

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

F24 HEATING; RANGES; VENTILATING

F24F AIR-CONDITIONING; AIR-HUMIDIFICATION; VENTILATION; USE OF AIR CURRENTS FOR SCREENING (devices for ventilating greenhouses A01G; 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 gasproof 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; 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 or 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)

Note(s)

1. 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.
2. In this subclass, the following terms or expressions are used with the meanings indicated:
 - "air-conditioning" means the supply of air to rooms or spaces by means which provide for the treatment of the air in at least two of the following ways:
heating — cooling — any other kind of treatment, e.g. humidification;
 - "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.
3. Processes using enzymes or micro-organisms in order to:
 - i. liberate, separate or purify a pre-existing compound or composition, or to
 - ii. treat textiles or clean solid surfaces of materials
 are further classified in subclass C12S.

Subclass index

AIR-CONDITIONING

Room units; central systems; other systems or apparatus.....1/00, 3/00, 5/00

AIR-HUMIDIFICATION.....6/00

VENTILATION.....7/00

SCREENING BY AIR CURRENTS.....9/00

COMMON DETAILS

Control, safety.....11/00

Use of energy recovery systems.....12/00

Other details.....13/00

Air-conditioning

1/00 Room units, e.g. separate or self-contained units or units receiving primary air from a central station [1, 2011.01]

1/01 • in which secondary air is induced by injector action of the primary air (F24F 1/02 takes precedence) [3, 2011.01]

1/02 • self-contained, i.e. with all apparatus for treatment installed in a common casing [1, 2011.01]

1/04 • • Arrangements for portability [1, 2011.01]

1/06 • Separate outdoor units, e.g. outdoor unit to be linked to a separate room unit comprising a compressor and a heat exchanger [2011.01]

Note(s) [2011.01]

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

1/08 • • Compressors specially adapted for separate outdoor units [2011.01]

1/10 • • • Arrangement or mounting thereof [2011.01]

1/12 • • • Vibration or noise prevention therefor [2011.01]

- 1/14 • • *Heat exchangers specially adapted for separate outdoor units [2011.01]*
- 1/16 • • • *Arrangement or mounting thereof [2011.01]*
- 1/18 • • • *characterised by their shape [2011.01]*
- 1/20 • • *Electric components for separate outdoor units [2011.01]*
- 1/22 • • • *Arrangement or mounting thereof [2011.01]*
- 1/24 • • • *Cooling of electric components [2011.01]*
- 1/26 • • *Refrigerant piping [2011.01]*
- 1/28 • • • *for connecting several separate outdoor units [2011.01]*
- 1/30 • • • *for use inside the separate outdoor units [2011.01]*
- 1/32 • • • *for connecting the separate outdoor unit to indoor units [2011.01]*
- 1/34 • • • *Protection means therefor, e.g. covers for refrigerant pipes [2011.01]*
- 1/36 • • *Drip trays for outdoor units [2011.01]*
- 1/38 • • *Fan details of outdoor units, e.g. bell-mouth shaped inlets or fan mountings [2011.01]*
- 1/40 • • *Vibration or noise prevention at outdoor units (for outdoor unit compressors F24F 1/12) [2011.01]*
- 1/42 • • *characterised by the use of the condensate, e.g. for enhanced cooling [2011.01]*
- 1/44 • • *characterised by the use of internal combustion engines [2011.01]*
- 1/46 • • *Component arrangements in separate outdoor units [2011.01]*
- 1/48 • • • *characterised by airflow, e.g. inlet or outlet airflow [2011.01]*
- 1/50 • • • • *with outlet air in upward direction [2011.01]*
- 1/52 • • • • *Inlet and outlet arranged on the same side, e.g. for mounting in a wall opening [2011.01]*
- 1/54 • • • • *Inlet and outlet arranged on opposite sides [2011.01]*
- 1/56 • • *Casing or covers of separate outdoor units, e.g. fan guards [2011.01]*
- 1/58 • • • *Separate protective covers for outdoor units, e.g. solar guards, snow shields or camouflage [2011.01]*
- 1/60 • • *Arrangement or mounting of the outdoor unit [2011.01]*
- 1/62 • • • *Wall-mounted [2011.01]*
- 1/64 • • • *Ceiling-mounted, e.g. below a balcony [2011.01]*
- 1/66 • • • *under the floor level [2011.01]*
- 1/68 • • • *Arrangement of multiple separate outdoor units [2011.01]*

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; construction of heat-exchangers F28)

- 3/02 • characterised by the pressure or velocity of the primary air (F24F 3/044 takes precedence) [3]
- 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]
- 3/048 • • with temperature control at constant rate of air-flow (F24F 3/056 takes precedence) [3]
- 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]

