

## H01Q

**AERIALS (microwave radiators for near-field therapeutic treatment [A61N 5/04](#); apparatus for testing aerials or for measuring aerial characteristics [G01R](#); waveguides [H01P](#); radiators or aerials for microwave heating [H05B 6/72](#))**

### Definition statement

*This subclass/group covers:*

an electrical conductor or array of conductors that radiates signal energy (transmitting) or collects signal energy (receiving); it's a transducer between a guided electromagnetic wave e.g. in a coaxial cable, waveguide, stripline and an electromagnetic wave in free space; the reciprocity relation is valid; the antenna is a passive linear reciprocal device That part of a transmitting or receiving system that is designed to radiate or to receive electromagnetic waves.

### Relationship between large subject matter areas

[H01P](#): Waveguides; Resonators; Lines, or other Devices of the Waveguide Type

[H01R](#): Line connectors; current collectors

[H03H](#): Impedance networks

[H03H 2/005](#): coupling circuits between transmission lines and antennas;

[H03H 7/38](#): impedance-matching networks

[H04B](#): Transmission

[H04B 1/3833](#): hand-held transceivers

[H04B 1/3838](#): with reducing RF exposure

[H04B 5/0018](#). near-field transmission using leaky cable

[H04B 7/02](#) and subgroups: diversity systems

[H04B 7/06](#): at transmitting station

[H04B 7/08](#): at receiving station

[H04B 7/14](#): Relay systems

[H04B 7/26](#): Capacity expanding techniques

[H04B 17/00](#) and subgroups: monitoring, testing

[H04Q](#): Selecting

[H04Q 7/36](#): Cells layout

[H04Q 7/3607](#): with adaptive channel assignment

[H04Q 7/3615](#): with steered beams

[H05K](#): Printed circuits; Casings or constructional details of electric apparatus; manufacture

[H05K 9/00](#): screening against electric or magnetic fields

[G01R](#): Measuring electric/magnetic variables

[G01R 29/10](#): radiation diagrams of antennas; antenna testing

[G01R 29/105](#): using anechoic chamber

[G02B](#): Optical elements

**[G02B6/12C2P](#)**: photonic crystals

[G01S](#): Radio direction-finding; radio navigation; determining distance or velocity; locating

[G01S 7/2813](#): modification of radiation pattern for cancelling noise or interfering signals

[G01S 7/40](#): means for calibrating or monitoring

[G06K](#): Recognition and presentation of data; record carriers; handling record carriers

[G06K 19/07749](#): transponder cards without electrical contacts

## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Microwave radiators for near-field therapeutic treatment	<a href="#">A61N 5/04</a>
Apparatus for testing aerials or for measuring aerial characteristics	<a href="#">G01R</a>
Waveguides	<a href="#">H01P</a>
Radiators or aerials for microwave heating	<a href="#">H05B 6/72</a>

## H01Q 1/00

Details of, or arrangements associated with, aerials  
(arrangements for varying orientation of directional pattern

[H01Q 3/00](#))

### Definition statement

*This subclass/group covers:*

Structural details or features of antennas not dependent on electric operation and applicable to more than one type of antenna. However, structural details or features described with reference to an antenna of a particular type are classified in the group or sub-group appropriate to that type. This implies that any class under [H01Q 1/00](#) should normally be accompanied by another class specifying the antenna type and/or working principle.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Arrangements for varying orientation of directional pattern	<a href="#">H01Q 3/00</a>
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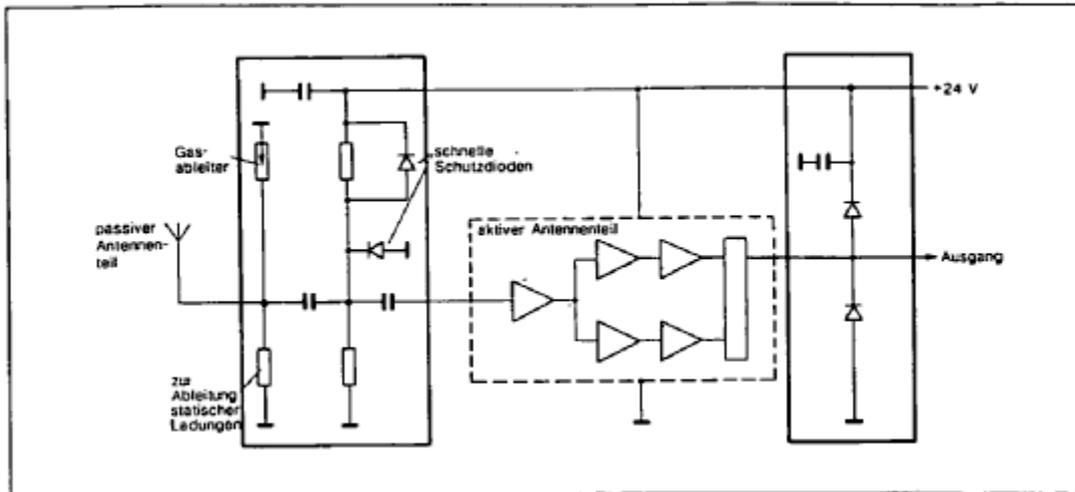
## H01Q 1/002

[N: Protection against seismic waves, thermal radiation or other disturbances, e.g. nuclear explosion; Arrangements for improving the power handling capability of an aerial (cooling [H01Q 1/02](#))]

### Definition statement

*This subclass/group covers:*

Power handling capability means efficiency. Also effects due to high-power use, e.g. multipaction, (passive) intermodulation, as far as it relates to antennas, are to be classified here.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling	<a href="#">H01Q 1/02</a>
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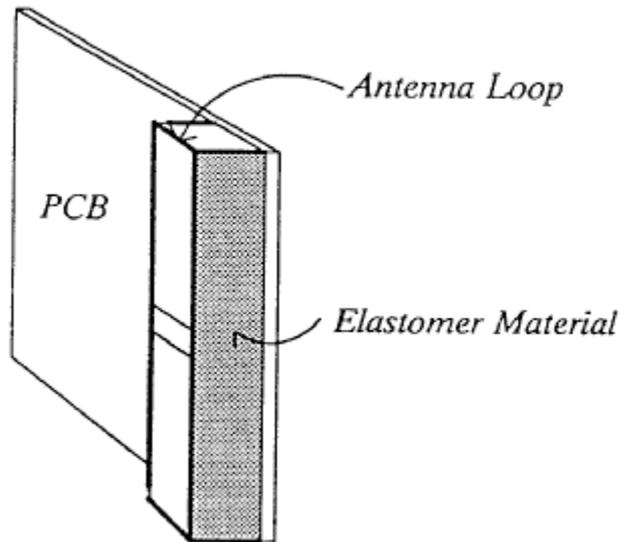
### H01Q 1/005

[N: Damping of vibrations; Means for reducing wind-induced forces (damping of vibrations in general [F16F](#))]

### Definition statement

*This subclass/group covers:*

Also covered by this group: reduction of mechanical deformations of an antenna, mast, etc.



### **Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Damping of vibrations in general	<a href="#">F16F</a>
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### **H01Q 1/007**

**[N: specially adapted for indoor communication]**

### **Definition statement**

*This subclass/group covers:*

Indoor coverage with distributed antennas. 'Indoor' is to be interpreted in a broad sense, e.g. inside an airplane, room, building.

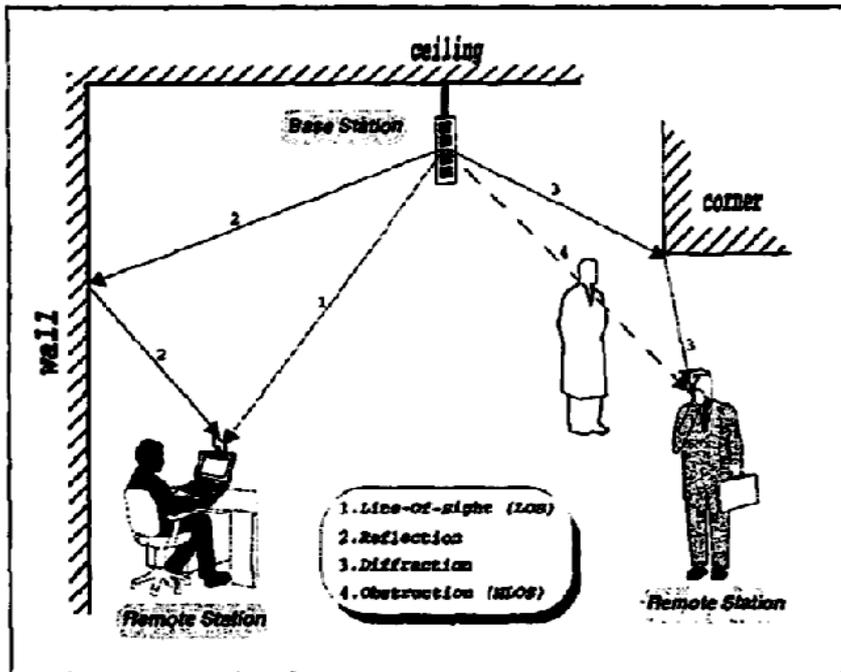


Figure 1. Sketch of important indoor propagation phenomenon.

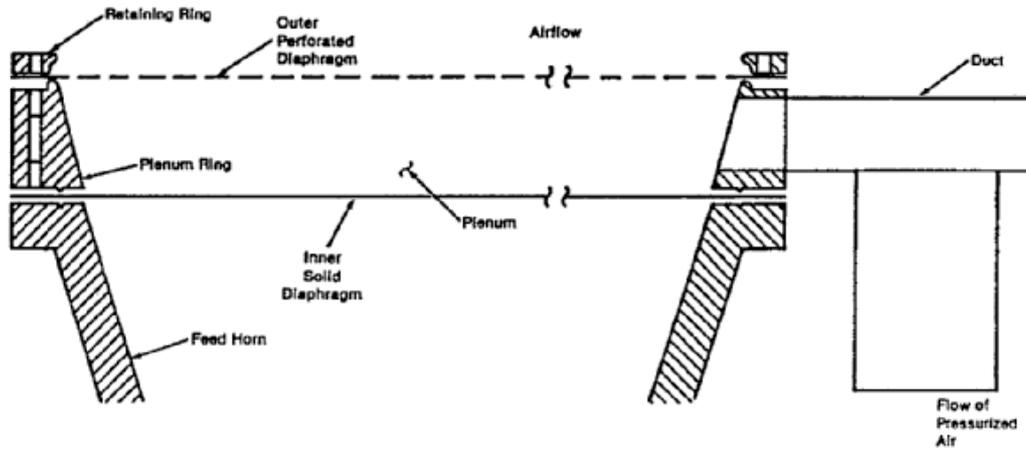
## H01Q 1/02

Arrangements for de-icing; Arrangements for drying-out; [N: Arrangements for cooling; Arrangements for preventing corrosion (radomes [H01Q 1/42](#))]

### Definition statement

*This subclass/group covers:*

Heating for removing snow or ice, for example used to blow droplets of water of the radome of a horn radiator in an earth station antenna. Cooling of T/R modules (see also [H01Q 21/0025](#) Modular arrays).



The **Double-Diaphragm Radome** includes a solid diaphragm at the mouth of a feed horn surmounted by a perforated diaphragm. Pressurized air in the plenum between the diaphragms flows out through the perforations.

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Radomes	<a href="#">H01Q 1/42</a>
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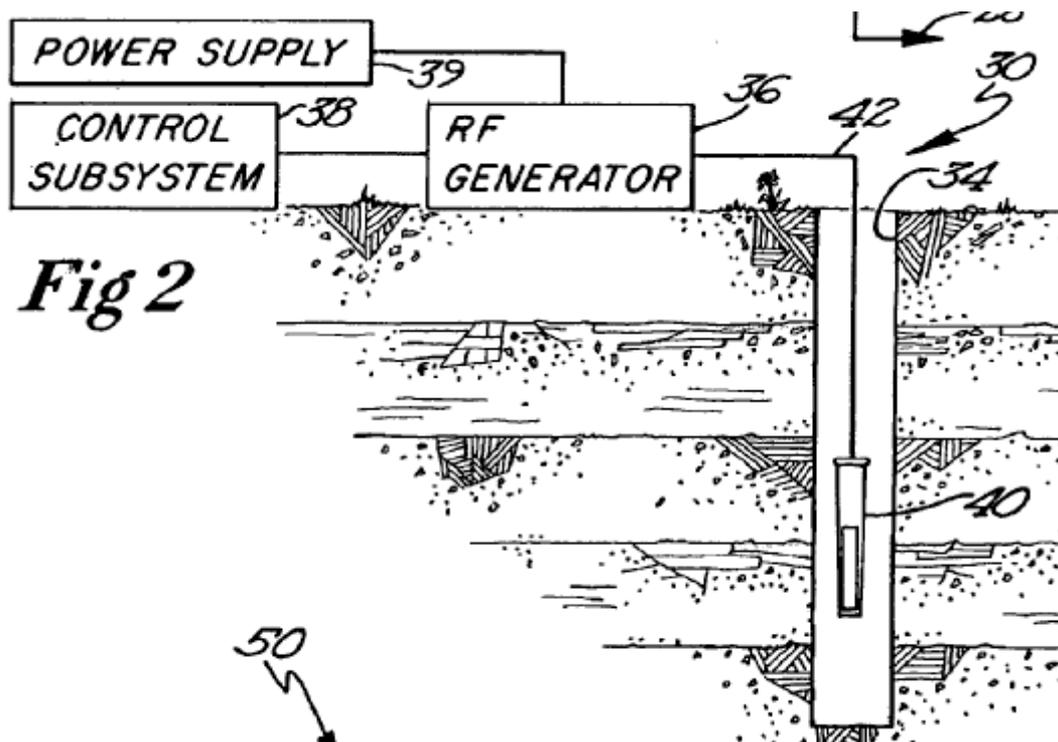
## H01Q 1/04

**Adaptation for subterranean or subaqueous use**

### Definition statement

*This subclass/group covers:*

In a borehole, tunnel, underground or underwater.



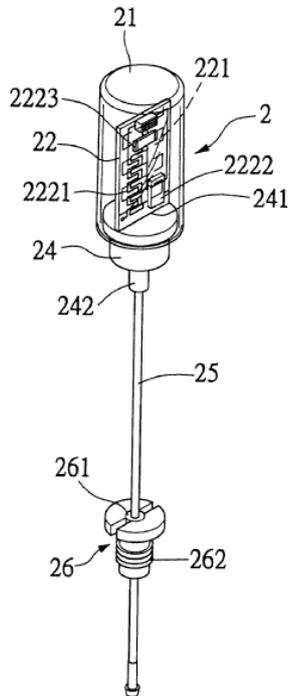
## H01Q 1/06

Means for the lighting or illuminating of aerials, e.g. for purpose of warning

### Definition statement

*This subclass/group covers:*

Originally used for lamps on masts; now also used for a LED on an antenna of a mobile phone. See the class **F21Q3/00F** as lighting devices for signalling; lamps on antennas or powerlines; antenna markers.



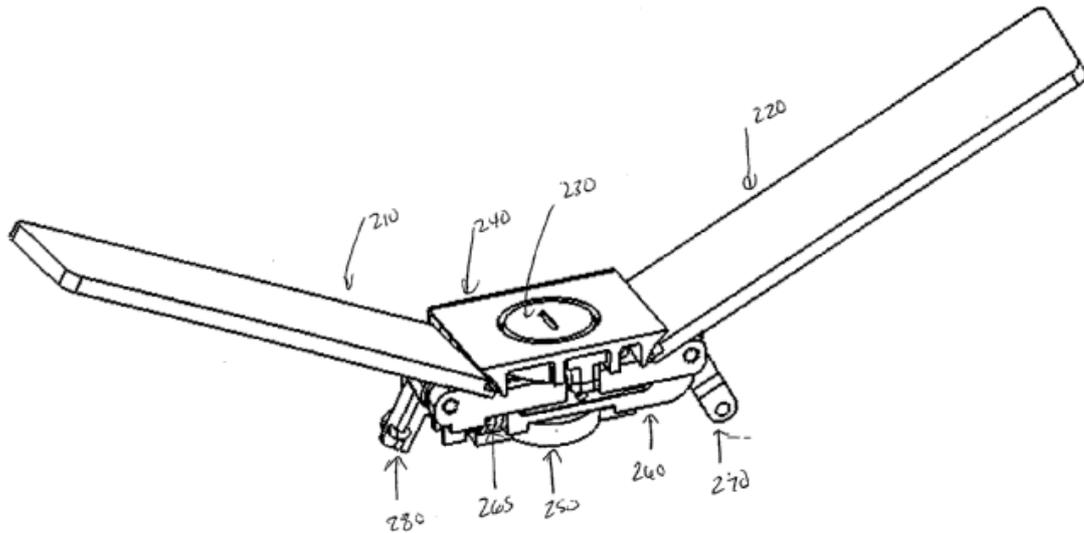
## H01Q 1/08

Means for collapsing aerials or parts thereof; [N: Collapsible aerials] ([N: collapsible supports [H01Q 1/1235](#)]; collapsible loop aerials [H01Q 7/02](#); [N: collapsible helical aerials [H01Q 11/086](#); collapsible reflecting surfaces [H01Q 15/161](#), [H01Q 15/20](#)]; collapsible H-aerials or Yagi aerials [H01Q 19/04](#))

### Definition statement

*This subclass/group covers:*

For example:



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Collapsible supports	<a href="#">H01Q 1/1235</a>
Collapsible loop aerials	<a href="#">H01Q 7/02</a>
Collapsible helical aerials	<a href="#">H01Q 11/086</a>
Collapsible reflecting surfaces	<a href="#">H01Q 15/161</a> , <a href="#">H01Q 15/20</a>
Collapsible H-aerials or Yagi aerials	<a href="#">H01Q 19/04</a>

## Special rules of classification within this group

Not used for the extractable antennas as used on mobile phones, nor for the clamm-shell phones with integrated antennas.

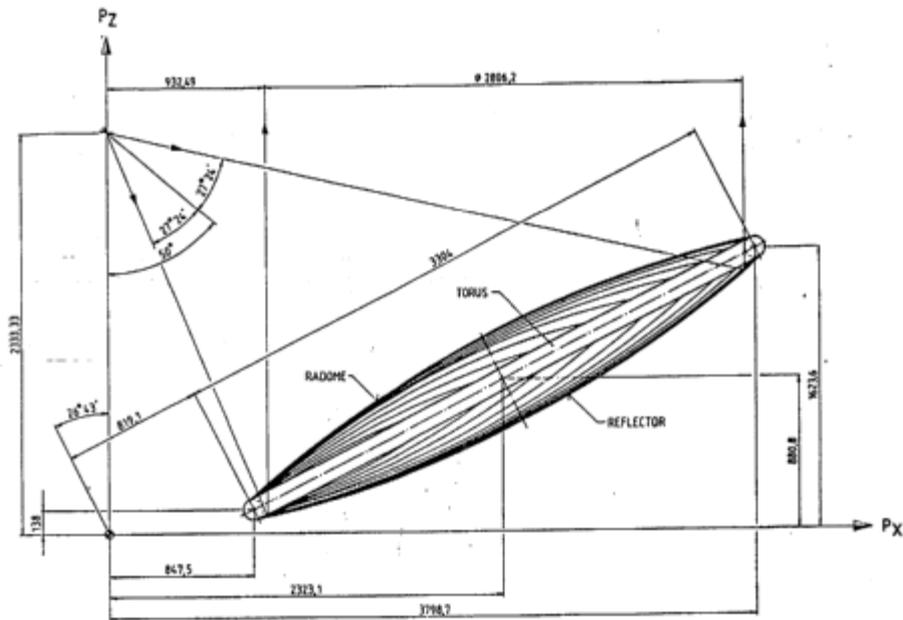
### H01Q 1/081

[N: Inflatable antennas]

#### Definition statement

*This subclass/group covers:*

For example:



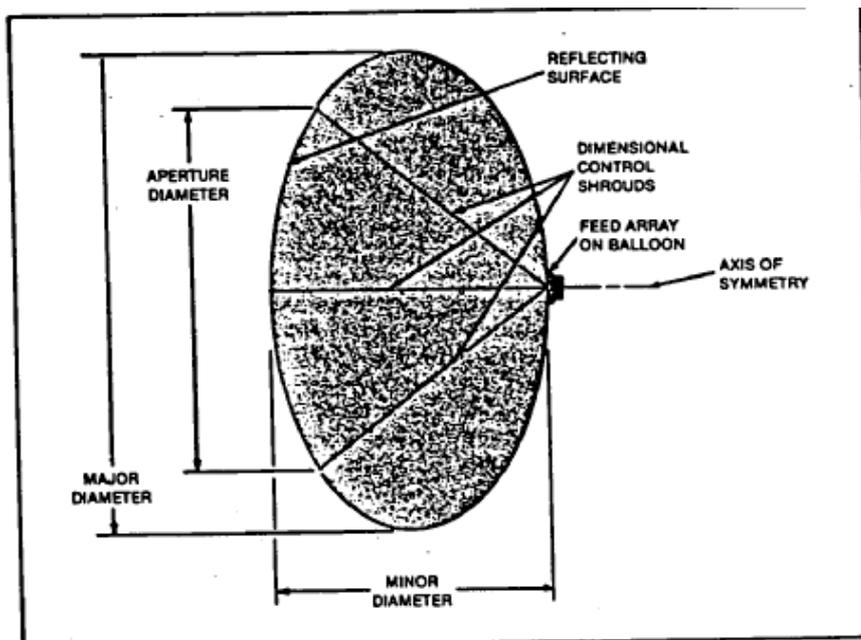
## H01Q 1/082

[N: Balloon antennas (balloon supported antennas [H01Q 1/1292](#))]

### Definition statement

*This subclass/group covers:*

For example:



Ellipsoidal Balloon Antenna has its feedpoint on the surface of the ellipsoid outside the balloon, simplifying balloon deployment and feed support. Dielectric shrouds may be used locally to adjust the shape of the balloon and to maintain the feed distance at its optimum value.

## Informative references

Attention is drawn to the following places, which may be of interest for search:

Balloon supported antennas	<a href="#">H01Q 1/1292</a>
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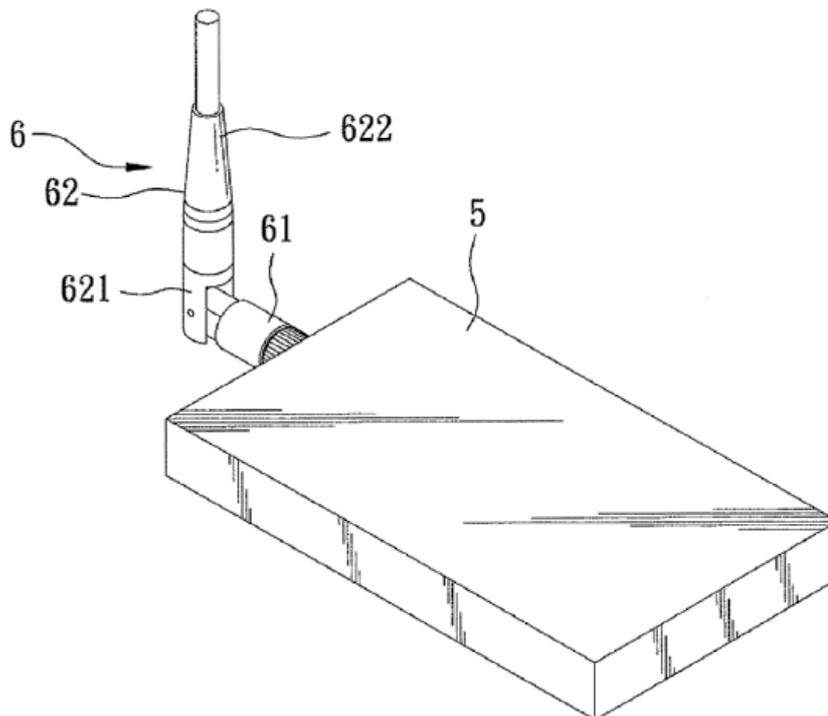
## H01Q 1/084

[N: Pivotal antennas (mechanical movement of aerial or aerial system for changing or varying the orientation or the shape of the directional pattern [H01Q 3/02](#); adjustment of angle between two radiating elements [H01Q 9/12](#))]

## Definition statement

*This subclass/group covers:*

Using (normally) a hinge.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Mechanical movement of aerial or aerial system for changing or varying the orientation or the shape of the directional pattern	<a href="#">H01Q 3/02</a>
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Adjustment of angle between two radiating elements	<a href="#">H01Q 9/12</a>
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## H01Q 1/085

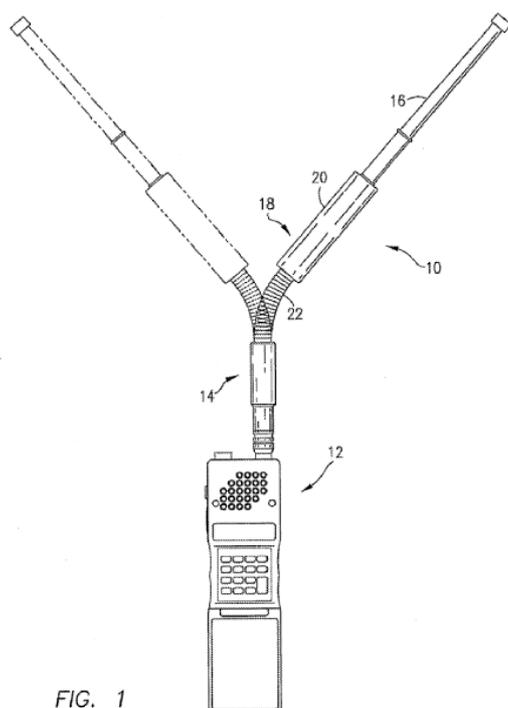
[N: Flexible aerials; Whip aerials with a resilient base]

### Definition statement

*This subclass/group covers:*

For example:

Traditional whip antenna with a mounting coil for a vehicle, rubber duck antenna (monopole coil wrapped in rubber cover).



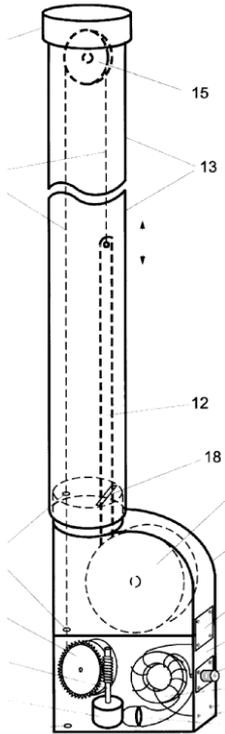
## H01Q 1/087

[N: Extensible roll- up aerials]

### Definition statement

*This subclass/group covers:*

Tape measure used as an antenna with variable length; antennas used on a vehicle that can be (electrically) extended by means of a tape-measure like conductor, push-pull wire, etc.



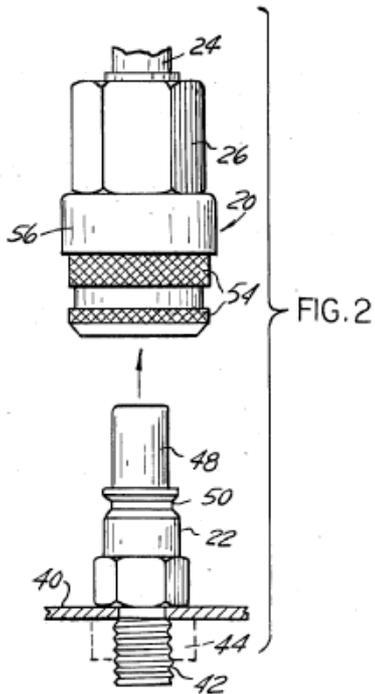
## H01Q 1/088

[N: Quick-releasable antenna elements]

### Definition statement

*This subclass/group covers:*

For example:



## Informative references

Attention is drawn to the following places, which may be of interest for search:

The stud, pin or spigot having two resilient parts on its opposite ends in order to connect two element	<a href="#">F16B 21/08</a>
Using clamps or clips	<a href="#">F16B 9/023</a>

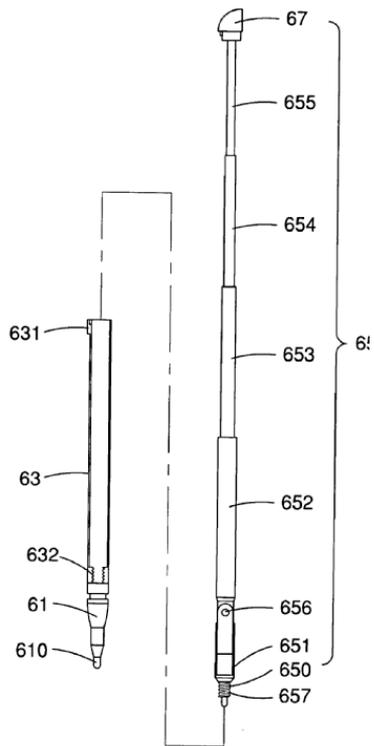
## H01Q 1/10

### Telescopic elements

#### Definition statement

*This subclass/group covers:*

Thin hollow metallic tubes/pipes that can be pushed into one another; telescoping tubing (former active group for telescopic car or mobile antennas).



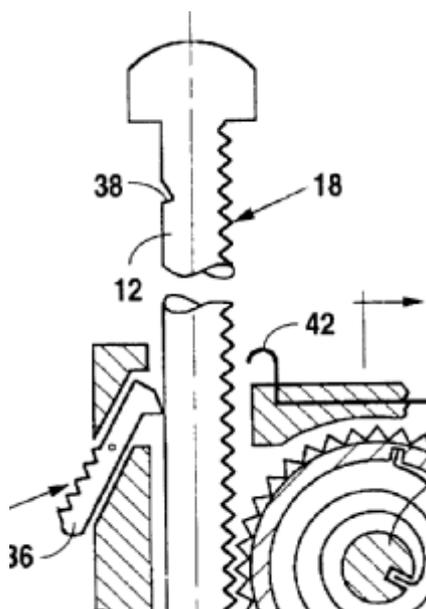
## H01Q 1/103

[N: Latching means; ensuring extension or retraction thereof]

### Definition statement

*This subclass/group covers:*

Extension/retraction by motor; BNC/bajonet type of releasable connecting arrangements.



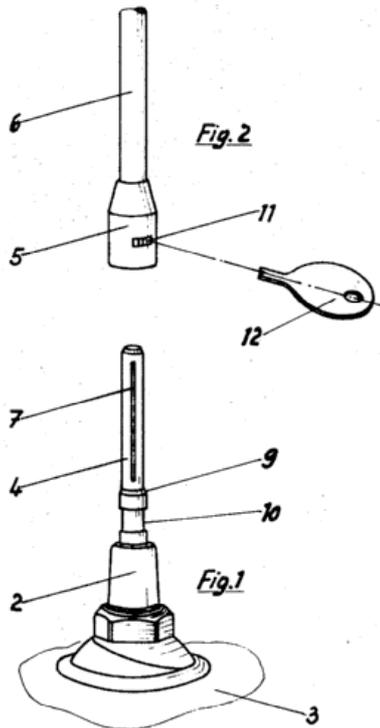
## H01Q 1/106

[N: Means for locking or protecting against unauthorized extraction]

### Definition statement

*This subclass/group covers:*

For example:



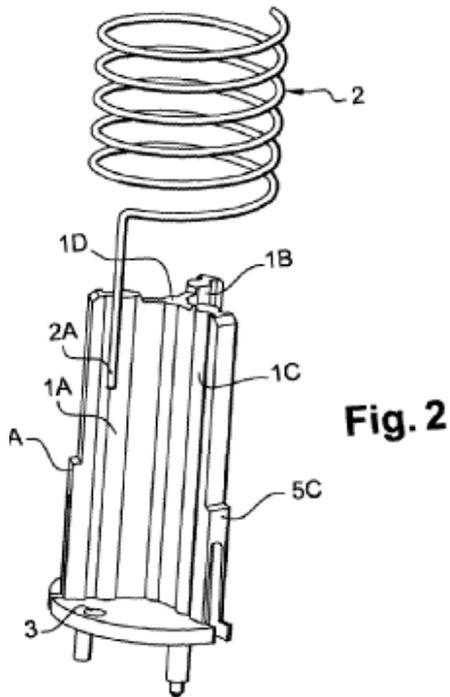
## H01Q 1/12

Supports; Mounting means ([N: for the purpose of scanning [H01Q 3/00](#); mounting structure for reflecting surfaces [H01Q 15/14](#); Towers, masts, or poles [E04H 12/00](#)]; supporting conductors in general [H02G 7/00](#))

### Definition statement

*This subclass/group covers:*

Any support related to an antenna; lower groups have turned into mobile telecoms usage.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

For the purpose of scanning	<a href="#">H01Q 3/00</a>
Mounting structure for reflecting surfaces	<a href="#">H01Q 15/14</a>
Towers, masts, or poles	<a href="#">E04H 12/00</a>
Supporting conductors in general	<a href="#">H02G 7/00</a>

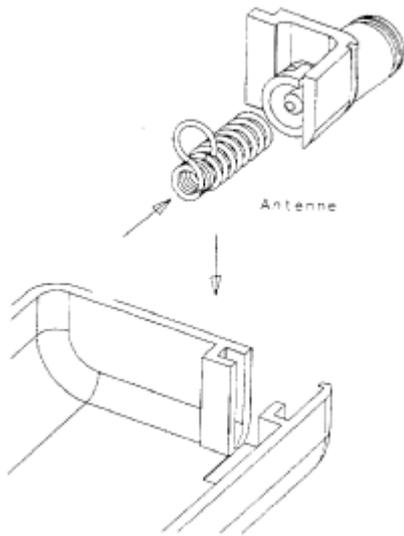
### H01Q 1/1207

[N: for fastening a rigid aerial element]

### Definition statement

*This subclass/group covers:*

Details of coupling fastening devices by engagement/disengagement.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of coupling devices operated by engagement or disengagement of coupling parts	<a href="#">H01R 13/703</a>
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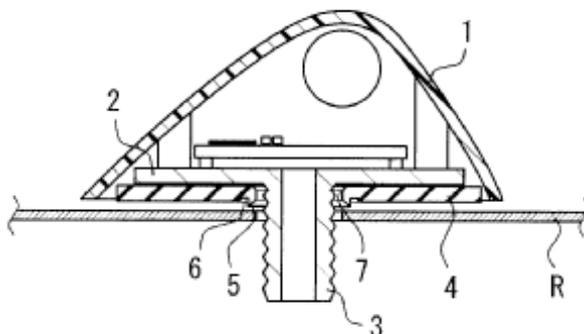
### H01Q 1/1214

[N: through a wall]

### Definition statement

*This subclass/group covers:*

For example: through the vehicle body of automobiles. Mounting through the roof of another object, e.g. vehicle, house, housing.



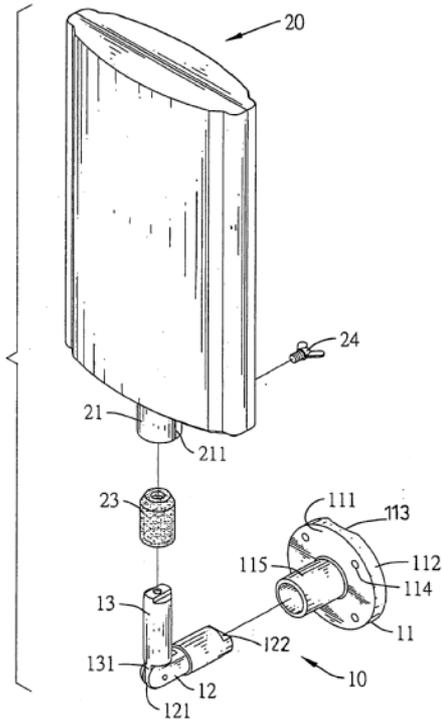
## H01Q 1/1221

[N: onto a wall]

### Definition statement

*This subclass/group covers:*

Wall mounted, also onto house roofs or tile roofs. If the wall is penetrated, it should be classified in [H01Q 1/1214](#).



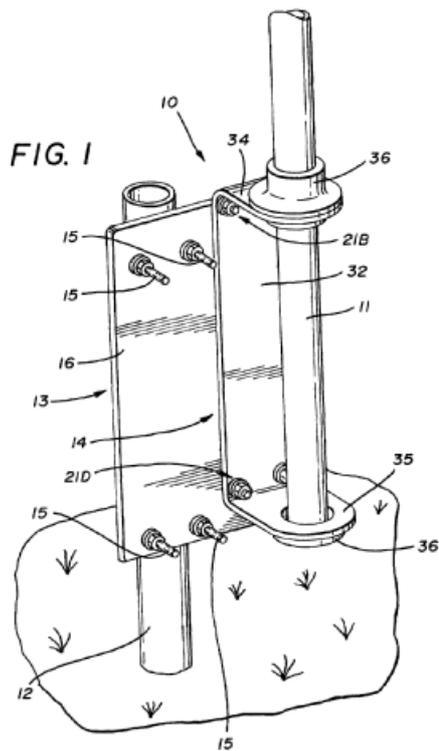
## H01Q 1/1228

[N: on a boom (coupling of tubular pipes [F16B 7/04](#))]

### Definition statement

*This subclass/group covers:*

Boom is to be interpreted as a supporting tubular pipe; cross-section of this pipe can be circular, rectangular, etc.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Coupling of tubular pipes	<a href="#">F16B 7/04</a>
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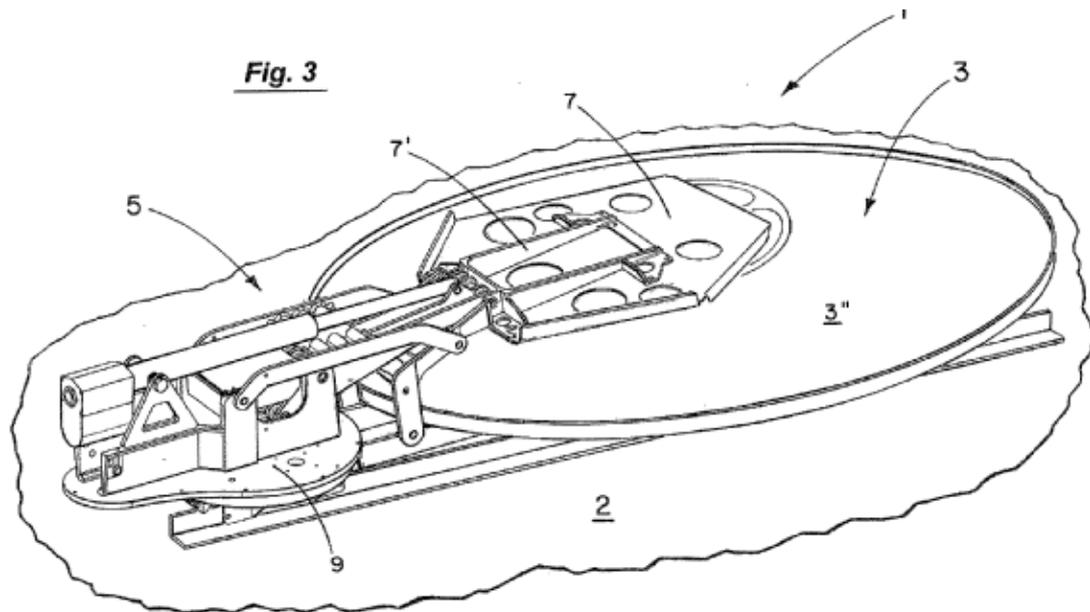
### H01Q 1/1235

[N: Collapsible supports; Means for erecting a rigid antenna]

### Definition statement

*This subclass/group covers:*

Tripods; vehicles for telescopic masts.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Where the road or rail vehicle is only used as transportation means	<a href="#">H01Q 1/3216</a>
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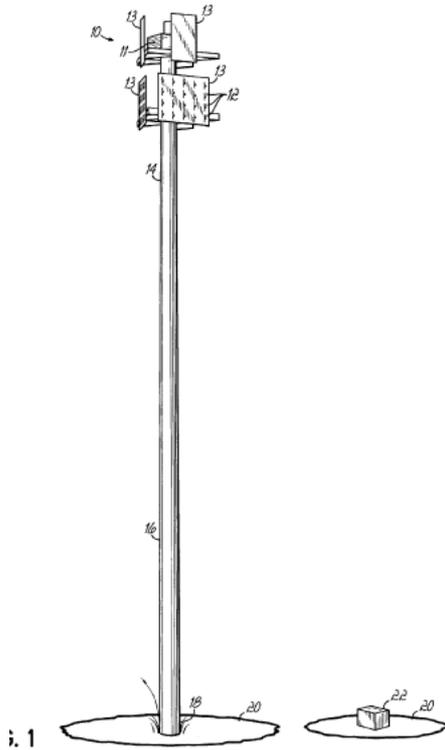
### H01Q 1/1242

[N: Rigid masts specially adapted for supporting an aerial]

### Definition statement

*This subclass/group covers:*

Tower, mast, pylon, pole, post: a self-supporting mast as lattice, or a concrete mast or guyed mast with guy cables for anchoring.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Structures made of specified materials, of metal	<a href="#">E04H 12/08</a>
Pre-stressed structures	<a href="#">E04H 12/16</a>

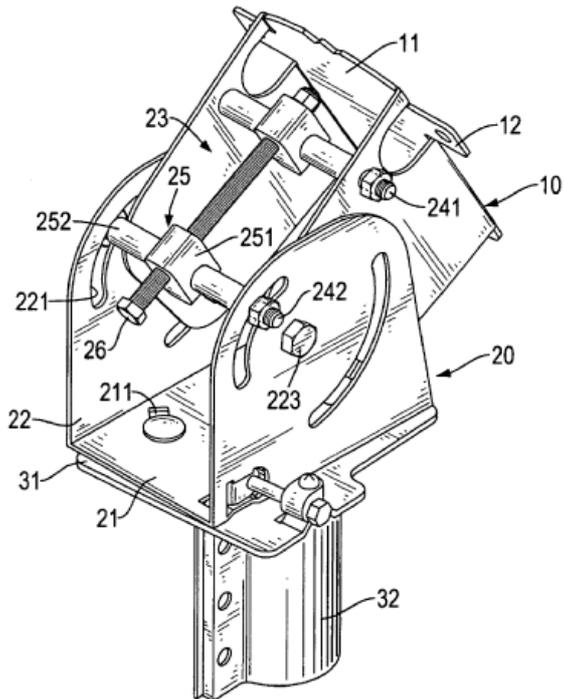
## H01Q 1/125

[N: Means for positioning (stabilising [H01Q 1/18](#); remotely controlled positioning [H01Q 3/005](#))]

### Definition statement

*This subclass/group covers:*

Antenna aiming; pointing the antenna to a fixed target by mechanical movement; sometimes also called tracking, i.e. means motion given to the major lobe of an antenna with the intention that a selected moving target, e.g. satellite, be contained within the major lobe. Collimation means adjusting accurately the line of sight, 'making parallel' However, scanning (a repetitive motion given to the major lobe of an antenna) in [H01Q 3/10](#).



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Stabilising	<a href="#">H01Q 1/18</a>
Remotely controlled positioning	<a href="#">H01Q 3/005</a>

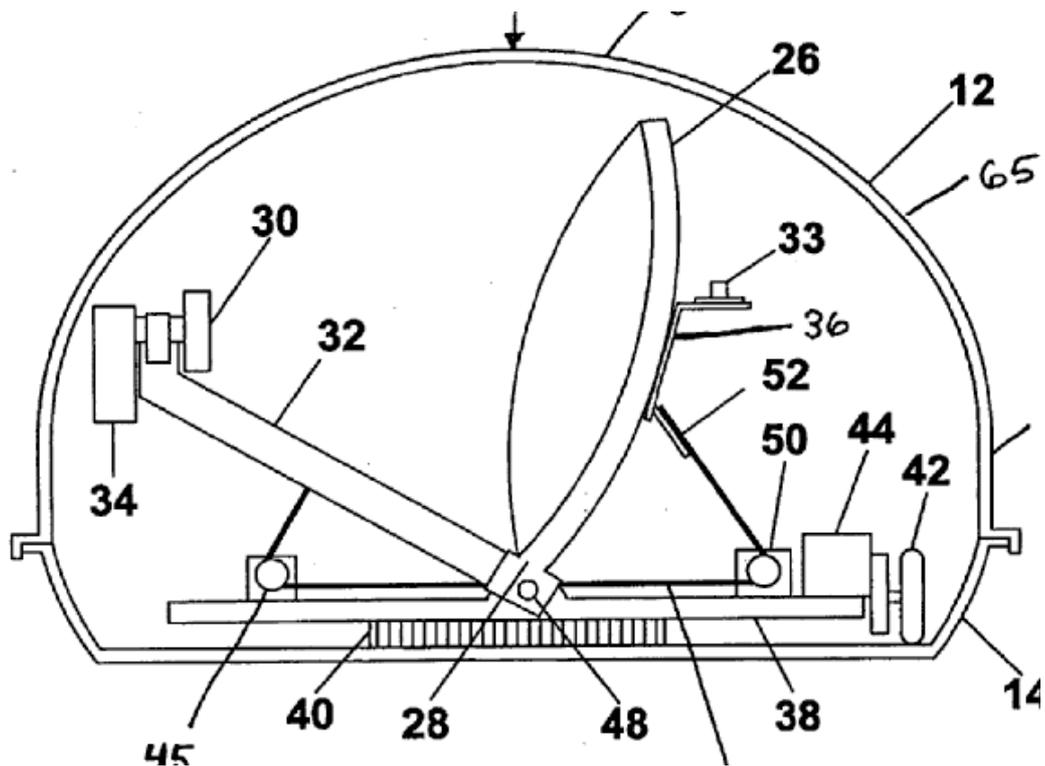
## H01Q 1/1257

[N: using the received signal strength (direction finding [G01S 3/38](#); diversity [H04B 7/10](#))]

## Definition statement

*This subclass/group covers:*

The strength of the received signal is monitored, as used as a parameter for steering the positioning means; normally feed back processing is used.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Direction finding	<a href="#">G01S 3/38</a>
Diversity	<a href="#">H04B 7/10</a>

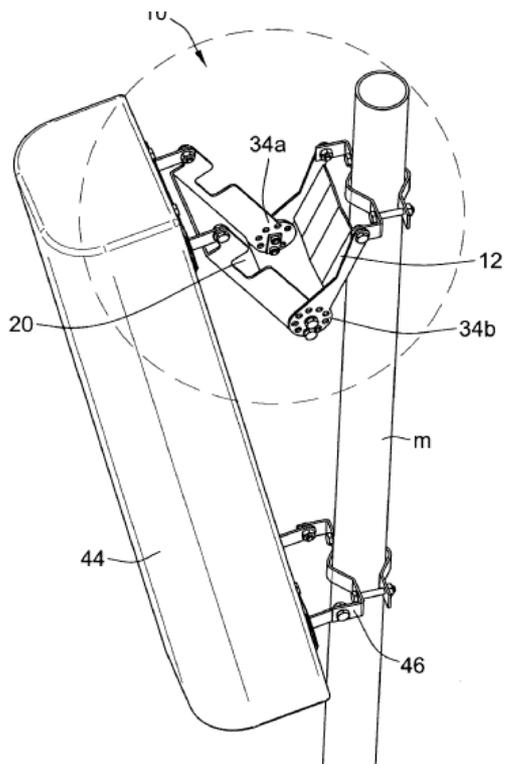
### H01Q 1/1264

[N: Adjusting different parts or elements of an aerial unit]

### Definition statement

*This subclass/group covers:*

Not frequently used; large overlap with the classes [H01Q 3/02](#) and groups thereunder.



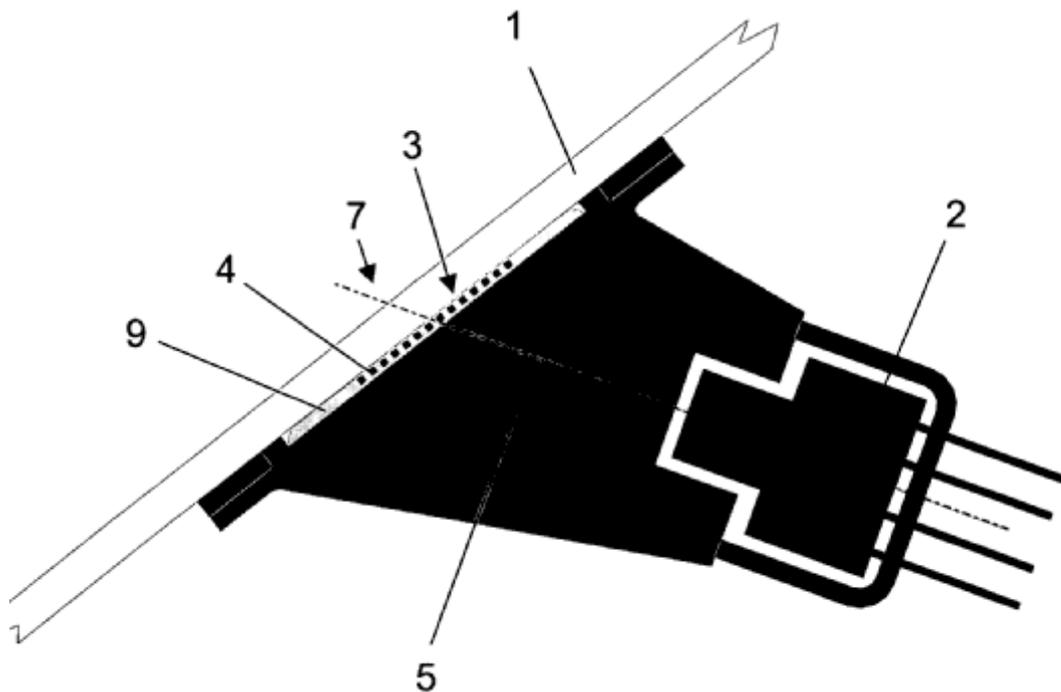
## H01Q 1/1271

[N: for mounting on windscreens]

### Definition statement

*This subclass/group covers:*

Glass antenna; window-; window pane-; on-vehicle glass antenna.



## Special rules of classification within this group

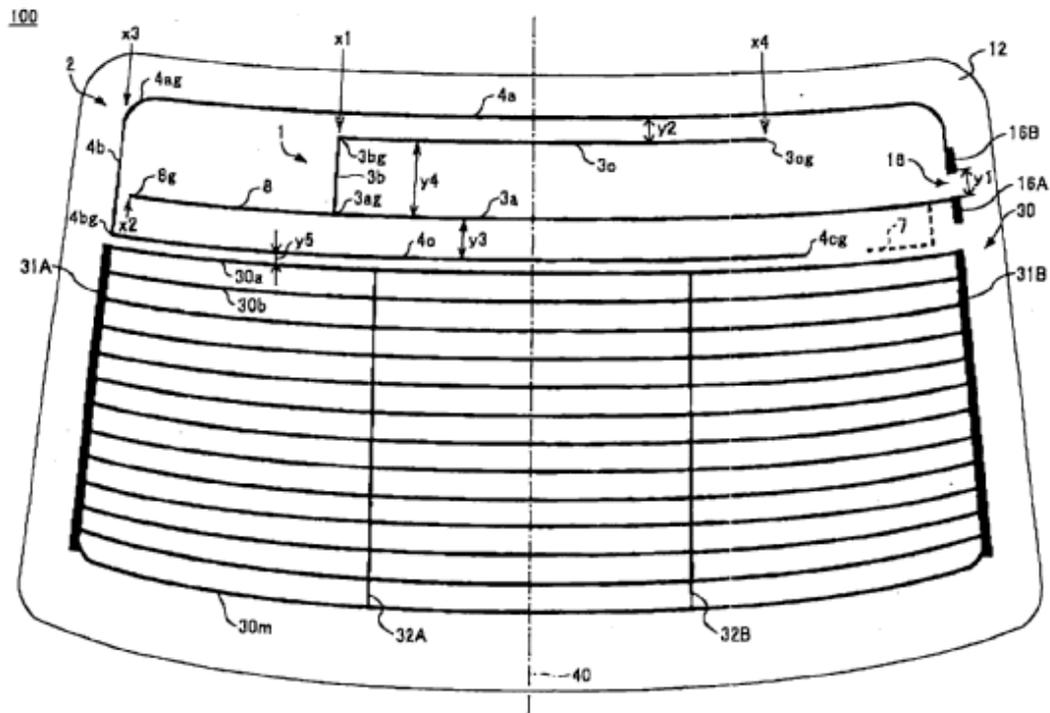
US class: 343/713. It appears these kind of applications are classified by the JPO under [H01Q 1/32](#).

## H01Q 1/1278

[N: in association with heating wires or layers]

### Definition statement

*This subclass/group covers:*



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Heating arrangements specially adapted for transparent or reflecting areas, e.g. for demisting or de-icing windows, mirrors or vehicle windshields	<a href="#">H05B 3/84</a>
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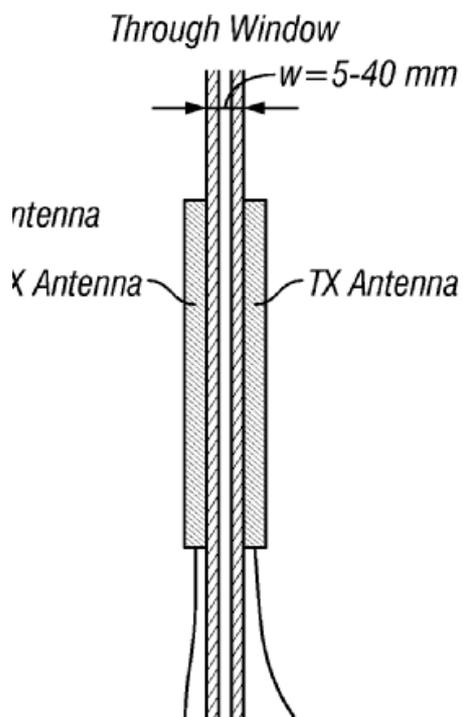
## H01Q 1/1285

[N: with capacitive feeding through the windscreen]

## Definition statement

*This subclass/group covers:*

Can be capacitive feeding through the complete glass layer, or partly through the glass layer, e.g. from within the layer to one outside thereof.



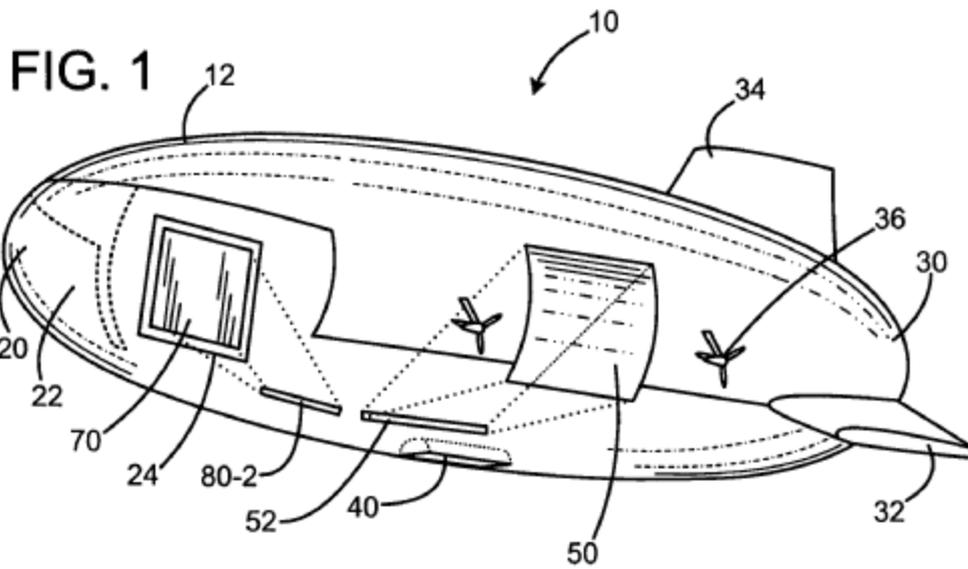
## H01Q 1/1292

[N: for mounting on balloons]

## Definition statement

*This subclass/group covers:*

Not frequently used; overlap with [H01Q 1/082](#): the distinction is that in this class the balloon is only the support, whereas in [H01Q 1/082](#) the balloon is the antenna.



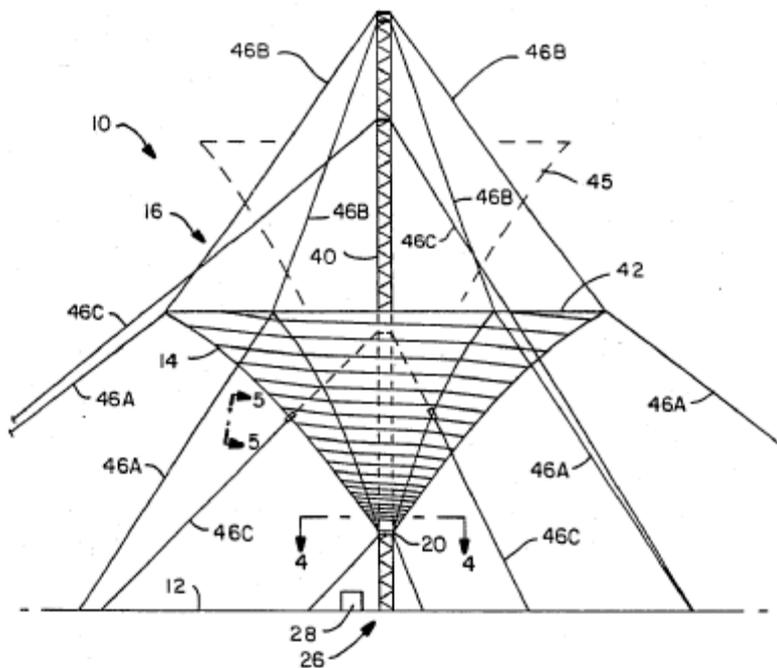
## H01Q 1/14

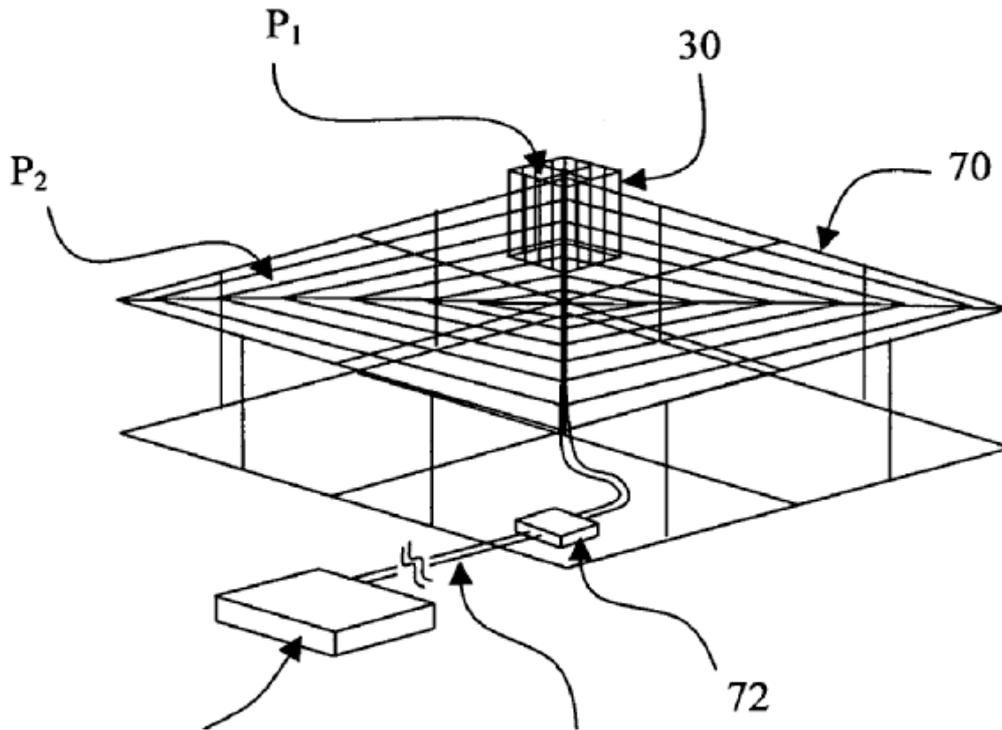
for wire or other non-rigid radiating elements

### Definition statement

*This subclass/group covers:*

Mechanical details for the so-called curtain antennas used in HF broadcast.





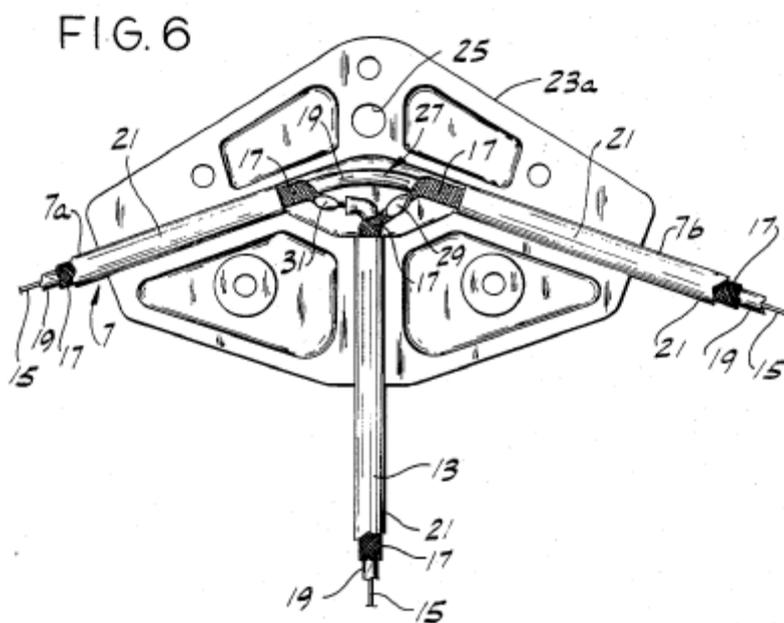
**H01Q 1/16**

**Strainers, spreaders, or spacers**

**Definition statement**

*This subclass/group covers:*

For example:



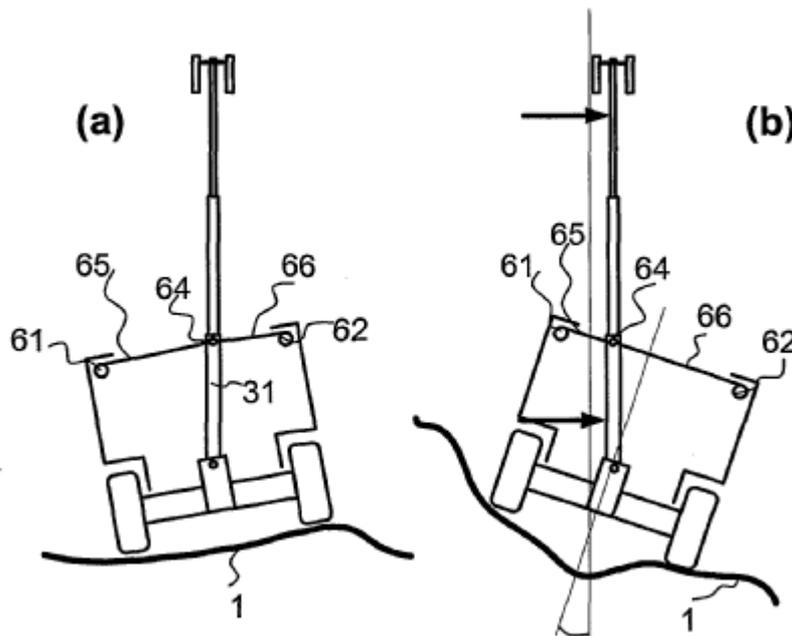
## H01Q 1/18

Means for stabilising aerials on an unstable platform [N: (reducing wind-induced forces [H01Q 1/005](#))]

### Definition statement

*This subclass/group covers:*

The unstable platform can be a ship, or a tower which is bending due to wind forces. Often a gimbal is used.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Reducing wind-induced forces	<a href="#">H01Q 1/005</a>
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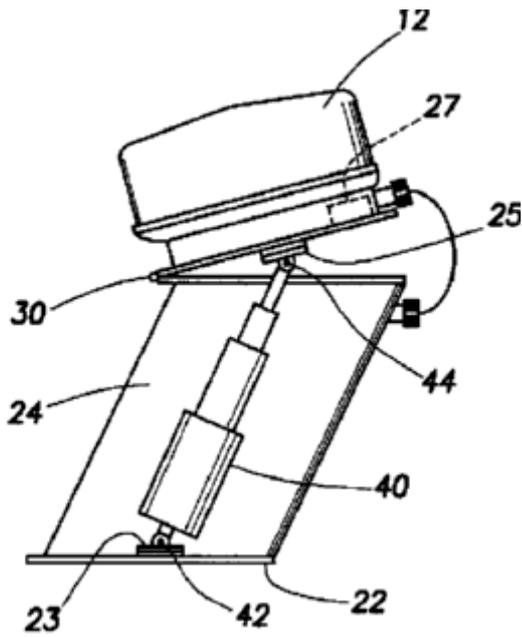
## H01Q 1/185

[N: by electronic means (electronic scanning [H01Q 3/26](#))]

### Definition statement

*This subclass/group covers:*

Any depointing due to the moving platform is corrected for using electronic means.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Electronic scanning	<a href="#">H01Q 3/26</a>
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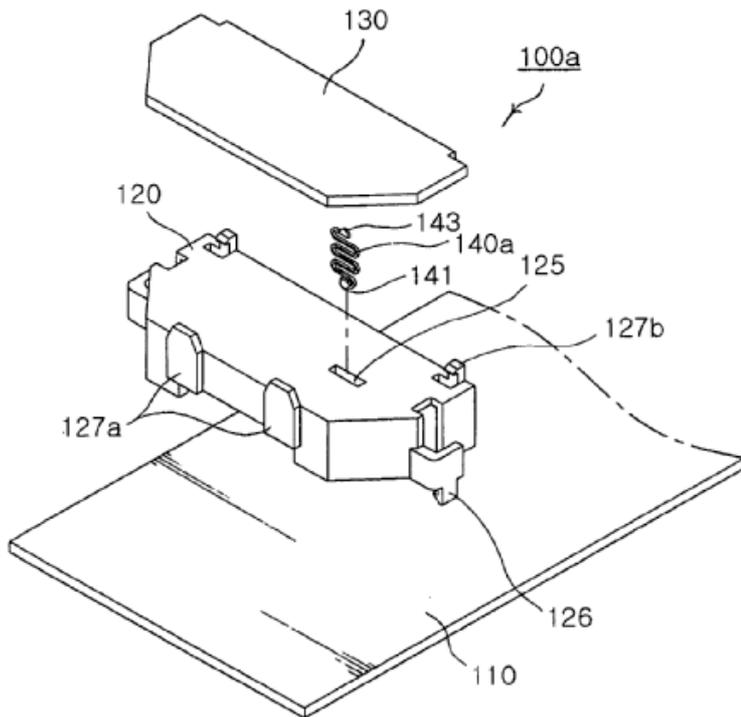
## H01Q 1/20

### Resilient mountings

#### Definition statement

*This subclass/group covers:*

Mechanical details of fixtures; normally used in conjunction with a monopole-like radiator (stems from old car-antennas with a resilient base, e.g. coil).



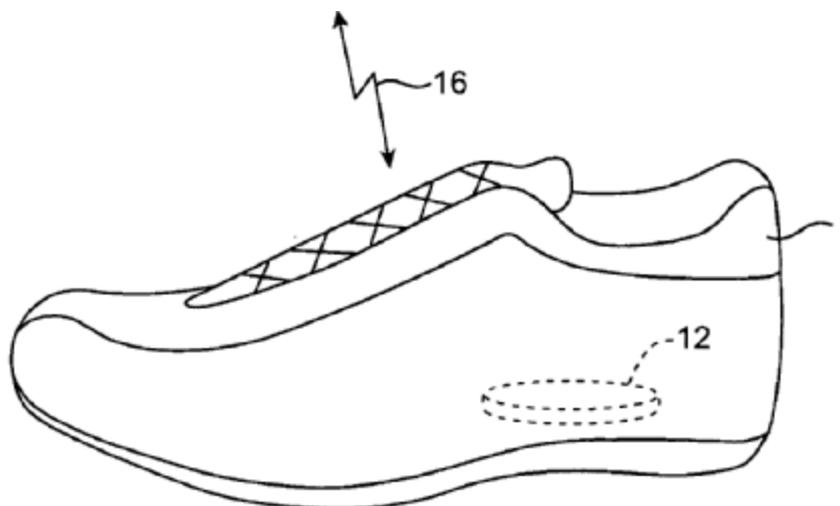
## H01Q 1/22

by structural association with other equipment or articles [N: (portable transceivers [H04B 1/3827](#))]

### Definition statement

*This subclass/group covers:*

The antenna or antennas are mounted on something else; this something else is an item with a dedicated use: integration aspects of the antenna and the item.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Portable transceivers	<a href="#">H04B 1/3827</a>
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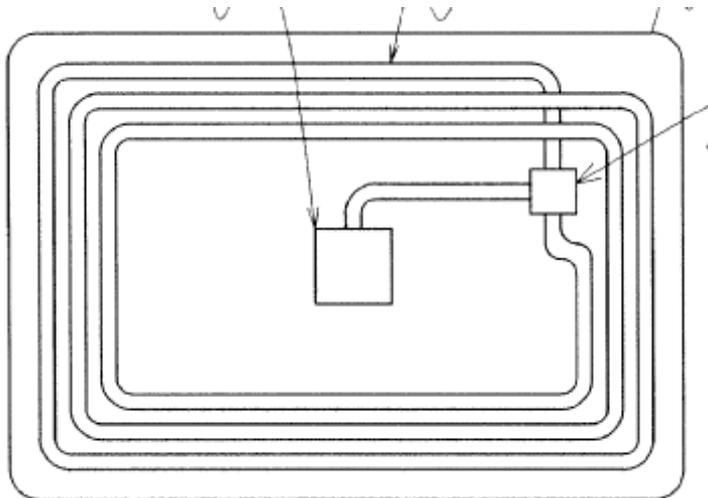
## H01Q 1/2208

[N: associated with components used in interrogation type services, i.e. in systems for information exchange between an interrogator/reader and a tag/transponder, e.g. in Radio Frequency Identification (RFID) systems ([G06K 7/00](#) and [G06K 19/00](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Antennas for a system of interrogator / reader which sends an unique identification (ID) to a tag which receives and sends back its stored information.



### References relevant to classification in this group

*This subclass/group does not cover:*

Record carrier for use with machines and with at least a part designed to carry digital markings	<a href="#">G06K 19/00</a>
Methods or arrangements for sensing record carriers, [N: e.g. for reading patterns]	<a href="#">G06K 7/00</a>

---

## H01Q 1/2216

**[N: used in interrogator/reader equipment]**

### **Definition statement**

*This subclass/group covers:*

Antennas for interrogation reader (stationary, portable or hand-held) depending on operating frequency such as e.g. loop or dipole antennas; also multi-frequency, multiple antennas; antenna arrays.

### **Special rules of classification within this group**

This class is normally accompanied with a class relating to the antenna type, e.g. slot, dipole, coil, etc.

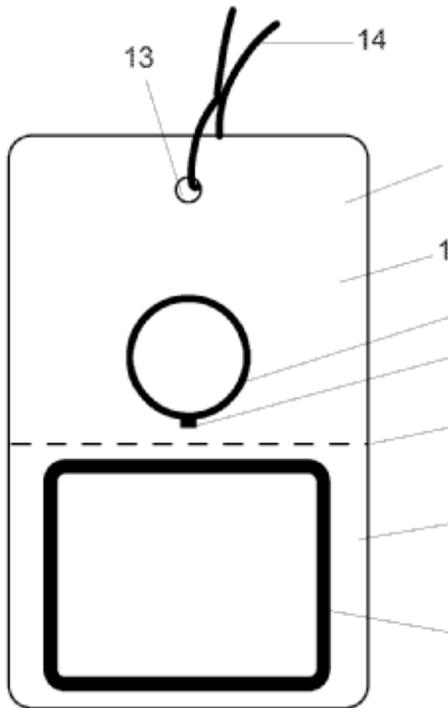
## H01Q 1/2225

**[N: used in active tags, i.e. provided with its own power source or in passive tags, i.e. deriving power from RF signal]**

### **Definition statement**

*This subclass/group covers:*

Antenna types depending on operating frequencies. Inductively coupled as multilayer coils, wrapped around ferrite cores, or radiatively coupled as dipoles, folded dipoles/monopoles, short loops, bow-tie, patch antennas



### Special rules of classification within this group

This class is normally accompanied with a class relating to the antenna type, e.g. slot, dipole, coil, etc.

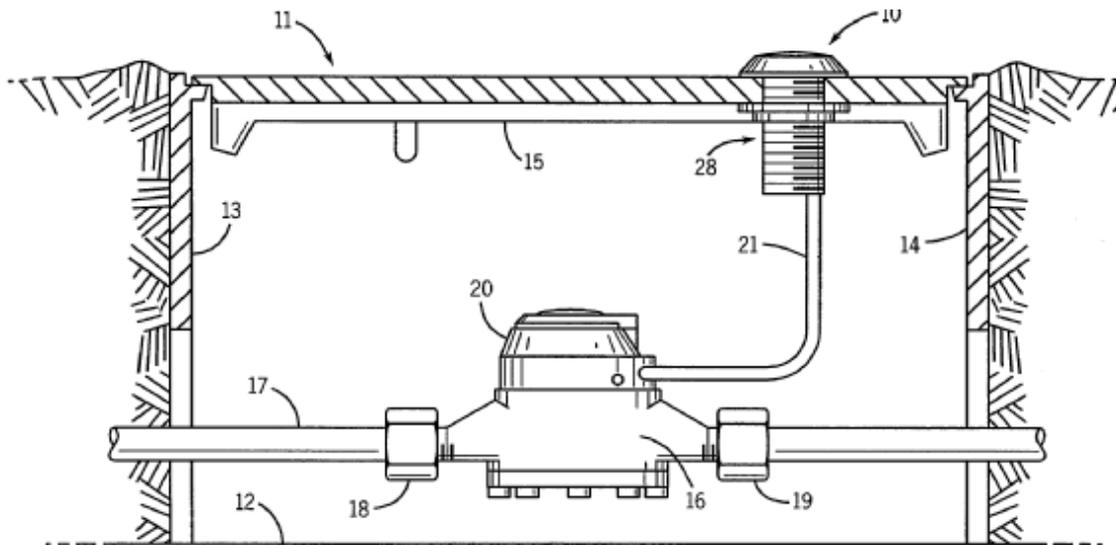
### H01Q 1/2233

[N: used in consumption-meter devices, e.g. electricity, gas or water meters (remote reading of utility meters [G01D 4/002](#); transmission of measured values using a radio link in general [G08C 17/02](#))]

### Definition statement

*This subclass/group covers:*

For example:



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Remote reading of utility meters	<a href="#">G01D 4/002</a>
Transmission of measured values using a radio link in general	<a href="#">G08C 17/02</a>

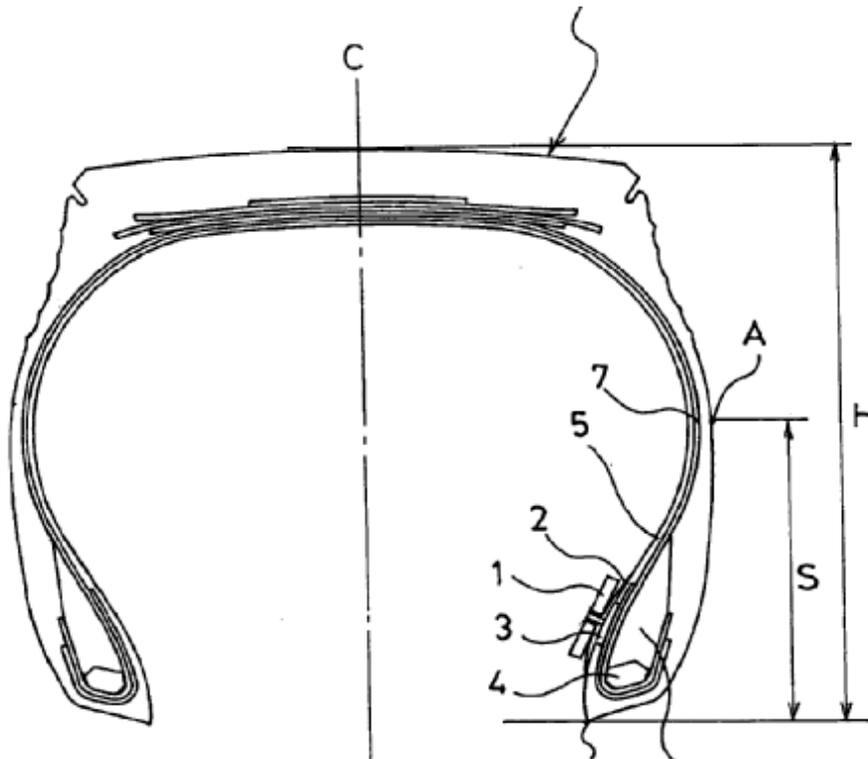
### H01Q 1/2241

[N: used in or for vehicle tyres (tyres in general [B60C 3/04](#))]

### Definition statement

*This subclass/group covers:*

For monitoring pressure, wear, etc.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Tyres in general	<a href="#">B60C 3/04</a>
------------------	---------------------------

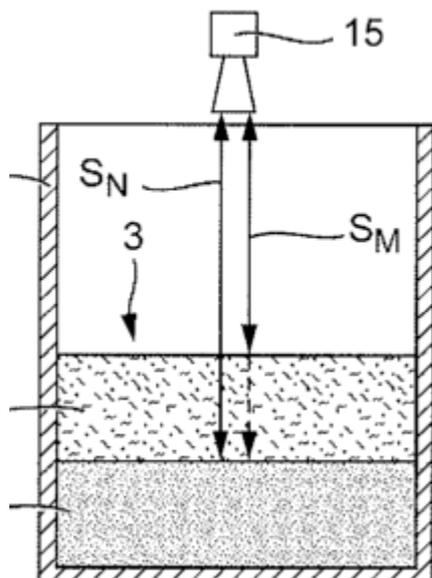
### H01Q 1/225

[N: used in level-measurement devices, e.g. for level gauge measurement (level measuring with electromagnetic waves in general [G01F 23/284](#))]

### Definition statement

*This subclass/group covers:*

Normally a radar principle including time-of-flight is used to determine the distance between the radiating antenna the liquid or other material inside a container. This is to be used for details on the radiating antenna, not on other aspects to the measurement system (see [G01F 23/284](#)).



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Level measuring with electromagnetic waves in general	<a href="#">G01F 23/284</a>
---	-----------------------------

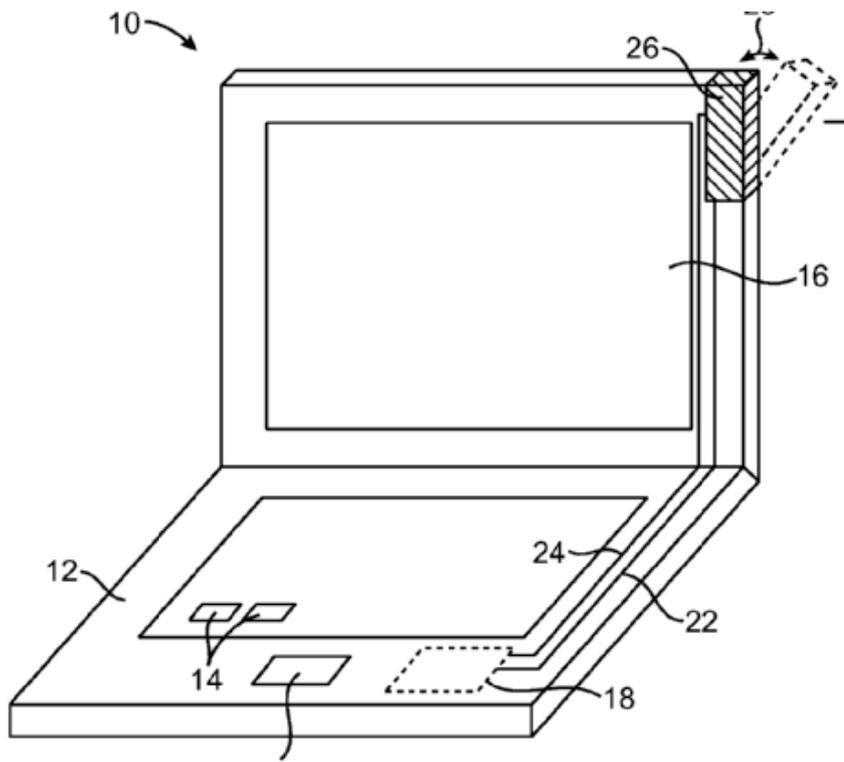
### H01Q 1/2258

[N: used with computer equipment]

### Definition statement

*This subclass/group covers:*

Antennas for computer equipment as laptops, notebooks, pdas, tablets, desktops or workstations.



