

## B64G

### COSMONAUTICS; VEHICLES OR EQUIPMENT THEREFOR

#### Definition statement

*This place covers:*

- Cosmonautic vehicles.
- Observing or tracking cosmonautic vehicles.
- Tools specially adapted for use in space.
- Space suits.
- Simulating cosmonautic conditions.
- Cosmonautics not otherwise provided for.

#### References

##### Informative references

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

Apparatus for, or methods of, winning materials from extraterrestrial sources	<a href="#">E21C 51/00</a>
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## B64G 1/00

### Cosmonautic vehicles

#### Definition statement

*This place covers:*

Satellites and other vehicles intended for use in space or on other celestial bodies.

Components specially adapted therefor.

## B64G 1/002

### {Launch systems}

#### Definition statement

*This place covers:*

Systems for launching spacecraft, e.g. rockets.

Space elevators.

#### References

##### Informative references

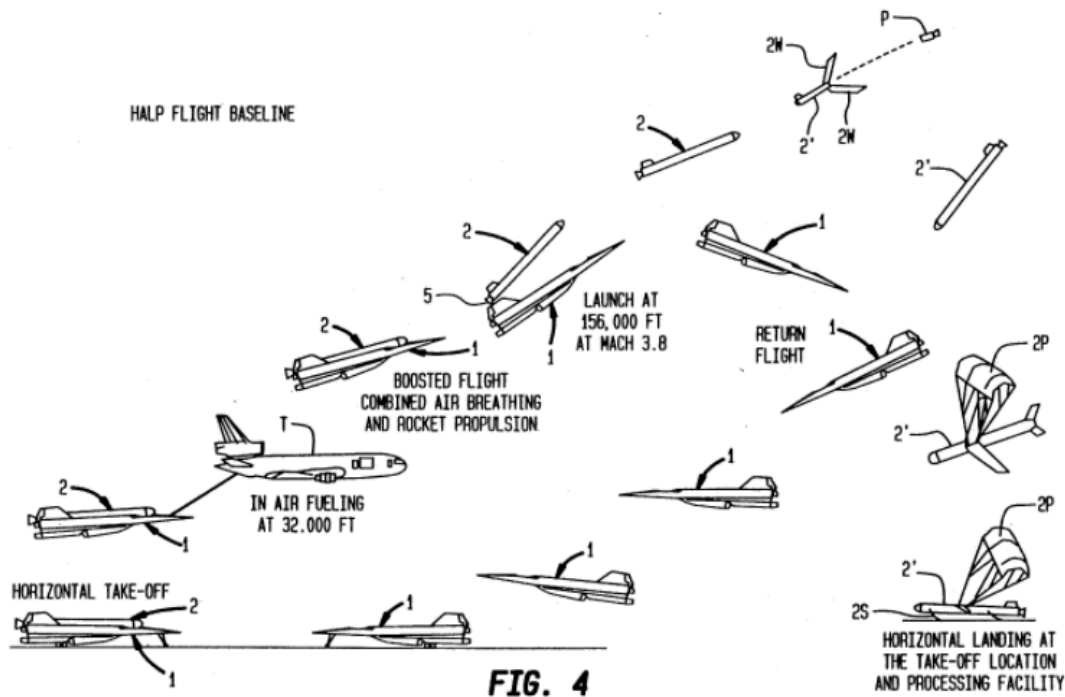
*Attention is drawn to the following places, which may be of interest for search:*

Payload connectors	<a href="#">B64G 1/641</a>
Separators	<a href="#">B64G 1/645</a>
Rockets	<a href="#">F42B 15/00</a>

**B64G 1/005****{Air launch}****Definition statement***This place covers:*

Launching using aircraft.

Illustrative example of subject matter classified in this group:

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

Flying units formed by separate aircraft	<a href="#">B64C 37/02</a>
Aircraft transported by aircraft	<a href="#">B64D 5/00</a>

**B64G 1/006****{Reusable launch rockets or boosters}****Definition statement***This place covers:*

Rockets for launching spacecraft which are intended for multiple launches.

## References

### Informative references

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

Space shuttles	<a href="#">B64G 1/14</a>
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## B64G 1/10

**Artificial satellites; Systems of such satellites; Interplanetary vehicles (space shuttles [B64G 1/14](#))**

### Definition statement

*This place covers:*

- Spacecraft characterised by the type or purpose.
- Shapes or forms of spacecraft.
- Satellite constellations.

## References

### Limiting references

*This place does not cover:*

Space shuttles	<a href="#">B64G 1/14</a>
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### Application-oriented references

*Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:*

Radio transmission active relay systems using satellites	<a href="#">H04B 7/185</a>
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### Informative references

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

Space shuttles	<a href="#">B64G 1/14</a>
Shapes or forms adapted for gravity gradient control	<a href="#">B64G 1/34</a>
Radio systems using satellites	<a href="#">H04B 7/185</a>

## B64G 1/1007

**{Communications satellites}**

### Relationships with other classification places

Communication aspects of communication satellites are classified in [H04B 7/185](#).

## B64G 1/1014

### {Navigation satellites}

#### Definition statement

*This place covers:*

Satellites for providing navigation signals, e.g. GPS.

#### References

##### *Informative references*

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

Navigation systems	<a href="#">G01S 5/145</a>
Satellite radio beacon positioning systems	<a href="#">G01S 19/00</a>

## B64G 1/1021

### {Earth observation satellites}

#### Definition statement

*This place covers:*

Satellites for observing the earth, e.g. for surveillance, meteorology or cartography.

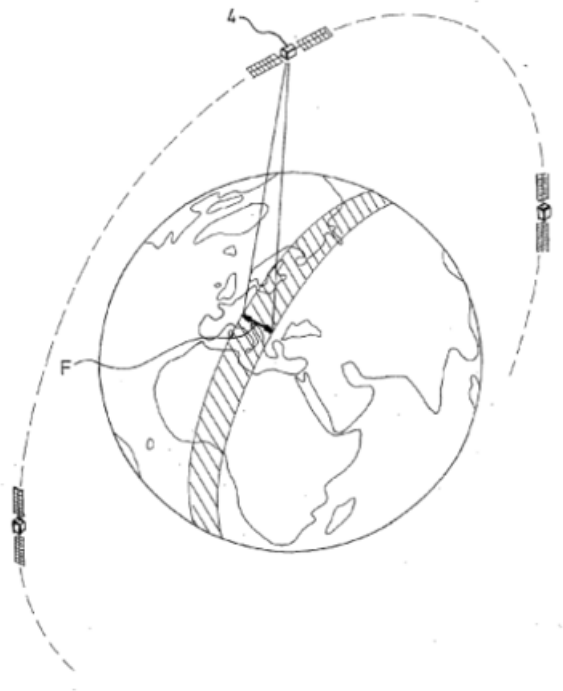
**B64G 1/1028**

{using optical means for mapping, surveying or detection, e.g. of intelligence}

**Definition statement**

*This place covers:*

Illustrative example of subject matter classified in this group:

**B64G 1/105**

{Space science}

**Definition statement**

*This place covers:*

Spacecraft specially adapted for scientific research relating to the cosmos or microgravity environments.

**B64G 1/1057**

{specifically adapted for astronomy}

**Definition statement**

*This place covers:*

For example, space telescopes.

**B64G 1/1071**

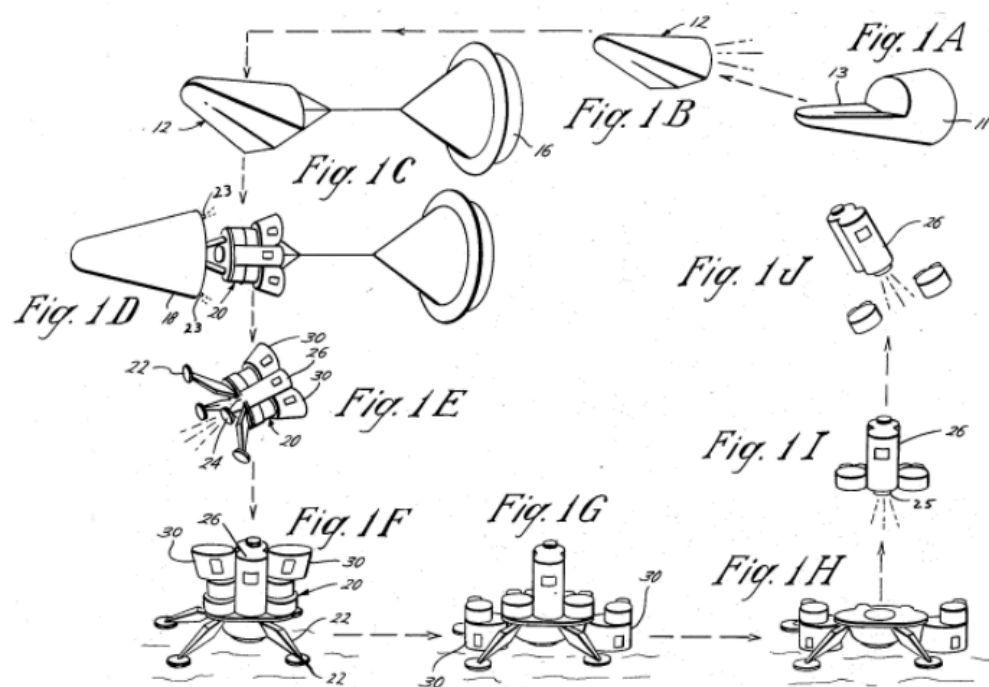
{Planetary landers intended for the exploration of the surface of planets, moons or comets}

**Definition statement**

*This place covers:*

Spacecraft which come to rest on the surface of celestial bodies other than the earth.

