

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](#).

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| 1/00 | Room units for air-conditioning, e.g. separate or self-contained units or units receiving primary air from a central station | 1/0047 | . . . mounted in the ceiling or at the ceiling |
| | | 1/005 | . . . mounted on the floor; standing on the floor |
| 1/0003 | . characterised by a split arrangement, wherein parts of the air-conditioning system, e.g. evaporator and condenser, are in separately located units | 1/0053 | . . . mounted at least partially below the floor; with air distribution below the floor |
| 1/0007 | . Indoor units, e.g. fan coil units (self-contained units F24F 1/02) | 1/0057 | . . . mounted in or on a wall |
| 1/00073 | . . {comprising a compressor in the indoor unit housing} | 1/0059 | . . characterised by heat exchangers |
| 1/00075 | . . {receiving air from a central station} | 1/0063 | . . . by the mounting or arrangement of the heat exchangers |
| 1/00077 | . . {receiving heat exchange fluid entering and leaving the unit as a liquid} | 1/0067 | . . . by the shape of the heat exchangers or of parts thereof, e.g. of their fins |
| 1/0011 | . . characterised by air outlets | 1/0068 | . . characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing |
| 1/0014 | . . . having two or more outlet openings | 1/0071 | . . with means for purifying supplied air (perfuming or deodorising means F24F 1/008) |
| 1/0018 | . . characterised by fans (with secondary air induced by injector action of the primary air F24F 1/01) | 1/0073 | . . . characterised by the mounting or arrangement of filters |
| 1/0022 | . . . Centrifugal or radial fans | 1/0076 | . . . by electric means, e.g. ionisers or electrostatic separators |
| 1/0025 | . . . Cross-flow or tangential fans | 1/008 | . . with perfuming or deodorising means |
| 1/0029 | . . . Axial fans | 1/0083 | . . with dehumidification means |
| 1/0033 | . . . having two or more fans | 1/0087 | . . with humidification means |
| 1/0035 | . . characterised by introduction of outside air to the room | 1/009 | . . characterised by heating arrangements (characterised by heat exchangers F24F 1/0059) |
| 1/0038 | . . . in combination with simultaneous exhaustion of inside air | 1/0093 | . . . with additional radiant heat-discharging elements, e.g. electric heaters |
| 1/0041 | . . characterised by exhaustion of inside air from the room (in combination with simultaneous introduction of outside air F24F 1/0038) | 1/0097 | . . . using thermoelectric or thermomagnetic means, e.g. Peltier elements |
| 1/0043 | . . characterised by mounting arrangements | | |

