

# CPC COOPERATIVE PATENT CLASSIFICATION

## F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING (NOTE omitted)

### LIGHTING; HEATING

#### F24 HEATING; RANGES; VENTILATING (NOTE omitted)

#### F24F AIR-CONDITIONING; AIR-HUMIDIFICATION; VENTILATION; USE OF AIR CURRENTS FOR SCREENING (removing dirt or fumes from areas where they are produced [B08B 15/00](#); vertical ducts for carrying away waste gases from buildings [E04F 17/02](#); tops for chimneys or ventilating shafts, terminals for flues [F23L 17/02](#))

##### NOTES

1. This subclass covers treatment, e.g. purification, of air supplied to human living or working spaces in air conditioning systems or in room units.
2. In this subclass:
  - air-humidification as auxiliary treatment in air-conditioning, i.e. in units wherein the air is also either cooled or heated, is covered by groups [F24F 1/00](#) or [F24F 3/14](#);
  - air-humidification per se, e.g. "room humidifiers", is covered by group [F24F 6/00](#).
3. In this subclass, the following terms or expressions are used with the meanings indicated:
  - "air-conditioning" means the supply of air to or the treatment of air in rooms or spaces by means of cooling or a combination of cooling and a further kind of air treatment, e.g. humidification, heating or air purification;
  - "ventilation" means the supply of air to, or its extraction from, rooms or spaces, and systems for circulating air within rooms or spaces, but does not cover the mere treatment of air being supplied to, extracted from, or circulated within, rooms or spaces.
4. In this subclass, control or safety arrangements are classified in group [F24F 11/00](#). In order to indicate the type of air-treatment system in which these arrangements are used, further classification may be made in groups [F24F 1/00](#) - [F24F 9/00](#).

##### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

<b>1/00</b>	<b>Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station</b>	1/0041	. . characterised by exhaustion of inside air from the room ( <a href="#">in combination with simultaneous introduction of outside air F24F 1/0038</a> )
1/0003	. characterised by a split arrangement, wherein parts of the air-conditioning system, e.g. evaporator and condenser, are in separately located units	1/0043	. . characterised by mounting arrangements
1/0007	. Indoor units, e.g. fan coil units ( <a href="#">self-contained units F24F 1/02</a> )	1/0047	. . . mounted in the ceiling or at the ceiling
1/00073	. . { <a href="#">comprising a compressor in the indoor unit housing</a> }	1/005	. . . mounted on the floor; standing on the floor
1/00075	. . { <a href="#">receiving air from a central station</a> }	1/0053	. . . mounted at least partially below the floor; with air distribution below the floor
1/00077	. . { <a href="#">receiving heat exchange fluid entering and leaving the unit as a liquid</a> }	1/0057	. . . mounted in or on a wall
1/0011	. . characterised by air outlets	1/0059	. . characterised by heat exchangers
1/0014	. . . having two or more outlet openings	1/0063	. . . by the mounting or arrangement of the heat exchangers
1/0018	. . characterised by fans ( <a href="#">with secondary air induced by injector action of the primary air F24F 1/01</a> )	1/0067	. . . by the shape of the heat exchangers or of parts thereof, e.g. of their fins
1/0022	. . . Centrifugal or radial fans	1/0068	. . characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing
1/0025	. . . Cross-flow or tangential fans	1/0071	. . with means for purifying supplied air ( <a href="#">perfuming or deodorising means F24F 1/008</a> )
1/0029	. . . Axial fans	1/0073	. . . characterised by the mounting or arrangement of filters
1/0033	. . . having two or more fans	1/0076	. . . by electric means, e.g. ionisers or electrostatic separators
1/0035	. . characterised by introduction of outside air to the room	1/008	. . with perfuming or deodorising means
1/0038	. . . in combination with simultaneous exhaustion of inside air	1/0083	. . with dehumidification means