Illustrative example of subject matter classified in this group:

**References****Informative references**

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

Planetary rovers	<a href="#">B64G 1/16</a>
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**B64G 1/1078**

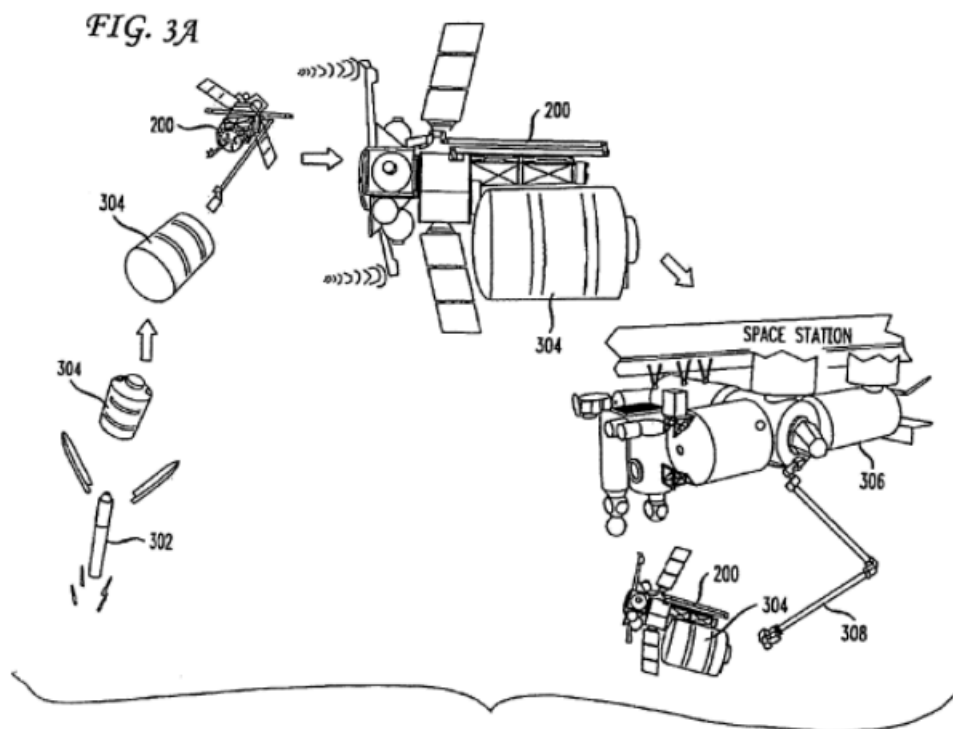
{Maintenance satellites (refueling in space [B64G 1/4024](#))}

**Definition statement**

*This place covers:*

Spacecraft for maintaining the position, attitude or operation of other spacecraft, e.g. space tugs or resupply.

Illustrative example of subject matter classified in this group:



## References

### Limiting references

*This place does not cover:*

Refueling in space	<a href="#">B64G 1/4024</a>
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## B64G 1/1081

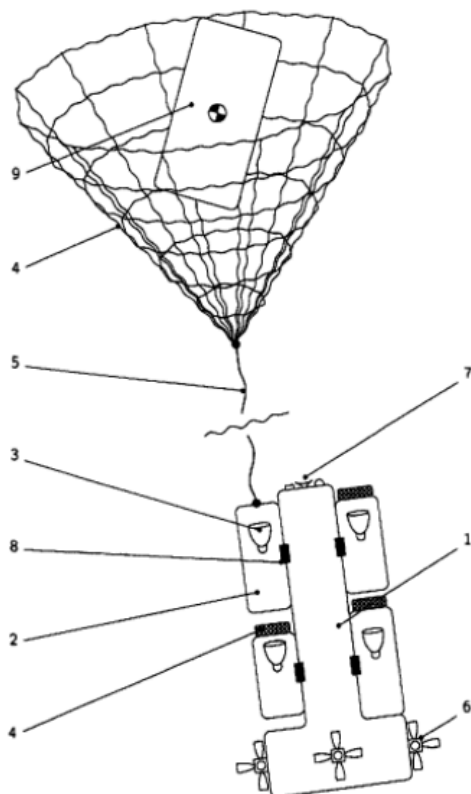
{for debris removal}

### Definition statement

*This place covers:*

Systems for clearing debris from orbit.

Illustrative example of subject matter classified in this group:



## References

### Informative references

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

Rendezvous or docking of spacecraft	<a href="#">B64G 1/646</a>
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## B64G 1/1085

### {Swarms and constellations}

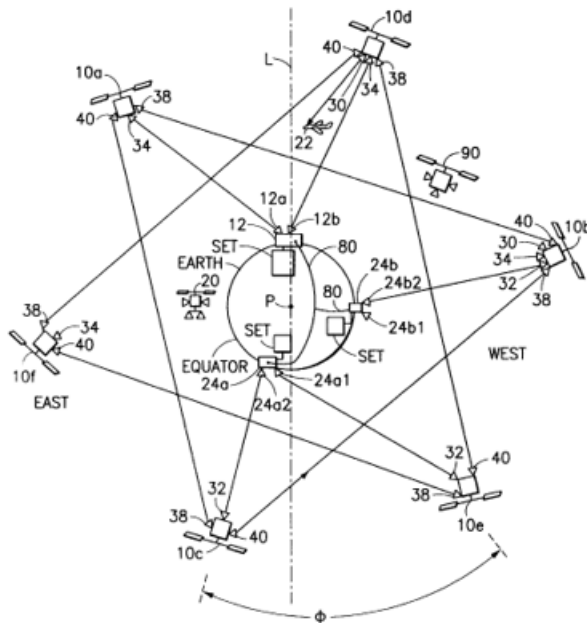
#### Definition statement

*This place covers:*

Multiple satellites in orbit working together as a system.



Illustrative example of subject matter classified in this group:



## B64G 1/12

**manned**

### Definition statement

*This place covers:*

Manned space stations and space vehicles.

### References

#### Informative references

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

Manned space shuttles	<a href="#">B64G 1/14</a>
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## B64G 1/14

**Space shuttles {(reusable launch rockets [B64G 1/006](#))}**

### Definition statement

*This place covers:*

Reusable space vehicles for transportation between the earth and space.

### References

#### Limiting references

*This place does not cover:*

Reusable launch rockets or boosters	<a href="#">B64G 1/006</a>
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B64G 1/16

Extraterrestrial cars

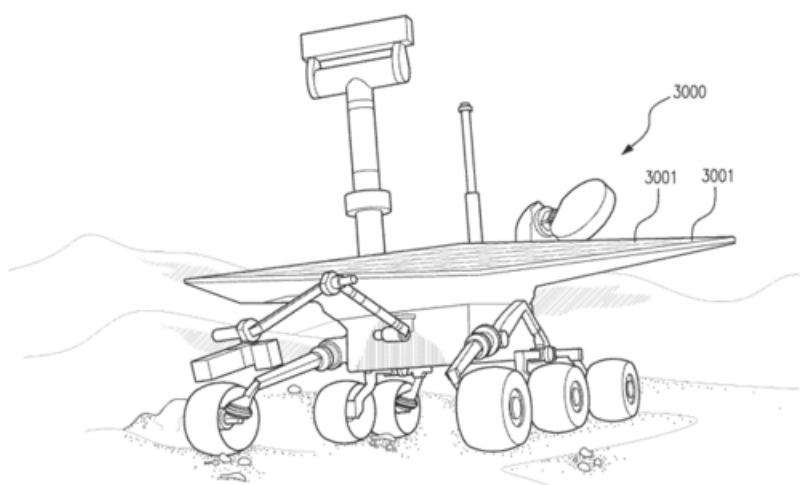
Definition statement

*This place covers:*

Manned or unmanned land vehicles specially adapted for use on other celestial bodies, e.g. Mars rovers.