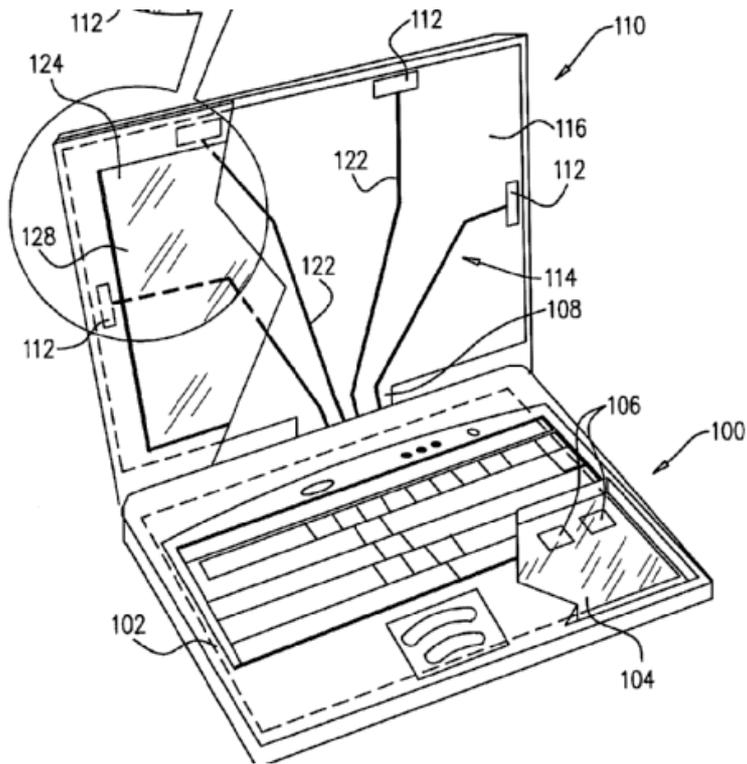
## H01Q 1/2266

[N: disposed inside the computer]

### Definition statement

*This subclass/group covers:*

Also antennas mounted in(side) a hinge are considered here.



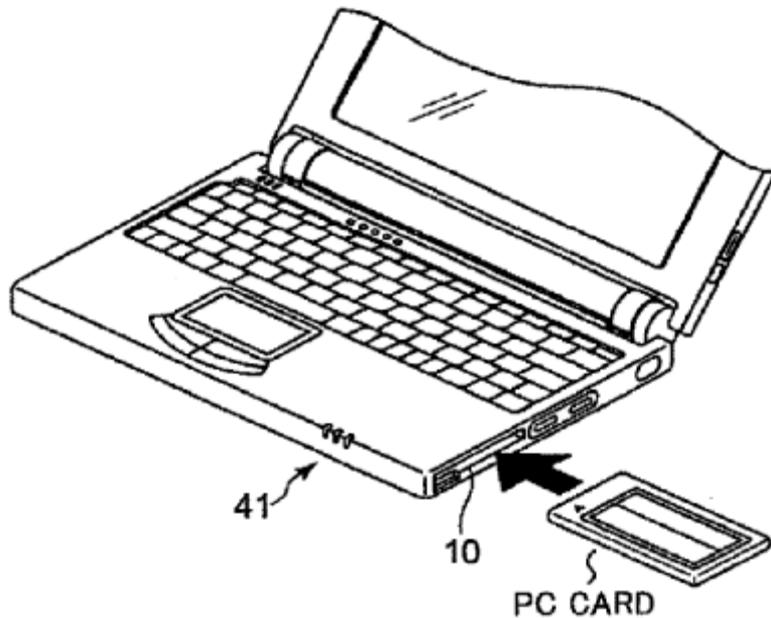
## H01Q 1/2275

[N: associated to expansion card or bus, e.g. in PCMCIA, PC cards, Wireless USB]

### Definition statement

*This subclass/group covers:*

Typically the expansion card is removable; this reflects more the use of the antenna.



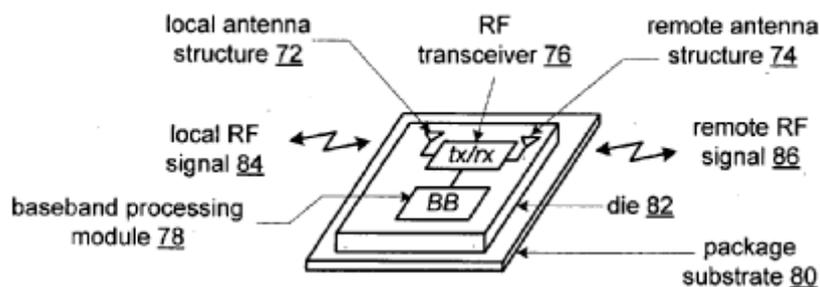
## H01Q 1/2283

[N: mounted in or on the surface of a semiconductor substrate as a chip-type antenna or integrated with other components into an IC package (chip carriers for flat cards [H01L 23/49855](#))]

### Definition statement

*This subclass/group covers:*

A small-size antenna which has an antenna element buried in a dielectric chip or stacked on the surface of a dielectric chip, (Murata appears to be the major applicant here).



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Chip carriers for flat cards [H01L 23/49855](#).

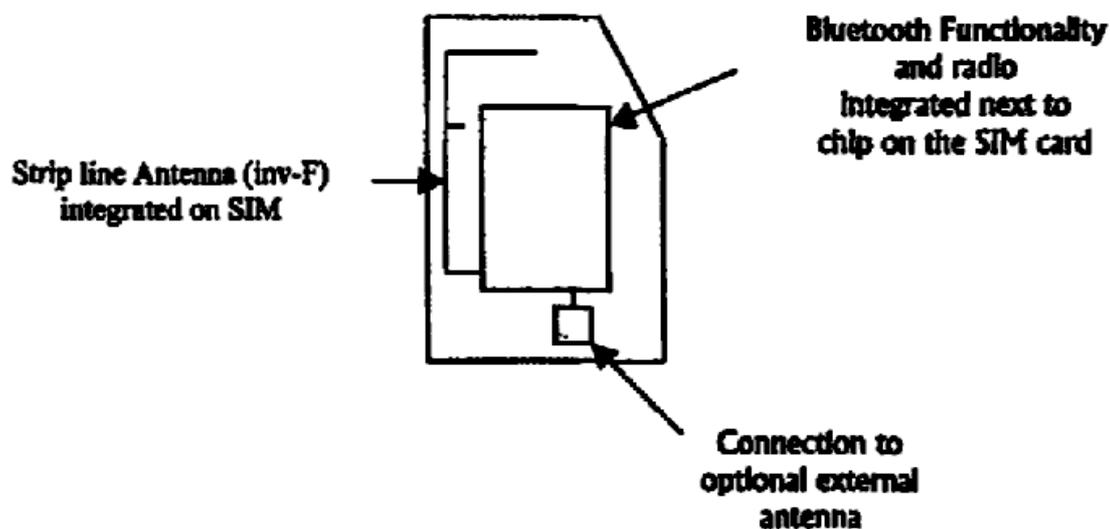
## H01Q 1/2291

[N: used in bluetooth or WI-FI devices of Wireless Local Area Networks (WLAN) ([H01Q 1/241](#) takes precedence; WLAN in general [H04L12/28W](#))]

### Definition statement

*This subclass/group covers:*

Antennas for a wireless system of access points as base stations and of clients with laptops, notebooks, PDA's, desktops or workstations; see also for indoor communication [H01Q1/OOE](#).



### References relevant to classification in this group

*This subclass/group does not cover:*

Receiving set used in mobile communications	<a href="#">H01Q 1/241</a>
WLAN in general	<a href="#">H04L12/28W</a>

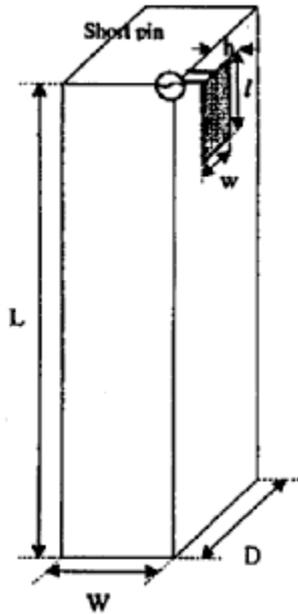
## H01Q 1/24

with receiving set

### Definition statement

*This subclass/group covers:*

Documents where antennas are in a transmitting/receiving set, i.e. a transceiver. "Receiving" here means actually receiving and/or transmitting.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Portable transceivers	<a href="#">H04B 1/3827</a>
Hand-held transceivers	<a href="#">H04B 1/3833</a>
Portable telephone sets, e.g. cordless phones, mobile phones or bar type handsets	<a href="#">H04M 1/0202</a>

### H01Q 1/241

[N: used in mobile communications, e.g. GSM ([H01Q 1/247](#), [H01Q 1/248](#) take precedence)]

### Definition statement

*This subclass/group covers:*

GSM: Global System for Mobile Communication, also 3G and other telecommunications systems.

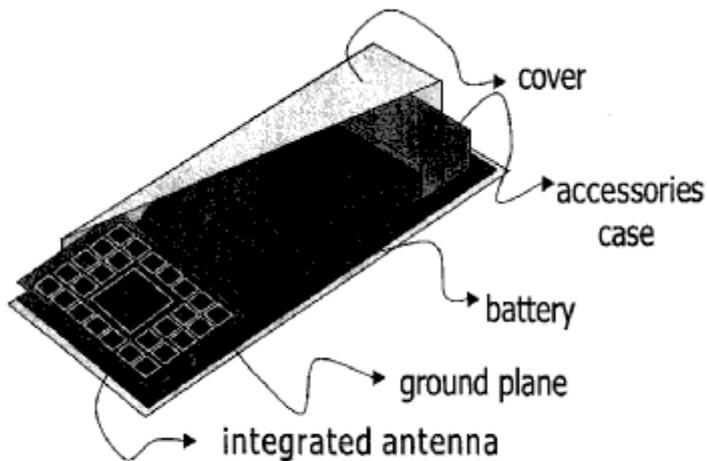


Fig. 1. Cellular phone layout with an integrated antenna employing EBG structures.

## References relevant to classification in this group

*This subclass/group does not cover:*

With frequency mixer, e.g. for direct satellite reception or Doppler radar	<a href="#">H01Q 1/247</a>
Provided with an AC/DC converting device, e.g. rectennas	<a href="#">H01Q 1/248</a>

## H01Q 1/242

[N: specially adapted for hand-held use]

### Definition statement

*This subclass/group covers:*

Hand-held here excludes wireless phone for domestic use. In mobile (read: cellular) telephones.

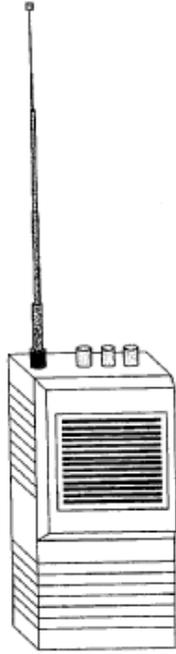


Figure 3. A monopole antenna, mounted on the top of a piece of portable equipment.

## H01Q 1/243

[N: with built-in antennas]

### Definition statement

*This subclass/group covers:*

Stored/located/contained within the housing. Also when integrated within the shell of the phone housing.

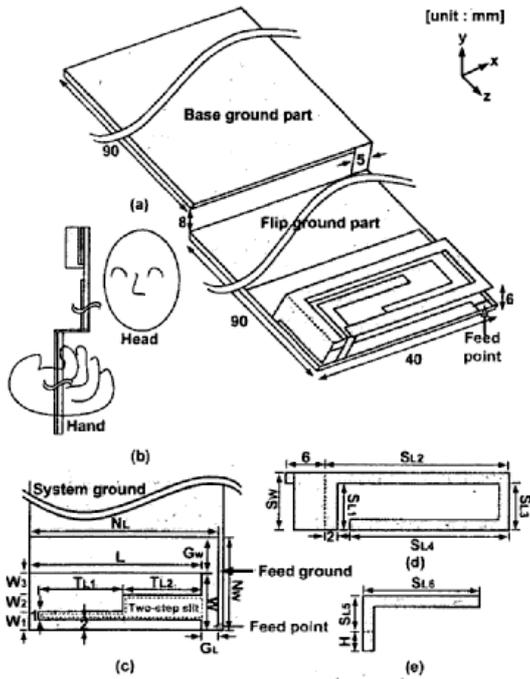


Fig.1 (a) Geometry of the proposed antenna with a system ground, (b) side view, (c) main patch, (d) element-1, (e) element-2.

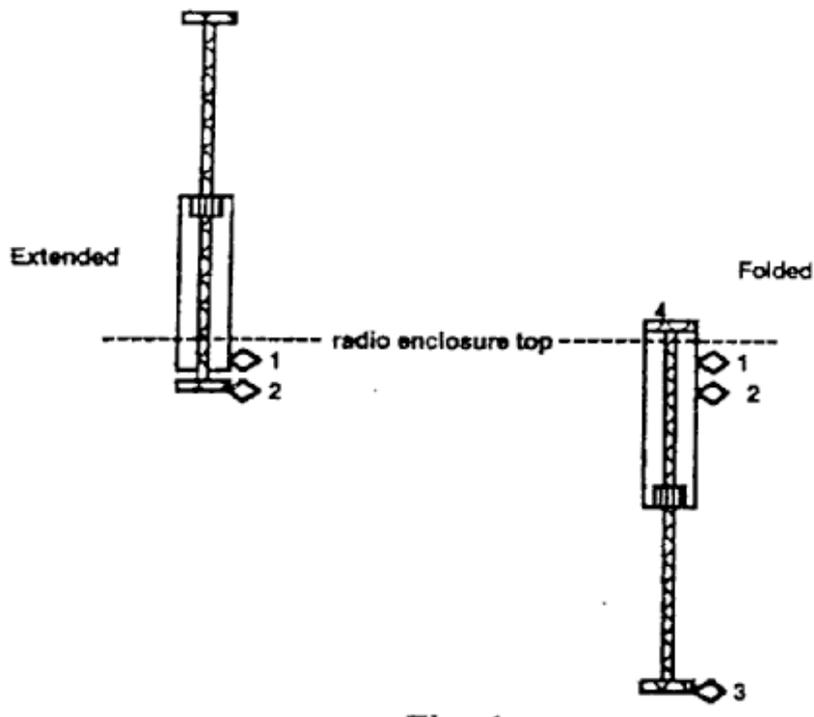
## H01Q 1/244

[N: extendable from a housing along a given path]

### Definition statement

*This subclass/group covers:*

Normally antenna is within the housing, but part of it can be extracted (extendable; extractable; pulled out; stored, pushed in, contained; passive, retract+). The device should be claimed/disclosed; isolated antennas in [H01Q 1/08](#) or [H01Q 1/10](#) (and subgroups).



### Special rules of classification within this group

Antennas per se are classified in [H01Q 1/10](#) and subgroups.

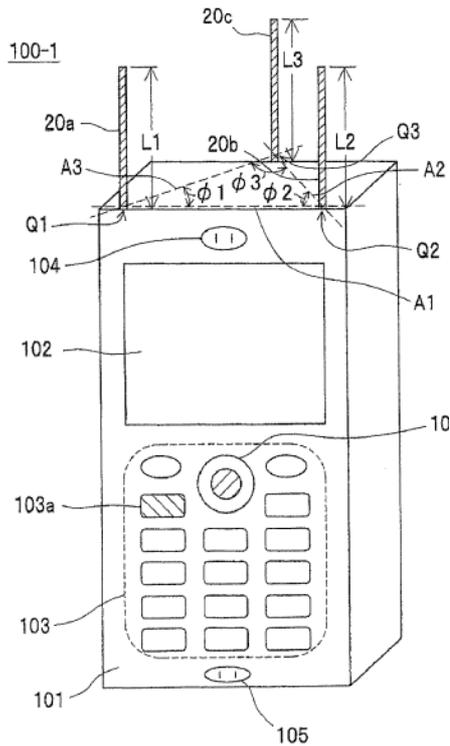
### H01Q 1/245

[N: with means for shaping the antenna pattern, e.g. in order to protect user against rf exposure]

### Definition statement

*This subclass/group covers:*

Health protection, RF exposure. Overlap in [H04B](#): "protect user against rf exposure". This class is about measures that influence the shape of the pattern, with the aim of reducing RF exposure / absorption by the user.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Arrangements for reducing RF exposure to the user, e.g. by changing the shape of the transceiver while in use	<a href="#">H04B 1/3838</a>
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## Special rules of classification within this group

Power control after proximity detection (for example), should be in [H04B](#).

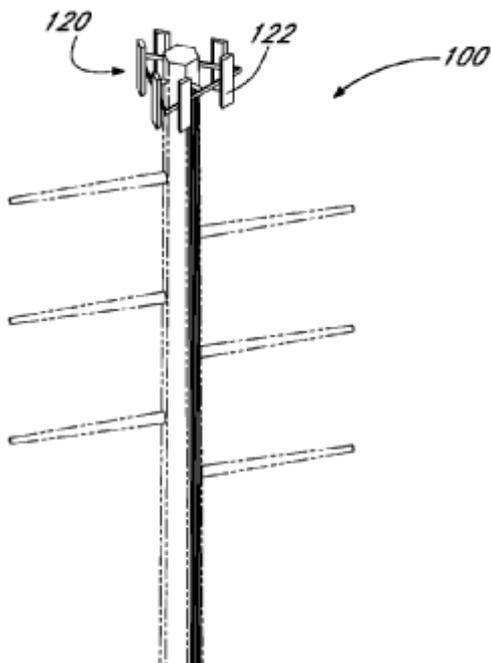
## H01Q 1/246

[N: specially adapted for base stations]

## Definition statement

*This subclass/group covers:*

To be interpreted as base stations in generalised cells (macro / micro / pico).



## Synonyms and Keywords

*In patent documents the following words are often used:*

Cell station; hub station; cell site; cellular cell site; radio base station; homebase; central site, fixed site.

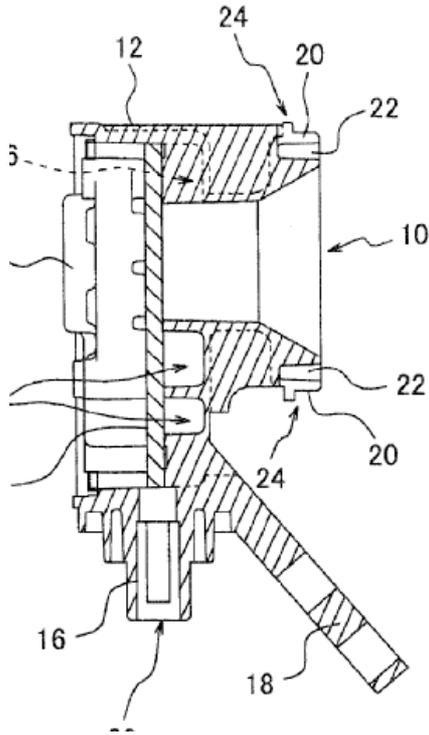
## H01Q 1/247

[N: with frequency mixer, e.g. for direct satellite reception or Doppler radar (active antennas [H01Q 23/00](#))]

## Definition statement

*This subclass/group covers:*

As LNB (Low noise block converter) or LNC (Low Noise Converter) or LNA (Low Noise Amplifier) as feeder of reflector antennas.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Adaptations for transmission via a GHz frequency band, e.g. via satellite	<a href="#">H04N 7/20</a>
Located in a hollow waveguide	<a href="#">H03D 9/0641</a>
Active antennas	<a href="#">H01Q 23/00</a>

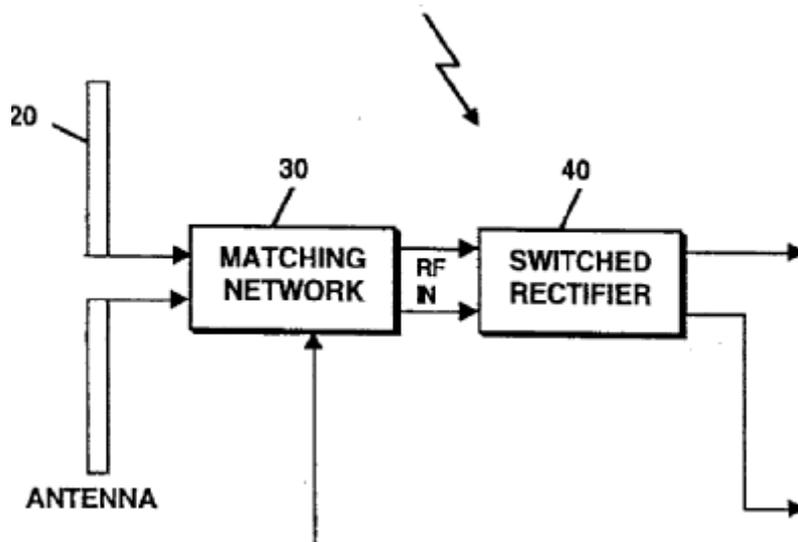
### H01Q 1/248

[N: provided with an AC/DC converting device, e.g. rectennas]

### Definition statement

*This subclass/group covers:*

Rectifying antenna for microwave power transmission and conversion; antenna elements and rectifiers (diodes) are directly connected to produce a DC output; energy harvesting.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Systems using reflection of radio waves, e.g. primary radar systems; Analogous systems	<a href="#">G01S 13/02</a>
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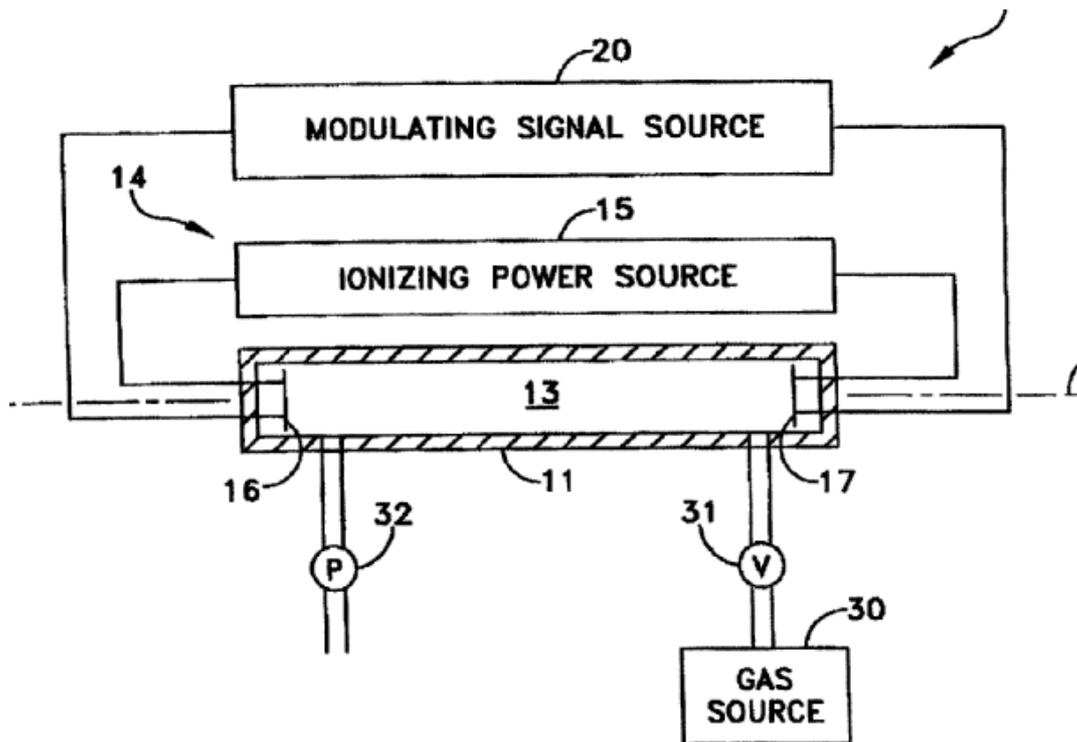
### H01Q 1/26

with electric discharge tube

### Definition statement

*This subclass/group covers:*

For example plasmas used for exciting waves; ionised gas columns excited by coil antenna at base.



## H01Q 1/27

Adaptation for use in or on movable bodies ([H01Q 1/08](#), [H01Q 1/12](#), [H01Q 1/18](#) take precedence; [N: portable transceivers [H04B 1/3827](#)])

### Definition statement

*This subclass/group covers:*  
For example:

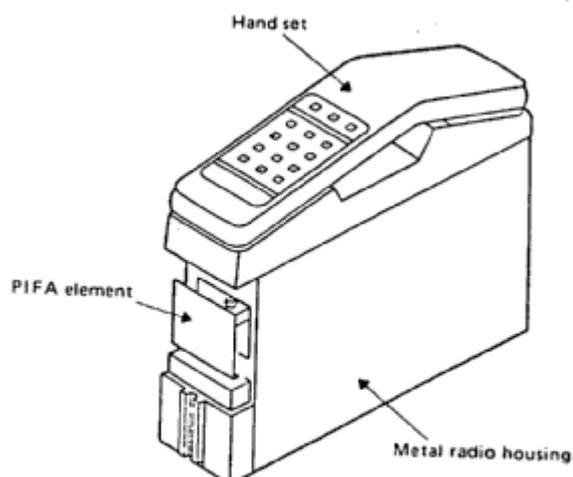


Fig. 1—Antenna configuration for over-the-shoulder type detachable transceiver unit (Type A).

## References relevant to classification in this group

*This subclass/group does not cover:*

Means for collapsing aerials or parts thereof	<a href="#">H01Q 1/08</a>
Support; mounting means	<a href="#">H01Q 1/12</a>
Means for stabilising aerials on an unstable platform	<a href="#">H01Q 1/18</a>
Portable transceivers	<a href="#">H04B 1/3827</a>

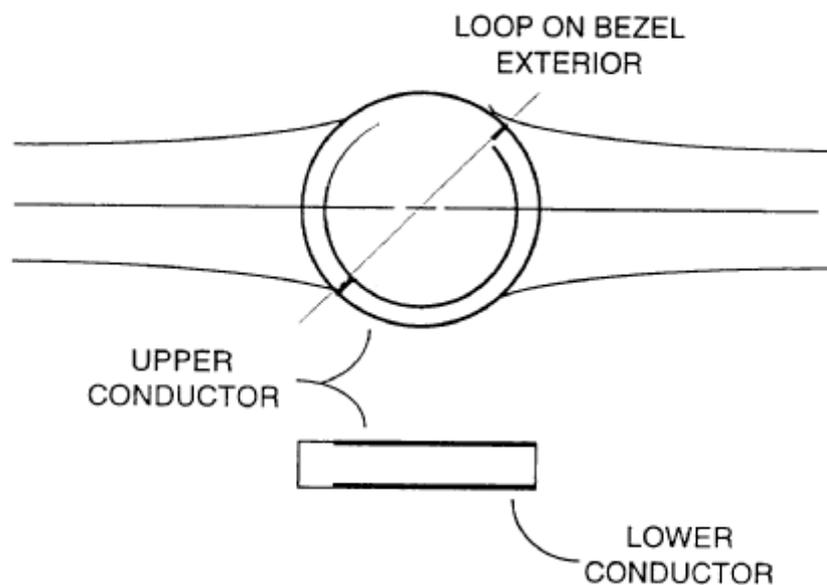
## H01Q 1/273

[N: Adaptation for carrying or wearing by persons or animals]

### Definition statement

*This subclass/group covers:*

Mostly wristwatch-type-, clock-, timepiece antennas; collars; necklaces.



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

See also	<b>G04G1/00D2</b>
----------	-------------------

Transceivers carried on the body, e.g. in helmets	<a href="#">H04B 1/385</a>
Bracelets; Wrist-watch straps; Fastenings for bracelets or wrist-watch straps	<a href="#">A44C 5/00</a>

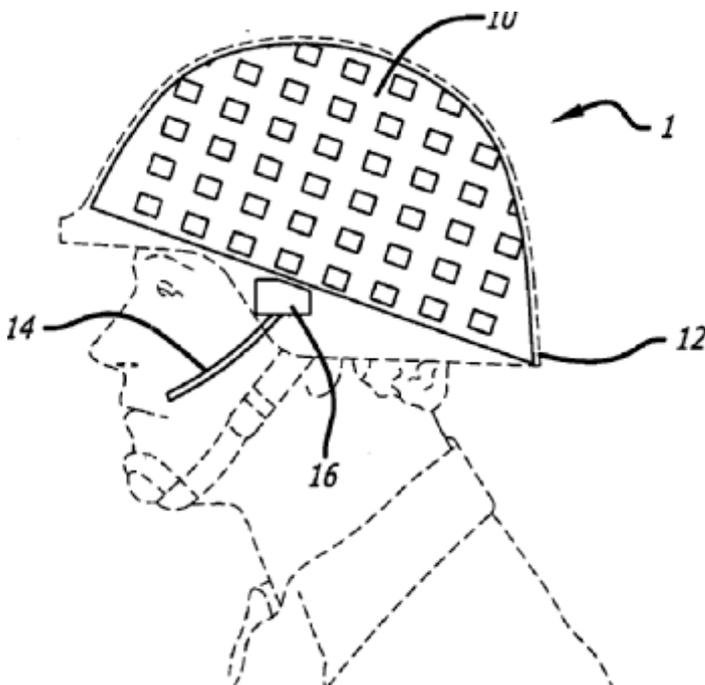
## H01Q 1/276

[N: for mounting on helmets]

### Definition statement

*This subclass/group covers:*

Military applications; use of these helmets by motor cycle drivers, soldiers.



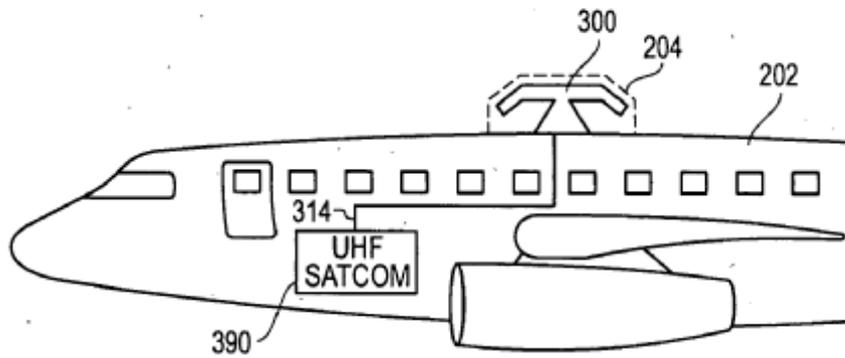
## H01Q 1/28

**Adaptation for use in or on aircraft, missiles, satellites, or balloons**

### Definition statement

*This subclass/group covers:*

For example:



(trains, cars are excluded)

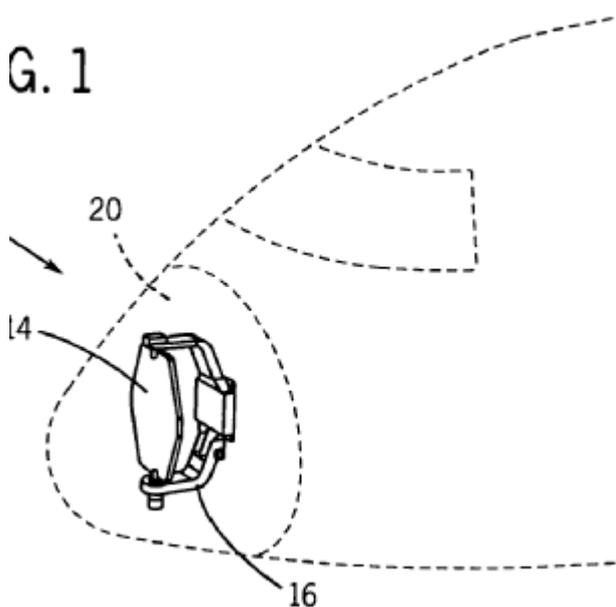
## H01Q 1/281

[N: Nose antennas]

### Definition statement

*This subclass/group covers:*

Antennas mounted in the nose of an airplane behind a radome.



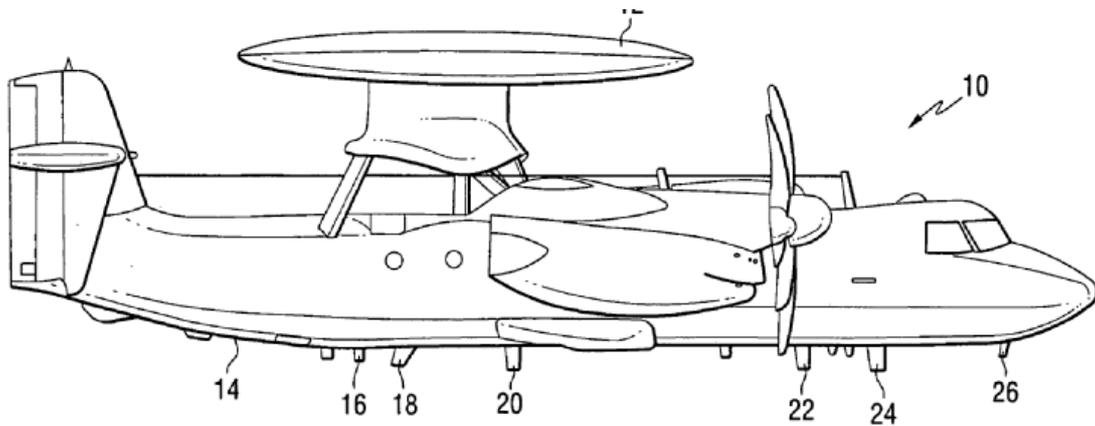
## H01Q 1/282

[N: Modifying the aerodynamic properties of the vehicle, e.g. projecting type aerials]

### Definition statement

*This subclass/group covers:*

Antenna inside a radome projecting from the fuselage/housing of the vehicle.



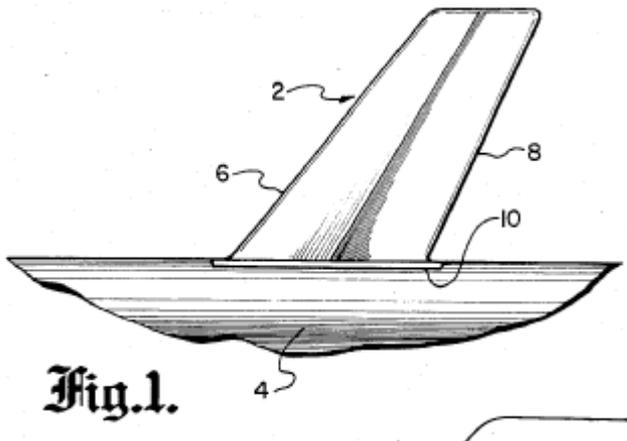
## H01Q 1/283

[N: Blade, stub antennas]

### Definition statement

*This subclass/group covers:*

Form of a monopole antenna that is blade-shaped for strength and low aerodynamic drag. E.g. shape of a blade or fin protruding from the surface of the aircraft affecting the aircraft aerodynamics; e.g. monopole made by flat sheet.



## H01Q 1/285

[N: Aircraft wire antennas (means for trailing [H01Q 1/30](#))]

### Definition statement

*This subclass/group covers:*

Wire antennas mounted on the vehicle; fuselage / housing used as support.  
Trailing antennas are NOT classified here.

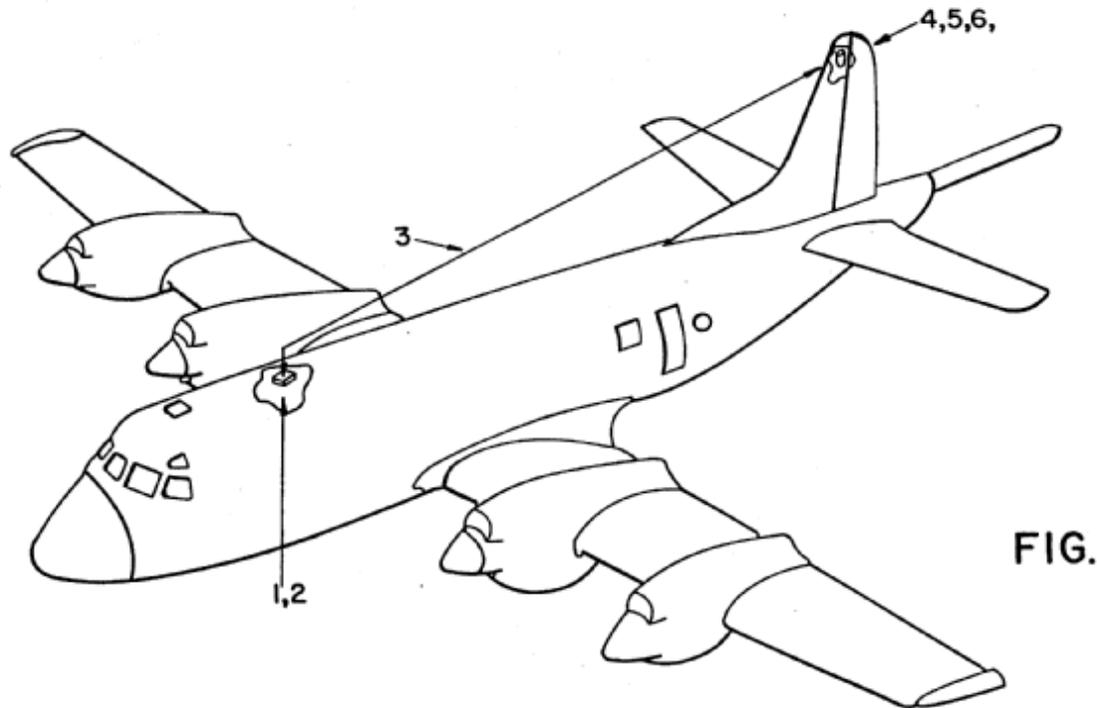


FIG.

### References relevant to classification in this group

*This subclass/group does not cover:*

Means for trailing	<a href="#">H01Q 1/30</a>
--------------------	---------------------------

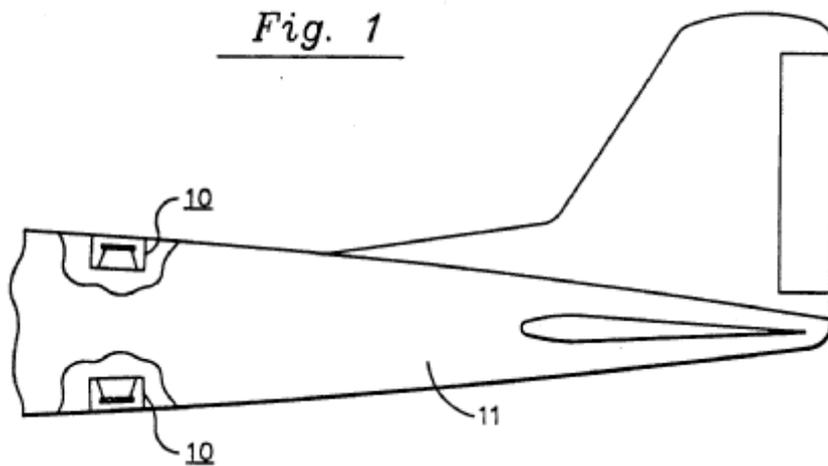
### H01Q 1/286

**[N: substantially flush mounted with the skin of the craft]**

### Definition statement

*This subclass/group covers:*

An antenna constructed into the surface of a mechanism, or of a vehicle, without affecting the shape of that surface. Contrast with a conformal antenna: An antenna (array) that conforms to a surface whose shape is determined by considerations other than electromagnetic; for example, aerodynamic or hydrodynamic.



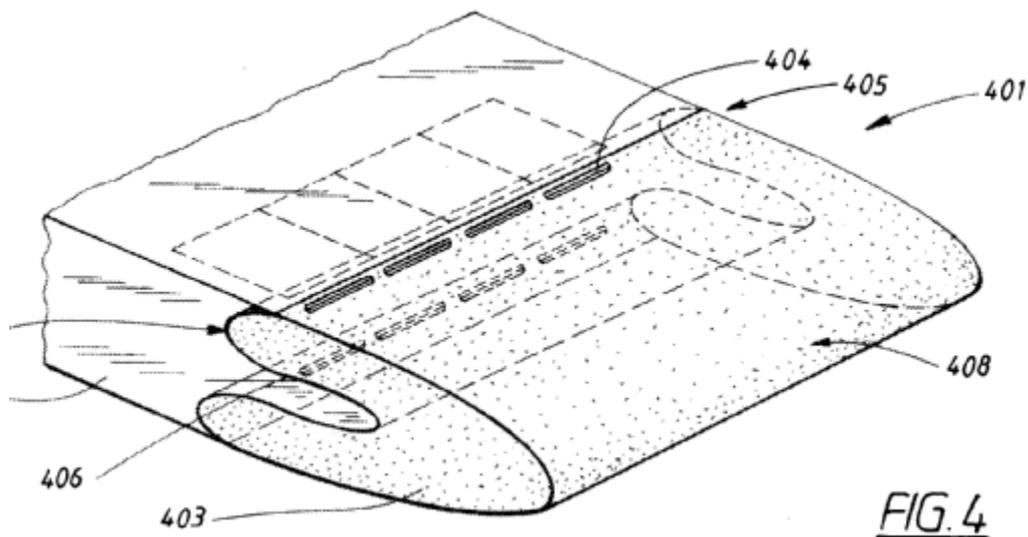
**H01Q 1/287**

**[N: integrated in a wing or a stabiliser]**

**Definition statement**

*This subclass/group covers:*

Only specifies the location where the antennas are flush mounted.



**H01Q 1/288**

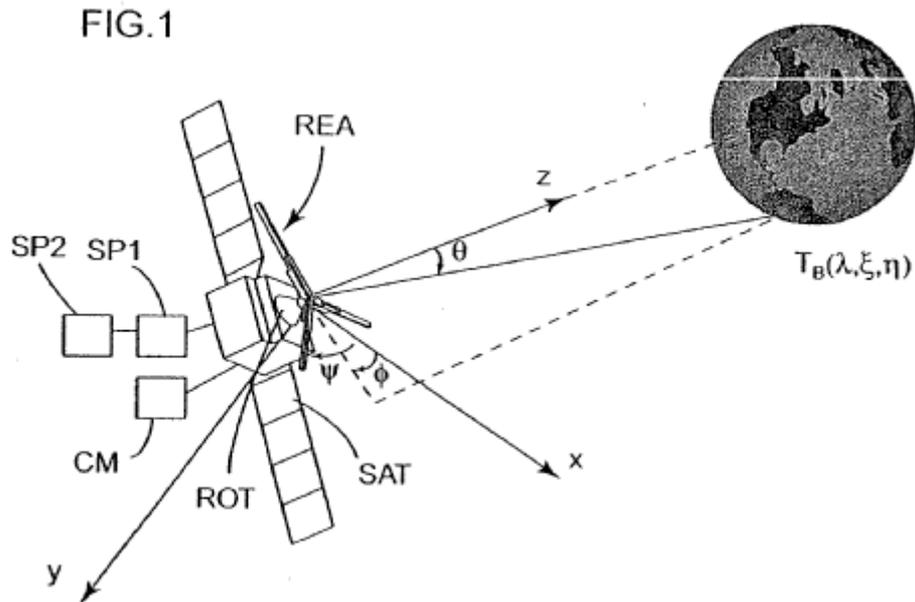
**[N: Satellite antennas]**

**Definition statement**

*This subclass/group covers:*

Antennas mounted in or on a satellite or space based station in aerospace,

e.g. communication satellite as geostationary or low or medium earth orbiting (LEO or MEO).



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Cosmonautics; vehicles or equipment therefor	<a href="#">B64G</a>
Space-based or airborne stations	<a href="#">H04B 7/185</a> and subgroups

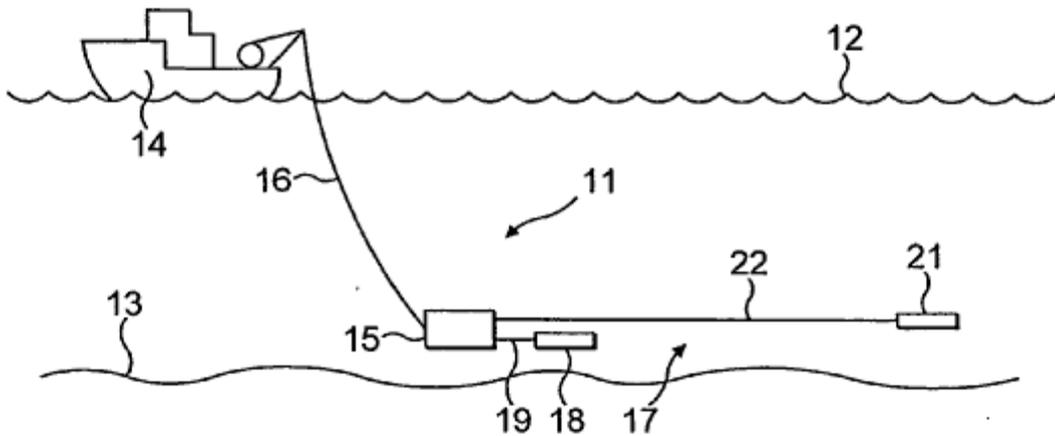
### H01Q 1/30

#### Means for trailing aerials

#### Definition statement

*This subclass/group covers:*

Antenna being trailed by aircraft, missiles, ships, satellites or balloons.



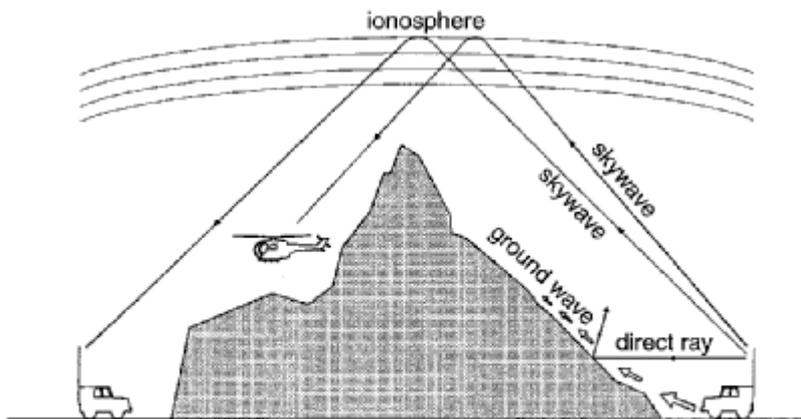
### H01Q 1/32

Adaptation for use in or on road or rail vehicles (telescopic elements [H01Q 1/10](#); resilient mountings for aerials [H01Q 1/20](#))

#### Definition statement

This subclass/group covers:

For example:



**Fig. 1** Diagrammatic view of the NVIS path (not to scale)

NOT the windscreen aerials.

#### References relevant to classification in this group

This subclass/group does not cover:

Telescopic elements	<a href="#">H01Q 1/10</a>
Resilient mountings for aerials	<a href="#">H01Q 1/20</a>

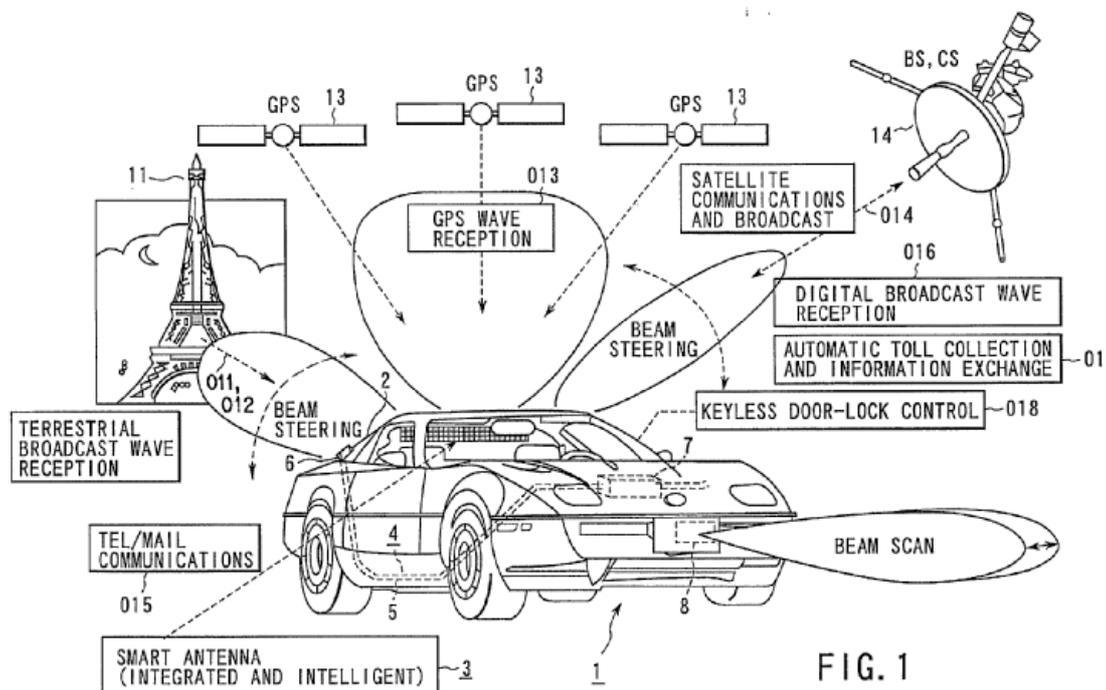
## H01Q 1/3208

[N: characterised by the application wherein the antenna is used]

### Definition statement

*This subclass/group covers:*

Directed at the use of the antennas.



### Synonyms and Keywords

*In patent documents the following abbreviations are often used:*

LCD	Liquid Crystal Display
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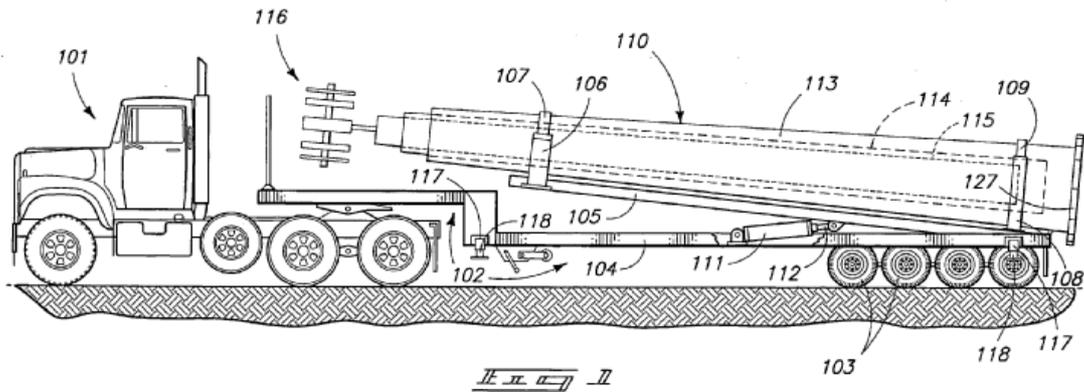
## H01Q 1/3216

[N: where the road or rail vehicle is only used as transportation means]

### Definition statement

This subclass/group covers:

For example:



## H01Q 1/3225

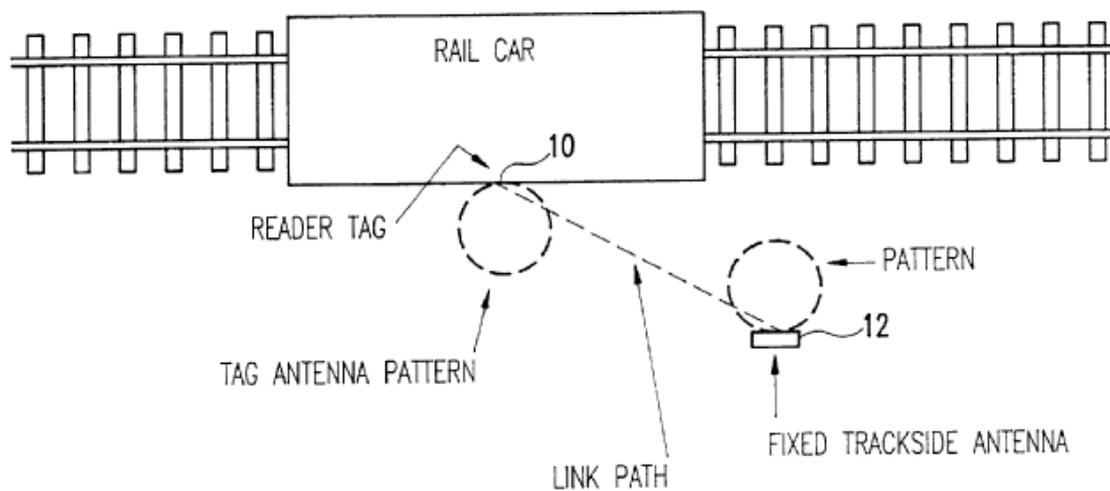
[N: Cooperation with the rails or the road]

### Definition statement

This subclass/group covers:

This group covers:

For example:



### Informative references

Attention is drawn to the following places, which may be of interest for search:

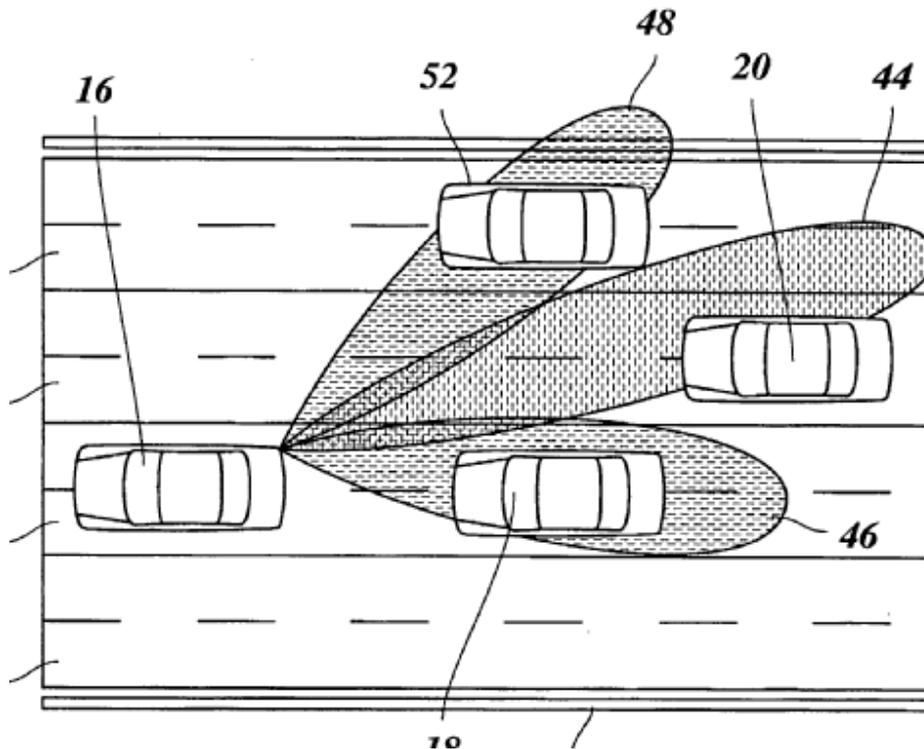
Traffic control systems for road vehicles	<a href="#">G08G 1/00</a>
---	---------------------------

## H01Q 1/3233

[N: particular used as part of a sensor or in a security system, e.g. for automotive radar, navigation systems]

### Definition statement

*This subclass/group covers:*  
Safety and security aspects.



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

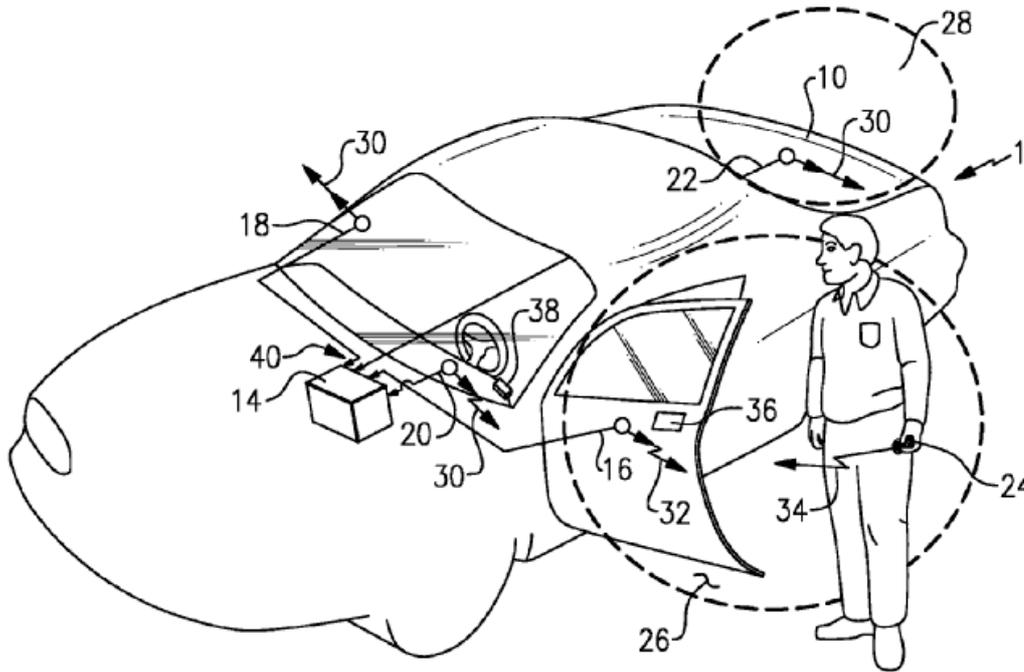
Between land vehicles; between land vehicles and fixed obstacle	<a href="#">G01S 13/931</a>
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## H01Q 1/3241

[N: particular used in keyless entry systems]

### Definition statement

*This subclass/group covers:*  
For example:



### Informative references

Attention is drawn to the following places, which may be of interest for search:

See also	<b>E04B49/00T</b>
The record carrier being capable of non-contact communication	<a href="#">G06K 19/07749</a>

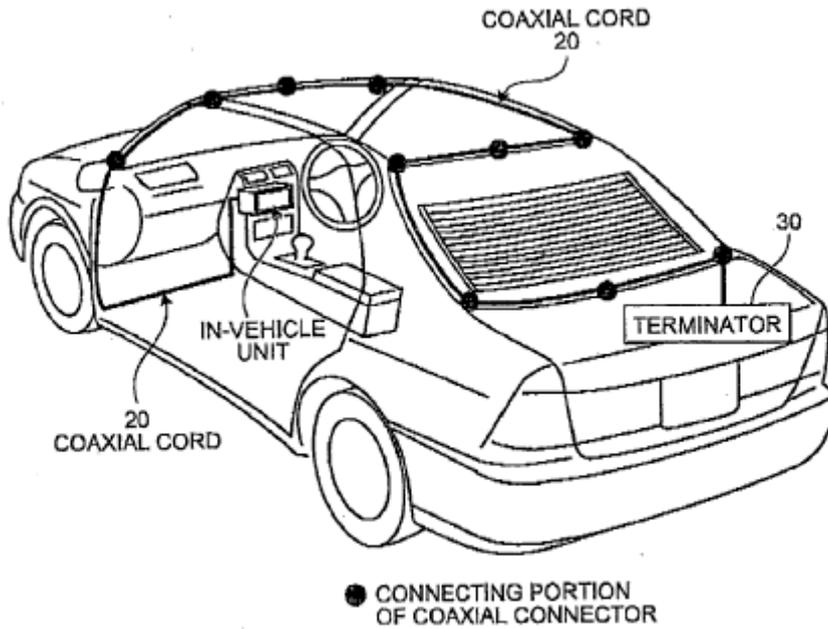
### H01Q 1/325

[N: characterised by the location of the antenna on the vehicle]

### Definition statement

*This subclass/group covers:*

Directed at the location of the antenna on the vehicle.



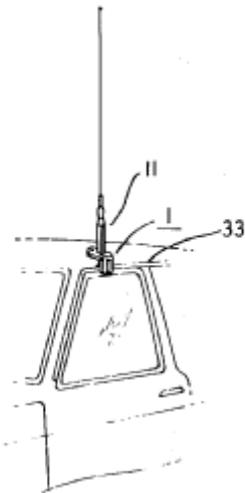
### H01Q 1/3258

[N: using the gutter of the vehicle; Means for clamping a whip aerial on the edge of a part of the vehicle]

#### Definition statement

*This subclass/group covers:*

For example:

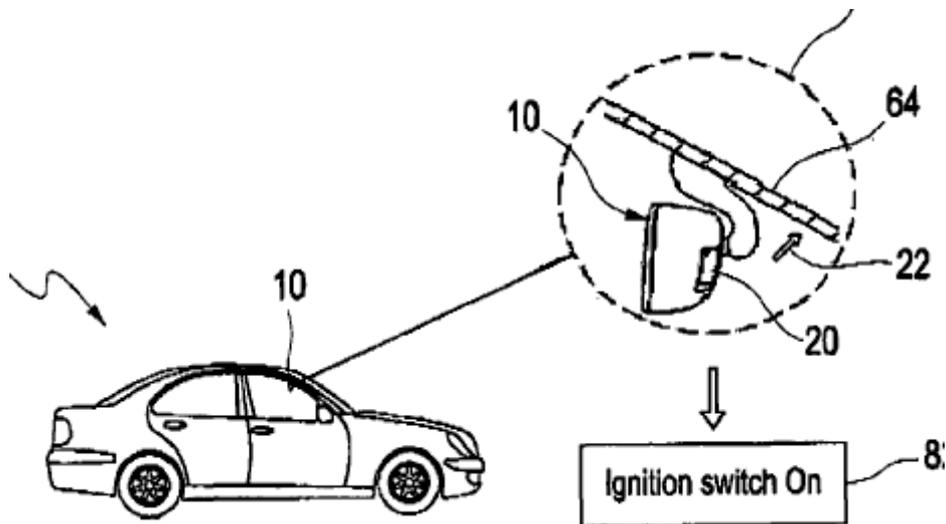


### H01Q 1/3266

[N: using the mirror of the vehicle]

## Definition statement

*This subclass/group covers:*  
Internal AND external mirrors.



## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

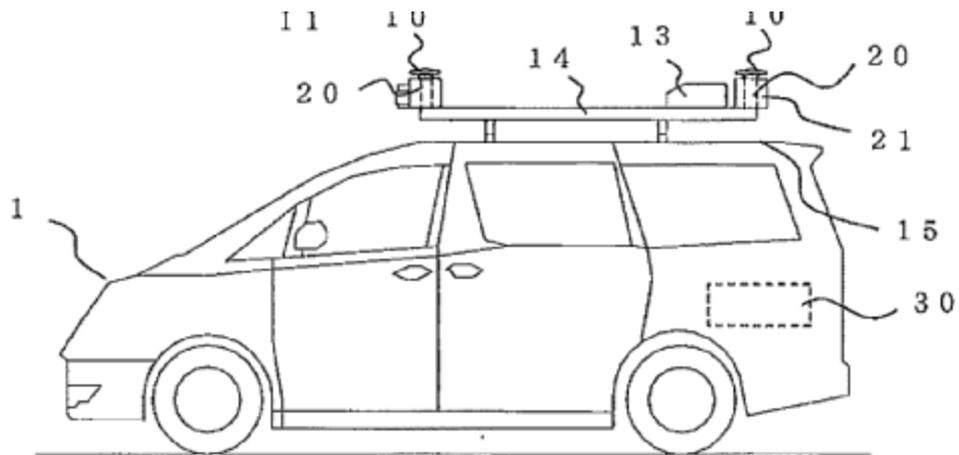
Rear-view mirror arrangements	<a href="#">B60R 1/02</a>
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## H01Q 1/3275

[N: mounted on a horizontal surface of the vehicle, e.g. on roof, hood, trunk]

## Definition statement

*This subclass/group covers:*  
For example:



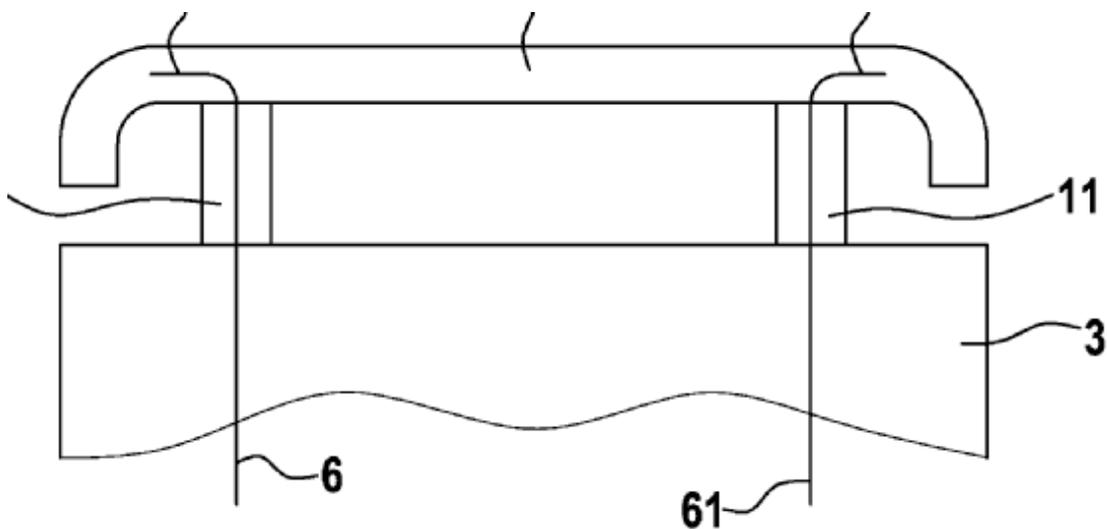
## H01Q 1/3283

[N: side-mounted antennas, e.g. bumper-mounted, door-mounted (mounted on windscreens [H01Q 1/1271](#))]

### Definition statement

*This subclass/group covers:*

For example:



### References relevant to classification in this group

*This subclass/group does not cover:*

Mounted on windscreens	<a href="#">H01Q 1/1271</a>
------------------------	-----------------------------

## H01Q 1/3291

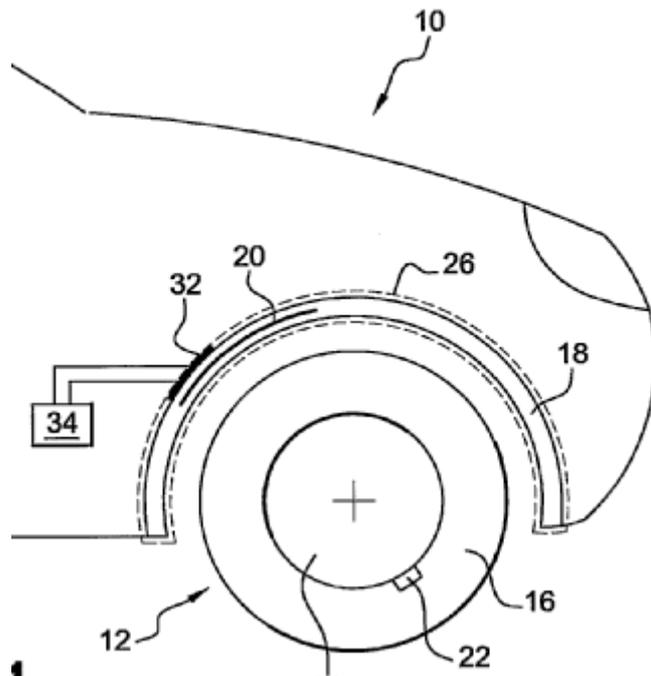
[N: mounted in or on other locations inside the vehicle or vehicle body]

**Definition statement**

*This subclass/group covers:*

For example:

Roof rack; inside cavities within the vehicle.



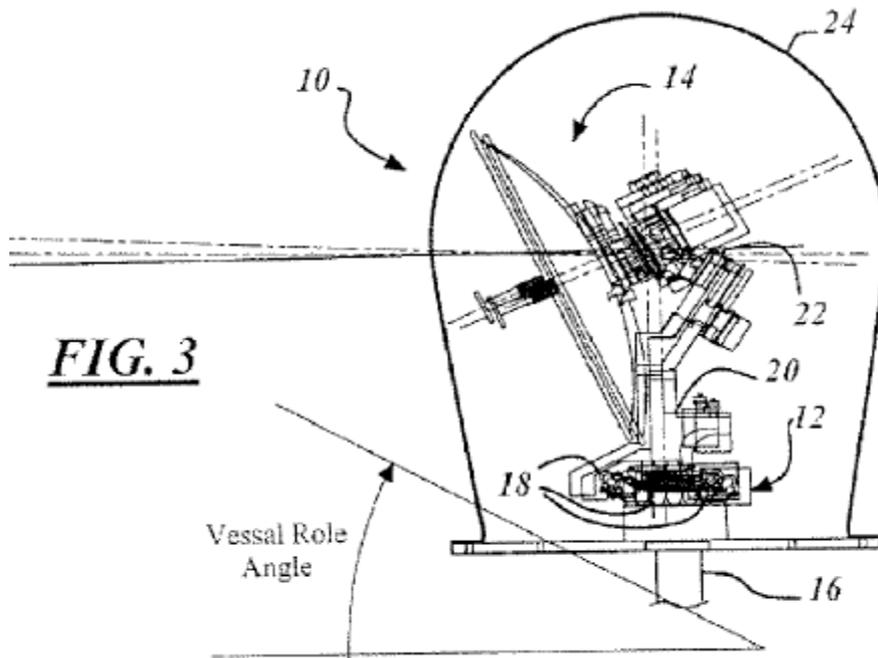
**H01Q 1/34**

Adaptation for use in or on ships, submarines, buoys, or torpedoes (for subaqueous use [H01Q 1/04](#); retractable loop aerials [H01Q 7/02](#))

**Definition statement**

*This subclass/group covers:*

For example:



**References relevant to classification in this group**

*This subclass/group does not cover:*

For subaqueous use	<a href="#">H01Q 1/04</a>
Retractable loop aerials	<a href="#">H01Q 7/02</a>

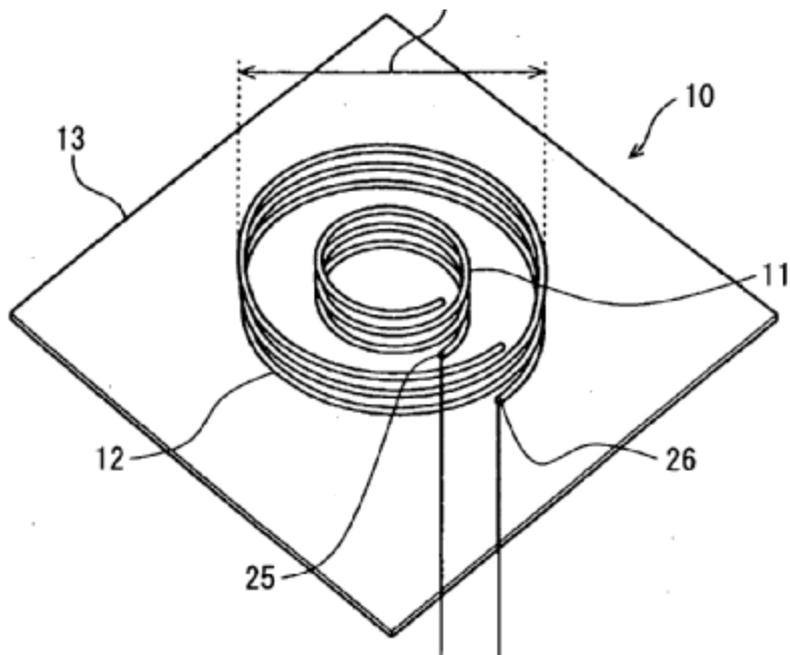
**H01Q 1/36**

**Structural form of radiating elements, e.g. cone, spiral, umbrella; [N: Particular materials used therewith] ([H01Q 1/08](#), [H01Q 1/14](#) take precedence)**

**Definition statement**

*This subclass/group covers:*

Directed at specific shapes of the radiator.



## References relevant to classification in this group

*This subclass/group does not cover:*

Means for collapsing aerials or parts thereof	<a href="#">H01Q 1/08</a>
For wire or other non-rigid radiating elements	<a href="#">H01Q 1/14</a>
Device acting selectively as reflecting surface, as diffracting or as refracting device e.g. frequency filtering or angular spatial filtering devices	<a href="#">H01Q 15/0006</a>

## H01Q 1/362

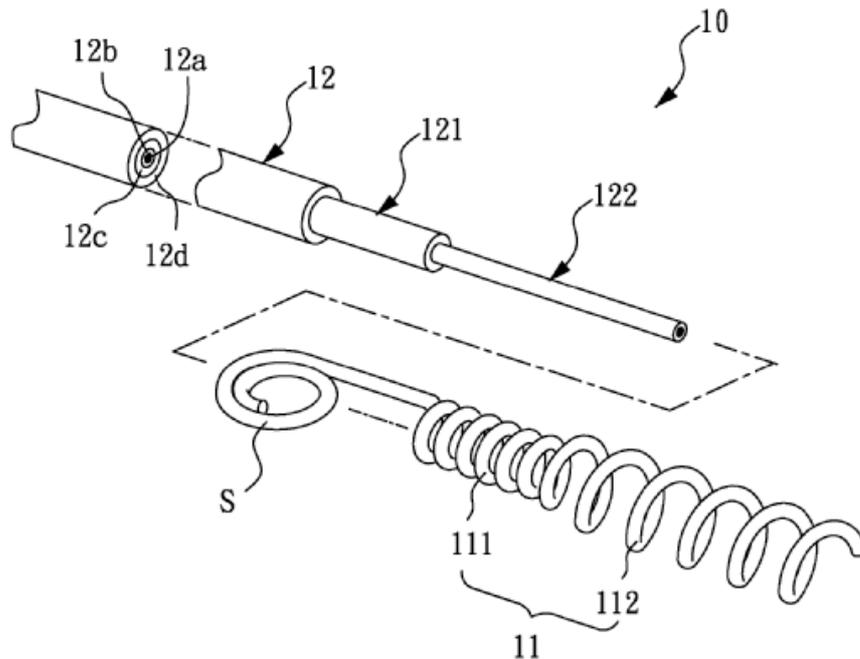
**[N: for broadside radiating helical antennas]**

### Definition statement

*This subclass/group covers:*

Definitions: An antenna whose configuration is that of a helix (the diameter, pitch, and number of turns in relation to the wavelength provide control of the polarization state and directivity) Here: helical antennas in the normal mode that means radiation broadside to the helix with linear polarization if helix diameter is less than  $\lambda$  but length is comparable to  $\lambda$ ; i.e. helical monopole (coiling the antenna along its length).

[H01Q 11/08+](#): helical antennas in axial/radial mode and circular polarization as monofilar, bifilar or quadrifilar (circumference in order of lambda and axial length several times larger than lambda).



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Helical aerials	<a href="#">H01Q 11/08</a> and subgroups
-----------------	--

### H01Q 1/364

[N: using a particular conducting material, e.g. superconductor]

### Definition statement

This subclass/group covers:  
Directed at specific/special materials.

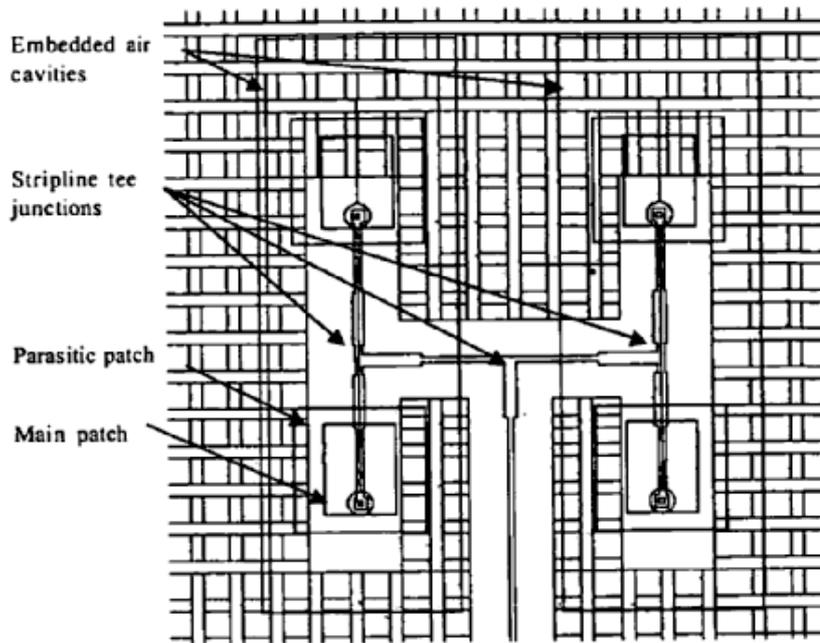


Fig. 5. Top view of a  $2 \times 2$  LTCC stacked patch antenna array showing embedded air cavities (grounding vias removed for clarity).

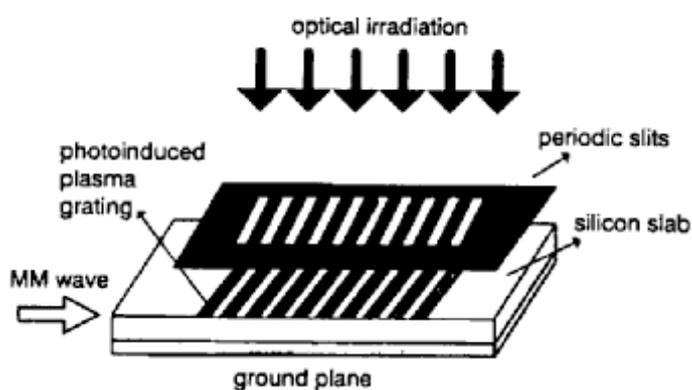
## H01Q 1/366

[N: using an ionized gas]

### Definition statement

*This subclass/group covers:*

For example:



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Using applied electromagnetic fields, e.g. high frequency or microwave	<a href="#">H05H 1/46</a>
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energy	
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## H01Q 1/368

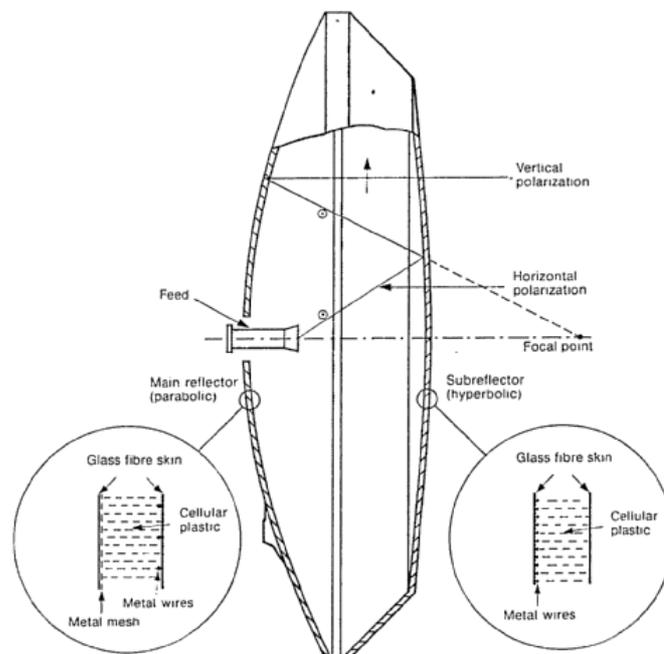
[N: using carbon or carbon composite]

### Definition statement

*This subclass/group covers:*

For example:

Fig. 2  
The basic principle of the Cassegrain antenna with polarization-twisting main reflector and polarization-sensitive subreflector



## H01Q 1/38

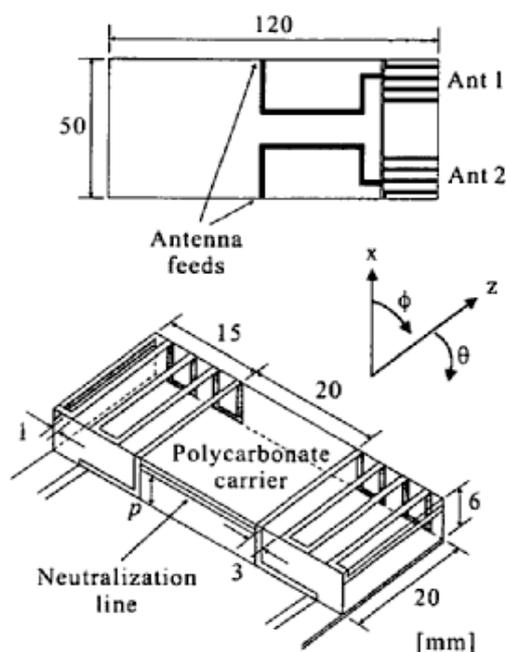
formed by a conductive layer on an insulating support ([N: patch antennas [H01Q 9/0407](#); microstrip dipole antennas [H01Q 9/065](#); microstrip slot antenna [H01Q 13/106](#); transmission line microstrip antennas [H01Q 13/206](#); manufacturing reflecting surfaces using insulating material for supporting the reflecting surface [H01Q 15/142](#); conductors in general [H01B 5/14](#))

### Definition statement

*This subclass/group covers:*

Sub-group of [H01Q 1/36](#) whereby special structural forms of radiating elements are mounted on an insulating support.

Printed circuit antenna, an antenna of some desired shape bonded onto a dielectric substrate with various insulating materials, like dielectrics; ceramics, ferrites, ferroelectric composites.



**Fig. 1** Miniaturized LTE-band dual monopole antenna examined in this paper.

## References relevant to classification in this group

*This subclass/group does not cover:*

Conductors in general	<a href="#">H01B 5/14</a>
Microstrip slot antennas	<a href="#">H01Q 13/106</a>
Transmission line microstrip antennas	<a href="#">H01Q 13/206</a>
Manufacturing reflecting surfaces using insulating material for supporting the reflecting surface	<a href="#">H01Q 15/142</a>
Patch antennas	<a href="#">H01Q 9/0407</a>
Microstrip dipole antennas	<a href="#">H01Q 9/065</a>

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this group, the following expression is used with the meaning indicated:*

Chiral composites	embedding miniature helices in a non-chiral host medium; the names comes from the Greek "kheir" which means "hand"
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## H01Q 1/40

### Radiating elements coated with or embedded in protective material

#### Definition statement

*This subclass/group covers:*

Protective cover like as radome and better matching to epsilon air.

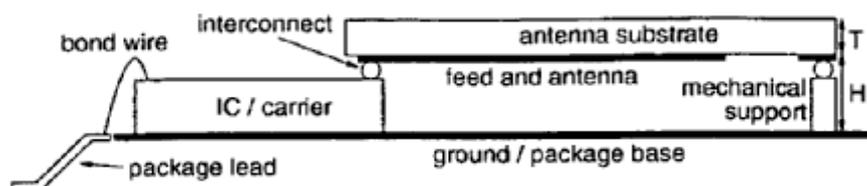


Fig. 1. Concept of antenna together with IC or carrier (side view, not to scale).

