

F24F

AIR-CONDITIONING, AIR-HUMIDIFICATION, VENTILATION, USE OF AIR CURRENTS FOR SCREENING (devices for ventilating greenhouses [A01G](#) {air-conditioning systems for greenhouses [A01G 9/246](#)}; animal husbandry [A01K](#), e.g. controlling humidity in incubators [A01K 41/04](#); disinfecting or sterilising of air [A61L](#); devices for reconditioning breathing air in sealed rooms or for ventilating gas-proof shelters [A62B](#); filtering, washing or drying of gases [B01D](#); mixing gases with vapours or liquids in general [B01F 3/00](#); spraying [B05B](#), [B05D](#); removing dirt or fumes from areas where they are produced [B08B 15/00](#); ventilation, air-conditioning or cooling, specially adapted for vehicles, see the relevant vehicle places, e.g. [B60H](#), [B61D 27/00](#), {[B64D 13/00](#)}; production of ozone [C01B 13/10](#); chimneys or flues [E04F 17/02](#), [E04H 12/28](#), [F23J 11/00](#), [F23L 17/02](#); air ducts or conduits [E04F 17/04](#), [F16L](#); ventilation in doors or windows [E06B 7/02](#); fans, blowers [F04](#); noise-absorbing in pipes or pipe systems [F16L](#); tops for chimneys and ventilating shafts [F23L](#); cooling [F25](#); details of heat-exchange or heat-transfer apparatus, of general application [F28F](#); apparatus for generating ions to be introduced into non-enclosed gases, e.g. the atmosphere [H01T 23/00](#))

Definition statement

This place covers:

Devices, systems and methods for changing the air characteristics within a room, a building or spaces, comprising air treatment like air-conditioning, air-humidification, dehumidification of room air, cleaning e.g. filtering of room air, ventilation, use of air currents for screening.

Air treatment to improve the air properties of breathing air for human beings in the room or building.

Relationships with other classification places

Subclass [F24F](#) covers arrangement of cooling and heating. The relative arrangement of merely heating is covered by [F24D](#) and [F24H](#).

Subclass [F24F](#) covers air-conditioning units characterised by the treatment of air. Air-conditioning units characterised by the refrigerant machines or systems per se are covered by [F25B](#).

References

Limiting references

This place does not cover:

Devices for ventilating greenhouses	A01G
Animal husbandry	A01K
Disinfecting or sterilising or air	A61L
Filtering, washing or drying of gases	B01D
Removing dirt or fumes from areas where they are produces	B08B 15/00
Ventilation, air-conditioning or cooling specially adapted for vehicles or aircrafts	B60H , B64D 13/00
Fans or blowers per se	F04D
Ducts in general	F16L
Chimney or flues	F23L 17/02

Domestic or space-heating systems	F24D
Fluid heaters, water or air-heaters	F24H
Refrigeration machines, systems of plants; heat pumps	F25B
Refrigerators, cold rooms, e.g. for food storage	F25D
Heat-exchanger and details of heat-exchanger	F28D , F28F
Cooling or ventilation of data center	H05K 7/20

Special rules of classification

Air-humidification per se, e.g. "room humidifiers", is covered by group [F24F 6/00](#). Air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated is covered by group [F24F 3/14](#).

Glossary of terms

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

Air-conditioning	Air treatment of room air or spaces comprising at least cooling
Supplied air	Air entering the room
Exhaust air	Air withdrawn from the room
Ventilation	Supplying air to the room, exhausting air from the room and circulating air within the room

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

HVAC	Heating, ventilating and air conditioning
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F24F 1/00

Room units, e.g. separate or self-contained units or units receiving primary air from a central station {or with supply of heating or cooling agents from a central station, such as those applied to air-treatment systems included in [F24F 3/00](#) and [F24F 5/00](#)}

Definition statement

This place covers:

- Air-conditioning units placed within a room for cooling the room, i.e. fan coil unit of a split unit. These indoor units can thereby receive primary air from a central station and/or recirculate the air within the room and/or supply outside air.
- Split unit comprising an indoor unit and an outdoor unit.
- Outdoor unit of split unit.
- Self-contained units.