Extraterrestrial air vehicles.

Illustrative example of subject matter classified in this group:



References

Informative references

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

Land vehicle aspects	<a href="#">B60 - B62</a>
Balloons	<a href="#">B64B</a>
Air vehicle aspects	<a href="#">B64C</a>

B64G 1/22

Parts of, or equipment specially adapted for fitting in or to, cosmonautic vehicles

Definition statement

*This place covers:*

Structural aspects of satellites, e.g. the frames of satellites.

References

Informative references

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

Body structures common to spacecraft and aircraft	<a href="#">B64C 1/00</a>
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**B64G 1/222**

{for deploying structures between a stowed and deployed state}

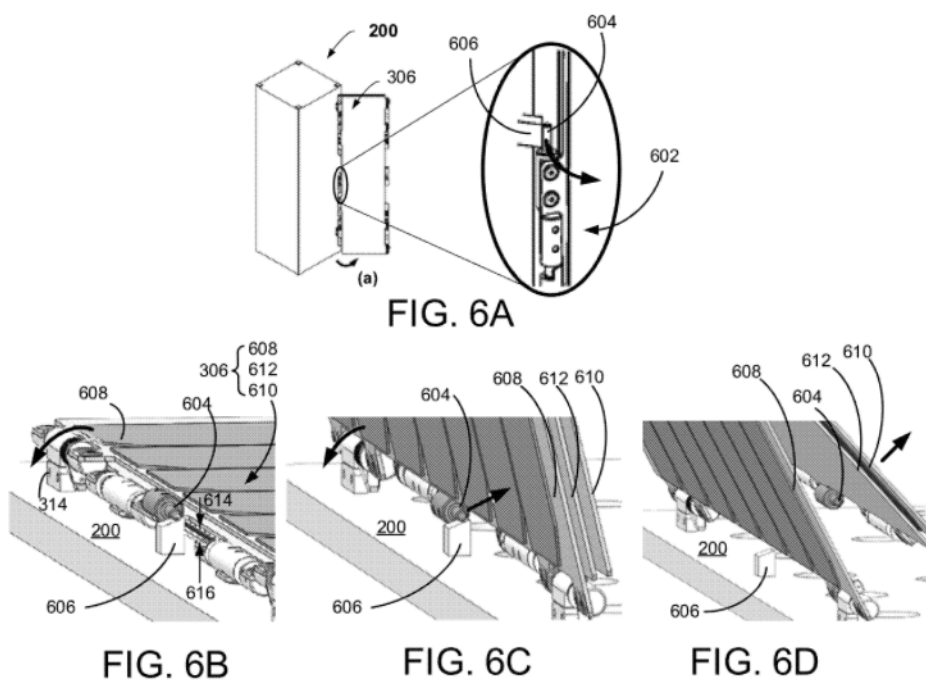
**Definition statement**

*This place covers:*

Spacecraft components which are deployed after launch from a stowed state, e.g. foldable solar panels.

Mechanisms for deploying such components.

Illustrative example of subject matter classified in this group:

**B64G 1/223**

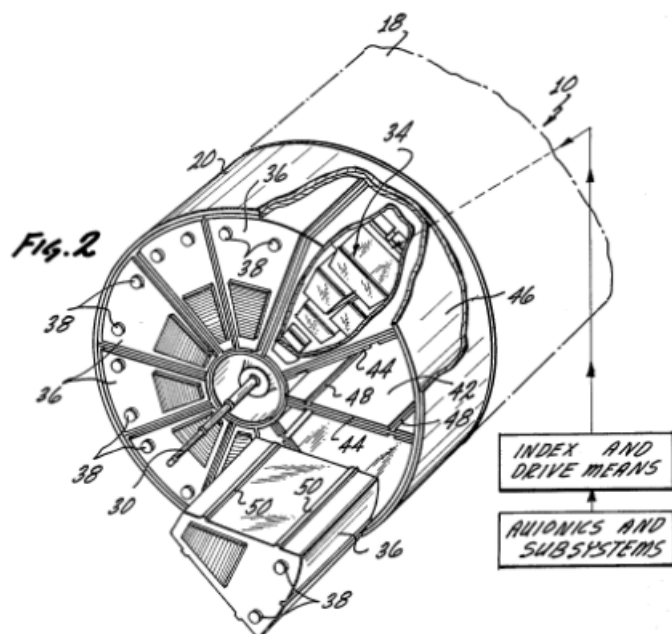
{Modular spacecraft systems}

**Definition statement**

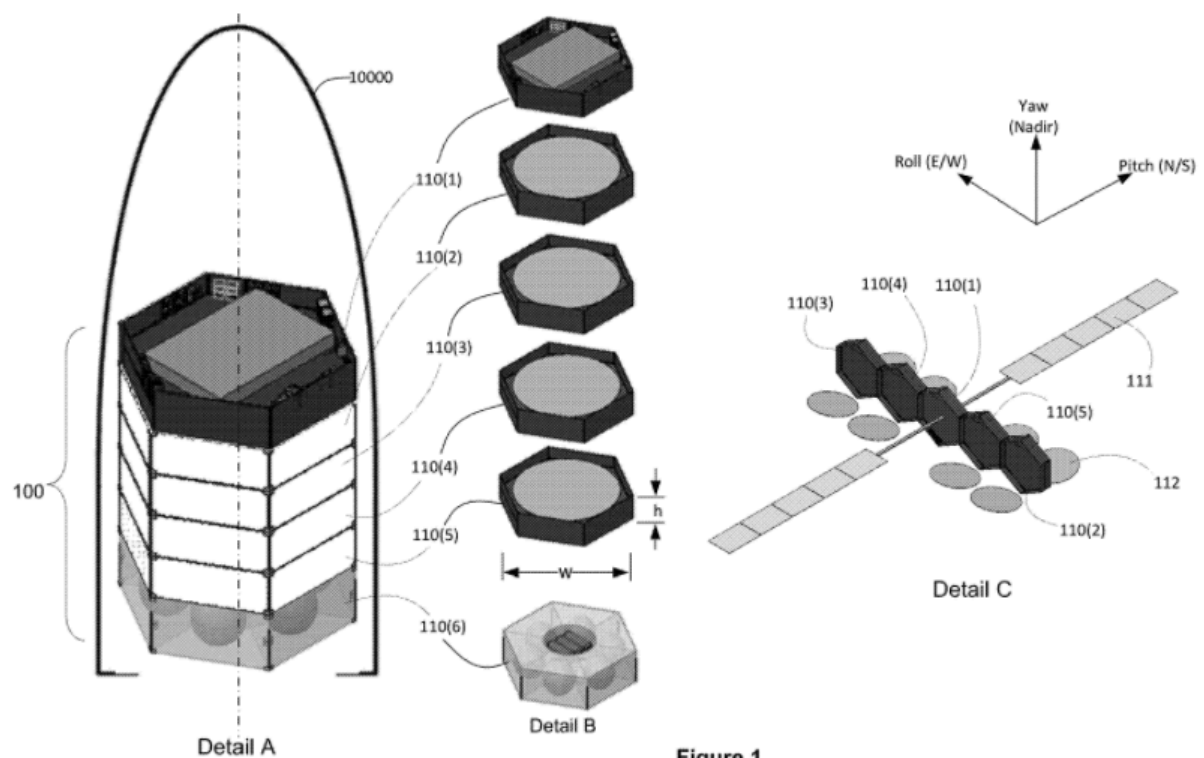
*This place covers:*

Spacecraft having modular structures or systems.

First illustrative example of subject matter classified in this group:



Second illustrative example of subject matter classified in this group:



**B64G 1/226****{Special coatings for spacecraft}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Coating compositions	<a href="#">C09D</a>
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**B64G 1/228****{Damping of high-frequency vibration effects on spacecraft elements, e.g. by using acoustic vibration dampers}****References****Informative references***Attention is drawn to the following places, which may be of interest for search:*

Vibration damping in general	<a href="#">F16F</a>
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**B64G 1/24****Guiding or controlling apparatus, e.g. for attitude control****Definition statement***This place covers:*

- Attitude detection and control.
- Orbit detection and control.
- Position detection and control, e.g. station-keeping.

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

Attitude control by solar sailing	<a href="#">B64G 1/407</a>
Tracking space vehicles	<a href="#">B64G 3/00</a>
Jet propulsion plants	<a href="#">F02K</a>
Navigation or navigational instruments	<a href="#">G01C</a>
Automatic pilots common to spacecraft and aircraft	<a href="#">G05D 1/00</a>
Control of position, course, altitude or attitude of space vehicles in general	<a href="#">G05D 1/00</a>

**B64G 1/242****{Orbits and trajectories}****Definition statement**

*This place covers:*

- Control and modification of orbits.
- Transfer orbits during operation or end-of-life.
- Position control, e.g. station-keeping.