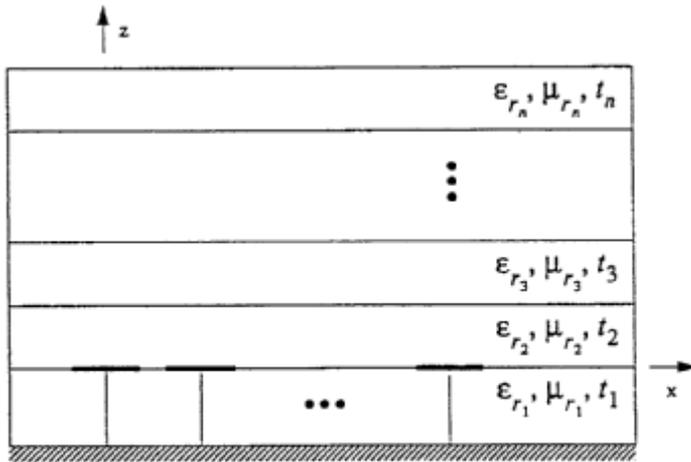
## H01Q 1/405

### [N: Radome integrated radiating elements]

#### Definition statement

*This subclass/group covers:*

Elements are INSIDE radome.



(b) Side View

Fig. 1 Array of probe-fed rectangular microstrip patches embedded in a multilayer dielectric material. The probes are connected to the ground plane through an arbitrary impedance  $Z_L$ .

## H01Q 1/42

Housings not intimately mechanically associated with radiating elements, e.g. radome

### Definition statement

*This subclass/group covers:*

A cover, usually intended for protecting an antenna from the effects of its physical environment without degrading its electrical performance.



Fig. 1. M.I.T. Haystack Observatory's 120-ft parabolic antenna enclosed in 150 ft MSF radome.

## Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this group, the following terms are used with the meaning indicated:

Radome	Radar dome
Irdome	Infrared dome

## H01Q 1/421

[N: Means for correcting aberrations introduced by a radome]

### Definition statement

This subclass/group covers:

Normally choice of material, thicknesses of layers, etc.

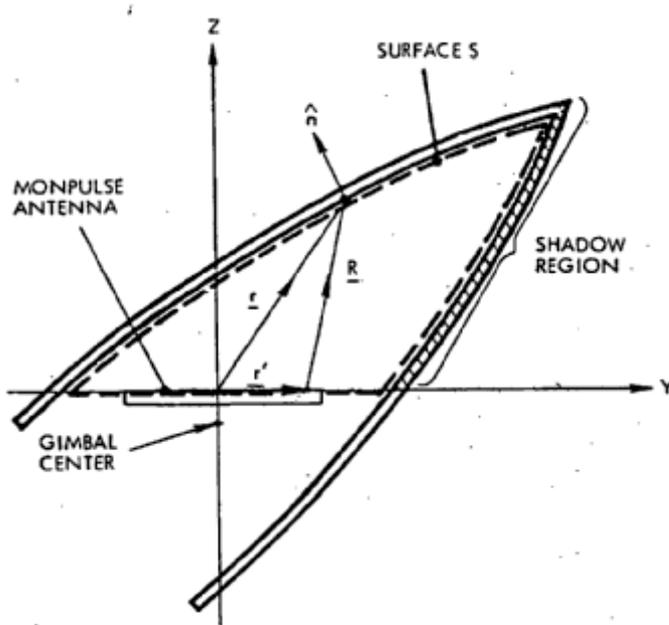


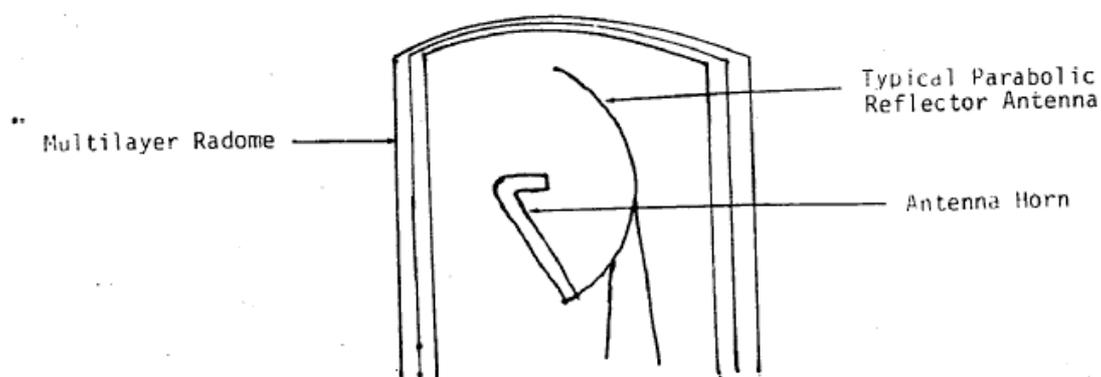
Fig. 2. Surface of integration  $S$  defined by inner radome contour and plane including antenna face.

## H01Q 1/422

[N: comprising two or more layers of dielectric material ([H01Q 1/425](#) takes precedence)]

### Definition statement

*This subclass/group covers:*  
Normally multilayer or sandwich construction.



### References relevant to classification in this group

*This subclass/group does not cover:*

Details of, or arrangements associated with, aerials, housings not intimately mechanically associated with radiating elements, e.g. radome, comprising a metallic grid	<a href="#">H01Q 1/425</a>
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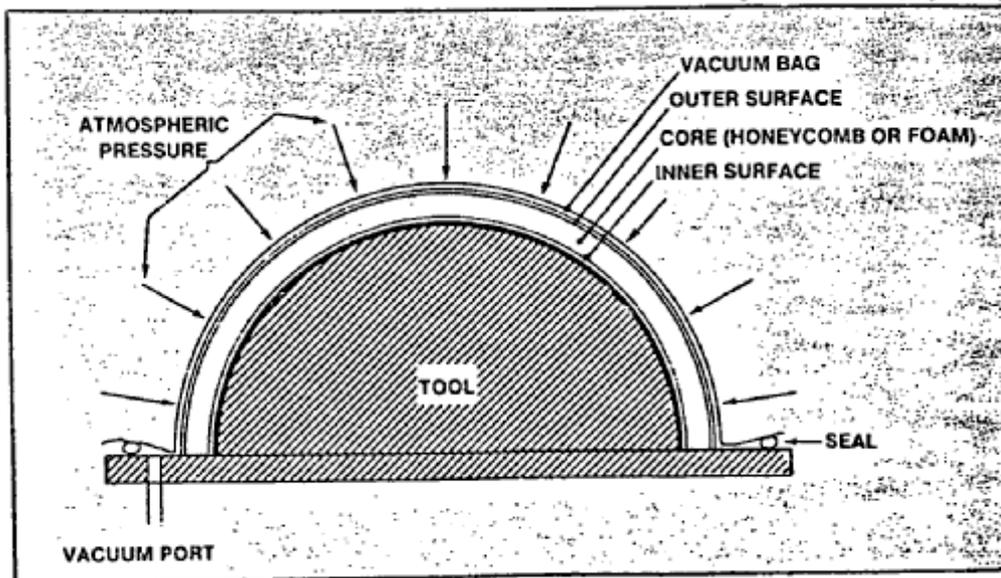
### H01Q 1/424

[N: comprising a layer of expanded material]

### Definition statement

*This subclass/group covers:*

Normally used using a moulding/molding process and expansion, e.g. polystyrene shells used for protection against weather influences.



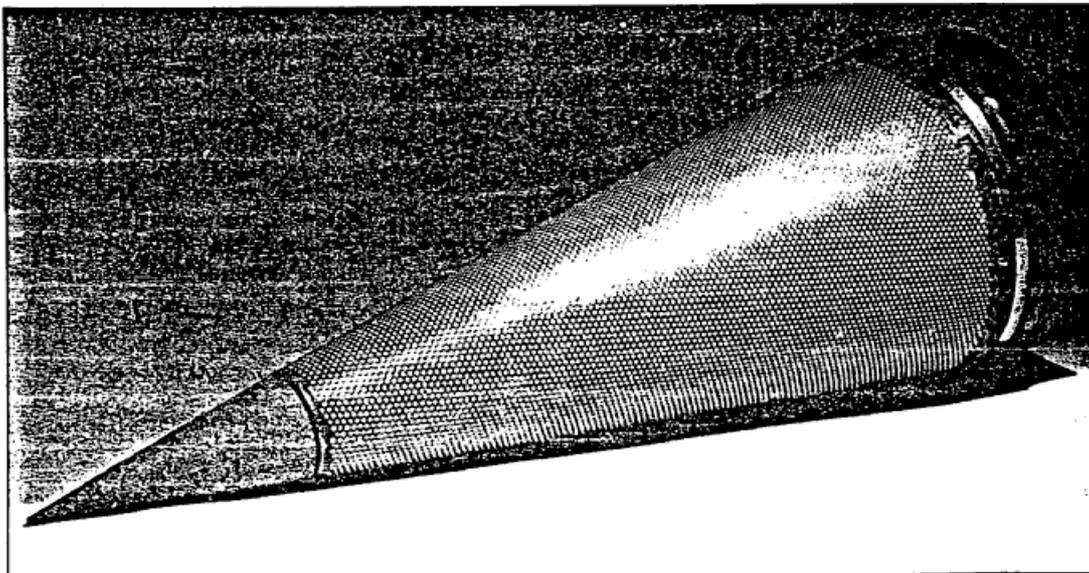
## H01Q 1/425

[N: comprising a metallic grid]

### Definition statement

*This subclass/group covers:*

Metallic grid e.g. for heating; as polarizer or frequency selective surface (FSS).



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Devices acting selectively as	<a href="#">H01Q 15/0006</a>
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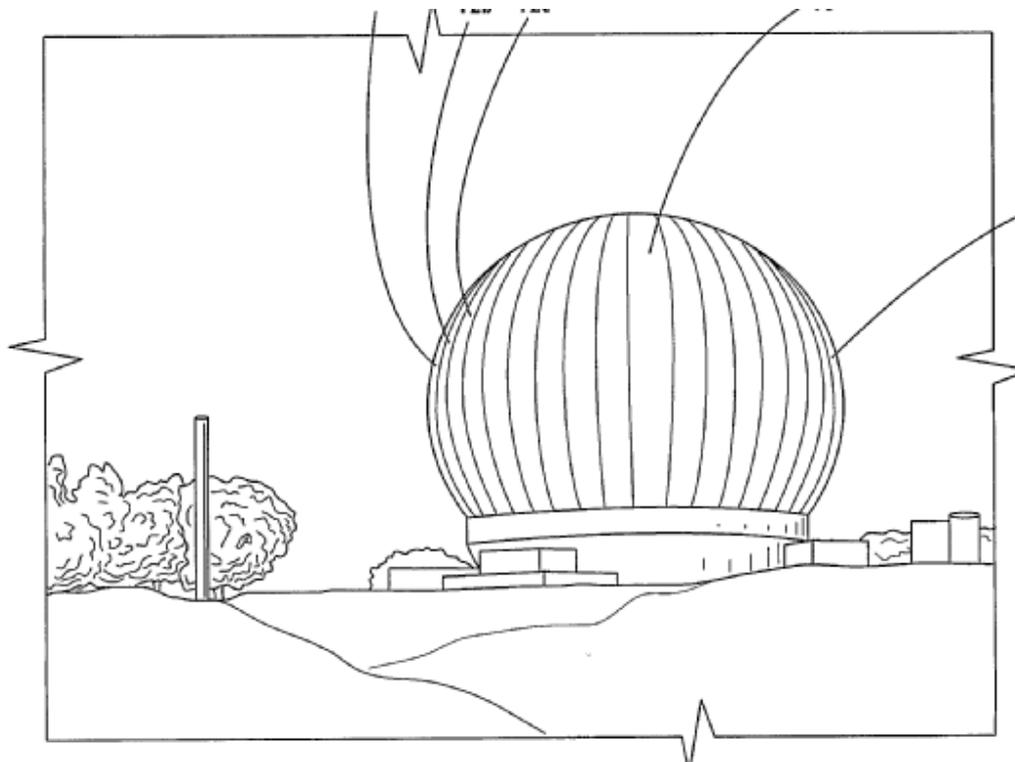
reflecting surface, as diffracting or as refracting device, e.g. frequency filtering or angular spatial filtering devices	
---	--

## H01Q 1/427

[N: Flexible radomes]

### Definition statement

*This subclass/group covers:*  
Normally used are fabrics.

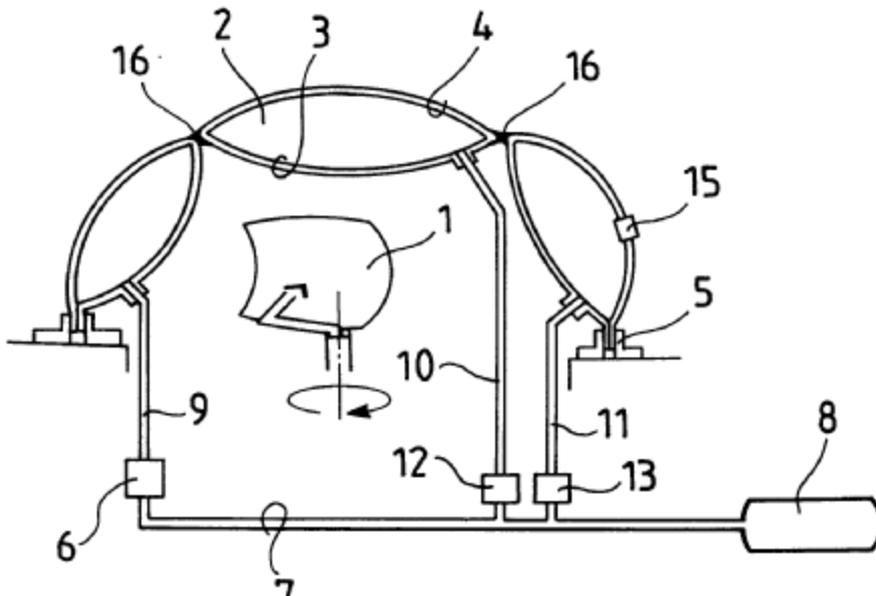


## H01Q 1/428

[N: Collapsible radomes; rotatable, tiltable radomes]

### Definition statement

*This subclass/group covers:*  
For example:



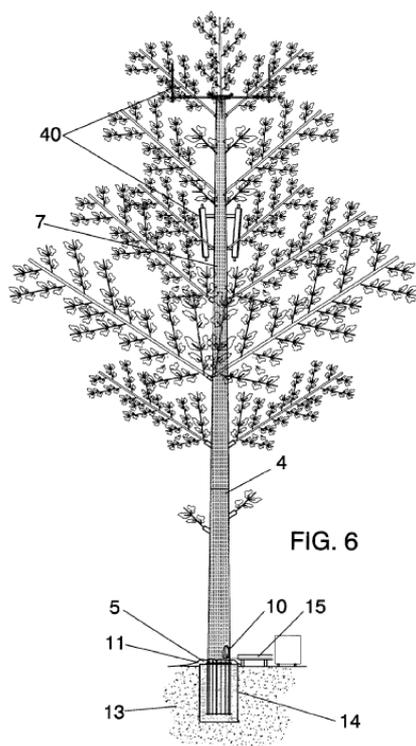
## H01Q 1/44

using equipment having another main function to serve additionally as an aerial; [N: Means for giving an aerial anaesthetic aspect] ([H01Q 1/28](#) to [H01Q 1/34](#) take precedence)

### Definition statement

*This subclass/group covers:*

Artificial trees; disguising antenna in other objects; camouflage; nicer, (a)esthetic appearance for reflectors; patterning / coloring of antennas; devices with integrated perfume dispensers.



## References relevant to classification in this group

*This subclass/group does not cover:*

Adaptation for use in or on aircraft, missiles, satellites or balloons	<a href="#">H01Q 1/28</a>
Adaptation for use in or on ships, submarines, buoys, or torpedoes	<a href="#">H01Q 1/34</a>

## H01Q 1/46

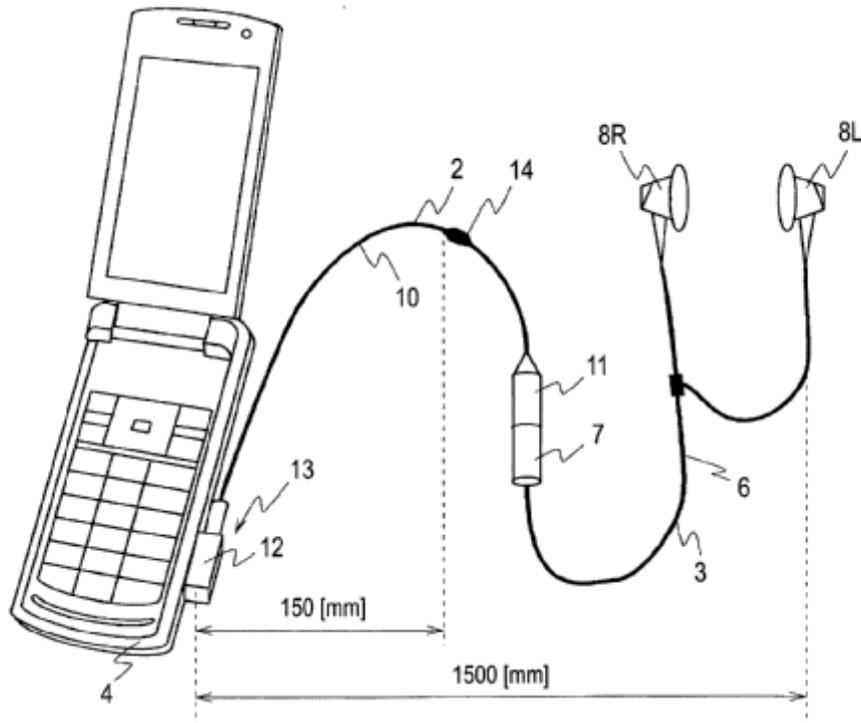
**Electric supply lines or communication lines [N: (circuits for signal transmission via power distribution lines [H04B 3/56](#))]**

### Definition statement

*This subclass/group covers:*

For example:

Power distribution lines used for a lf radar application.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Circuits for signal transmission via power distribution lines	<a href="#">H04B 3/56</a>
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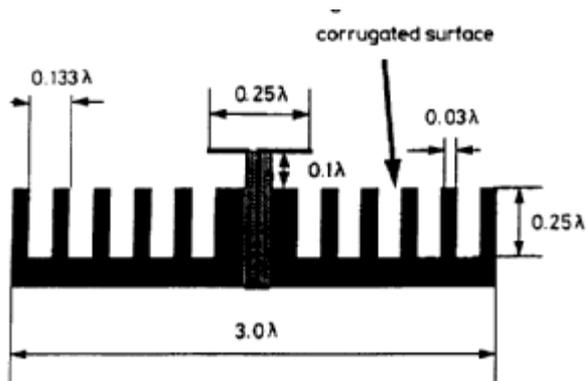
### H01Q 1/48

Earthing means; Earth screens; Counterpoises (earthing pins [H01R 4/66](#))

### Definition statement

*This subclass/group covers:*

Counterpoise: A system of conductors, elevated above and insulated from the ground, forming a lower system of conductors of an antenna.



**Fig. 1** Horizontal dipole on corrugated soft ground plane  
Geometry with dimension in wavelengths at 5.0GHz

## Informative references

Attention is drawn to the following places, which may be of interest for search:

Earthing pins	<a href="#">H01R 4/66</a>
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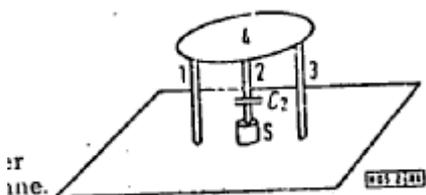
## H01Q 1/50

Structural association of aerials with earthing switches, (lead-in devices [H01B](#); lightning protectors, switches [H01H](#))

## Definition statement

This subclass/group covers:

Only when integrated with antenna. The devices as such are in [H01T](#).



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Structurally associated with protected apparatus	<a href="#">H01T 4/08</a>
Lead-in devices	<a href="#">H01B</a>
Lightning protectors, switches	<a href="#">H01H</a>

## H01Q 1/52

Means for reducing coupling between aerials; Means for reducing coupling between an aerial and another structure [N: (absorbing means [H01Q 17/00](#))]

### Definition statement

*This subclass/group covers:*

Reducing the irradiation of objects.

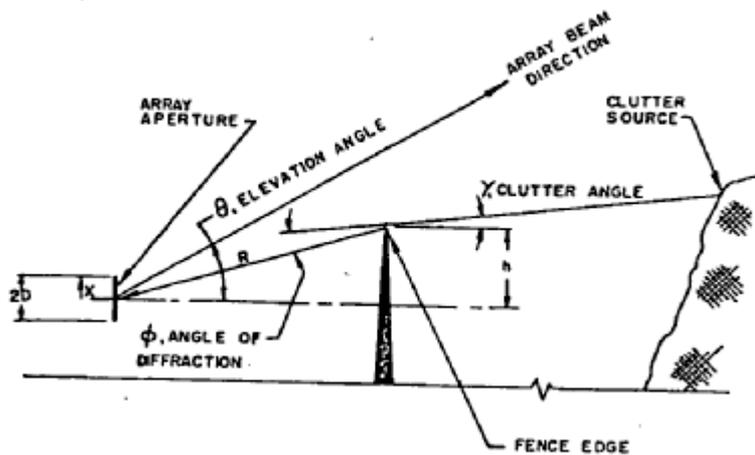


Fig. 1. Radar site dimensions and angles.

### References relevant to classification in this group

*This subclass/group does not cover:*

Absorbing means	<a href="#">H01Q 17/00</a>
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### Synonyms and Keywords

Increasing isolation between antennas.

## H01Q 1/521

[N: reducing the coupling between adjacent antennas]

### Definition statement

*This subclass/group covers:*

Antennas are next to each other, but have no relation to another: antennas on the same GSM mast, but dedicated to the same service.

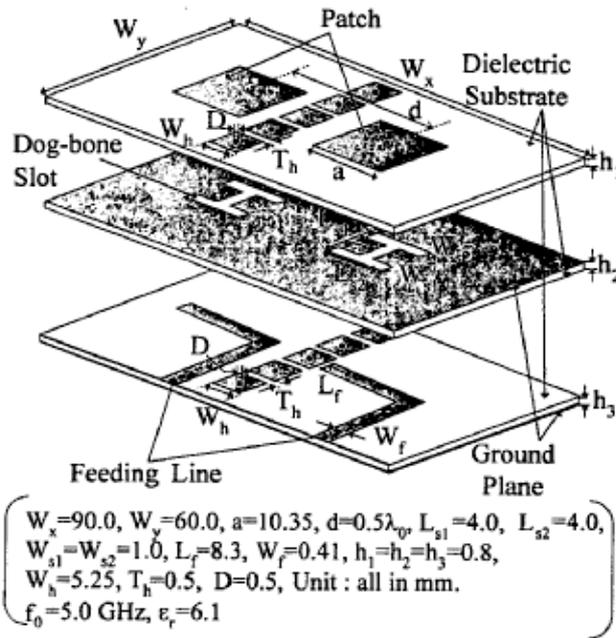


Fig.1 Configuration of a 2-element MSA array fed by a triplate waveguide with EBG elements.

## H01Q 1/523

[N: between antennas of an array]

### Definition statement

*This subclass/group covers:*

Antennas next to each other, and belong to the same array, i.e. Sharing a feeding system.

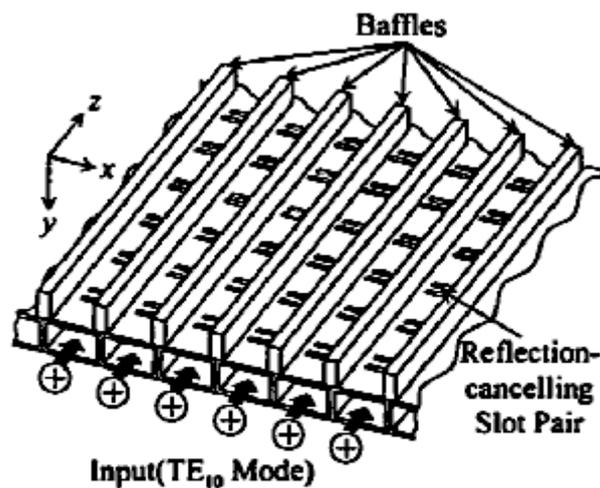


Fig.1 Reflection-cancelling transverse slot-pair array antenna with grating-lobe suppressing baffles.

## H01Q 1/525

[N: between emitting and receiving antennas (feed-through nulling for radar [G01S 7/038](#))]

### Definition statement

*This subclass/group covers:*

Solutions for overload / saturation at RX antenna: one antenna transmits, and at the same time, the other neighbouring antenna receives.

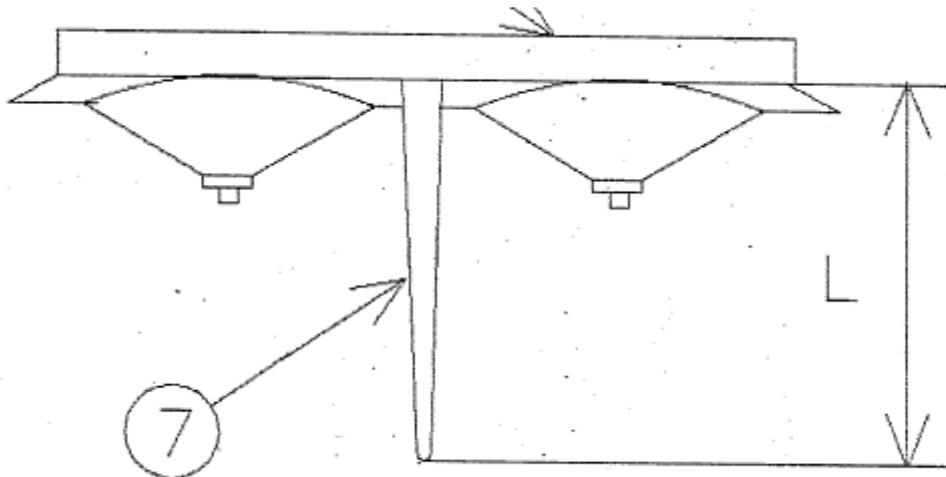


Fig. 2

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Feed-through nulling for radar	<a href="#">G01S 7/038</a>
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## H01Q 1/526

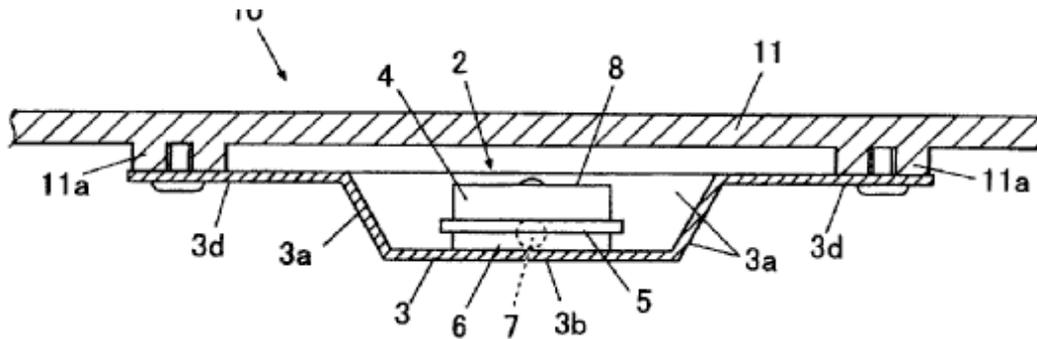
[N: Electromagnetic shields (anechoic chambers [G01R 29/105](#); shielding of instruments [G12B 17/00](#), of CRT [H01J 29/867](#), of electrical apparatus or components [H05K 9/00](#))]

### Definition statement

*This subclass/group covers:*

For example:

Grounded wall between a radiator and something else; fences.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Anechoic chambers	<a href="#">G01R 29/105</a>
Shielding of instruments	<a href="#">G12B 17/00</a>
Shielding of CRT	<a href="#">H01J 29/867</a>
Shielding of electrical apparatus or components	<a href="#">H05K 9/00</a>

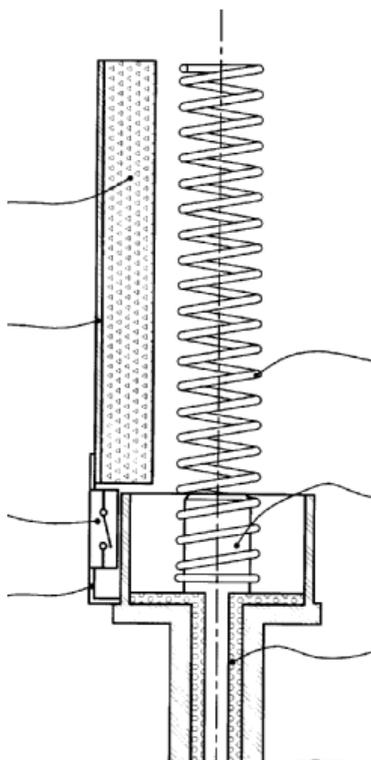
## H01Q 1/528

[N: reducing the reradiation of a support structure (in a parabolic reflector antenna [H01Q 19/023](#))]

### Definition statement

*This subclass/group covers:*

Reducing the influence of currents induced by the antenna onto, e.g. A support; increasing the decoupling of a ground-plane supported antenna, where the ground plane is not a counterpoise. ideally influence should be nothing, e.g. antenna on space craft.



## References relevant to classification in this group

*This subclass/group does not cover:*

In a parabolic reflector antenna	<a href="#">H01Q 19/023</a>
----------------------------------	-----------------------------

## H01Q 3/00

**Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system [N: (means for positioning [H01Q 1/125](#))]**

### Definition statement

*This subclass/group covers:*

Changing or varying the orientation that is beam steering as changing the direction of the major lobe.

Related is beam scanning that is a repetitive motion given to the major lobe.

Changing or varying the shape that is beam forming.

Motion of the major lobe to have moving target within the lobe that is beam tracking.

Realized either:

- by mechanically moving the antenna or the feed or
- by electronically altering the aperture excitation with amplitude and phase.

### References relevant to classification in this group

*This subclass/group does not cover:*

Means for positioning	<a href="#">H01Q 1/125</a>
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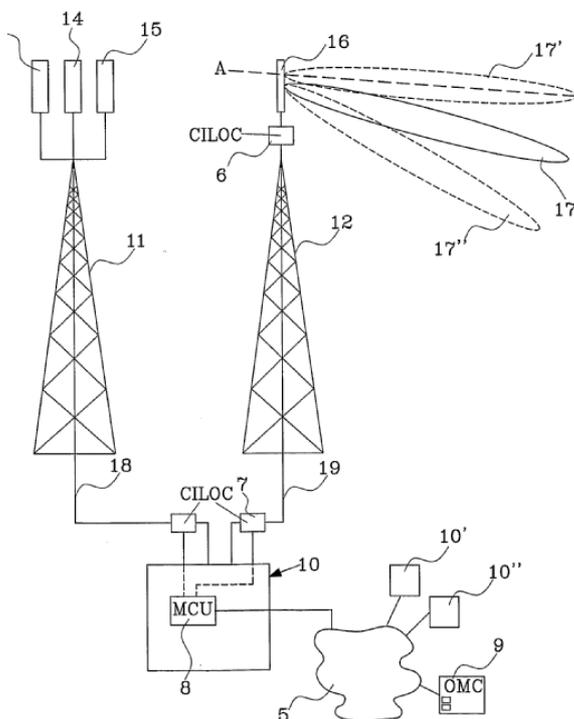
### H01Q 3/005

[N: using remotely controlled aerial positioning or scanning (remote control in general [G08C](#))]

### Definition statement

*This subclass/group covers:*

Remote control aspects as such.



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Remote control in general	<a href="#">G08C</a>
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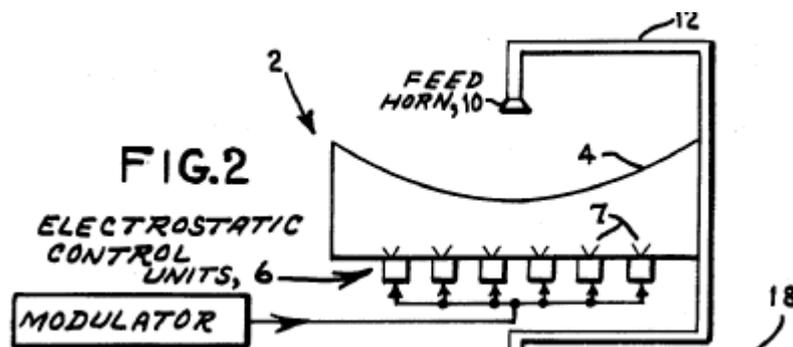
## H01Q 3/01

varying the shape of the aerial or aerial system

### Definition statement

*This subclass/group covers:*

The variations are mechanical variations, e.g. Deformable sub-reflectors in dual reflector antenna systems.



## H01Q 3/02

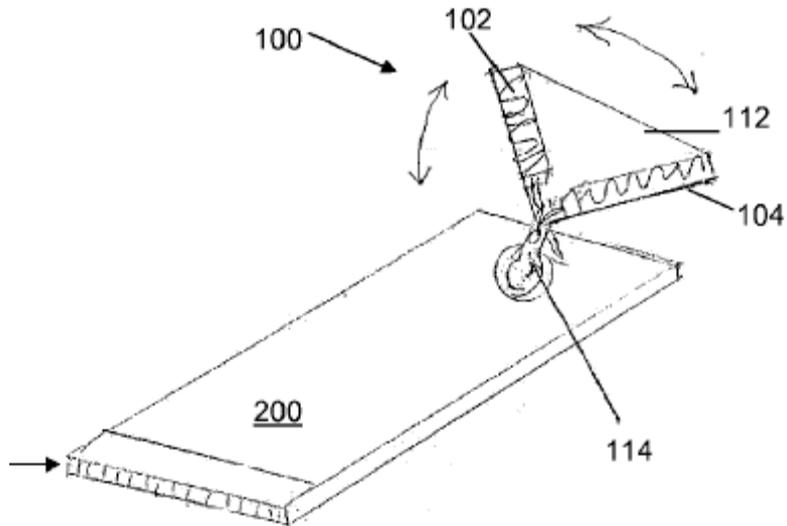
using mechanical movement of aerial or aerial system as a whole

### Definition statement

*This subclass/group covers:*

The whole antenna moves, i.e. one needs.

Rotary joints, couplers between fixed TIR and rotating antenna. Rotary joints belong to [H01P](#).



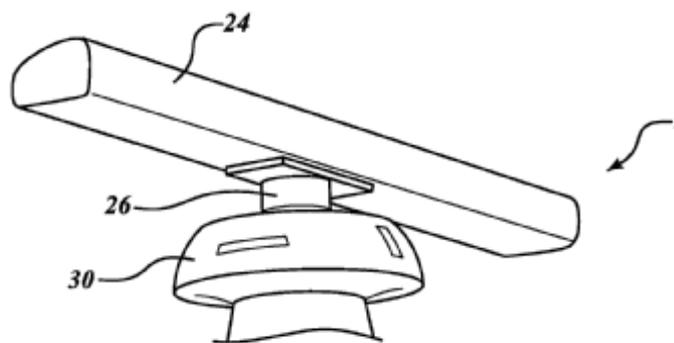
### H01Q 3/04

for varying one co-ordinate of the orientation

#### Definition statement

*This subclass/group covers:*

Either azimuth, elevation or another axis of rotation, e.g. Polar axis for leo orbit satellites.



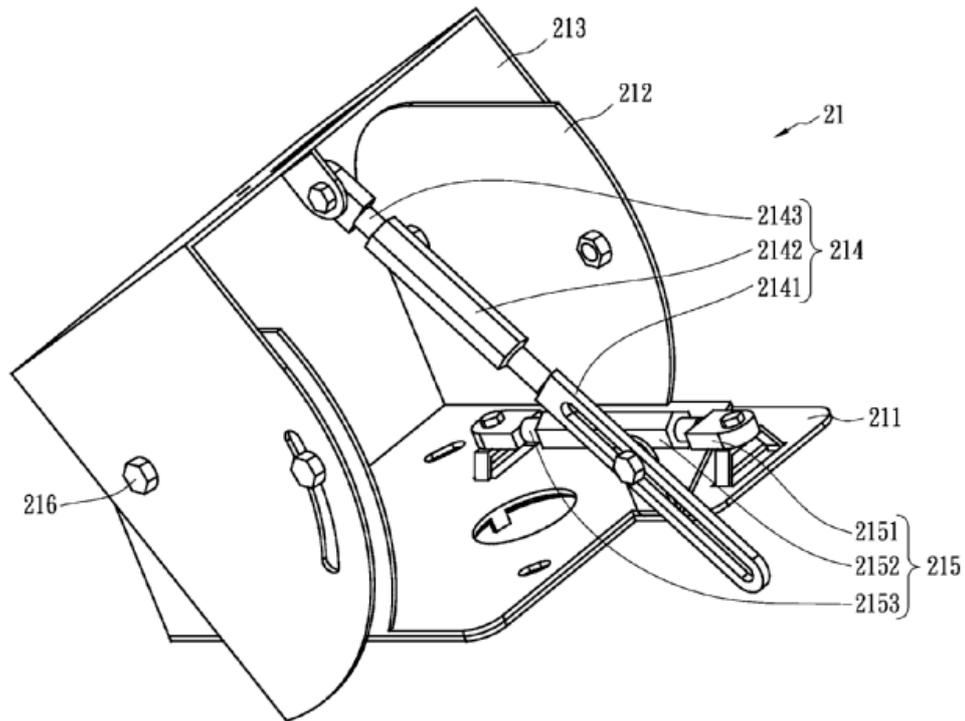
### H01Q 3/06

over a restricted angle

#### Definition statement

*This subclass/group covers:*

For example:



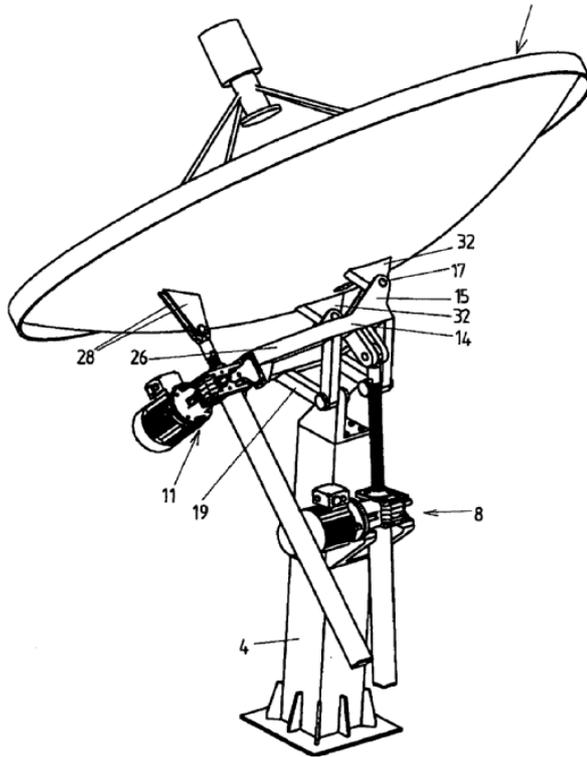
## H01Q 3/08

for varying two co-ordinates of the orientation

### Definition statement

*This subclass/group covers:*

Normally variation of two (orthogonal) angles, e.g. Azimuth and elevation, polar and cross-polar angles.



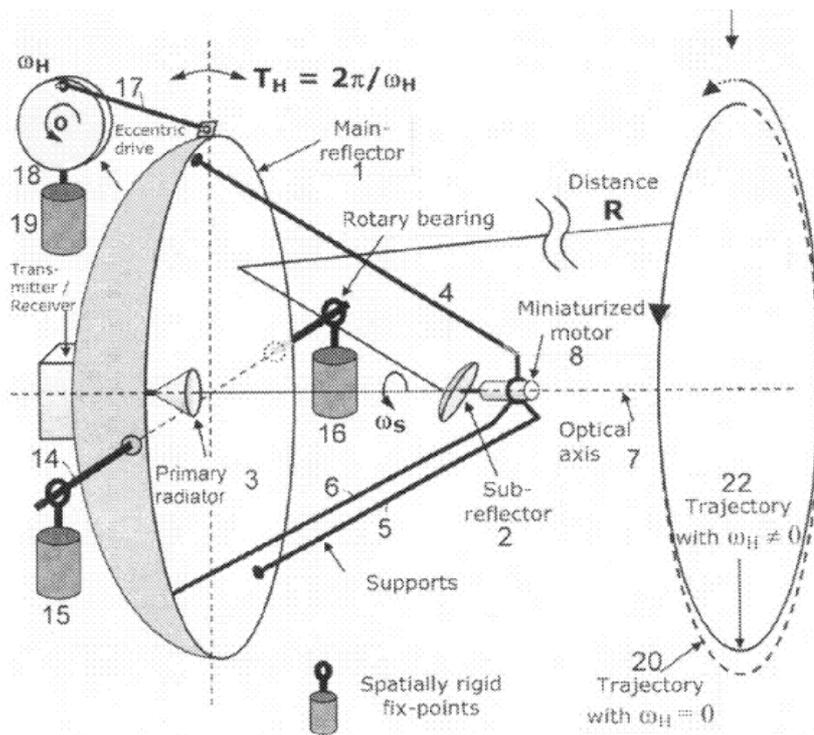
## H01Q 3/10

to produce a conical or spiral scan

### Definition statement

*This subclass/group covers:*

The direction of maximum radiation generates a cone whose vertex angle is in the order of the antenna half-power beamwidth.



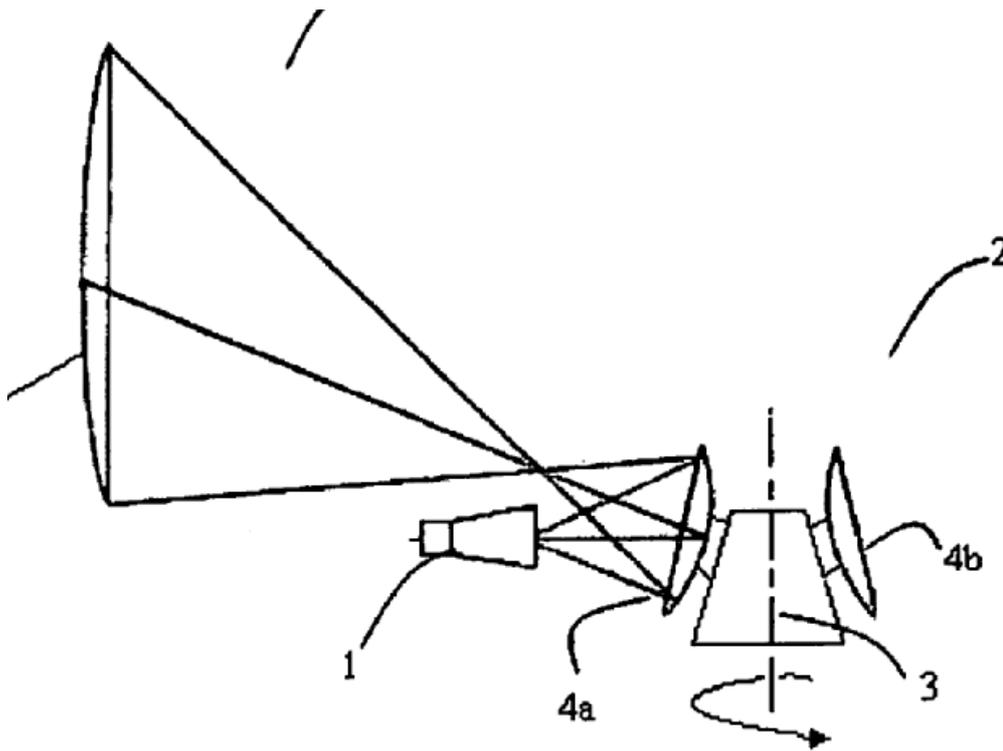
## H01Q 3/12

using mechanical relative movement between primary active elements and secondary devices of aerials or aerial systems [N: (positioning [H01Q 1/1264](#))]

### Definition statement

*This subclass/group covers:*

The movement is relative, one element moves w.r.t. another one, e.g. feed w.r.t. lens, sub-reflector w.r.t. feed. See also lower classes for specific cases of relative movement.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Positioning	<a href="#">H01Q 1/1264</a>
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### H01Q 3/14

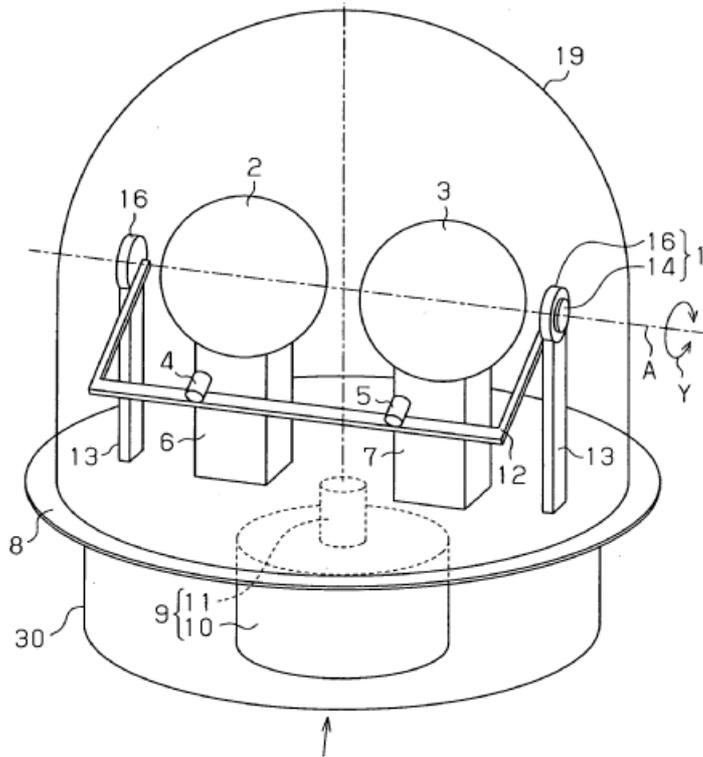
for varying the relative position of primary active element and a refracting or diffracting device

### Definition statement

*This subclass/group covers:*

Refracting device, like lens.

Diffracting device, like grating.



## H01Q 3/16

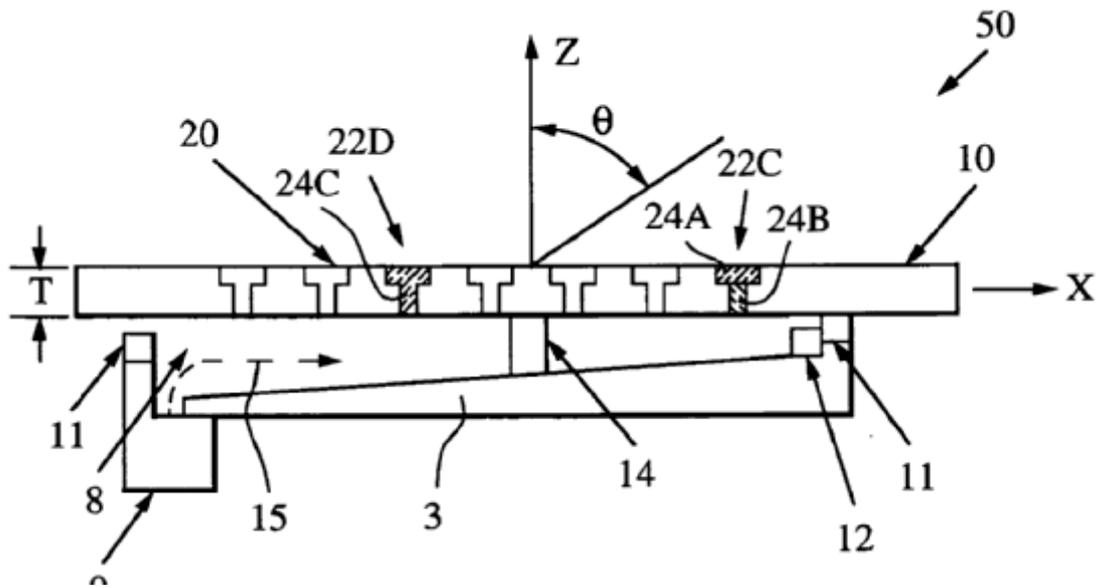
for varying relative position of primary active element and a reflecting device

### Definition statement

*This subclass/group covers:*

Primary active element, like feed, radiating element.

Reflecting device, like sub reflector or main reflector.



## H01Q 3/18

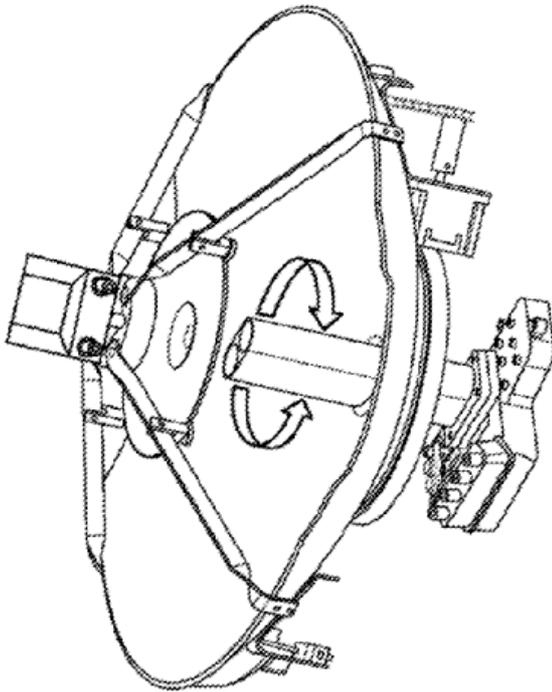
wherein the primary active element is movable and the reflecting device is fixed

### Definition statement

*This subclass/group covers:*

Mechanically moving the feed of the antenna, that is steerable-beam antenna.

Feed-motion, off-axis fed, that is lateral displacement of the feed.

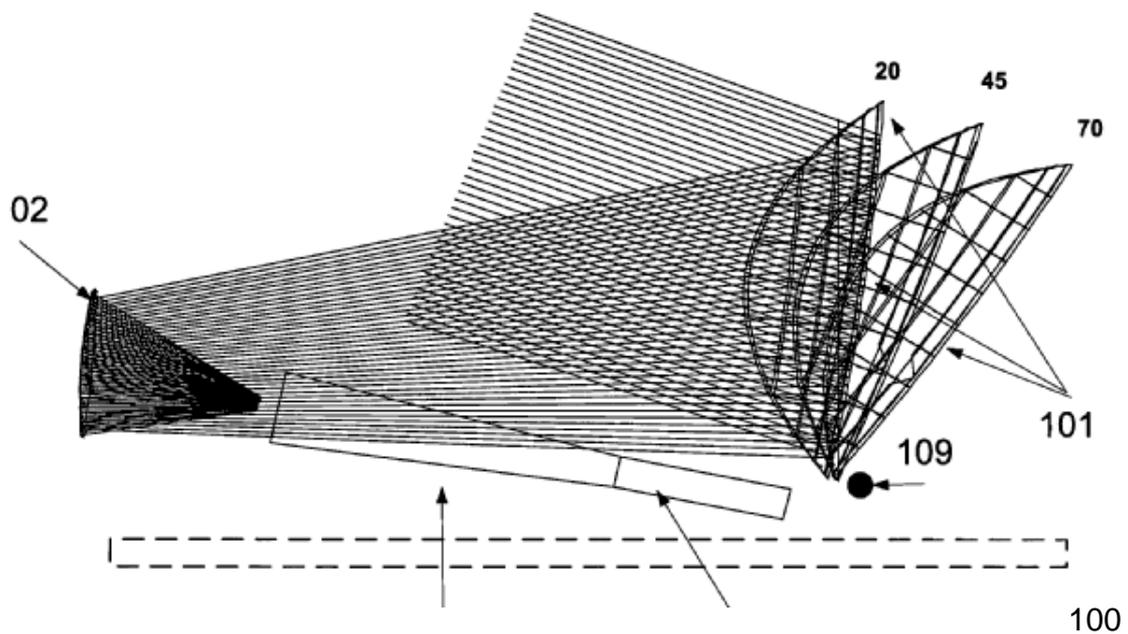


### H01Q 3/20

wherein the primary active element is fixed and the reflecting device is movable

#### Definition statement

*This subclass/group covers:*  
Reflector tilt; subreflector scanning.



## H01Q 3/22

**varying the orientation in accordance with variation of frequency of radiated wave**

### Definition statement

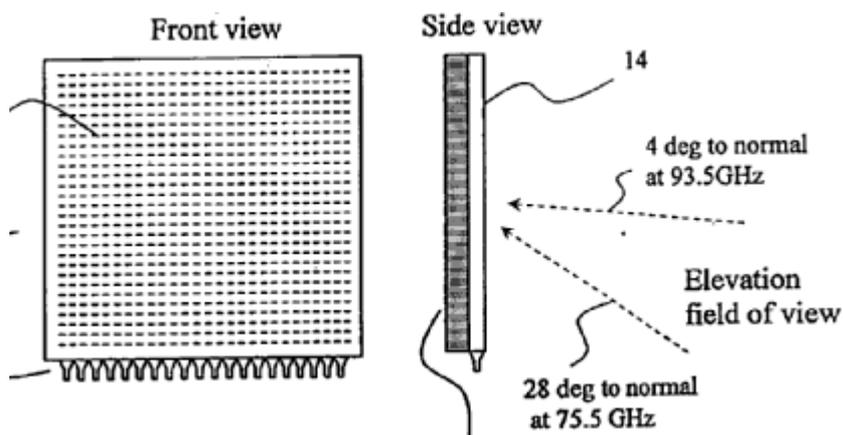
*This subclass/group covers:*

Type of electronic scanning, i.e. scanning an antenna beam by electronic or electric means without moving parts, inertialess scanning.

Frequency scanning is defined as that the direction of the radiated beam is controlled by changing the operating frequency. It is based on the fact that the phase delay through a length of transmission line changes with frequency; no phase shifters.

Frequency hopping means that the frequency of the transmitter abruptly changes (or hops) in accordance with a pseudo-random code sequence; the receiver tracks these changes.

With a phased array without phase shifters, frequency hopping will inevitably result in beam scanning.



## H01Q 3/24

**varying the orientation by switching energy from one active radiating element to another, e.g. for beam switching**

### Definition statement

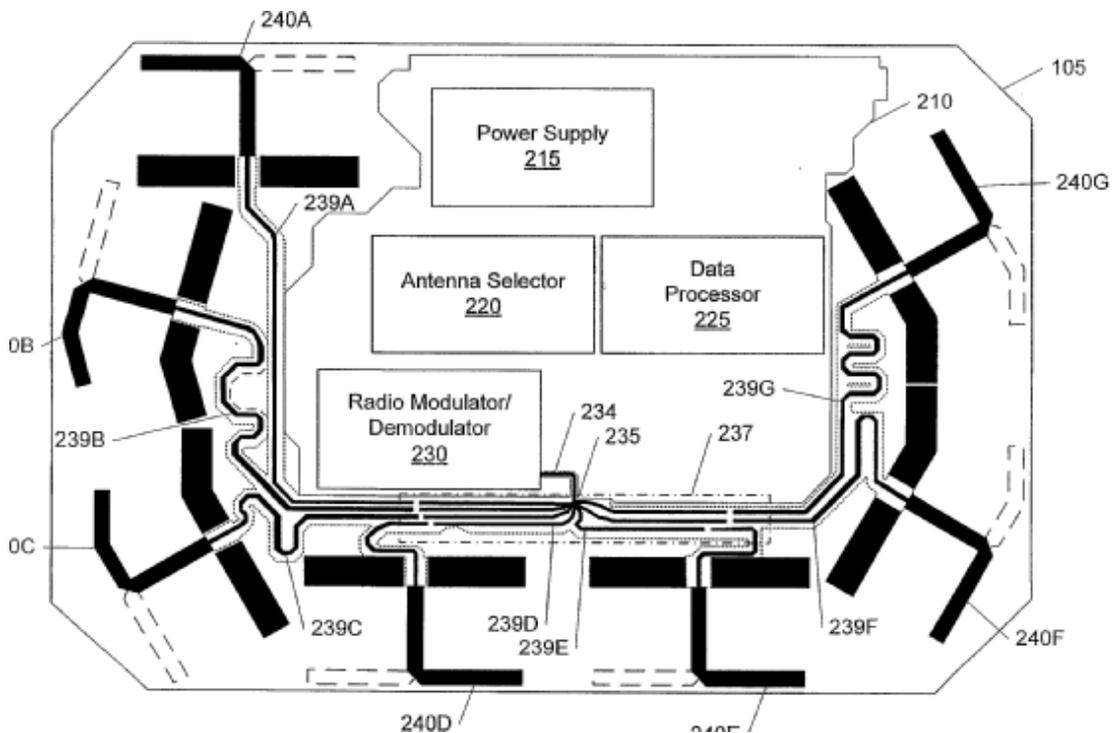
*This subclass/group covers:*

Scanning of a radiating beam by selecting a particular fixed beam from an available set of fixed beams.

Due to the switching, there exists only a single beam at a time. The non-selected elements are simply not used. This concept is distinctively different from having a multiple beam array antenna with a beam former for

which only a specific beam port is selected. In this specific case all the active elements will radiate/receive at all times.

For example, if the direction of main radiation of two antenna elements is different, selecting one or the other element will change the direction of the beam.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

At receiving station, e.g. space diversity	<a href="#">H04B 7/08</a> and subgroups for diversity systems
--	---

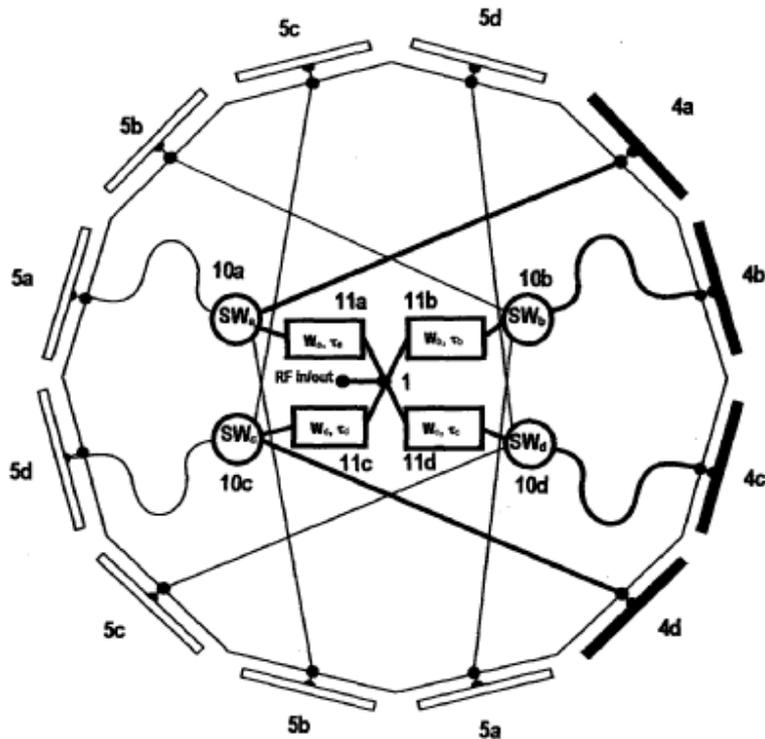
### H01Q 3/242

[N: Circumferential scanning]

### Definition statement

*This subclass/group covers:*

Circumferential scanning means that the beams scan around the circumference e.g. with a cylindrical array, an array on a cylinder with transfer switches (double-pole, double or four throw switches).



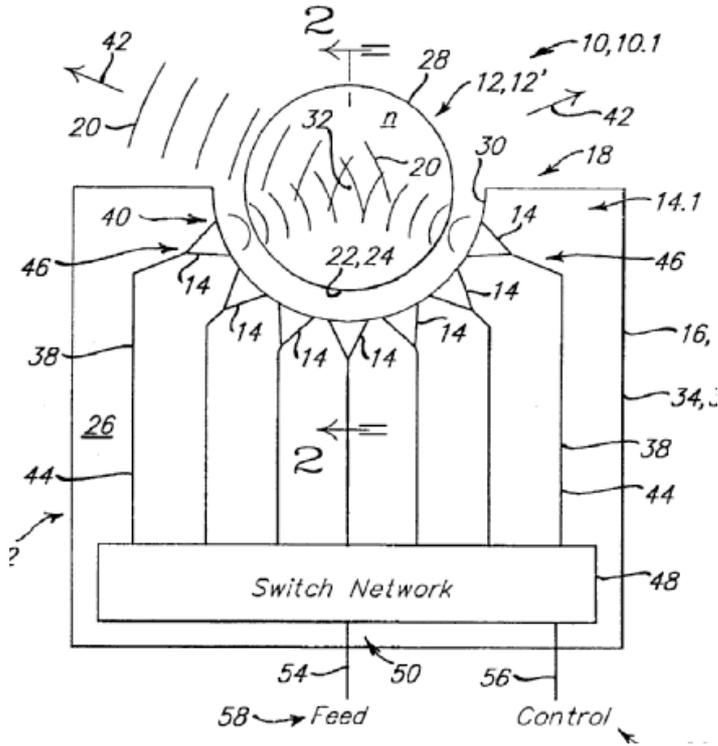
## H01Q 3/245

[N: in the focal plane of a focussing device]

### Definition statement

*This subclass/group covers:*

The switching in fact causes the phase center of the active element to change, e.g. lateral displacement. As a consequence, also the produced beam changes direction.



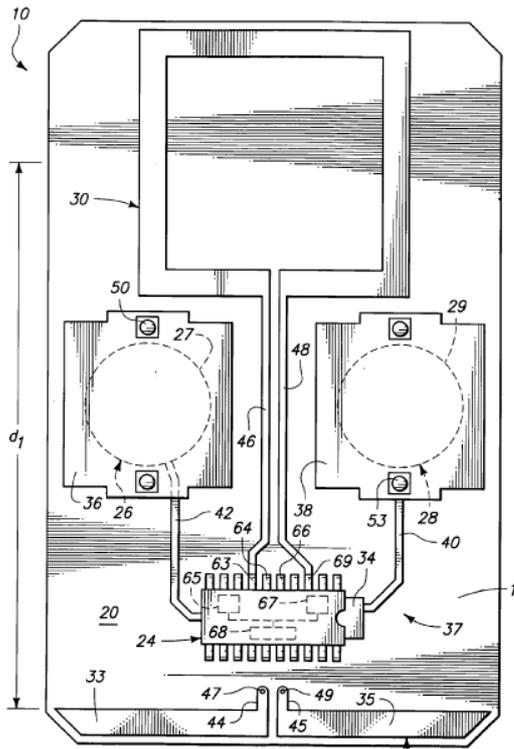
**H01Q 3/247**

[N: by switching different parts of a primary active element]

**Definition statement**

*This subclass/group covers:*

On-off switching of elements or parts of a single element.



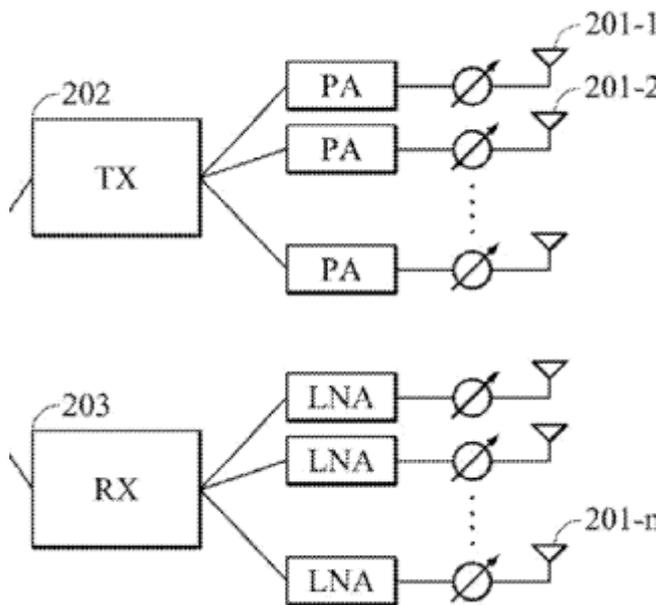
## H01Q 3/26

varying the relative phase or relative amplitude of energisation between two or more active radiating elements; varying the distribution of energy across a radiating aperture ([N: [H01Q 3/12](#)], [H01Q 3/22](#), [H01Q 3/24](#) take precedence; [N: use of steered beams for mobile service area coverage [H04Q 7/3615](#)])

### Definition statement

*This subclass/group covers:*

- Varying the phase or amplitude:
  - beam can be scanned by using phase shifters to change the excitation phases of its array elements;
  - and forming a desired radiation pattern by amplitude control via amplifiers/attenuators.
- Varying the distribution of energy across aperture:
  - amplitude distribution (uniform or non-uniform) over a aperture, near or on an antenna, on which it is convenient to make assumptions over the field values at external points e.g. applying amplitude taper for reducing sidelobes as Taylor or Dolph-Chebyshev distributions.



## References relevant to classification in this group

*This subclass/group does not cover:*

Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system	<a href="#">H01Q 3/00</a>
Using mechanical relative movement between primary active elements and secondary devices of aerials or aerial systems	<a href="#">H01Q 3/12</a>
Arrangements for changing or varying the orientation or the shape of the directional pattern of the waves radiated from an aerial or aerial system using mechanical relative movement between primary active elements and secondary devices of aerials or aerial systems	<a href="#">H01Q 3/12</a>
Arrangements for varying the orientation in accordance with variation of frequency of radiated wave	<a href="#">H01Q 3/22</a>
Arrangements for varying the	<a href="#">H01Q 3/24</a>

orientation by switching energy from one active radiating element to another, e.g. for beam switching	
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## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Use of steered beams for mobile service area coverage	<a href="#">H04Q 7/3615</a>
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## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this subclass, the following terms (or expressions) are often used with the meaning indicated:*

Beam forming	weighting and summing the elements signals
Weighting	phase and amplitude applied to the signals; changing the weighting of one element to the other changes the pattern in direction and beamwidth/beamform
Analog beamforming (RF beamforming)	phase and/or amplitude control takes place in the RF domain
Digital beamforming	phase and/or amplitude control takes place inside a beamforming computer / processor, after having sampled the RF signals using an A/D convertor. In a digital beamforming array, the received signals are detected and digitized at the element level; the digitized signals are then processed in a digital computer to form a desired beam on transmit and/or receive; processing of the digitized signals in time and amplitude according to a software program.

## Synonyms and Keywords

In patent documents the following abbreviations are often used:

ESA	electronically scanned array
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## H01Q 3/2605

[N: Array of radiating elements provided with a feedback control over the element weights, e.g. adaptive arrays (tracking [G01S 3/42](#))]

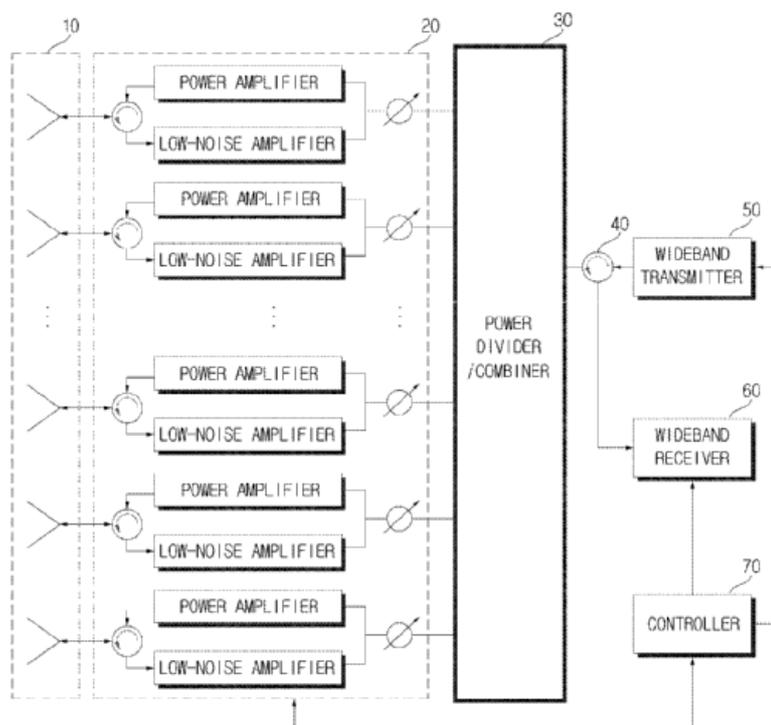
### Definition statement

*This subclass/group covers:*

Adaptivity: automatic signal-dependent weight adjustment to reduce unwanted signals and/or emphasize the desired signal or an antenna system having circuit elements associated with its radiating elements such that one or more of the antenna properties are controlled by the received signal.

Different Weight-determining Algorithms in the Adaptive Control Processor.

Applebaum-Howell circuit.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

The adaptive array algorithms should not be classified here, but belong to	<a href="#">H04B 7/08</a> and subgroups
Tracking	<a href="#">G01S 3/42</a>

### **Glossary of terms**

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this subclass, the following terms (or expressions) are often used with the meaning indicated:*

LMS	Least-Mean-Square algorithm
MUSIC	Multiple Signal Classification
ESPRIT	Estimation of Signal Parameters via Rotational Invariance Techniques
DOA	Direction of Arrival

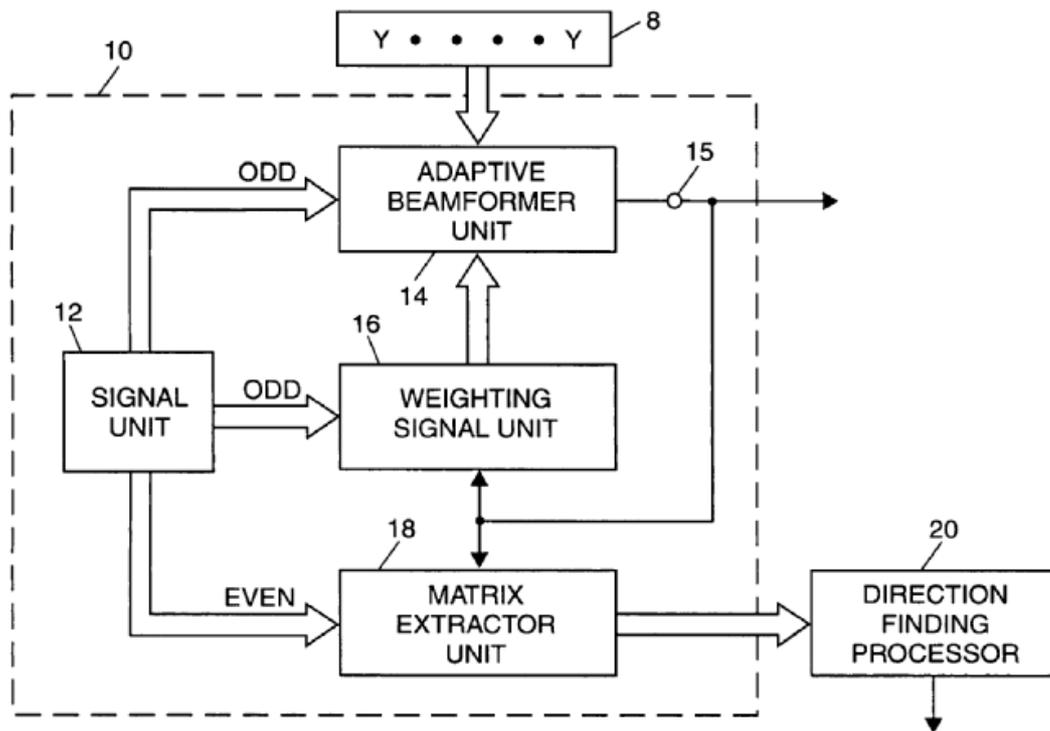
### **H01Q 3/2611**

**[N: Means for null steering; Adaptive interference nulling]**

#### **Definition statement**

*This subclass/group covers:*

For example:



### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this subclass, the following terms (or expressions) are often used with the meaning indicated:*

Null steering	to control, usually electronically, the direction at which a directional null appears in the radiation pattern or directing the peak of the directivity to the direction of arrival or the location of a signal source and by directing a null point of the directivity to the direction of an incoming disturbance wave
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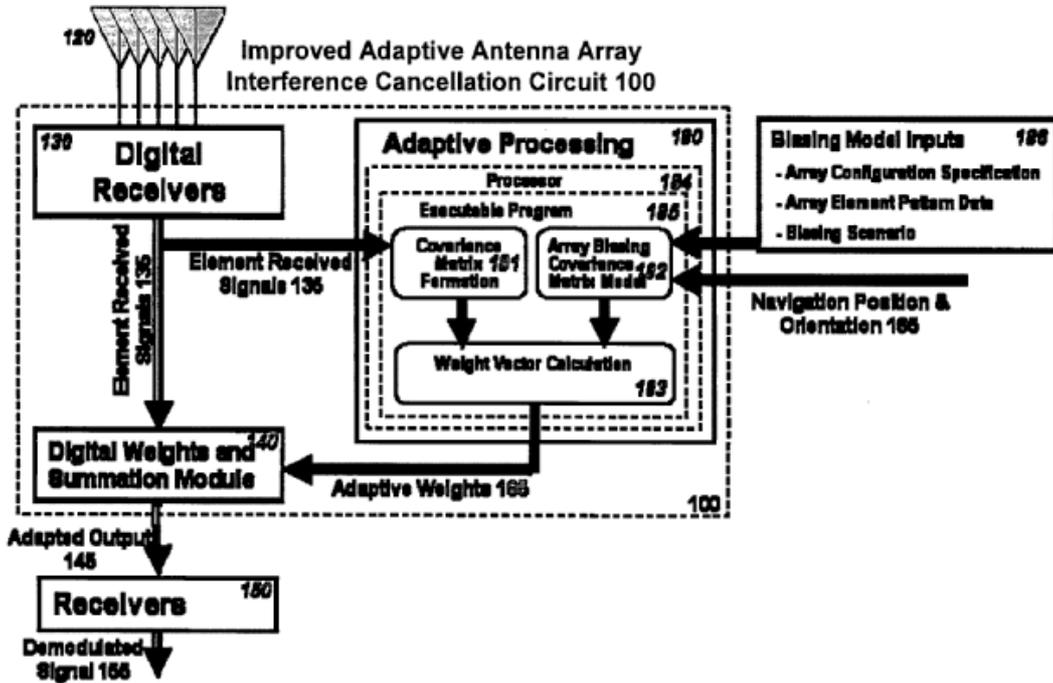
### H01Q 3/2617

[N: Array of identical elements]

### Definition statement

*This subclass/group covers:*

For example:



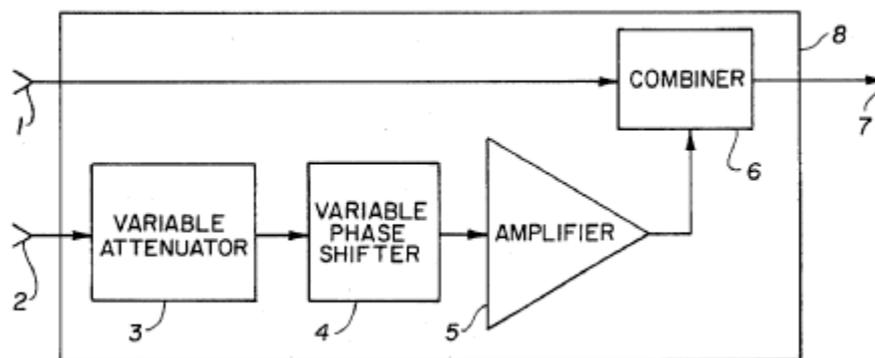
### H01Q 3/2623

[N: composed of two antennas]

#### Definition statement

*This subclass/group covers:*

For example:



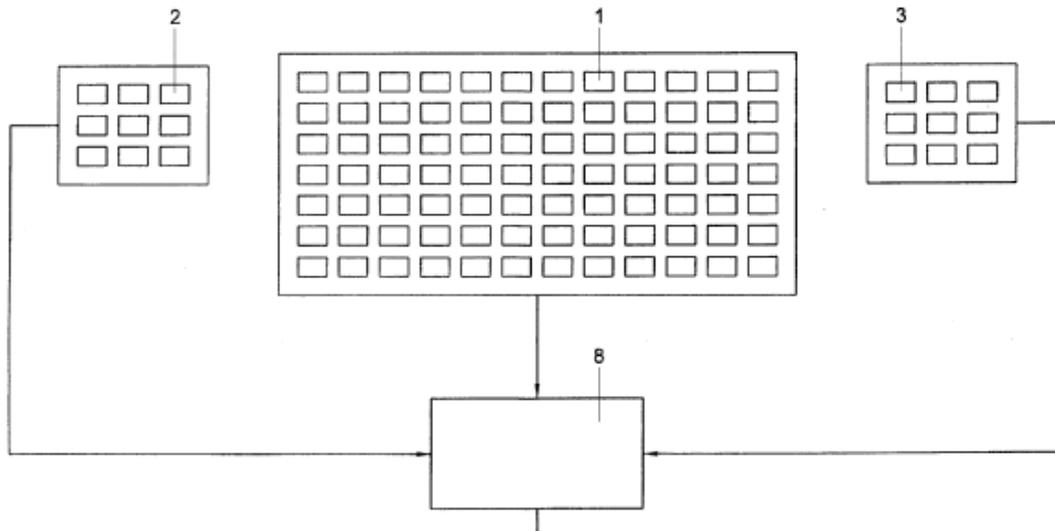
### H01Q 3/2629

[N: Combination of a main antenna unit with an auxiliary antenna unit]

#### Definition statement

*This subclass/group covers:*

Sidelobe canceller, sidelobe blanker: destructive interference is used for blanking a null in a pattern by subtraction of signals having identical amplitude and phase: this causes a distinct null in the pattern.



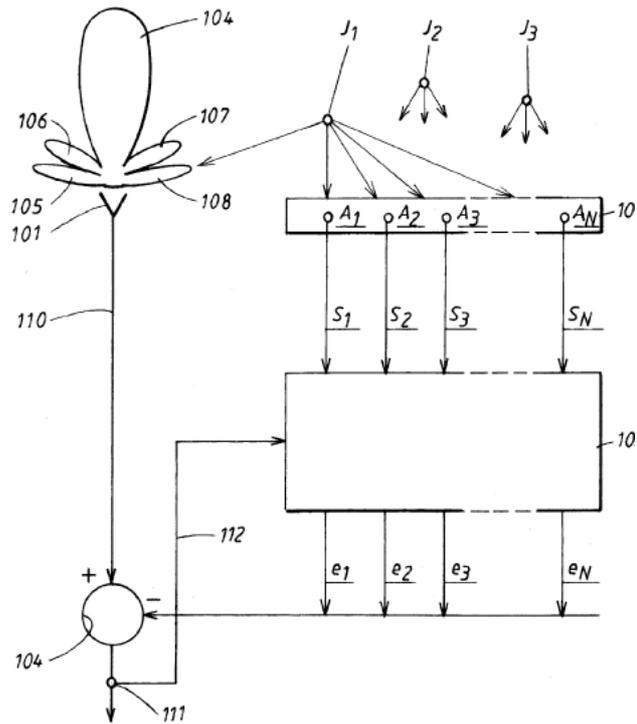
## **H01Q 3/2635**

**[N: the auxiliary unit being composed of a plurality of antennas]**

### **Definition statement**

*This subclass/group covers:*

For example:



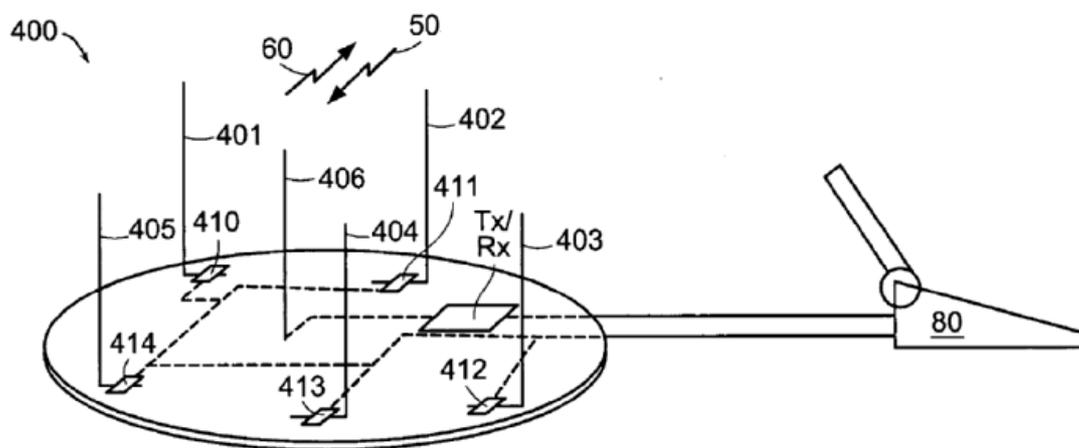
### H01Q 3/2641

[N: being secondary elements, e.g. reactively steered]

#### Definition statement

*This subclass/group covers:*

Adjusting terminating reactances, e.g. Varicap diodes.



### H01Q 3/2647

[N: Retrodirective arrays]

## Definition statement

*This subclass/group covers:*

Perform beam steering in an automatic fashion by retransmitting an incoming selfphased signal in a phase conjugated manner. The received signal is then retransmitted in the direction it was originated from. Active devices can be added to enhance the return signal (that is, active retrodirective antenna system); as retro-reflector or retro-reflective transponder; Van Atta array.

## Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Wherein continuous-type signals are transmitted	<a href="#">G01S 13/82</a>
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## H01Q 3/2652

[N: Self-phasing arrays]

### Definition statement

*This subclass/group covers:*

A receiving antenna system that introduces a phase distribution among the array elements so as to maximize the received signal, regardless of the direction of incidence; Contrast with: Retrodirective.