Usually, these room units comprise a refrigerant cycle.

References

Informative references

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

Central station centrally producing cool air for distributing cool air in a plurality of rooms	F24F 3/00
Systems comprising multiple indoor units	F24F 3/065
Dehumidification	F24F 3/14
Filter units per se	F24F 3/1603
Humidification	F24F 6/00
Control of room units	F24F 11/30
Vanes or dampers of room units	F24F 13/14 , F24F 13/15
Casing of indoor units and self-contained units	F24F 13/20
Condensate evacuation	F24F 13/222

Glossary of terms

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

Split unit	Air conditioning unit in split configuration, often with the compressor and condenser located in a separate external outdoor unit and the evaporator located in an indoor unit, the two units being connected via refrigerant pipes
Self-contained unit	Air conditioning unit with all apparatus for air treatment installed in a common casing, e.g. compressor, condenser and evaporator

F24F 3/00

Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment; Apparatus specially designed for such systems (room units [F24F 1/00](#))

Definition statement

This place covers:

Air-conditioning systems in which conditioned primary air is supplied from one or more central stations to distributing units in the rooms or spaces where it may receive secondary treatment; Apparatus specially designed for such systems.

References

Limiting references

This place does not cover:

Room units	F24F 1/00
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Informative references

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

Room humidifier	F24F 6/00
Mounting arrangement of air filters	F24F 13/28
Disinfection, sterilisation or deodorisation of air	A61L 9/00
Filter unit per se	B01D
Drying of gases	B01D 53/26
Electric filter	B03C
Cogeneration of electricity and heat or cold	F25B
Clean room for semiconductor production	H01L 21/67017
Computer rooms	H05K 7/20

F24F 5/00

Air-conditioning systems or apparatus not covered by [F24F 1/00](#) or [F24F 3/00](#) {, e.g. using solar heat or combined with household units such as an oven or water heater}

Definition statement

This place covers:

- Exclusively-fluid system, e.g. using water as cooling fluid ([F24F 5/0003](#)),
- Cooling apparatus specially adapted for use in air-conditioning, e.g. using absorption or desorption ([F24F 5/0014](#)), or using cold storage body ([F24F 5/0017](#)) (e.g. PCM material for storage), or using evaporation ([F24F 5/0035](#)).
- Cooling apparatus using the Peltier effect ([F24F 5/0042](#)).
- Cooling apparatus using natural energy ([F24F 5/0046](#)), e.g. solar energy or air from the ground.
- Cooling apparatus using thermal walls ([F24F 5/0075](#)),
- Cooling apparatus using radiation from walls or ceiling ([F24F 5/0089](#)).
- Cooling apparatus combined with domestic apparatus, e.g. boiler, heating system ([F24F 5/0096](#)).

References**Informative references**

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

Absorption or desorption for humidification or dehumidification purposes	F24F 3/1411
Air conditioning in containers	B65D 88/74
Apparatus using radiation from walls or ceiling for heating purposes only	F24D 3/14 , F24D 3/16
Hot-water central heating system	F24D 3/18
Solar heat collector	F24S
Production of heat using geothermal energy	F24T
Cooling towers	F28C 1/00
Phase Change Material (PCM) in general	F28D 20/02

F24F 6/00

Air-humidification {, e.g. cooling by humidification}

Definition statement

This place covers:

Local unit for room humidification by evaporation of water in the air, or by water dispersion or by injection of steam in the air.

References

Informative references

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

Humidification systems	F24F 3/14
Cooling using evaporation	F24F 5/0035
Device to humidify the respiration air of patients	A61M 16/16
Spraying apparatus with rotating elements discharging water by centrifugal forces	B05B 3/10
Ultrasonic oscillator	B05B 17/06
Steam generation in boilers	F22B 1/28
Humidifying within a fuel cell	H01M 8/04126

F24F 7/00

Ventilation {, e.g. by means of wall-ducts or systems using window or roof apertures}

Definition statement

This place covers:

Systems or apparatus for supplying air to rooms or exhausting air from rooms or circulating air within the rooms.