**Synonyms and Keywords**

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

HEO	"High Earth Orbit" or "Highly Elliptical Orbit"
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**B64G 1/244****{Spacecraft control systems}****Definition statement**

*This place covers:*

Data processing systems for orbit, attitude or position control.

Mathematical concepts relating to orbit, attitude or position control.

**References*****Informative references***

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

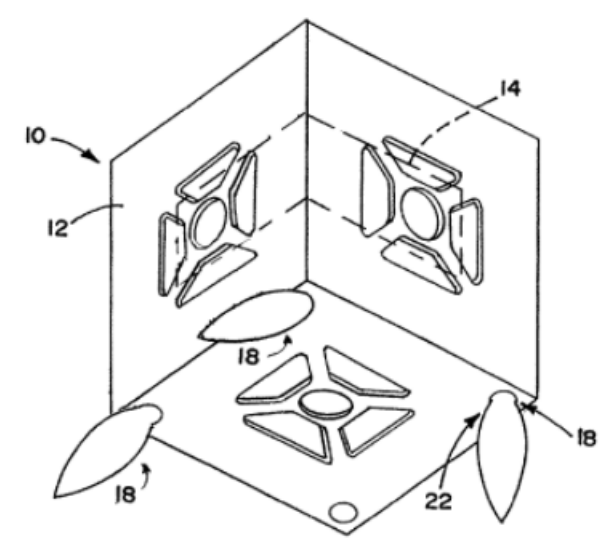
Manner for effecting attitude changes, e.g. using jets	<a href="#">B64G 1/26</a> – <a href="#">B64G 1/34</a>
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**B64G 1/26****using jets****Definition statement**

*This place covers:*

Systems which expel propellant to effect attitude or position control.

Illustrative example of subject matter classified in this group:



References

Informative references

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

Details of the jet device used in spacecraft	<a href="#">B64G 1/40</a>
Rocket-engine plants, i.e. plants carrying both fuel and oxidant therefore; Control thereof	<a href="#">F02K 9/00</a>
Producing a reactive propulsive thrust	<a href="#">F03H</a>

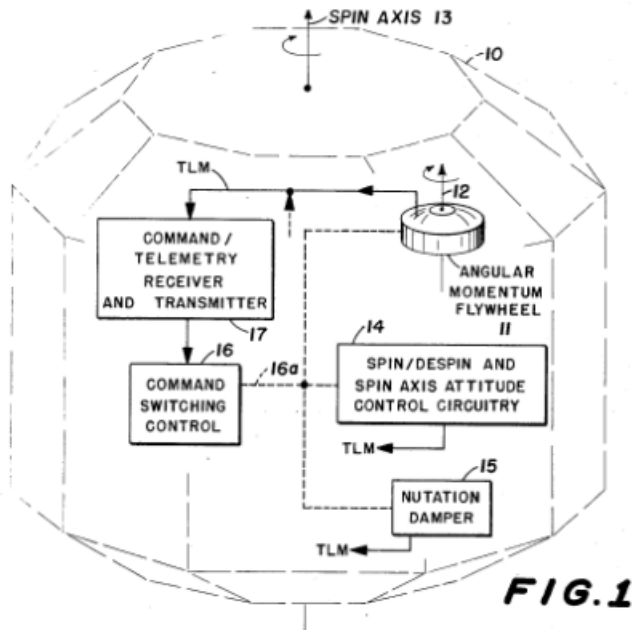
B64G 1/281

{Spin-stabilised spacecraft}

Definition statement

This place covers:  
Spacecraft which are stabilised in attitude by spinning about a primary axis.  
Control of any such spin.

Illustrative example of subject matter classified in this group:



## **B64G 1/283**

{using reaction wheels}

### **Definition statement**

*This place covers:*

Spacecraft which use rotating flywheels for attitude orientation.

## **B64G 1/285**

{using momentum wheels}

### **Definition statement**

*This place covers:*

Spacecraft which use rotating flywheels for attitude stabilisation.

## **B64G 1/286**

{using control momentum gyroscopes (CMGs)}

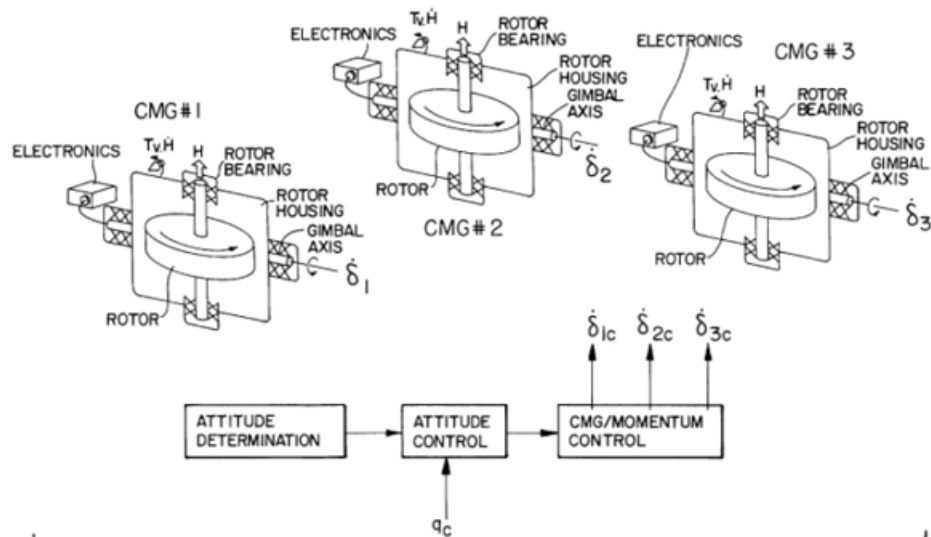
### **Definition statement**

*This place covers:*

Spacecraft which use gimbaled rotors for attitude control.



Illustrative example of subject matter classified in this group:



## B64G 1/32

using earth's magnetic field

### Definition statement

*This place covers:*

Systems for interacting with the magnetic field of the earth or other celestial body to control orbit, attitude or position of the spacecraft.

### References

#### Informative references

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

Using sensors for detecting or measuring the magnetic field	<a href="#">B64G 1/366</a>
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## B64G 1/34

using gravity gradient

### Definition statement

*This place covers:*

Systems for interacting with the gravitational field of the earth or other celestial body to control orbit, attitude or position of the spacecraft.

### References

#### Informative references

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

Using sensors for detecting or measuring the gravitational field	<a href="#">B64G 1/368</a>
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**B64G 1/36****using sensors, e.g. sun-sensors, horizon sensors****Definition statement***This place covers:*

Type of sensor used for position control and station keeping.

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

Sensors, per se	<a href="#">G01C 21/00</a>
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**B64G 1/361****{using star sensors}****Definition statement***This place covers:*

Sensors which detect the position of stars to determine attitude or position.

**B64G 1/363****{using sun sensors}****Definition statement***This place covers:*

Sensors which detect the position of the sun to determine attitude or position.

**B64G 1/365****{using horizon or Earth sensors}****Definition statement***This place covers:*

Sensors which detect the position of the Earth or points thereon to determine attitude or position.

**B64G 1/366****{using magnetometers}****Definition statement***This place covers:*

Sensors which detect or measure surrounding magnetic fields to determine attitude or position.

**B64G 1/368****{using gravimeters}****Definition statement***This place covers:*

Sensors which detect gravitational fields to determine attitude or position.

**B64G 1/38****damping of oscillations, e.g. nutation dampers****Definition statement***This place covers:*

Damping of oscillations in attitude or position of the spacecraft, often due to external perturbations.

**B64G 1/40****Arrangements or adaptations of propulsion systems****Definition statement***This place covers:*

Types of propulsion systems for cosmonautic vehicles and arrangements thereof.

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

Using jets	<a href="#">B64G 1/26</a>
Power supply systems	<a href="#">B64G 1/42</a>
Jet-propulsion plants	<a href="#">F02K</a>
Producing a reactive propulsive thrust, not otherwise provided for	<a href="#">F03H</a>

**Special rules of classification**Details of propulsion systems used as attitude or position control jets proper for [B64G 1/26](#) are still classified within [B64G 1/40](#) as applicable.Propulsion systems using tethers are placed only in [B64G 1/40](#).**B64G 1/4005****{Air-breathing propulsion}****Definition statement***This place covers:*

Propulsion systems using intake air to create thrust.