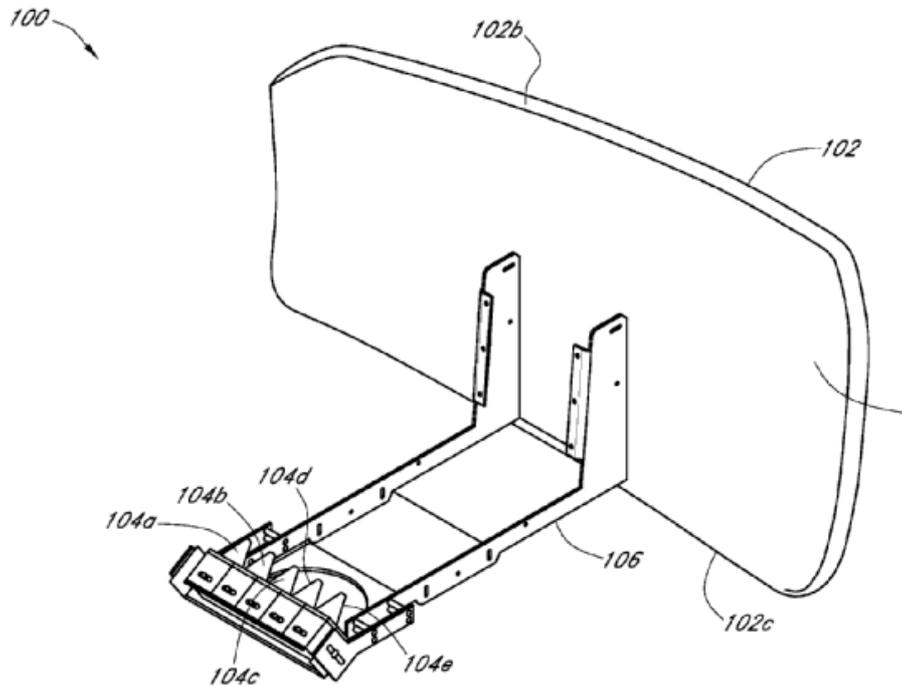
## H01Q 3/2658

[N: Phased-array fed focusing structure]

### Definition statement

*This subclass/group covers:*

Phased array in/at the focal point of a lens or parabolic/hyperbolic dish.



## H01Q 3/2664

[N: electrically moving the phase centre of a radiating element in the focal plane of a focusing device (switching [H01Q 3/245](#), phased-array feeds [H01Q 3/2658](#))]

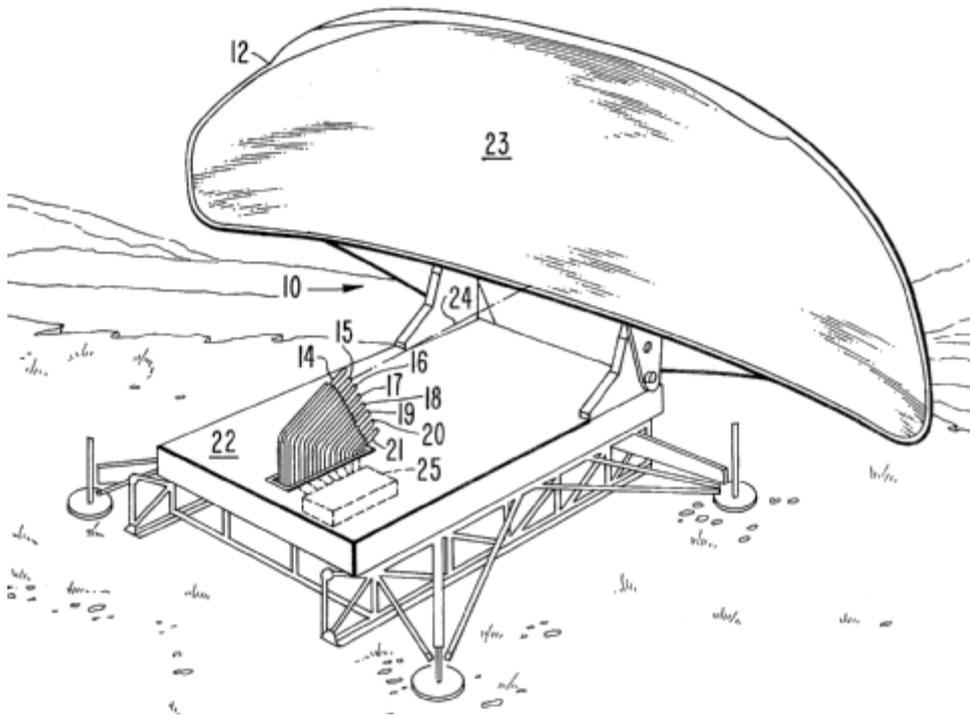
### Definition statement

*This subclass/group covers:*

This gives the possibility of shaping the beam that is incident upon the focussing device, as well as its angle of incidence.

Examples:

- rotating obstacles in front of a conical horn;
- aperture shaping: the aperture of a feed horn or of a focused reflector surface is modified.



## References relevant to classification in this group

*This subclass/group does not cover:*

Switching	<a href="#">H01Q 3/245</a>
Phased-array feeds	<a href="#">H01Q 3/2658</a>

## H01Q 3/267

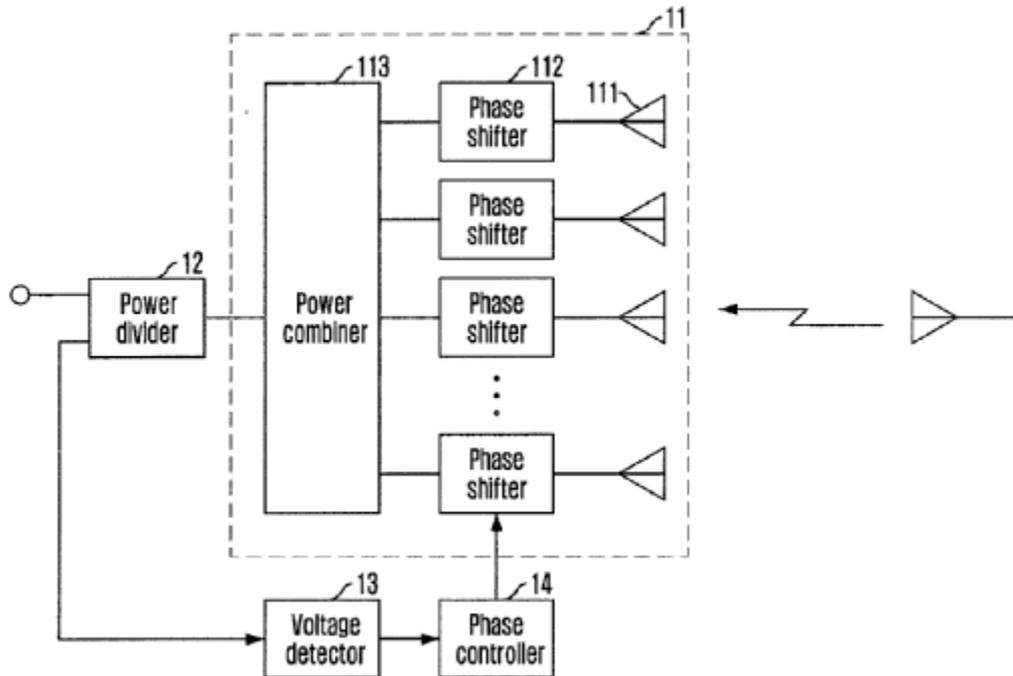
**[N: Phased-array testing or checking devices (measuring radiation diagrams of aerials [G01R 29/10](#))]**

### Definition statement

*This subclass/group covers:*

Testing means diagnosis of faults by integral monitors; with built-in performance monitoring and measurement of aperture distribution; near-field measurements with a probe antenna; built-in test equipment BITE.

Calibration means to standardize by determining the deviation from standard so as to ascertain the proper correction factors, i.e. diagnosis of errors in terms of amplitude and/or phase.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

<p>Anything dealing with the calibration of phased arrays is classified here, e.g. single carrier, multi-carrier systems, measuring radiation diagrams of aerials</p>	<p><a href="#">G01R 29/10</a></p>
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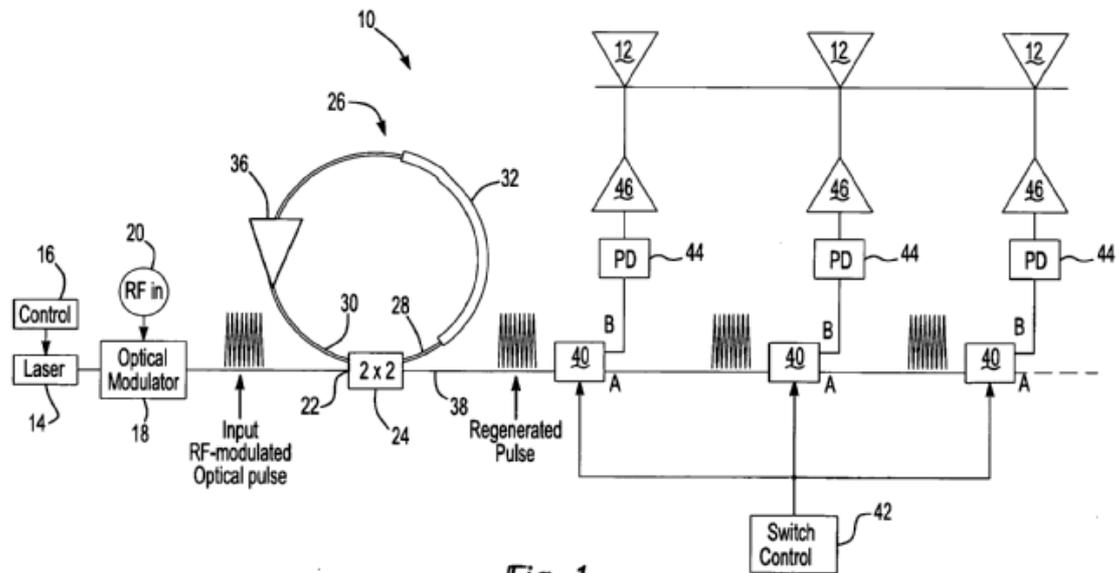
## H01Q 3/2676

[N: Optically controlled phased array (optical fibre networks [H03H 2/003](#))]

## Definition statement

*This subclass/group covers:*

Optical control means beam scanning by the use of photoelectric conversion i.e. optical to microwave conversion and reverse with lasers, photodiodes and fibers as true time delay elements; photonic time shifter; electric-optical conversion elements.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical fibre networks	<a href="#">H03H 2/003</a>
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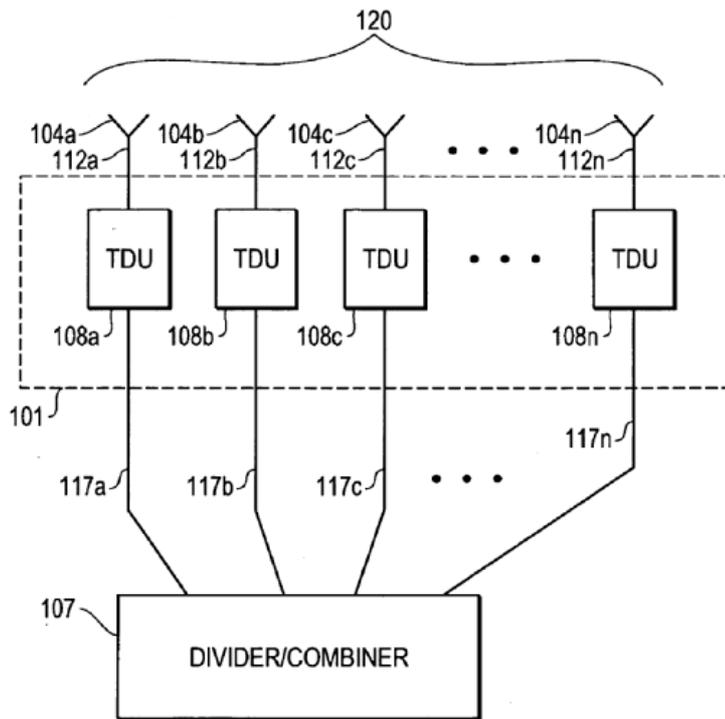
### H01Q 3/2682

[N: Time delay steered arrays]

### Definition statement

*This subclass/group covers:*

Other method beside beam steering/scanning with phase shifters using delay lines which introduce a frequency independent time delay; e.g. switchable delay lines; Blass matrix.



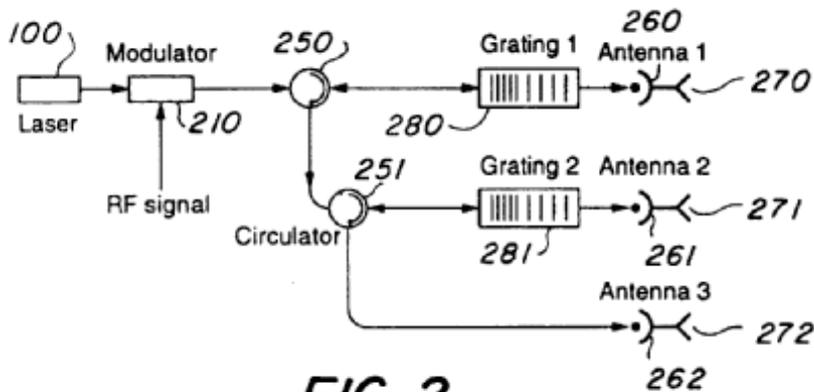
## H01Q 3/2688

[N: using acoustic or magnetostatic wave devices]

### Definition statement

*This subclass/group covers:*

An input electrical signal is launched as acoustic signal by an input transducer. The acoustic signal undergoes a finite delay as it propagates over the medium and then reconverted to electrical signal. Surface Acoustic Wave (SAW) or Magnetostatic Wave (MSW) with YIG material as ferrimagnetic material.



**FIG. 2**

## H01Q 3/2694

[N: using also variable phase-shifters ([H01Q 3/2688](#) takes precedence)]

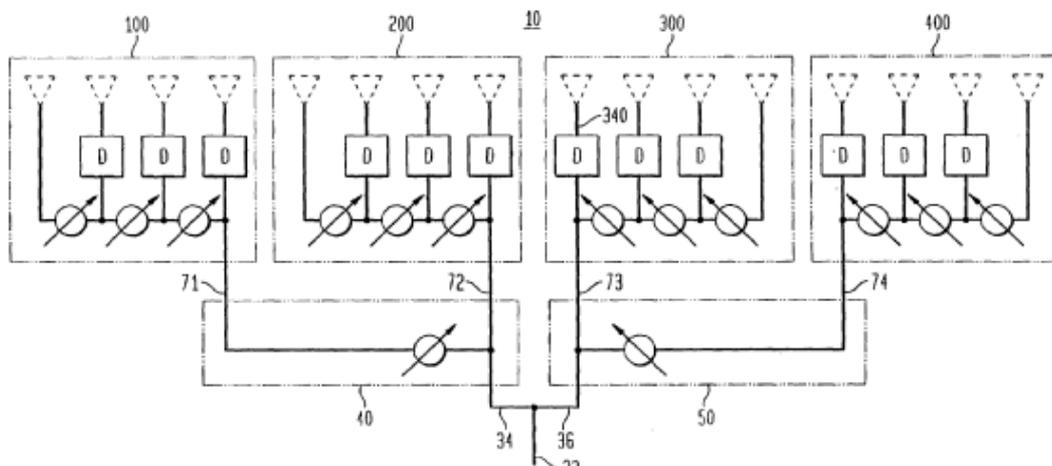
### Definition statement

*This subclass/group covers:*

For example: time delays in sub-array, phase shifters in each element.

The time delay becomes important in wideband applications where  $2\pi$  phase shift do not suffice.

See also: R.C. Hansen, Phased array antennas, section 6.2.



### References relevant to classification in this group

*This subclass/group does not cover:*

Using acoustic or magnetostatic wave devices	<a href="#">H01Q 3/2688</a>
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## H01Q 3/28

### varying the amplitude

### Definition statement

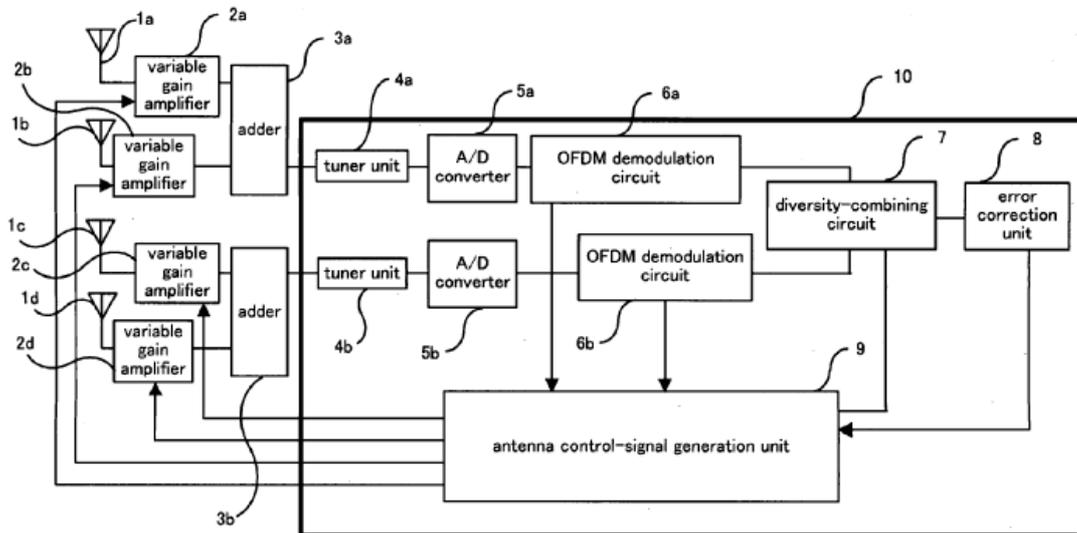
*This subclass/group covers:*

Varying the amplitude for shaping the antenna pattern as beamwidth and sidelobes; shaped beams, varying the amplitude distribution of the radiating aperture e.g. by amplitude taper:

- with power dividers, e.g. as directional coupler; hybrid ring; magic T,

branch-line coupler;

- with attenuators,
- with amplifiers.



## H01Q 3/30

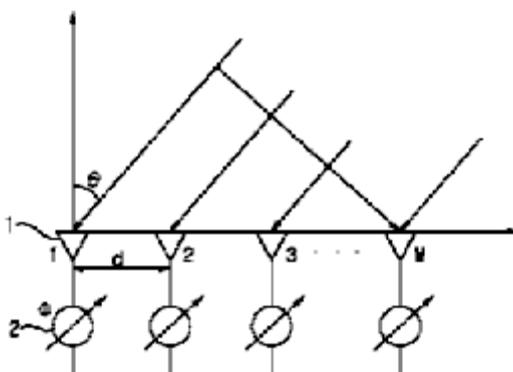
varying the [N: relative] phase [N: between the radiating elements of an array ([H01Q 3/2605](#), [H01Q 3/2658](#), [H01Q 3/2682](#), [H01Q 3/44](#) take precedence)]

### Definition statement

*This subclass/group covers:*

Varying the distribution of the phase over any path, surface or radiation pattern for steering, scanning the beam.

Phase shifters can be broadly classified as mechanical or electronic, depending on whether the phase control is achieved through mechanical or electronic tuning.



## References relevant to classification in this group

*This subclass/group does not cover:*

Array of radiating elements provided with a feedback control over the element weights, adaptive arrays	<a href="#">H01Q 3/2605</a>
Phased-array fed focussing structure	<a href="#">H01Q 3/2658</a>
Time delay steered arrays	<a href="#">H01Q 3/2682</a>
Varying the electric or magnetic characteristics of reflecting, refracting, or diffracting devices associated with the radiating element	<a href="#">H01Q 3/44</a>

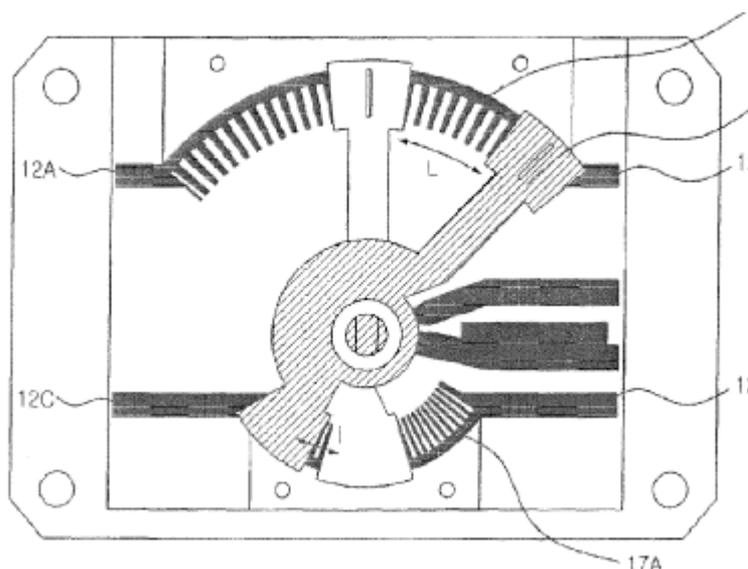
## H01Q 3/32

**by mechanical means**

### Definition statement

*This subclass/group covers:*

Mechanical phase shifter are generally constructed in coaxial line or metallic waveguides. The insertion phase is varied by means of mechanical tuning, such as variation in the physical length or rotation-displacement of a dielectric slab inside the waveguide.



## H01Q 3/34

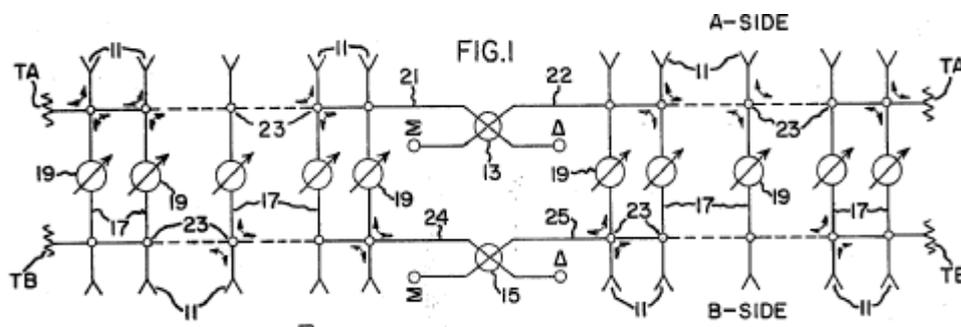
by electrical means (active lenses or reflecting arrays [H01Q 3/46](#))

### Definition statement

*This subclass/group covers:*

Electronic phase shifters as:

- ferrite phase shifter and
- semiconductor device phase shifter that use semiconductor junction devices as electronic control element.



### References relevant to classification in this group

*This subclass/group does not cover:*

Active lenses or reflecting arrays	<a href="#">H01Q 3/46</a>
------------------------------------	---------------------------

## H01Q 3/36

with variable phase-shifters [N: (combined with time delay devices [H01Q 3/2682](#))]

### Definition statement

*This subclass/group covers:*

With continuous variation (analog phase shifter).

In discrete step (digital): too coarse resolution will lead to discretisation lobes.

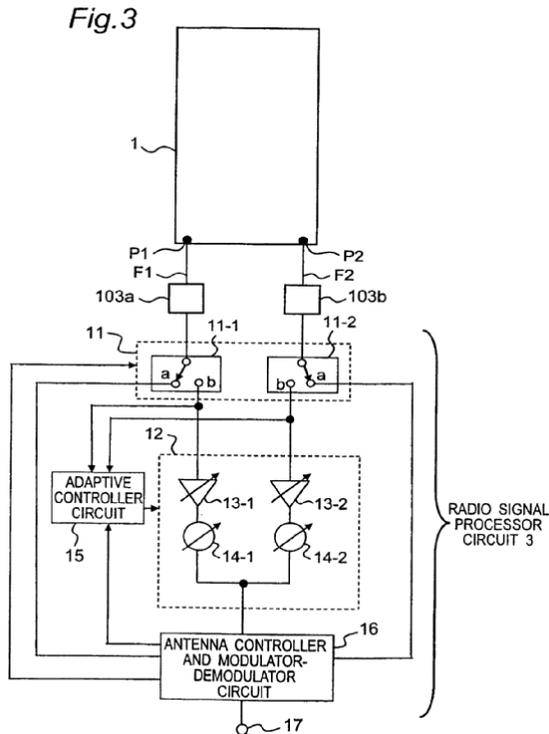
Ferrite phase shifters:

- enclosed in waveguide;
- using a microstrip configuration; ferrimagnetic material; Faraday rotator

phase shifter; either non reciprocal or reciprocal.

Semiconductor device phase shifters:

- with PIN-diodes;
- Varactor diodes, Schottky diodes;
- FET switches.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Phase shifter as such should be dealt with in	<a href="#">H01P</a>
Combined with time delay devices	<a href="#">H01Q 3/2682</a>

## H01Q 3/38

the phase-shifters being digital

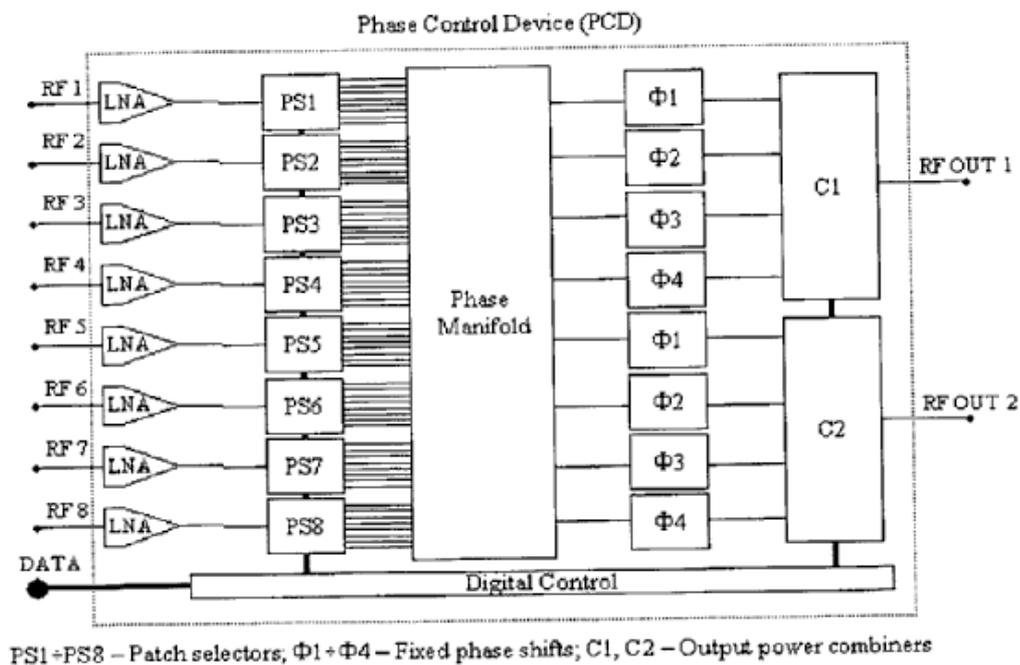
## Definition statement

This subclass/group covers:

*This group covers:*

Digital means in steps; e.g. as 3 bit phase shifter (180°, 90°, 45°):

- with hybrid;
- with circulator;
- with loaded line;
- with switched line.



*Figure. 1. Block diagram of the MMIC*

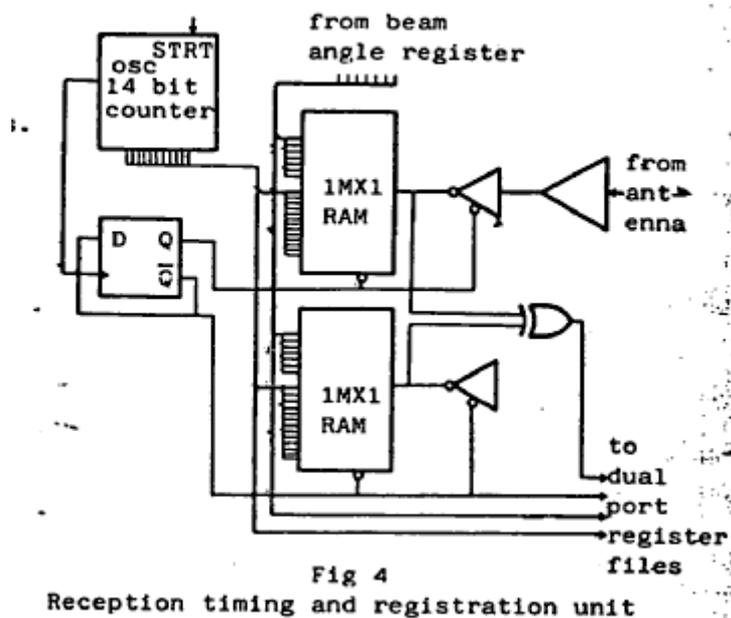
## H01Q 3/385

### [N: Scan control logics]

#### Definition statement

*This subclass/group covers:*

This field is not active, as nowadays the control of the phase shifters is normally performed using a dedicated processor, or controller.



## H01Q 3/40

with phasing matrix

### Definition statement

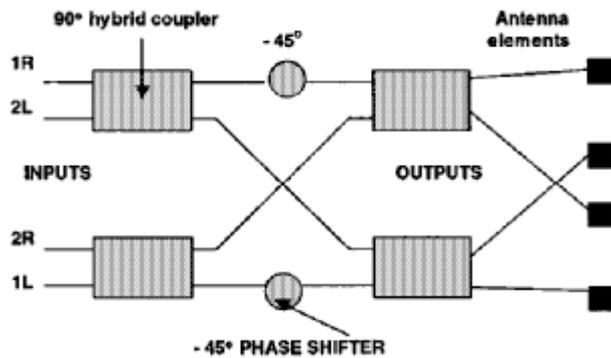
*This subclass/group covers:*

Circuit configuration whereby signal inputs are connected with antenna elements via a matrix with phase shifters and hybrid couplers; Beam Forming Matrix / Network (BFM,BFN). The inputs of the matrix are referred to beam ports, since the signal of this port corresponds to a beam direction. The BFN therefore works as a kind of Fourier transformer.

For example:

Butler -Matrix: Network with number of inputs and outputs; multibeam; beam scanning by sequentially feeding the elements with the phase increment provided by the matrix. The phase gradient over the outputs is dependent on the beam port chosen.

Blass-Matrix: a number of travelling wave feed lines are connected to a linear array; at each crossover point a small will be coupled and the path difference between the input and each element control the beam direction.



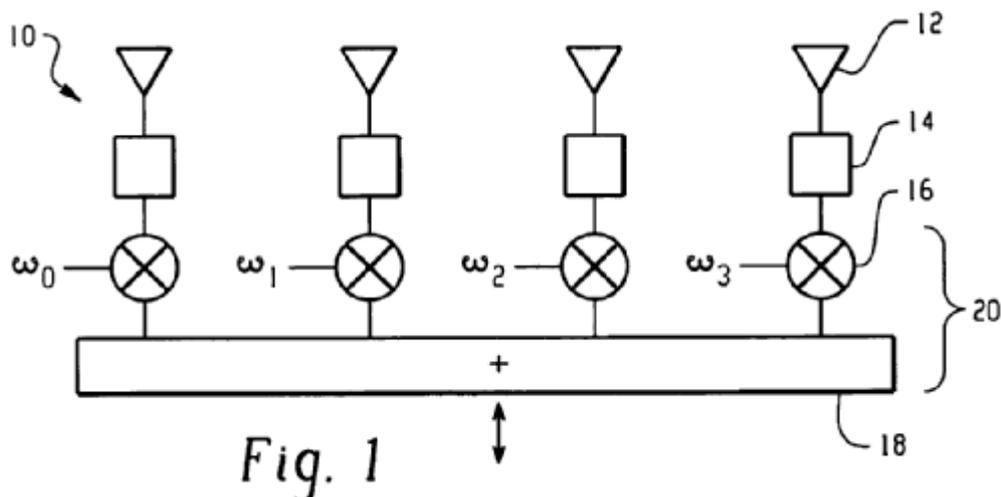
## H01Q 3/42

using frequency-mixing [N: ([H01Q 3/2676](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Beam forming is carried out on Intermediate Frequency (I.F.). I.F. is formed when the R.F. signal coming from the antenna elements is mixed with local oscillator to convert the R.F. down to a more convenient frequency, where, for example, accurate phase shifts are easier to be performed.



### References relevant to classification in this group

*This subclass/group does not cover:*

Optically controlled phased array	<a href="#">H01Q 3/2676</a>
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## H01Q 3/44

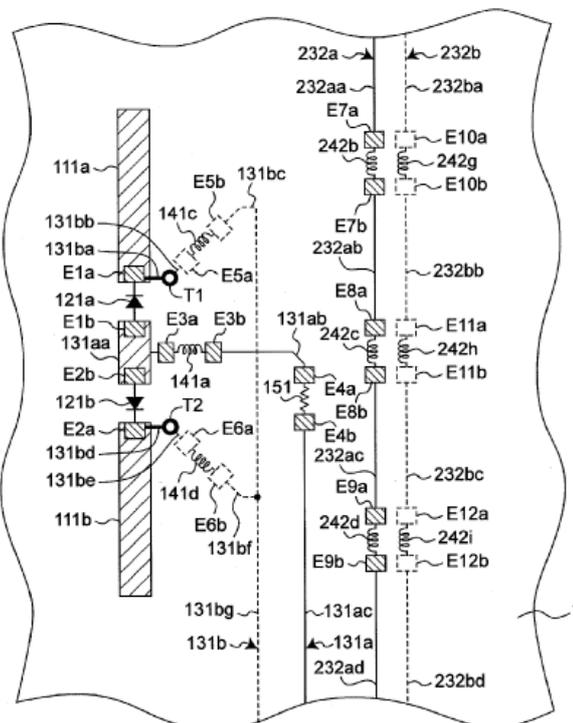
varying the electric or magnetic characteristics of reflecting,

refracting, or diffracting devices associated with the radiating element

### Definition statement

*This subclass/group covers:*

- With ferroelectric materials: have the property of variable dielectric constant with applied DC bias voltage; ferroelectric scanning.
- With ferrite using magnetic phase control by changes the effective permeability by magnetic bias.



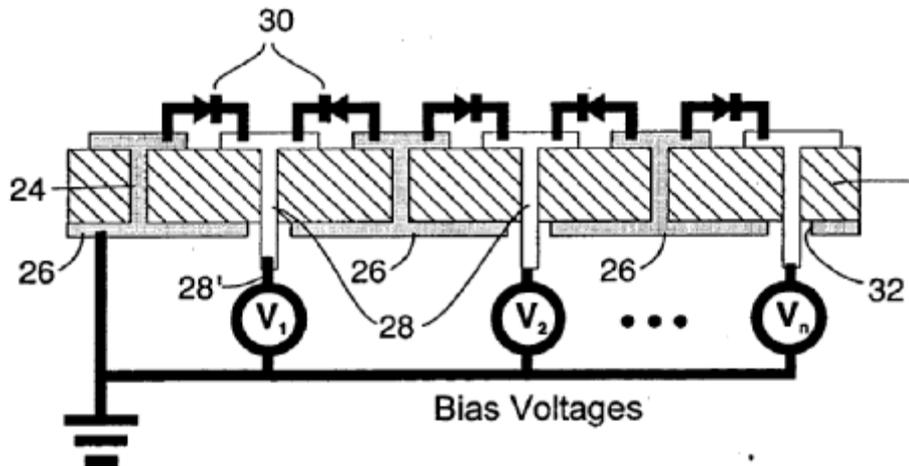
### H01Q 3/443

[N: varying the phase velocity along a leaky transmission line (frequency scanning [H01Q 3/22](#); non-resonant leaky-waveguide or transmission-line aerials [H01Q 13/20](#))]

### Definition statement

*This subclass/group covers:*

Typically material parameters are varied to achieve the desired effect. The antenna is a leaky antenna.



**References relevant to classification in this group**

*This subclass/group does not cover:*

Non-resonant leaky-waveguide or transmission-line aerials	<a href="#">H01Q 13/20</a>
Frequency scanning	<a href="#">H01Q 3/22</a>

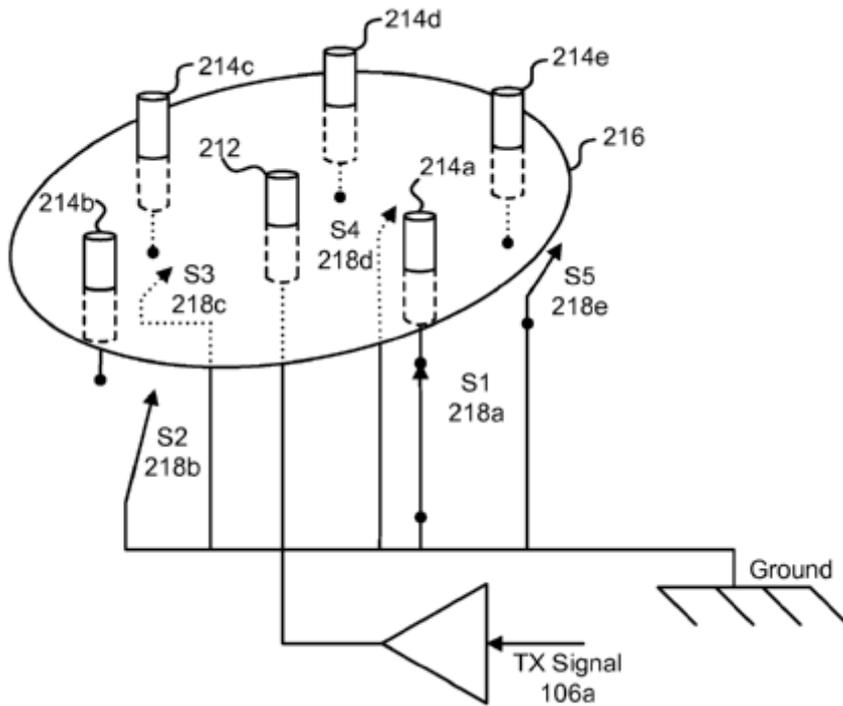
**H01Q 3/446**

**[N: the radiating element being at the centre of one or more rings of auxiliary elements]**

**Definition statement**

*This subclass/group covers:*

For example: one active element and a number of passive elements, reactively loaded and adjustable. Irrespective of the antenna types: here only the principle is classified.



### Informative references

Attention is drawn to the following places, which may be of interest for search:

The primary active element being end-fed and elongated	<a href="#">H01Q 19/32</a>
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## H01Q 3/46

### Active lenses or reflecting arrays

#### Definition statement

*This subclass/group covers:*

Reflective array: An antenna consisting of a feed and an array of reflecting elements arranged on a surface and adjusted so that the reflected waves from the individual elements combine to produce a prescribed secondary pattern. The reflecting elements can be waveguides containing electrical phase shifters and terminated by short circuits.

Active lens: array of active units (receive-amplify-transmit), that is transponders, in which also phase shifts can be introduced. The array behaves as a lens, and high power can be generated.

Active lens is therefore of the transmission type, whereas a reflecting array is of the reflection type.



## feeder system [H01Q 21/30](#))

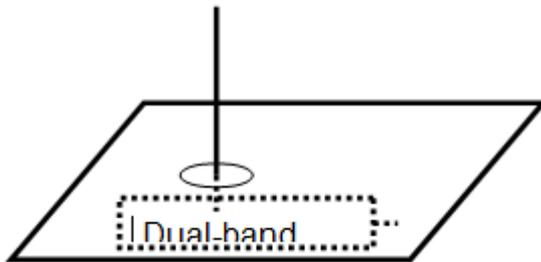
### Definition statement

*This subclass/group covers:*

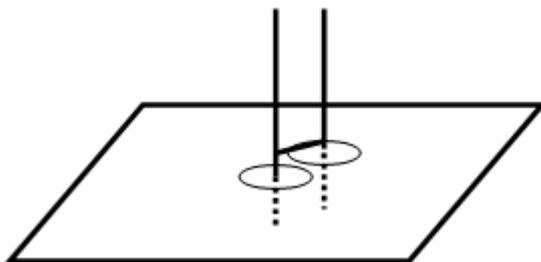
An antenna designed to operate simultaneously, without modification, in any of a number of pre-set frequency bands.

Antennas with (inherent) broadband characteristics are classified in the antenna type, e.g. folded or loaded or extended surface monopole antennas with broadband are classified in the relevant antenna type classes.

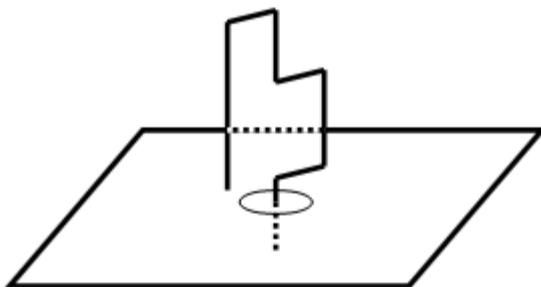
Remark: It is difficult to draw a clear line between some of the classes, but here are some clear examples representing the underlying ideas.



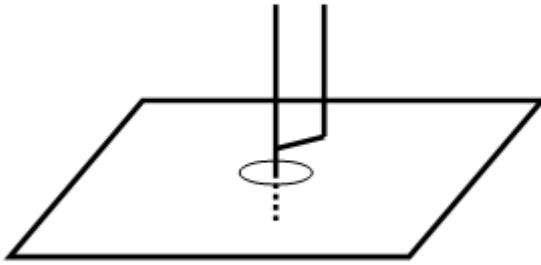
Dual-band imp-match: [H01Q 5/0041](#)



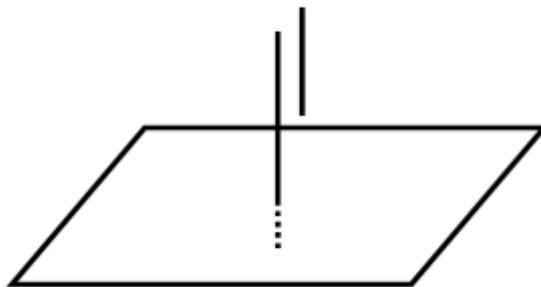
Two feed points: [H01Q 5/0048](#)



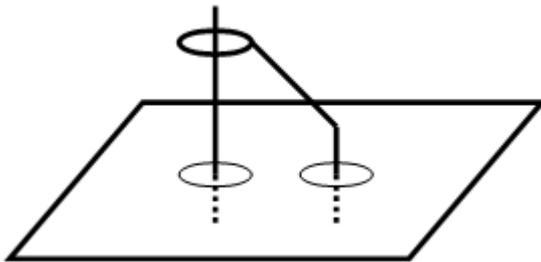
Different paths: [H01Q 5/0055](#)



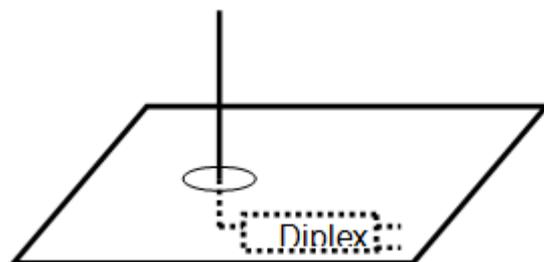
Branching: **H01Q5/00K2C4C**



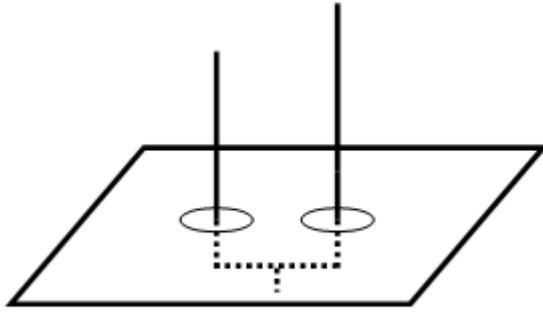
Parasitic: [H01Q 5/0062](#)



Imbricated, interleaved: [H01Q 5/0072](#)



Special feed arrangement: [H01Q 5/0093](#)



Common feeder: [H01Q 21/30](#)

### References relevant to classification in this group

*This subclass/group does not cover:*

Ground plane features per se	<a href="#">H01Q 1/48</a>
The changing per se of electrical (for example by switching) or physical length of the antenna	<a href="#">H01Q 9/14</a>

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

Receivers or transmitters adapted for more than one waveband	<a href="#">H04B 1/005</a>
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### H01Q 5/0003

[N: Single aerial units operating on two or more wavebands ([H01Q 5/02](#) takes precedence)]

### Special rules of classification within this group

This group has become obsolete as of 01.09.2011.

### H01Q 5/0006

[N: Imbricated structures ([H01Q 5/02](#) takes precedence)]

### Special rules of classification within this group

This group has become obsolete as of 01.09.2011.

## **H01Q 5/00C1**

**[N: using two or more imbricated arrays (H01Q5/00C3B takes precedence)]**

### **Special rules of classification within this group**

This group has become obsolete as of 01.09.2011.

All documents to go to new class [H01Q 5/0075](#).

## **H01Q 5/00C2**

**[N: using two or more feeds in association with a same reflecting, diffracting or refracting device]**

### **Special rules of classification within this group**

This group has become obsolete as of 01.09.2011.

All documents to go to new class [H01Q 5/0079](#).

## **H01Q 5/00C2B**

**[N: with a coaxial arrangement of the feeds]**

### **Special rules of classification within this group**

This group has become obsolete as of 01.09.2011.

All documents to go to new class [H01Q 5/0082](#).

## **H01Q 5/00C3**

**[N: Combinations of dipole type aerials]**

### **Special rules of classification within this group**

This group has become obsolete as of 01.09.2011.

All documents to go to new class [H01Q 5/0086](#).

## **H01Q 5/00C3B**

**[N: with parasitic elements, e.g. imbricated Yagi aerials]**

### **Special rules of classification within this group**

This group has become obsolete as of 01.09.2011.

All documents to go to new class [H01Q 5/0089](#).

## H01Q 5/001

[N: Characterized by having two or more different wavebands]

### Definition statement

*This subclass/group covers:*

Antennas with specific applications related to two or more different wavebands, where focus is on the application and not on how the achievement of the different wavebands is done.

### References relevant to classification in this group

*This subclass/group does not cover:*

The achievement of operation on two or more different wavebands	<a href="#">H01Q 5/0024</a> , <a href="#">H01Q 5/0072</a> , <a href="#">H01Q 5/0093</a>
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## H01Q 5/0013

[N: RF wavebands combined with non-RF wavebands, e.g. infrared or optical]

### Definition statement

*This subclass/group covers:*

Arrangements of antennas with operation on both RF and non-RF wavebands.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

IR, Optics	<a href="#">G01J</a> , <a href="#">H01L 27/14</a> , G02
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## H01Q 5/0017

[N: ultra-wide-band or pulse applications due to multiple resonances; [H01Q 9/005](#) takes precedence]

## References relevant to classification in this group

*This subclass/group does not cover:*

Non-sinusoidal waves.	<a href="#">H01Q 9/005</a>
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## H01Q 5/002

**[N: achieving other properties, e.g. polarisation or beam width over two or more different wavebands]**

### Definition statement

*This subclass/group covers:*

Antenna arrangement operating on two or more wavebands, where certain properties are achieved over these bands, such as constant polarisation, beam width, etc.

## H01Q 5/0024

**[N: Arrangements or measures for achieving the different wavebands]**

### Definition statement

*This subclass/group covers:*

Antennas with special features making the antenna operable over two or more different frequency bands.

Antennas considered have a single fed radiating elements, connected radiating elements, or a combination of a fed radiating element and a non-directly fed element (parasitic element).

## References relevant to classification in this group

*This subclass/group does not cover:*

Imbricated or interleaved structures	<a href="#">H01Q 5/0072</a>
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## H01Q 5/0027

**[N: Single fed radiating element, or connected radiating elements at least one of which is fed]**

## H01Q 5/0031

**[N: using frequency dependent circuits, e.g. capacitors, trap circuits]**

### **Definition statement**

*This subclass/group covers:*

Antennas having frequency dependent circuits in order to create multiple resonances, for example by trap circuits blocking parts of the antenna at certain frequencies.

## **H01Q 5/0041**

**[N: at the feed, e.g. for impedance matching]**

### **Definition statement**

*This subclass/group covers:*

Frequency dependent circuits at the (single) feed, and which are responsible for the multiple wavebands.

The circuit typically has one input and one output.

### **References relevant to classification in this group**

*This subclass/group does not cover:*

General impedance matching	<a href="#">H01Q 5/00</a>
Impedance matching diplexers	<a href="#">H01Q 5/0093</a>

### **Informative references**

*Attention is drawn to the following places, which may be of interest for search:*

Impedance matching, filters per se	<a href="#">H03H</a>
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## **H01Q 5/0044**

**[N: using different modes ([H01Q 5/0031](#) takes precedence)]**

### **References relevant to classification in this group**

*This subclass/group does not cover:*

Different modes due to frequency dependent circuits	<a href="#">H01Q 5/0031</a>
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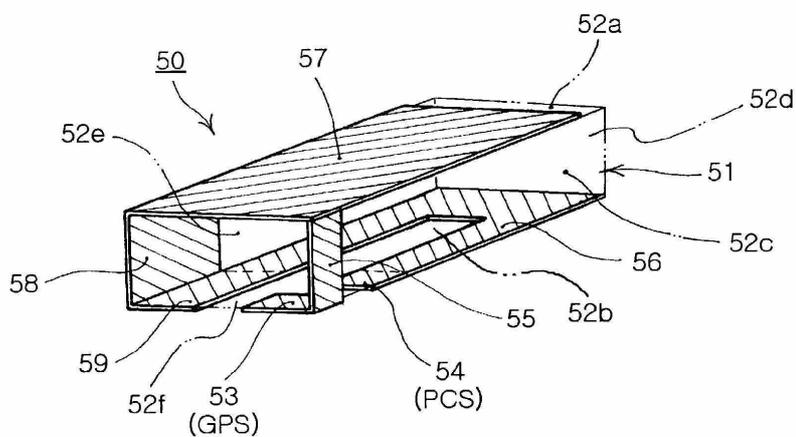
## H01Q 5/0048

[N: using two or more simultaneous feed points on a same radiating element or on the connected radiating elements]

### Definition statement

*This subclass/group covers:*

For example:



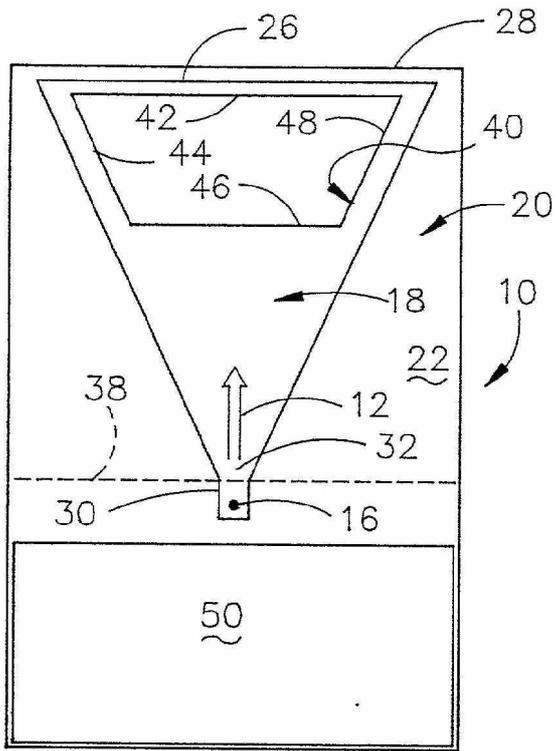
## H01Q 5/0055

[N: Creating different current paths, e.g. of the same type]

### Definition statement

*This subclass/group covers:*

Antennas having different current paths, for example:



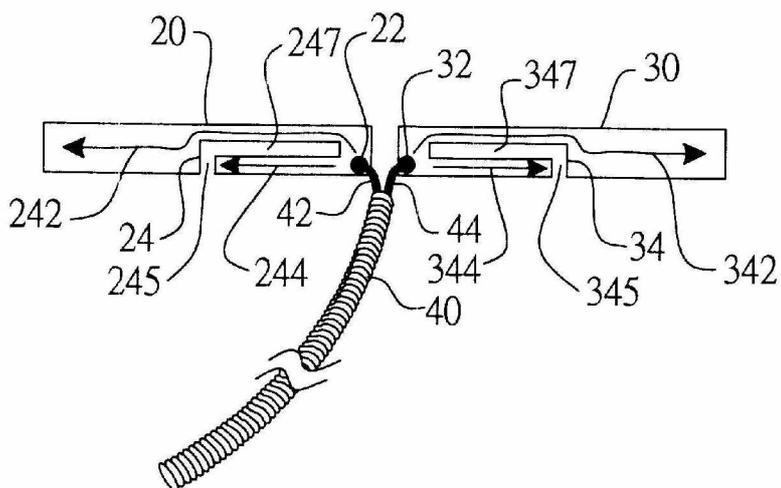
### H01Q 5/00K2C4C

[N: branching current paths of the same type]

#### Definition statement

*This subclass/group covers:*

Antennas, where the different current paths are also branching, for example:



### H01Q 5/0062

[N: combination of a fed and one or more additional parasitic

elements]

### Definition statement

*This subclass/group covers:*

The arrangement of a fed antenna with a parasitic element in order to create different wavebands.

### References relevant to classification in this group

*This subclass/group does not cover:*

Parasitic elements for shaping the beam	<a href="#">H01Q 19/00</a>
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## H01Q 5/0072

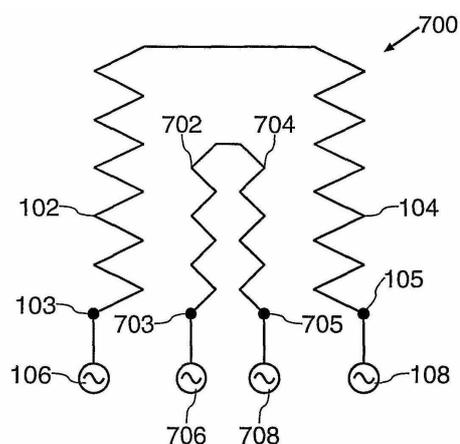
**[N: imbricated, interleaved structures, structures otherwise combined, or electro-magnetically coupled structures, comprising two or more non-connected fed radiating elements (same feed in [H01Q 21/30](#), independent non-interacting antennas in [H01Q 21/28](#))]**

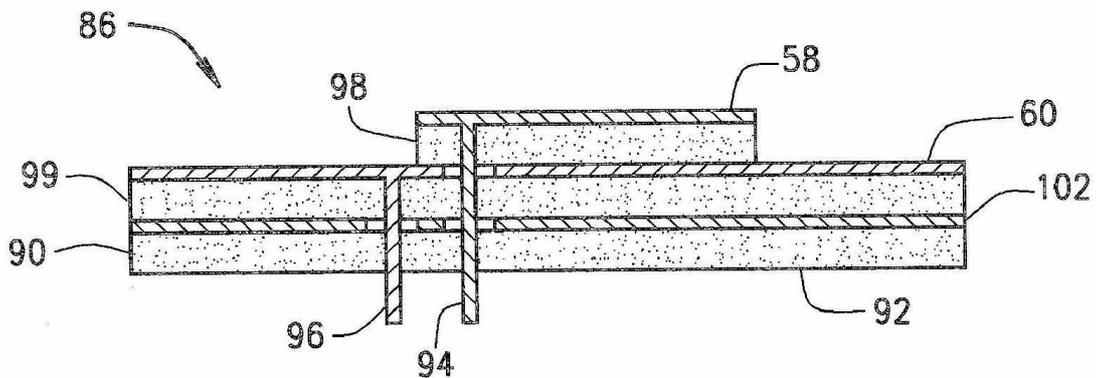
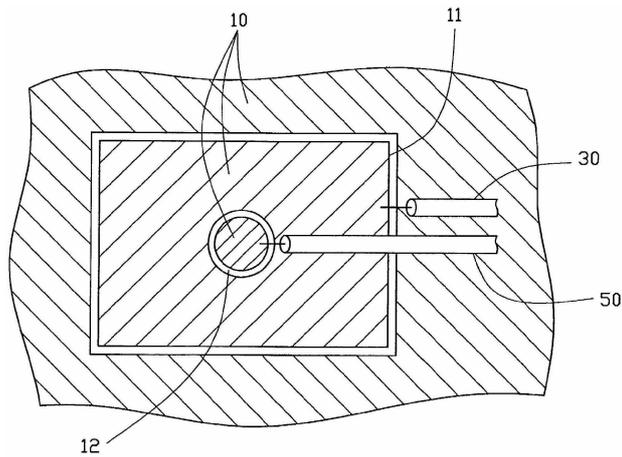
### Definition statement

*This subclass/group covers:*

Antenna arrangement of fed radiating elements, where there is a structural and/or electromagnetic relationship between the elements.

Antenna arrangement where two different types of antennas (dipole and monopole, slot and patch, ...) are partly overlapping.





### Informative references

Attention is drawn to the following places, which may be of interest for search:

Separate independent antennas.	<a href="#">H01Q 21/28</a>
Antennas with common feed.	<a href="#">H01Q 21/30</a>

### H01Q 5/0079

**[N: using two or more feeds in association with a same reflecting, diffracting or refracting device]**

### Definition statement

*This subclass/group covers:*

- reflecting device, e.g. parabolic reflector;
- diffracting device e.g. grids;
- refracting device e.g. lens.

## H01Q 5/0082

[N: with a coaxial arrangement of the feeds]

### Definition statement

*This subclass/group covers:*

For example double coaxial horn; horn in horn; nested horn. Typically, the feeds have the same phase centre.

## H01Q 5/0089

[N: with parasitic elements not for dual- or multi-band, e.g. imbricated Yagi aerials]

### Definition statement

*This subclass/group covers:*

For example vertical or horizontal stacked Yagi-Uda antennas

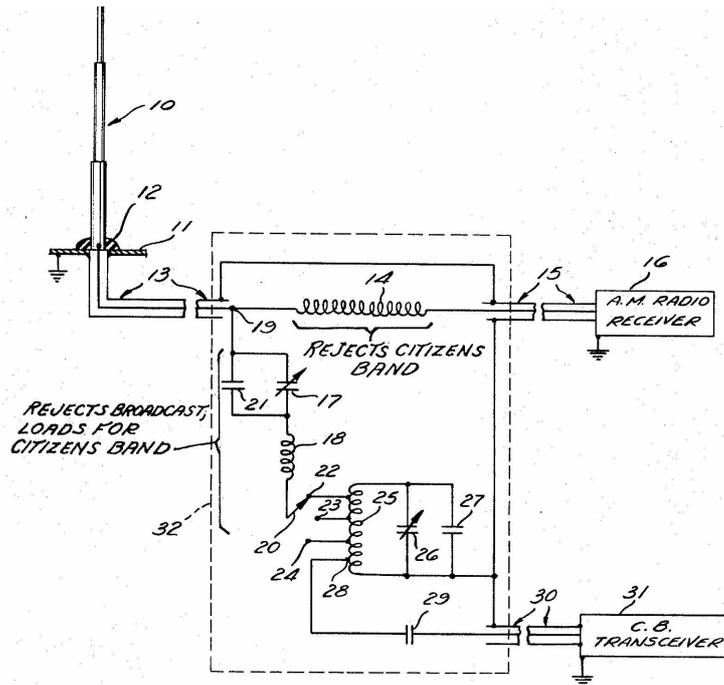
## H01Q 5/0093

[N: arrangement for broad - or multi-band operation concerning feeding or matching; **H01Q9/04K2A6** takes precedence]

### Definition statement

*This subclass/group covers:*

Antennas having special feeding/matching arrangements at or before the feeding for directing the signal from the antenna on at least two paths, for example diplexer circuitry.



## References relevant to classification in this group

*This subclass/group does not cover:*

Frequency dependent circuits at the feed (with only one input/output).	<b>H01Q9/04K2A6</b>
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## H01Q 5/01

### Resonant aerials

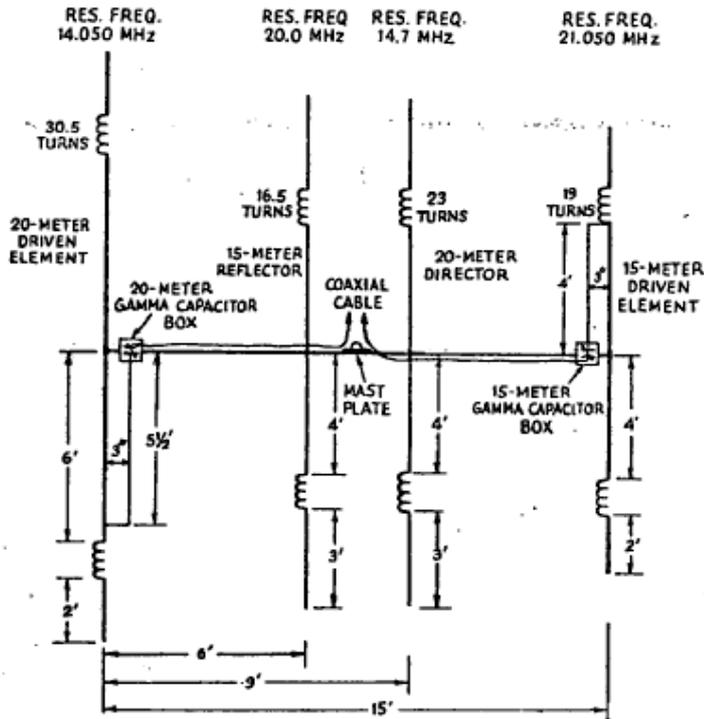
#### Definition statement

*This subclass/group covers:*

Multiband aspects for resonant antennas ( $\lambda/4$  or  $\lambda/2$ ) as e.g. vertical monopole or horizontal dipole antennas.

Single resonant multiband dipole- or monopole antennas.

Resonant antennas with trap circuits or stub elements.



## H01Q 5/02

for operation of centre-fed aerials which comprise a single, or two or more collinear, substantially straight elongated active elements

### Definition statement

*This subclass/group covers:*

Collinear means a linear arrangement of radiating elements with their axis lying in a straight line (vertical or horizontal), e.g. multi-band trap centre-fed dipole.

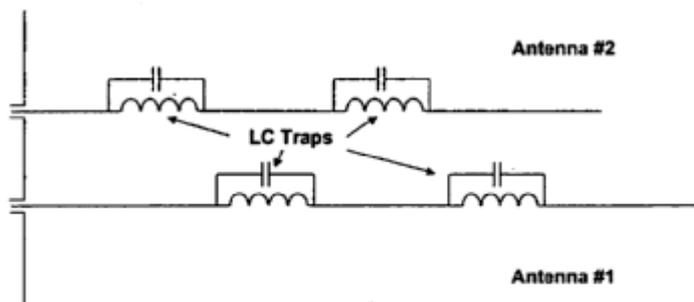


Figure 1. The LC trapped-wire-antenna design.

## H01Q 7/00

**Loop aerials with a substantially uniform current distribution around the loop and having a directional radiation pattern in a plane perpendicular to the plane of the loop**

### Definition statement

*This subclass/group covers:*

An antenna whose configuration is that of a loop, bent into the shape of closed curve.

Two types:

- Small loops

Circumference of the loop is small compared to lambda with constant current distribution (same value at any point) - magnetic antenna (more H-field) - max. sensitivity in the plane; nulls are perpendicular to the plane of the loop - circular (ring) with a number of windings as a solenoidal coil on a frame: multiturn loop; Alford loop antenna (see [H01Q 7/08](#)).

- Large loops (resonant loops)

The loop circumference is comparable to lambda with sinusoidal current distribution (half- or one wavelength loop); -more E-field (resonant loops; dual to dipole antenna) - max. sensitivity perpendicular to the plane - circular (ring); square (Quad, that is four sides  $\lambda/4$ ); delta, diamond shapes.

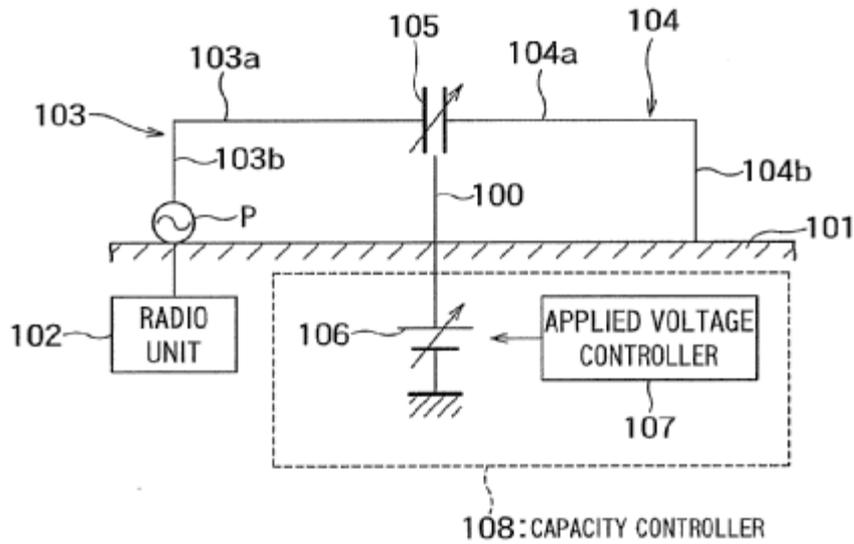
## H01Q 7/005

**[N: with variable reactance for tuning the antenna (tuning resonant circuits [H03J](#))]**

### Definition statement

*This subclass/group covers:*

For example:



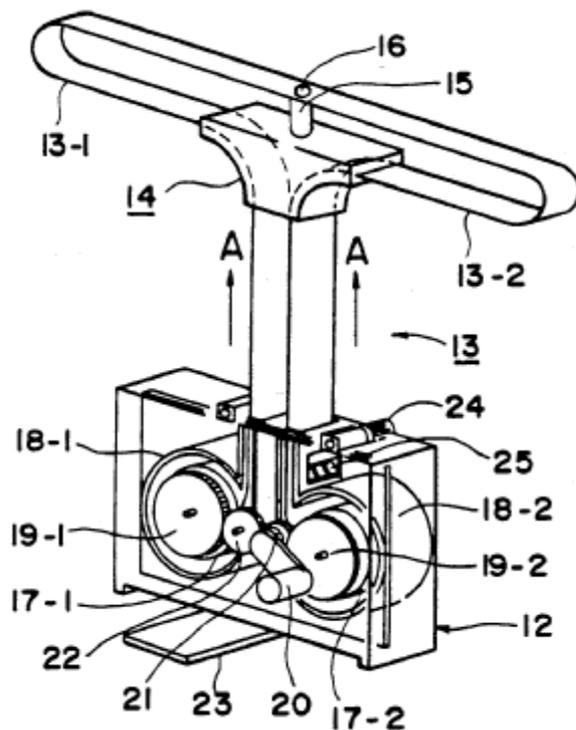
## H01Q 7/02

### Collapsible aerials; Retractable aerials

#### Definition statement

*This subclass/group covers:*

There are mechanical measures foreseen to collapse the aerial.



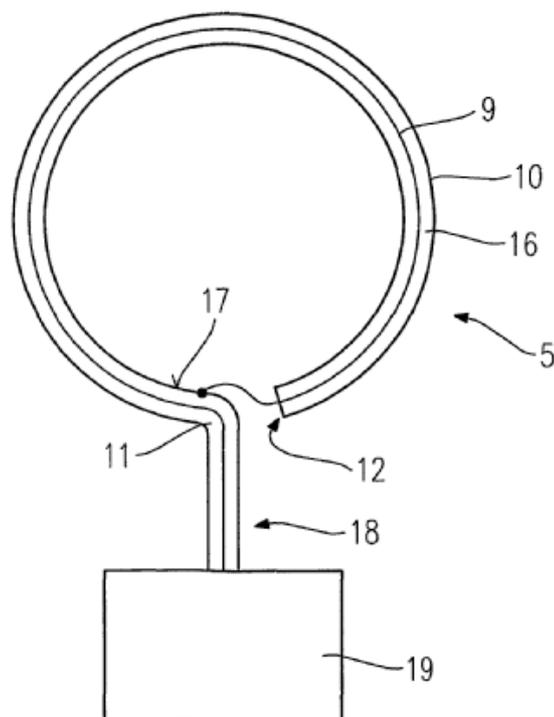
## H01Q 7/04

## Screened aerials ([H01Q 7/02](#), [H01Q 7/06](#) take precedence)

### Definition statement

*This subclass/group covers:*

For improving the directivity the loop antenna is drawn into a metal tube with a gap. The gap constitutes a potential source which generates a current at the exterior side of the tube. The current generates a magnetic field around the external side of the tube (screened by the metal tubes).



Application for article surveillance ([G08B 13/2402](#), [G08B13/24B2](#)).

### References relevant to classification in this group

*This subclass/group does not cover:*

Collapsible aerials; Retractable aerials	<a href="#">H01Q 7/02</a>
Loop aerials with a substantially uniform current distribution around the loop and having a directional radiation pattern in a plane perpendicular to the plane of the loop with core of ferromagnetic material	<a href="#">H01Q 7/06</a>



## Ferrite rod or like elongated core

### Definition statement

*This subclass/group covers:*

A loop receiving antenna with a ferrite rod core used for increasing its radiation efficiency.

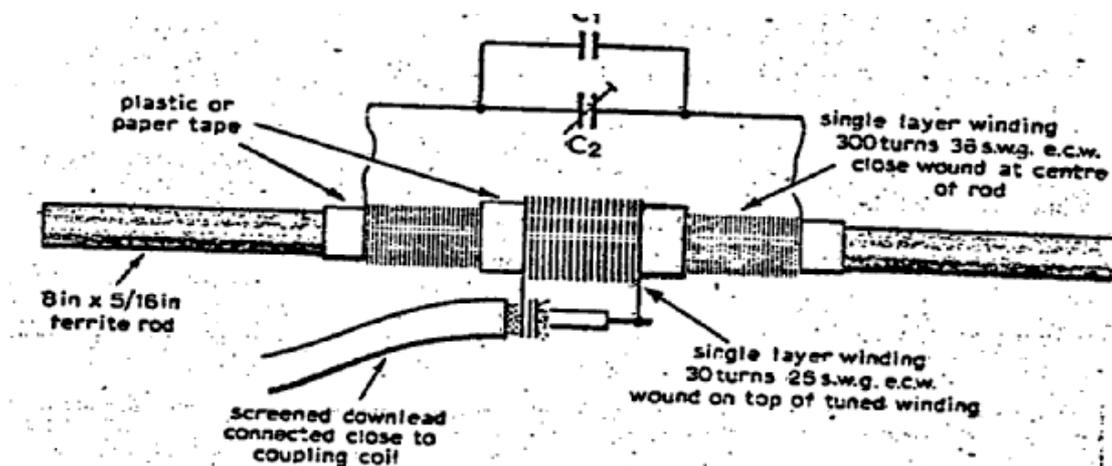


Fig. 16. Ferrite-rod aerial constructional details.

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this group, the following terms are used with meaning indicated:*

Ferrite	high permeability and high resistance; are high permeable isolators; e.g. mangan- or nickel ferrite
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## H01Q 9/00

Electrically-short aerials having dimensions not more than twice the operating wavelength and consisting of conductive active radiating elements (loop aerials [H01Q 7/00](#); waveguide horns or mouths [H01Q 13/00](#); slot aerials [H01Q 13/00](#); combinations of active elements with secondary devices to give desired directional characteristic [H01Q 19/00](#); combinations of two or more active elements [H01Q 21/00](#))

### Definition statement

*This subclass/group covers:*

An integral number of  $\lambda/2$  -standing waves of current or voltage; self-resonant e.g.  $\lambda/2$ -dipole;  $\lambda/4$  monopole;  $\lambda/2 \times \lambda/2$  -square patch. Also electrically small antennas whose dimensions are such that it can be contained within a sphere whose diameter is small compared to a wavelength at the frequency of operation.

## H01Q 9/005

[N: for radiating non-sinusoidal waves]

### Definition statement

*This subclass/group covers:*

Originally intended for pulsed operation; now slowly moving to UWB type of operation.

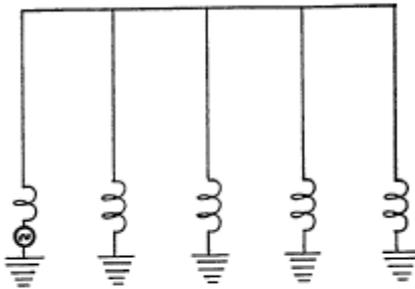


Figure 1. A multituned antenna.

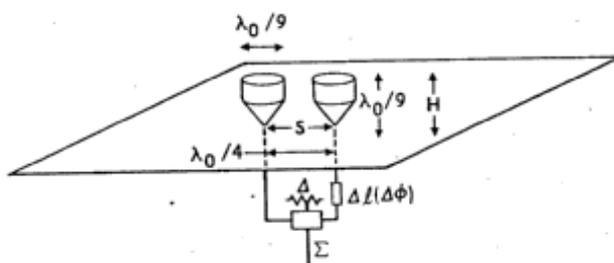
## H01Q 9/02

### Non-resonant aerials

### Definition statement

*This subclass/group covers:*

Used for pulsed signals; transient signals; reduction of ringing effect after extremely short pulses.



## H01Q 9/04

## Resonant aerials

### Special rules of classification within this group

Inactive.

### H01Q 9/0407

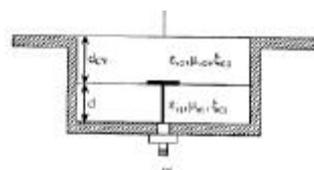
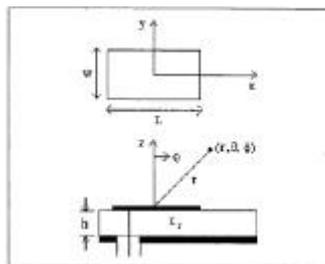
[N: Substantially flat resonant element parallel to ground plane, e.g. patch antenna (dipole [H01Q 9/285](#); monopole [H01Q 9/40](#))]

### Definition statement

*This subclass/group covers:*

Microstrip device with two parallel conducting layers, a ground plane and a resonant plate, separated by a thin dielectric substrate and a feeder coupled to the resonant plate.

Rectangular patch; cavity- backed patch; inverted patch i.e. dielectric on top.



See: XP000965987, XP001175135, XP00680870, XP00026.

### Relationship between large subject matter areas

[H01Q 9/065](#) Microstrip dipole antennas (a resonator made of a narrow conductor strip excited in the middle).

[H01P](#) microstrip transmission lines.

### Special rules of classification within this group

JPO classifies in [H01Q 13/08](#) ("Radiating ends of two-conductor microwave transmission lines e.g. of coaxial lines, of microstrip lines") resp. in [H01Q 13/18](#) for cavity backed patches.

Reasons; accord. Transmission line model, that is half-wave open-ended transmission line resonator or cavity model with edges as radiating slots.

Content:

Documents that address generally to parameters that determine the characteristics of the patch antenna like frequency (only bandwidth), radiation pattern like beamwidth by modifying shape, dielectric material, size of ground plane, overlays/ superstrates, thickness, feed position.

Shapes:

Square, rectangular, circular(disc), triangular, elliptical, bow-tie, fractal shaped (Sierpinski); H- or E-shaped, with slits or slots, but annular ring patch ([H01Q 9/0464](#)); non-planar, stepped or wedge-shaped ([H01Q 9/0471](#)).

Material:

Dielectric constants, ceramics, ferrite, air, multilayer, photonic bandgap or electromagnetic bandgap (PBG or EBG) materials.

Feed:

Standard probe/coaxial or stripline fed but particular feeding means in [H01Q 9/045](#); electromagnetically coupled in [H01Q 9/0457](#).

## Synonyms and Keywords

*In patent documents the following expression/words "patch", "microstrip patch", "micro strip patch", "microstrip antenna", "microstrip disc", "microstrip", "resonator", "MSA", "planar antenna" and "patch microstrip" are often used as synonyms.*

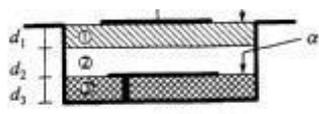
## H01Q 9/0414

**[N: in a stacked or folded configuration]**

### Definition statement

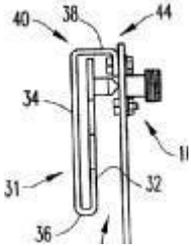
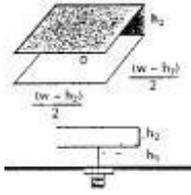
*This subclass/group covers:*

Stacked: Two or more electromagnetically coupled patches are placed on top of one another to increase bandwidth or operating on different frequencies.



See: XP00686400,XP000457518

Folded: Folding the patch to reduce its surface cross section resp. to increase its physical length



See: XP1192752, XP6010688, US2003107518, US2002175865

If stacking leads to separate dual- or multiple resonances then also [H01Q 5/0003](#) or [H01Q 5/0006](#).

If planar parasitic elements are placed also as side elements then [H01Q 19/005](#) too.

## Special rules of classification within this group

All documents where stacked patches are used.

## Synonyms and Keywords

*In patent documents the following expression/words "stacked patch radiators", "driven and parasitic patch", "upper or top and lower or bottom patch" and "multilayered with upper and lower patches folded" are often used as synonyms.*

## H01Q 9/0421

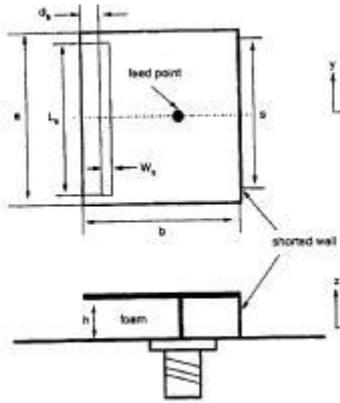
[N: with a shorting wall or a shorting pin at one end of the element ([H01Q 9/0414](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

An inverted F antenna is essentially a shorted quarter wavelength long patch. Shorting pins/posts or vertical wall inserted where the surface currents are at a minimum maintain the antenna resonance at the same frequency as a full-size patch, thus size reduction, small size.

Planar inverted L-antenna (PILA) Planar inverted F-antenna (PIFA).



See: XP1112734, XP963857.

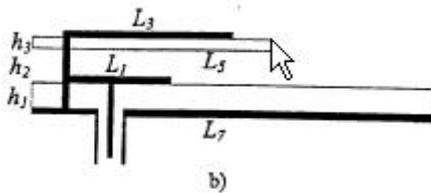
### Relationship between large subject matter areas

Inverted- L and inverted -F-antennas as wire (not-planar) are in [H01Q 9/42](#) (monopole with folded element).

### References relevant to classification in this group:

*This subclass/group does not cover:*

[H01Q 9/0414](#) (stacked or folded patches); see



PIFA with stacked patches

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

PILA	Planar Inverted-L Antenna
PIFA	Planar Inverted-F Antenna

### Synonyms and Keywords

*In patent documents the following expression/words "hort-circuited" and "planar inverted" are often used as synonyms.*

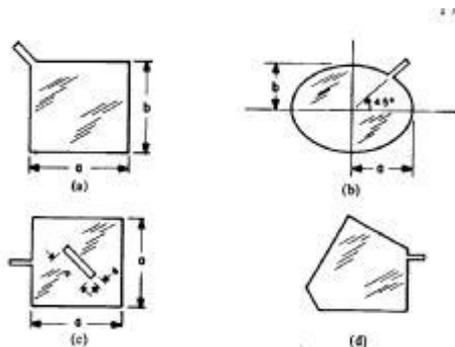
## H01Q 9/0428

### [N: radiating a circular polarised wave]

#### Definition statement

*This subclass/group covers:*

Single-fed circularly polarised (CP) patch antenna: two orthogonal modes are generated by perturbations or modifications to the standard patch geometry; that leads to circular polarisation radiation in the far field; without external network.



- diagonal-fed nearly square; corner-fed;
- truncated-corners;
- square with diagonal slot, slit or cutout;
- pentagon or triangular patch;
- with stubs extending from the edges or notches inserted at the edge; with loading.

See: XP740145

Circular polarised patch antennas using a single feed, single- or singly-fed.

#### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

CP	circular polarised
RHCP	right hand circular polarized
LHCP	left hand
SFCP	singly-fed or one-point feed ,or singly

	fed
--	-----

## Synonyms and Keywords

*In patent documents the following expression/words "RHCP", "right hand circular polarised" and "left hand polarised" are often used as synonyms.*

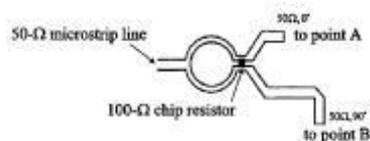
## H01Q 9/0435

[N: using two feed points]

### Definition statement

*This subclass/group covers:*

Circular polarised patch with dual feed at two orthogonal points with equal amplitude and 90° phase difference.



Input signal is split with 90° hybrid or Wilkinson power divider in two signals and coupled directly or capacitively coupled two feed points.

See: XP1058724, XP279307.

### Special rules of classification within this group

Keyword for dual polarisation, i.e. polarisation-dual ([H01Q](#)) (will/to be converted into Indexing Code /CPC symbol).

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

CP	fed circular polarised
----	------------------------

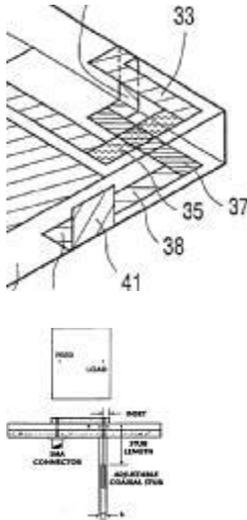
## H01Q 9/0442

[N: with particular tuning means]

## Definition statement

*This subclass/group covers:*

Particular tuning means refers here to patch antennas where the resonance frequency or bandwidth may be adjusted/controlled by tuning elements/circuits like switch devices, diodes, varactors, reactive loading, stubs, strips, capacitors, permeability of ferrites, ferroelectric materials, etc.



With tuning stub(28); with pin diodes(230,240); with stub line (41);reactive loaded.

See: US2002075190, XP680870.

Comprises patch antennas with controllable tuning elements.