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| 1/01 | • in which secondary air is induced by injector action of the primary air | 1/20 | • • Electric components for separate outdoor units |
| 1/02 | • Self-contained room units for air-conditioning, i.e. with all apparatus for treatment installed in a common casing | 1/22 | • • • Arrangement or mounting thereof |
| 1/022 | • • comprising a compressor cycle | 1/24 | • • • Cooling of electric components |
| 1/027 | • • • mounted in wall openings, e.g. in windows | 1/26 | • • Refrigerant piping |
| 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) | 1/28 | • • • for connecting several separate outdoor units |
| 1/0284 | • • • with horizontally arranged fan axis | 1/30 | • • • for use inside the separate outdoor units |
| 1/0287 | • • • with vertically arranged fan axis | 1/32 | • • • for connecting the separate outdoor units to indoor units |
| 1/029 | • • characterised by the layout or mutual arrangement of components, e.g. of compressors or fans | 1/34 | • • • Protection means thereof, e.g. covers for refrigerant pipes |
| 1/03 | • • characterised by mounting arrangements | 1/36 | • • Drip trays for outdoor units |
| 1/031 | • • • penetrating a wall or window | 1/38 | • • Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings |
| 1/0314 | • • • mounted on a wall | 1/40 | • • Vibration or noise prevention at outdoor units (for outdoor units compressors F24F 1/12) |
| 1/0317 | • • • suspended from the ceiling | 1/42 | • • characterised by the use of the condensate, e.g. for enhanced cooling |
| 1/032 | • • characterised by heat exchangers | 1/44 | • • characterised by the use of internal combustion engines |
| 1/0323 | • • • by the mounting or arrangement of the heat exchangers | 1/46 | • • Component arrangements in separate outdoor units |
| 1/0325 | • • • by the shape of the heat exchangers or of parts thereof, e.g. of their fins | 1/48 | • • • characterised by air airflow, e.g. inlet or outlet airflow |
| 1/0326 | • • characterised by the arrangement of refrigerant piping outside the heat exchanger within the unit casing | 1/50 | • • • • with outlet air in upward direction |
| 1/0328 | • • with means for purifying supplied air (perfuming or deodorising means F24F 1/0355) | 1/52 | • • • • with inlet and outlet arranged on the same side, e.g. for mounting in a wall opening |
| 1/035 | • • • characterised by the mounting or arrangement of filters | 1/54 | • • • • Inlet and outlet arranged on opposite sides |
| 1/0353 | • • • by electric means, e.g. ionisers or electrostatic separators | 1/56 | • • Casing or covers of separate outdoor units, e.g. fan guards |
| 1/0355 | • • with perfuming or deodorising means | 1/58 | • • • Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage |
| 1/0358 | • • with dehumidification means | 1/60 | • • Arrangement or mounting of the outdoor unit |
| 1/037 | • • with humidification means | 1/62 | • • • Wall-mounted |
| 1/0373 | • • characterised by heating arrangements (characterised by heat exchangers F24F 1/032) | 1/64 | • • • Ceiling-mounted, e.g. below a balcony |
| 1/0375 | • • • with additional radiant heat-discharging elements, e.g. electric heaters | 1/66 | • • • under the floor level |
| 1/0378 | • • • using thermoelectric or thermomagnetic means, e.g. Peltier elements | 1/68 | • • • Arrangement of multiple separate outdoor units |
| 1/039 | • • using water to enhance cooling, e.g. spraying onto condensers | 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) |
| 1/04 | • • Arrangements for portability | 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 (reversible cycle for humidifying and drying air F24F 3/147)} |
| 1/06 | • Separate outdoor units, e.g. outdoor unit to be linked to a separate room comprising a compressor and a heat exchanger | 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} |
| 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. | 2003/005 | • • {with a single air duct for transporting treated primary air from the central station to air treatment units located in or near the rooms} |
| 1/08 | • • Compressors specially adapted for separate outdoor units | 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} |
| 1/10 | • • • Arrangement or mounting thereof | 2003/008 | • {Supplying highly filtered air to a room or to a limited area within a room} |
| 1/12 | • • • Vibration or noise prevention thereof | 3/02 | • characterised by the pressure or velocity of the primary air |
| 1/14 | • • Heat exchangers specially adapted for separate outdoor units | 3/04 | • • operating with high pressure or high velocity |
| 1/16 | • • • Arrangement or mounting thereof | 3/044 | • Systems in which all treatment is given in the central station, i.e. all-air systems |
| 1/18 | • • • characterised by their shape | | |