## References

### *Informative references*

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

Rockets combined with air-breathing jet-propulsion plant	<a href="#">F02K 9/78</a>
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## B64G 1/401

{Liquid propellant rocket engines (Ion or plasma engines [B64G 1/413](#); Arcjets and other resistojets [B64G 1/415](#))}

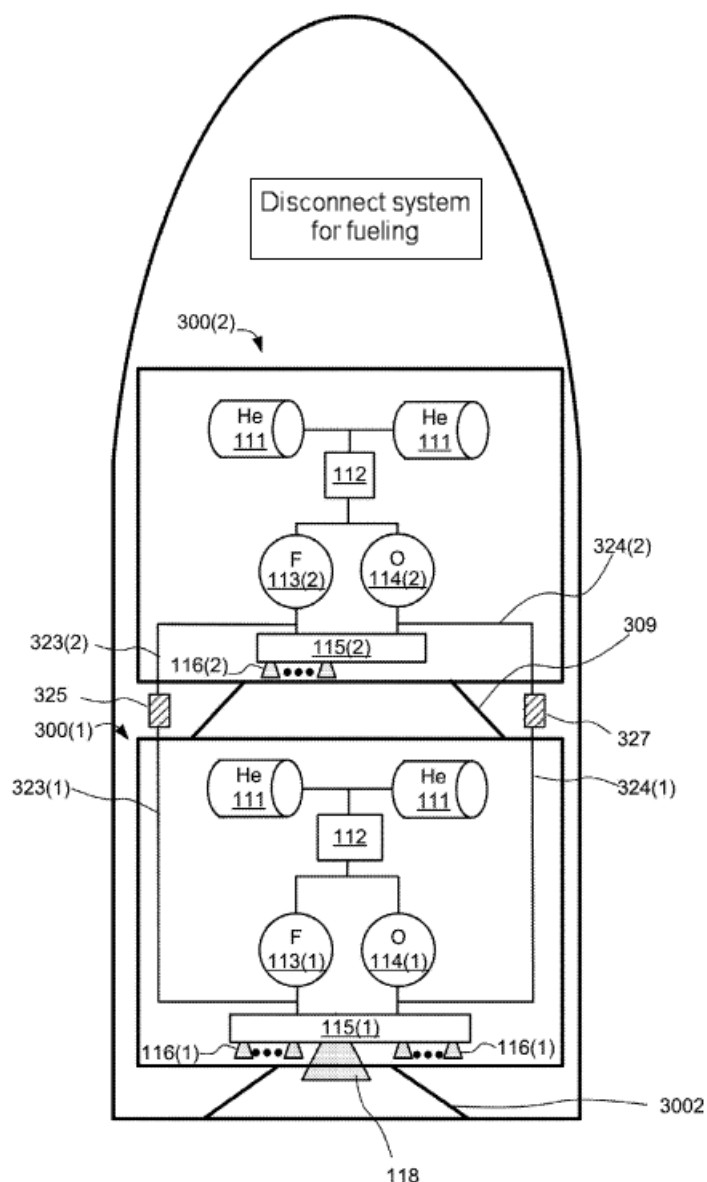
### Definition statement

*This place covers:*

Spacecraft propulsion systems which use liquid or gaseous propellants, either alone (monopropellants) or in combination (bipropellants).

Air-breathing systems.

Illustrative example of subject matter classified in this group:



## References

### Limiting references

*This place does not cover:*

Using ions or plasma	<a href="#">B64G 1/413</a>
Arcjets and other resistojets	<a href="#">B64G 1/415</a>

### Informative references

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

Liquid or gas propellant rockets, per se	<a href="#">F02K 9/42</a>
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**B64G 1/402****{Propellant tanks; Feeding propellants}****Definition statement**

*This place covers:*

Arrangements for storing and feeding propellants within spacecraft.

**References****Informative references**

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

Feeding propellants, per se	<a href="#">F02K 9/44</a>
Means for supplying the propellant	<a href="#">F03H 1/0012</a>
Vessels for containing or storing compressed, liquefied or solidified gases	<a href="#">F17C</a>

**B64G 1/4022****{Arrangements of tanks in or on spacecraft}****Definition statement**

*This place covers:*

Refueling probes and receivers for fueling spacecraft in space.

**References****Informative references**

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

Refueling on ground	<a href="#">B64G 5/00</a>
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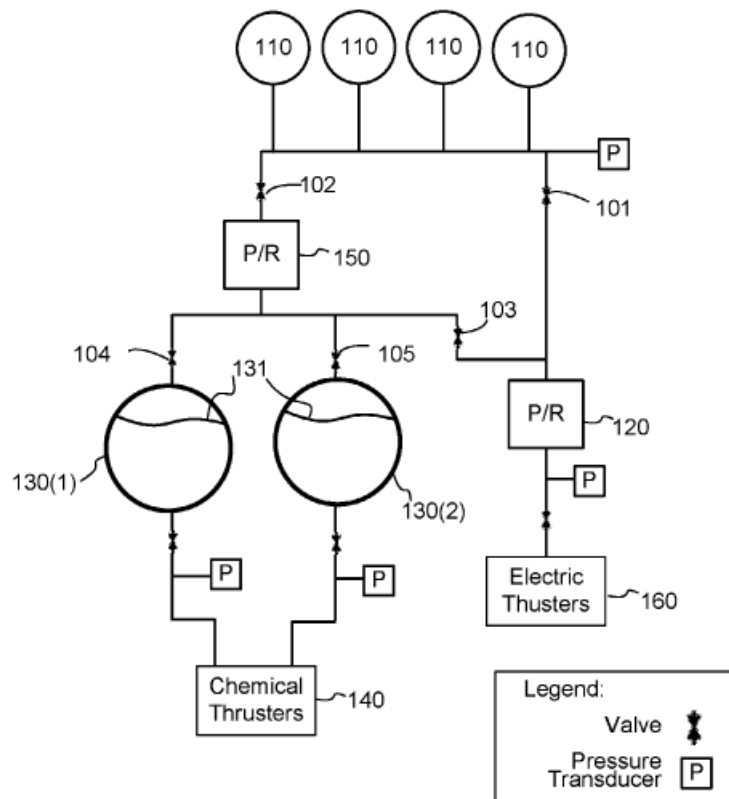
**B64G 1/4026****{providing propellant to propulsion systems of differing type}****Definition statement**

*This place covers:*

Systems which selectively or additionally provide propellant to differing types of thrusters.

## Definition statement

Illustrative example of the subject matter classified in this group:



## B64G 1/403

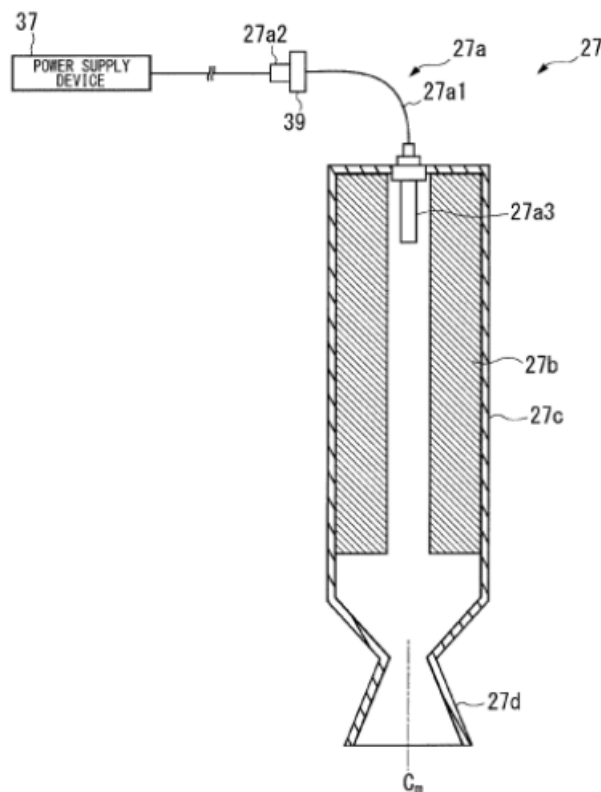
### {Solid propellant rocket engines}

#### Definition statement

*This place covers:*

Spacecraft propulsion systems which use solid propellant.