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

Tunable reactive loading	controllable element which reactance (capacitance or inductance) can be changed
--------------------------	---

## Synonyms and Keywords

*In patent documents the following expression/words " tuning / adjusting / controlling resonant frequency or bandwidth" and "variably frequency" are often used as synonyms.*

## H01Q 9/045

[N: with particular feeding means (for circular polarisation

## [H01Q 9/0428](#)]

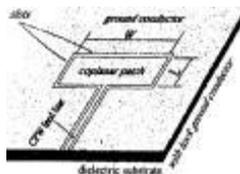
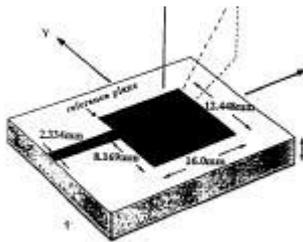
### Definition statement

*This subclass/group covers:*

All feedings means which are particular, not standard like coaxial probe-fed or direct coplanar transmission line fed ([H01Q 9/0407](#)).

Particular direct coupling:

transmission line with matching circuit and coax probe feed



Inset-fed; edge- fed; coplanar waveguide fed (CPW).

See:XP336955, XP273716, XP1058725, US4724443

### Special rules of classification within this group

This group contains documents with particular direct coupling; electromagnetic coupling is in [H01Q 9/0457](#).

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In patent documents the following expression/words "conventional direct contacting feeding", "probe-fed, coaxial, direct probe fed, directly fed" and "coplanar transmission line fed; stripline edge fed, line fed" are often used as synonyms.*

## [H01Q 9/0457](#)

[N: electromagnetically coupled to the feed line]

### Definition statement

*This subclass/group covers:*

All patch antennas without direct connection of the feed line to the patch, i.e. with non-contacting feeding structures as electromagnetic coupling like:

- proximity, capacitive coupling or
- aperture (slot) coupling

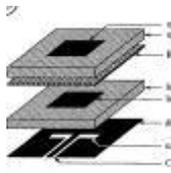
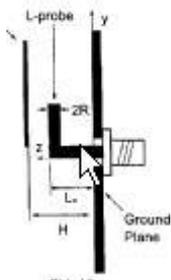


Fig. 1. Stacked patch antenna configuration.

Proximity stripline coupled; L-probe proximity coupled; aperture coupled; CPW (Coplanar Waveguide) coupled.

See: XP1046273, XP895921, XP294631, XP1006617, XP230628, XP1158250.

## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

EMC, EM coupled	electromagnetically coupled -capacitively coupled; proximity coupled, gap coupled, coplanar side coupled - aperture coupled via slot, also via crossed slot, slot-coupled with various shapes
CPW coupled	coplanar waveguide coupled

## Synonyms and Keywords

*In patent documents the following expression/words "electromagnetic", "proximity" and "capacitive coupling" are often used as synonyms.*

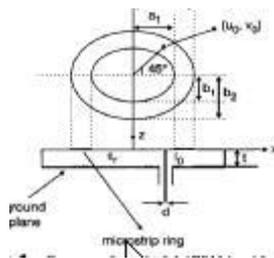
## H01Q 9/0464

[N: Annular ring patch]

### Definition statement

*This subclass/group covers:*

All patch antennas whereby the patch radiator is in the form of an annular ring which shows small size and larger bandwidth as compared to conventional rectangular or circular patches.

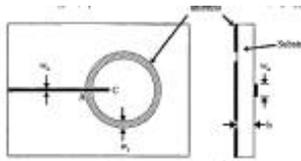


Annular ring proximity/electromagnetically coupled; direct coupled annular elliptical ring.

See: XP1201836, XP951884.

### Relationship between large subject matter areas

Microstrip-fed slot-ring in [H01Q 13/106](#).



### Synonyms and Keywords

*In patent documents the following expression/words "I microstrip ring", "Annular ring microstrip antenna (ARMSA)", "annular ring patch" and "ring-shaped, annular patch" are often used as synonyms.*

## H01Q 9/0471

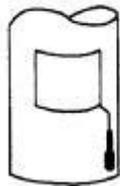
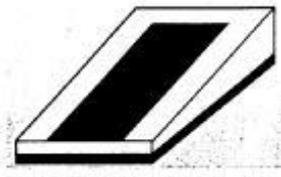
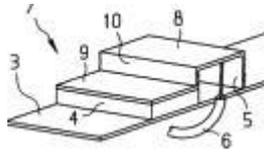
[N: Non-planar, stepped or wedge-shaped patch]

### Definition statement

*This subclass/group covers:*

Special shaped patch antennas whereby the patch:

- is non-planar e.g. curved; spherical; three dimensional shape;
- stepped or
- wedge shaped i.e. mounted on wedge-shaped dielectric; slanted; sloping patch).



Non-planar; stepped; wedge shaped; cylindrical.

See: XP680870, EP1026774, US6879290, US2003210190, US200289455, EP806810.

### Special rules of classification within this group

Comprises also patches wraparound cylindrical surfaces; also patches with shaped ground planes.

### Synonyms and Keywords

*In patent documents the following expression/words "I microstrip ring", "annular ring microstrip antenna (ARMSA)", "staircase" and "slope" are often used as synonyms.*

### H01Q 9/0478

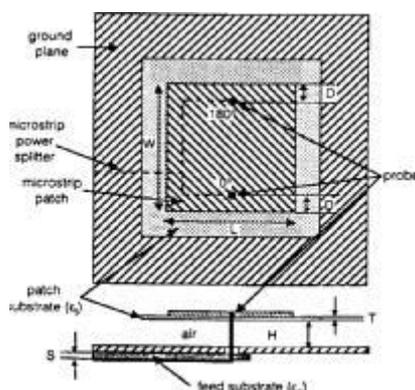
**[N: with means for suppressing spurious modes, e.g. cross polarisation]**

### Definition statement

*This subclass/group covers:*

Patches with means for reducing spurious modes which cause cross

polarization i.e. the unwanted other polarization e.g. the orthogonal linear or circular polarization caused by a second mode resp. by orthogonal currents on the patch.



Patch with plurality of parallel conductive strips; with dual-probe fed (balanced feed) or two shorting pins.

## H01Q 9/0485

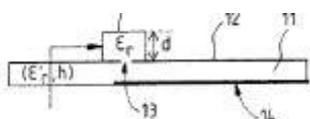
### [N: Dielectric resonator antennas]

#### Definition statement

*This subclass/group covers:*

Consists of a volume of a dielectric material disposed on or close to a grounded substrate, with energy transferred by way of monopole probes inserted into the dielectric or by way of aperture feeds provided in the ground substrate. In a dielectric resonator antenna (DRA) it is the dielectric material that radiates when excited by the feed.

The resonant characteristics depend upon the shape and size of the volume of dielectric, the material  $\gg 1$ , the shape, size and position of the feeds thereto and also on the shape, size and position of the ground plane.



See: US6198450, WO2004017461.

Quite similar modifications as for patch antennas in respect to feeding (probe-fed or slot/ aperture fed), increasing of bandwidth and tuning of resonant frequency.

#### Special rules of classification within this group

USPTO classifies in [H01Q 1/38](#) (/IC).

A dielectric loaded antenna (DLA) is a patch antenna in which the conductive radiating element is encased in a dielectric material for modifying the resonance characteristics.

## Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

DRA	dielectric resonator antenna;
HDA	high dielectric antenna

## H01Q 9/0492

[N: circularly polarised]

### Definition statement

This subclass/group covers:

Using two feed points, or using coupled modes.

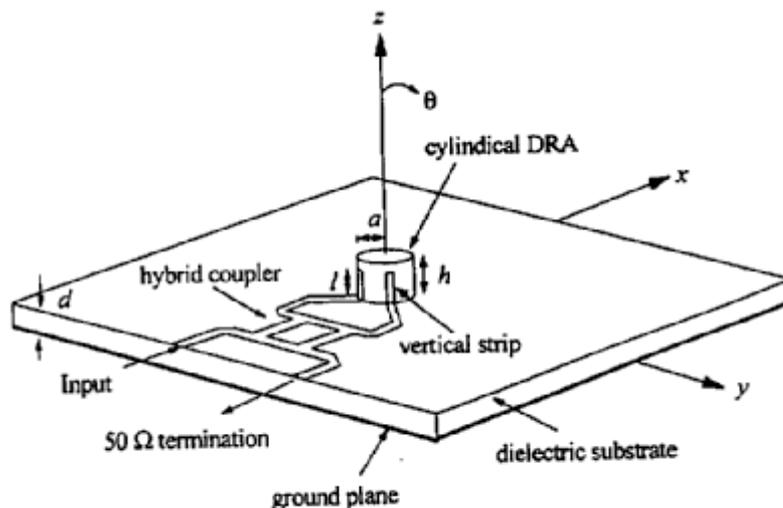


Fig. 1 Configuration of the dual-strip excited cylindrical DRA for circular polarization

## H01Q 9/06

### Details

### Special rules of classification within this group

Inactive.

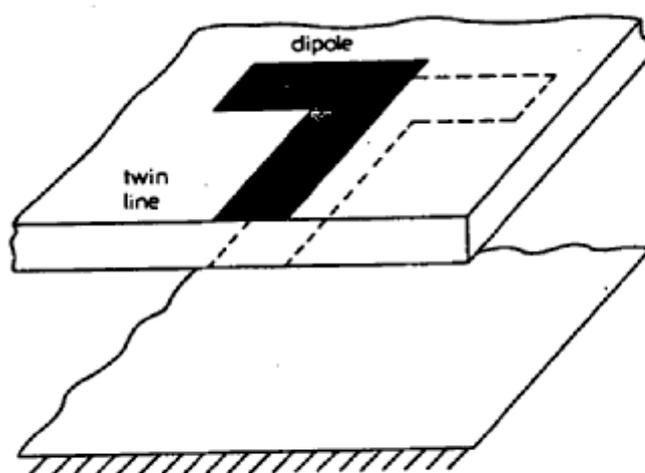
## H01Q 9/065

[N: Microstrip dipole antennas (patch antenna [H01Q 9/0407](#))]

### Definition statement

*This subclass/group covers:*

A microstrip antenna of rectangular shape with its width much smaller than its length. A resonator made with a narrow conductor strip, i.e. making L resonant and W very thin.



**Fig. 1** Double-sided printed dipole fed by a twin-line and backed by a metallic ground. The dark area represents the upper print and the dashed area is the lower print

### Synonyms and Keywords

*In patent documents the following expression/words "strip dipole", "printed dipole", "monopole strip" and "microstrip antenna with dipole resonator" are often used as synonyms.*

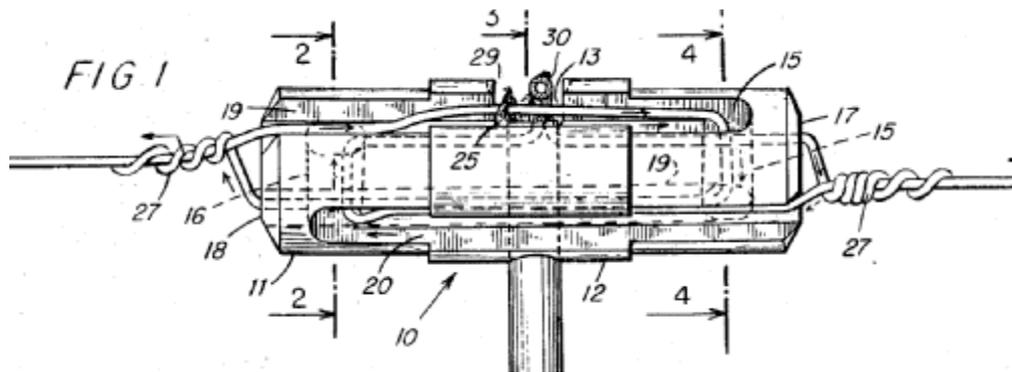
## H01Q 9/08

**Junction boxes specially adapted for supporting adjacent ends of collinear rigid elements**

### Definition statement

*This subclass/group covers:*

Originally used for top-set TV antenna with adjustable angle between telescopic dipole arms.



### Special rules of classification within this group

Inactive.

### H01Q 9/10

Junction boxes specially adapted for supporting adjacent ends of divergent elements

### Special rules of classification within this group

Inactive.

### H01Q 9/12

adapted for adjustment of angle between elements

### Special rules of classification within this group

Inactive.

### H01Q 9/14

Length of element or elements adjustable (telescopic elements [H01Q 1/10](#))

### Special rules of classification within this group

Inactive.

### H01Q 9/145

[N: by varying the electrical length]

### Special rules of classification within this group

Inactive.

## H01Q 9/16

with feed intermediate between the extremities of the aerial,  
e.g. centre-fed dipole ([H01Q 9/44](#) takes precedence)

### Definition statement

*This subclass/group covers:*

A dipole consist of two collinear and contiguous metallic rods or tubes with the feed between or of two conical conductors, typical hollow, or of strips or triangles printed on a thin dielectric substrate: maximum radiation everywhere at right angles, zero along the length.

Sleeve-dipole antenna: An antenna surrounded in its central portion by a coaxial conducting sleeve.

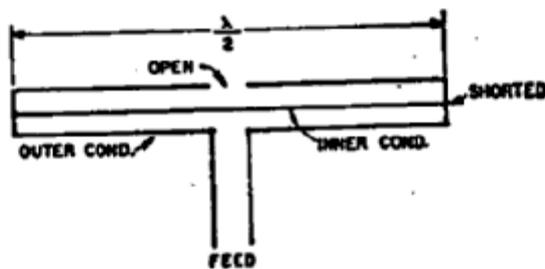


Fig. 1 — The original coax dipole system, using air-insulated coaxial line. Velocity factor is essentially the same both inside and outside the line in such case.

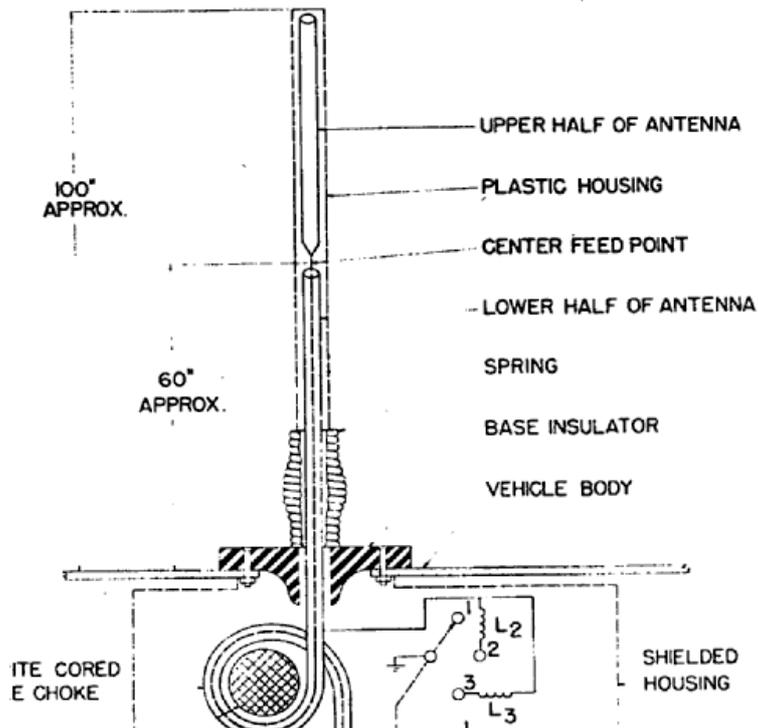
## H01Q 9/18

Vertical disposition of the aerial

### Definition statement

*This subclass/group covers:*

Typically used for pattern which is omnidirectional in azimuth.



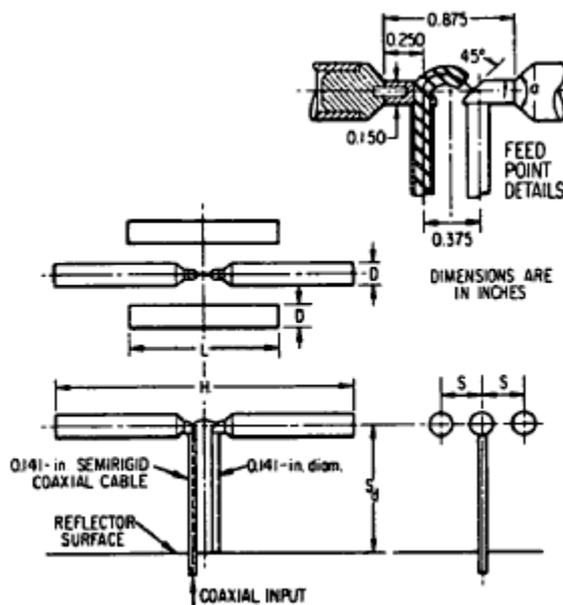
## H01Q 9/20

Two collinear substantially straight active elements;  
Substantially straight single active elements ([H01Q 9/28](#) takes precedence)

### Definition statement

*This subclass/group covers:*

Collinear, that is axis lying in a straight line.



## References relevant to classification in this group

*This subclass/group does not cover:*

<p>Conical, cylindrical, cage, strip, gauze, or like elements having an extended radiating surface; Elements comprising two conical surfaces having collinear axes and adjacent apices and fed by two-conductor transmission lines</p>	<p><a href="#">H01Q 9/28</a></p>
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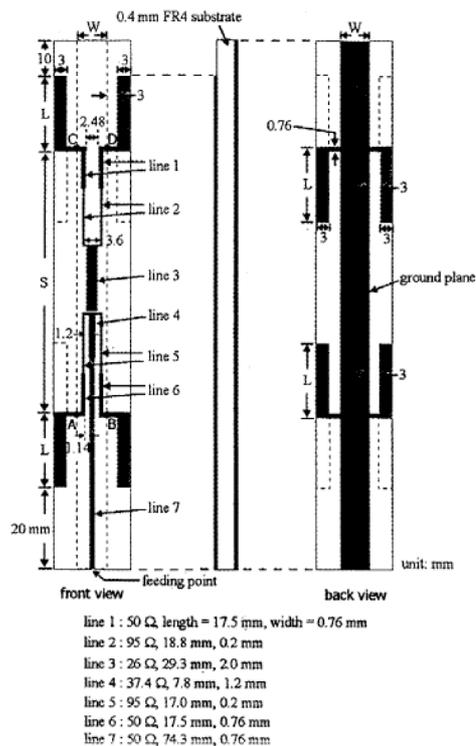
## H01Q 9/22

**Rigid rod or equivalent tubular element or elements**

### Definition statement

*This subclass/group covers:*

Cylindrical dipole: dipole with cylindrical arms.



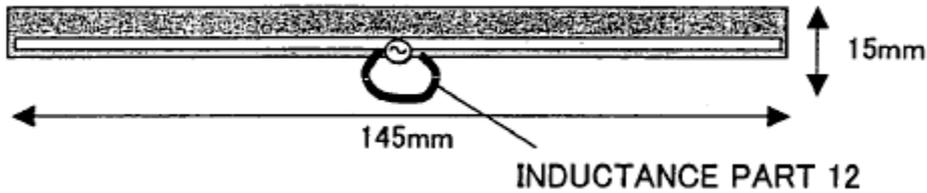
## H01Q 9/24

**Shunt feed arrangements to single active elements, e.g. for delta matching**

## Definition statement

*This subclass/group covers:*

This actually pertains to how the currents on the dipole are excited.



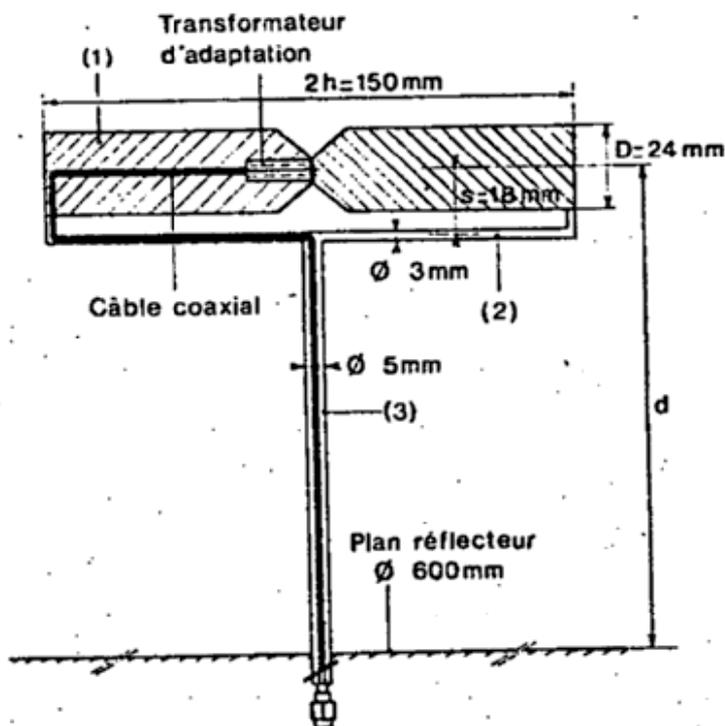
## H01Q 9/26

with folded element or elements, the folded parts being spaced apart a small fraction of operating wavelength (resonant loop aerials [H01Q 7/00](#))

## Definition statement

*This subclass/group covers:*

An antenna composed of two or more parallel, closely-spaced dipole antennas connected together at their ends with one of the dipole antennas fed at its center and the others short-circuited at their centers.



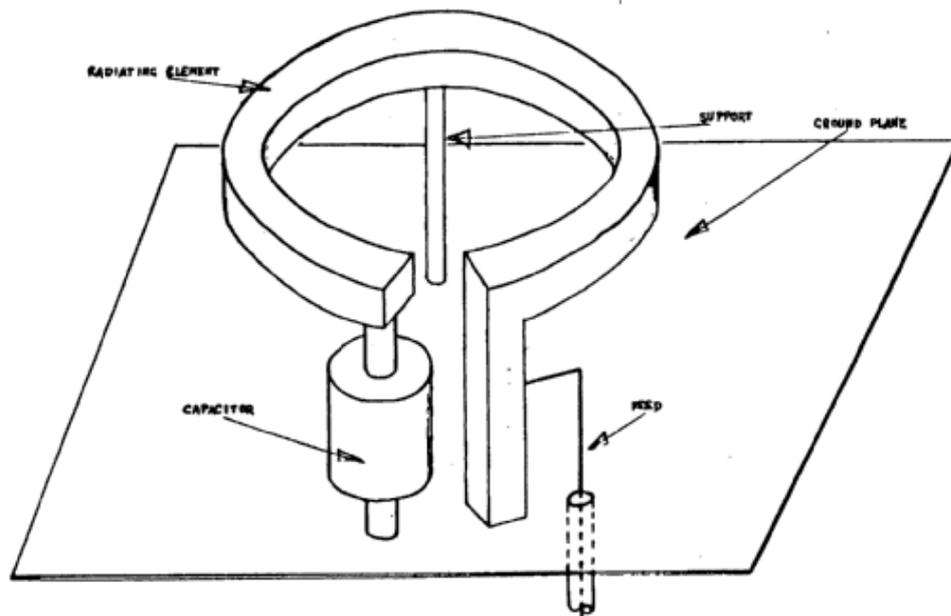
## H01Q 9/265

## [N: Open ring dipoles; Circular dipoles]

### Definition statement

*This subclass/group covers:*

Only pertains to the shape of the dipole.



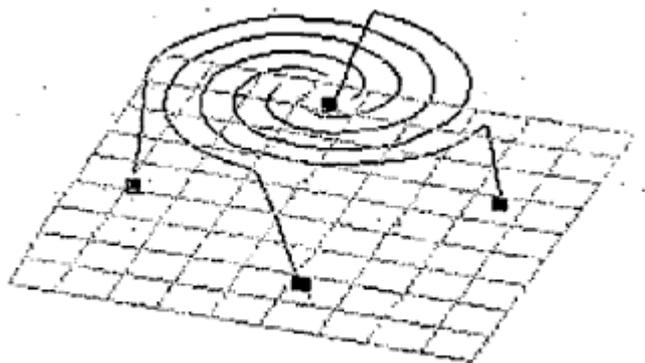
## H01Q 9/27

### Spiral aerials

### Definition statement

*This subclass/group covers:*

An antenna consisting of one or more conducting wires or tapes arranged as a spiral.



(a)

## Special rules of classification within this group

Spiral antennas are usually classified according to the shape of the surface to which they conform (for example, conical or planar spirals), and according to the mathematical form (for example, equiangular or archimedean).

## H01Q 9/28

**Conical, cylindrical, cage, strip, gauze, or like elements having an extended radiating surface; Elements comprising two conical surfaces having collinear axes and adjacent apices and fed by two-conductor transmission lines (biconical horns [H01Q 13/04](#))**

### Definition statement

*This subclass/group covers:*

Basically any dipole geometry for which the dipole arms have a specific shape: bow-tie, bicone.

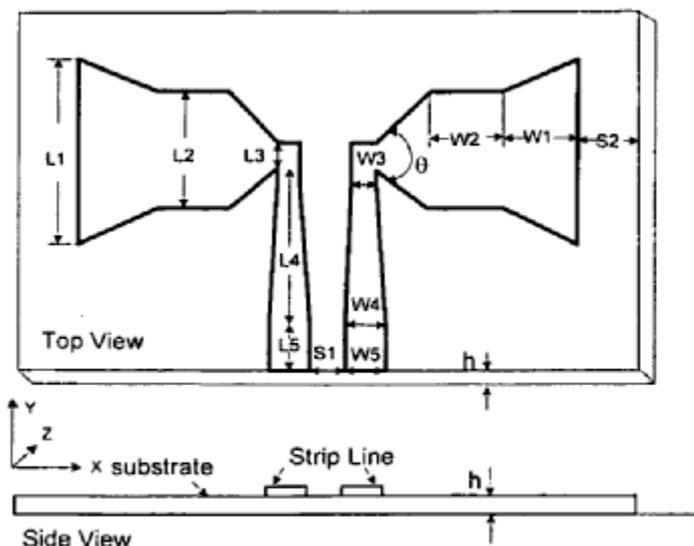


Fig. 1 Proposed bowtie antenna on the single-sided substrate.

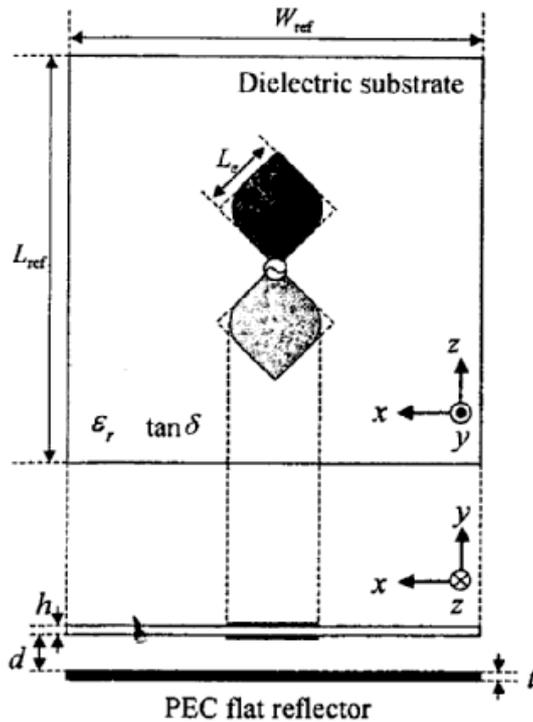
## H01Q 9/285

**[N: Planar dipole ([H01Q 9/065](#) takes precedence; patch antenna [H01Q 9/0407](#))]**

### Definition statement

*This subclass/group covers:*

Dipole printed on a dielectric substrate; printed -, dielectric dipole.



## H01Q 9/30

with feed to end of elongated active element, e.g. unipole  
([H01Q 9/44](#) takes precedence)

### Definition statement

*This subclass/group covers:*

An antenna, constructed above an imaging plane, that produces a radiation pattern approximating that of an electric dipole in the half-space above the imaging plane. The monopole requires a ground plane or counterpoise which may be the equipment enclosure. The monopole is a dipole with half of its length replaced by an "image created by an infinite (or very large) ground plane; also with base or centre loading.

Coaxial monopole antenna: An antenna comprised of an extension to the inner conductor of a coaxial line and a radiating sleeve that in effect is formed by folding back the outer conductor of the coaxial line; sleeve-monopole/sleeve stub antenna.

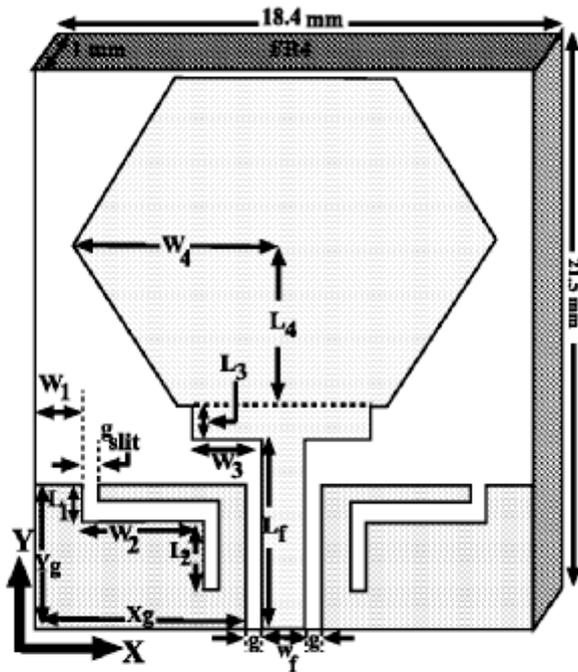


Fig. 1. Geometry of the proposed monopole antenna (unit: mm).

## References relevant to classification in this subclass

*This subclass/group does not cover:*

with feed to end of elongated active element, e.g. unipole

[H01Q 9/44](#)

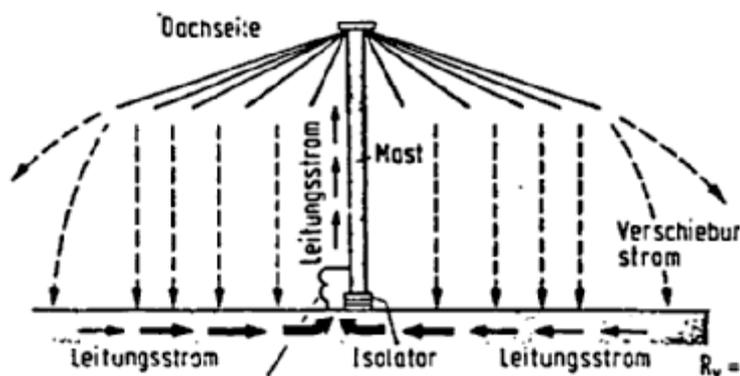
## H01Q 9/32

Vertical arrangement of element ([H01Q 9/40](#) takes precedence)

### Definition statement

*This subclass/group covers:*

Only pertains to the orientation.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

Vertical arrangement of element	<a href="#">H01Q 9/40</a>
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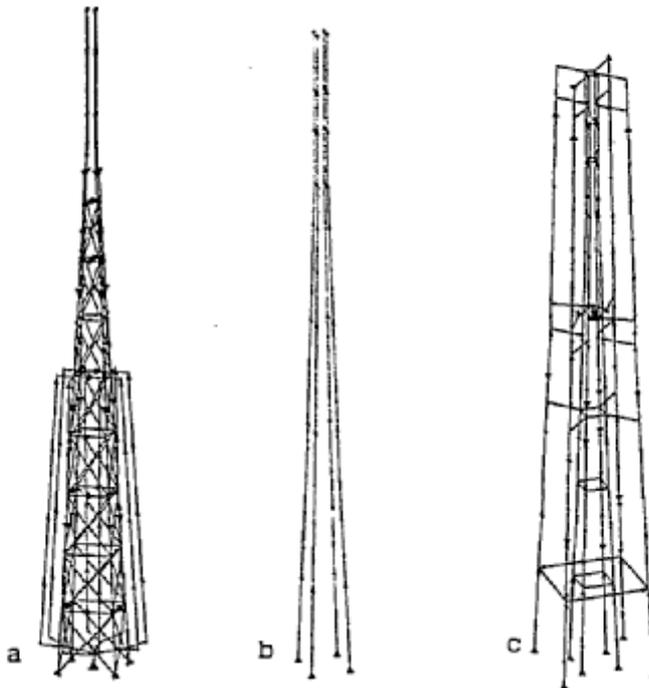
## H01Q 9/34

**Mast, tower, or like self-supporting or stay-supported aerials**

### Definition statement

*This subclass/group covers:*

Mechanical rigidity required.



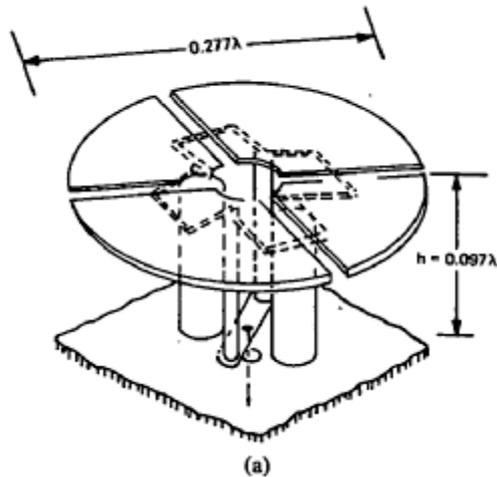
## H01Q 9/36

**with top loading**

### Definition statement

*This subclass/group covers:*

A vertical monopole with an additional metallic structure at the top intended to increase the effective height of the antenna and to change its input impedance.



## Synonyms and Keywords

*In patent documents the following expression/words "flat-top antenna", "end capacitor", "top-loaded vertical antenna" and "umbrella antenna" are often used as synonyms.*

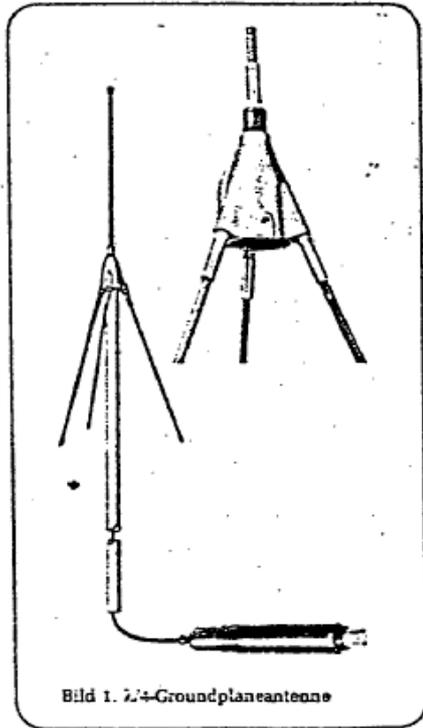
## H01Q 9/38

**with counterpoise (with counterpoise comprising elongated elements coplanar with the active element [H01Q 9/44](#))**

## Definition statement

*This subclass/group covers:*

As series-fed or shunt-fed vertical antenna whereby the antenna is insulated from ground and whose feed line connects between ground and the lower end of the antenna or the antenna is connected directly to ground and whose feed line connects between ground and a point suitably positioned above.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

with counterpoise comprising elongated elements coplanar with the active element	<a href="#">H01Q 9/44</a>
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### H01Q 9/40

#### Element having extended radiating surface

#### Definition statement

*This subclass/group covers:*

Basically any monopole geometry for which the radiator has a specific shape: conical, planar-triangular, etc.

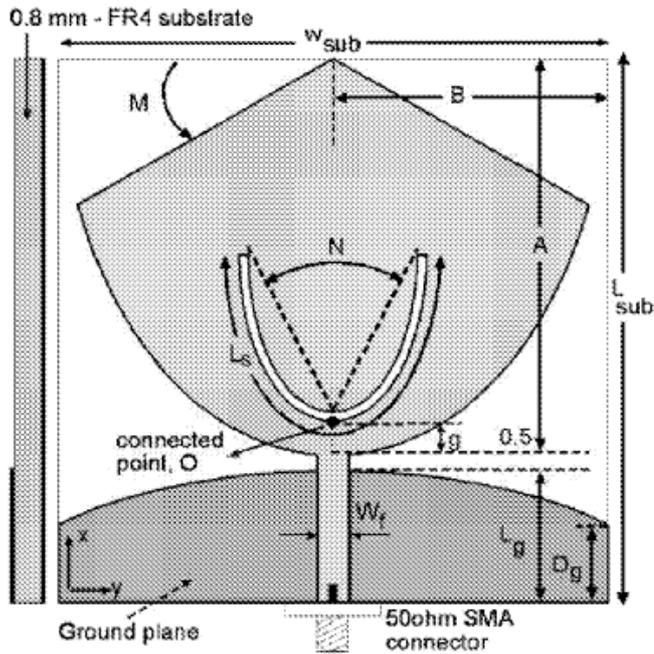


Fig. 1. Geometry of the proposed monopole antenna (unit: mm).

## H01Q 9/42

with folded element, the folded parts being spaced apart a small fraction of the operating wavelength

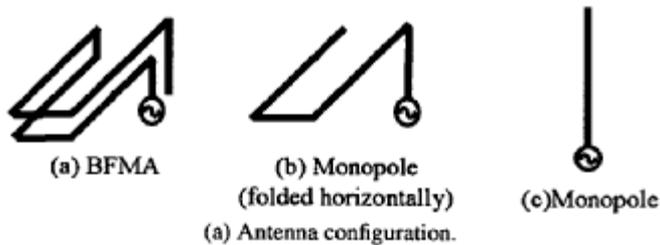
### Definition statement

*This subclass/group covers:*

A monopole antenna formed from half of a folded dipole with the unfed element(s) directly connected to the imaging plane.

Inverted- L antenna: a short monopole as vertical element and a wire horizontal element (quarter wavelength) attached at the end of the monopole.

Inverted -F antenna: a small I-L element is attached at the end of the vertical element of the ILA.

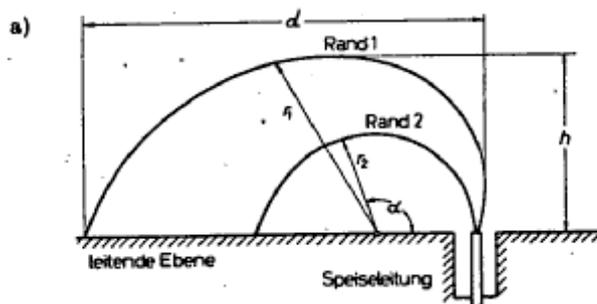


## H01Q 9/43

## Scimitar aerials

### Definition statement

*This subclass/group covers:*  
Turkish sabre shape.



### H01Q 9/44

with plurality of divergent straight elements, e.g. V-dipole, X-aerial; with plurality of elements having mutually inclined substantially straight portions (turnstile aerials [H01Q 21/26](#))

### Definition statement

*This subclass/group covers:*

If the straight elements have different length, see also [H01Q 21/30](#), since multiband operation is obtained in this way when fed at the same point.

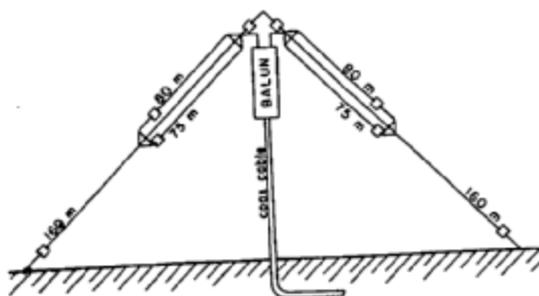


Fig. 1 – The initial two-band system described in the text.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

with plurality of elements having mutually inclined substantially straight portions	<a href="#">H01Q 21/26</a>
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## H01Q 9/46

with rigid elements diverging from single point

### Definition statement

*This subclass/group covers:*

For example:

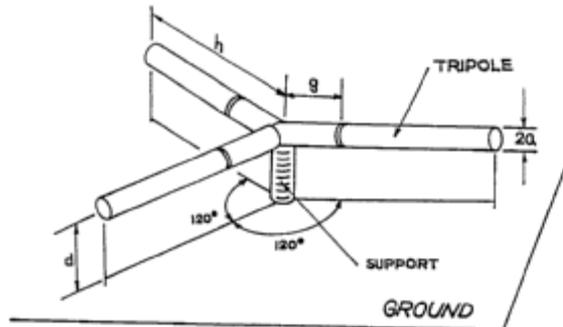


Figure 1 A Tripole Antenna Over a Large Ground Plane.

See also [H01Q 21/30](#) if the elements are joined to the same feed point.

## H01Q 11/00

Electrically-long aerials having dimensions more than twice the shortest operating wavelength and consisting of conductive active radiating elements (leaky waveguides aerials, slot aerials [H01Q 13/00](#); combinations of active elements with secondary devices to give desired directional characteristic [H01Q 19/00](#); aerial arrays or systems [H01Q 21/00](#))

### Definition statement

*This subclass/group covers:*

An antenna consisting of one or more wires whose length is large in respect to the wavelength (long-wire antennas). Two types:

- non-resonant (non-periodic; terminated) and
- resonant antennas with standing waves.

Long-wire antenna: A wire antenna that, by virtue of its considerable length in comparison with the operating wavelength, provides a directional pattern.

## References relevant to classification in this group

*This subclass/group does not cover:*

Leaky waveguides aeriels, slot aeriels	<a href="#">H01Q 13/00</a>
Combinations of active elements with secondary devices to give desired directional characteristic	<a href="#">H01Q 19/00</a>
Aerial arrays or systems	<a href="#">H01Q 21/00</a>

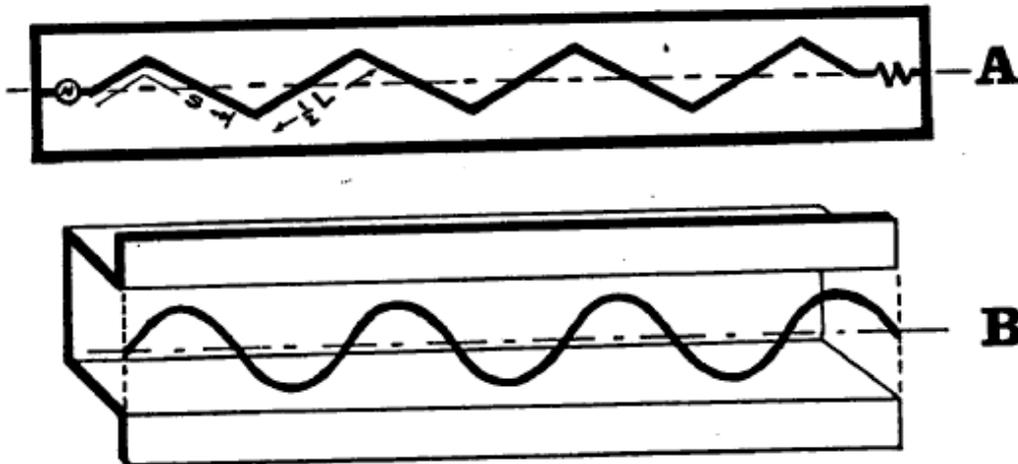
## H01Q 11/02

**Non-resonant aeriels, e.g. travelling-wave aerial**

### Definition statement

*This subclass/group covers:*

Travelling-wave antennas means antennas whose excitation has a quasiuniform progressive phase, as the result of a single feeding wave traversing its length in one direction only. Terminated in a resistance.



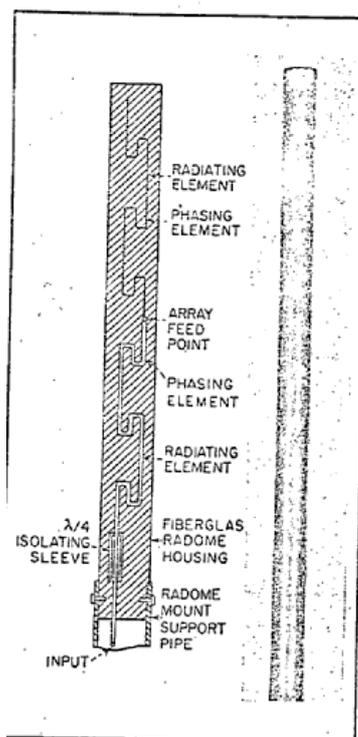
## H01Q 11/04

with parts bent, folded, shaped, screened, or electrically loaded to obtain desired phase relation of radiation from selected sections of the aerial (rhombic aeriels, V-aeriels [H01Q 11/06](#))

### Definition statement

*This subclass/group covers:*

As fishbone antenna: an end-fire, travelling wave antenna.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

rhombic aerials, V-aerials	<a href="#">H01Q 11/06</a>
----------------------------	----------------------------

## H01Q 11/06

### Rhombic aerials; V-aerials

#### Definition statement

*This subclass/group covers:*

Rhombic antenna: composed of long wire radiators arranged in such a manner that they form the sides of a rhombus.

V-antenna: A V-shaped arrangement of two conductors, balanced fed at the apex, with induced angle, length and apex height above the earth chosen so as to give the desired directive properties to the radiation pattern.

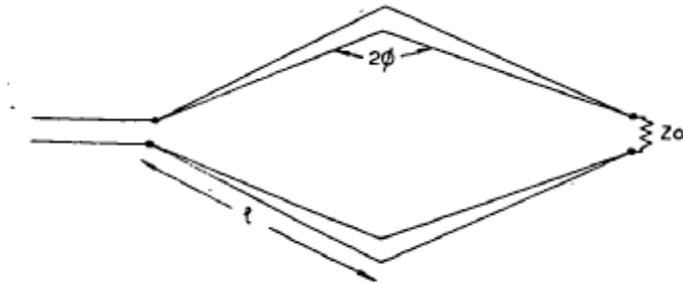


Fig. 1 Simple rhombic aerial

## H01Q 11/08

### Helical aerials

#### Definition statement

*This subclass/group covers:*

An antenna consisting of a single conductor or multiple conductors wound into a helical shape, whereby the helix circumference is of the order of one wavelength; radiating in axial mode i.e. along the helix axis.

- monofilar, unifilar or
- bifilar, quadrifilar, octofilar or multifilar also in backfire configuration

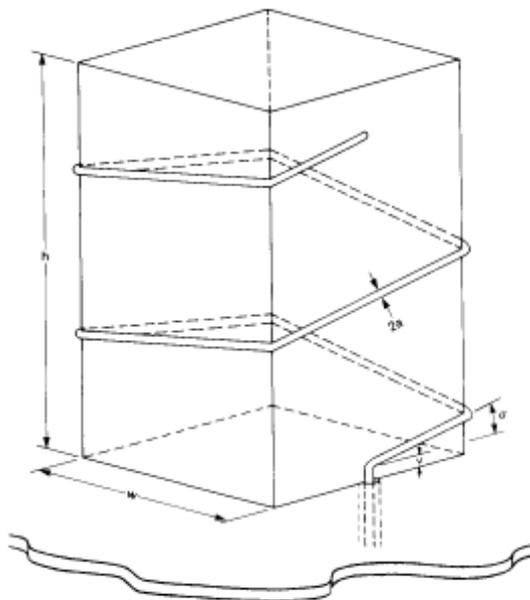


Fig. 1. Two-turn square helical antenna with a dielectric core and fed over a ground plane.

## H01Q 11/083

[N: Tapered helical aerials, e.g. conical spiral aerials]

## Definition statement

This subclass/group covers:

Windings are on a (part of a) cone; tapered geometries.

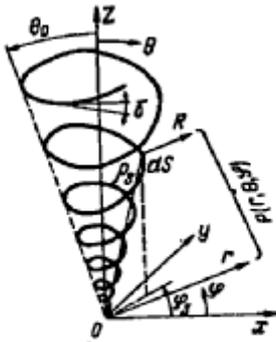


Fig. 1

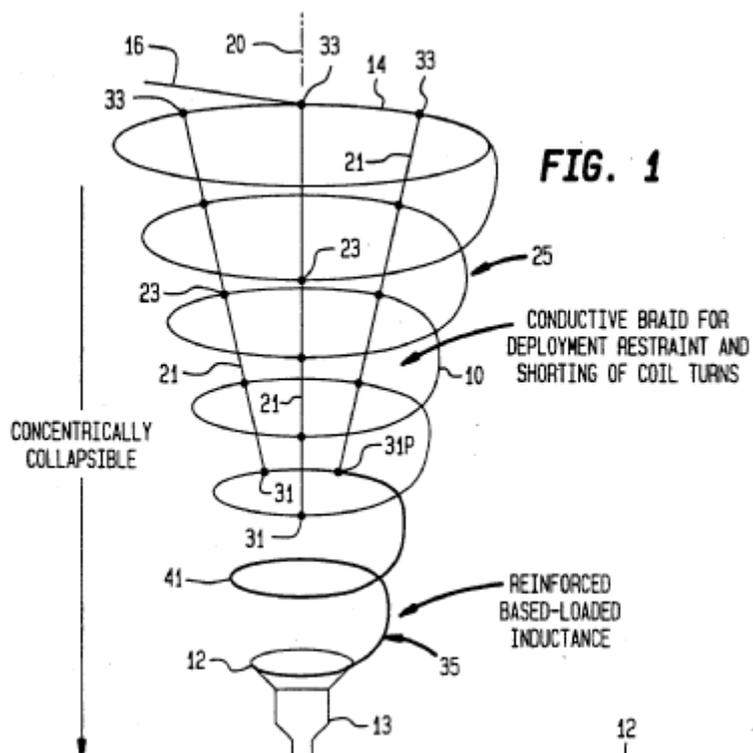
## H01Q 11/086

[N: collapsible]

## Definition statement

This subclass/group covers:

For example:



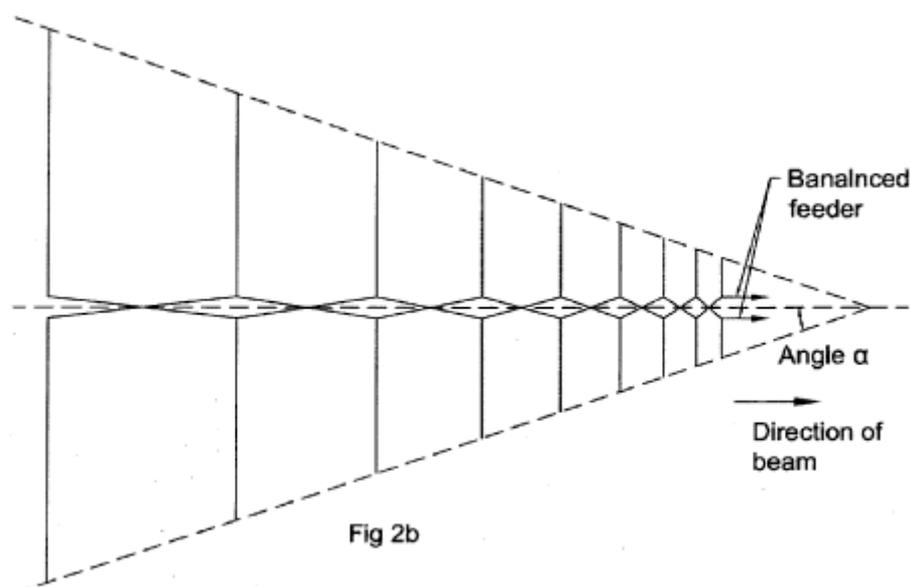
## H01Q 11/10

Log-periodic aerials [N: periodic aerials, e.g. length or spacing of elements according to a given law] ([H01Q 11/08](#) takes precedence)

### Definition statement

*This subclass/group covers:*

A class of antennas having the structural geometry such that its impedance and radiation characteristics repeat periodically as the logarithm of the frequency.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

periodic aerials, e.g. length or spacing of elements according to a given law	<a href="#">H01Q 11/08</a>
---	----------------------------

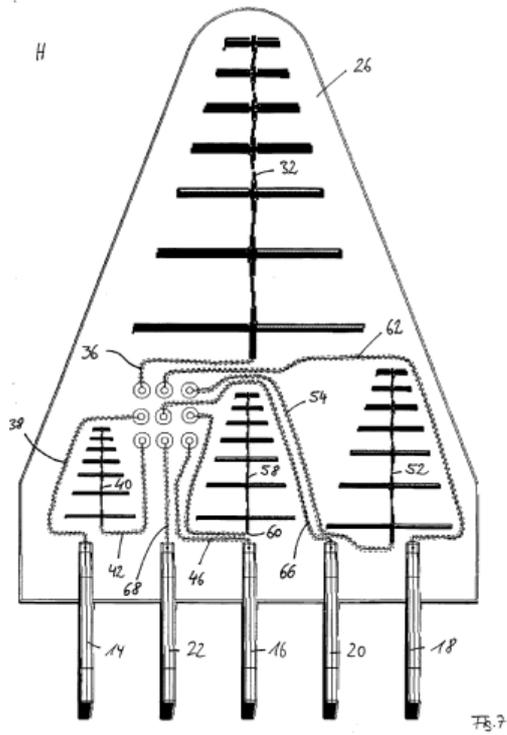
## H01Q 11/105

[N: using a dielectric support]

### Definition statement

*This subclass/group covers:*

For example:



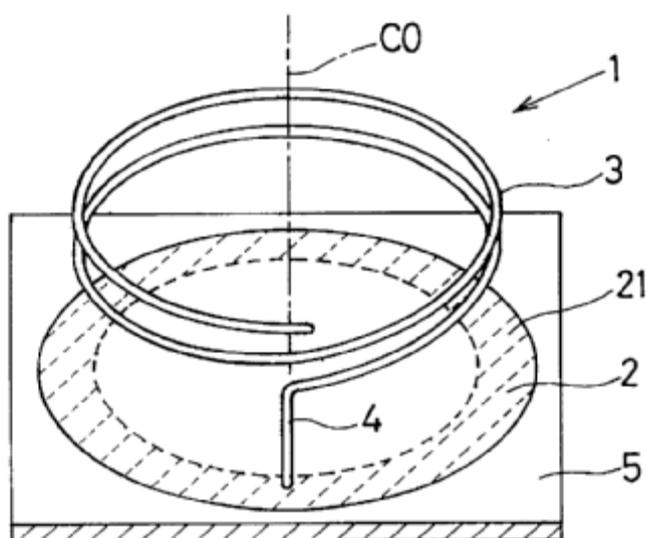
## H01Q 11/12

### Resonant aerials

#### Definition statement

*This subclass/group covers:*

When the long-wire antenna is open at its end standing waves can be formed when the length is a multiple of the wavelength.



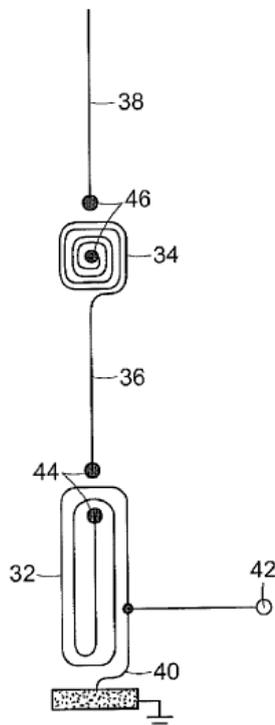
## H01Q 11/14

with parts bent, folded, shaped, or screened, or with phasing impedances, to obtain desired phase relation of radiation from selected sections of the aerial or to obtain desired polarisation effects

### Definition statement

*This subclass/group covers:*

For example:



## H01Q 11/16

in which the selected sections are collinear

### Definition statement

*This subclass/group covers:*

For example:

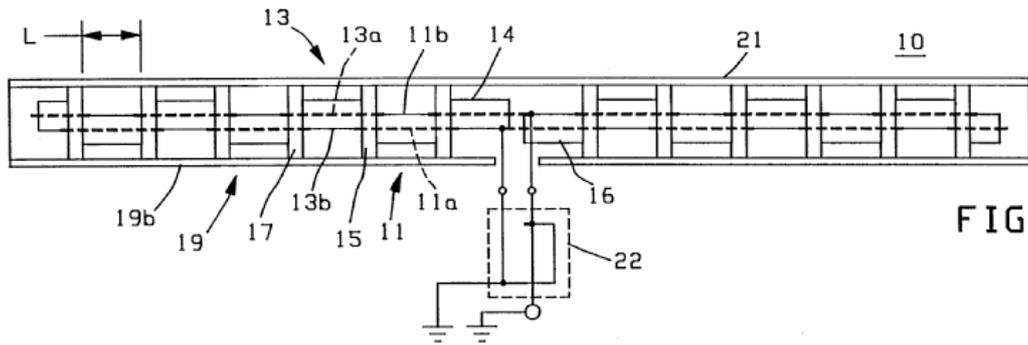


FIG. 1

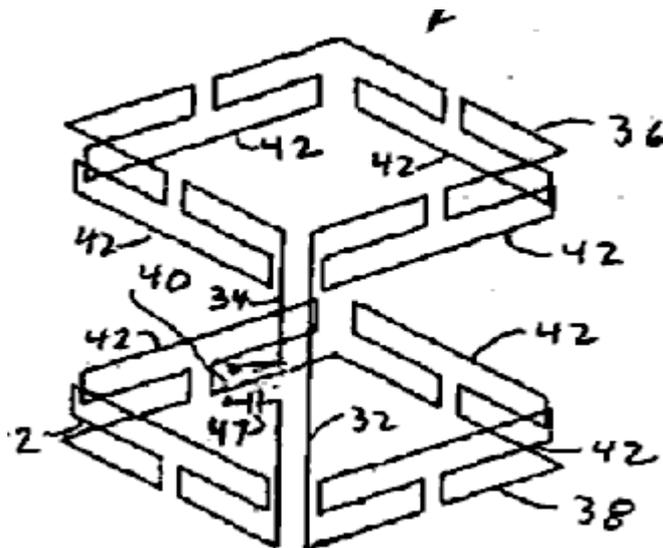
## H01Q 11/18

in which the selected sections are parallelly spaced

### Definition statement

*This subclass/group covers:*

For example:



## H01Q 11/20

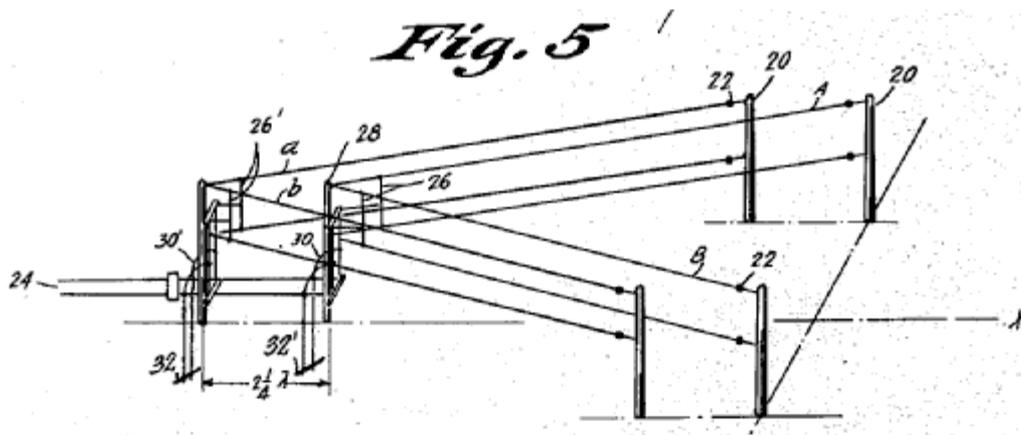
### V-aerials

### Definition statement

*This subclass/group covers:*

A V-shaped arrangement of two horizontally arranged long-wire antenna.

In essence, it is a centre-fed dipole for which the arms are collinear; this has an effect on the impedance seen at the feedpoint.



## H01Q 13/00

**Waveguide horns or mouths; Slot aeri-als; Leaky-waveguide aeri-als; Equivalent structures causing radiation along the transmission path of a guided wave [N: multimode aeri-als [H01Q 25/04](#)]**

### Definition statement

*This subclass/group covers:*

Horn radiator: a waveguide section in which the cross section increases towards an open end that is the aperture.

Slot antenna: a radiating element formed by a slot in a conducting surface.

Leaky wave antenna: an antenna that couples power in small increments per unit length, either continuously or discretely, from a traveling wave structure to free space.

### Informative references:

*Attention is drawn to the following places, which may be of interest for search:*

*Attention is drawn to the following places which may be of interest for search:*

Multimode aeri-als	<a href="#">H01Q 25/04</a>
--------------------	----------------------------

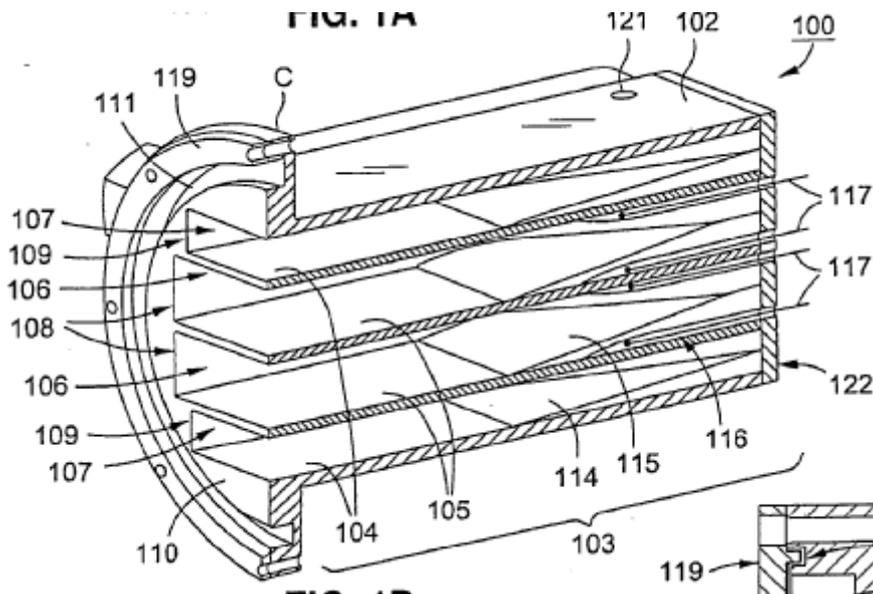
## H01Q 13/02

### Waveguide horns

#### Definition statement

*This subclass/group covers:*

An antenna consisting of a waveguide section in which the cross sectional area increases towards an open end that is the aperture.



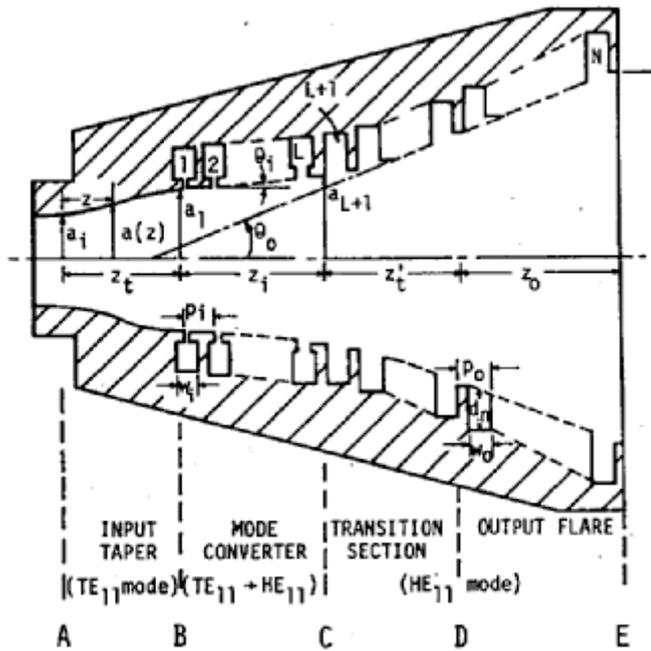
## H01Q 13/0208

[N: Corrugated horns (waveguide mouth antenna with corrugated flange [H01Q 13/065](#); manufacturing details [H01Q 13/0283](#))]

### Definition statement

*This subclass/group covers:*

A hybrid-mode horn antenna produced by cutting narrow transverse grooves of specified depth in the interior walls of the horn.



## H01Q 13/0216

[N: Dual-depth corrugated horns]

### Definition statement

*This subclass/group covers:*

Depth of the corrugations is not constant: e.g. for dual frequency operation, the depth still is a quarter wave at the respective frequencies.

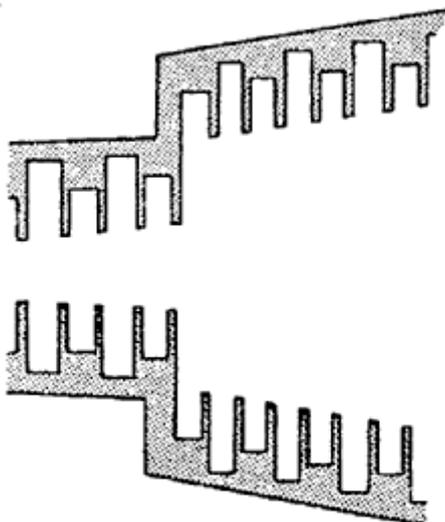


Fig. 3. Mode Transducer  
Showing Alternating Corrugation  
Depths

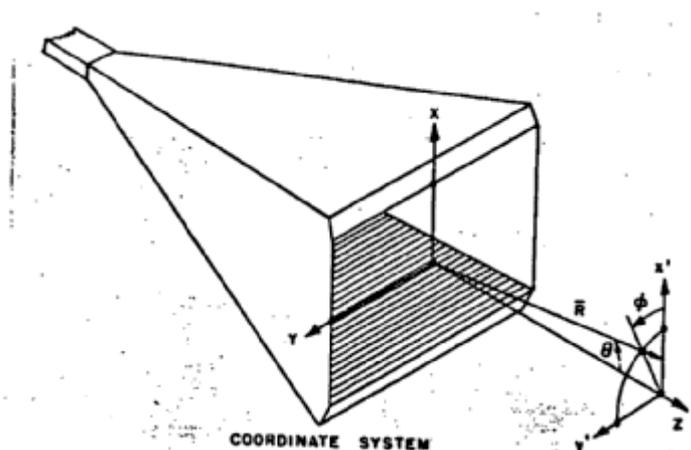
## H01Q 13/0225

[N: of non-circular cross-section ([H01Q 13/0216](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Rectangular, pyramidal, elliptical.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

of non-circular cross-section	<a href="#">H01Q 13/0216</a>
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## H01Q 13/0233

[N: Horns fed by a slotted waveguide array (biconical horns [H01Q 13/06](#))]

### Definition statement

*This subclass/group covers:*

Normally slots are disposed in the wall of a waveguide. Flanges are attached in order to increase directivity.

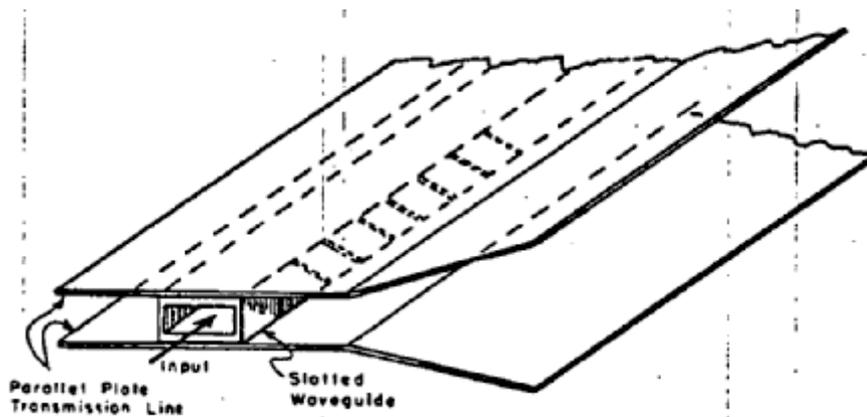


Fig. 1—A sketch of the variably polarized line source.

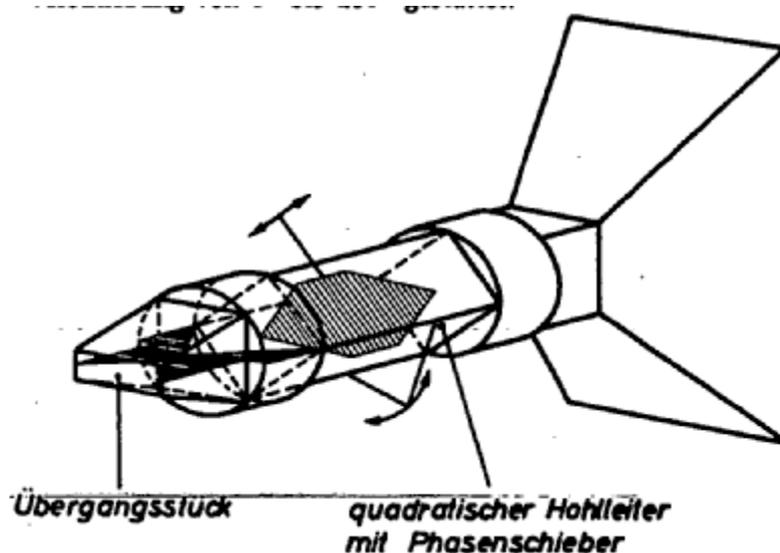
## H01Q 13/0241

[N: radiating a circularly polarised wave ([H01Q 13/0258](#) takes precedence; polarisation converters [H01Q 15/244](#), in a waveguide [H01P 1/17](#))]

### Definition statement

*This subclass/group covers:*

Converters from linear polarisation to circular and vice versa; linear to linear (polarisation rotator), or from linear to elliptical.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

radiating a circularly polarised wave	<a href="#">H01Q 13/0258</a>
takes precedence; polarisation	<a href="#">H01Q 15/244</a>

converters	
in a waveguide	<a href="#">H01P 1/17</a>

## H01Q 13/025

[N: Multimode horn antennas; Horns using higher mode of propagation ([H01Q 13/0241](#) takes precedence; multiple beam [H01Q 25/04](#))]

### Definition statement

*This subclass/group covers:*

Multiple modes are used either for matching, or for cross-polarisation reduction, or any other aim.

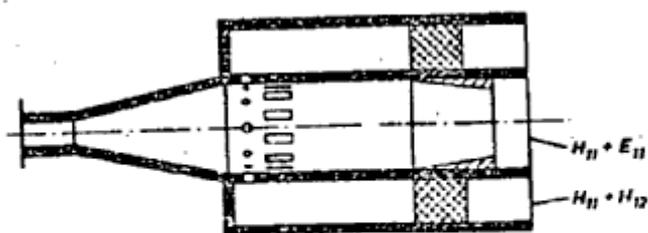


Fig. 5  
Multimode coaxial radiator

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Horns using higher mode of propagation	<a href="#">H01Q 13/0241</a>
multiple beam	<a href="#">H01Q 25/04</a>

### Synonyms and Keywords

*In patent documents the following expression/words "hybrid mode", "dual mode", "potter horn" and "dompson horn antenna" are often used as synonyms.*

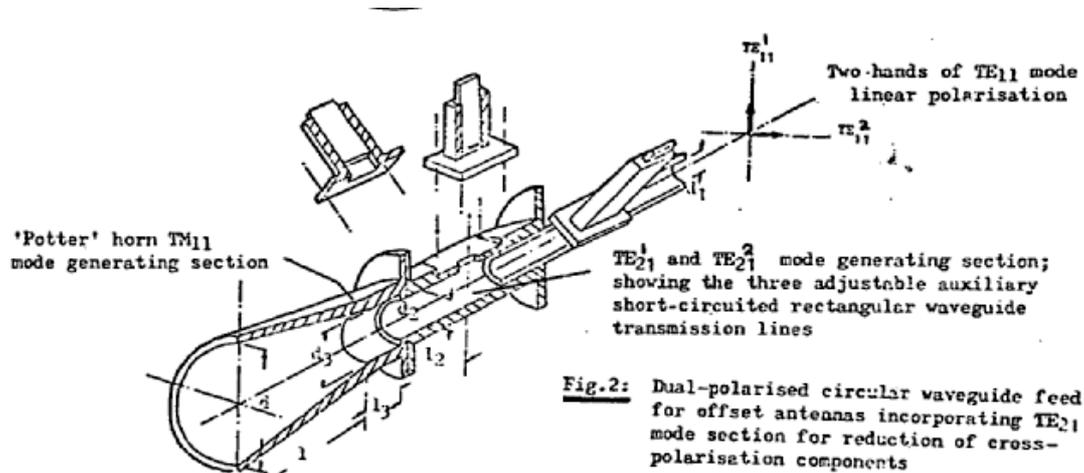
## H01Q 13/0258

[N: Orthomode horns (Orthomode transducers [H01P 1/161](#))]

**Definition statement**

*This subclass/group covers:*

Receiving or transmitting orthogonal polarised signals; polarisation filter which separates orthogonal polarisations within the same band; OMT.



**Informative references**

Attention is drawn to the following places, which may be of interest for search:

With combining or separating polarisations	<a href="#">H01P 1/2131</a>
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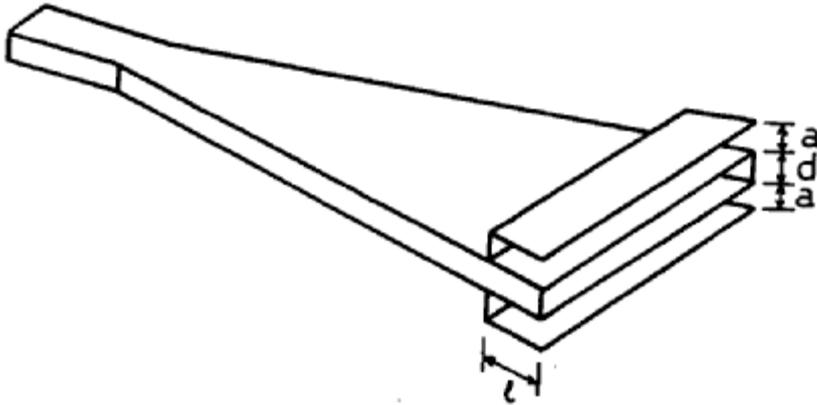
**H01Q 13/0266**

[N: provided with a flange or a choke]

**Definition statement**

*This subclass/group covers:*

Chokes are either for VSWR reduction, or for sidelobe reduction.



## H01Q 13/0275

[N: Ridged horns (slot-line radiating ends [H01Q 13/085](#))]

### Definition statement

*This subclass/group covers:*

Ridges in pyramidal horns to expand frequency range of operation; ridge-loaded.

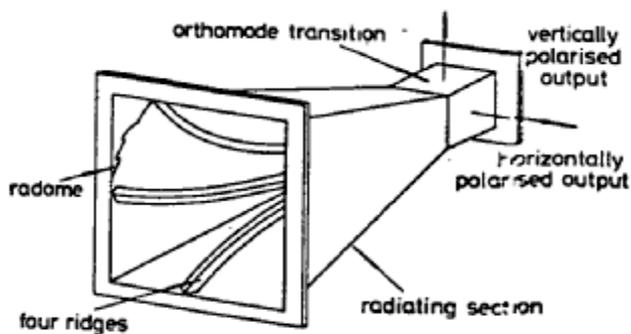


Fig. 2 Typical dual-polarised horn for ESM applications

### References relevant to classification in this subclass

*This subclass/group does not cover:*

slot-line radiating ends	<a href="#">H01Q 13/085</a>
--------------------------	-----------------------------

## H01Q 13/0283

[N: Apparatus or processes specially provided for

manufacturing horns]

**Definition statement**

*This subclass/group covers:*

Any manufacturing process related to horns is to be classified here.



Fig. 1. A diagonal horn made in the split-block technique.

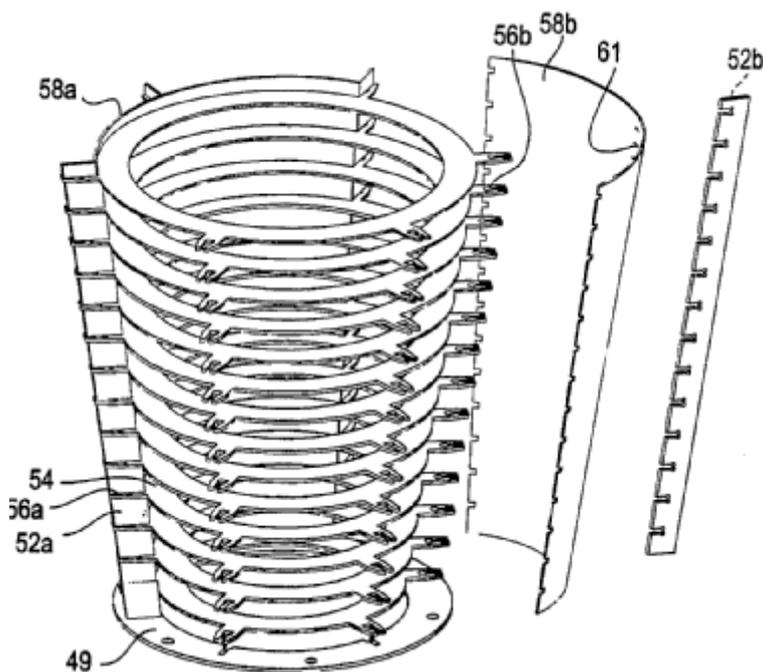
**H01Q 13/0291**

[N: for corrugated horns]

**Definition statement**

*This subclass/group covers:*

Any manufacturing process related to corrugated horns is to be classified here.



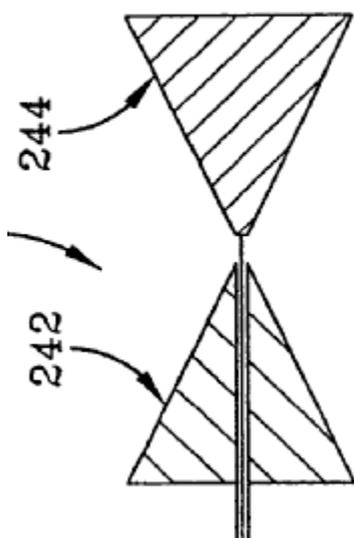
## H01Q 13/04

**Biconical horns (biconical dipoles comprising two conical surfaces having collinear axes and adjacent apices and fed by a two-conductor transmission line [H01Q 9/28](#))**

### Definition statement

*This subclass/group covers:*

An antenna consisting of two conical horns having a common axis and vertex.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

biconical dipoles comprising two conical surfaces having collinear axes and adjacent apices and fed by a two-conductor transmission line	<a href="#">H01Q 9/28</a>
--	---------------------------

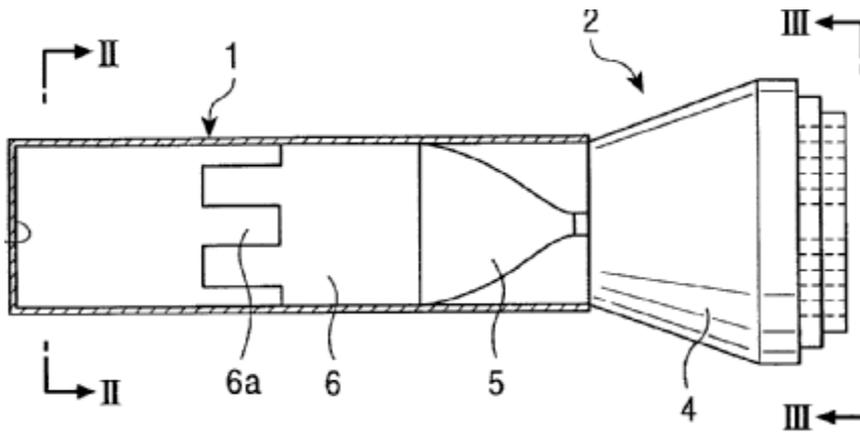
## H01Q 13/06

**Waveguide mouths (horns [H01Q 13/02](#))**

### Definition statement

*This subclass/group covers:*

An open waveguide with round or square opening.



**References relevant to classification in this subclass**

*This subclass/group does not cover:*

Waveguide mouths (horns	<a href="#">H01Q 13/02</a>
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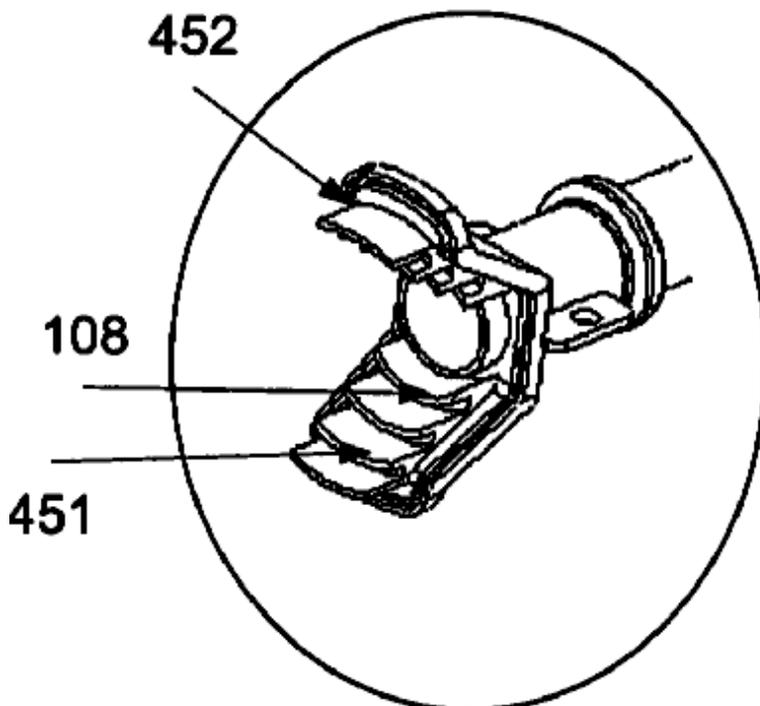
**H01Q 13/065**

[N: provided with a flange or a choke]

**Definition statement**

*This subclass/group covers:*

Chokes for either for VSWR reduction, or for sidelobe reduction.



## H01Q 13/08

### Radiating ends of two-conductor microwave transmission lines, e.g. of coaxial lines, of microstrip lines

#### Definition statement

*This subclass/group covers:*

Open-ended coaxial line: current minimum and voltage maximum at the end; standing waves by superposition of running and reflected wave TEM-mode coaxial line as feeding a radiating annular slot.

Microstrip line, open-ended or with short-circuited edge.