- 1/0087 . . with humidification means
- 1/009 . . characterised by heating arrangements  
(characterised by heat exchangers F24F 1/0059)
- 1/0093 . . . with additional radiant heat-discharging elements, e.g. electric heaters
- 1/0097 . . . using thermoelectric or thermomagnetic means, e.g. Peltier elements
- 1/01 . . in which secondary air is induced by injector action of the primary air
- 1/02 . . Self-contained room units for air-conditioning, i.e. with all apparatus for treatment installed in a common casing
- 1/022 . . comprising a compressor cycle
- 1/027 . . . mounted in wall openings, e.g. in windows
- 1/028 . . characterised by air supply means, e.g. fan casings, internal dampers or ducts (with secondary air induced by injector action of the primary air F24F 1/01)
- 1/0284 . . . with horizontally arranged fan axis
- 1/0287 . . . with vertically arranged fan axis
- 1/029 . . characterised by the layout or mutual arrangement of components, e.g. of compressors or fans
- 1/03 . . characterised by mounting arrangements
- 1/031 . . . penetrating a wall or window
- 1/0314 . . . mounted on a wall
- 1/0317 . . . suspended from the ceiling
- 1/032 . . characterised by heat exchangers
- 1/0323 . . . by the mounting or arrangement of the heat exchangers
- 1/0325 . . . by the shape of the heat exchangers or of parts thereof, e.g. of their fins
- 1/0326 . . characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing
- 1/0328 . . with means for purifying supplied air (perfuming or deodorising means F24F 1/0355)
- 1/035 . . . characterised by the mounting or arrangement of filters
- 1/0353 . . . by electric means, e.g. ionisers or electrostatic separators
- 1/0355 . . with perfuming or deodorising means
- 1/0358 . . with dehumidification means
- 1/037 . . with humidification means
- 1/0373 . . characterised by heating arrangements  
(characterised by heat exchangers F24F 1/032)
- 1/0375 . . . with additional radiant heat-discharging elements, e.g. electric heaters
- 1/0378 . . . using thermoelectric or thermomagnetic means, e.g. Peltier elements
- 1/039 . . using water to enhance cooling, e.g. spraying onto condensers
- 1/04 . . Arrangements for portability
- 1/06 . . Separate outdoor units, e.g. outdoor unit to be linked to a separate room comprising a compressor and a heat exchanger
- 1/08 . . Compressors specially adapted for separate outdoor units
- 1/10 . . . Arrangement or mounting thereof
- 1/12 . . . Vibration or noise prevention thereof
- 1/14 . . Heat exchangers specially adapted for separate outdoor units
- 1/16 . . . Arrangement or mounting thereof
- 1/18 . . . characterised by their shape
- 1/20 . . Electric components for separate outdoor units
- 1/22 . . . Arrangement or mounting thereof
- 1/24 . . . Cooling of electric components
- 1/26 . . Refrigerant piping
- 1/28 . . . for connecting several separate outdoor units
- 1/30 . . . for use inside the separate outdoor units
- 1/32 . . . for connecting the separate outdoor units to indoor units
- 1/34 . . . Protection means thereof, e.g. covers for refrigerant pipes
- 1/36 . . Drip trays for outdoor units
- 1/38 . . Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings
- 1/40 . . Vibration or noise prevention at outdoor units (for outdoor units compressors F24F 1/12)
- 1/42 . . characterised by the use of the condensate, e.g. for enhanced cooling
- 1/44 . . characterised by the use of internal combustion engines
- 1/46 . . Component arrangements in separate outdoor units
- 1/48 . . . characterised by air airflow, e.g. inlet or outlet airflow
- 1/50 . . . . with outlet air in upward direction
- 1/52 . . . . with inlet and outlet arranged on the same side, e.g. for mounting in a wall opening
- 1/54 . . . . Inlet and outlet arranged on opposite sides
- 1/56 . . Casing or covers of separate outdoor units, e.g. fan guards
- 1/58 . . . Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage
- 1/60 . . Arrangement or mounting of the outdoor unit
- 1/62 . . . Wall-mounted
- 1/64 . . . Ceiling-mounted, e.g. below a balcony
- 1/66 . . . under the floor level
- 1/68 . . . Arrangement of multiple separate outdoor units
- 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)**
- 3/001 . . {in which the air treatment in the central station takes place by means of a heat-pump or by means of a reversible cycle (regulation of heat-pump circuit in air treatment systems F25B 29/00; heat pumps F25B 13/00, F25B 29/00; reversible cycle for humidifying and drying air F24F 3/147)}
- 2003/003 . . {with primary air treatment in the central station and subsequent secondary air treatment in air treatment units located in or near the rooms}
- 2003/005 . . {with a single air duct for transporting treated primary air from the central station to air treatment units located in or near the rooms}

**NOTE**

In this group, the first place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the first appropriate place.