- 3/056 • • the air at least partially flowing over lighting fixtures, the heat of which is dissipated or used [3]
- 3/06 • characterised by the arrangements for the supply of heat-exchange fluid for the subsequent treatment of primary air in the room units (F24F 3/02 takes precedence)
- 3/08 • • with separate supply and return lines for hot and cold heat-exchange fluids
- 3/10 • • with separate supply lines and common return line for hot and cold heat-exchange fluids
- 3/12 • characterised by the treatment of the air otherwise than by heating and cooling (F24F 3/02, F24F 3/06 take precedence; apparatus for the individual treatment, see the appropriate subclasses for the treatments)
- 3/14 • • by humidification; by dehumidification
- 3/147 • • • with both heat and humidity transfer between supplied and exhausted air [3]
- 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]
- 3/16 • • by purification, e.g. by filtering; by sterilisation; by ozonisation

5/00 Air-conditioning systems or apparatus not covered by group F24F 1/00 or F24F 3/00

6/00 Air-humidification [3]

- 6/02 • by evaporation of water in the air [3]
- 6/04 • • using stationary unheated wet elements [3]
- 6/06 • • using moving unheated wet elements [3]
- 6/08 • • using heated wet elements [3]
- 6/10 • • • heated electrically [3]
- 6/12 • by forming water dispersions in the air [3]
- 6/14 • • using nozzles (nozzles per se, spraying in general B05B) [3]
- 6/16 • • using rotating elements [3]
- 6/18 • by injection of steam into the air [3]

7/00 Ventilation

- 7/007 • with forced flow (using ducting systems F24F 7/06) [3]
- 7/013 • • using wall or window fans, displacing air through the wall or window [3]
- 7/02 • Roof ventilation (F24F 7/007 takes precedence; ventilation of roof coverings E04D) [3, 6]
- 7/04 • with ducting systems
- 7/06 • • with forced air circulation, e.g. by fan
- 7/08 • • • with separate ducts for supplied and exhausted air [3]
- 7/10 • • • with air supply, or exhaust, through perforated wall, floor or ceiling (outlet members for directing or distributing air F24F 13/06) [3]

9/00 Use of air currents for screening, e.g. air curtain (air curtains for vehicles B60J 9/04)

Common features or details

- 11/00 Control or safety systems or apparatus** (control valves per se F16K) [3]
- 11/02 • Arrangement or mounting of control or safety devices
- 11/04 • • solely for controlling the rate of air-flow (F24F 11/08 takes precedence)

- 11/047 • • • to constant value [3]
- 11/053 • • • by means responsive to temperature [3]
- 11/06 • • • solely for controlling the supply of heating or cooling fluids for secondary treatment (F24F 11/08 takes precedence)
- 11/08 • • • for controlling the primary treatment of air
- 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) [4]
- 13/00 Details common to, or for air-conditioning, air-humidification, ventilation or use of air currents for screening**
 - 13/02 • Ducting arrangements
 - 13/04 • • Air-mixing units (F24F 13/06 takes precedence; mixing gases in general B01F 3/02)
 - 13/06 • • Outlets for directing or distributing air into rooms or spaces, e.g. ceiling air diffuser
 - 13/062 • • • having one or more bowls or cones diverging in the flow direction (F24F 13/072 takes precedence) [3]
 - 13/065 • • • formed as cylindrical or spherical bodies which are rotatable (F24F 13/072 takes precedence) [3]
 - 13/068 • • • formed as perforated walls, ceilings or floors (F24F 13/078 takes precedence) [3]
 - 13/072 • • • of elongated shape, e.g. between ceiling panels [3]
 - 13/075 • • • having parallel rods or lamellae directing the outflow, e.g. the rods or lamellae being individually adjustable (F24F 13/072 takes precedence) [3]
 - 13/078 • • • combined with lighting fixtures (air-treatment systems with air-flow over lighting fixtures F24F 3/056) [3]
 - 13/08 • Air-flow control members, e.g. louveres, grilles, flaps, guide plates (F24F 7/013, F24F 13/06 take precedence; roof ventilation F24F 7/02) [3]
 - 13/10 • • movable, e.g. damper (F24F 13/18 takes precedence; valves in general F16K)
 - 13/12 • • • built-up of sliding members
 - 13/14 • • • built-up of tilting members, e.g. louver
 - 13/15 • • • • with parallel simultaneously tiltable lamellae [3]
 - 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 [5]
 - 13/22 • Means for preventing condensation or evacuating condensate [5]
 - 13/24 • Means for preventing or suppressing noise [5]
 - 13/26 • Arrangements for air-circulation by means of induction, e.g. by fluid coupling or thermal effect [6]
 - 13/28 • Arrangement or mounting of filters [6]
 - 13/30 • Arrangement or mounting of heat-exchangers [6]
 - 13/32 • Supports for air-conditioning, air-humidification or ventilation units [6]