Illustrative example of subject matter classified in this group:



## References

### Informative references

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

Solid propellant rockets, per se	<a href="#">F02K 9/08</a>
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## B64G 1/404

### {Hybrid rocket engines}

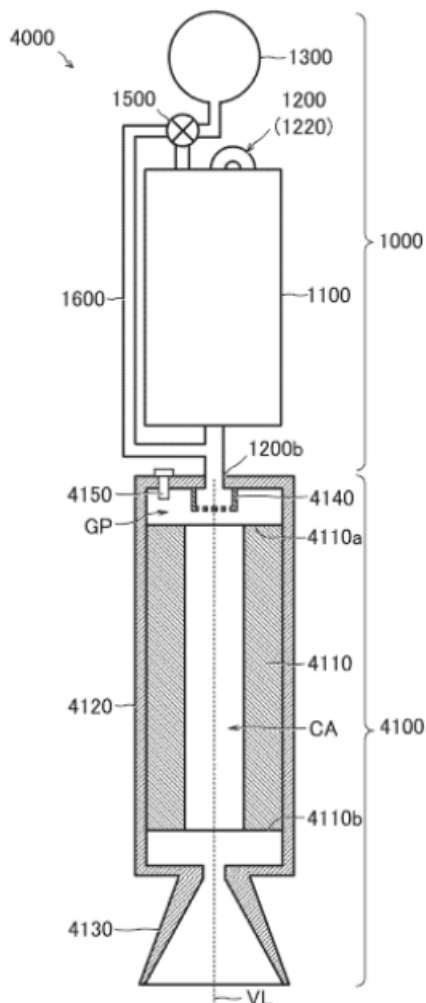
#### Definition statement

*This place covers:*

Spacecraft propulsion systems which use a combination of liquid propellants and solid propellants within the same propulsion plant.



Illustrative example of subject matter classified in this group:



## References

### Informative references

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

Hybrid rocket engines, per se	<a href="#">F02K 9/72</a>
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## B64G 1/407

### {Solar sailing}

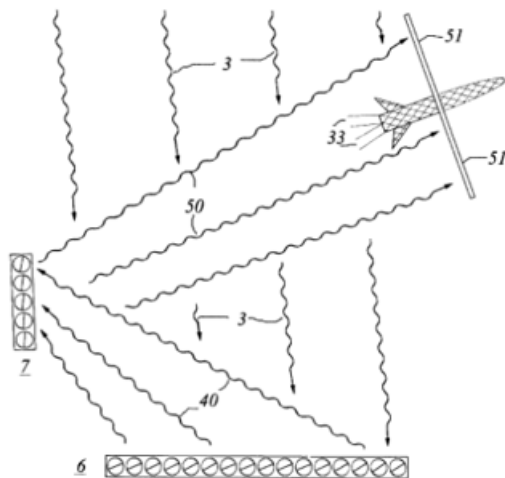
## Definition statement

*This place covers:*

Spacecraft propulsion which uses radiation pressure, such as by solar wind or lasers, acting upon spacecraft surfaces.

Attitude control using such radiation pressure.

Illustrative example of subject matter classified in this group:



## B64G 1/408

**{Nuclear spacecraft propulsion}**

### Definition statement

*This place covers:*

Spacecraft propulsion systems involving nuclear reactions to produce thrust, e.g. nuclear thermal propulsion.

### References

#### Informative references

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

Nuclear power generation	<a href="#">B64G 1/422</a>
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## B64G 1/409

**{Unconventional spacecraft propulsion systems}**

### Definition statement

*This place covers:*

Spacecraft propulsion systems without mass expulsion, e.g. using photons or magnetic fields.

Spacecraft propulsion systems which violate known laws of physics.

### References

#### Informative references

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

Propulsion systems using photons or without mass expulsion, per se	<a href="#">F03H</a>
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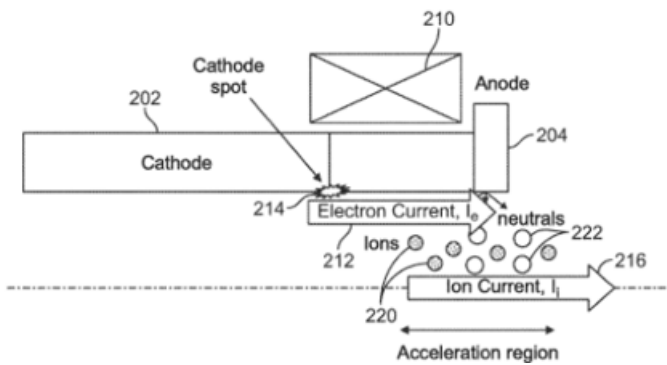
B64G 1/413

{Ion or plasma engines}

Definition statement

*This place covers:*  
Spacecraft propulsion which expel ions or plasma (ions and electrons) to produce a reactive propulsive thrust.

Illustrative example of subject matter classified in this group:



References

Informative references

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

Ion or plasma engines, per se	<a href="#">F03H 1/00</a>
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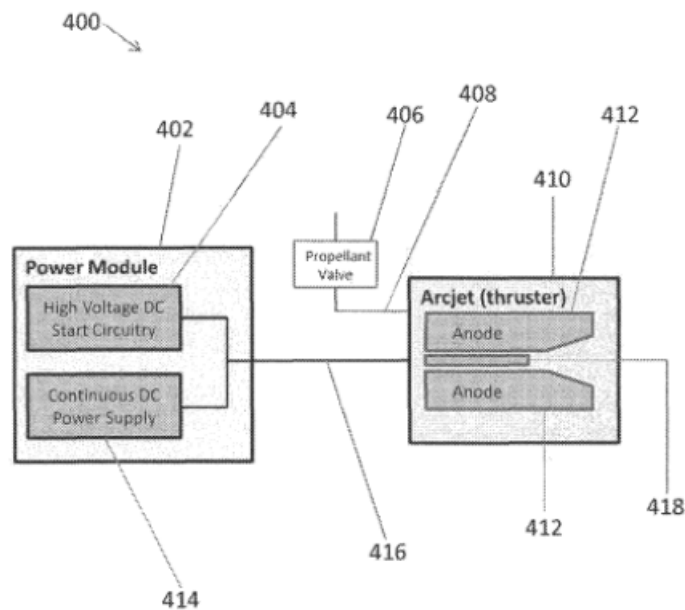
B64G 1/415

{Arcjets or resistojets}

Definition statement

*This place covers:*  
Spacecraft propulsion systems which use an electrical discharge (arc) or other form of electrical heating to heat the propellant to produce thrust.

Illustrative example of subject matter classified in this group:



References

Informative references

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

Arcjets, per se	<a href="#">F03H 1/00</a>
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B64G 1/417

{Electromagnetic fields or flux without mass expulsion}

Definition statement

This place covers:

Systems which use or interact solely with electromagnetic properties to propel a spacecraft.

References

Informative references

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

Expelling ions, plasma or the like	<a href="#">B64G 1/413</a>
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B64G 1/42

Arrangements or adaptations of power supply systems

Definition statement

This place covers:

Types of power supply systems for cosmonautic vehicles and arrangements thereof.

## References

### Informative references

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

Propulsion systems	<a href="#">B64G 1/40</a>
Circuits for supplying or distributing electrical power; Systems for storing electrical energy	<a href="#">H02J</a>

## B64G 1/421

### {Non-solar power generation}

#### Definition statement

*This place covers:*

Systems for deriving electrical energy from sources other than sunlight.

## B64G 1/422

### {Nuclear power generation}

#### Definition statement

*This place covers:*

Systems for deriving electrical energy from nuclear reactions.

## References

### Informative references

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

Nuclear spacecraft propulsion	<a href="#">B64G 1/408</a>
Nuclear reactors, power plants	<a href="#">G21B</a> , <a href="#">G21C</a> , <a href="#">G21D</a>

## B64G 1/423

### {Fuel cells}

#### Definition statement

*This place covers:*

Systems for deriving electrical energy from the chemical reaction within a generator, wherein the reactants, typically hydrogen and oxygen, are supplied from outside of the generator.

## References

### Informative references

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

Fuel cells, per se	<a href="#">H01M 8/00</a>
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**B64G 1/425****{Power storage}****Definition statement**

*This place covers:*

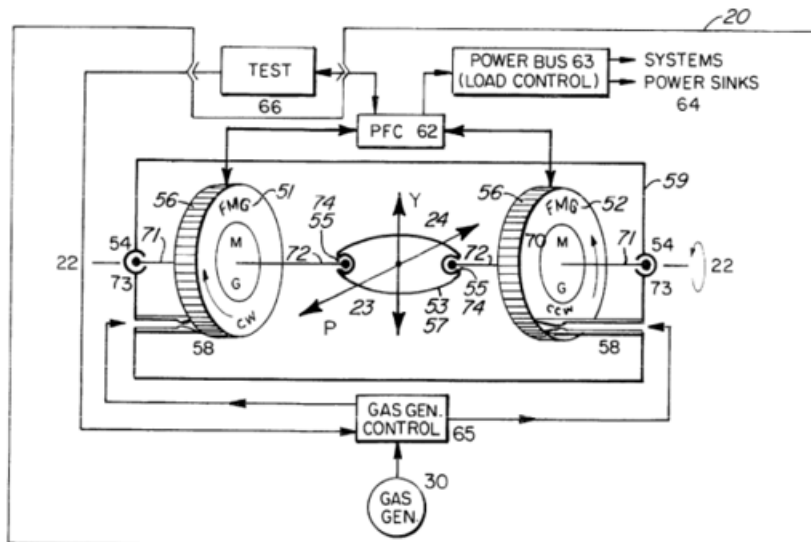
Systems and arrangements in the spacecraft for storing power.