- 2003/006 . . {with two air ducts for separately transporting treated hot and cold primary air from the central station to air treatment units located in or near the rooms}
  - 2003/008 . {Supplying highly filtered air to a room or to a limited area within a room}
  - 3/02 . characterised by the pressure or velocity of the primary air
  - 3/04 . . operating with high pressure or high velocity
  - 3/044 . Systems in which all treatment is given in the central station, i.e. all-air systems
  - 3/0442 . . {with volume control at a constant temperature}
  - 3/0444 . . . {in which two airstreams are conducted from the central station via independent conduits to the space to be treated, of which one has a constant volume and a season-adapted temperature to compensate for the fluctuating heat transfer losses of the building, while the other varies in volume and is always cold in order to compensate for the interior fluctuations and variable solar heating effects, i.e. so-called "Dual Conduit System"; this system is similar to a high-pressure air-water system}
  - 2003/0446 . . {with a single air duct for transporting treated air from the central station to the rooms}
  - 2003/0448 . . {with two air ducts for separately transporting treated hot and cold air from the central station to the rooms}
  - 3/048 . . with temperature control at constant rate of air-flow
  - 3/052 . . . Multiple duct systems, e.g. systems in which hot and cold air are supplied by separate circuits from the central station to mixing chambers in the spaces to be conditioned
  - 3/0522 . . . . {in which warm or cold air from the central station is delivered via individual pipes to mixing chambers in the space to be treated, the cold air/warm air ratio being controlled by a thermostat in the space concerned, i.e. so-called Dual-duct System}
  - 3/0525 . . . . {in which the air treated in the central station is reheated; this may take place near the central station upon arrival, in the space to be treated, in a branch pipe to zone in a multi-zone system or in the warm pipe in a system having separate supply conduits for warm and cold air}
  - 3/0527 . . . . {in which treated air having differing temperatures is conducted through independent conduits from the central station to various spaces to be treated, i.e. so-called "multi-Zone" system; (F24F 3/0525 takes precedence)}
  - 3/056 . . the air at least partially flowing over lighting fixtures, the heat of which is dissipated or used (outlets for directing or distributing air into rooms or spaces combined with lighting fixtures F24F 13/078)
  - 3/06 . characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units
  - 3/065 . . {with a plurality of evaporators or condensers}
  - 3/08 . . with separate supply and return lines for hot and cold heat-exchange fluids {i.e. so-called "4-conduit" system}
  - 3/10 . . with separate supply lines and common return line for hot and cold heat-exchange fluids {i.e. so-called "3-conduit" system}
  - 3/12 . characterised by the treatment of the air otherwise than by heating and cooling
  - 3/14 . . by humidification; by dehumidification
  - 3/1405 . . . {in which the humidity of the air is exclusively affected by contact with the evaporator of a closed-circuit cooling system or heat pump circuit}
  - 3/1411 . . . {by absorbing or adsorbing water, e.g. using an hygroscopic desiccant}
  - 3/1417 . . . . {with liquid hygroscopic desiccants}
  - 3/1423 . . . . {with a moving bed of solid desiccants, e.g. a rotary wheel supporting solid desiccants}
  - 3/1429 . . . . {alternatively operating a heat exchanger in an absorbing/adsorbing mode and a heat exchanger in a regeneration mode}
  - 2003/1435 . . . {comprising semi-permeable membrane}
  - 2003/144 . . . {by dehumidification only}
  - 2003/1446 . . . . {by condensing}
  - 2003/1452 . . . . . {heat extracted from the humid air for condensing is returned to the dried air}
  - 2003/1458 . . . {using regenerators}
  - 2003/1464 . . . . {using rotating regenerators}
  - 3/147 . . . with both heat and humidity transfer between supplied and exhausted air
  - 3/153 . . . with subsequent heating, i.e. with the air, given the required humidity in the central station, passing a heating element to achieve the required temperature
  - 3/16 . . by purification, e.g. by filtering; by sterilisation; by ozonisation
- WARNING**
- Group [F24F 3/16](#) is impacted by reclassification into groups [F24F 8/00](#), [F24F 8/20](#), [F24F 8/22](#), [F24F 8/24](#), [F24F 8/26](#), [F24F 8/28](#), [F24F 8/30](#), [F24F 8/40](#), [F24F 8/50](#), [F24F 8/60](#), [F24F 8/70](#), [F24F 8/80](#), and [F24F 8/95](#).
- All groups listed in this Warning should be considered in order to perform a complete search.
- 3/163 . . . Clean air work stations, i.e. selected areas within a space which filtered air is passed
  - 3/167 . . . Clean rooms, i.e. enclosed spaces in which a uniform flow of filtered air is distributed (air distribution by perforated walls [F24F 7/10](#))
  - 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}**
  - 5/0003 . {Exclusively-fluid systems}
  - 5/0007 . {cooling apparatus specially adapted for use in air-conditioning (self-contained room units [F24F 1/02](#); [F24F 5/0046](#) takes precedence; air-humidification [F24F 6/00](#))}
  - 5/001 . . {Compression cycle type}
  - 5/0014 . . {using absorption or desorption}
  - 5/0017 . . {using cold storage bodies, e.g. ice}
  - 5/0021 . . . {using phase change material [PCM] for storage}

- 2005/0025 . . . {using heat exchange fluid storage tanks}
- 2005/0028 . . . {using hydridable metals as energy storage media}
- 2005/0032 . . . {Systems storing energy during the night}
- 5/0035 . . {using evaporation}
- 2005/0039 . . {using a cryogen, e.g. CO<sub>2</sub> liquid or N<sub>2</sub> liquid}
- 5/0042 . {characterised by the application of thermo-electric units or the Peltier effect (refrigerators and cooling systems using magnetic or electrical effects in general [F25B 21/02](#); for semi-conductors [H01L 23/38](#); thermobatteries or thermogenerators [H01L 35/00](#))}
- 5/0046 . {using natural energy, e.g. solar energy, energy from the ground}
- 5/005 . . {using energy from the ground by air circulation, e.g. "Canadian well"}
- 2005/0053 . . {receiving heat-exchange fluid from a well}
- 2005/0057 . . {receiving heat-exchange fluid from a closed circuit in the ground}
- 2005/006 . . {receiving heat-exchange fluid from the drinking or sanitary water supply circuit}
- 2005/0064 . . {using solar energy}
- 2005/0067 . . . {with photovoltaic panels}
- 5/0071 . {adapted for use in covered swimming pools}
- 5/0075 . {Systems using thermal walls, e.g. double window (double windows [per se E06B](#))}
- 2005/0078 . . {Double windows}
- 2005/0082 . . {Facades}
- 5/0085 . {Systems using a compressed air circuit ([B64D 13/00](#), [B60H](#) take precedence)}
- 5/0089 . {Systems using radiation from walls or panels}
- 5/0092 . . {ceilings, e.g. cool ceilings}
- 5/0096 . {combined with domestic apparatus}
- 6/00 Air-humidification {, e.g. cooling by humidification}**
- 2006/001 . {using a water curtain}
- 2006/003 . {using a decorative fountain}
- 2006/005 . {using plants}
- 2006/006 . {with water treatment}
- 2006/008 . {Air-humidifier with water reservoir}
- 6/02 . by evaporation of water in the air {(humidifiers specially adapted for radiators [see F24D 19/008](#))}
- 6/025 . . {using electrical heating means ([F24F 6/105](#) takes precedence)}
- 6/04 . . using stationary unheated wet elements
- 6/043 . . . {with self-sucking action, e.g. wicks (humidifiers for radiators [F24D 19/008](#))}
- 2006/046 . . . {with a water pump}
- 6/06 . . using moving unheated wet elements
- 2006/065 . . . {using slowly rotating discs for evaporation}
- 6/08 . . using heated wet elements
- 6/10 . . . heated electrically
- 6/105 . . . . {using the heat of lamps}
- 6/12 . by forming water dispersions in the air
- 6/14 . . using nozzles
- 2006/143 . . . {using pressurised air for spraying}
- 2006/146 . . . {using pressurised water for spraying}
- 6/16 . . using rotating elements
- 6/18 . by injection of steam into the air