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| 3/0442 | . . {with volume control at a constant temperature} | 2003/1452 | {heat extracted from the humid air for condensing is returned to the dried air} |
| 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, while the other one is always cold and varies in volume} | 2003/1458 | . . . {using regenerators} |
| 2003/0446 | . . {with a single air duct for transporting treated air from the central station to the rooms} | 2003/1464 | {using rotating regenerators} |
| 2003/0448 | . . {with two air ducts for separately transporting treated hot and cold air from the central station to the rooms} | 3/147 | . . . with both heat and humidity transfer between supplied and exhausted air |
| 3/048 | . . with temperature control at constant rate of air-flow | 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 |
| 3/052 | . . . 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 | 3/16 | . . by purification, e.g. by filtering; by sterilisation; by ozonisation |
| 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} | 3/163 | . . . Clean air work stations, i.e. selected areas within a space which filtered air is passed |
| 3/0525 | {in which the air treated in the central station is reheated} | 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) |
| 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" systems (F24F 3/0525 takes precedence)} | 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} |
| 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) | 5/0003 | . {Exclusively-fluid systems} |
| 3/06 | . characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units | 5/0007 | . {cooling apparatus specially adapted for use in air-conditioning (F24F 5/0046 takes precedence)} |
| 3/065 | . . {with a plurality of evaporators or condensers} | 5/001 | . . {Compression cycle type} |
| 3/08 | . . with separate supply and return lines for hot and cold heat-exchange fluids {i.e. so-called "4-conduit" system} | 5/0014 | . . {using absorption or desorption} |
| 3/10 | . . with separate supply lines and common return line for hot and cold heat-exchange fluids {i.e. so-called "3-conduit" system} | 5/0017 | . . {using cold storage bodies, e.g. ice} |
| 3/12 | . characterised by the treatment of the air otherwise than by heating and cooling | 5/0021 | . . . {using phase change material [PCM] for storage} |
| 3/14 | . . by humidification; by dehumidification | 2005/0025 | . . . {using heat exchange fluid storage tanks} |
| 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} | 2005/0028 | . . . {using hydridable metals as energy storage media} |
| 3/1411 | . . . {by absorbing or adsorbing water, e.g. using an hygroscopic desiccant} | 2005/0032 | . . . {Systems storing energy during the night} |
| 3/1417 | {with liquid hygroscopic desiccants} | 5/0035 | . . {using evaporation} |
| 3/1423 | {with a moving bed of solid desiccants, e.g. a rotary wheel supporting solid desiccants} | 2005/0039 | . . {using a cryogen, e.g. CO ₂ liquid or N ₂ liquid} |
| 3/1429 | {alternatively operating a heat exchanger in an absorbing/adsorbing mode and a heat exchanger in a regeneration mode} | 5/0042 | . {characterised by the application of thermo-electric units or the Peltier effect} |
| 2003/1435 | . . . {comprising semi-permeable membrane} | 5/0046 | . {using natural energy, e.g. solar energy, energy from the ground} |
| 2003/144 | . . . {by dehumidification only} | 5/005 | . . {using energy from the ground by air circulation, e.g. "Canadian well"} |
| 2003/1446 | {by condensing} | 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} |
| | | 2005/0078 | . . {Double windows} |
| | | 2005/0082 | . . {Facades} |
| | | 5/0085 | . {Systems using a compressed air circuit} |
| | | 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} |