**B64G 1/426****{Flywheels}****Definition statement**

*This place covers:*

Systems for storing power in mechanical form using rotating flywheels.

Illustrative example of subject matter classified in this group:

**References****Informative references**

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

Flywheel power storage, per se	<a href="#">H02J 15/007</a>
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**B64G 1/427****{Thermal power storage}****Definition statement**

*This place covers:*

Systems for storing power in the form of thermal energy.

## References

### Informative references

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

Thermal energy storage, in general	<a href="#">F28D 20/00</a>
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## B64G 1/428

### {Power distribution and management}

#### Definition statement

*This place covers:*

Systems and arrangements for distributing and regulating spacecraft power.

Spacecraft systems for transmitting space-generated power to earth-based locations.

## References

### Informative references

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

Power supply and distribution in general	<a href="#">H02J</a>
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## B64G 1/4282

### {for transmitting power to earth or other spacecraft}

#### Definition statement

*This place covers:*

Spacecraft systems for transmitting space-generated power to locations on earth or other celestial bodies, or for use by other spacecraft.

## B64G 1/44

### using radiation, e.g. deployable solar arrays

## References

### Informative references

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

Solar cells per se	<a href="#">H01L 31/00</a>
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## B64G 1/443

### {Photovoltaic cell arrays}

#### Definition statement

*This place covers:*

Spacecraft systems and arrangements for deriving electrical energy through photovoltaics, e.g. solar panels.

## References

### Informative references

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

Solar cells, per se	<a href="#">H01L 31/00</a>
Solar panels, per se	<a href="#">H02S</a>

## B64G 1/446

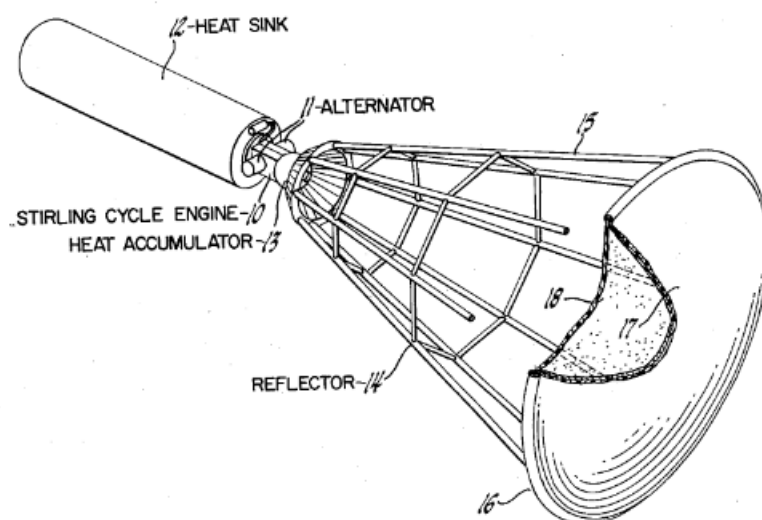
### {Thermal solar power generation}

### Definition statement

This place covers:

Spacecraft systems and arrangements for deriving electrical energy from thermal energy generated by solar energy.

Illustrative example of subject matter classified in this group:



## References

### Informative references

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

Solar thermal propulsion	<a href="#">B64G 1/40</a>
Solar heat systems, in general	<a href="#">F24S</a>



**B64G 1/46****Arrangements or adaptations of devices for control of environment or living conditions****Definition statement**

*This place covers:*

Systems and arrangements for controlling the environmental parameters within the spacecraft, e.g. life-support systems for occupants.

**References****Informative references**

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

Space suits	<a href="#">B64G 6/00</a>
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**B64G 1/48****for treatment of the atmosphere ([B64G 1/50](#) takes precedence)****Definition statement**

*This place covers:*

Arrangements for treating the atmosphere within the spacecraft, e.g. air conditioning or oxygen generation.

**References****Limiting references**

*This place does not cover:*

Arrangements or adaptations of devices for temperature control of environment or living conditions	<a href="#">B64G 1/50</a>
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**Informative references**

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

Filtering of particles from gases, waste gas removal or treatment	<a href="#">B01D 53/00</a>
Air conditioning in general	<a href="#">F24F</a>

**B64G 1/50****for temperature control****Definition statement**

*This place covers:*

Systems for regulating the temperature of the spacecraft or of its atmosphere or components.

## References

### Informative references

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

Temperature control in general	<a href="#">G05D 23/00</a>
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## B64G 1/503

{Radiator panels}

### Definition statement

*This place covers:*

Panels, and arrangements thereof, for transferring heat between the spacecraft and the environment.

## B64G 1/506

{Heat pipes}

### Definition statement

*This place covers:*

Systems and arrangements using fluid, which undergoes a phase change, flowing through pipes to transfer heat.

## References

### Informative references

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

Heat pipes, per se	<a href="#">F28D 15/02</a>
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## B64G 1/52

Protection, safety or emergency devices; Survival aids

## References

### Informative references

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

Life-saving in general	<a href="#">A62</a>
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## B64G 1/525

{Survival aids}

### Definition statement

*This place covers:*

Devices for use by spacecraft occupants for survival in space or returning to earth.

**B64G 1/54****Protection against radiation****Definition statement**

*This place covers:*

Spacecraft arrangements for protection against ionising radiation, ions or plasma.

**References****Informative references**

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

Protection against radiation in general	<a href="#">G21F</a>
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**B64G 1/546****{shielding electronic equipment}****Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

Radiation hardening	The process of making electrical components and circuits resistant to damage or malfunction caused by ionising radiation
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**B64G 1/56****Protection against meteoroids or space debris****Definition statement**

*This place covers:*

Systems for protecting the spacecraft from impacts by natural or artificial space debris, e.g. shielding.

**References****Informative references**

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

Meteoroid or space debris detectors	<a href="#">B64G 1/68</a>
Tracking space debris	<a href="#">B64G 3/00</a>

**B64G 1/58****Thermal protection, e.g. heat shields****Definition statement**

*This place covers:*

Arrangements for protecting the spacecraft from thermal loads, e.g. insulation.

## References

### Informative references

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

Temperature control	<a href="#">B64G 1/50</a>
Thermal insulation in general	<a href="#">F16L 59/00</a>

## Special rules of classification

Systems used to shield against thermal loads during re-entry are additionally attributed the symbol [B64G 1/62](#).

## B64G 1/60

### Crew or passenger accommodations

#### Definition statement

*This place covers:*

Systems and arrangements generally related to the occupancy of persons within a spacecraft, e.g. flight decks or sleeping quarters.

## References

### Informative references

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

Arrangements for control of environment or living conditions	<a href="#">B64G 1/46</a>
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## B64G 1/62

### Systems for re-entry into the earth's atmosphere; Retarding or landing devices

#### Definition statement

*This place covers:*

Systems specially adapted for re-entry into the atmosphere.

Systems for slowing the descent into the atmosphere or landing upon a surface, e.g. landing legs.

## B64G 1/623

### {Retarding devices, e.g. retrorockets}

#### Definition statement

*This place covers:*

Devices for reducing or otherwise managing the speed at which a spacecraft descends.

## References

### Informative references

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

Parachutes, per se	<a href="#">B64D 17/00</a> , <a href="#">B64D 19/00</a>
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## B64G 1/625

### {Landing devices; Undercarriages}

#### Definition statement

*This place covers:*

Devices for aiding the landing of a spacecraft, e.g. ground contact sensors, or mitigating landing impacts, e.g. cushions.

Landing gear for spacecraft.

#### References

##### Informative references

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

Landing gear, in general	<a href="#">B64C 25/00</a>
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## B64G 1/64

### Systems for coupling or separating cosmonautic vehicles or parts thereof, e.g. docking arrangements

#### Definition statement

*This place covers:*

Systems for coupling spacecraft sections together, or payloads to spacecraft or launch systems.

Systems for joining previously separate vehicles or components into combined vehicles or systems of vehicles.

Systems for separating vehicles or components of vehicles into individual vehicles or components.

Systems for releasing payloads, e.g. satellites from launch vehicles.