**7/00****Ventilation****WARNING**

Group [F24F 7/00](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 7/00](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 2007/001 . {with exhausting air ducts}

**WARNING**

Group [F24F 2007/001](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 2007/001](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 2007/002 . . {Junction box, e.g. for ducts from kitchen, toilet or bathroom}

**WARNING**

Group [F24F 2007/002](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 2007/002](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 2007/0025 . {using vent ports in a wall}

**WARNING**

Group [F24F 2007/0025](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 2007/0025](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 7/003 . in combination with air cleaning

**WARNING**

Group [F24F 7/003](#) is incomplete pending reclassification of documents from groups [F24F 7/00](#), [F24F 2007/001](#), [F24F 2007/002](#), [F24F 2007/0025](#), [F24F 2007/004](#), and [F24F 2007/005](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 2007/004 . {Natural ventilation using convection}

**WARNING**

Group [F24F 2007/004](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 2007/004](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 2007/005 . {Cyclic ventilation, e.g. alternating air supply volume or reversing flow direction}

**WARNING**

Group [F24F 2007/005](#) is impacted by reclassification into group [F24F 7/003](#).

Groups [F24F 2007/005](#) and [F24F 7/003](#) should be considered in order to perform a complete search.

- 7/007 . . with forced flow (using ducting systems [F24F 7/06](#))
- 7/013 . . using wall or window fans, displacing air through the wall or window
- 7/02 . . Roof ventilation (ventilation of roof coverings [E04D](#))
- 7/025 . . { with forced air circulation by means of a built-in ventilator }
- 7/04 . . with ducting systems { also by double walls; with natural circulation ([F24F 7/02](#) takes precedence) }
- 7/06 . . with forced air circulation, e.g. by fan { positioning of a ventilator in or against a conduit }
- 7/065 . . . { fan combined with single duct; mounting arrangements of a fan in a duct }
- 7/08 . . . with separate ducts for supplied and exhausted air { with provisions for reversal of the input and output systems }
- 7/10 . . . with air supply, or exhaust, through perforated wall, floor or ceiling (outlet members for directing or distributing air { into rooms or spaces, e.g. ceiling air-diffusers } [F24F 13/06](#))

**8/00 Treatment, e.g. purification, of air supplied to human living or working spaces otherwise than by heating, cooling, humidifying or drying**

**WARNING**

Groups [F24F 8/00](#), [F24F 8/20](#), [F24F 8/22](#), [F24F 8/24](#), [F24F 8/26](#), [F24F 8/28](#), [F24F 8/30](#), [F24F 8/40](#), [F24F 8/50](#), [F24F 8/60](#), [F24F 8/70](#), [F24F 8/80](#), and [F24F 8/95](#) are incomplete pending reclassification of documents from group [F24F 3/16](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/10 . . by separation, e.g. by filtering

**WARNING**

Group [F24F 8/10](#) is impacted by reclassification into groups [F24F 8/108](#), [F24F 8/117](#), [F24F 8/125](#), [F24F 8/133](#), [F24F 8/142](#), [F24F 8/15](#), [F24F 8/158](#), [F24F 8/167](#), [F24F 8/175](#), [F24F 8/183](#), [F24F 8/90](#), [F24F 8/96](#), [F24F 8/97](#), [F24F 8/98](#), and [F24F 8/99](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/108 . . using dry filter elements

**WARNING**

Group [F24F 8/108](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/108](#) should be considered in order to perform a complete search.

- 8/117 . . using wet filtering

**WARNING**

Group [F24F 8/117](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Group [F24F 8/117](#) is also impacted by reclassification into groups [F24F 8/125](#), [F24F 8/133](#), and [F24F 8/142](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/125 . . . using wet filter elements

**WARNING**

Group [F24F 8/125](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/125](#) should be considered in order to perform a complete search.

- 8/133 . . . by direct contact with liquid, e.g. with sprayed liquid

**WARNING**

Group [F24F 8/133](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/133](#) should be considered in order to perform a complete search.

- 8/142 . . . Treatment of used liquid, e.g. cleaning for recycling

**WARNING**

Group [F24F 8/142](#) is incomplete pending reclassification of documents from groups [F24F 8/10](#) and [F24F 8/117](#).