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| 2006/008 | . {Air-humidifier with water reservoir} | 8/175 | . . using biological materials, plants or microorganisms |
| 6/02 | . by evaporation of water in the air | 8/183 | . . by centrifugal separation, e.g. using vortices |
| 6/025 | . . {using electrical heating means (F24F 6/105 takes precedence)} | 8/192 | . . by electrical means, e.g. by applying electrostatic fields or high voltages |
| 6/04 | . . using stationary unheated wet elements | 8/194 | . . . {by filtering using high voltage} |
| 6/043 | . . . {with self-sucking action, e.g. wicks} | 8/20 | . by sterilisation |
| 2006/046 | . . . {with a water pump} | 8/22 | . . using UV light |
| 6/06 | . . using moving unheated wet elements | 8/24 | . . using sterilising media |
| 2006/065 | . . . {using slowly rotating discs for evaporation} | 8/26 | . . . using ozone |
| 6/08 | . . using heated wet elements | 8/28 | . . specially adapted for combatting or avoiding Legionella bacteria |
| 6/10 | . . . heated electrically | 8/30 | . by ionisation |
| 6/105 | {using the heat of lamps} | 8/40 | . by ozonisation (for sterilisation F24F 8/26) |
| 6/12 | . by forming water dispersions in the air | 8/50 | . by odourisation |
| 6/14 | . . using nozzles | 8/60 | . by adding oxygen |
| 2006/143 | . . . {using pressurised air for spraying} | 8/70 | . by removing radon |
| 2006/146 | . . . {using pressurised water for spraying} | 8/80 | . Self-contained air purifiers |
| 6/16 | . . using rotating elements | 8/90 | . Cleaning of purification apparatus |
| 6/18 | . by injection of steam into the air | 8/95 | . specially adapted for specific purposes |
| 7/00 | Ventilation | 8/96 | . . for removing pollen |
| 2007/001 | . {with exhausting air ducts} | 8/97 | . . for removing tobacco smoke |
| 2007/002 | . . {Junction box, e.g. for ducts from kitchen, toilet or bathroom} | 8/98 | . . for removing ozone |
| 2007/0025 | . {using vent ports in a wall} | 8/99 | . . for treating air sourced from urban areas, e.g. from streets |
| 7/003 | . in combination with air cleaning | | |
| 2007/004 | . {Natural ventilation using convection} | 9/00 | Use of air currents for screening, e.g. air curtains |
| 2007/005 | . {Cyclic ventilation, e.g. alternating air supply volume or reversing flow direction} | 2009/002 | . {Room dividers} |
| 7/007 | . with forced flow (using ducting systems F24F 7/06) | 2009/005 | . {combined with a door} |
| 7/013 | . . using wall or window fans, displacing air through the wall or window | 2009/007 | . {using more than one jet or band in the air curtain} |
| 7/02 | . Roof ventilation (ventilation of roof coverings E04D) | 11/00 | Control or safety arrangements |
| 7/025 | . . {with forced air circulation by means of a built-in ventilator} | | NOTE |
| 7/04 | . with ducting systems {, e.g. by double walls; with natural circulation (F24F 7/02 takes precedence)} | | In this group, it is desirable to add the indexing codes of groups F24F 2110/00 – F24F 2140/00 . |
| 7/06 | . . with forced air circulation, e.g. by fan {positioning of a ventilator in or against a conduit} | 11/0001 | . {for ventilation (F24F 11/30 takes precedence)} |
| 7/065 | . . . {fan combined with single duct; mounting arrangements of a fan in a duct} | 2011/0002 | . . {for admittance of outside air} |
| 7/08 | . . . with separate ducts for supplied and exhausted air {with provisions for reversal of the input and output systems} | 2011/0004 | . . . {to create overpressure in a room} |
| 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) | 2011/0005 | . . . {to create underpressure in a room, keeping contamination inside} |
| 8/00 | Treatment, e.g. purification, of air supplied to human living or working spaces otherwise than by heating, cooling, humidifying or drying | 2011/0006 | . . {using low temperature external supply air to assist cooling} |
| 8/10 | . by separation, e.g. by filtering | 11/0008 | . {for air-humidification (F24F 11/30 takes precedence)} |
| 8/108 | . . using dry filter elements | 11/30 | . for purposes related to the operation of the system, e.g. for safety or monitoring |
| 8/117 | . . using wet filtering | 11/32 | . . Responding to malfunctions or emergencies |
| 8/125 | . . . using wet filter elements | 11/33 | . . . to fire, excessive heat or smoke |
| 8/133 | . . . by direct contact with liquid, e.g. with sprayed liquid | 11/34 | by opening air passages |
| 8/142 | . . . Treatment of used liquid, e.g. cleaning for recycling | 11/35 | by closing air passages |
| 8/15 | . . by chemical means | 11/36 | . . . to leakage of heat-exchange fluid |
| 8/158 | . . . using active carbon | 11/37 | . . . Resuming operation, e.g. after power outages; Emergency starting |
| 8/167 | . . . using catalytic reactions | 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 |