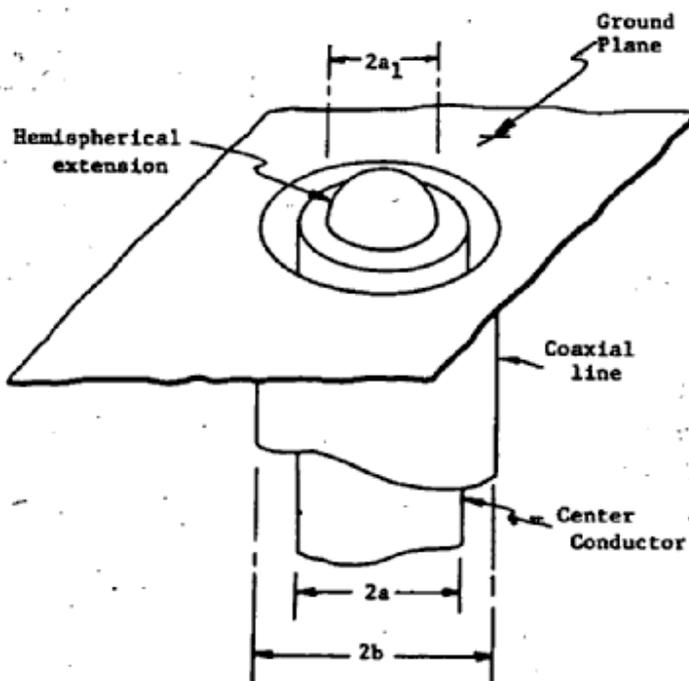


Fig. 1. The annular aperture antenna containing a hemispherical center conductor extension.

#### Special rules of classification within this group

A microstrip-line as open-ended or with a short-circuited edge becomes a microstrip antenna when its length is half-wave resp. quarter-wave and its width less than a wavelength, then it behaves as a half wave open-ended transmission line resonator with radiating edges.

JPO classifies this antenna type here; however we classify said type as a resonant structure in [H01Q 9/0407](#) and subgroups.

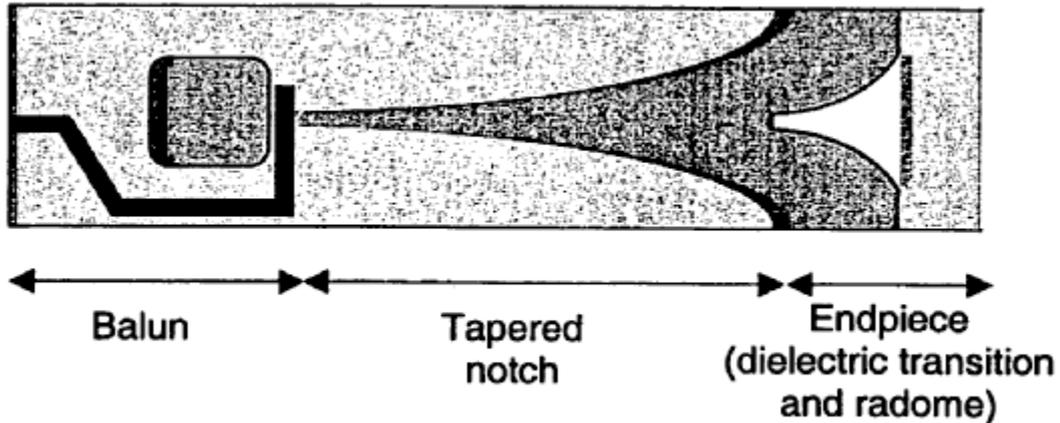
## H01Q 13/085

### [N: Slot-line radiating ends]

## Definition statement

*This subclass/group covers:*

In the form of tapered or flared slot antenna: Are a type of travelling-wave antenna where a travelling wave propagates along the surface of the antenna taper with a phase velocity less than the speed of light. Under this condition, endfire radiation results.



## Synonyms and Keywords

*In patent documents the following abbreviations are often used:*

TSA	tapered slot antenna
-----	----------------------

*In patent documents the expression/word "Vivaldi antenna" is often used with the meaning "endfire slotline".*

## H01Q 13/10

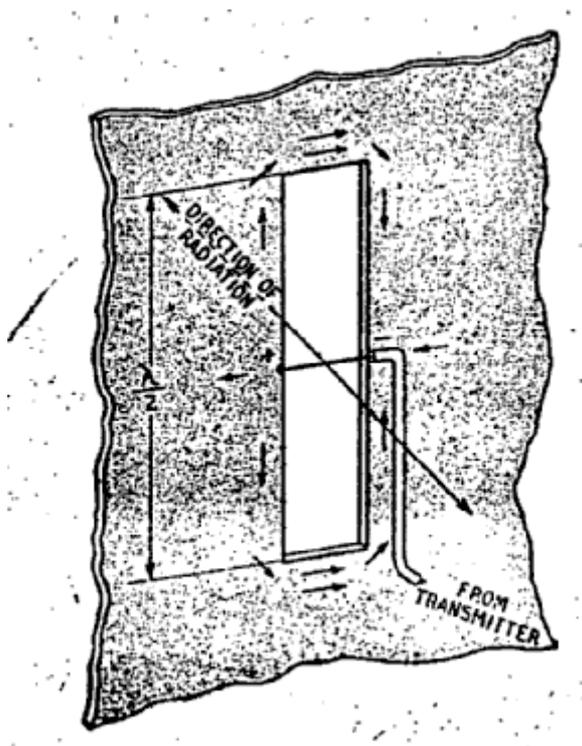
### Resonant slot aeriels

## Definition statement

*This subclass/group covers:*

A radiating element formed by a slot in a conducting surface; in its simplest form as thin rectangular slot having a length of  $\lambda/2$  or  $\lambda/4$  cut in an extended thin flat sheet of metal excited by a voltage source to the opposite edges of the slot; complementary to dipole.

Slot, usually a half-wavelength long, is cut from a large (relative to the slot length) metal plate. The center conductor of a coaxial cable is connected to one side of the slot, the outside conductor is connected to the other side of the slot; the feed-point can be off-center to provide 50- Ohm impedance.



See: XP010608951.

### Special rules of classification within this group

Normally speaking, a slot is a cut for which the wavelength is around half a wavelength, due to the boundary conditions of the electric field.

A notch typically has an open end, and this causes that its minimum length is around a quarter wavelength.

In the field, slit is used to denominate both types of radiators (slot and notch).

### Synonyms and Keywords

*In patent documents the expression/word "votch- or slit antenna" is often used with the meaning "annular - or ring slot antenna".*

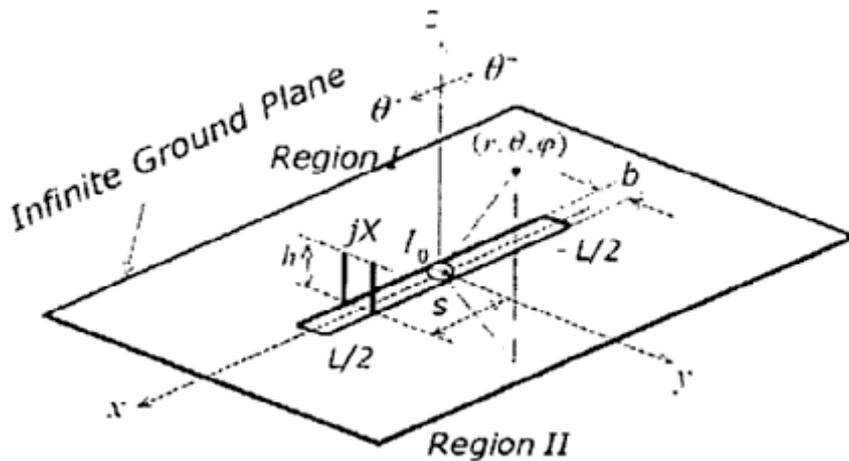
## H01Q 13/103

[N: with variable reactance for tuning the antenna (tuning resonant circuits [H03J](#))]

### Definition statement

*This subclass/group covers:*

Basically impedance loading is used for tuning the antenna; here it can be a reactive load (L/C) or a resistive one (R), contrary to the definition of the class.



**Fig. 1** A slot antenna element loaded with reactance  $jX$ .

### References relevant to classification in this subclass

*This subclass/group does not cover:*

with variable reactance for tuning the antenna	<a href="#">H03J</a>
--	----------------------

### H01Q 13/106

[N: Microstrip slot antennas (patch antenna elements [H01Q 9/0407](#))]

### Definition statement

*This subclass/group covers:*

Slot in conducting surface bonded to a thin grounded dielectric substrate.

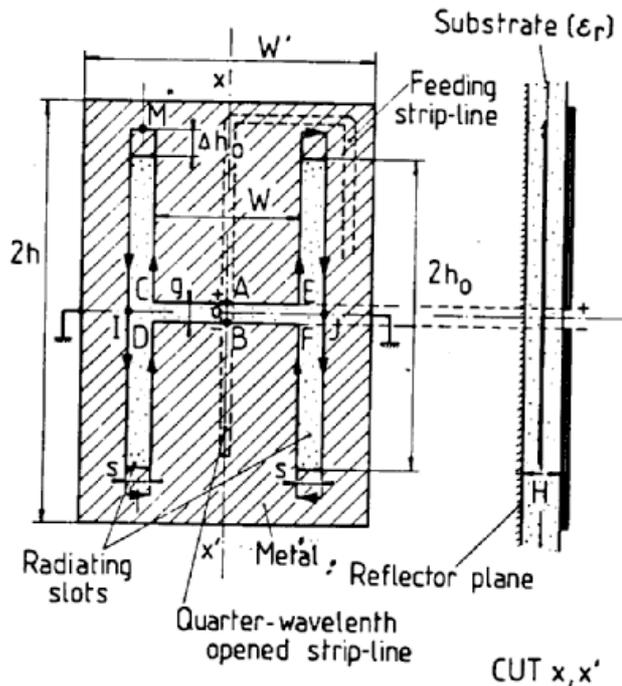


Fig. 3. Directional folded slot dipole geometry.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Microstrip slot antennas (patch antenna elements)	<a href="#">H01Q 9/0407</a>
---	-----------------------------

### Special rules of classification within this group

The geometries can be the following: narrow slot/slit, circular slot, annular -, ring-, slot-ring antenna; spiral, bow-tie; folded slot antenna.

## H01Q 13/12

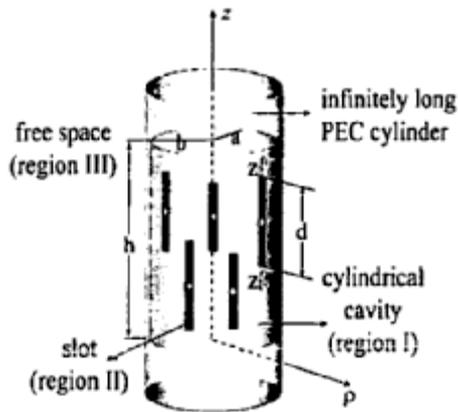
### Longitudinally slotted cylinder aerials; Equivalent structures

#### Definition statement

*This subclass/group covers:*

A cylindrical waveguide with a continuous slot in its wall; the geometry can be such it is not continuous, but curved or wave, in order to change the excitation law along the longitudinal extent of the waveguide.

Examples: as narrow slot/slit, circular slot, annular -, ring-, slot-ring antenna; spiral, bow-tie; folded slot antenna.



## H01Q 13/14

### Skeleton cylinder aerials

#### Special rules of classification within this group

Inactive.

## H01Q 13/16

### Folded slot aerials

#### Definition statement

*This subclass/group covers:*

For example:

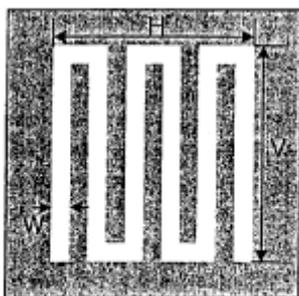


Figure 1 Top view of the conventional Meander-type slot antenna

## H01Q 13/18

the slot being backed by, or formed in boundary wall of, a resonant cavity (longitudinally slotted cylinder [H01Q 13/12](#)); [N: Open cavity antennas]

## Definition statement

*This subclass/group covers:*

For example:

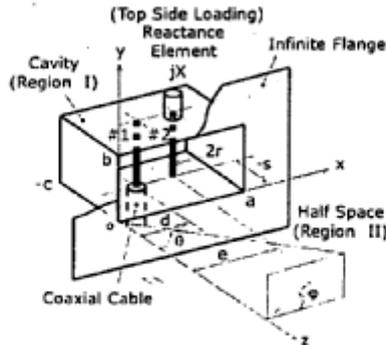


Fig. 1. The geometry and the coordinate system of the cut off cavity-backed slot radiator with one external reactance element.

## References relevant to classification in this subclass

*This subclass/group does not cover:*

ongitudinally slotted cylinder	<a href="#">H01Q 13/12</a>
--------------------------------	----------------------------

## H01Q 13/20

**Non-resonant leaky-waveguide or transmission-line aeriars; Equivalent structures causing radiation along the transmission path of a guided wave [N: varying the phase velocity [H01Q 3/443](#); near-field transmission systems using leaky cable [H04B 5/0018](#)]**

## Definition statement

*This subclass/group covers:*

An antenna that couples power in small increments per unit length, either continuously or discretely, from a travelling wave structure to free space; a guiding structure that leaks power all along its length; typically 20 times lambda; remaining power in matched load.

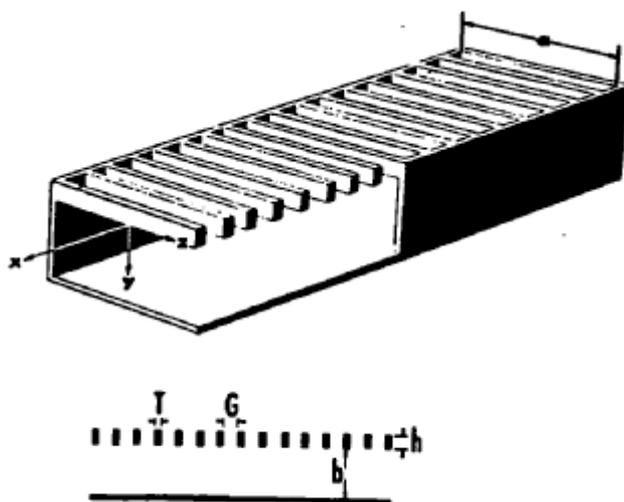


Figure 1. Serrated Rectangular Waveguide

## References relevant to classification in this subclass

*This subclass/group does not cover:*

varying the phase velocity	<a href="#">H01Q 3/443</a>
near-field transmission systems using leaky cable	<a href="#">H04B 5/0018</a>

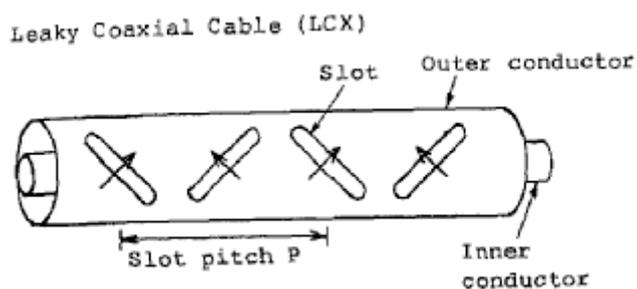
## H01Q 13/203

[N: Leaky coaxial lines]

### Definition statement

*This subclass/group covers:*

The radiation happens via periodic slits/slots or holes in the outer conductor; variation of slot length, width and inclination angle.



## Informative references

Attention is drawn to the following places, which may be of interest for search:

Using leaky or radiating cables, e.g. leaky coaxial cables or power lines for inductive transmission	<a href="#">H04B 5/0018</a>
For concentric or coaxial cables	<a href="#">H01B 13/20</a>

## Synonyms and Keywords

Radiating coaxial cable.

## H01Q 13/206

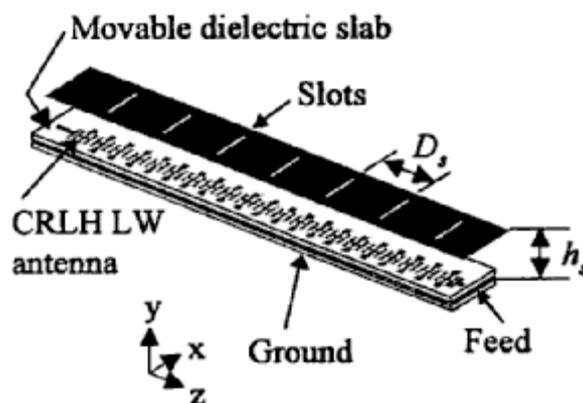
### [N: Microstrip transmission line antennas]

#### Definition statement

*This subclass/group covers:*

A microstrip transmission line is normally non radiating but can be made to radiate:

- by a series of patch antennas connected by a microstrip line;
- by a series of radiators, resonant or not, coupled by proximity to the microstrip line;
- bending the strip conductor ( meandered periodically, sinusoidal, trapezoidal, zigzag).



**Fig. 1** Structure of 21-element steerable CRLH LW antenna with movable dielectric slab (slot interval  $D_s=1.8$  mm, distance between slots and CRLH LW antenna  $h_s=1.5$  mm).

## Synonyms and Keywords

In patent documents the expression/word "microstrip travelling wave" is often used with the meaning "microstrip leaky wave".

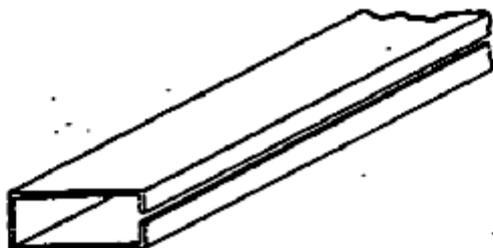
## H01Q 13/22

**Longitudinal slot in boundary wall of waveguide or transmission line [N: ([H01Q 13/203](#) takes precedence)]**

### Definition statement

*This subclass/group covers:*

Leaky waveguide with long or narrow slits/slots or holes.



**Bild 2. Enger Schlitz in der Schmalseite eines Rechteckhohlleiters**

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Longitudinal slot in boundary wall of waveguide or transmission line	<a href="#">H01Q 13/203</a>
--	-----------------------------

## H01Q 13/24

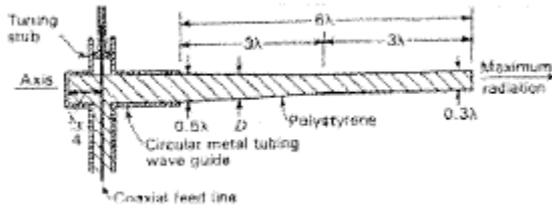
**constituted by a dielectric or ferromagnetic rod or pipe ([H01Q 13/28](#) takes precedence)**

### Definition statement

*This subclass/group covers:*

An antenna that employs a shaped dielectric rod as the electrically significant part of a radiating element. excited by a circular or rectangular waveguide; a surface wave travels along the rod till the end where it radiates into space.

The polyrod antenna is a notable example of the dielectric rod when constructed of polystyrene. Ferrod made of ferrite material.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

constituted by a dielectric or ferromagnetic rod or pipe

[H01Q 13/28](#)

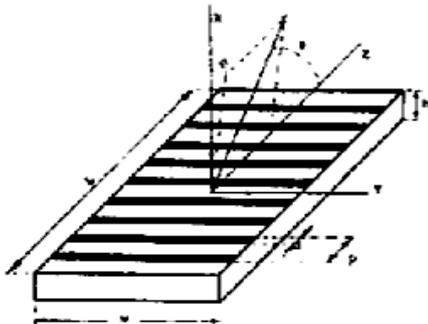
## H01Q 13/26

**Surface waveguide constituted by a single conductor, e.g. strip conductor**

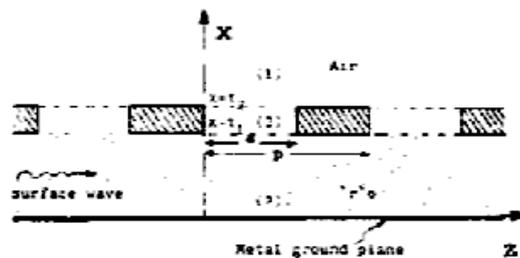
### Definition statement

*This subclass/group covers:*

A surface wave radiates only at discontinuities, i.e. these discontinuities are therefore a requirement.



**Fig. 1.** Leaky wave antenna.



**Fig. 2.** Structure under consideration.

## H01Q 13/28

comprising elements constituting electric discontinuities and spaced in direction of wave propagation, e.g. dielectric elements, conductive elements forming artificial dielectric (Yagi aerials [H01Q 19/30](#))

## Definition statement

*This subclass/group covers:*

Periodic modulation of the guiding structure: e.g. periodic metal strips  
Guiding structure: dielectric waveguide or dielectric image guide.

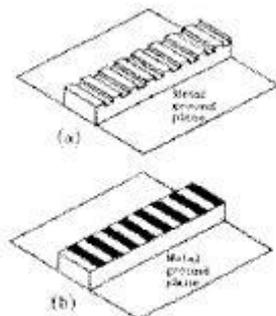
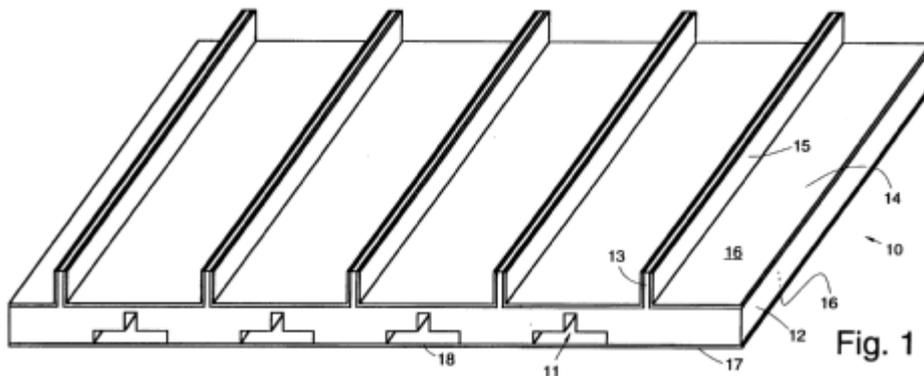


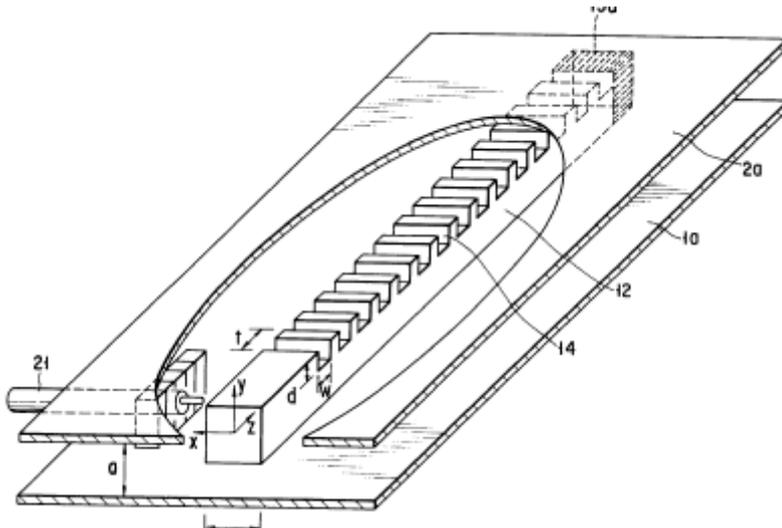
FIG. 16-11 Dielectric image guide with (a) a grating of grooves and (b) a grating of metal strips.

Discontinuities by:

- grating by periodic array of grooves or b) grating of periodic array of metal strips;
- continuous transverse stub;



- non-radiative dielectric guide/waveguide (NRD) as antenna as leaky NRD.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

elements, conductive elements forming artificial dielectric	<a href="#">H01Q 19/30</a>
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## H01Q 15/00

**Devices for reflection, refraction, diffraction, or polarisation of waves radiated from an aerial, e.g. quasi-optical devices (variable for purpose of altering directivity [H01Q 3/00](#); arrangements of such devices for guiding waves [H01P 3/20](#); variable for purpose of modulation [H03C 7/02](#))**

### Definition statement

*This subclass/group covers:*

Lenses, reflectors and polarising devices per se or in combination with a classification in [H01Q 19/00](#) and subgroups, [H01Q 21/00](#) and subgroups or [H01Q 25/00](#) and subgroups if aspects of the lens, reflector etc. per se are also relevant.

### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

*Attention is drawn to the following places which may be of interest for search:*

Arrangements of such devices for guiding waves	<a href="#">H01P 3/20</a>
--	---------------------------

Variable for purpose of altering directivity	<a href="#">H01Q 3/00</a>
Variable for purpose of modulation	<a href="#">H03C 7/02</a>

## H01Q 15/0006

[N: Devices acting selectively as reflecting surface, as diffracting or as refracting device, e.g. frequency filtering or angular spatial filtering devices ([H01Q 15/12](#), [H01Q 15/22](#), [H01Q 15/24](#) take precedence)]

### Definition statement

*This subclass/group covers:*

This class and subclasses emphasize the frequency dependence on impedance and other properties of the device.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Devices acting selectively as reflecting surface, as diffracting or as refracting device, e.g. frequency filtering or angular spatial filtering devices	<a href="#">H01Q 15/12</a> , <a href="#">H01Q 15/22</a> , <a href="#">H01Q 15/24</a>
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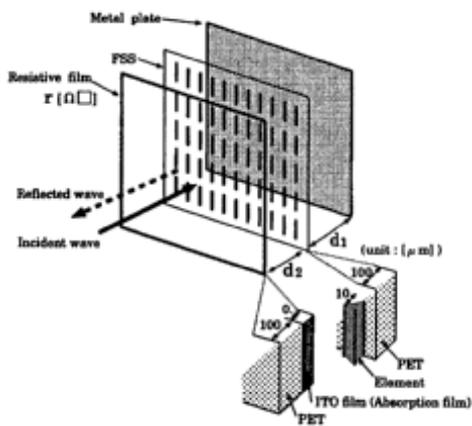
## H01Q 15/0013

[N: said selective devices working as frequency-selective reflecting surfaces, e.g. FSS, dichroic plates, surfaces being partly transmissive and reflective]

### Definition statement

*This subclass/group covers:*

Perforated plates, where the apertures can have any generalised shape.



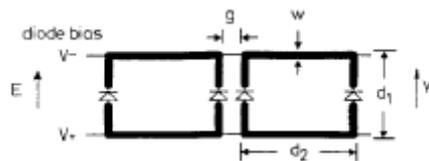
## H01Q 15/002

[N: said selective devices being reconfigurable or tunable, e.g. using switches or diodes]

### Definition statement

*This subclass/group covers:*

Normally switches or variable impedance are used for the tuning or reconfiguration.



## H01Q 15/0026

[N: said selective devices having a stacked geometry or having multiple layers]

### Definition statement

*This subclass/group covers:*

Multiple layers of (different) FSS's are present.

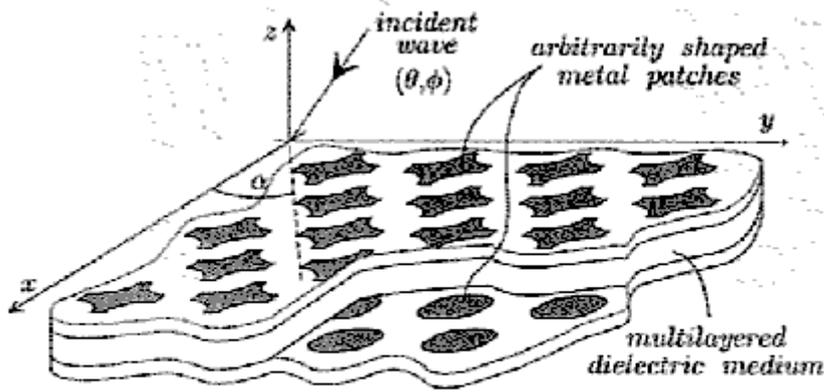


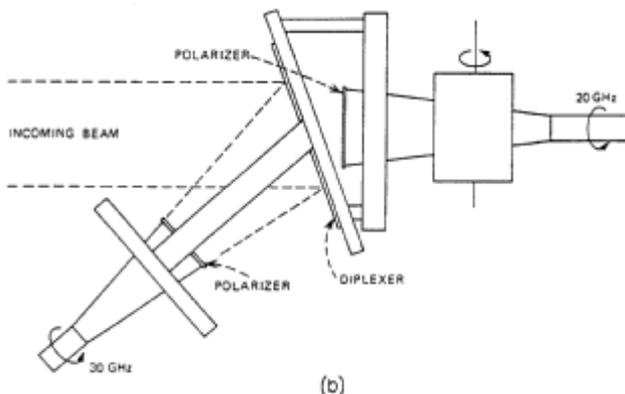
Fig. 1. Frequency selective surface consisting of a periodic array of metal patches with an arbitrary shape. The patches are located on different layers and embedded in a stratified dielectric medium.

## H01Q 15/0033

[N: used for beam splitting or combining, e.g. acting as a quasi-optical multiplexer ([H01Q 19/191](#) and [H01Q 19/195](#) take precedence)]

### Definition statement

*This subclass/group covers:*  
As used in beam waveguides.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

used for beam splitting or combining, e.g. acting as a quasi-optical multiplexer	<a href="#">H01Q 19/191</a> <a href="#">H01Q 19/195</a>
--	---

## H01Q 15/004

[N: using superconducting materials or magnetised substrates]

### Definition statement

*This subclass/group covers:*

This class emphasizes the materials used: chiral materials, superconducting materials, etc.

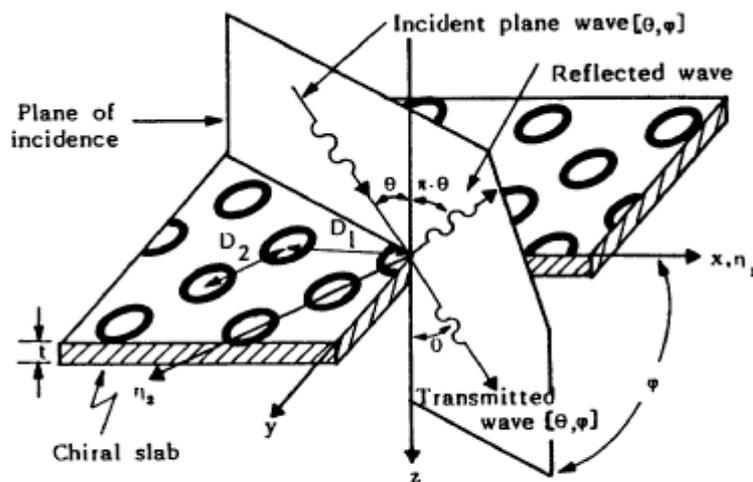


Figure 1. Geometry of the ring array on a chiral slab.

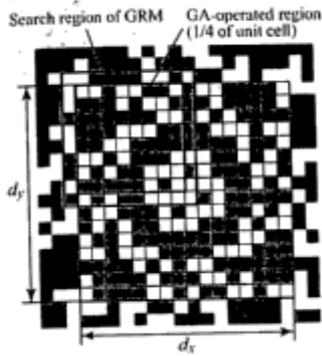
## H01Q 15/0046

[N: theoretical analysis and design methods of such selective devices]

### Definition statement

*This subclass/group covers:*

For example randomised FSS cells based on genetic algorithms.



## H01Q 15/0053

[N: selective devices used as spatial filter or angular sidelobe filter]

### Definition statement

*This subclass/group covers:*

For example:

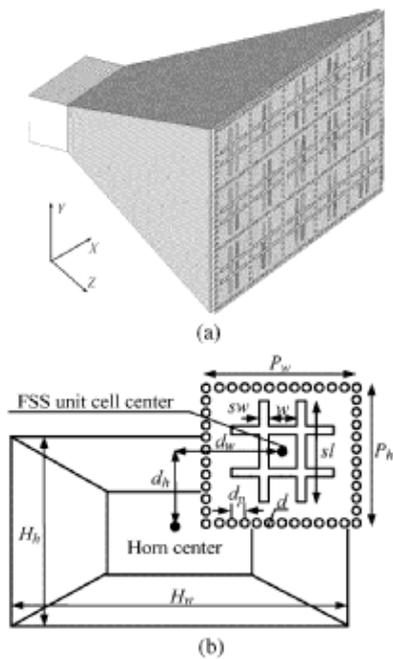


Fig. 1. Geometry of normal horn antenna covered with SIWC-FSS at its aperture. (a) 3-D view. (b) Front view.

## H01Q 15/006

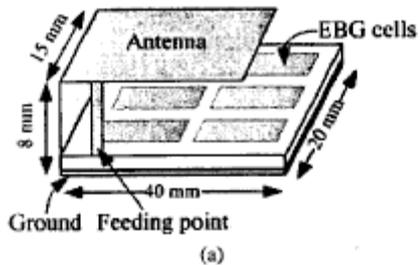
[N: selective devices having photonic band gap materials or materials of which the material properties are frequency dependent, e.g. perforated substrates, high-impedance

surfaces]

### Definition statement

*This subclass/group covers:*

Emphasizes on band gap materials, in any application.



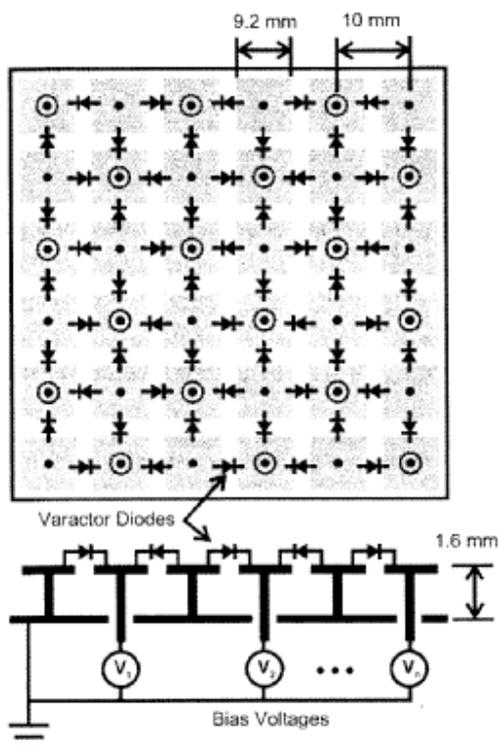
### H01Q 15/0066

[N: said selective devices being reconfigurable, tunable, controllable, e.g. using switches]

### Definition statement

*This subclass/group covers:*

Emphasis is on reconfigurability and tunability.



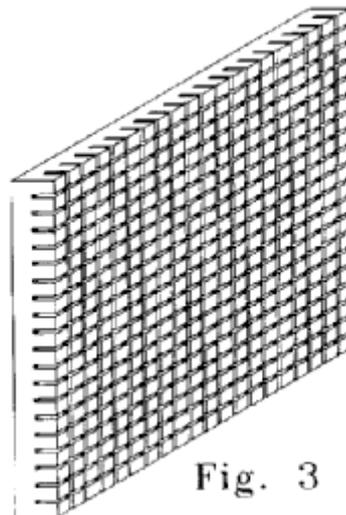
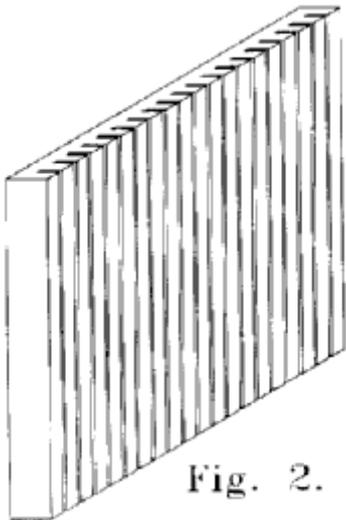
## H01Q 15/0073

[N: said selective devices having corrugations]

### Definition statement

*This subclass/group covers:*

Either corrugations in a single direction, or in two orthogonal directions; may be filled with dielectric material.



## H01Q 15/008

[N: said selective devices having Sievenpipers' mushroom elements]

### Definition statement

*This subclass/group covers:*

Or similar structures to these mushroom elements: triangular/square/circular shapes.

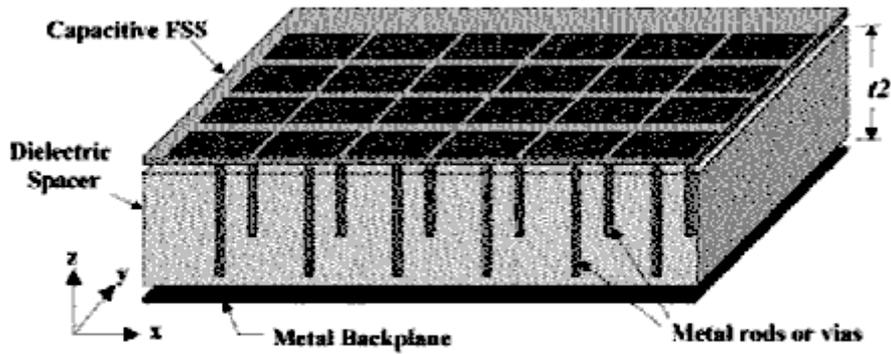


Fig. 1. Sketch of the typical Sievenpiper structure.

## H01Q 15/0086

[N: said selective devices having materials with a synthesized negative refractive index, e.g. metamaterials or left-handed materials]

### Definition statement

*This subclass/group covers:*

These materials do not exist in nature, but they are artificial, and strongly frequency dependent.

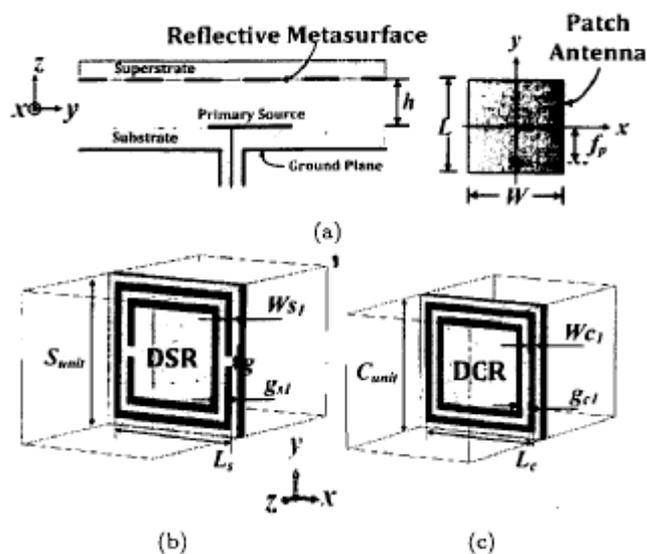


Fig.1 (a) Configuration of a microstrip patch antenna with reflective metasurface (RMS) as a superstrate, (b) a unit cell of double split-ring resonator (DSR) and (c) a unit cell of double closed-ring resonator (DCR).

## H01Q 15/0093

[N: having a fractal shape]

## Definition statement

*This subclass/group covers:*

ANY fractal shape (sierpinski/peano/ ...).

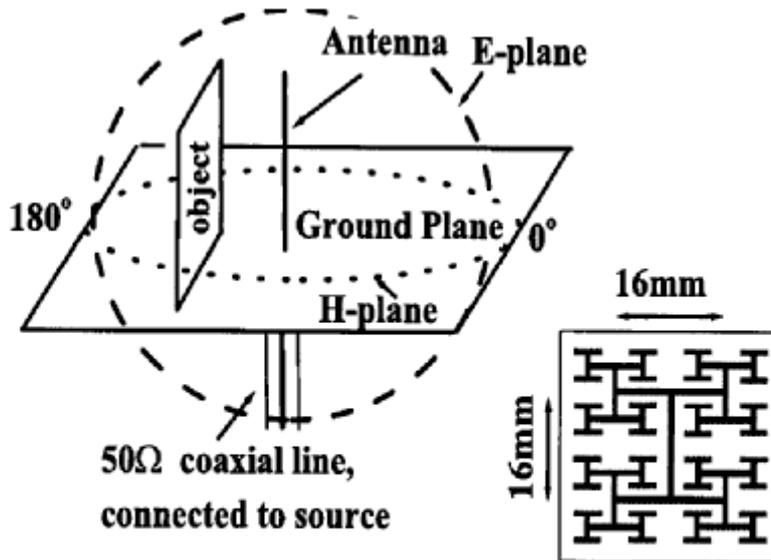


FIG. 1. Schematic picture of the experimental setup. Inset shows the six-level fractal structure: First-level line length 16 mm, linewidth=1 mm, thickness=0.5 mm. The plate measures 28×29 mm.

## H01Q 15/02

### Refracting or diffracting devices, e.g. lens, prism

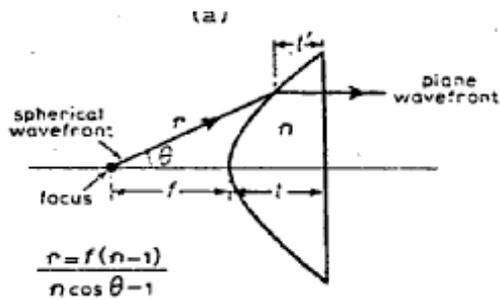
## Definition statement

*This subclass/group covers:*

Lens, electromagnetic. A three-dimensional structure, through which electromagnetic waves can pass, possessing an index of refraction that may be a function of position and a shape that is chosen so as to control the exiting aperture illumination to transform a spherical wavefront.

- lens constructed of dielectrics;
- of metallic or artificial dielectrics.

Examples: Wire -grid lens, that is constructed of wire grids, in which the effective index of refraction (path delay) is locally controlled by the dimensions and the spacing of the wire grid; zoned lenses, that is various portions (zones or steps) form a discontinuous surface such that a desired phase distribution of the aperture illumination is achieved.



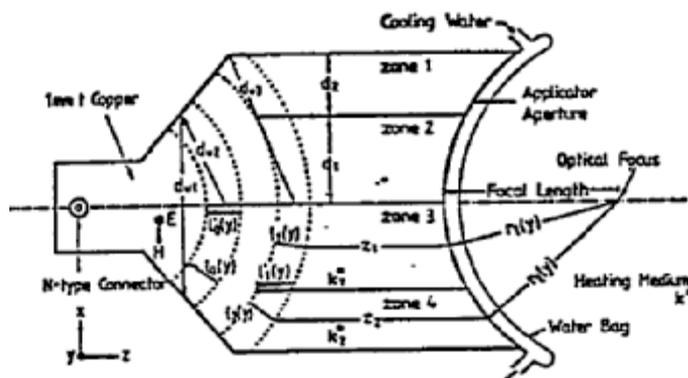
## H01Q 15/04

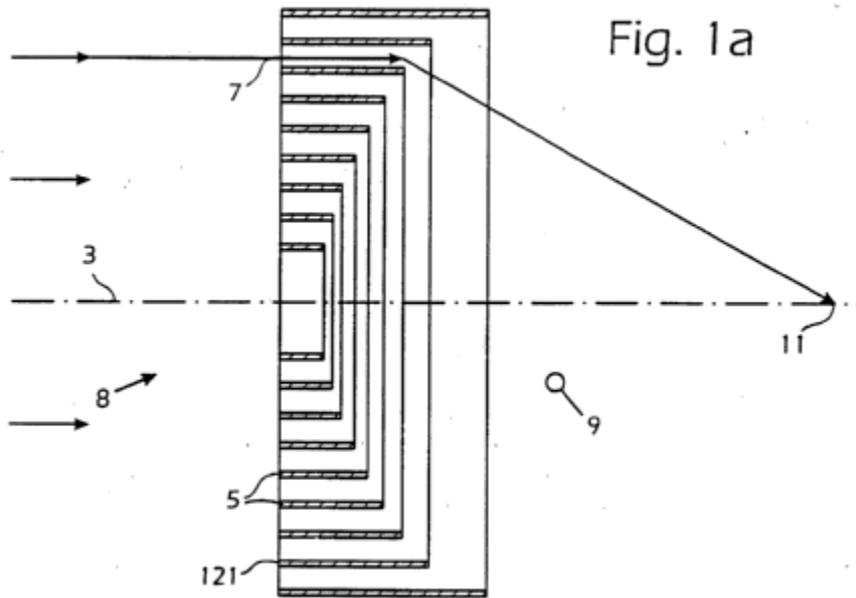
comprising wave-guiding channel or channels bounded by effective conductive surfaces substantially perpendicular to the electric vector of the wave, e.g. parallel-plate waveguide lens

### Definition statement

*This subclass/group covers:*

Metal-plate lens using parallel metal plates, spaced a fraction of a wavelength apart; also use of parallel wires.





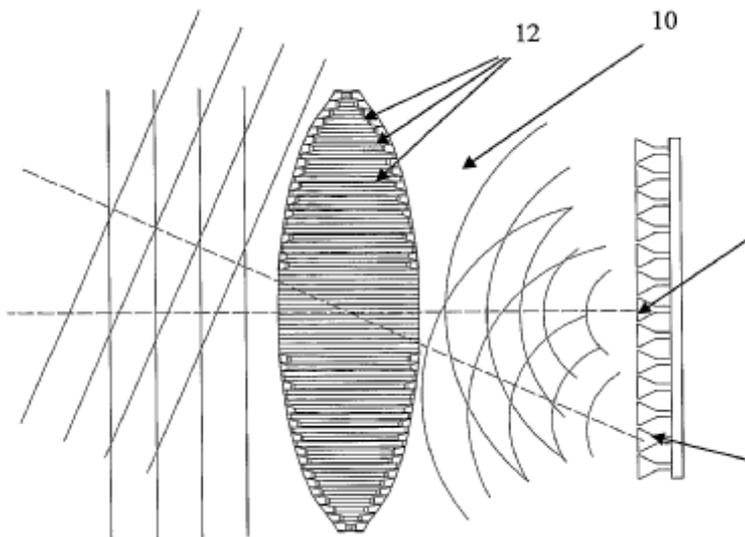
## H01Q 15/06

comprising plurality of wave-guiding channels of different length

### Definition statement

*This subclass/group covers:*

Consisting of an array of waveguide tubes or transmission lines in which focusing is achieved by means of phase correction introduced by the tube or line length or the tube section profile.



### Synonyms and Keywords

Waveguide-lens, Bootlace lens antenna consists of an input array connected to an output array by transmission lines; Rotman lens.

## H01Q 15/08

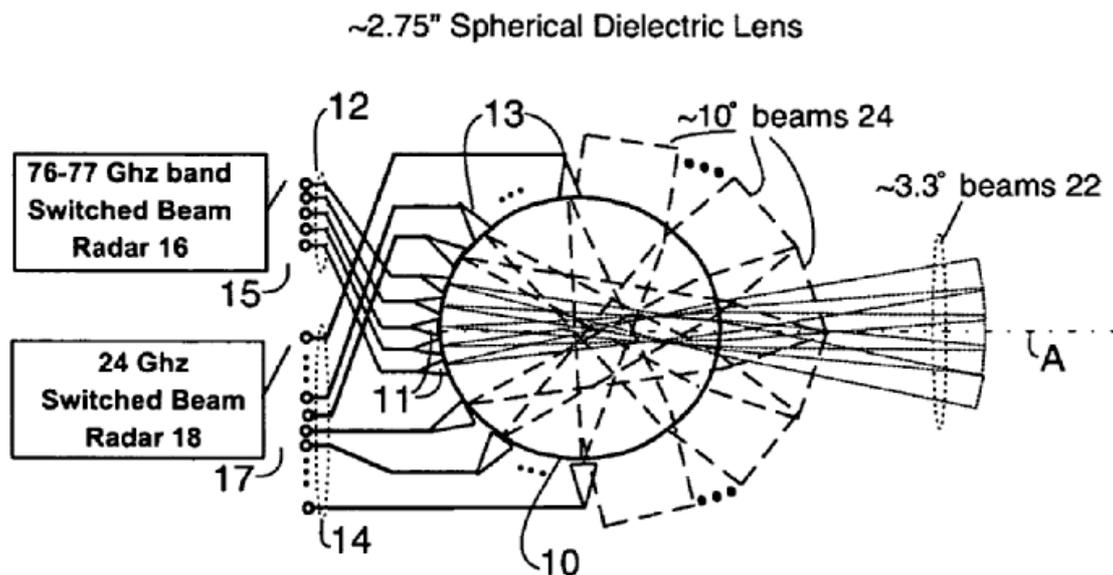
formed of solid dielectric material

### Definition statement

*This subclass/group covers:*

Conventional dielectric lenses: Materials: made of thermoplastics, styropor, Rexolite, teflon, styrofoam, foamed glas, polystyrene, plexiglas.

Luneberg lens: A lens with a circular cross section having an index of refraction varying only in the radial direction (e.g. two or more concentric spheres).



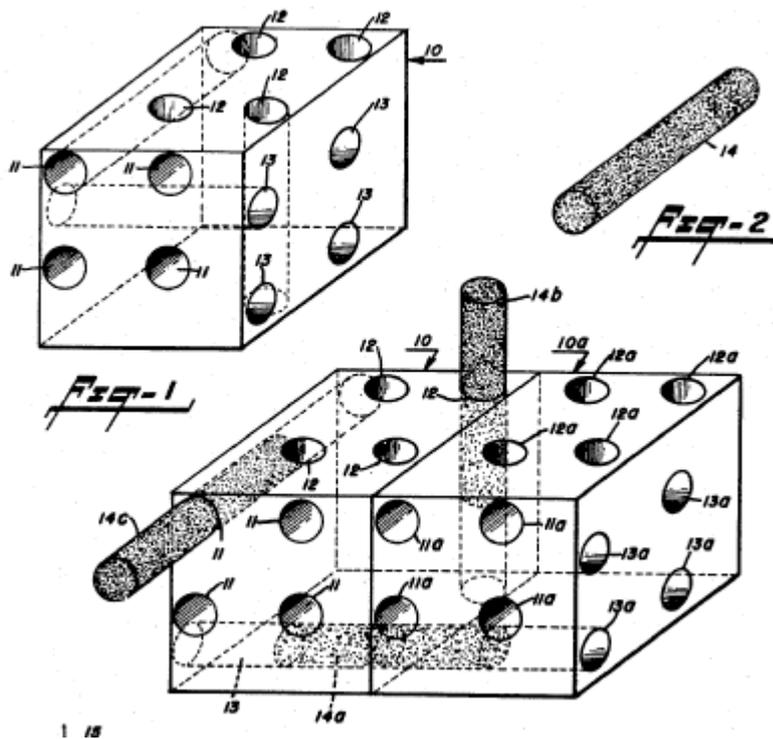
## H01Q 15/10

comprising three-dimensional array of impedance discontinuities, e.g. holes in conductive surfaces or conductive discs forming artificial dielectric (leaky-waveguide aerials [H01Q 13/28](#))

### Definition statement

*This subclass/group covers:*

Artificial dielectric by distribution of conducting or non-conducting elements in a medium of relatively low dielectric constant: lightweight in respect to solid dielectric lenses.



**References relevant to classification in this subclass**

*This subclass/group does not cover:*

leaky-waveguide aerials	<a href="#">H01Q 13/28</a>
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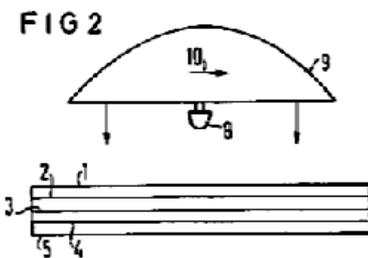
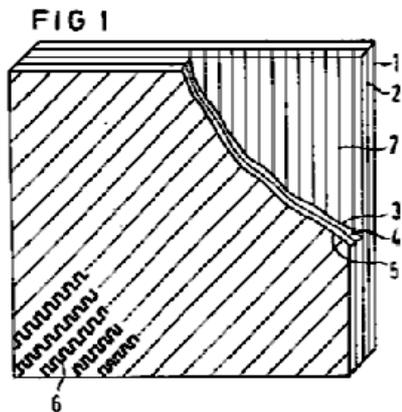
**H01Q 15/12**

functioning also as polarisation filter [N: (polarisation converters [H01Q 15/242](#))]

**Definition statement**

*This subclass/group covers:*

For example: dielectric microwave lens or prism with polarisation filter located on one side of the lens.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

functioning also as polarisation filter	<a href="#">H01Q 15/242</a>
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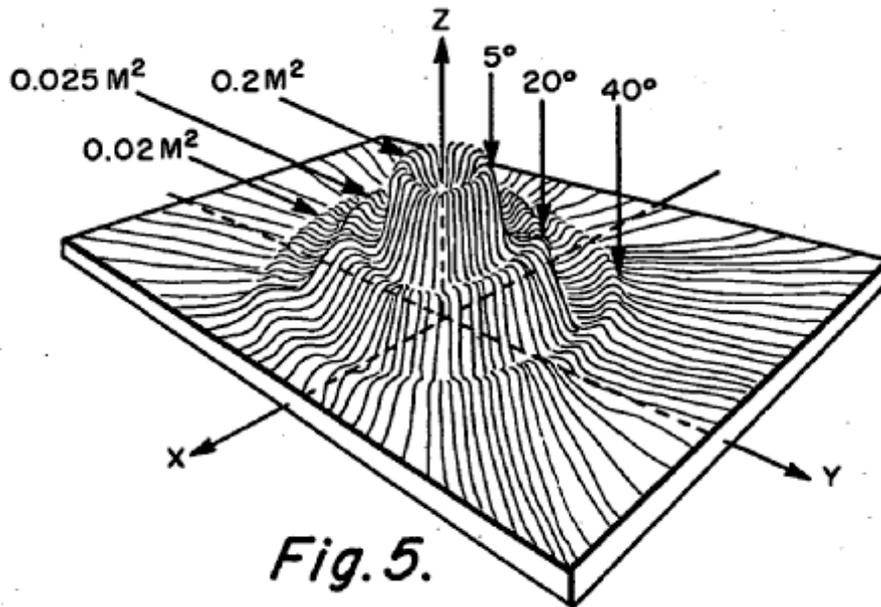
## H01Q 15/14

Reflecting surfaces; Equivalent structures [N: (electromagnetic shields [H01Q 1/526](#); radar-reflecting targets in general [F41J 2/00](#))]

### Definition statement

*This subclass/group covers:*

Basically anything that reflects, i.e. the reflectors proper.



**References relevant to classification in this subclass**

*This subclass/group does not cover:*

electromagnetic shields	<a href="#">H01Q 1/526</a>
radar-reflecting targets in general	<a href="#">F41J 2/00</a>

**H01Q 15/141**

**[N: Apparatus or processes specially adapted for manufacturing reflecting surfaces]**

**Definition statement**

*This subclass/group covers:*

Any manufacturing method goes here.

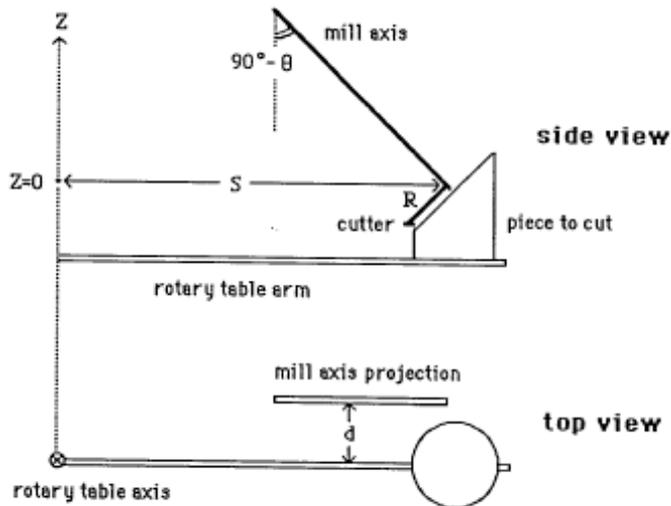


Fig. 1 Schematic of the milling machine setup

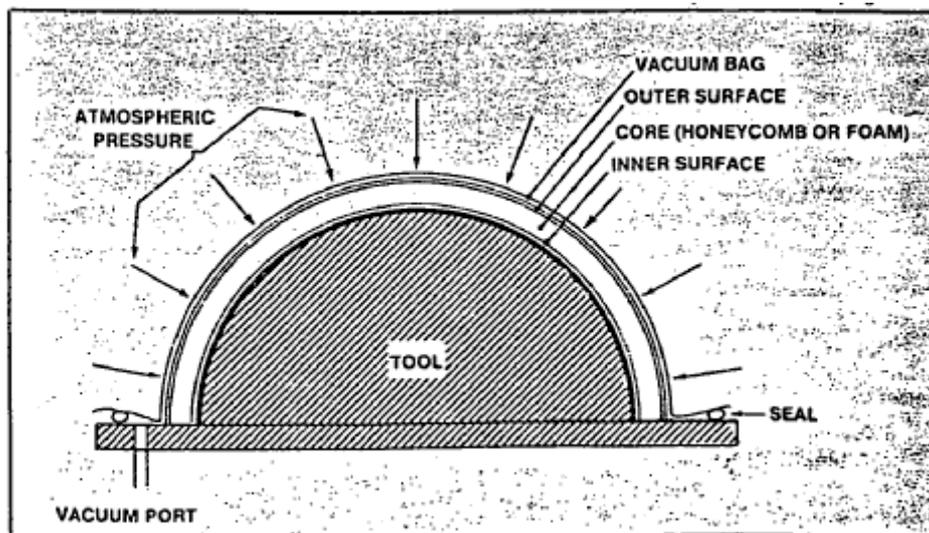
## H01Q 15/142

[N: using insulating material for supporting the reflecting surface]

### Definition statement

*This subclass/group covers:*

Insulating material fulfills the role of support or backing structure.



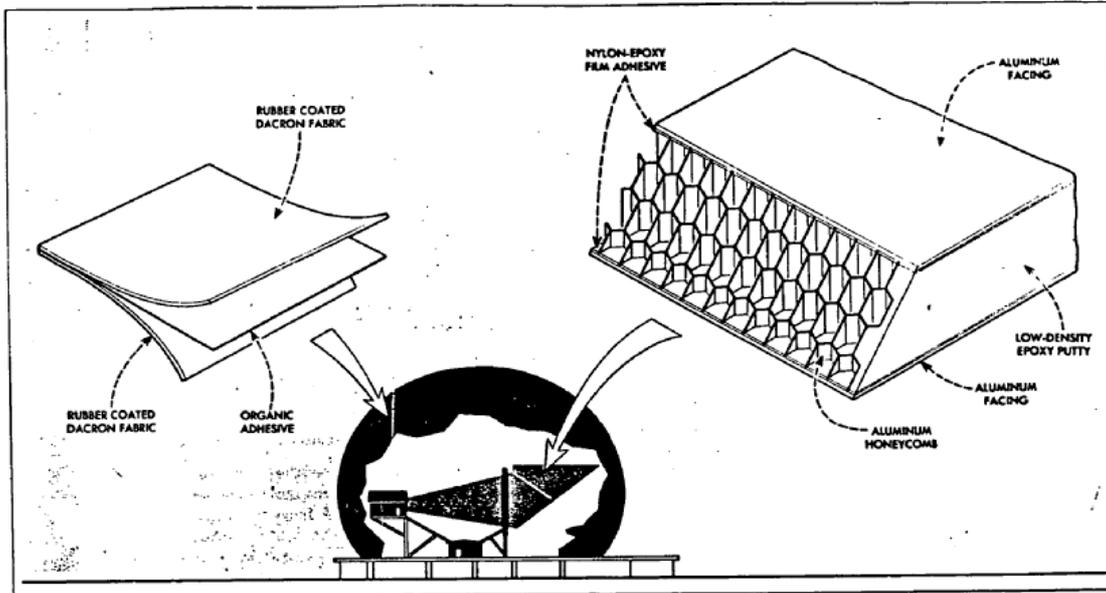
## H01Q 15/144

[N: with a honeycomb, cellular or foamed sandwich structure]

### Definition statement

*This subclass/group covers:*

For example:



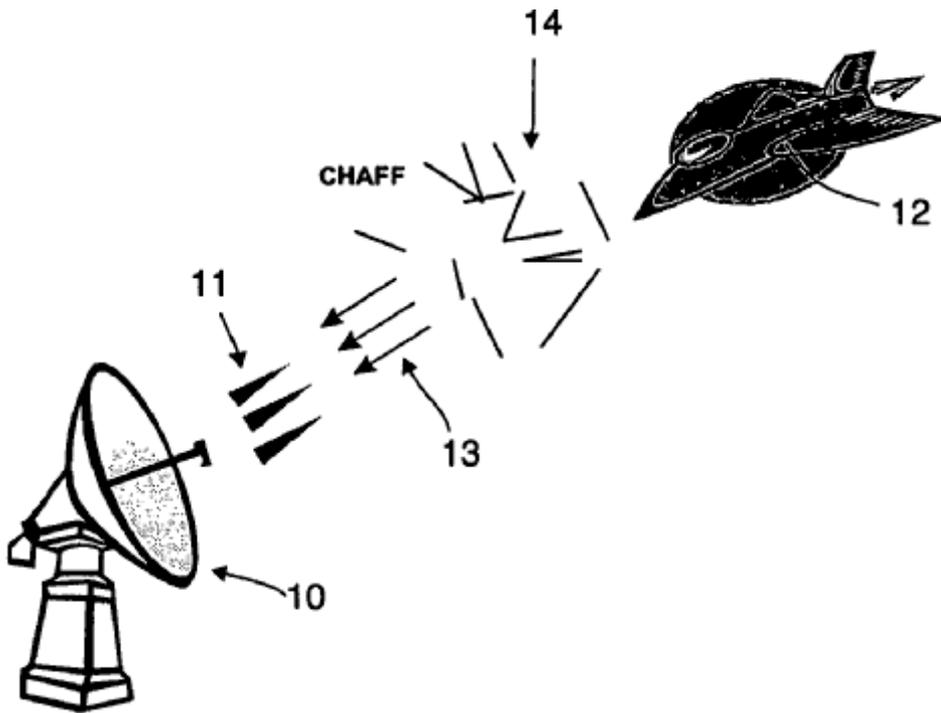
## H01Q 15/145

[N: comprising a plurality of reflecting particles, e.g. radar chaff (missiles of the signal type provided with means for disseminating radar-reflecting chaff [F42B 12/70](#))]

### Definition statement

*This subclass/group covers:*

Consists of thousands of fine wire clippings, paper backed metal foils or carbon fibers; the chaff acts as dipoles that reflect a wide range of radar frequencies.



**References relevant to classification in this subclass**

*This subclass/group does not cover:*

missiles of the signal type provided with means for disseminating radar-reflecting chaff	<a href="#">F42B 12/70</a>
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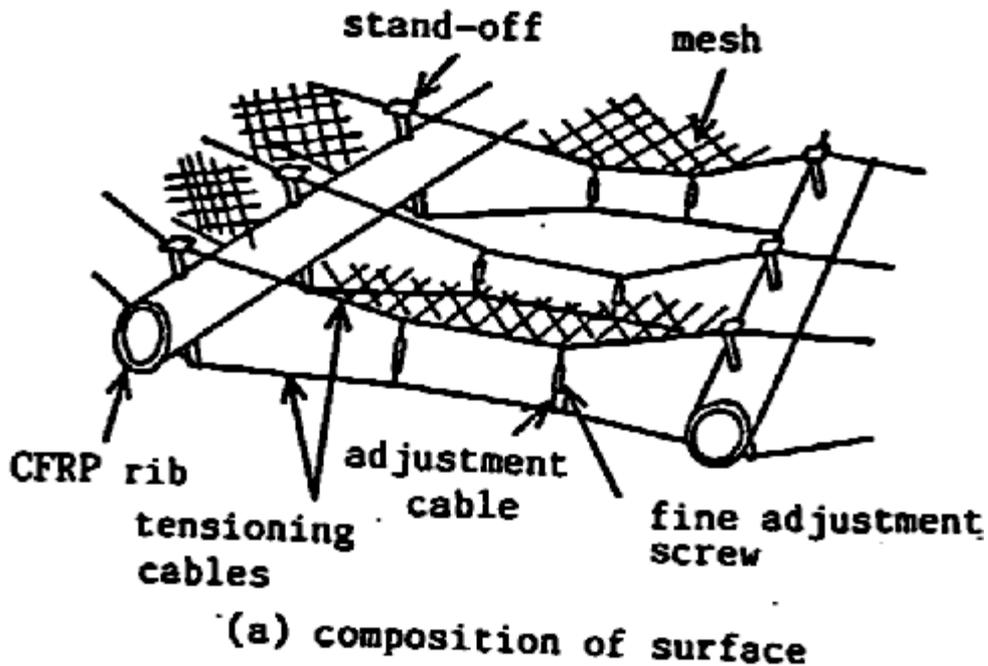
**H01Q 15/147**

[N: provided with means for controlling or monitoring the shape of the reflecting surface (for scanning [H01Q 3/01](#); aerials or aerial systems providing multiple beamwidths [H01Q 25/002](#))]

**Definition statement**

*This subclass/group covers:*

Shaped reflector, reconfigurable, reflector surface control, deformable reflector surface; zoned or stepped reflector.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

(for scanning	<a href="#">H01Q 3/01</a>
aerials or aerial systems providing multiple beamwidths	<a href="#">H01Q 25/002</a>

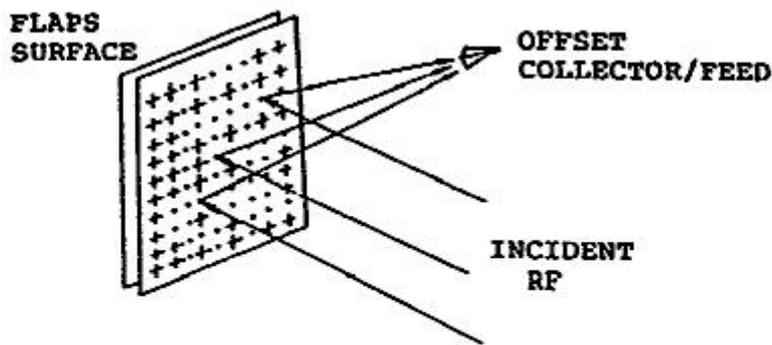
## H01Q 15/148

[N: with means for varying the reflecting properties ([H01Q 15/147](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

For example a reflect-array where the individual elements are subject to weighting in amplitude and phase.



**Figure 4**  
Flat Collimating Reflector  
With Offset Feed

**References relevant to classification in this subclass**

*This subclass/group does not cover:*

with means for varying the reflecting properties	<a href="#">H01Q 15/147</a>
--	-----------------------------

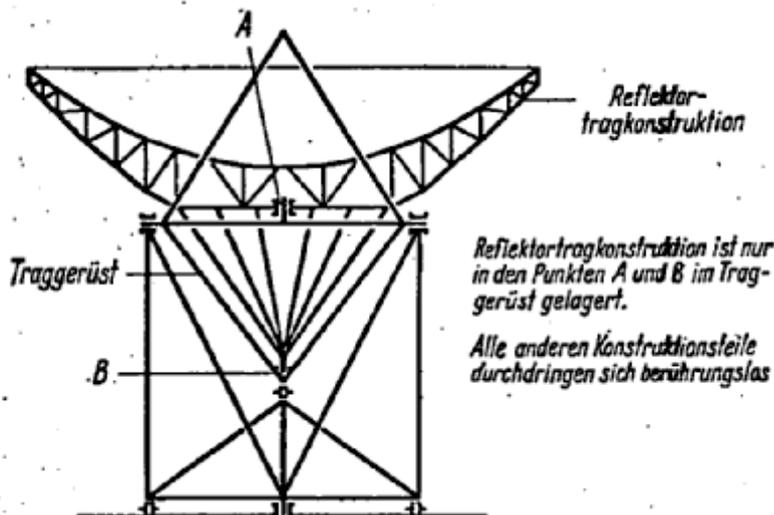
**H01Q 15/16**

**Curved in two dimensions, e.g. paraboloidal**

**Definition statement**

*This subclass/group covers:*

Paraboloidal, hyperboloidal, ellipsoidal.



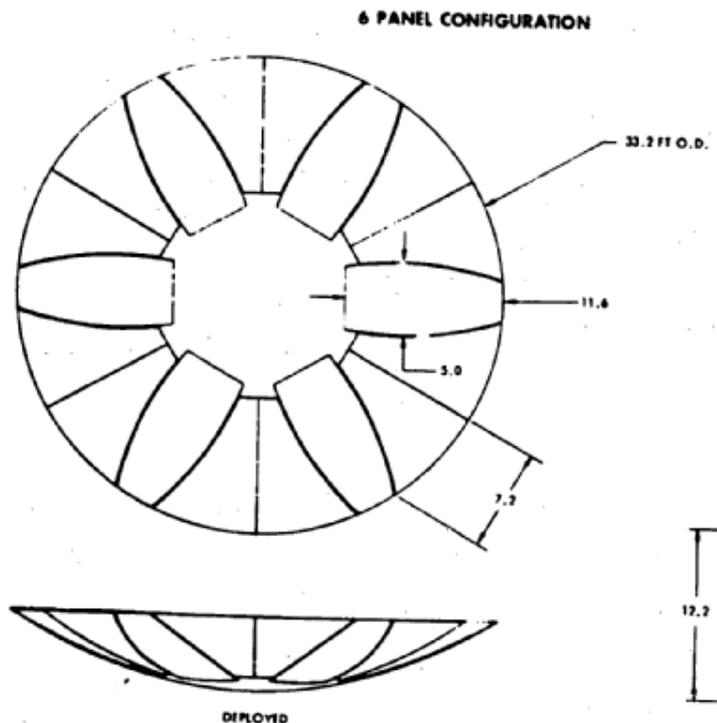
## H01Q 15/161

[N: Collapsible reflectors]

### Definition statement

*This subclass/group covers:*

For example using separate panels and hinges.



### Informative references

*Attention is drawn to the following places, which may be of interest for search:*

See also [B64G 1/44](#), [B64G 1/66](#).

### Synonyms and Keywords

*In patent documents the following words are often used:*

Unfurlable/ furlable; deployable; foldable; erectable, fold/unfold.

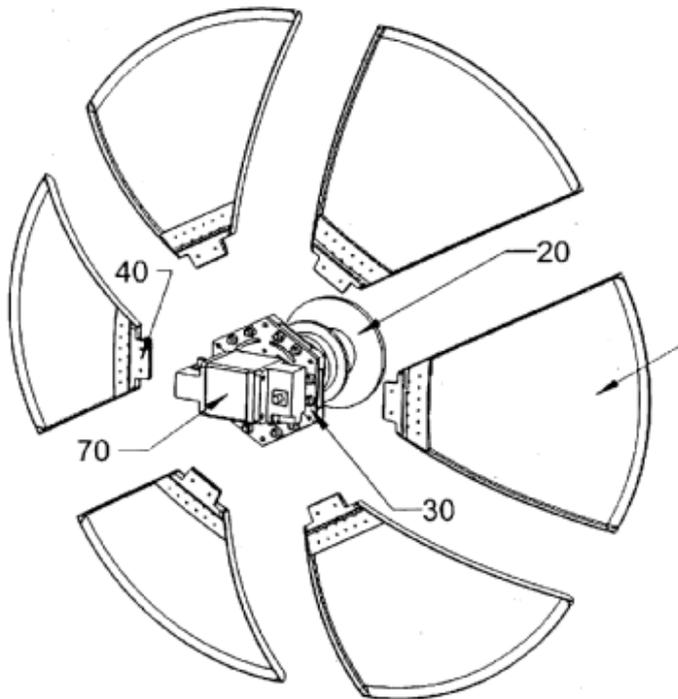
## H01Q 15/162

[N: composed of a plurality of rigid panels]

### Definition statement

*This subclass/group covers:*

For example:



## **H01Q 15/163**

**[N: inflatable]**

### **Definition statement**

*This subclass/group covers:*

Normally an inflatable carrier is used, which ruggedizes, e.g. vulcanisation in outer space.

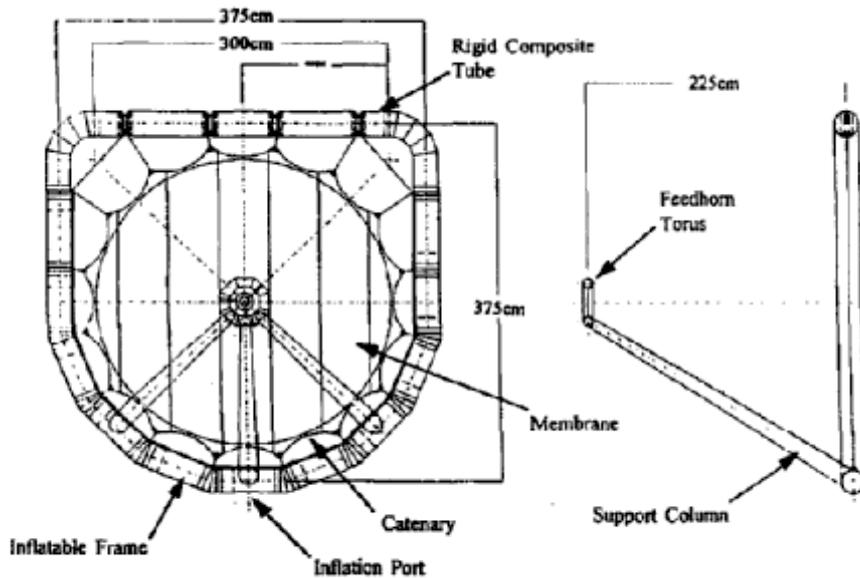


Fig. 4. Configuration of the Ka-band 3-m inflatable microstrip reflectarray

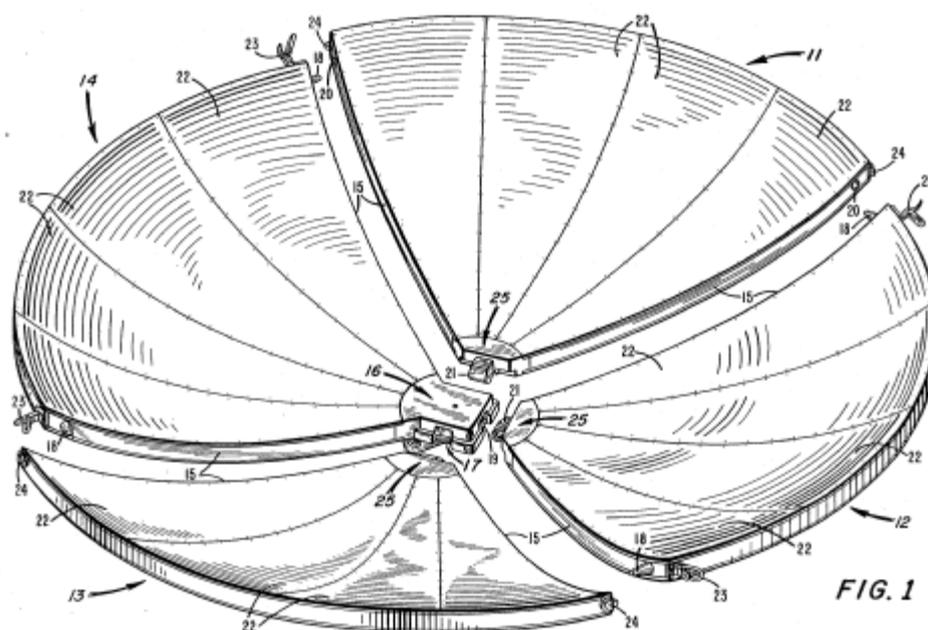
## H01Q 15/165

[N: composed of a plurality of rigid panels (collapsible [H01Q 15/161](#))]

### Definition statement

*This subclass/group covers:*

For example earth station antenna need to be made with panels, as otherwise they are too big.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

composed of a plurality of rigid panels	<a href="#">H01Q 15/161</a>
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## H01Q 15/166

[N: sector shaped]

### Definition statement

*This subclass/group covers:*

For example:

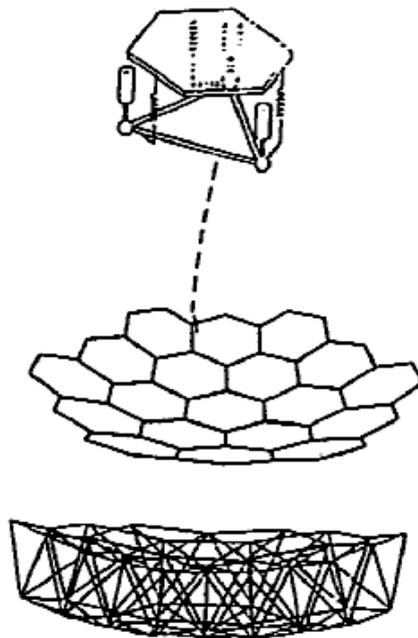


Figure 1. Two-Ring PSR

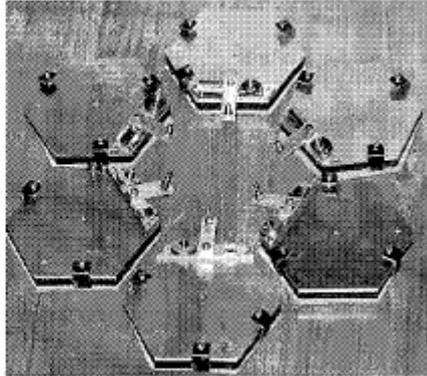
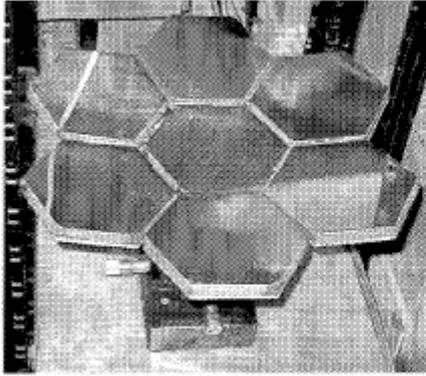
## H01Q 15/167

[N: comprising a gap between adjacent panels or group of panels, e.g. stepped reflectors]

### Definition statement

*This subclass/group covers:*

The gap causes scattering, and this needs to be prevented; normally conducting tape is used to cover the gap.



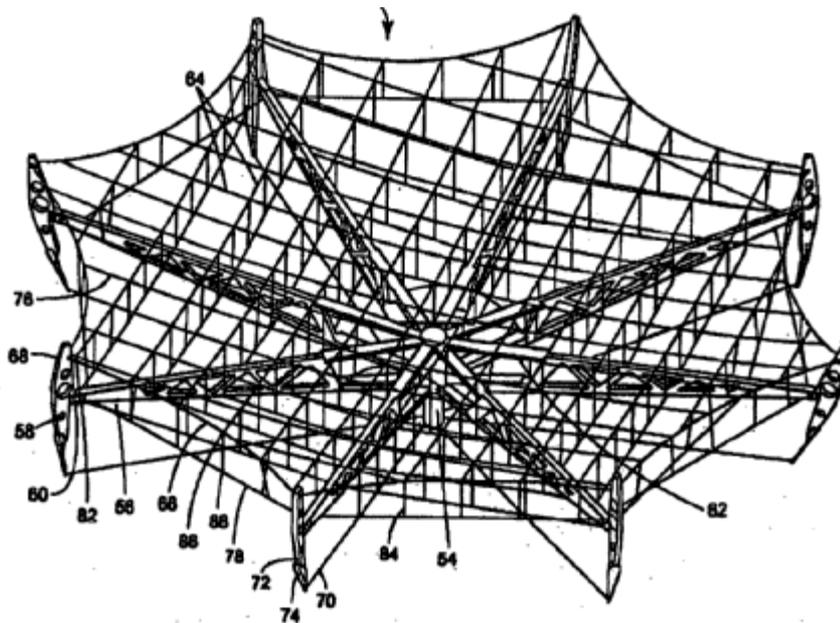
## H01Q 15/168

[N: Mesh reflectors mounted on a non-collapsible frame]

### Definition statement

*This subclass/group covers:*

Metallic mesh as a fabric with a supporting structure, e.g. truss structure shaped by a cable network: umbrella reflector.



### Synonyms and Keywords

*In patent documents the following expression/words "mesh net", "pliant metal gauze", "cloth-like material" and "pliant reflective material" are often used as synonyms.*

## H01Q 15/18

comprising plurality of mutually inclined plane surfaces, e.g. corner reflector [N: ([H01Q 15/16](#) takes precedence)]

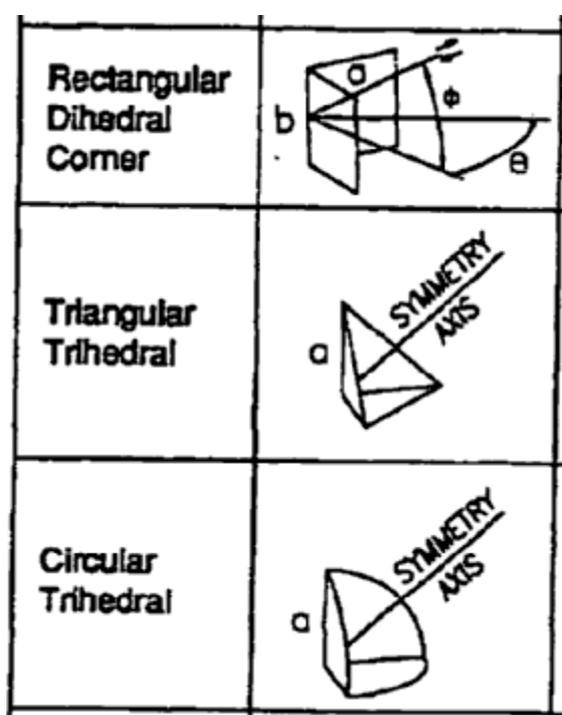
### Definition statement

*This subclass/group covers:*

A reflecting object consisting of two or three mutually intersecting conducting flat surfaces.

Type of a retroreflector (large echoes); used as emergency signalling device; passive marker; linear polarisation rest unchanged but the sense of circular polarisation is changed after reflection.