Groups [F24F 8/10](#), [F24F 8/117](#), and [F24F 8/142](#) should be considered in order to perform a complete search.

- 8/15 . . by chemical means

**WARNING**

Groups [F24F 8/15](#) - [F24F 8/167](#) are incomplete pending reclassification of documents from group [F24F 8/10](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 8/158 . . . using active carbon

- 8/167 . . . using catalytic reactions



- 8/175 . . using biological materials, plants or microorganisms
- WARNING**
- Group [F24F 8/175](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).
- Groups [F24F 8/10](#) and [F24F 8/175](#) should be considered in order to perform a complete search.

- 8/183 . . by centrifugal separation, e.g. using vortices
- WARNING**
- Group [F24F 8/183](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).
- Groups [F24F 8/10](#) and [F24F 8/183](#) should be considered in order to perform a complete search.

- 8/192 . . by electrical means, e.g. by applying electrostatic fields or high voltages
- 8/194 . . . {by filtering using high voltage}
- 8/20 . by sterilisation
- 8/22 . . using UV light
- 8/24 . . using sterilising media
- 8/26 . . . using ozone
- 8/28 . . specially adapted for combatting or avoiding Legionella bacteria
- 8/30 . by ionisation
- 8/40 . by ozonisation (for sterilisation [F24F 8/26](#))
- 8/50 . by odourisation
- 8/60 . by adding oxygen
- 8/70 . by removing radon
- 8/80 . Self-contained air purifiers
- 8/90 . Cleaning of purification apparatus

**WARNING**

Group [F24F 8/90](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/90](#) should be considered in order to perform a complete search.

- 8/95 . specially adapted for specific purposes
- 8/96 . . for removing pollen

**WARNING**

Group [F24F 8/96](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/96](#) should be considered in order to perform a complete search.

- 8/97 . . for removing tobacco smoke

**WARNING**

Group [F24F 8/97](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/97](#) should be considered in order to perform a complete search.

- 8/98 . . for removing ozone

**WARNING**

Group [F24F 8/98](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/98](#) should be considered in order to perform a complete search.

- 8/99 . . for treating air sourced from urban areas, e.g. from streets

**WARNING**

Group [F24F 8/99](#) is incomplete pending reclassification of documents from group [F24F 8/10](#).

Groups [F24F 8/10](#) and [F24F 8/99](#) should be considered in order to perform a complete search.

- 9/00 Use of air currents for screening, e.g. air curtains**
- 2009/002 . {Room dividers}
- 2009/005 . {combined with a door}
- 2009/007 . {using more than one jet or band in the air curtain}

**11/00 Control or safety arrangements****NOTE**

In this group, it is desirable to add the indexing codes of groups [F24F 2110/00](#) – [F24F 2140/00](#).

- 11/0001 . {for ventilation ([F24F 11/30](#) takes precedence)}
- 2011/0002 . . {for admittance of outside air}
- 2011/0004 . . . {to create overpressure in a room}
- 2011/0005 . . . {to create underpressure in a room, keeping contamination inside}
- 2011/0006 . . {using low temperature external supply air to assist cooling}
- 11/0008 . {for air-humidification ([F24F 11/30](#) takes precedence)}

- 11/30 . . for purposes related to the operation of the system, e.g. for safety or monitoring

#### **WARNINGS**

1. Group [F24F 11/30](#) is impacted by reclassification into groups [F24F 11/32](#) – [F24F 11/88](#), [F24F 2120/00](#), and [F24F 2140/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

2. Groups [F24F 11/32](#) – [F24F 11/49](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/30](#) and [F24F 11/32](#) – [F24F 11/49](#) should be considered in order to perform a complete search.

- 11/32 . . Responding to malfunctions or emergencies  
 11/33 . . . to fire, excessive heat or smoke  
 11/34 . . . . by opening air passages  
 11/35 . . . . by closing air passages  
 11/36 . . . to leakage of heat-exchange fluid  
 11/37 . . . Resuming operation, e.g. after power outages; Emergency starting  
 11/38 . . . Failure diagnosis  
 11/39 . . . Monitoring filter performance  
 11/41 . . Defrosting; Preventing freezing  
 11/42 . . . of outdoor units  
 11/43 . . . of indoor units  
 11/46 . . Improving electric energy efficiency or saving  
 11/47 . . . Responding to energy costs  
 11/48 . . prior to normal operation, e.g. pre-heating or pre-cooling  
 11/49 . . ensuring correct operation, e.g. by trial operation or configuration checks  
 11/50 . . characterised by user interfaces or communication

#### **WARNING**

Groups [F24F 11/50](#) – [F24F 11/61](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/50](#) – [F24F 11/61](#) and [F24F 11/30](#) should be considered in order to perform a complete search.

- 11/52 . . Indication arrangements, e.g. displays  
 11/523 . . . for displaying temperature data  
 11/526 . . . giving audible indications  
 11/54 . . using one central controller connected to several sub-controllers  
 11/56 . . Remote control  
 11/57 . . . using telephone networks  
 11/58 . . . using Internet communication  
 11/59 . . . for presetting  
 11/61 . . using timers

- 11/62 . . characterised by the type of control or by internal processing, e.g. using fuzzy logic, adaptive control or estimation of values

#### **WARNING**

Groups [F24F 11/62](#) – [F24F 11/67](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/62](#) – [F24F 11/67](#) and [F24F 11/30](#) should be considered in order to perform a complete search.