References

Informative references

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

Ventilation control	F24F 11/0001
Ventilation of animal housings	A01K 1/0047
Hoods preventing escape of fumes from the area where they are produced	B08B 15/02
Ventilation systems of lifts	B66B 11/024
Roof-covering elements	E04D 1/30
Ventilation of roof coverings	E04D 13/17
Ventilation through double windows	E06B 7/02
Ventilation of mines or tunnels	E21F 1/00
Ventilators or fans per se	F04D

Removing cooking fumes	F24C 15/20
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Glossary of terms

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

Natural circulation	Air circulation without active fan, e.g. chimney effect, using solar energy or using wind energy
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F24F 9/00

Use of air currents for screening, e.g. air curtains

Definition statement

This place covers:

- Air curtain delimiting two different spaces.
- Air curtain in a wall opening delimiting a room from the outside
- The air curtain can be obtained by using more than one jet or band.

References

Informative references

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

Clean air workstation	F24F 3/1607
Means providing sterile air to operating tables in surgery	A61G 13/108
Air curtain for vehicles	B60J 9/04
Removing cooking fumes	F24C 15/20
Air curtain in cold rooms	F25D 23/023

F24F 11/00

Control or safety arrangements

Definition statement

This place covers:

Control of HVAC devices or systems ([F24F 11/00](#)).

Elements or components of control device, e.g. flap or damper control, ([F24F 11/89](#)).

References

Informative references

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

Air flow control members	F24F 13/08
Tilting members, e.g. louvre	F24F 13/14
Fire prevention or containment	A62C 2/00
Extinguishing or preventing fire	A62C 3/14
Controlling the speed of ventilators by varying driving speed	F04D 27/0261

Control valve per se	F16K
Compressor control	F25B 49/022
Refrigerant flow control	F25B 49/025
Humidity control using electrical means	G05D 22/02
Temperature control using electrical means (thermostat)	G05D 23/19

Special rules of classification

Damper control controlling the rate of air-flow:

- If increasing air pressure opens the damper, then classify in [F24F 11/745](#)
- If increasing air pressure closes the damper, then classify in [F24F 11/75](#)

F24F 12/00

Use of energy recovery systems in air conditioning, ventilation or screening (with both heat and humidity transfer between supplied and exhausted air [F24F 3/147](#); heat-exchange in general [F28](#))

Definition statement

This place covers:

Apparatus and systems with heat-exchange between supplied and exhausted air, e.g. using an air-to-air heat exchanger or using an intermediate fluid, e.g. heat pump.

References

Limiting references

This place does not cover:

Both heat and humidity transfer between supplied and exhausted air	F24F 3/147
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Informative references

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

Heat-exchange in general	F28D
Heat-exchange apparatus having plate-like conduit	F28D 9/00
Heat pipes	F28D 15/00

F24F 13/00

Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening

Definition statement

This place covers:

Details concerning ducting arrangements ([F24F 13/02](#)); Air outlets ([F24F 13/06](#)); Air-flow control members ([F24F 13/08](#)); Casing or covers ([F24F 13/20](#)).

Means for preventing or evacuating condensate ([F24F 13/22](#)).

Means for preventing or suppressing noise ([F24F 13/24](#)).

Arrangement for air-circulation by means of air-induction ([F24F 13/26](#)).

Arrangement for mounting of filter ([F24F 13/28](#)), of heat exchanger([F24F 13/30](#)).

Mounting means for HVAC devices ([F24F 13/32](#)).

References

Limiting references

This place does not cover:

Ventilating nozzles for vehicles	B60H 1/34
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Informative references

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

Room units in which secondary air is induced by injection action of the primary air	F24F 1/01
Mounting of filtering elements within a casing	B01D 46/0005
Ventilation combined with door or window frames	E06B 7/02
Butterfly valves	F16K 1/22
Support for pipes	F16L 3/00
Flange joints of pipes	F16L 23/00
Noise absorbers in pipes	F16L 55/033
Lighting devices combined with ventilating systems	F21V 33/0088
Method or devices for protecting against noise	G10K 11/16