#### References

##### Informative references

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

Assembling of space structures	<a href="#">B64G 99/00</a>
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## B64G 1/641

### {Interstage or payload connectors (docking systems [B64G 1/646](#))}

#### Definition statement

*This place covers:*

Devices for coupling spacecraft sections together, or for coupling payloads to spacecraft or launchers, e.g. Marman clamps.

## References

### Limiting references

*This place does not cover:*

Docking systems	<a href="#">B64G 1/646</a>
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### Informative references

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

Means for interconnecting rocket sections	<a href="#">F42B 15/36</a>
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## B64G 1/643

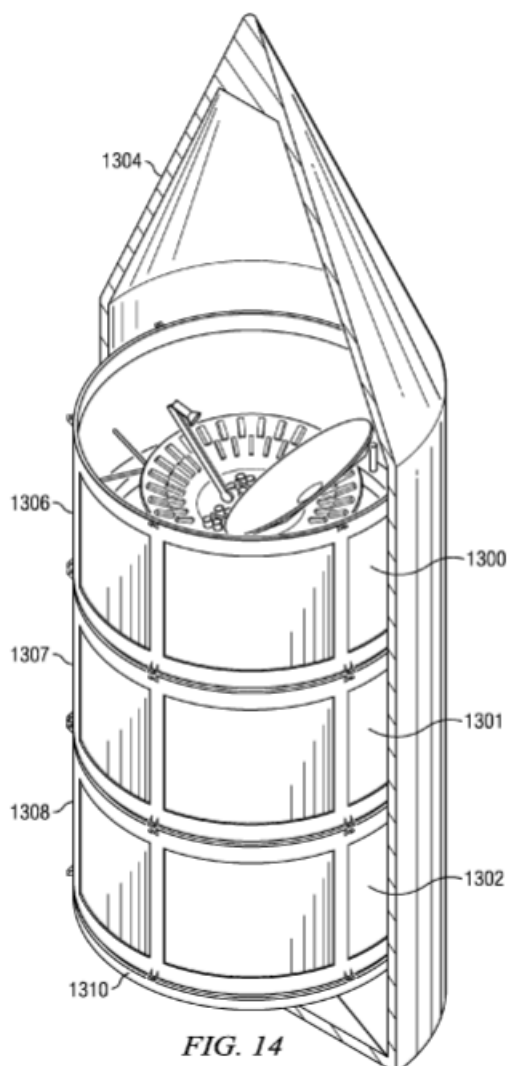
**{for arranging multiple satellites in a single launcher}**

### Definition statement

*This place covers:*

Systems in which multiple satellites are launched with a single launcher.

Illustrative example of subject matter classified in this group:



## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Piggyback	Using the excess space of a launcher to launch additional spacecraft
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## B64G 1/644

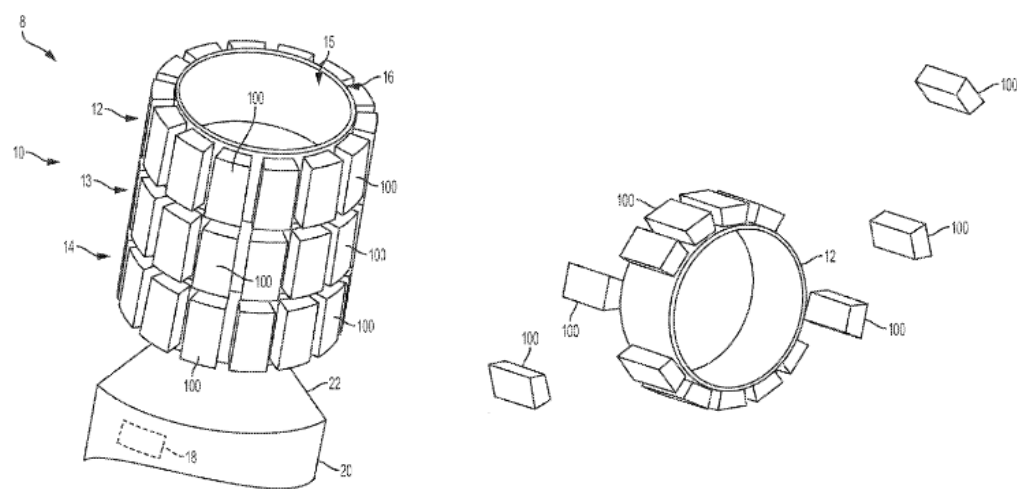
**{arranged for independent deployment}**

## Definition statement

*This place covers:*

Arrangements of satellites in which each satellite may be deployed independently of any other satellite.

Illustrative example of subject matter classified in this group:



B64G 1/645

{Separators}

Definition statement

*This place covers:*  
Systems for separating spacecraft sections from each other.  
Systems for separating payloads from spacecraft or launchers.

References

Informative references

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

Equipment for deploying structures between a stowed and deployed state characterised by the deployment actuating mechanism	<a href="#">B64G 1/2229</a>
Disconnecting rocket sections	<a href="#">F42B 15/36</a>

B64G 1/6455

{Pyrotechnics; Using heat}

Definition statement

*This place covers:*  
Arrangements using a charge or other explosive means for separating the components.  
Arrangements for burning or melting components to cause separation.



## References

### Informative references

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

Blasting cartridges, i.e. case and explosive	<a href="#">F42B 3/00</a>
Electric heating	<a href="#">H05B</a>

## B64G 1/646

{Docking or rendezvous systems (refueling in space [B64G 1/4024](#))}

### Definition statement

*This place covers:*

Systems for approaching and joining individual spacecraft with each other.

## References

### Limiting references

*This place does not cover:*

Refueling in space	<a href="#">B64G 1/4024</a>
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### Informative references

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

Satellites for servicing other satellites	<a href="#">B64G 1/1078</a>
Rendezvous trajectories, in general	<a href="#">B64G 1/242</a>

## Special rules of classification

Systems for clearing space debris are classified only in [B64G 1/1078](#).

## B64G 1/648

{Tethers}

### Definition statement

*This place covers:*

Spacecraft systems which are coupled together by tethers.

## B64G 1/66

Arrangements or adaptations of apparatus or instruments, not otherwise provided for

### Definition statement

*This place covers:*

Antennas, flight deck control sticks, indicators and other equipment specially adapted for spacecraft use, not provided for elsewhere.

## References

### References out of a residual place

Examples of places in relation to which this place is residual:

Adaptations to antennas for use in satellites	<a href="#">H01Q 1/28</a>
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## B64G 1/68

### of meteoroid or space debris detectors

#### Definition statement

*This place covers:*

Devices for detecting meteoroids and other space debris.

## References

### Informative references

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

Protection against meteoroids or debris	<a href="#">B64G 1/56</a>
Tracking space debris or decommissioned vehicles	<a href="#">B64G 3/00</a>

## B64G 3/00

### Observing or tracking cosmonautic vehicles

#### Definition statement

*This place covers:*

Observing or tracking spacecraft, space stations or other natural or artificial debris.

## References

### Informative references

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

Radio or other wave systems for navigating or tracking	<a href="#">G01S</a>
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## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Ephemeris	Tables, or the collection of tables in books or data files, giving the calculated positions of celestial objects at regular intervals throughout a period.
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**B64G 4/00****Tools specially adapted for use in space****Definition statement**

*This place covers:*

Tools specially adapted for use in space or on spacecraft, e.g. robotic arms.

**References****Informative references**

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

Robot arms	<a href="#">B25J 1/00</a>
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**B64G 5/00****Ground equipment for vehicles, e.g. starting towers, fuelling arrangements  
([B64G 3/00](#) takes precedence)****Definition statement**

*This place covers:*

Starting towers, fueling arrangements, transportation devices and other ground equipment for assisting the operation of spacecraft prior to or during launch.

**References****Limiting references**

*This place does not cover:*

Observing or tracking cosmonautic vehicles	<a href="#">B64G 3/00</a>
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**B64G 6/00****Space suits****Definition statement**

*This place covers:*

Apparel for use in space.

**References****Informative references**

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

High-altitude pressure suits	<a href="#">A62B 17/008</a>
Flight suits	<a href="#">B64D 10/00</a>

**B64G 7/00****Simulating cosmonautic conditions, e.g. for conditioning crews****Definition statement***This place covers:*

- Space simulators.
- Training astronauts.

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

Simulators for teaching or training purposes	<a href="#">G09B 9/00</a>
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**B64G 99/00****Subject matter not provided for in other groups of this subclass****Definition statement***This place covers:*

Constructions of structures specially adapted for use in space, not otherwise provided for.

Moon bases, and the like.

Manufacturing, assembling, maintenance or repairing in space.

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

Structural aspects of spacecraft, e.g. frames	<a href="#">B64G 1/22</a>
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