- 11/63 . . . Electronic processing  
 11/64 . . . using pre-stored data  
 11/65 . . . for selecting an operating mode

#### **WARNING**

Group [F24F 11/65](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).

Group [F24F 11/65](#) is also impacted by reclassification into group [F24F 11/67](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 11/66 . . . . Sleep mode  
 11/67 . . . . Switching between heating and cooling modes

#### **WARNING**

Group [F24F 11/67](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/65](#).

Groups [F24F 11/30](#), [F24F 11/65](#), and [F24F 11/67](#) should be considered in order to perform a complete search.

- 11/70 . . Control systems characterised by their outputs; Constructional details thereof

#### **WARNING**

Groups [F24F 11/70](#) – [F24F 11/875](#) are incomplete pending reclassification of documents from group [F24F 11/30](#).

Group [F24F 11/70](#) is also impacted by reclassification into groups [F24F 11/80](#) – [F24F 11/875](#).

All groups listed in this warning should be considered in order to perform a complete search.

- 11/72 . . for controlling the supply of treated air, e.g. its pressure  
 11/74 . . . for controlling air flow rate or air velocity

#### **WARNING**

Group [F24F 11/74](#) is incomplete pending reclassification of documents from group [F24F 11/30](#) and [F24F 11/70](#).

Group [F24F 11/74](#) is also impacted by reclassification into group [F24F 11/755](#).

All groups listed in this warning should be considered in order to perform a complete search

- 11/745 . . . . {the air flow rate increasing with an increase of air-current or wind pressure}
- 11/75 . . . . for maintaining constant air flow rate or air velocity
- 11/755 . . . . for cyclical variation of air flow rate or air velocity

**WARNING**

Group [F24F 11/755](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/74](#).

All groups listed in this warning should be considered in order to perform a complete search.

- 11/76 . . . . by means responsive to temperature, e.g. bimetal springs
- 11/77 . . . . by controlling the speed of ventilators
- 11/79 . . . . for controlling the direction of the supplied air
- 11/80 . . . . for controlling the temperature of the supplied air

**WARNING**

Groups [F24F 11/80](#) – [F24F 11/875](#) are incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/70](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 11/81 . . . . by controlling the air supply to heat-exchangers or bypass channels
- 11/83 . . . . by controlling the supply of heat-exchange fluids to heat-exchangers

**WARNING**

Group [F24F 11/83](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#) and [F24F 11/70](#).

Group [F24F 11/83](#) is also impacted by reclassification into groups [F24F 11/84](#) and [F24F 11/85](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 11/84 . . . . using valves

**WARNING**

Group [F24F 11/84](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/83](#).

All groups listed in this warning should be considered in order to perform a complete search.

- 11/85 . . . . using variable-flow pumps

**WARNING**

Group [F24F 11/85](#) is incomplete pending reclassification of documents from groups [F24F 11/30](#), [F24F 11/70](#) and [F24F 11/83](#).

All groups listed should be considered in order to perform a complete search.

- 11/86 . . . . by controlling compressors within refrigeration or heat pump circuits
- 11/87 . . . . by controlling absorption or discharge of heat in outdoor units
- 11/871 . . . . by controlling outdoor fans
- 11/873 . . . . by controlling refrigerant heaters
- 11/875 . . . . by controlling heat-storage apparatus
- 11/88 . . . . Electrical aspects, e.g. circuits

**WARNING**

Group [F24F 11/88](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).

Groups [F24F 11/30](#) and [F24F 11/88](#) should be considered in order to perform a complete search.

- 11/89 . . . . Arrangement or mounting of control or safety devices

### **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](#))**

- 12/001 . . . {with heat-exchange between supplied and exhausted air}
- 12/002 . . . {using an intermediate heat-transfer fluid}
- 12/003 . . . {using a heat pump}
- 2012/005 . . . {using heat pipes}
- 12/006 . . . {using an air-to-air heat exchanger ([F24F 12/002](#) takes precedence)}
- 2012/007 . . . {using a by-pass for bypassing the heat-exchanger}
- 2012/008 . . . {cyclic routing supply and exhaust air}

### **13/00 Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening**

- 13/02 . . . Ducting arrangements
- 13/0209 . . . {characterised by their connecting means, e.g. flanges}
- 13/0218 . . . {Flexible soft ducts, e.g. ducts made of permeable textiles}
- 13/0227 . . . {using parts of the building, e.g. air ducts inside the floor, walls or ceiling of a building ([air ducts or channels of buildings E04F 17/04](#))}
- 13/0236 . . . {with ducts including air distributors, e.g. air collecting boxes with at least three openings}
- 13/0245 . . . {Manufacturing or assembly of air ducts; Methods therefor}
- 13/0254 . . . {characterised by their mounting means, e.g. supports}
- 13/0263 . . . {Insulation for air ducts}
- 13/0272 . . . {Modules for easy installation or transport}
- 13/0281 . . . {Multilayer duct}
- 13/029 . . . {Duct comprising an opening for inspection, e.g. manhole}
- 13/04 . . . Air-mixing units ([F24F 13/06](#) takes precedence {; room units for the mixing of pre-treated primary air with recirculated or room air [F24F 1/00](#)})
- 13/06 . . . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser
- 13/0604 . . . {integrated in or forming part of furniture}
- 2013/0608 . . . {Perforated ducts}
- 2013/0612 . . . {Induction nozzles without swirl means}



