

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

### F28 HEAT EXCHANGE IN GENERAL

**F28D HEAT-EXCHANGE APPARATUS, NOT PROVIDED FOR IN ANOTHER SUBCLASS, IN WHICH THE HEAT-EXCHANGE MEDIA DO NOT COME INTO DIRECT CONTACT** (heat-transfer, heat-exchange or heat-storage materials C09K 5/00; fluid heaters having heat generating means and heat transferring means F24H; furnaces F27; details of heat-exchange apparatus of general application F28F); **HEAT STORAGE PLANTS OR APPARATUS IN GENERAL [4]**

#### Subclass index

HEAT-EXCHANGE APPARATUS WITHOUT INTERMEDIATE HEAT-TRANSFER MEDIA OR BODIES

With stationary conduit assemblies

for only one medium using: mass of fluid; trickle or film; the cooling effect of evaporation.....1/00, 3/00, 5/00

for both media: by tubular conduits; by plate-like conduits.....7/00, 9/00

With moving conduit assemblies.....11/00

With fluidised bed.....13/00

HEAT-EXCHANGE APPARATUS WITH INTERMEDIATE HEAT-TRANSFER MEDIA OR BODIES

With the intermediate medium in closed tubes passing into or through the conduit walls.....15/00

In which the intermediate medium or body is contacted successively by the other media.....17/00, 19/00

HEAT STORAGE PLANTS OR APPARATUS.....20/00

OTHER HEAT-EXCHANGE APPARATUS.....21/00

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|-------|---|------|--|
| 1/00  | <b>Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, in which the other heat-exchange medium is a large body of fluid, e.g. domestic or motor car radiators</b> (F28D 5/00 takes precedence) [1, 2006.01]    | 5/02 | • in which the evaporating medium flows in a continuous film or trickles freely over the conduits [1, 2006.01]   |
| 1/02  | • with the heat-exchange conduits immersed in the body of fluid [1, 2006.01]  | 7/00 | <b>Heat-exchange apparatus having stationary tubular conduit assemblies for both heat-exchange media, the media being in contact with different sides of a conduit wall</b> [1, 2006.01]                 |
| 1/03  | • • with plate-like or laminated conduits [4, 2006.01]  | 7/02 | • the conduits being helically coiled (F28D 7/10 takes precedence) [1, 2006.01]  |
| 1/04  | • • with tubular conduits [1, 2006.01]  | 7/04 | • the conduits being spirally coiled (F28D 7/10 takes precedence) [1, 2006.01]   |
| 1/047 | • • • the conduits being bent, e.g. in a serpentine or zig-zag [4, 2006.01]   | 7/06 | • the conduits having a single U-bend (F28D 7/10 takes precedence) [1, 2006.01]  |
| 1/053 | • • • the conduits being straight [4, 2006.01]  | 7/08 | • the conduits being otherwise bent, e.g. in a serpentine or zig-zag (F28D 7/10 takes precedence) [1, 2006.01]   |
| 1/06  | • with the heat-exchange conduits forming part of, or being attached to, the tank containing the body of fluid [1, 2006.01]   | 7/10 | • the conduits being arranged one within the other, e.g. concentrically [1, 2006.01]   |
| 3/00  | <b>Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, in which the other heat-exchange medium flows in a continuous film, or trickles freely, over the conduits</b> (F28D 5/00 takes precedence) [1, 2006.01] | 7/12 | • • the surrounding tube being closed at one end, i.e. return type (F28D 7/14 takes precedence) [1, 2006.01]   |
| 3/02  | • with tubular conduits [1, 2006.01]  | 7/14 | • • both tubes being bent [1, 2006.01]   |
| 3/04  | • Distributing arrangements [1, 2006.01]  | 7/16 | • the conduits being arranged in parallel spaced relation (F28D 7/02-F28D 7/10 take precedence) [4, 2006.01]   |
| 5/00  | <b>Heat-exchange apparatus having stationary conduit assemblies for one heat-exchange medium only, the media being in contact with different sides of the conduit wall, using the cooling effect of natural or forced evaporation</b> [1, 2006.01]  | 9/00 | <b>Heat-exchange apparatus having stationary plate-like or laminated conduit assemblies for both heat-exchange media, the media being in contact with different sides of a conduit wall</b> [1, 2006.01] |
|       |   | 9/02 | • the heat-exchange media travelling at an angle to one another (F28D 9/04 takes precedence) [1, 2006.01]  |

F28D

- 9/04 • the conduits being formed by spirally-wound plates or laminae [1, 2006.01]
- 11/00 **Heat-exchange apparatus employing moving conduits [1, 2006.01]**
- 11/02 • the movement being rotary, e.g. performed by a drum or roller (F28D 11/08 takes precedence) [1, 2006.01]
- 11/04 • • performed by a tube or a bundle of tubes [1, 2006.01]
- 11/06 • the movement being reciprocating or oscillating (F28D 11/08 takes precedence) [1, 2006.01]
- 11/08 • more than one conduit assembly performing independent movements, e.g. rotary bundle of tubes in a rotary drum [1, 2006.01]
- 13/00 **Heat-exchange apparatus using a fluidised bed [1, 2006.01]**

Heat-exchange apparatus employing intermediate heat-transfer media or bodies [3]

- 15/00 **Heat-exchange apparatus with the intermediate heat-transfer medium in closed tubes passing into or through the conduit walls [1, 2006.01]**
- 15/02 • in which the medium condenses and evaporates, e.g. heat-pipes [4, 2006.01]
- 15/04 • • with tubes having a capillary structure [6, 2006.01]

- 15/06 • • Control arrangements therefor [6, 2006.01]
  - 17/00 **Regenerative heat-exchange apparatus in which a stationary intermediate heat-transfer medium or body is contacted successively by each heat-exchange medium, e.g. using granular particles [1, 2006.01]**
  - 17/02 • using rigid bodies, e.g. of porous material [1, 2006.01]
  - 17/04 • Distributing arrangements for the heat-exchange media [1, 2006.01]
  - 19/00 **Regenerative heat-exchange apparatus in which the intermediate heat-transfer medium or body is moved successively into contact with each heat-exchange medium [1, 2006.01]**
  - 19/02 • using granular particles [1, 2006.01]
  - 19/04 • using rigid bodies, e.g. mounted on a movable carrier [1, 2006.01]
  - 20/00 **Heat storage plants or apparatus in general (specially adapted for particular applications, see the relevant places, e.g. F24D 15/02); Regenerative heat-exchange apparatus not covered by groups F28D 17/00 or F28D 19/00 [4, 2006.01]**
  - 20/02 • using latent heat [6, 2006.01]
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- 21/00 **Heat-exchange apparatus not covered by any of the groups F28D 1/00-F28D 20/00 [1, 4, 2006.01]**