Also used as a reference target for radar calibration.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

<p>comprising plurality of mutually inclined plane surfaces, e.g. corner reflector</p>	<p><a href="#">H01Q 15/16</a></p>
--	-----------------------------------

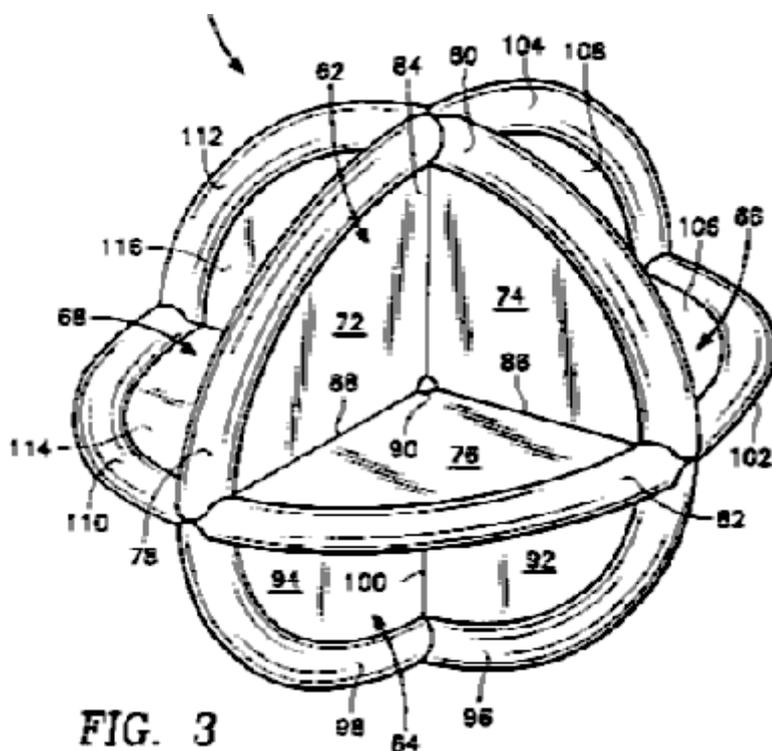
## H01Q 15/20

### Collapsible reflectors

## Definition statement

*This subclass/group covers:*

For example inflatable corner reflector.



## H01Q 15/22

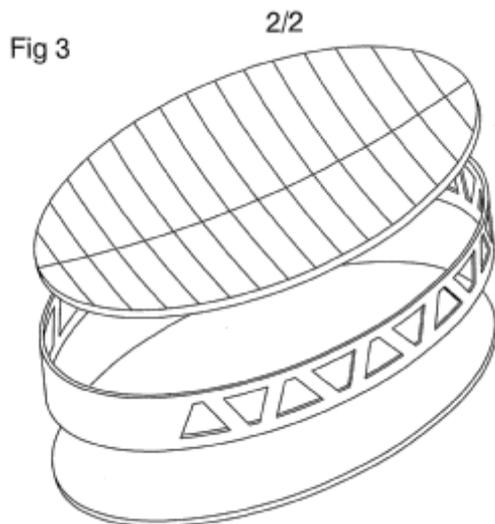
functioning also as polarisation filter [N: (in combination with polarising devices [H01Q 15/24](#))]

## Definition statement

*This subclass/group covers:*

Additional function as a polarisation sensitive reflector.

For example; double gridded reflector.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

in combination with polarising devices	<a href="#">H01Q 15/24</a>
--	----------------------------

### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this group, the following expression is used with the meaning indicated:*

PSS	Polarisation Sensitive Surface
-----	--------------------------------

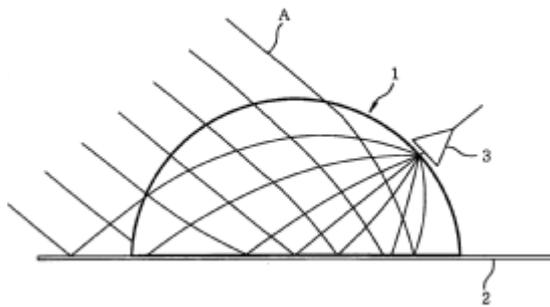
## H01Q 15/23

### Combinations of reflecting surfaces with refracting or diffracting devices

#### Definition statement

*This subclass/group covers:*

For example: lens reflector: (part of) a lens mounted on a reflecting surface.



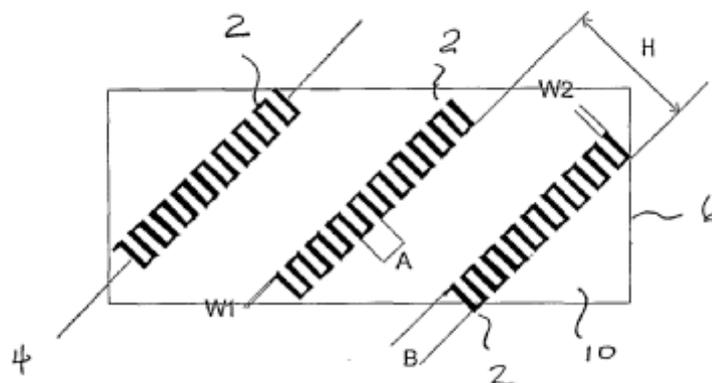
## H01Q 15/24

**Polarising devices; Polarisation filters (devices functioning simultaneously both as polarisation filters and as refracting or diffracting devices or as reflectors [H01Q 15/12](#), [H01Q 15/22](#))**

### Definition statement

*This subclass/group covers:*

For converting from one into another polarisation, e.g. meanderline polariser.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

devices functioning simultaneously both as polarisation filters and as refracting or diffracting devices or as reflectors	<a href="#">H01Q 15/12</a> , <a href="#">H01Q 15/22</a>
---	---

### Synonyms and Keywords

*In patent documents the following expression/words "polarizer", "polarisator", "polarisation transformer" and "polarisation converter" are often used as*

synonyms.

## H01Q 15/242

[N: Polarisation converters]

### Definition statement

*This subclass/group covers:*

For transforming one polarisation into another one (and back): reciprocity.

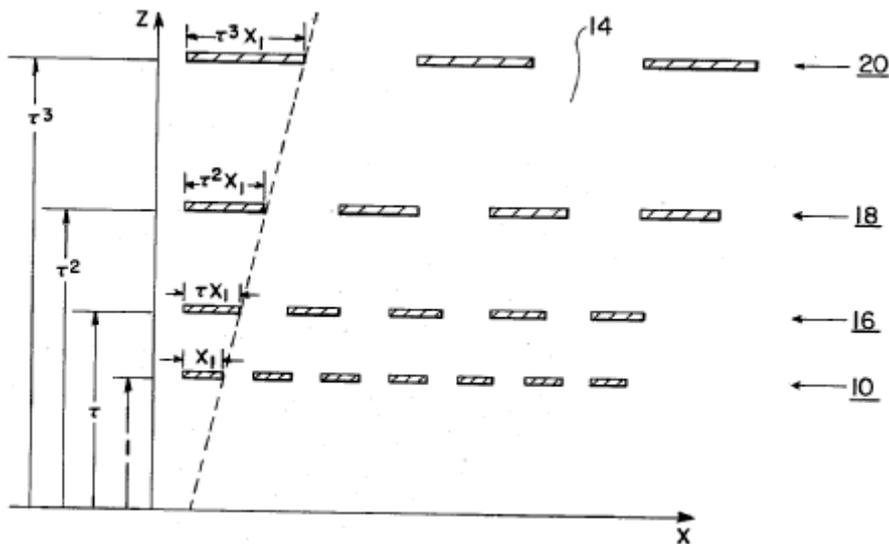


FIG. 3

### Synonyms and Keywords

*In patent documents the following expression/words "polarizer", "polarisator", "polarisation transformer" and "polarisation converter" are often used as synonyms.*

## H01Q 15/244

[N: converting a linear polarised wave into a circular polarised wave (guided wave [H01P 1/17](#))]

### Definition statement

*This subclass/group covers:*

For example: meanderline converters, or dielectric quarter wave plate inside waveguide, under 45 degrees.



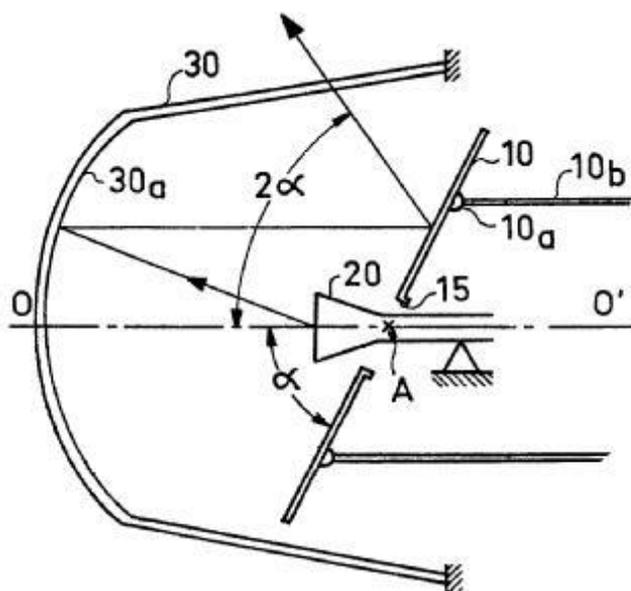
**H01Q 15/248**

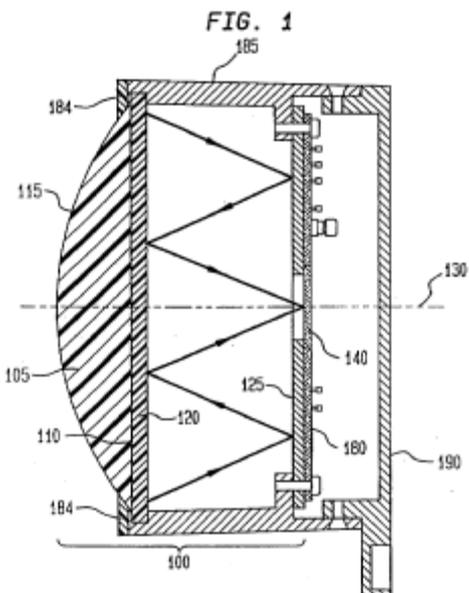
[N: using a reflecting surface, e.g. twist reflector (combination with a polarisation filter in dual reflector antennas [H01Q 19/195](#))]

**Definition statement**

*This subclass/group covers:*

A polarisation sensitive device consisting of unidirectional planar gratings which rotate the state of polarisation.





### References relevant to classification in this subclass

*This subclass/group does not cover:*

combination with a polarisation filter in dual reflector antennas	<a href="#">H01Q 19/195</a>
---	-----------------------------

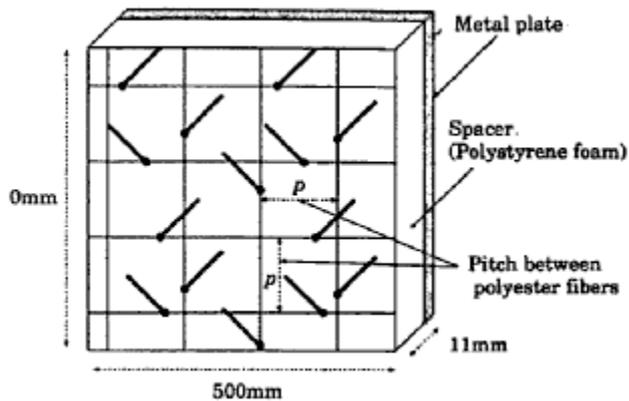
### H01Q 17/00

**Devices for absorbing waves radiated from an aerial;  
Combinations of such devices with active aerial elements or  
systems [N: (anechoic chambers [G01R 29/105](#))]**

### Definition statement

*This subclass/group covers:*

There are absorptive and reflective absorbers. In the absorptive absorbers RF energy is transferred into heat, whereas in the reflective absorbers the incident wave directs the RF energy away from the subject to be protected.



## Relationship between large subject matter areas:

Anechoic chambers are in [G01R 29/105](#).

## H01Q 17/001

[N: for modifying the directional characteristic of an aerial]

### Definition statement

*This subclass/group covers:*

For example rim loading for a reflector antenna to lower sidelobes.

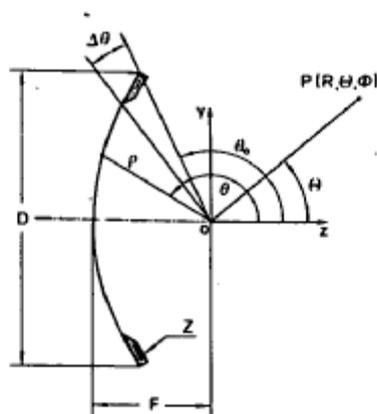


Fig. 1. Parabolic dish geometry.

## H01Q 17/002

[N: using short elongated elements as dissipative material, e.g. metallic threads or flake-like particles]

### Definition statement

*This subclass/group covers:*

For example chiral type material.



Fig. 1. Basic wire structures. Two chiral cranks of opposite handedness (enantiomorphs), a non-chiral staple, and a non-chiral crank.

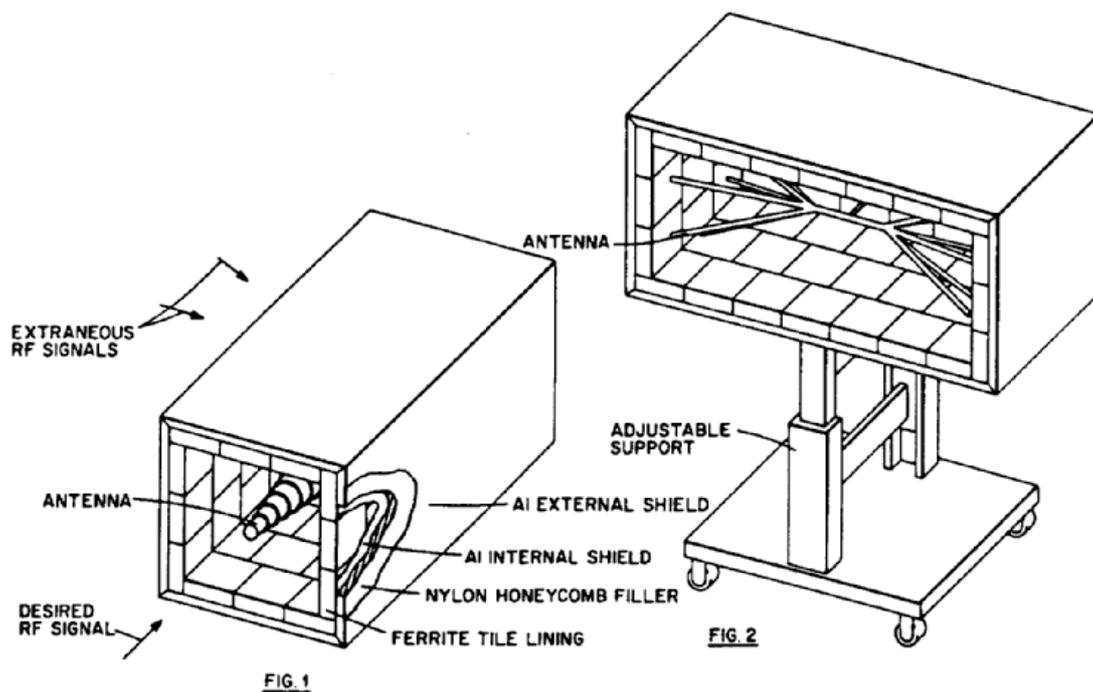
## H01Q 17/004

[N: using non-directional dissipative particles, e.g. ferrite powders ([H01Q 17/005](#) takes precedence; flake-like [H01Q 17/002](#))]

### Definition statement

*This subclass/group covers:*

Focuses on the material properties in order to improve the losses.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

using non-directional dissipative particles, e.g. ferrite powders	<a href="#">H01Q 17/005</a>
---	-----------------------------

flake-like	<a href="#">H01Q 17/002</a>
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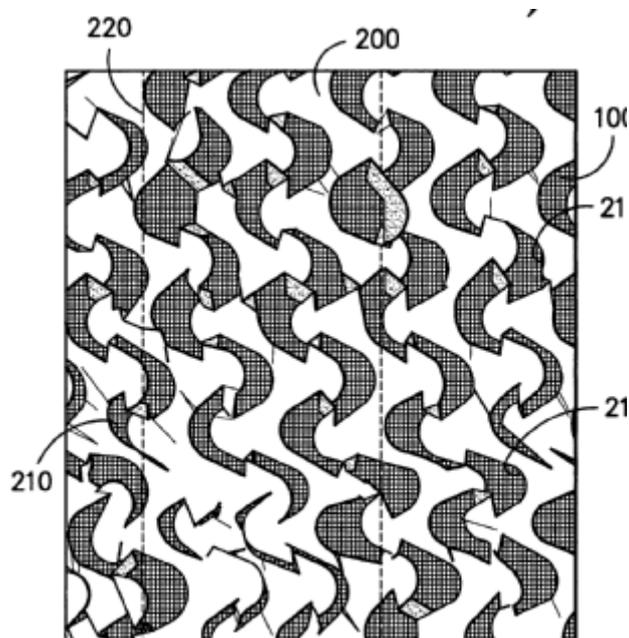
## H01Q 17/005

[N: using woven or wound filaments; impregnated nets or clothes]

### Definition statement

*This subclass/group covers:*

Also combination of optical camouflage, IR camouflage and RF absorbing material.



## H01Q 17/007

[N: with means for controlling the absorption]

### Definition statement

*This subclass/group covers:*

Typically one studies the effect of something, e.g. geometrical arrangement, chemical composition, on the properties of the absorber; largely experimental.

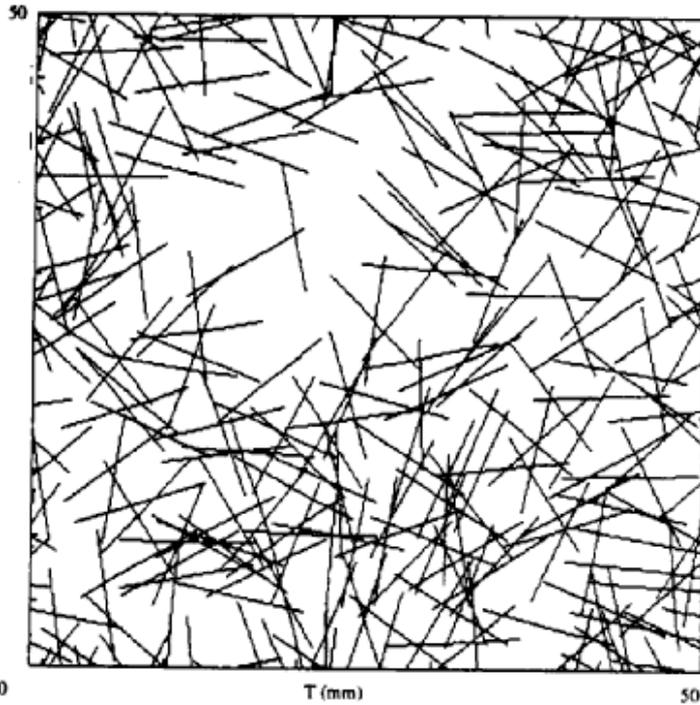


Fig. 2. Random distribution of sticks inside the pattern.

## H01Q 17/008

[N: with a particular shape ([H01Q 17/007](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Focusing on the geometrical shapes of the absorbers, e.g. wedge, tile, pyramid, truncated pyramid.

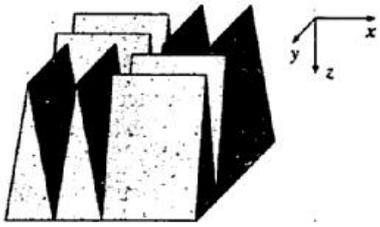


Fig. 2. Alternating wedge absorber.

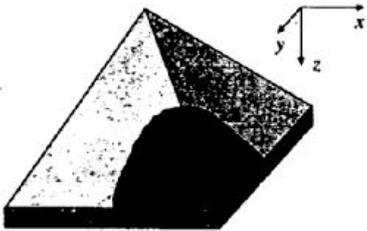
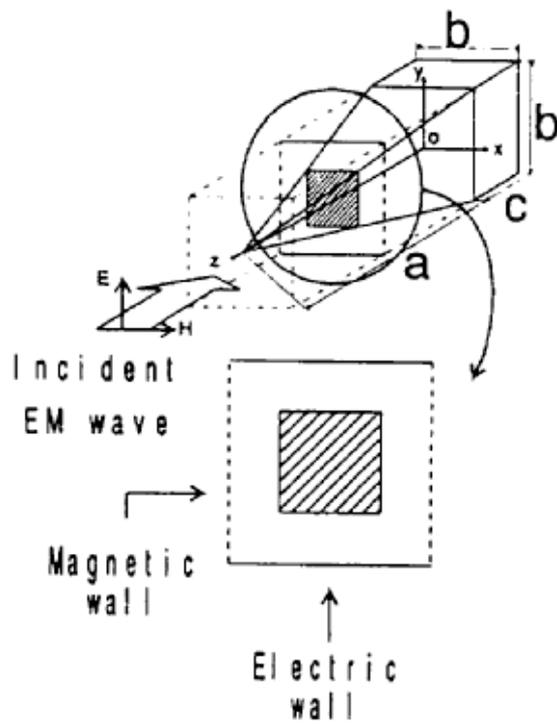


Fig. 3. Hollow pyramidal absorber.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

with a particular shape	<a href="#">H01Q 17/007</a>
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## H01Q 19/00

Combinations of primary active aerial elements and units with secondary devices, e.g. with quasi-optical devices, for giving the aerial a desired directional characteristic [N: (combination of horns with slotted waveguide array [H01Q 13/0233](#))]

### Definition statement

*This subclass/group covers:*

As Lens antennas and Reflector antennas, i.e. a primary radiator with a lens or reflector as secondary radiators.

### References relevant to classification in this group

*This subclass/group does not cover:*

Combination of horns with slotted waveguide array	<a href="#">H01Q 13/0233</a>
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## H01Q 19/005

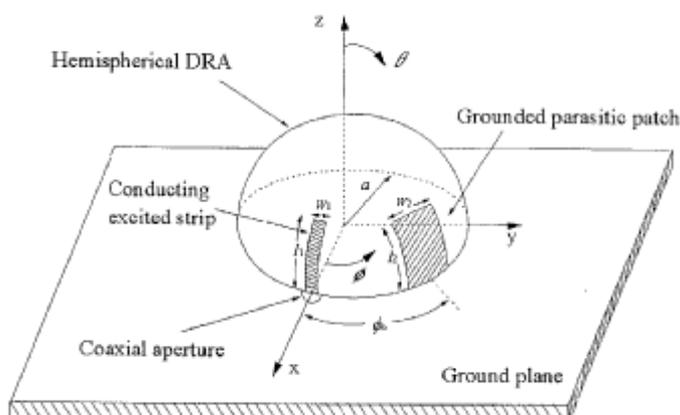
[N: Patch antenna using one or more coplanar parasitic elements]

### Definition statement

*This subclass/group covers:*

Parasitic element is a radiating element that is not connected to the feed lines of an antenna but affects the radiation pattern.

Only relates to patch antennas.



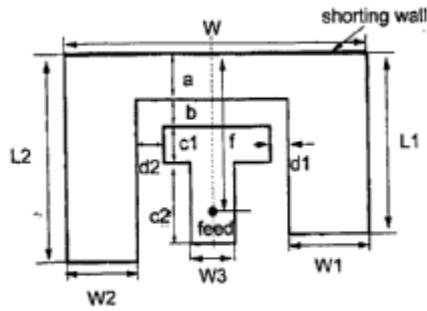


Fig. 1. Geometry of the antenna with  $h = 11$  mm.

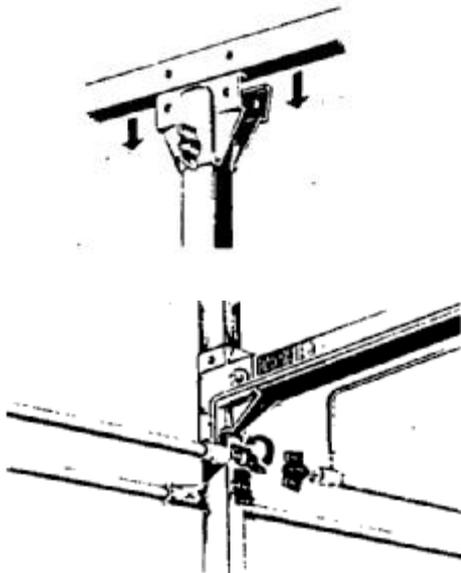
## H01Q 19/02

Details [N: (fastening of an element on a boom [H01Q 1/1228](#))]

### Definition statement

*This subclass/group covers:*

For example:



### References relevant to classification in this subclass

*This subclass/group does not cover:*

fastening of an element on a boom	<a href="#">H01Q 1/1228</a>
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### Special rules of classification within this group

Inactive.

## H01Q 19/021

[N: Means for reducing undesirable effects]

### Definition statement

*This subclass/group covers:*

Grating lobes, that is undesired sidelobes in the radiation pattern; e.g. edge scattering, scattering at struts, etc.

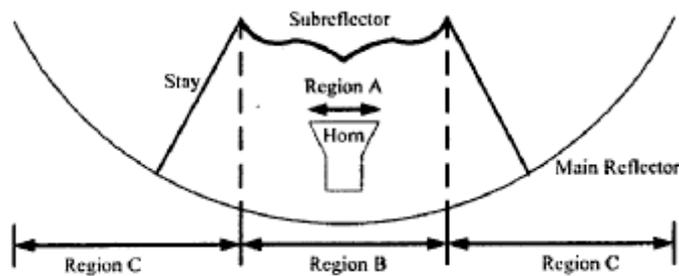


Fig.4 Classification of the region on the reflector.

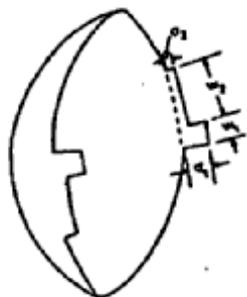
## H01Q 19/022

[N: for reducing the edge scattering of reflectors]

### Definition statement

*This subclass/group covers:*

Rim loading, rim shaping.



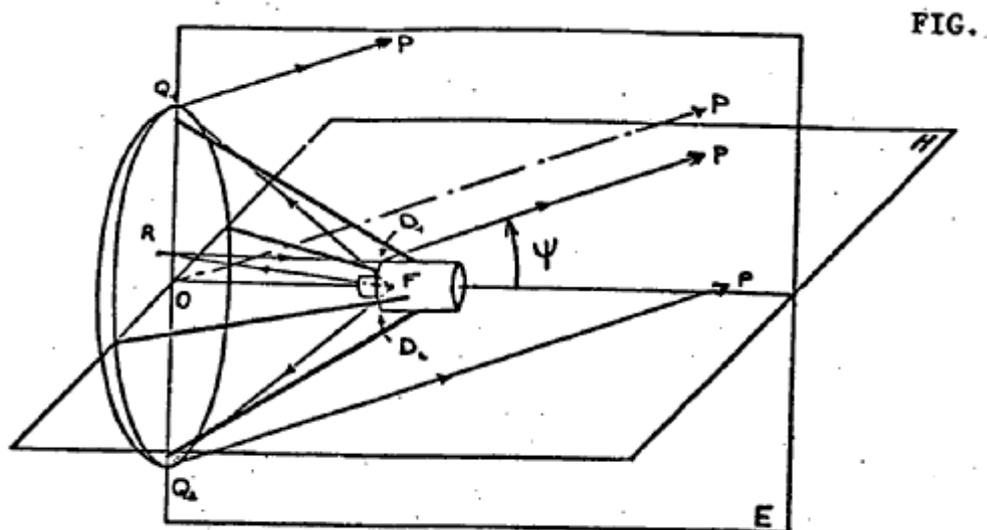
## H01Q 19/023

[N: for reducing the scattering of mounting structures, e.g. of the struts]

### Definition statement

*This subclass/group covers:*

Shaping of struts; covering of struts with absorbing material.



## H01Q 19/025

[N: for optimizing the matching of the primary feed, e.g. vertex plates]

### Definition statement

*This subclass/group covers:*

Changing the shape of (sub) reflectors that are responsible for backscattered energy that causes VSWR degradation.

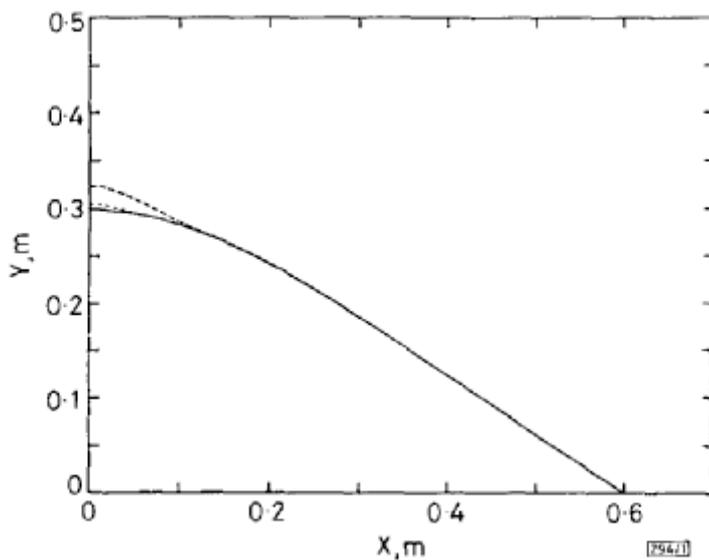


Fig. 1 Subreflector profile with various matching cosine-squared shaped knobs

## H01Q 19/026

[N: for reducing the primary feed spill-over]

### Definition statement

*This subclass/group covers:*

Changing the aperture illumination used for generating the secondary pattern.

In the transmit mode of a reflector antenna, the power from the feed that is not intercepted by the reflecting elements.

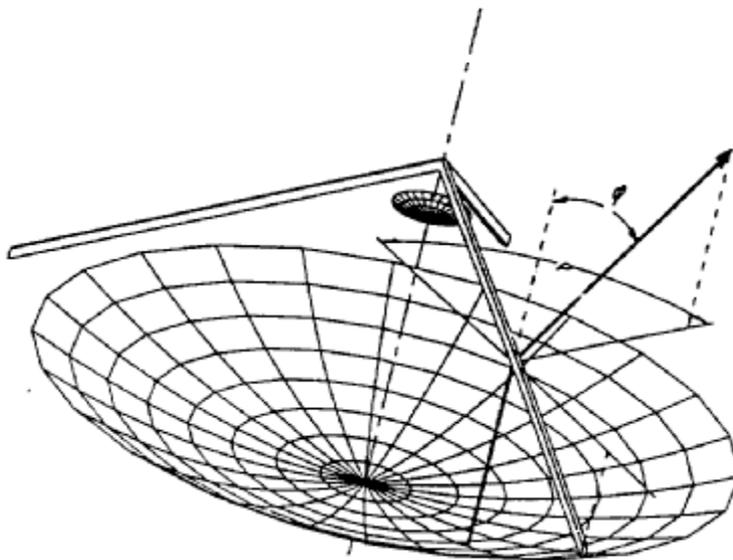


Fig. 4. Schematic view of the telescope showing all three support legs and the angles  $\varphi$  and  $\rho$  that describe the direction of a ray after reflection from a radiation baffle on the leg's underside.

## H01Q 19/027

[N: for compensating or reducing aperture blockage (offset feeding [H01Q 19/132](#), [H01Q 19/192](#))]

### Definition statement

*This subclass/group covers:*

A condition resulting from objects lying in the path of rays arriving at or departing from the aperture of an antenna.

The shadowing causes increase in sidelobe levels.

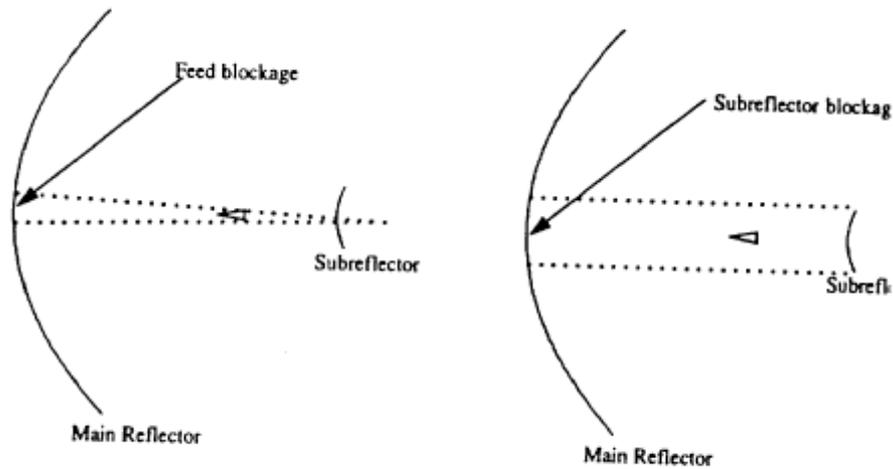


Fig 1. Feed and subreflector blockage in a symmetric dual reflector

### References relevant to classification in this subclass

*This subclass/group does not cover:*

offset feeding	<a href="#">H01Q 19/132</a> , <a href="#">H01Q 19/192</a>
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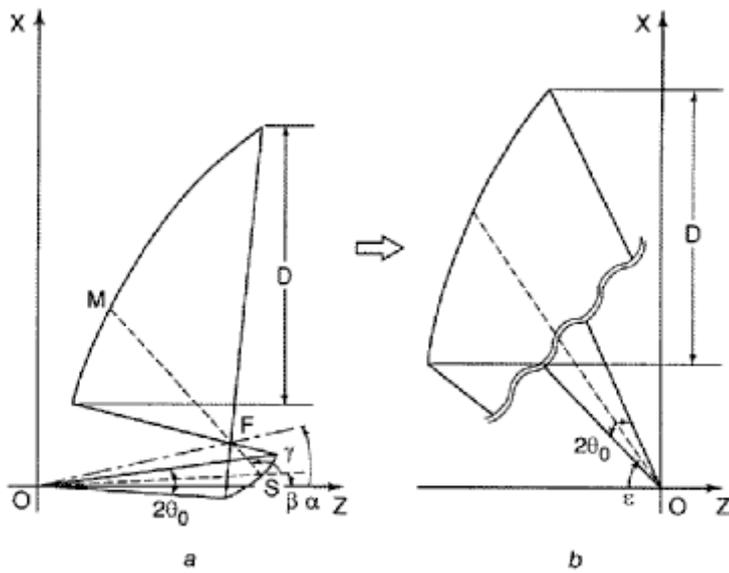
### H01Q 19/028

[N: for reducing the cross polarisation]

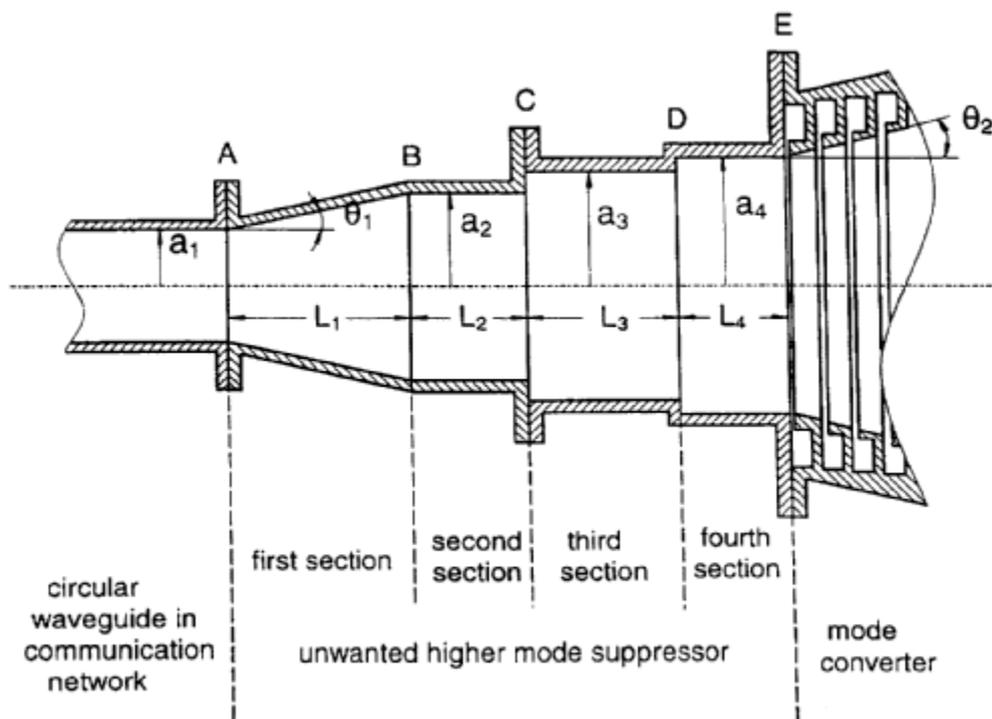
#### Definition statement

*This subclass/group covers:*

The polarisation orthogonal to a reference polarisation, that is co-polarisation; polarisation purity; cross-polarisation suppression.



**Fig.2** Design parameters of reflectors of quadric surface of revolution  
 a Dual reflector type antenna: offset Gregorian antenna  
 b Equivalent offset parabola



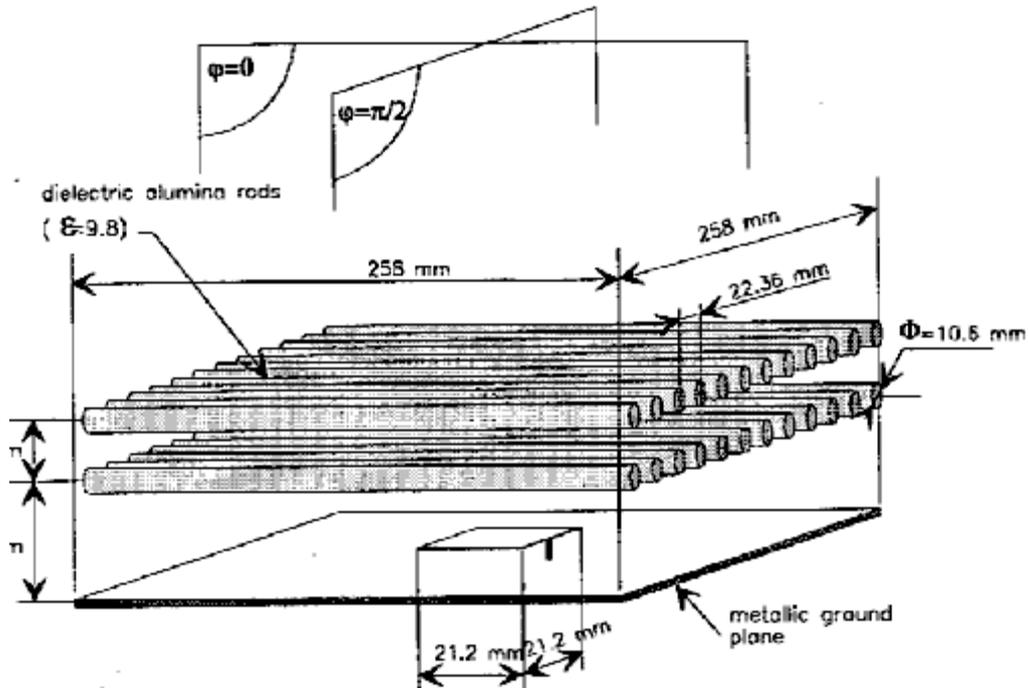
## H01Q 19/04

### Means for collapsing H-aerials or Yagi aerials

#### Definition statement

This subclass/group covers:  
 Mechanical details thereof.





## References relevant to classification in this subclass

*This subclass/group does not cover:*

using refracting or diffracting devices, e.g. lens	<a href="#">H01Q 1/42</a>
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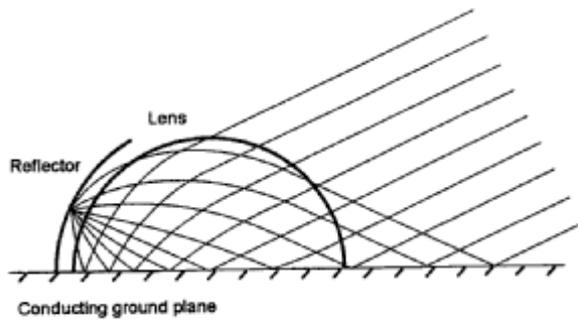
## H01Q 19/062

[N: for focusing]

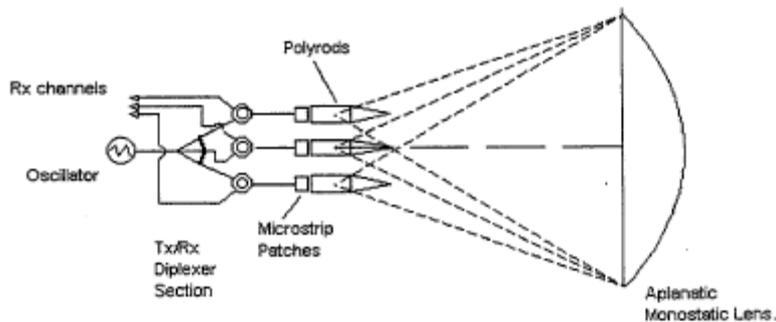
### Definition statement

*This subclass/group covers:*

For transforming an incident wavefront into another wavefront, e.g. spherical into plane.



**Figure 1. A ground-plane backed hemispherical Luneberg-lens reflector.**



## H01Q 19/065

### [N: Zone plate type antennas]

#### Definition statement

*This subclass/group covers:*

Fresnel lens antenna. An antenna consisting of a feed and a lens, usually planar, that transmits the radiated power from the feed through the central zone and alternate Fresnel zones of the illuminating field on the lens.

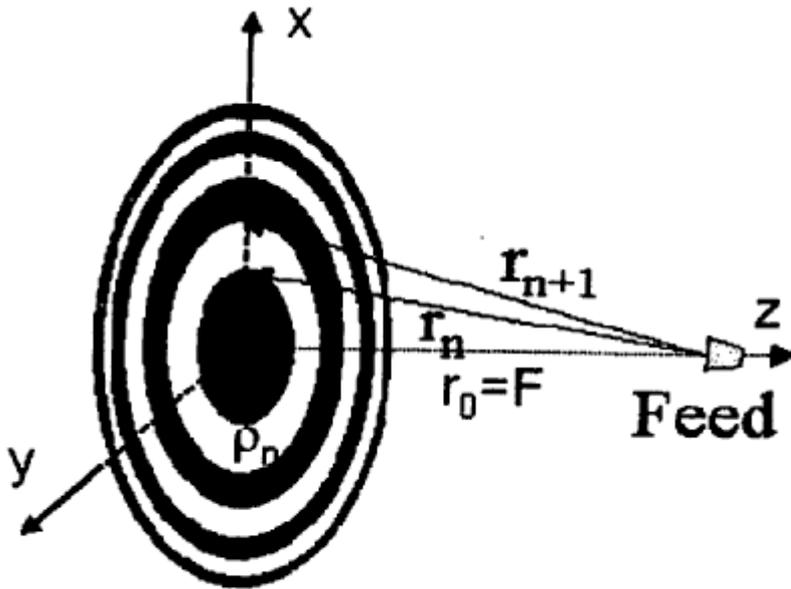


Figure 3. A three-dimensional view of a Fresnel antenna.

### Synonyms and Keywords

Planar lens antenna; Fresnel zone plate antenna (FZP, FZPA).

### H01Q 19/067

[N: using a hologram]

### Definition statement

*This subclass/group covers:*

Quasi-optical wave of generating an antenna beam, based on constructive interference. Operates as kind of grating.

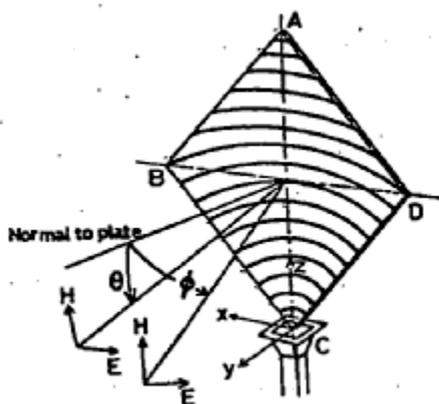


Fig. 1. Structure and geometry of holographic plate.

## H01Q 19/08

for modifying the radiation pattern of a radiating horn in which it is located [N: (corrugated horns [H01Q 13/0208](#); producing a circular polarisation [H01Q 13/0241](#))]

### Definition statement

*This subclass/group covers:*

For example: dielectrically filled horns.

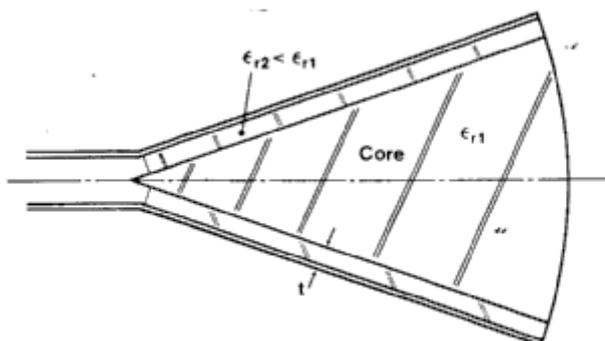


Fig. 1. Illustration of the new hybrid-mode horn antenna (the "dielectric core horn").

### References relevant to classification in this subclass

*This subclass/group does not cover:*

corrugated horns	<a href="#">H01Q 13/0208</a>
producing a circular polarisation	<a href="#">H01Q 13/0241</a>

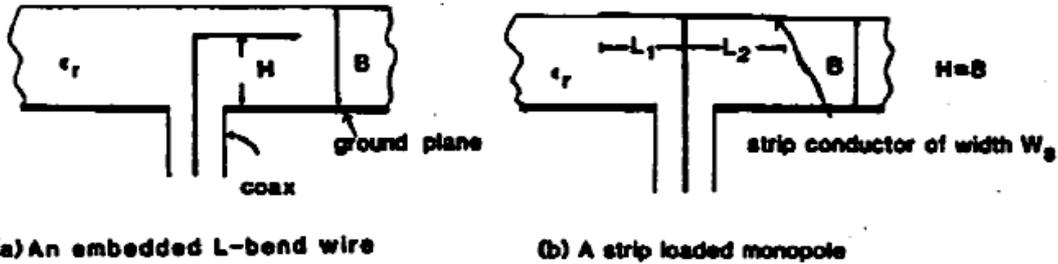
## H01Q 19/09

wherein the primary active element is coated with or embedded in a dielectric or magnetic material (protective material [H01Q 1/40](#); with variable characteristics [H01Q 3/44](#))

### Definition statement

*This subclass/group covers:*

Coated/embedded monopole.



## References relevant to classification in this subclass

*This subclass/group does not cover:*

protective material	<a href="#">H01Q 1/40</a>
with variable characteristics	<a href="#">H01Q 3/44</a>

## H01Q 19/10

using reflecting surfaces

### Definition statement

*This subclass/group covers:*

An antenna consisting of one or more reflecting surfaces and a radiating (receiving) feed system.

### Synonyms and Keywords

Reflector antenna, dish antenna.

## H01Q 19/102

[N: wherein the surfaces are of convex toroidal shape (biconical horns [H01Q 13/04](#))]

### Definition statement

*This subclass/group covers:*

A reflector formed by rotating a segment of plane curve about a nonintersecting coplanar line.

Example: torus antenna.

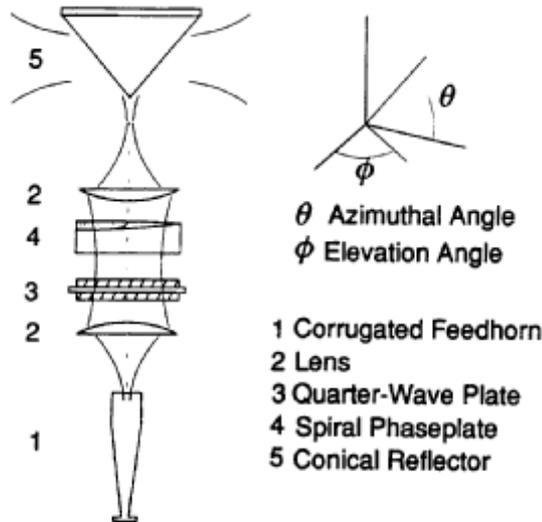


Fig. 1 : Layout of antenna components.

### References relevant to classification in this subclass

This subclass/group does not cover:

biconical horns	<a href="#">H01Q 13/04</a>
-----------------	----------------------------

### H01Q 19/104

[N: using a substantially flat reflector for deflecting the radiated beam, e.g. periscopic antennas (periscopic fed Cassegrain antennas [H01Q19/19C3](#); passive relays [H04B 7/145](#))]

### Definition statement

This subclass/group covers:

An antenna consisting of a very directive feed located close to ground level and oriented so that its beam illuminates an elevated reflector that is oriented so as to produce a horizontal beam.

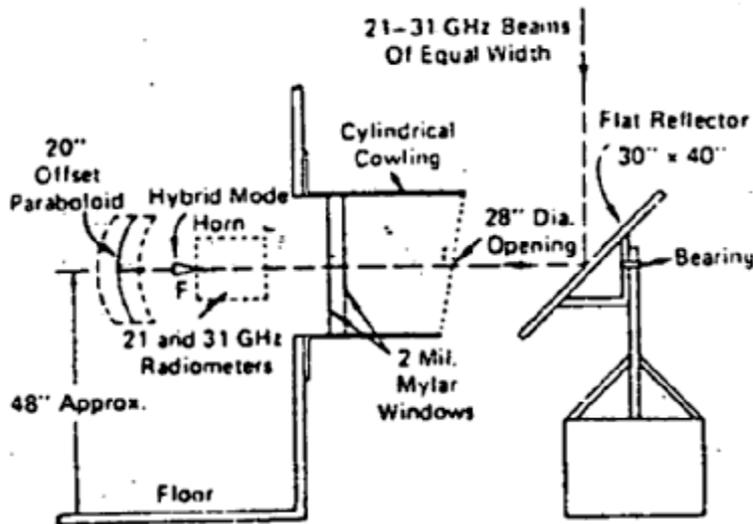


Fig. 1. Equal-beamwidth antenna (side view) shown in all-weather configuration for remotely sensing the atmosphere. Flat is rotatable on a bearing for scanning the beam in elevation.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

periscopic fed Cassegrain antennas	<b>H01Q19/19C3</b>
passive relays	<a href="#">H04B 7/145</a>

### H01Q 19/106

[N: using two or more intersecting plane surfaces, e.g. corner reflector antennas]

### Definition statement

*This subclass/group covers:*

Corner reflector antenna, that is an antenna consisting of a feed and a corner reflector.

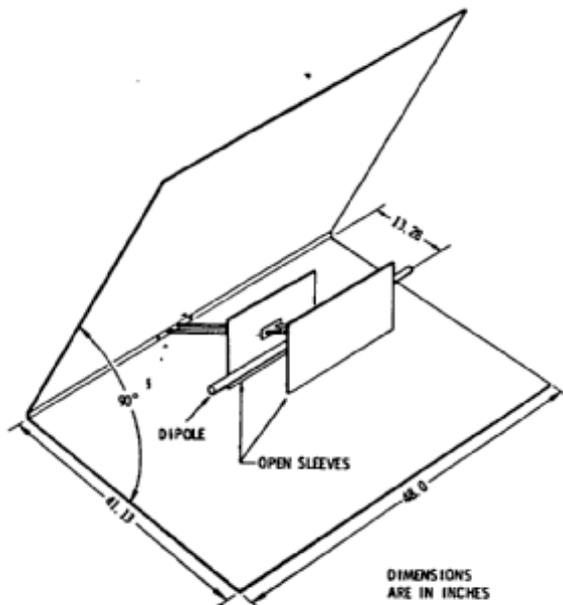


Fig. 1. Corner reflector dimensions.

## H01Q 19/108

[N: Combination of a dipole with a plane reflecting surface ([H01Q 19/106](#) takes precedence; strip line [H01Q 9/065](#))]

### Definition statement

*This subclass/group covers:*

Any dipole with any planar reflecting surface.

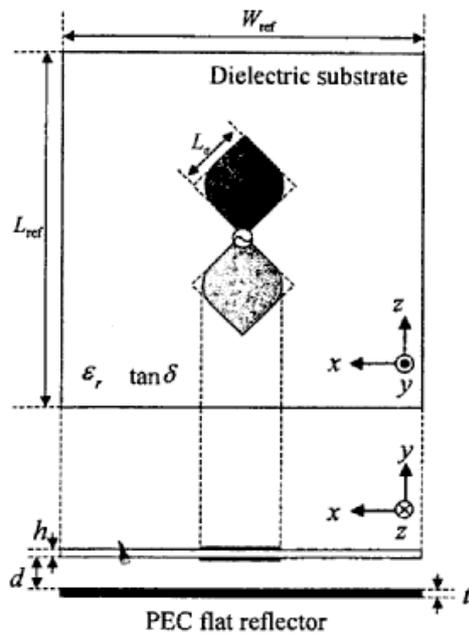


Fig. 1 Antenna geometry and coordinate system when using delta-gap feed.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

Combination of a dipole with a plane reflecting surface	<a href="#">H01Q 19/106</a>
takes precedence; strip line	<a href="#">H01Q 9/065</a>

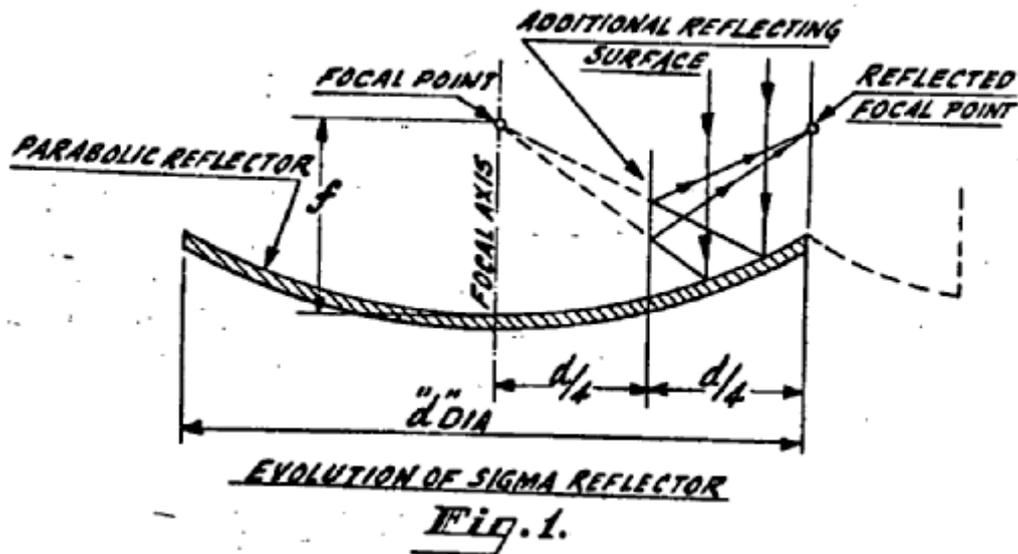
### H01Q 19/12

wherein the surfaces are concave ([H01Q 19/18](#) takes precedence)

### Definition statement

*This subclass/group covers:*

A feed with a dish.



## References relevant to classification in this subclass

This subclass/group does not cover:

wherein the surfaces are concave	<a href="#">H01Q 19/18</a>
----------------------------------	----------------------------

## Synonyms and Keywords

In patent documents the following words are often used:

Parabolic, paraboloidal, paraboloid.

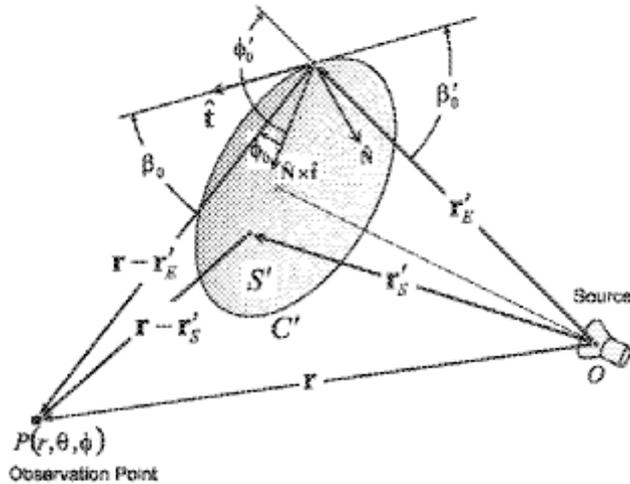
## H01Q 19/13

the primary radiating source being a single radiating element, e.g. a dipole, a slot, a waveguide termination ([H01Q 19/15](#) takes precedence)

## Definition statement

This subclass/group covers:

For example:



**Fig. 1.** Geometry for a reflector surface with the vectors and angles employed in the TDPO + FWCs formulation.

## References relevant to classification in this subclass

*This subclass/group does not cover:*

the primary radiating source being a single radiating element, e.g. a dipole, a slot, a waveguide termination	<a href="#">H01Q 19/15</a>
---	----------------------------

## Synonyms and Keywords

*In patent documents the following words are often used:*

Prime focus feed; center-feed, centre-fed; front feed; front-fed.

## H01Q 19/132

**[N: Horn reflector antennas; Off-set feeding]**

### Definition statement

*This subclass/group covers:*

An antenna consisting of a portion of a paraboloidal reflector fed with an offset horn that physically intersects the reflector, part of the wall of the horn being removed to form the antenna aperture.

The horn is usually either pyramidal or conical, with an axis perpendicular to that of the paraboloid.

Advantage: aperture blockage by the feed is reduced.

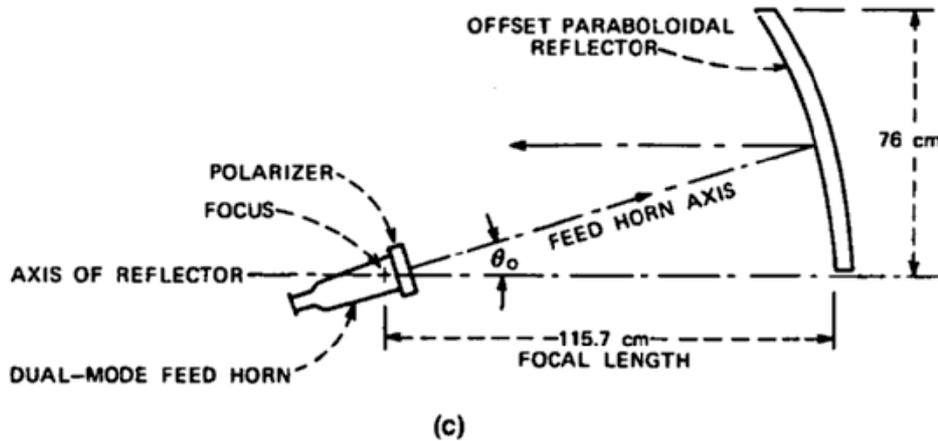


Fig. 2—(a) Cross-sectional view of the dual-mode feed-horn design used for the offset launcher of Fig. 1. (b) Profile of measuring range. (c) Launcher schematic.

## H01Q 19/134

[N: Rear-feeds; Splash plate feeds]

### Definition statement

*This subclass/group covers:*

Splash plate feeds can have various profiles, optimised for VSWR.

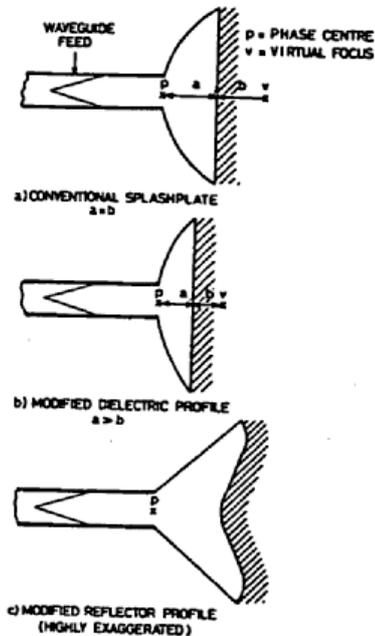


Figure 1 VARIOUS SPLASHPLATE DESIGNS

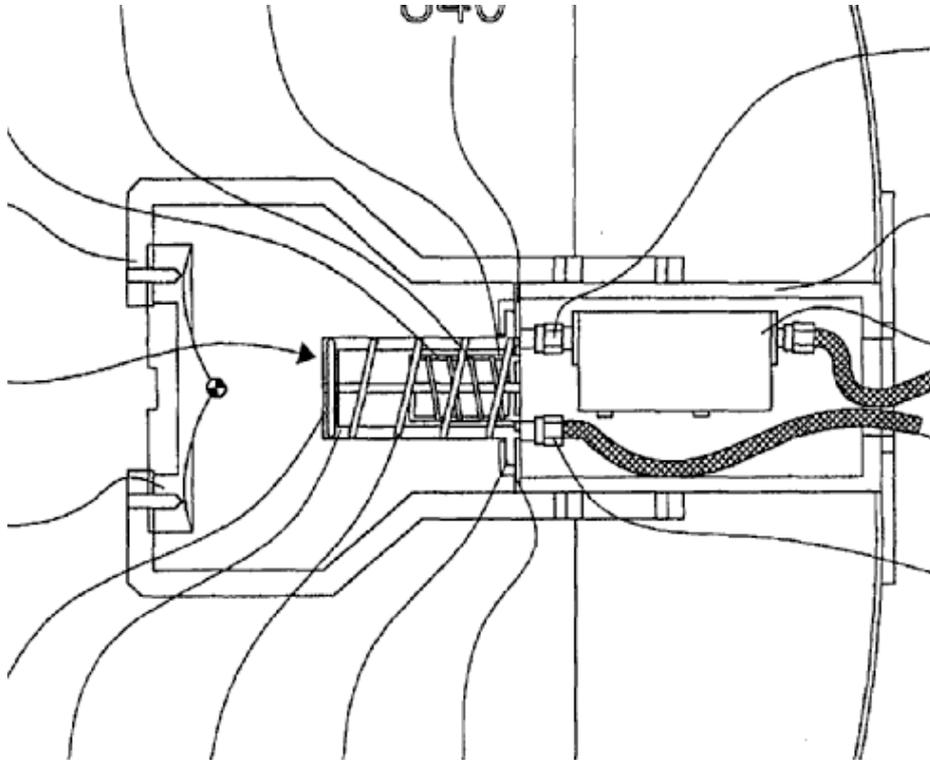
## H01Q 19/136

**[N: cross-polarised]**

**Definition statement**

*This subclass/group covers:*

Should be interpreted as dual-polarised.



**H01Q 19/138**

**[N: Parallel-plate feeds, e.g. pill-box, cheese aerials]**

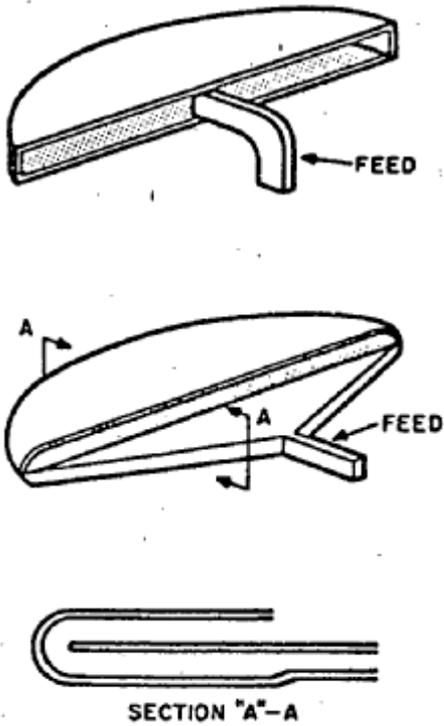
**Definition statement**

*This subclass/group covers:*

Cheese: a reflector antenna having a cylindrical reflector enclosed by two parallel conducting plates perpendicular to the cylinder, spaced more than one wavelength apart.

Contrast with Pillbox: a reflector antenna having a cylindrical reflector enclosed by two parallel conducting plates perpendicular to the cylinder, spaced less than one wavelength apart.

## SINGLE LAYER PILLBOX



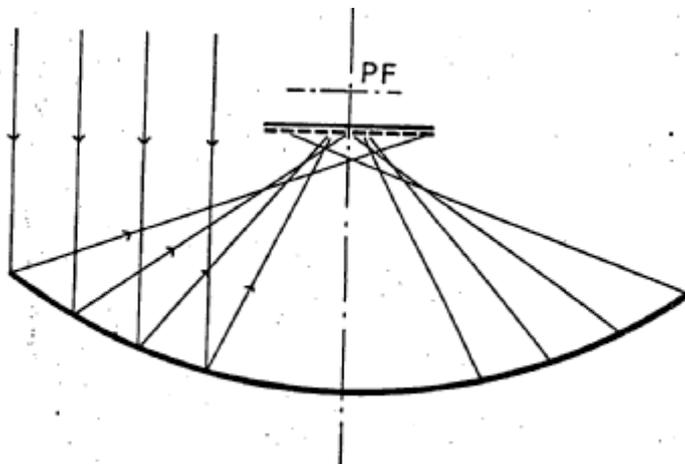
### H01Q 19/15

the primary radiating source being a line source, e.g. leaky waveguide aerials

#### Definition statement

*This subclass/group covers:*

A continuous distribution of sources of electromagnetic radiation, lying along a line segment.



## H01Q 19/17

the primary radiating source comprising two or more radiating elements ([H01Q 19/15](#), [H01Q 25/00](#) take precedence)

### Definition statement

*This subclass/group covers:*

Reflector fed by a number of antenna elements.

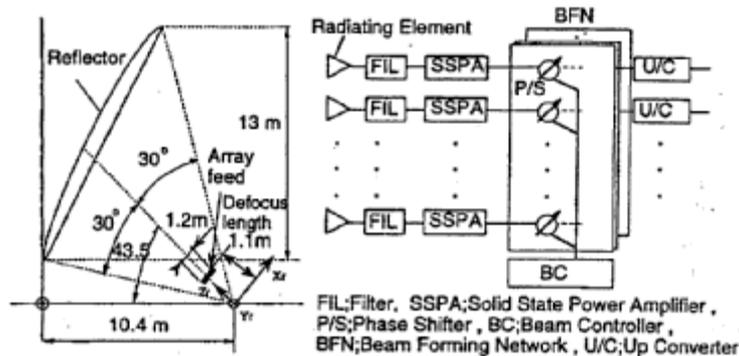


Fig.2 Antenna configuration and active phased array feed.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

the primary radiating source comprising two or more radiating elements	<a href="#">H01Q 19/15</a> , <a href="#">H01Q 25/00</a>
--	---

### Synonyms and Keywords

*In patent documents the following expression/words "array-fed", "array feed", "feed array", "feed cluster", "multifeed reflector" and "duofeed" are often used as synonyms.*

## H01Q 19/175

[N: arrayed along the focal line of a cylindrical focusing surface]

### Definition statement

*This subclass/group covers:*

Cylindrical reflector (curved in one dimension) illuminated by a line source of

finite extent.

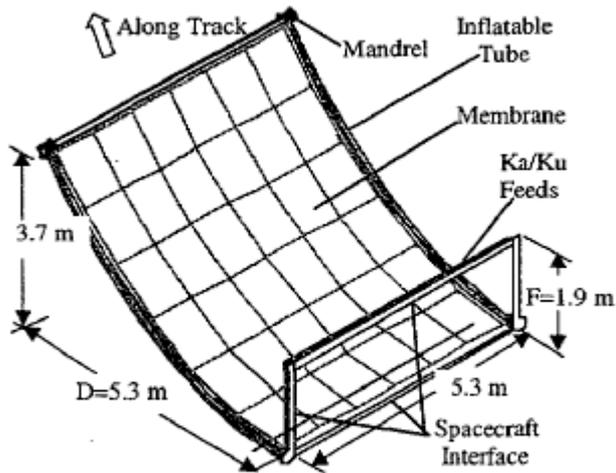


Figure 1 – Membrane Antenna Configuration

## H01Q 19/18

having two or more spaced reflecting surfaces ([N: surfaces of convex toroidal shape [H01Q 19/102](#); using a deflecting plane mirror [H01Q 19/104](#); splash plate feeds [H01Q 19/134](#)]; producing pencil beam by two cylindrical reflectors with their focal lines orthogonally disposed [H01Q 19/20](#))

### Definition statement

*This subclass/group covers:*

For example:

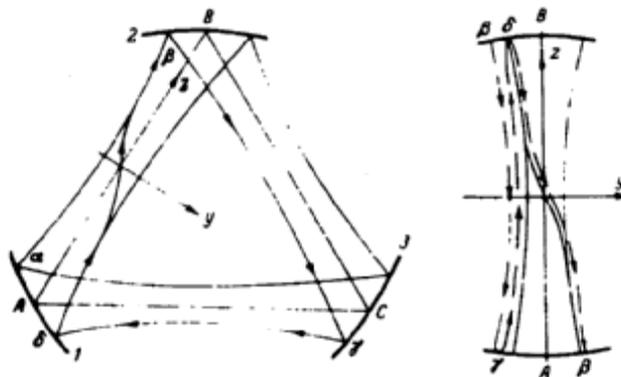


Fig. 3

### References relevant to classification in this subclass

*This subclass/group does not cover:*

surfaces of convex toroidal shape	<a href="#">H01Q 19/102</a>
using a deflecting plane mirror	<a href="#">H01Q 19/104</a>
splash plate feeds	<a href="#">H01Q 19/134</a>
producing pencil beam by two cylindrical reflectors with their focal lines orthogonally disposed	<a href="#">H01Q 19/20</a>

### Special rules of classification within this group

Inactive.

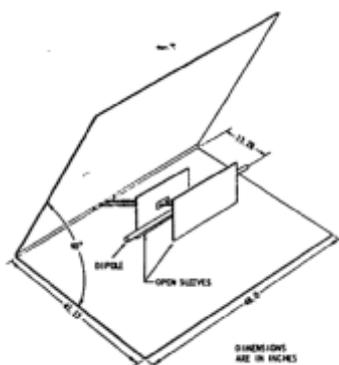
### H01Q 19/185

wherein the surfaces are plane

#### Definition statement

*This subclass/group covers:*

For example:



### Special rules of classification within this group

Inactive.

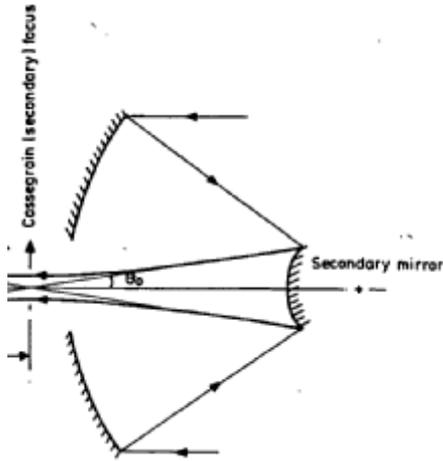
### H01Q 19/19

comprising one main concave reflecting surface associated with an auxiliary reflecting surface

#### Definition statement

*This subclass/group covers:*  
 Classical dual reflector systems.

Cassegrain reflector antenna with a convex subreflector; Gregorian reflector antenna with a concave subreflector.

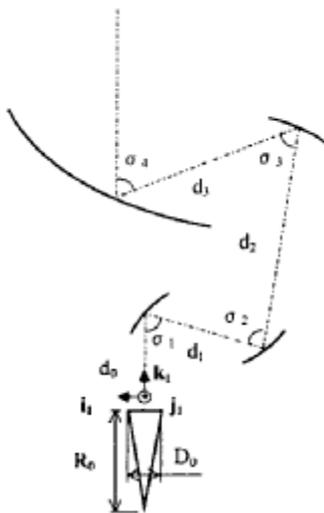


### H01Q 19/191

[N: wherein the primary active element uses one or more deflecting surfaces, e.g. beam waveguide feeds]

#### Definition statement

*This subclass/group covers:*  
 Quasi-optical collimators.



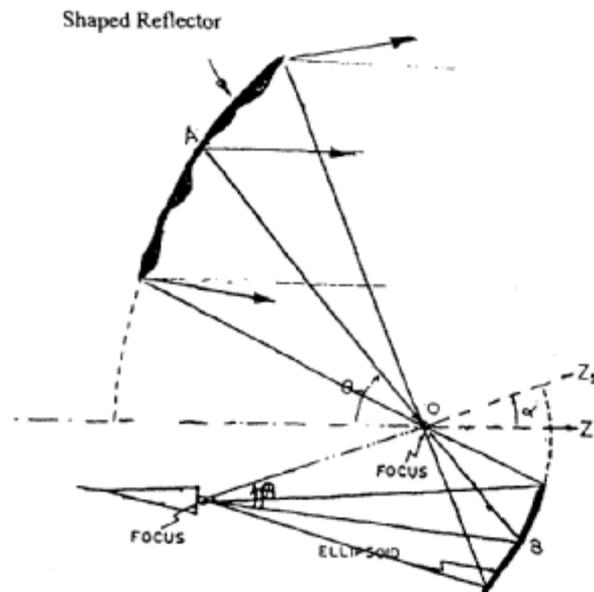
### H01Q 19/192

[N: with dual offset reflectors]

## Definition statement

*This subclass/group covers:*

Dual-offset Cassegrain or Gregorian systems.



## H01Q 19/193

[N: with feed supported subreflector (splash plate feeds [H01Q 19/134](#))]

## Definition statement

*This subclass/group covers:*

The sub-reflector is connected to the feeder system; mechanical considerations.

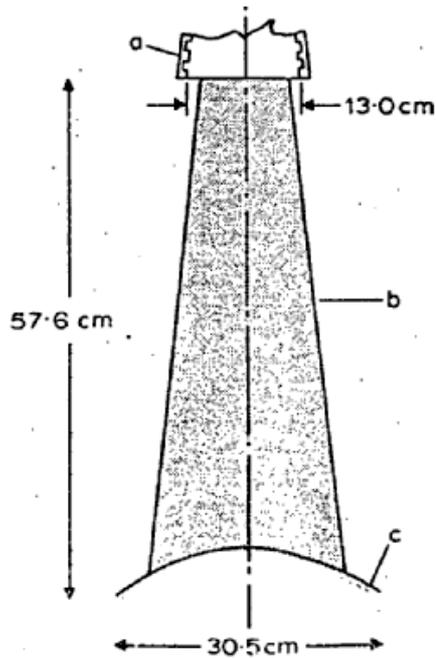


Fig. 1c Configuration of feed and subreflector assembly  
 (i)  $\theta$  scalar feed horn  
 (ii)  $\theta$  dielectric-foam cone,  $\epsilon_r = 1.15$   
 (iii) Subreflector

## References relevant to classification in this subclass

*This subclass/group does not cover:*

with feed supported subreflector (splash plate feeds)	<a href="#">H01Q 19/134</a>
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## H01Q 19/195

wherein a reflecting surface acts also as a polarisation filter or a polarising device

### Definition statement

*This subclass/group covers:*

For example: polarisation sensitive main reflector in a twist reflector system.

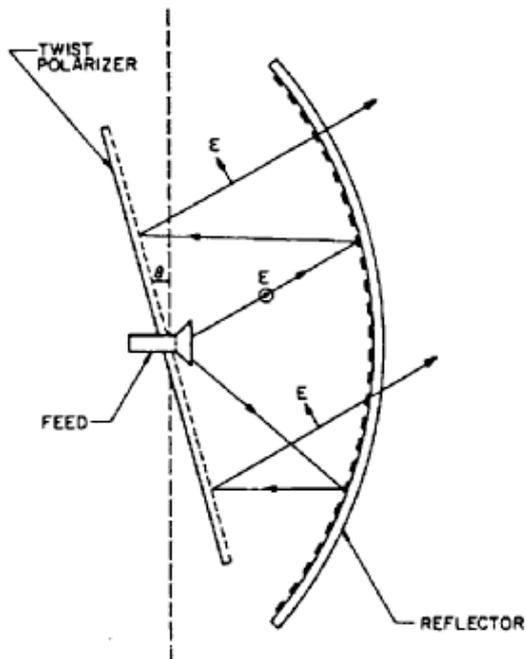


Fig. 1. Twist reflector antenna system.

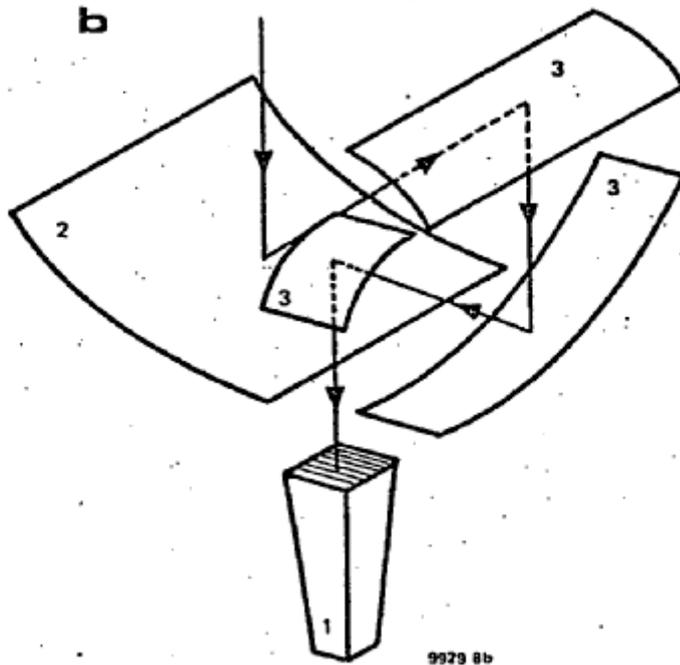
## H01Q 19/20

**Producing pencil beam by two cylindrical focusing devices with their focal lines orthogonally disposed**

### **Definition statement**

*This subclass/group covers:*

An antenna whose radiation pattern consists of a single main lobe with narrow principal half-power beamwidths and sidelobes having relatively low levels.



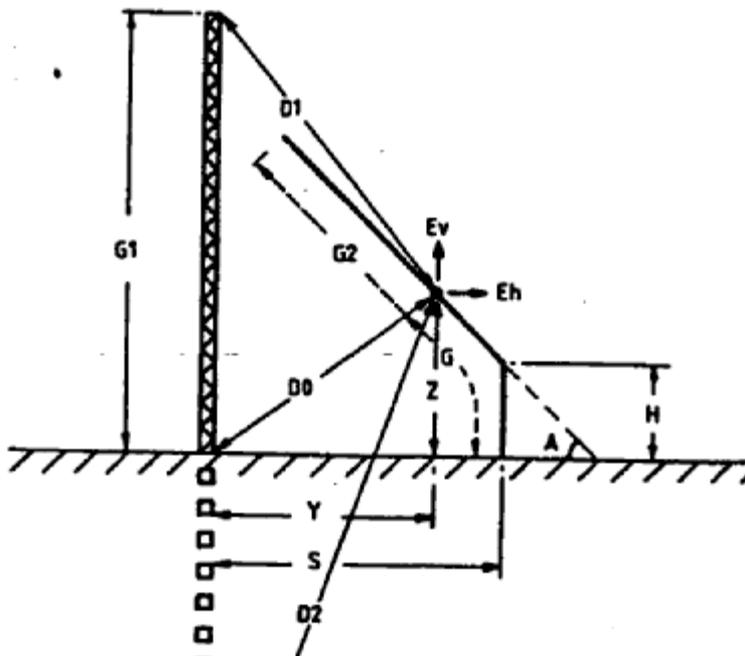
## H01Q 19/22

using a secondary device in the form of a single substantially straight conductive element

### Definition statement

*This subclass/group covers:*

It is either a reflector or a director.



### Special rules of classification within this group

Group is inactive.

### H01Q 19/24

the primary active element being centre-fed and substantially straight, e.g. H-aerial

### Definition statement

*This subclass/group covers:*

For example:

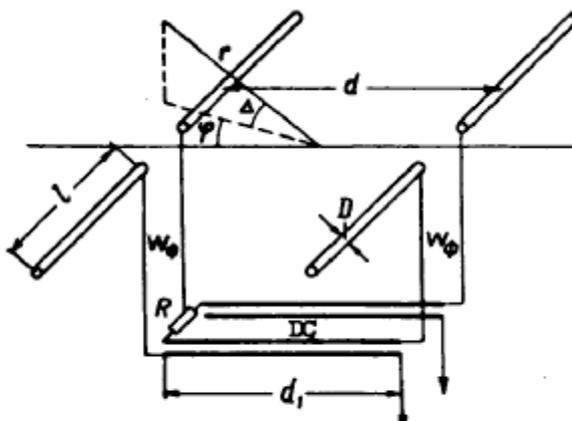
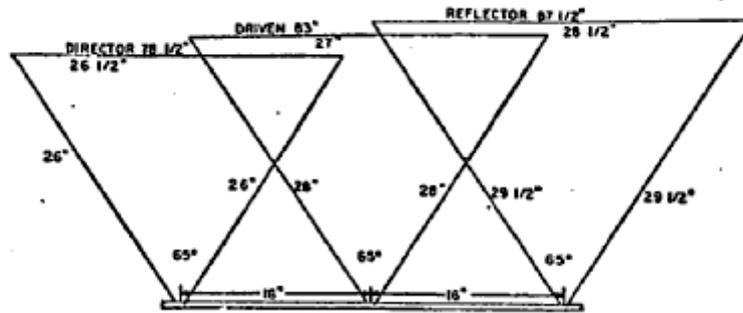


Fig. 1



*This subclass/group covers:*

This is inherently a yagi-principle: the parasitic elements should have a similar shape as the excited element.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

using a secondary device in the form of two or more substantially straight conductive elements (log-periodic aerials)	<a href="#">H01Q 11/10</a>
constituting a reflecting surface	<a href="#">H01Q 19/10</a>

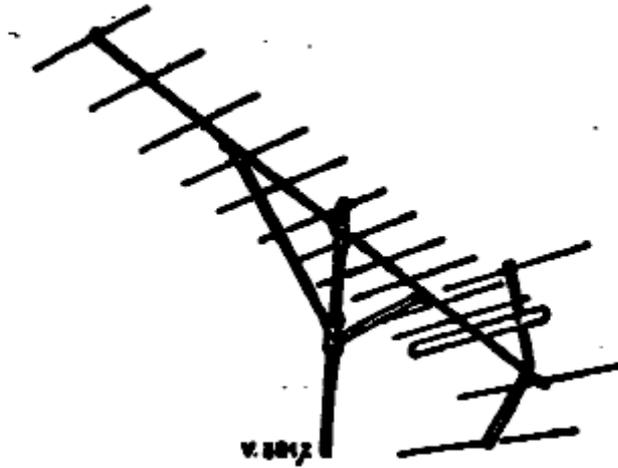
### H01Q 19/30

the primary active element being centre-fed and substantially straight, e.g. Yagi-aerial

#### Definition statement

*This subclass/group covers:*

A linear end-fire array consisting of a driven element, a reflector element, and one or more director elements.



## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

*In this group, the following terms are used with the meaning indicated:*

Driven element	radiating element coupled directly to the feed line of an antenna
Director element	a parasitic element located forward of the driven element
Reflector element	a parasitic element located in a direction other than forward.

## Synonyms and Keywords

*In patent documents the following expression/words "Yagi-antenna" and "Yagi-Uda antenna" are often used as synonyms.*

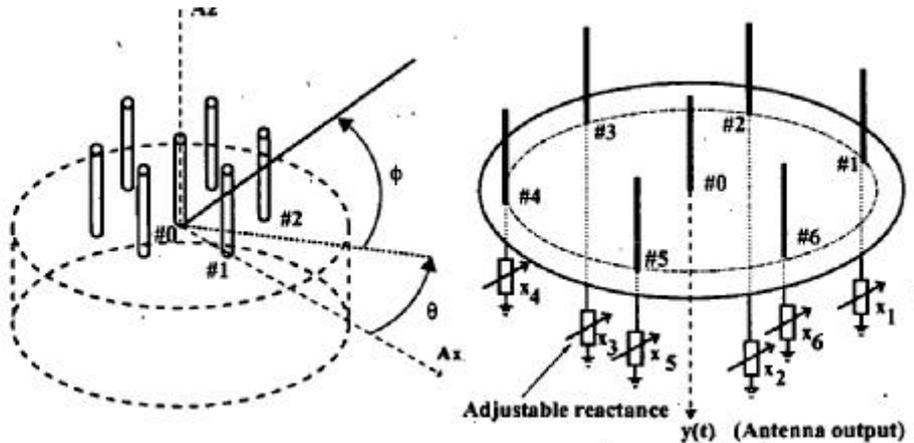
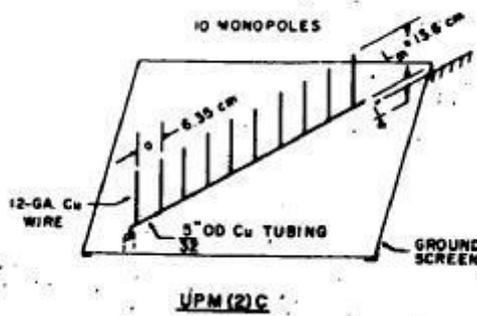
## H01Q 19/32

**the primary active element being end-fed and elongated**

### Definition statement

*This subclass/group covers:*

For example monopole yagis and ESPAR.



## H01Q 21/00

Aerial arrays or systems (producing a beam the orientation or the shape of the directional pattern of which can be changed or varied [H01Q 3/00](#); [N: combination of imbricated aerials or arrays operating on different wavebands [H01Q 5/0006](#)]; electrically-long aerials [H01Q 11/00](#))

### Definition statement

*This subclass/group covers:*

An antenna comprised of a number of identical radiating elements in a regular arrangement and excited to obtain a prescribed radiation pattern.

### References relevant to classification in this group

*This subclass/group does not cover:*

Producing a beam the orientation or the shape of the directional pattern of which can be changed or varied	<a href="#">H01Q 3/00</a>
Combination of imbricated aerials or arrays operating on different wavebands	<a href="#">H01Q 5/0006</a>

Electrically-long aerials	<a href="#">H01Q 11/00</a>
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## Synonyms and Keywords

*In patent documents the following expression/words "array antenna" and "antenna array" are often used as synonyms.*

## H01Q 21/0006

### [N: Particular feeding systems]

#### Definition statement

*This subclass/group covers:*

Sub-arrays: In large arrays, the elements may be divided into a plurality of subarrays. The division into sub-arrays have a number of advantages, e.g. reduced number of phase shifters, but a more complex feed layout.

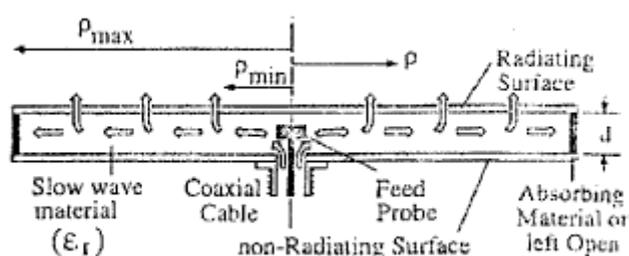
## H01Q 21/0012

### [N: Radial guide fed arrays]

#### Definition statement

*This subclass/group covers:*

The power is distributed using a radial waveguide.



## Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

RLSA	Radial line Slot Antenna
------	--------------------------



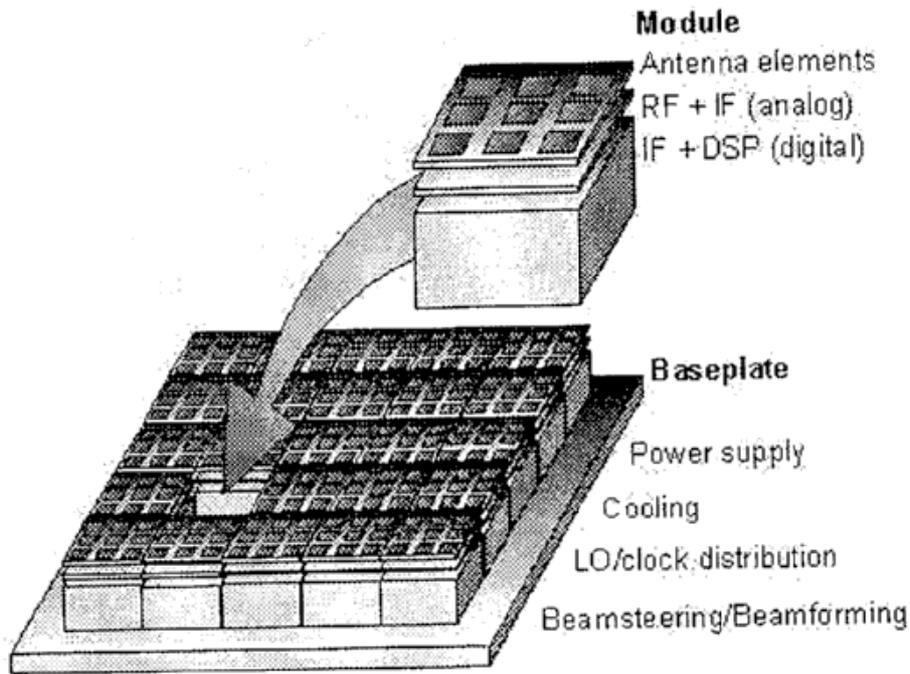


Fig. 1: Modular concept

### Informative references

Attention is drawn to the following places, which may be of interest for search:

Constructional details for solid-state radar subsystems	<a href="#">G01S 7/032</a>
Transmit/receive switching	<a href="#">H04B 1/44</a>
By semiconductor devices	<a href="#">H01P 1/15</a>

### H01Q 21/0031

[N: Parallel-plate fed arrays; Lens-fed arrays (multibeam arrays [H01Q 25/008](#))]

### Definition statement

*This subclass/group covers:*

The power is distributed using a parallel plate waveguide.

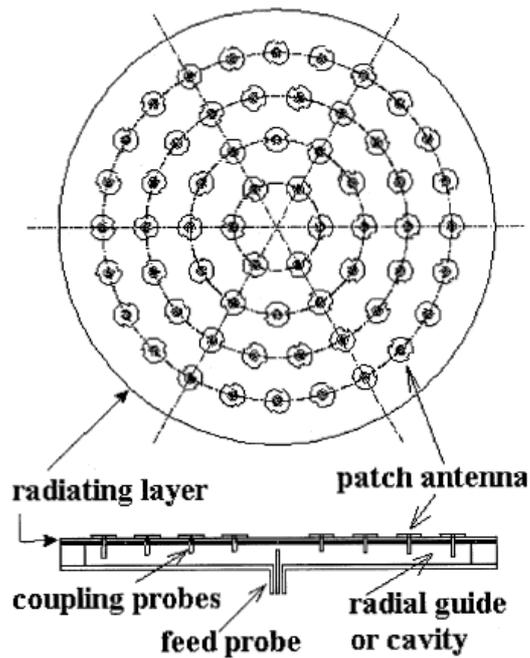


Fig. 1. Configuration of the investigated radial line planar antenna.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

multibeam arrays	<a href="#">H01Q 25/008</a>
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### H01Q 21/0037

[N: linear waveguide fed arrays]

#### Definition statement

*This subclass/group covers:*

The power is distributed using a linear waveguide of a particular cross-section.

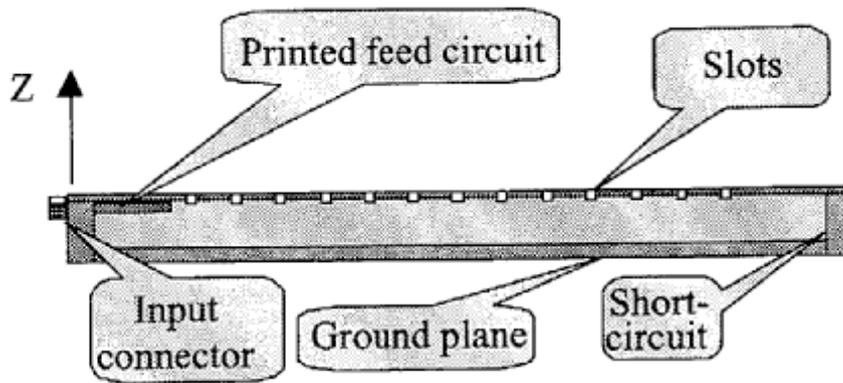


Fig. 1. Transversal section of the antenna.

### Synonyms and Keywords

Travelling wave feed.

### H01Q 21/0043

[N: Slotted waveguides (combination with horns [H01Q 13/0233](#))]

### Definition statement

*This subclass/group covers:*

The distributing waveguide contains slots.

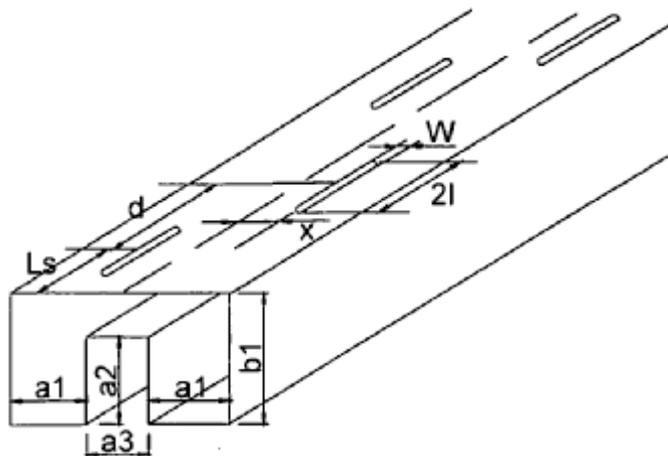


Fig. 1. Geometry of symmetric rectangular single-ridged slotted waveguide antenna.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

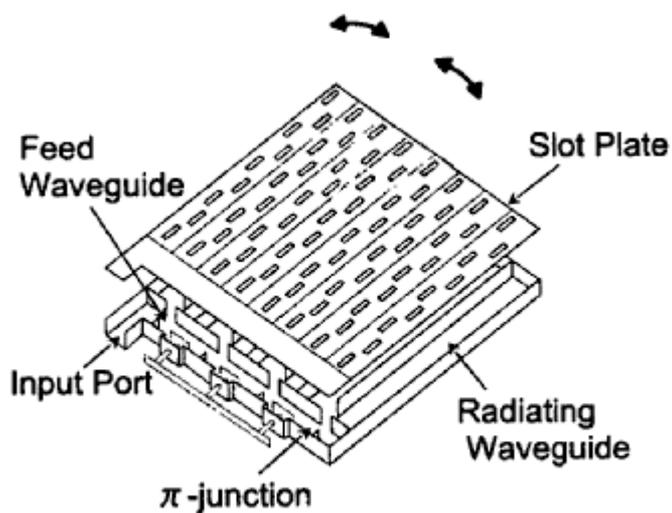
## H01Q 21/005

[N: Slotted waveguides arrays]

### Definition statement

*This subclass/group covers:*

Multiple waveguide are formed into an array.



(a) Beam scanning in single-layer slotted arrays.

## H01Q 21/0056

[N: Conically or cylindrically arrayed]

### Definition statement

*This subclass/group covers:*

The individual arrays are disposed on a cone or a cylinder.

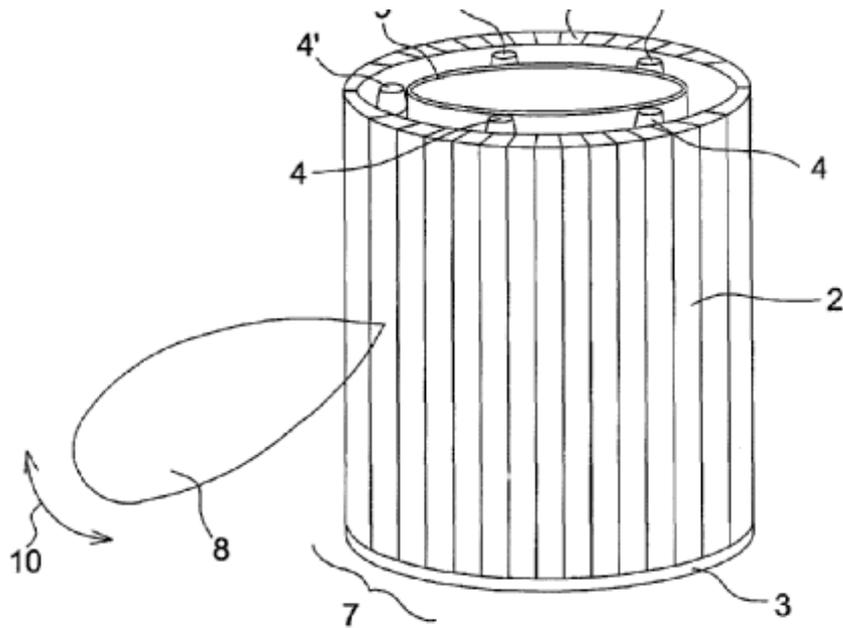


FIG. 1

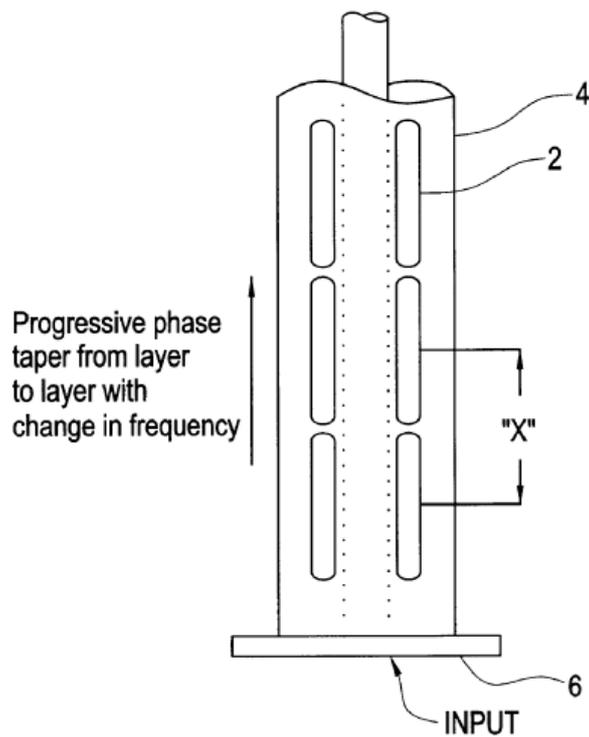
**H01Q 21/0062**

[N: the slots being disposed around the feeding waveguide]

**Definition statement**

*This subclass/group covers:*

For example:



## Special rules of classification within this group

Inactive.

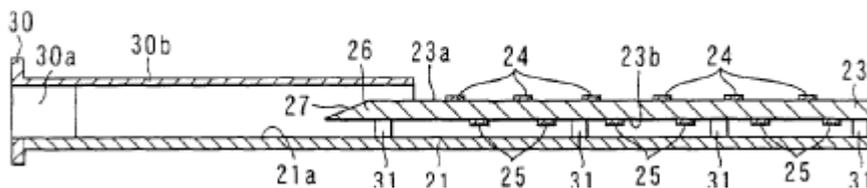
### H01Q 21/0068

[N: Dielectric waveguide fed arrays]

#### Definition statement

*This subclass/group covers:*

Power distribution by linear dielectric waveguide.



### H01Q 21/0075

[N: Stripline fed arrays ([H01Q 21/065](#) takes precedence)]

#### Definition statement

*This subclass/group covers:*

Power distribution using stripline, includes microstrips, suspended stripline, etc.

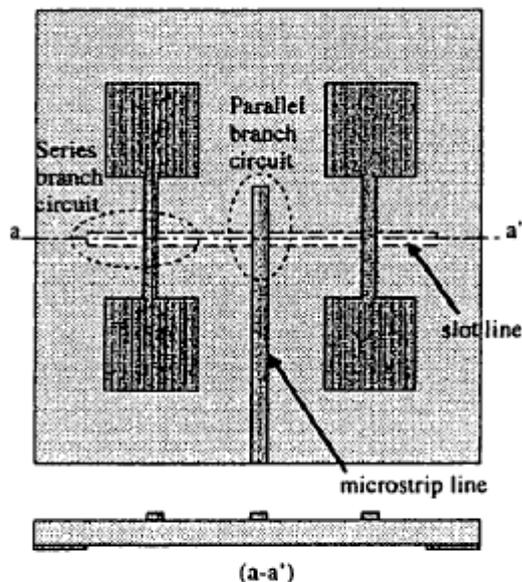


Fig. 1. Layout of array antenna with four elements.

## References relevant to classification in this subclass

*This subclass/group does not cover:*

Stripline fed arrays	<a href="#">H01Q 21/065</a>
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## H01Q 21/0081

[N: using suspended striplines]

### Definition statement

*This subclass/group covers:*

Here suspended stripline.

The ground plane is not connected directly on the substrate but separated by air space.

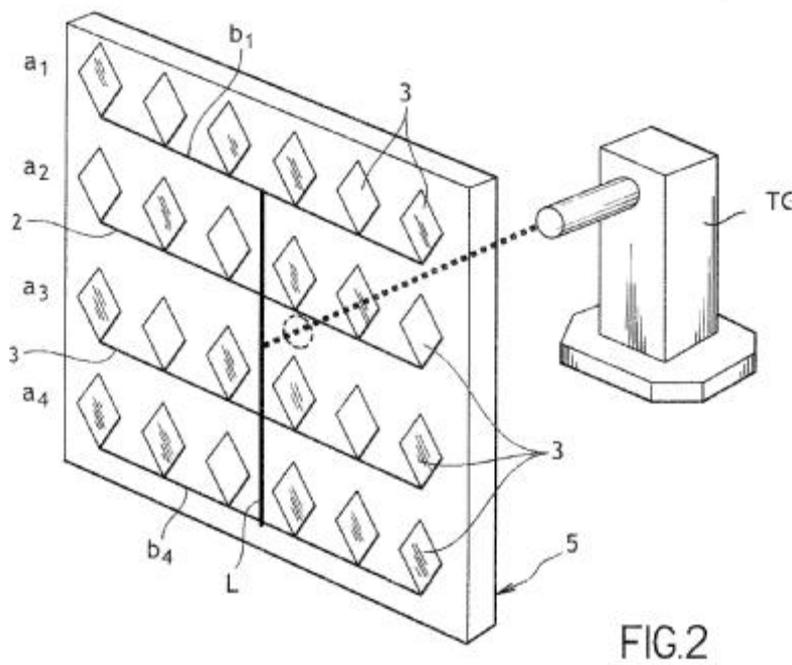


FIG. 2

## H01Q 21/0087

[N: Apparatus or processes specially adapted for manufacturing antenna arrays (manufacturing waveguides [H01P 11/00](#))]

### Definition statement

*This subclass/group covers:*

Tile construction: the radiating elements, active devices are in parallel layers, which is also the direction in which the array is made.

Brick construction: the interconnections are straightforward / perpendicular to the plane of the array.

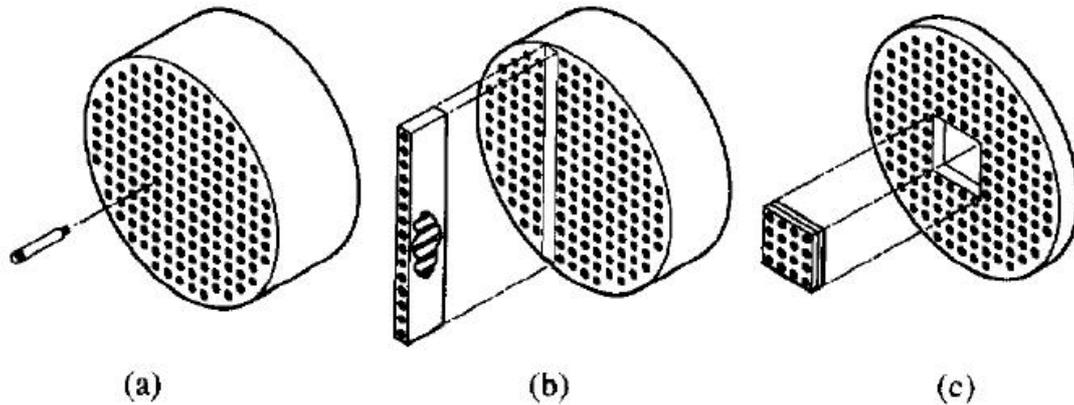


Fig. 1. Evolution of active array architectures.

(a) isolated T/R modules, (b) brick architecture, (c) tile architecture.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

manufacturing waveguides	<a href="#">H01P 11/00</a>
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### Glossary of terms

*In this subclass/group, the following terms (or expressions) are used with the meaning indicated:*

Flip chip bonding method	<p>metal bumps are formed on the surface of a chip, then the chip is faced down onto metal pads of a substrate/printed circuit board and by soldering/pressing/ thermosonic or ultrasonic bumps and pads are connected (see <a href="#">H01L 21/00</a>, <a href="#">H01L 23/00</a>, <a href="#">H01L 25/00</a> )</p> <p>See: US6168972, US2004217472, WO03050865</p>
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## H01Q 21/0093

[N: Monolithic arrays]

### Definition statement

*This subclass/group covers:*

Using monolithic techniques to produce the array: upcoming technology  
ceramic cofiring technologies.

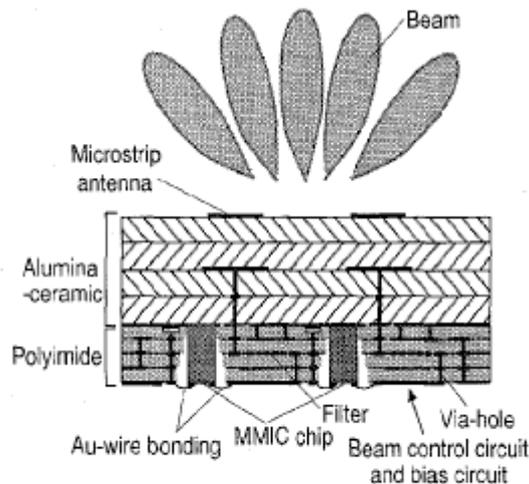


Fig. 1 Schematic diagram of proposed three dimension active antenna

## H01Q 21/06

**Arrays of individually energised active aerial units similarly polarised and spaced apart**

### Definition statement

*This subclass/group covers:*

This class only specifies the array GEOMETRY, not how they are fed, or whether the array is a phased array; for the latter, see [H01Q 3/26](#) and subgroups.

## H01Q 21/061

[N: Two dimensional planar arrays]

### Definition statement

*This subclass/group covers:*

Two-dimensional array.

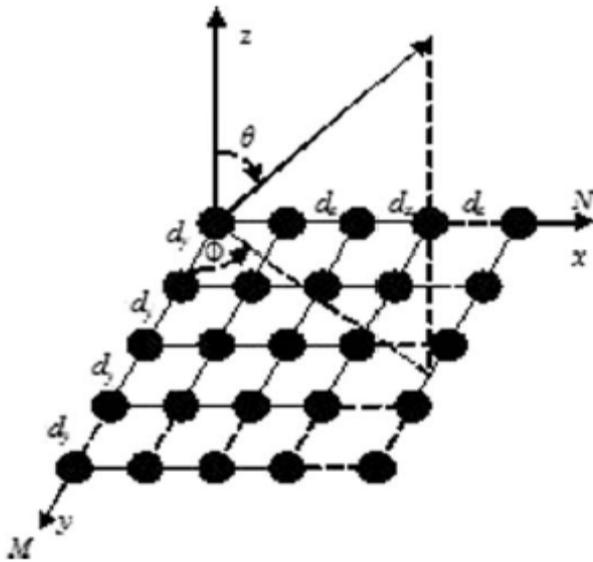


Fig. 1. Structure of a uniform planar antenna array.

## H01Q 21/062

[N: using dipole aerials; ([H01Q 21/067](#), [H01Q 21/068](#) take precedence)]

### Definition statement

*This subclass/group covers:*  
2D dipole array.

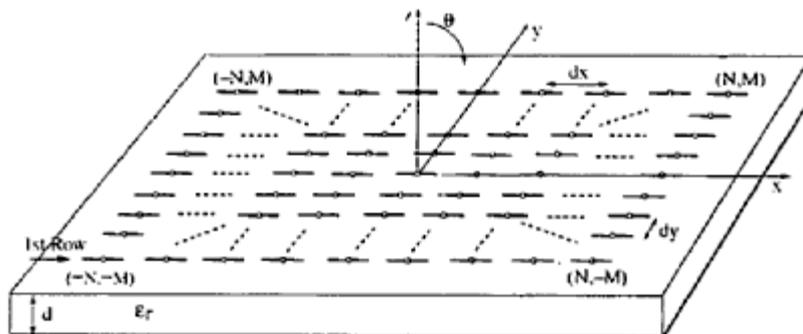


Fig. 1. Finite array of printed dipoles on a grounded substrate of infinite extent.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

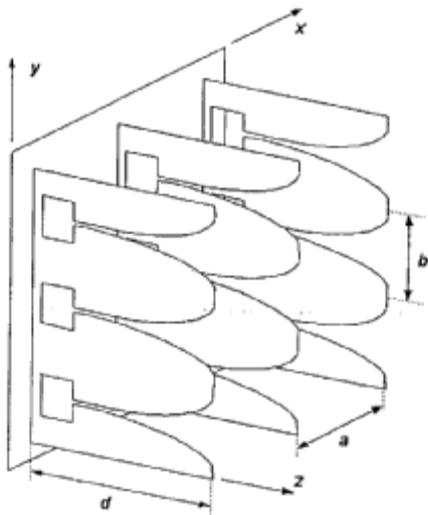
using dipole aerials	<a href="#">H01Q 21/067</a> , <a href="#">H01Q 21/068</a>
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## H01Q 21/064

[N: using horn or slot aeralis (slotted waveguides arrays [H01Q 21/005](#))]

### Definition statement

*This subclass/group covers:*  
2D slot/horn array, includes vivaldi elements.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

slotted waveguides arrays	<a href="#">H01Q 21/005</a>
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## H01Q 21/065

[N: Patch antenna array]

### Definition statement

*This subclass/group covers:*  
2D array of patches.

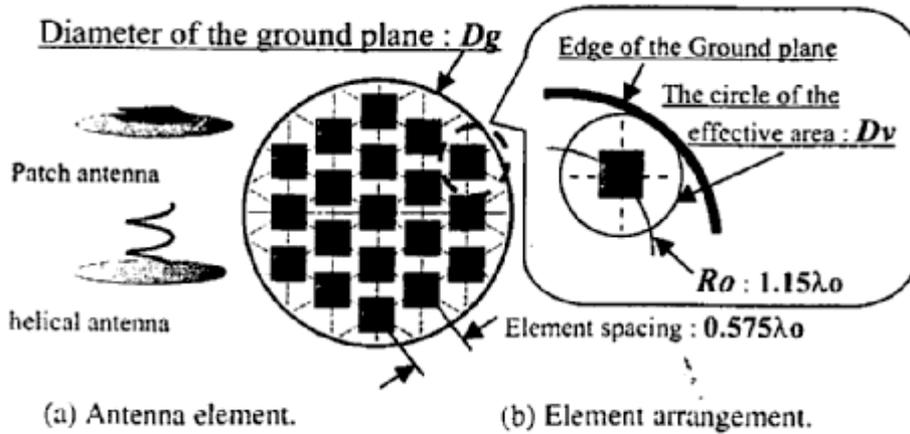


Fig. 1 Triangle arrangement array antenna.

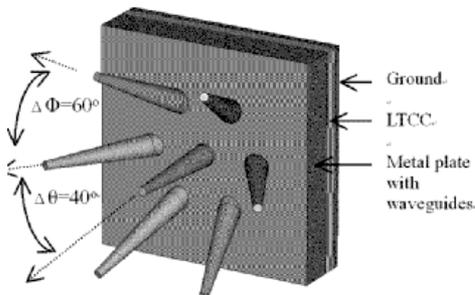
## H01Q 21/067

[N: using endfire radiating aerial units transverse to the plane of the array]

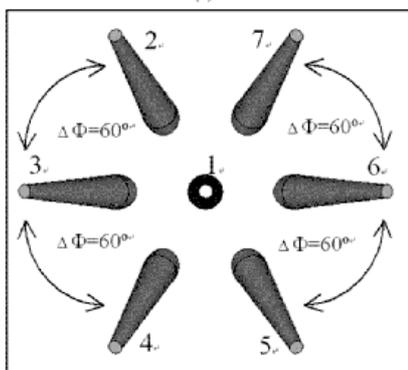
### Definition statement

*This subclass/group covers:*

Specific end-fire type of elements, e.g. rod antennas, helical antennas.



(a)



(b)

## H01Q 21/068

[N: using parallel coplanar travelling wave or leaky wave aerial units ([H01Q 21/065](#) takes precedence)]

### Definition statement

*This subclass/group covers:*

Arrays of travelling wave or leaky wave units.

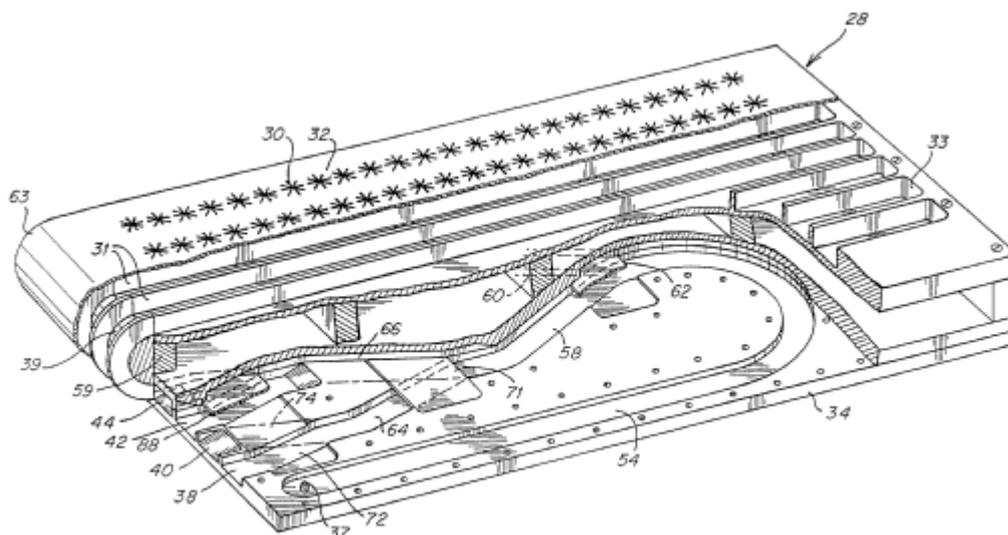


Fig 2

### References relevant to classification in this subclass

*This subclass/group does not cover:*

using parallel coplanar travelling wave or leaky wave aerial units	<a href="#">H01Q 21/065</a>
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### H01Q 21/08

the units being spaced along or adjacent to a rectilinear path  
[N: (waveguide fed [H01Q 21/0037](#))]

### Definition statement

*This subclass/group covers:*

A one-dimensional array of elements whose corresponding points lie along a straight line.

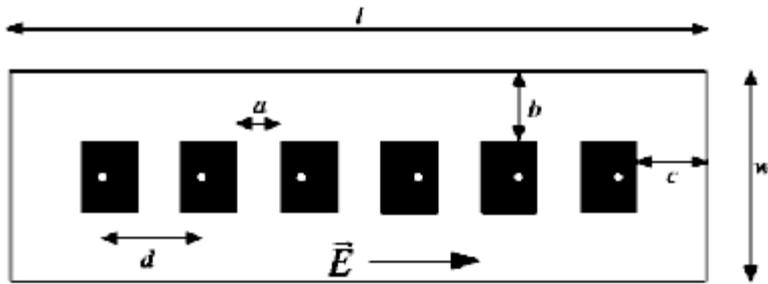


Fig. 1. Microstrip antenna array layout with element spacing  $d$ . The backside of the substrate plate is fully metallized with copper. The feed probe is zoomed to be clearly visible.

## References relevant to classification in this subclass

*This subclass/group does not cover:*

the units being spaced along or adjacent to a rectilinear path	<a href="#">H01Q 21/0037</a>
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## Synonyms and Keywords

*In patent documents the following expression/words "linear array antenna" and "uniform linear array" are often used as synonyms.*

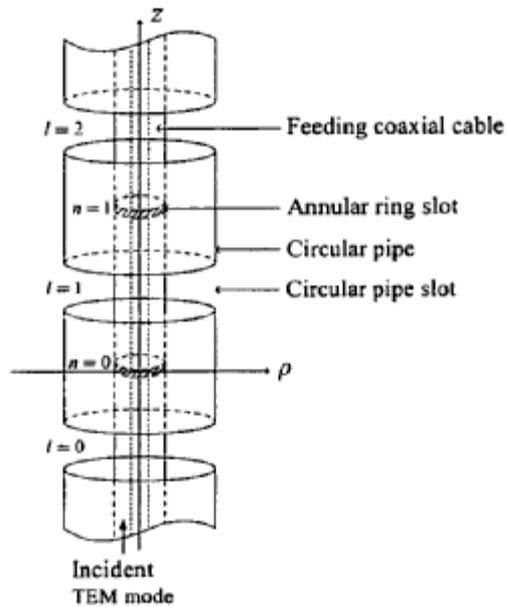
## H01Q 21/10

**Collinear arrangements of substantially straight elongated conductive units**

### Definition statement

*This subclass/group covers:*

A linear array of radiating elements, usually dipoles, with their axis lying in a straight line.



**Fig.1** Structure of ECCD array antenna. The number of annular ring slots is  $N$  ( $n = 0, 1, \dots, N - 1$ ) and the number of circular pipe slots is  $L = N + 1$  ( $l = 0, 1, \dots, N$ ).

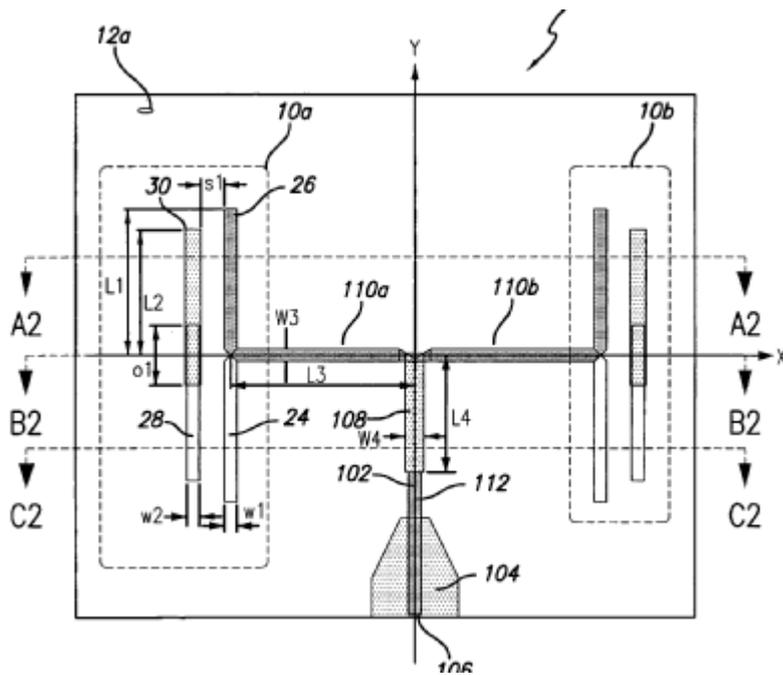
## H01Q 21/12

Parallel arrangements of substantially straight elongated conductive units (travelling-wave aerials comprising transmission line loaded with transverse elements, e.g. "fishbone" aerial [H01Q 11/04](#))

### Definition statement

*This subclass/group covers:*

For example:



### References relevant to classification in this subclass

*This subclass/group does not cover:*

travelling-wave aerials comprising transmission line loaded with transverse elements, e.g. "fishbone" aerial	<a href="#">H01Q 11/04</a>
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### Special rules of classification within this group

Inactive group.

## H01Q 21/14

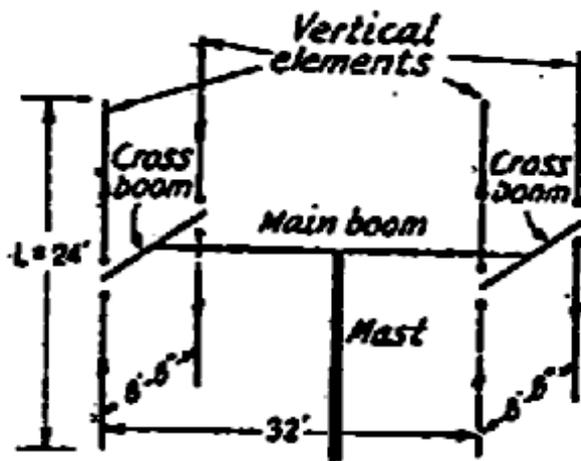
### Adcock aerials

#### Definition statement

*This subclass/group covers:*

A pair of vertical antennas separated by a distance of one-half wavelength or less, and connected in phase opposition to produce a radiation pattern having the shape of the figure eight in all planes containing the centers of the two antennas.

Two vertical elements fed by 180° apart and mounted so that the system may be rotated; used for direction finding.



**Fig. 1 – Basic arrangement of the antenna.**

**H01Q 21/16**

U-type

**Special rules of classification within this group**

Inactive group.

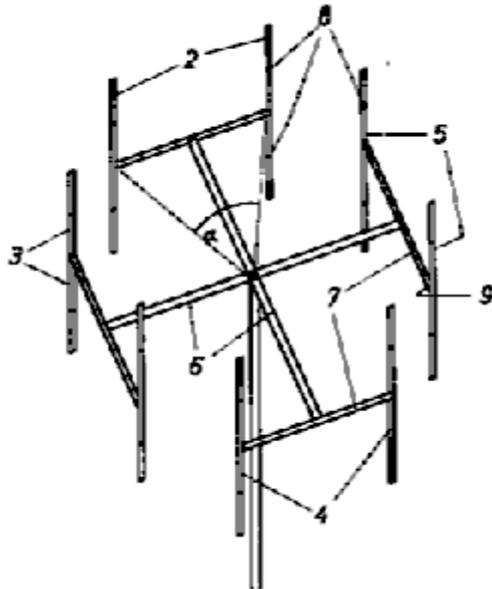
**H01Q 21/18**

H-type

**Definition statement**

*This subclass/group covers:*

For example:



### Special rules of classification within this group

Inactive group.

### H01Q 21/20

the units being spaced along or adjacent to a curvilinear path  
[N: slotted waveguide arrays [H01Q 21/005](#); circularly or helically slotted waveguides [H01Q 21/0062](#)]

### Definition statement

*This subclass/group covers:*

An array of elements whose corresponding points lay on a circle, or a part thereof, e.g. an arc.

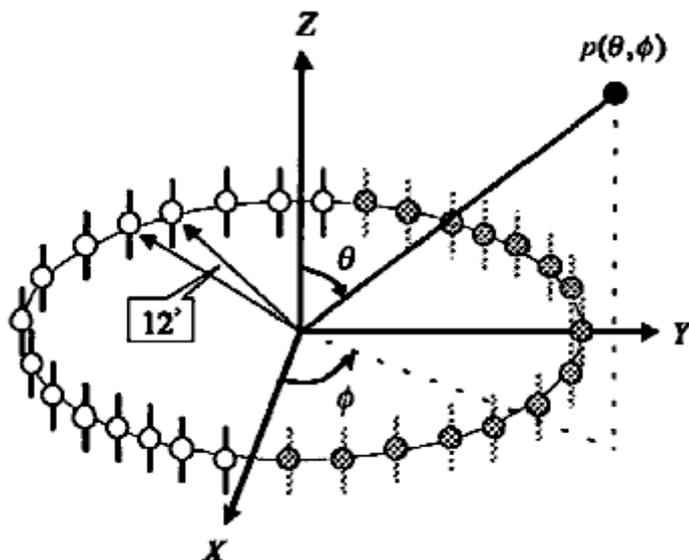


Fig. 2

### References relevant to classification in this subclass

*This subclass/group does not cover:*

slotted waveguide arrays	<a href="#">H01Q 21/005</a>
circularly or helically slotted waveguides	<a href="#">H01Q 21/0062</a>

### Synonyms and Keywords

*In patent documents the following expression/words "ring arrays" circular arrays", "conical array", "cylindrical array" and "spherical array" are often used as synonyms.*

### H01Q 21/205

**[N: providing an omnidirectional coverage (turnstile aeri**  
[H01Q 21/26\)](#)]

### Definition statement

*This subclass/group covers:*

Radiating in all directions simultaneously.

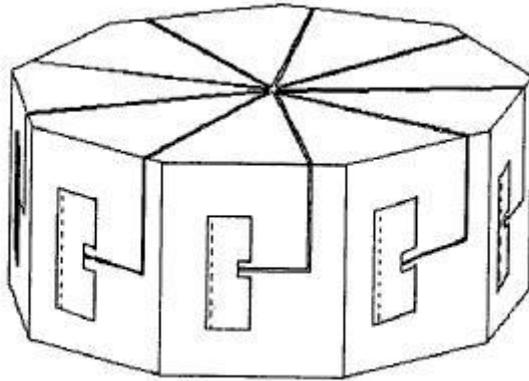
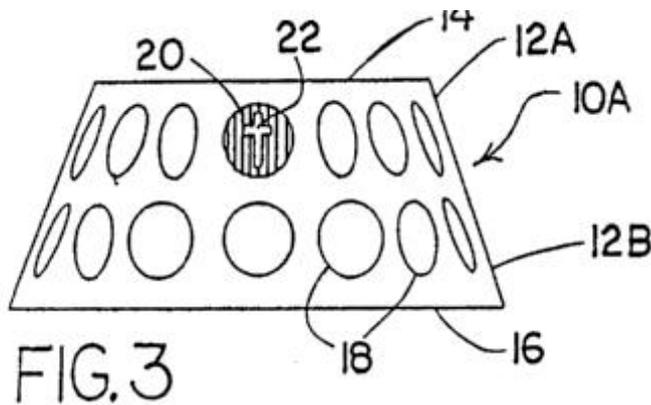


Fig.7 Regular nine-prism array.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

turnstile aerials	<a href="#">H01Q 21/26</a>
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### H01Q 21/22

**Aerial units of the array energised non-uniformly in amplitude or phase, e.g. tapered array, binomial array**

#### Definition statement

*This subclass/group covers:*

An antenna that is designed to have a prescribed pattern shape differing significantly from the obtained from a uniform-phase aperture of the same size. not-equally or non-equally amplitude or phase; shaped-beam antenna.

Also arrays where the elements are not located in a regular arrangement but e.g. randomly or thinned ; not-equally spaced.

Space-tapered or density-tapered array, that is an array antenna whose radiation pattern is shaped by varying the density of driven radiating elements

over the array surface.

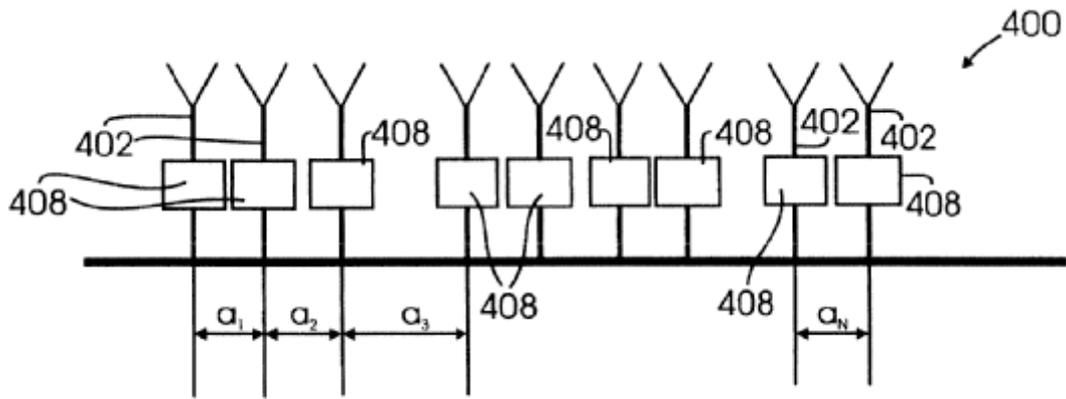


Fig.4

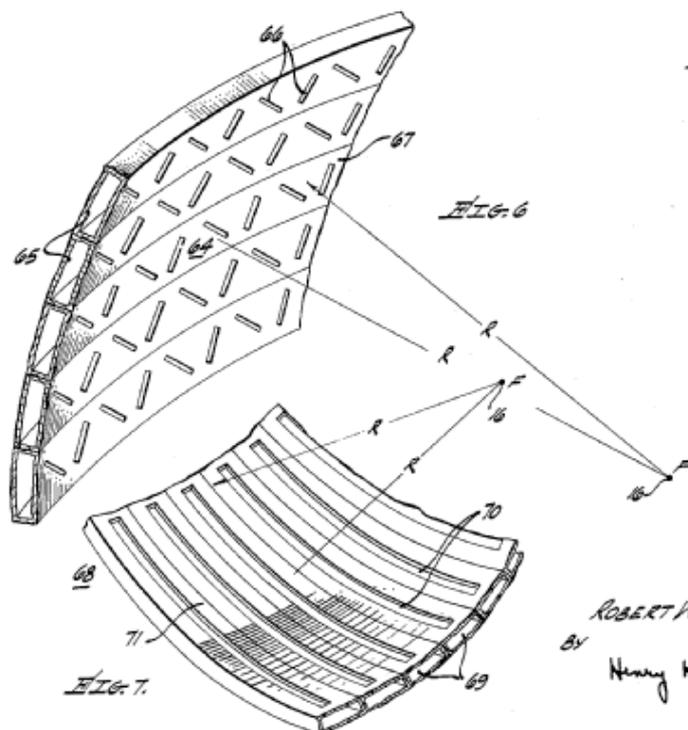
## H01Q 21/225

[N: Finite focus antenna arrays]

### Definition statement

*This subclass/group covers:*

Zooming antennas, or near-field focusing antennas. Inactive group.



## H01Q 21/24

Combinations of aerial elements or aerial units polarised in

different directions for transmitting or receiving circularly and elliptically polarised waves or waves linearly polarised in any direction [N: (circularly polarised patch antennas [H01Q 9/0428](#); circularly polarised horns [H01Q 13/0241](#); cross-polarised horns [H01Q 13/0258](#); polarisation converters [H01Q 15/242](#); cross-polarised rear feeds [H01Q 19/136](#); crossed polarisation dual antenna [H01Q 25/001](#))]

### Definition statement

*This subclass/group covers:*

The ability to radiate different polarisations.

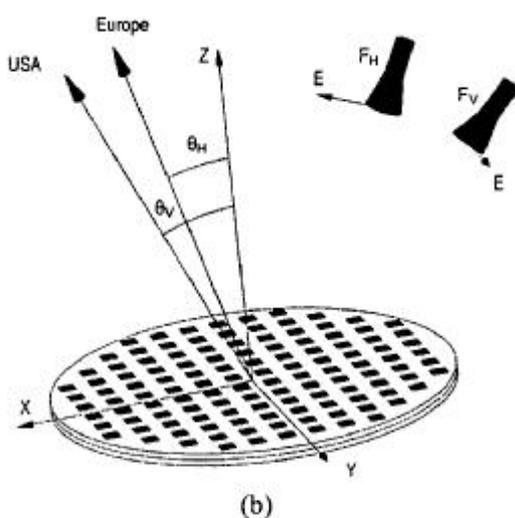


Fig. 1. Dual-polarization dual-coverage three-layer reflectarray. (a) Periodic cell. (b) Reflectarray configuration.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

circularly polarised patch antennas	<a href="#">H01Q 9/0428</a>
circularly polarised horns	<a href="#">H01Q 13/0241</a>
cross-polarised horns	<a href="#">H01Q 13/0258</a>
cross-polarised rear feeds	<a href="#">H01Q 15/242</a>
crossed polarisation dual antenna	<a href="#">H01Q 19/136</a>
crossed polarisation dual antenna	<a href="#">H01Q 25/001</a>

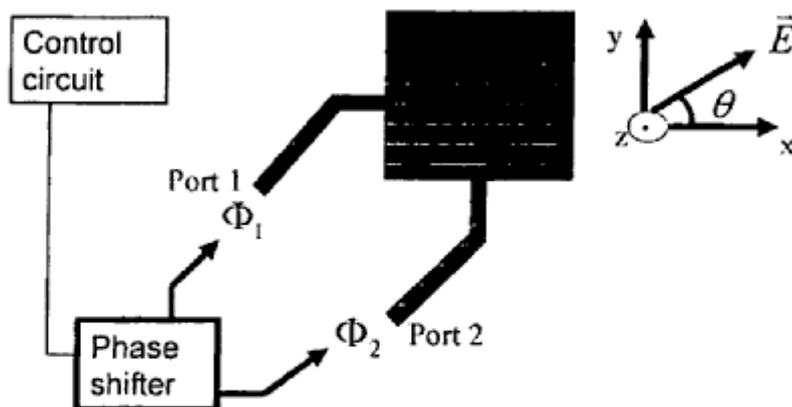
## H01Q 21/245

[N: provided with means for varying the polarisation (polarising devices [H01Q 15/24](#); tracking by comparing linear polarisation compounds [G01S 3/146](#); reducing depolarisation effects [H04B 7/00](#) polarisation diversity [H04B 7/10](#))]

### Definition statement

*This subclass/group covers:*

Variable polarisation, adaptive polarisation.



**Figure 3. A polarization-agile microstrip-patch antenna with a switchable phase shifter.**

### References relevant to classification in this subclass

*This subclass/group does not cover:*

polarising devices	<a href="#">H01Q 15/24</a>
tracking by comparing linear polarisation compounds	<a href="#">G01S 3/146</a>
reducing depolarisation effects	<a href="#">H04B 7/00</a>
polarisation diversity	<a href="#">H04B 7/10</a>

## H01Q 21/26

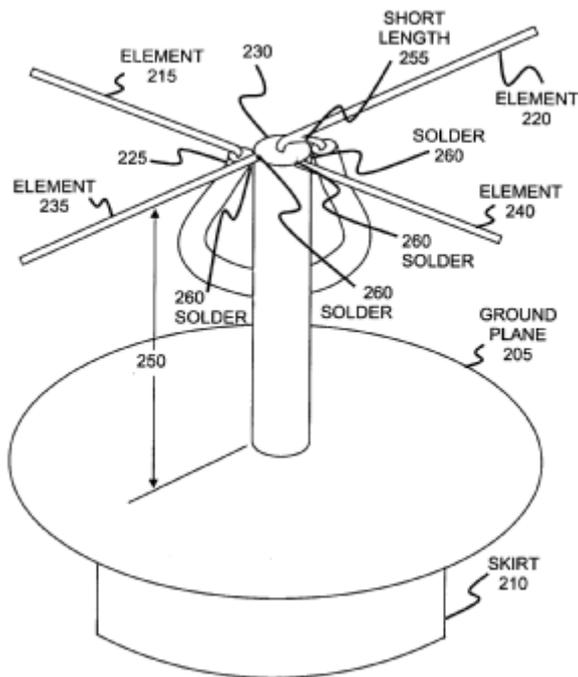
Turnstile or like aerials comprising arrangements of three or more elongated elements disposed radially and symmetrically

in a horizontal plane about a common centre

### Definition statement

*This subclass/group covers:*

An antenna composed of two dipole antennas, perpendicular to each other, with their axes intersecting at their midpoints. Usually, the currents on the two dipole antennas are equal and in phase quadrature.



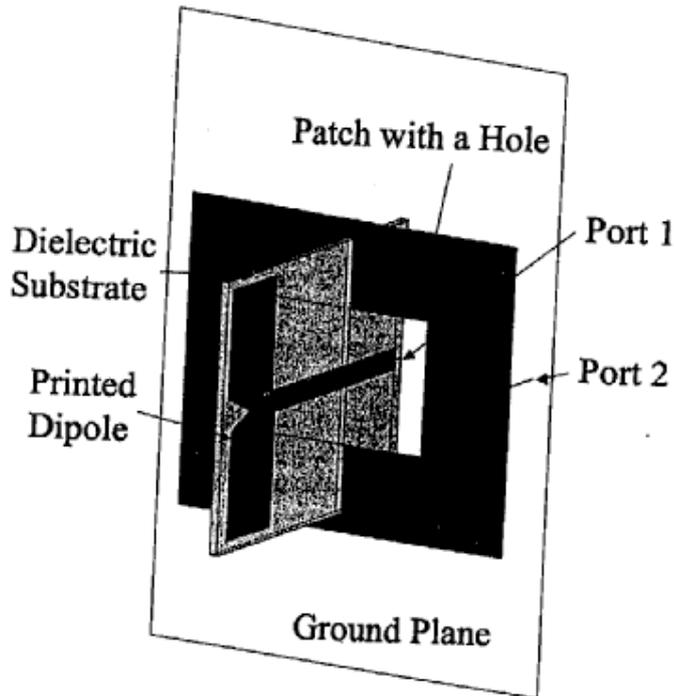
### H01Q 21/28

Combinations of substantially independent non-interacting aerial units or systems [N: (multiple beam [H01Q 25/00](#))]

### Definition statement

*This subclass/group covers:*

Multiple antennas or antenna arrays defining an antenna system, but not having any relationship except being defined as part of the antenna system.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

Combinations of substantially independent non-interacting aerial units or systems	<a href="#">H01Q 25/00</a>
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### H01Q 21/29

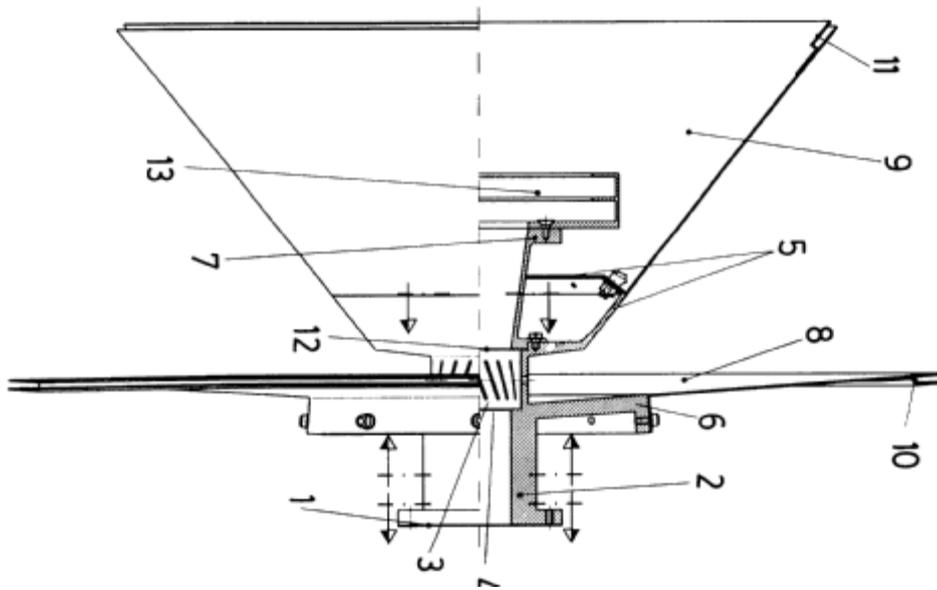
**Combinations of different interacting aerial units for giving a desired directional characteristic ([H01Q 25/00](#) takes precedence)**

#### Definition statement

*This subclass/group covers:*

For example used for pattern synthesis; this class is NOT used for diversity applications ([H04B 7/08](#) and subgroups).

If the antennas defining the system do not operate on the same frequency, this class does not apply.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

Combinations of different interacting aerial units for giving a desired directional characteristic	<a href="#">H01Q 25/00</a>
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### H01Q 21/293

[N: one unit or more being an array of identical aerial elements (adaptive arrays [H01Q 3/2605](#))]

### Definition statement

*This subclass/group covers:*

One of the constituents is an array.

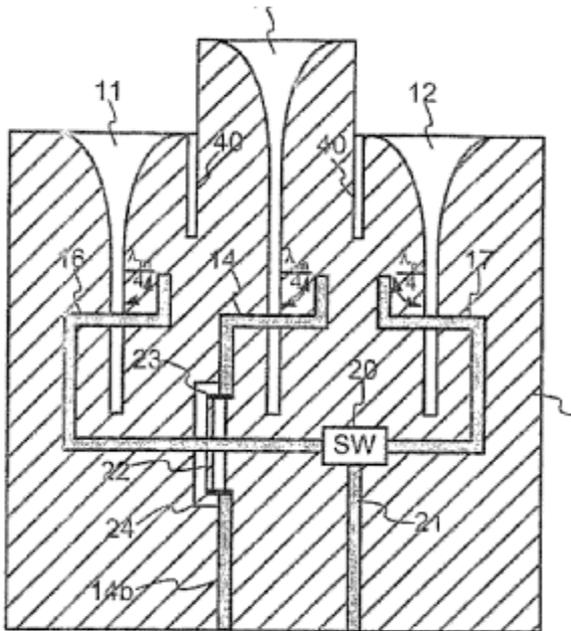


Fig.3

### References relevant to classification in this subclass

*This subclass/group does not cover:*

one unit or more being an array of identical aerial elements	<a href="#">H01Q 3/2605</a>
--	-----------------------------

### H01Q 21/296

[N: Multiplicative arrays]

#### Definition statement

*This subclass/group covers:*

Form of a signal processing antenna system having circuit elements associated with its radiating element(s) that perform functions such as multiplication, storage, correlation, and time modulation of the input signals

Data processing is used for achieving the final pattern.

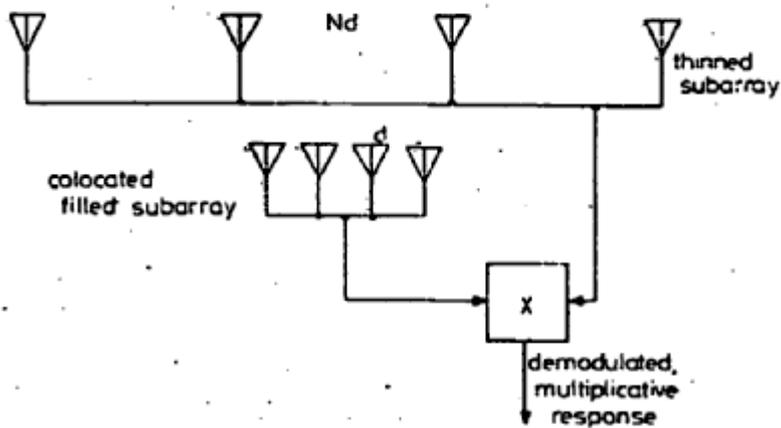


Fig. 2 Thinned multiplicative array configuration with coincident subarrays

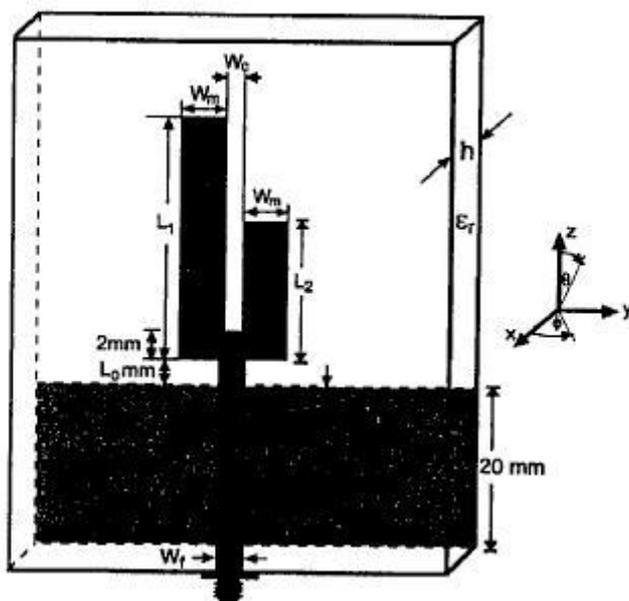
## H01Q 21/30

Combinations of separate aerial units operating in different wavebands and connected to a common feeder system

### Definition statement

*This subclass/group covers:*

Separate antennas operating at different frequencies sharing a feeder system (or feed point). This leads to isolation problems.



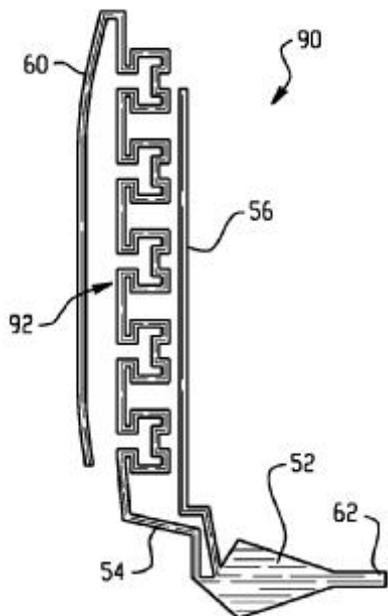
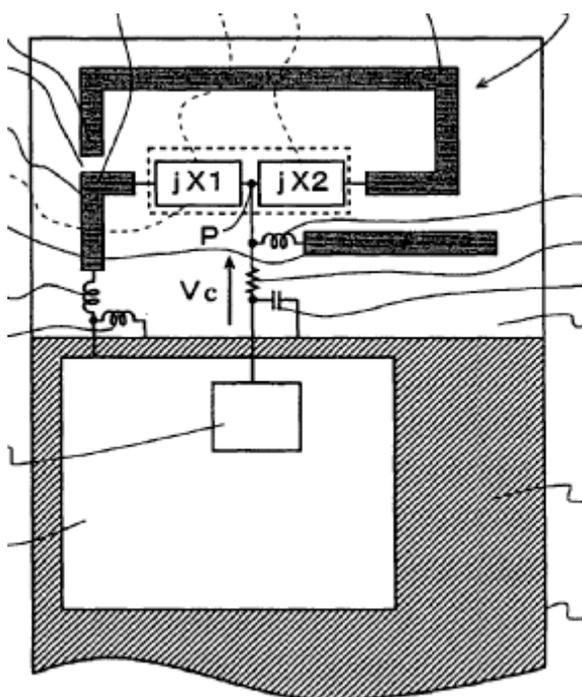


Fig. 6



## H01Q 23/00

**Aerials with active circuits or circuit elements integrated within them or attached to them**

### **Definition statement**

*This subclass/group covers:*

Only used in conjunction with another class, and to emphasize there is active circuitry integrated, or mounted at the antenna, e.g. amplifiers, mixers, etc. Not used on its own.

## H01Q 25/00

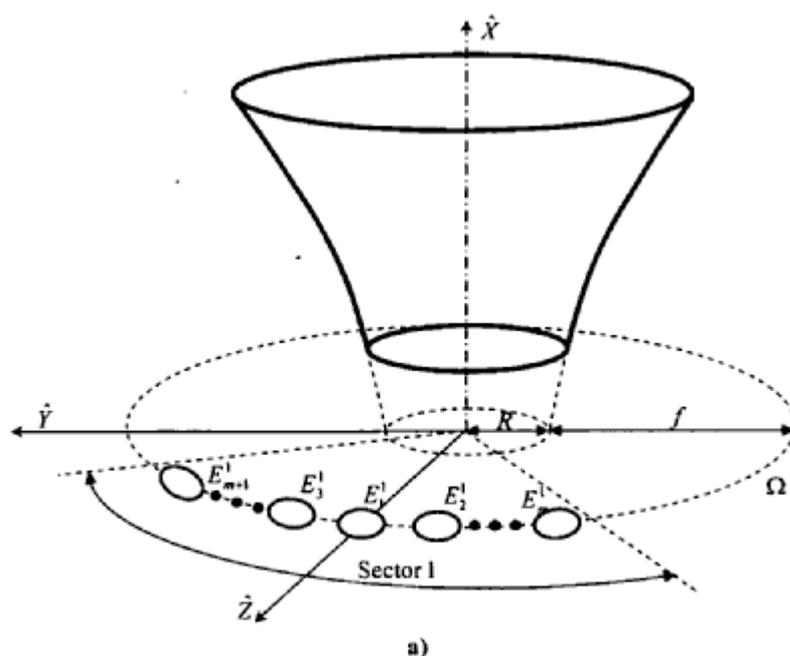
**Aerials or aerial systems providing at least two radiating patterns (arrangements for changing or varying the orientation or the shape of the directional pattern [H01Q 3/00](#))**

### Definition statement

*This subclass/group covers:*

An antenna capable of creating a family of major lobes from a single non-moving aperture, through use of a multiport feed, with one-to-one correspondence between input ports and member lobes, the latter characterized by having unique main beam pointing directions.

Often, the multiple main beam angular positions are arranged to provide complete coverage of a solid angle region of space.



### Informative references:

Attention is drawn to the following places, which may be of interest for search:

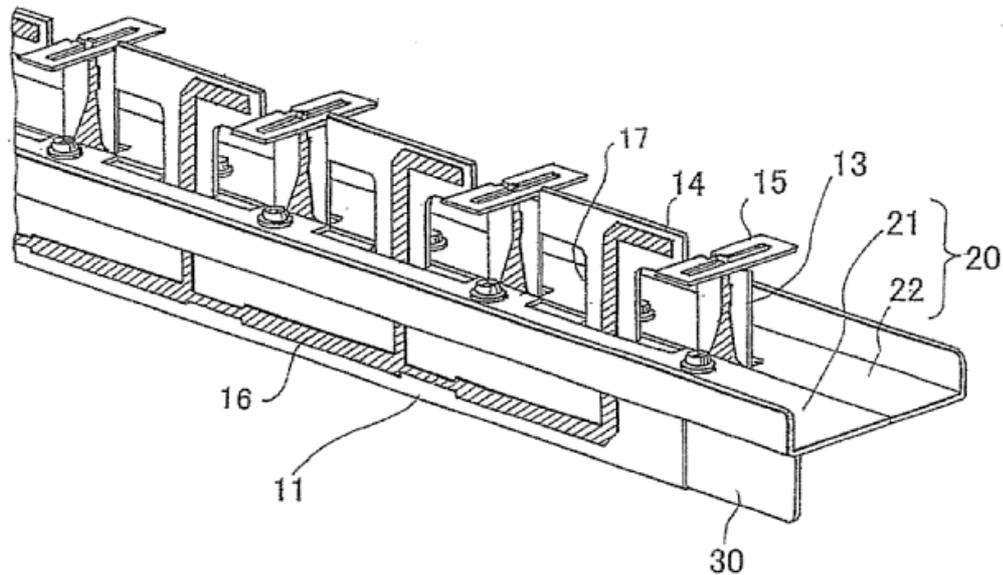
Arrangements for changing or varying the orientation or the shape of the directional pattern	<a href="#">H01Q 3/00</a>
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## H01Q 25/001

[N: Crossed polarisation dual antennas (orthomode horns [H01Q 13/0258](#); cross-polarised rear feeds [H01Q 19/136](#); orthomode transducers [H01P 1/161](#))]

### Definition statement

*This subclass/group covers:*



### References relevant to classification in this subclass

*This subclass/group does not cover:*

orthomode horns	<a href="#">H01Q 13/0258</a>
cross-polarised rear feeds	<a href="#">H01Q 19/136</a>
orthomode transducers	<a href="#">H01P 1/161</a>

## H01Q 25/002

[N: providing at least two patterns of different beamwidth;  
Variable beamwidth antennas]

### Definition statement

*This subclass/group covers:*

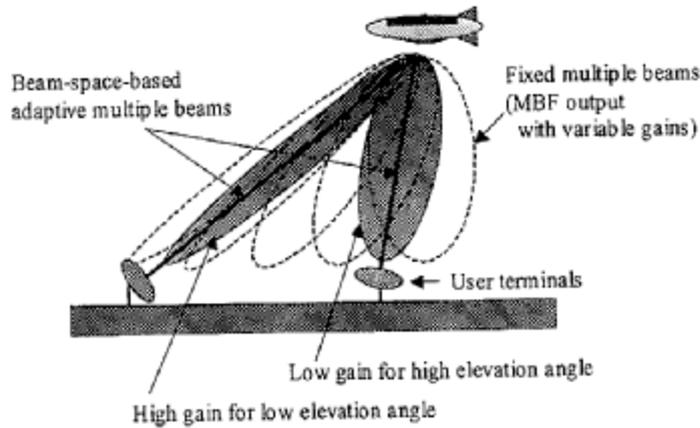


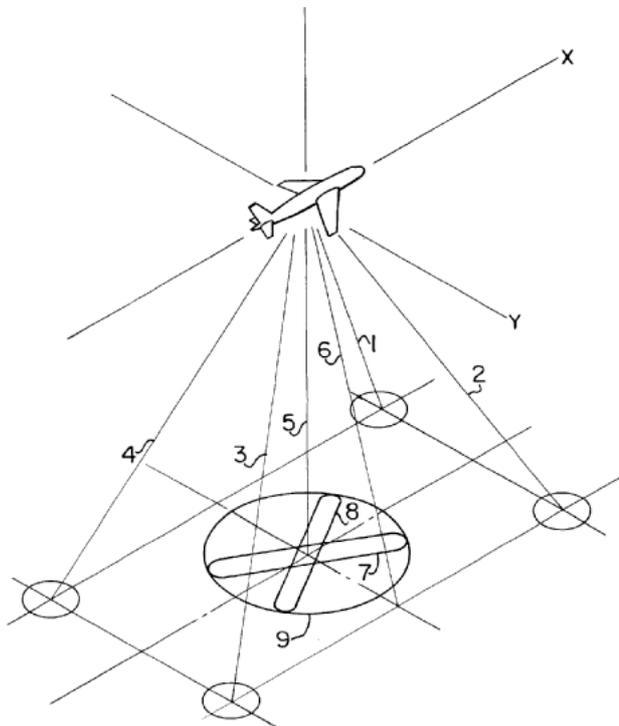
Fig. 5 The concept of variable gain according to the elevation angle

## H01Q 25/004

[N: providing two or four symmetrical beams for Janus application]

### Definition statement

*This subclass/group covers:*

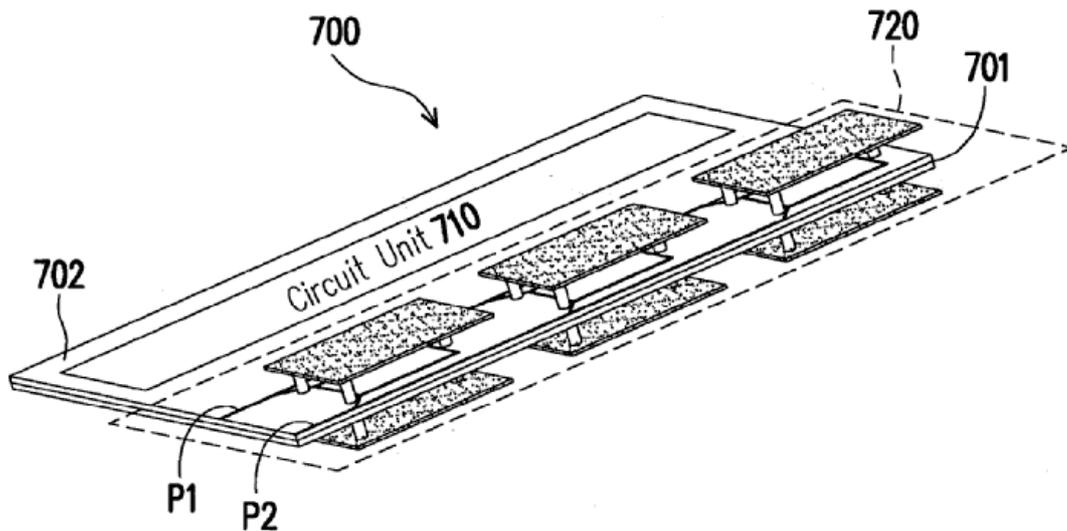


## H01Q 25/005

[N: providing two patterns of opposite direction; back to back antennas ([H01Q 25/004](#) takes precedence)]

## Definition statement

*This subclass/group covers:*



## References relevant to classification in this subclass

*This subclass/group does not cover:*

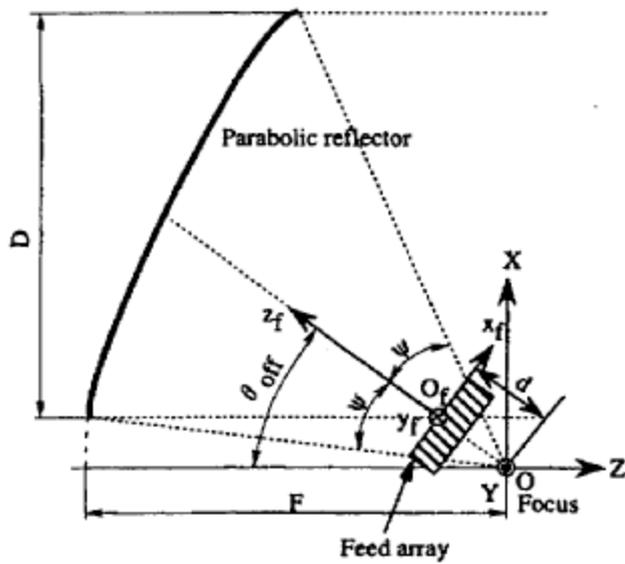
providing two patterns of opposite direction; back to back antennas	<a href="#">H01Q 25/004</a>
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## H01Q 25/007

[N: using two or more primary active elements in the focal region of a focusing device (for operation on different wavebands **H01Q5/00C2**)]

## Definition statement

*This subclass/group covers:*



(a) Configuration of antenna.

### References relevant to classification in this subclass

*This subclass/group does not cover:*

for operation on different wavebands	<b>H01Q5/00C2</b>
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### **H01Q 25/008**

[N: lens fed multibeam arrays]

### Definition statement

*This subclass/group covers:*

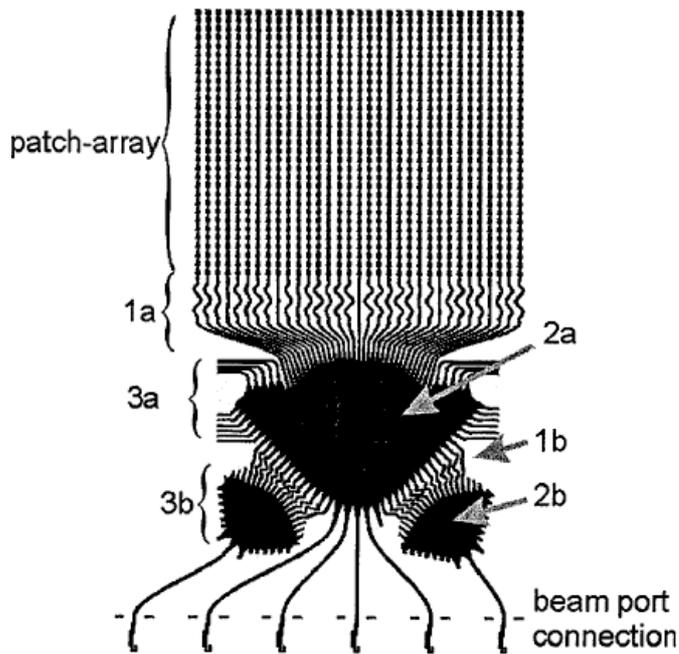


Figure 2: 77GHz multiresolutional microstrip antenna for ACC and cut-in detection; (1) delay network, (2) parallel-plate waveguide. (3) dummy

## H01Q 25/02

providing sum and difference patterns (multimode aerials  
[H01Q 25/04](#))

### Definition statement

*This subclass/group covers:*

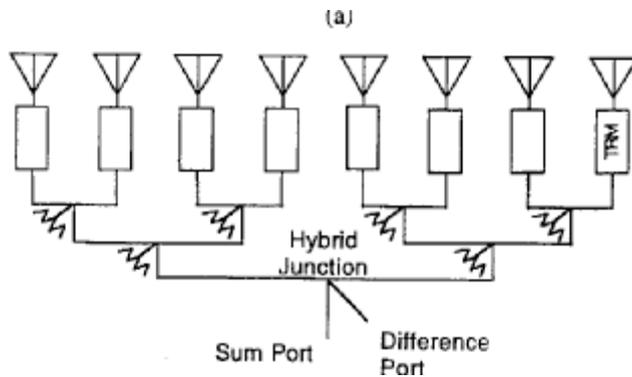
Sum pattern: a radiation pattern characterized by a single main lobe whose cross section is essentially elliptical, and a family of side lobes the latter usually at a relatively low level.

Difference pattern: a radiation pattern characterized by a pair of main lobes of opposite phase, separated by a single null, plus a family of side lobes, the latter usually desired to be at a low level.

Antennas used in many radar applications are capable of producing a sum pattern and two orthogonal difference patterns, the difference pattern can be employed to determine the position of a target in a right/left and up/down sense by the antenna pointing, which places the target in the null between the twin lobes of each difference pattern.

Radar system is called monopulse radar system because direction-finding information is obtainable from a single pulse A monopulse receiving system includes a monopulse circuit which receives signals from the antenna and forms sum and difference monopulse output signals. The sum and difference signals are formed by combining received antenna signals in a particular manner. The signals can be combined using circuits referred to as hybrid

circuits. The monopulse sum and difference signals can be formed either at the transmitted signal frequency or, after down conversion of a return signal, at a lower frequency.



### References relevant to classification in this subclass

*This subclass/group does not cover:*

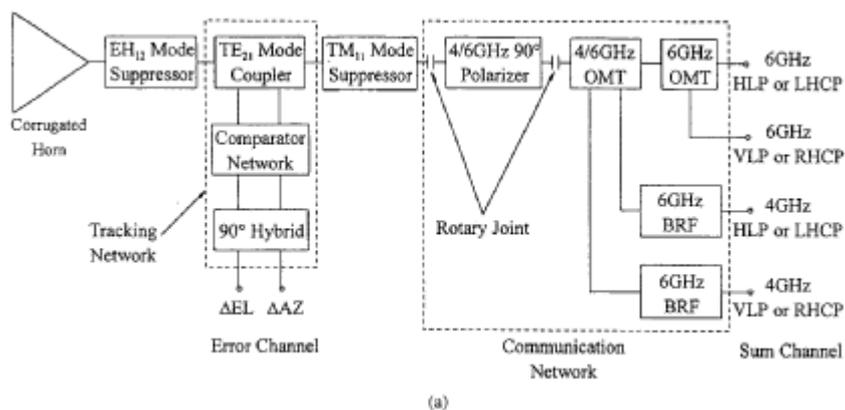
multimode aerials	<a href="#">H01Q 25/04</a>
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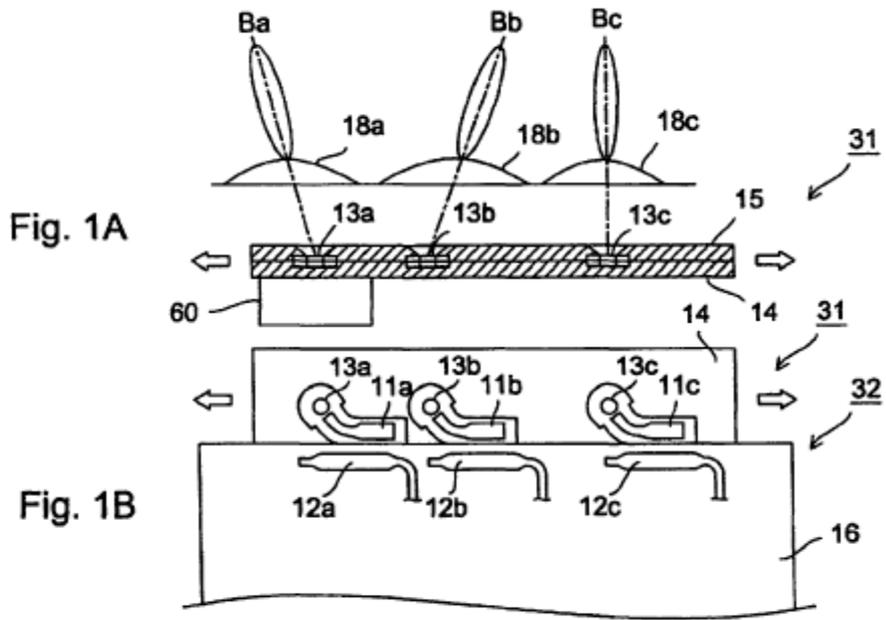
### H01Q 25/04

Multimode aerials [N: (corrugated horns [H01Q 13/0208](#))]

### Definition statement

*This subclass/group covers:*





**References relevant to classification in this subclass**

*This subclass/group does not cover:*

corrugated horns	<a href="#">H01Q 13/0208</a>
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