- 2013/0616 . . . {Outlets that have intake openings}
- 13/062 . . . having one or more bowls or cones diverging in the flow direction
- 13/065 . . . formed as cylindrical or spherical bodies which are rotatable
- 13/068 . . . formed as perforated walls, ceilings or floors ([F24F 13/078 takes precedence](#))
- 13/072 . . . of elongated shape, e.g. between ceiling panels
- 13/075 . . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable ([F24F 13/072 takes precedence](#))
- 13/078 . . . combined with lighting fixtures
- 13/08 . . Air-flow control members, e.g. louveres, grilles, flaps or guide plates ([F24F 7/013](#), [F24F 13/06 take precedence](#))
- 13/081 . . {for guiding air around a curve}
- 13/082 . . {Grilles, registers or guards}
- 13/084 . . . {with mounting arrangements, e.g. snap fasteners for mounting to the wall or duct}
- 13/085 . . . {including an air filter}
- 2013/087 . . . {using inflatable bellows}
- 2013/088 . . . {Air-flow straightener}
- 13/10 . . movable, e.g. dampers
- 13/105 . . . {composed of diaphragms or segments}
- 13/12 . . . built up of sliding members
- 13/14 . . . built up of tilting members, e.g. louver
- 13/1406 . . . . {characterised by sealing means}
- 13/1413 . . . . {using more than one tilting member, e.g. with several pivoting blades ([F24F 13/15 takes precedence](#))}
- 13/142 . . . . {using pivoting blades with intersecting axles}
- 13/1426 . . . . {characterised by actuating means}
- 2013/1433 . . . . . {with electric motors}
- 2013/144 . . . . . {with thermoactuators}
- 2013/1446 . . . . . {with gearings}
- 2013/1453 . . . . . {with cables, e.g. bowden cables}
- 2013/146 . . . . . {with springs}
- 2013/1466 . . . . . {with pneumatic means}
- 2013/1473 . . . . . {with cams or levers}
- 2013/148 . . . . . {with magnets}
- 13/1486 . . . . {characterised by bearings, pivots or hinges}
- 2013/1493 . . . . {using an elastic membrane}
- 13/15 . . . . with parallel simultaneously tiltable lamellae
- 13/16 . . . built up of parallelly-movable plates
- 13/18 . . specially adapted for insertion in flat panels, e.g. in door or window-pane
- 13/20 . Casings or covers
- 2013/202 . . {Mounting a compressor unit therein}
- 2013/205 . . {Mounting a ventilator fan therein}
- 2013/207 . . {with control knobs; Mounting controlling members or control units therein}
- 13/22 . Means for preventing condensation or evacuating condensate {(for refrigerating devices in general [F25D 21/14](#))}
- 2013/221 . . {to avoid the formation of condensate, e.g. dew}
- 13/222 . . {for evacuating condensate}
- 13/224 . . . {in a window-type room air conditioner}
- 2013/225 . . . {by evaporating the condensate in the cooling medium, e.g. in air flow from the condenser}
- 2013/227 . . . {Condensate pipe for drainage of condensate from the evaporator}

- 2013/228 . . {Treatment of condensate, e.g. sterilising}
- 13/24 . Means for preventing or suppressing noise {(in [perforated ceilings F24F 7/10](#))}
- 2013/242 . . {Sound-absorbing material}
- 2013/245 . . {using resonance}
- 2013/247 . . {Active noise-suppression}
- 13/26 . Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect
- 13/28 . Arrangement or mounting of filters
- 13/30 . Arrangement or mounting of heat-exchangers
- 13/32 . Supports for air-conditioning, air-humidification or ventilation units

**Indexing scheme associated with group F24F 11/00, relating to control inputs, e.g. measured or estimated values or parameters**

**2110/00 Control inputs relating to air properties**

- 2110/10 . Temperature
- 2110/12 . . of the outside air
- 2110/20 . Humidity
- 2110/22 . . of the outside air
- 2110/30 . Velocity
- 2110/32 . . of the outside air
- 2110/40 . Pressure, e.g. wind pressure

**WARNING**

Group [F24F 2110/40](#) is impacted by reclassification into groups [F24F 2140/10](#) and [F24F 2140/12](#).

Groups [F24F 2110/40](#), [F24F 2140/10](#), and [F24F 2140/12](#) should be considered in order to perform a complete search.

- 2110/50 . Air quality properties

**WARNING**

Group [F24F 2110/50](#) is impacted by reclassification into group [F24F 2110/65](#).

Groups [F24F 2110/50](#) and [F24F 2110/65](#) should be considered in order to perform a complete search.

- 2110/52 . . of the outside air
- 2110/60 . . Odour
- 2110/62 . . Tobacco smoke
- 2110/64 . . Airborne particle content
- 2110/65 . . Concentration of specific substances or contaminants

**WARNING**

Group [F24F 2110/65](#) is incomplete pending reclassification of documents from group [F24F 2110/50](#).

Groups [F24F 2110/50](#) and [F24F 2110/65](#) should be considered in order to perform a complete search.