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| 11/49 | . . ensuring correct operation, e.g. by trial operation or configuration checks | 2012/005 | . . . {using heat pipes} |
| 11/50 | . characterised by user interfaces or communication | 12/006 | . . {using an air-to-air heat exchanger (F24F 12/002 takes precedence)} |
| 11/52 | . . Indication arrangements, e.g. displays | 2012/007 | . . {using a by-pass for bypassing the heat-exchanger} |
| 11/523 | . . . for displaying temperature data | 2012/008 | . . {cyclic routing supply and exhaust air} |
| 11/526 | . . . giving audible indications | | |
| 11/54 | . . using one central controller connected to several sub-controllers | 13/00 | Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening |
| 11/56 | . . Remote control | 13/02 | . Ducting arrangements |
| 11/57 | . . . using telephone networks | 13/0209 | . . {characterised by their connecting means, e.g. flanges} |
| 11/58 | . . . using Internet communication | 13/0218 | . . {Flexible soft ducts, e.g. ducts made of permeable textiles} |
| 11/59 | . . . for presetting | 13/0227 | . . {using parts of the building, e.g. air ducts inside the floor, walls or ceiling of a building} |
| 11/61 | . . using timers | 13/0236 | . . {with ducts including air distributors, e.g. air collecting boxes with at least three openings} |
| 11/62 | . characterised by the type of control or by internal processing, e.g. using fuzzy logic, adaptive control or estimation of values | 13/0245 | . . {Manufacturing or assembly of air ducts; Methods therefor} |
| 11/63 | . . Electronic processing | 13/0254 | . . {characterised by their mounting means, e.g. supports} |
| 11/64 | . . . using pre-stored data | 13/0263 | . . {Insulation for air ducts} |
| 11/65 | . . . for selecting an operating mode | 13/0272 | . . {Modules for easy installation or transport} |
| 11/66 | Sleep mode | 13/0281 | . . {Multilayer duct} |
| 11/67 | Switching between heating and cooling modes | 13/029 | . . {Duct comprising an opening for inspection, e.g. manhole} |
| 11/70 | . Control systems characterised by their outputs; Constructional details thereof | 13/04 | . . Air-mixing units (F24F 13/06 takes precedence) |
| 11/72 | . . for controlling the supply of treated air, e.g. its pressure | 13/06 | . . Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser |
| 11/74 | . . . for controlling air flow rate or air velocity | 13/0604 | . . . {integrated in or forming part of furniture} |
| 11/745 | {the air flow rate increasing with an increase of air-current or wind pressure} | 2013/0608 | . . . {Perforated ducts} |
| 11/75 | for maintaining constant air flow rate or air velocity | 2013/0612 | . . . {Induction nozzles without swirl means} |
| 11/755 | for cyclical variation of air flow rate or air velocity | 2013/0616 | . . . {Outlets that have intake openings} |
| 11/76 | by means responsive to temperature, e.g. bimetal springs | 13/062 | . . . having one or more bowls or cones diverging in the flow direction |
| 11/77 | by controlling the speed of ventilators | 13/065 | . . . formed as cylindrical or spherical bodies which are rotatable |
| 11/79 | . . . for controlling the direction of the supplied air | 13/068 | . . . formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence) |
| 11/80 | . . for controlling the temperature of the supplied air | 13/072 | . . . of elongated shape, e.g. between ceiling panels |
| 11/81 | . . . by controlling the air supply to heat-exchangers or bypass channels | 13/075 | . . . having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence) |
| 11/83 | . . . by controlling the supply of heat-exchange fluids to heat-exchangers | 13/078 | . . . combined with lighting fixtures |
| 11/84 | using valves | 13/08 | . Air-flow control members, e.g. louveres, grilles, flaps or guide plates (F24F 7/013 , F24F 13/06 take precedence) |
| 11/85 | using variable-flow pumps | 13/081 | . . {for guiding air around a curve} |
| 11/86 | . . . by controlling compressors within refrigeration or heat pump circuits | 13/082 | . . {Grilles, registers or guards} |
| 11/87 | . . . by controlling absorption or discharge of heat in outdoor units | 13/084 | . . . {with mounting arrangements, e.g. snap fasteners for mounting to the wall or duct} |
| 11/871 | by controlling outdoor fans | 13/085 | . . . {including an air filter} |
| 11/873 | . . . by controlling refrigerant heaters | 2013/087 | . . . {using inflatable bellows} |
| 11/875 | . . . by controlling heat-storage apparatus | 2013/088 | . . . {Air-flow straightener} |
| 11/88 | . Electrical aspects, e.g. circuits | 13/10 | . . movable, e.g. dampers |
| 11/89 | . Arrangement or mounting of control or safety devices | 13/105 | . . . {composed of diaphragms or segments} |
| 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) | 13/12 | . . . built up of sliding members |
| 12/001 | . {with heat-exchange between supplied and exhausted air} | 13/14 | . . . built up of tilting members, e.g. louver |
| 12/002 | . . {using an intermediate heat-transfer fluid} | 13/1406 | {characterised by sealing means} |
| 12/003 | . . . {using a heat pump} | | |

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| 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 |
| 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 |
| 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 |
| 2110/50 | . Air quality properties |
| 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 |
| 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

| | |
|---------|---------------------------|
| 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

| | |
|---------|---|
| 2140/10 | . Pressure |
| 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