- 2110/66 . . . Volatile organic compounds [VOC]
- 2110/68 . . . Radon
- 2110/70 . . . Carbon dioxide
- 2110/72 . . . Carbon monoxide
- 2110/74 . . . Ozone
- 2110/76 . . . Oxygen
- 2110/80 . . Electric charge

**2120/00 Control inputs relating to users or occupants**

**WARNING**

Group [F24F 2120/00](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).  
Groups [F24F 11/30](#) and [F24F 2120/00](#) should be considered in order to perform a complete search.

- 2120/10 . Occupancy
- 2120/12 . . Position of occupants
- 2120/14 . . Activity of occupants
- 2120/20 . Feedback from users

**2130/00 Control inputs relating to environmental factors not covered by group [F24F 2110/00](#)**

- 2130/10 . Weather information or forecasts
- 2130/20 . Sunlight
- 2130/30 . Artificial light
- 2130/40 . Noise

**2140/00 Control inputs relating to system states**

**WARNING**

Group [F24F 2140/00](#) is incomplete pending reclassification of documents from group [F24F 11/30](#).  
Groups [F24F 11/30](#) and [F24F 2140/00](#) should be considered in order to perform a complete search.

- 2140/10 . Pressure

**WARNING**

Groups [F24F 2140/10](#) and [F24F 2140/12](#) are incomplete pending reclassification of documents from group [F24F 2110/40](#).  
Groups [F24F 2110/40](#), [F24F 2140/10](#) and [F24F 2140/12](#) should be considered in order to perform a complete search.

- 2140/12 . . Heat-exchange fluid pressure
- 2140/20 . Heat-exchange fluid temperature
- 2140/30 . Condensation of water from cooled air
- 2140/40 . Damper positions, e.g. open or closed
- 2140/50 . Load
- 2140/60 . Energy consumption

**2203/00 Devices or apparatus used for air treatment**

- 2203/02 . System or Device comprising a heat pump as a subsystem, e.g. combined with humidification/dehumidification, heating, natural energy or with hybrid system
- 2203/021 . . Compression cycle
- 2203/023 . . . with turbine used for expansion
- 2203/025 . . . with turbine for compression
- 2203/026 . . Absorption - desorption cycle
- 2203/028 . . . using a solid absorbing medium
- 2203/10 . Rotary wheel
- 2203/1004 . . Bearings or driving means
- 2203/1008 . . comprising a by-pass channel
- 2203/1012 . . Details of the casing or cover
- 2203/1016 . . combined with another type of cooling principle, e.g. compression cycle
- 2203/102 . . combined with a heat pipe

- 2203/1024 . . combined with a humidifier
- 2203/1028 . . combined with a spraying device
- 2203/1032 . . Desiccant wheel
- 2203/1036 . . . Details
- 2203/104 . . Heat exchanger wheel
- 2203/1044 . . performing other movements, e.g. sliding
- 2203/1048 . . Geometric details
- 2203/1052 . . comprising a non-axial air flow
- 2203/1056 . . comprising a reheater
- 2203/106 . . . Electrical reheater
- 2203/1064 . . . Gas fired reheater
- 2203/1068 . . comprising one rotor
- 2203/1072 . . comprising two rotors
- 2203/1076 . . comprising three rotors
- 2203/108 . . comprising rotor parts shaped in sector form
- 2203/1084 . . comprising two flow rotor segments
- 2203/1088 . . comprising three flow rotor segments
- 2203/1092 . . comprising four flow rotor segments
- 2203/1096 . . comprising sealing means
- 2203/12 . Dehumidifying or humidifying belt type

**Air-conditioning**

**2221/00 Details or features not otherwise provided for**

- 2221/02 . combined with lighting fixtures
- 2221/08 . Installation or apparatus for use in sport halls, e.g. swimming pools, ice rings
- 2221/10 . combined with, or integrated in, furniture
- 2221/12 . transportable
- 2221/125 . . mounted on wheels
- 2221/14 . mounted on the ceiling
- 2221/16 . mounted on the roof
- 2221/17 . mounted in a wall
- 2221/18 . combined with domestic apparatus
- 2221/183 . . combined with a hot-water boiler
- 2221/186 . . combined with a fireplace
- 2221/20 . mounted in or close to a window
- 2221/22 . Cleaning ducts or apparatus
- 2221/225 . . using a liquid
- 2221/26 . improving the aesthetic appearance
- 2221/28 . using the Coanda effect
- 2221/30 . comprising fireproof material
- 2221/32 . preventing human errors during the installation, use or maintenance, e.g. goofy proof
- 2221/34 . Heater, e.g. gas burner, electric air heater
- 2221/36 . Modules, e.g. for an easy mounting or transport
- 2221/38 . Personalised air distribution
- 2221/40 . HVAC with raised floors
- 2221/42 . Mobile autonomous air conditioner, e.g. robots
- 2221/44 . Protection from terrorism or theft
- 2221/46 . Air flow forming a vortex
- 2221/48 . HVAC for a wine cellar
- 2221/50 . HVAC for high buildings, e.g. thermal or pressure differences
- 2221/52 . Weather protecting means, e.g. against wind, rain or snow
- 2221/54 . Heating and cooling, simultaneously or alternatively
- 2221/56 . Cooling being a secondary aspect