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

F17 STORING OR DISTRIBUTING GASES OR LIQUIDS

F17B **GAS-HOLDERS OF VARIABLE CAPACITY** (self-acting gas cut-off devices A47J 27/62, G05D; flame traps A62C 4/00; gas mixers B01F, F16K 11/00, G05D 11/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; gas compressors F04; valves F16K; damping pulsations in valves or pipes F16K, F16L; pipes F16L; stopping devices for gas mains F16L 55/10; vessels adapted for storing compressed, liquefied, or solidified gases F17C; gas distribution systems F17D 1/04; detecting leakage F17D 5/02, G01M; supervising or alarm devices F17D 5/02, G08B; control of combustion in burners F23N; gas flow or pressure regulators G05D)

1/00 **Gas-holders of variable capacity** (large containers in general B65D 88/00; storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00)

1/007 • with telescopically movable ring-shaped parts (F17B 1/10 takes precedence; sealing of rings F17B 1/04) **[2]**

1/013 • with movables discs (F17B 1/10 takes precedence; sealing of discs F17B 1/04) **[2]**

1/02 • Details

1/04 • • Sealing devices for sliding parts (in general F16J 15/00)

1/06 • • • using sealing liquids

1/08 • • • using resilient materials for packing, e.g. leather

1/10 • • Guiding moving parts

1/12 • • Gas admission or discharge arrangements

1/14 • • Safety devices, e.g. prevention of excess pressure

1/16 • of wet type

1/18 • • bell-shaped

1/20 • • telescopic

1/22 • • • spirally-guided

1/24 • of dry type

1/26 • • with flexible walls, e.g. bellows (connection of valves to inflatable elastic bodies B60C 29/00)

F17C **VESSELS FOR CONTAINING OR STORING COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES; FIXED-CAPACITY GAS-HOLDERS; FILLING VESSELS WITH, OR DISCHARGING FROM VESSELS, COMPRESSED, LIQUEFIED, OR SOLIDIFIED GASES** (storing fluids in natural or artificial cavities or chambers in the earth B65G 5/00; construction or assembling of bulk storage containers employing civil-engineering techniques E04H 7/00; variable-capacity gas-holders F17B; liquefaction or refrigeration machines, plants, or systems F25)

Subclass index

1/00 **Pressure vessels, e.g. gas cylinder, gas tank, replaceable cartridge** (pressurised apparatus for purposes other than storage, see the relevant subclasses such as A62C, B05B; associated with vehicles, see the appropriate subclass of classes B60-B64; pressure vessels in general F16J 12/00)

1/02 • involving reinforcing arrangements **[4]**

1/04 • • Protecting sheatings

1/06 • • • built-up from wound-on bands or filamentary material, e.g. wires **[4]**

1/08 • • Integral reinforcements, e.g. ribs

1/10 • with provision for protection against corrosion, e.g. due to gaseous acid (inhibiting corrosion of metallic material or incrustation in general C23F) **[4]**

1/12 • with provision for thermal insulation (thermal insulation in general F16L 59/00) **[4]**

1/14 • constructed of aluminium; constructed of non-magnetic steel

1/16 • constructed of plastics materials

3/00 **Vessels not under pressure**

3/02 • with provision for thermal insulation (thermal insulation in general F16L 59/00)

3/04 • • by insulating layers (F17C 3/08 takes precedence)

3/06 • • • on the inner surface, i.e. in contact with the stored fluid **[4]**

3/08 • • by vacuum spaces, e.g. Dewar flask (for household use A47J 41/02)

3/10 • • by liquid-circulating or vapour-circulating jackets

3/12 • with provision for protection against corrosion, e.g. due to gaseous acid (protection against corrosion in general C23F)

5/00 **Methods or apparatus for filling pressure vessels with liquefied, solidified, or compressed gases** (adding propellants to aerosol containers B65B 31/00)

Note(s)

This group covers:
- the filling of vessels for storage of compressed or liquefied gases;
- the filling of pressurised apparatus insofar as it is not covered by a single other subclass, e.g. A62C, B05B.

5/02 • for filling with liquefied gases

5/04 • • requiring the use of refrigeration, e.g. filling with helium or hydrogen

5/06 • for filling with compressed gases

6/00 Methods or apparatus for filling vessels not under pressure with liquefied or solidified gases [3]

7/00 Methods or apparatus for discharging liquefied, solidified, or compressed gases from pressure vessels, not covered by another subclass

7/02 • Discharging liquefied gases

7/04 • • with change of state, e.g. vaporisation **[3]**

9/00 Methods or apparatus for discharging liquefied or solidified gases from vessels not under pressure

9/02 • with change of state, e.g. vaporisation

9/04 • • Recovery of thermal energy **[3]**

11/00 Use of gas-solvents or gas-sorbents in vessels

13/00 Details of vessels or of the filling or discharging of vessels

13/02 • Special adaptations of indicating, measuring, or monitoring equipment (measuring in general G01)

13/04 • Arrangement or mounting of valves (valves per se F16K)

13/06 • Closures, e.g. cap, breakable member (closures for containers in general B65D)

13/08 • Mounting arrangements for vessels

13/10 • Arrangements for preventing freezing

13/12 • Arrangements or mounting of devices for preventing or minimising the effect of explosion (flame traps A62C 4/00)

F17D PIPE-LINE SYSTEMS; PIPE-LINES (distributing water E03B; pumps or compressors F04; fluid dynamics F15D; valves or the like F16K; pipes, laying pipes, supports, joints, branches, repairing, work on the entire line, accessories F16L; steam traps or the like F16T; fluid-pressure electric cables H01B 9/06)

Note(s)

In this subclass, the following expression is used with the meaning indicated:
- "pipe-line systems" means systems described in flow sheets as well as arrangements of co-operating elements, the elements per se being covered by the relevant subclasses.

1/00 Pipe-line systems (conveying articles or materials through a pipe-line by means of a fluid carrier B65G 51/00, B65G 53/00; dispensing, delivering or transferring liquids B67D; apparatus or devices for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers, e.g. for retail sale purposes, B67D 7/00; conveying material which has been excavated by a dredger or soil shifter through a pipe-line E02F 7/10; sewer pipe-line systems E03F 3/00; thermal insulation of pipe-lines F16L 59/00; central heating systems F24D) **[2]**

1/02 • for gases or vapours

1/04 • • for distribution of gas

1/05 • • • Preventing freezing (by heating F16L 53/00)

1/06 • • for steam

1/065 • • Arrangements for producing propulsion of gases or vapours **[2]**

1/07 • • • by compression **[2]**

1/075 • • • by mere expansion from an initial pressure level, e.g. by arrangement of a flow-control valve **[2]**

1/08 • for liquids or viscous products (water-main or service pipe systems E03B 7/04; domestic hot-water supply systems F24D 17/00) **[2]**

1/12 • • Conveying liquids or viscous products by pressure of another fluid **[2]**

1/13 • • Conveying liquids or viscous products by gravity **[2]**

1/14 • • Conveying liquids or viscous products by pumping **[2]**

1/16 • • Facilitating the conveyance of liquids or effecting the conveyance of viscous products by modification of their viscosity **[2]**

1/17 • • • by mixing with another liquid **[2]**

1/18 • • • by heating **[2]**

1/20 • Arrangements or systems of devices for influencing or altering dynamic characteristics of the systems, e.g. for damping pulsations caused by opening or closing of valves (fluid dynamics F15D; damping pulsations in fluids in pipes in general F16L 55/04) **[2]**

3/00 Arrangements for supervising or controlling working operations

3/01 • for controlling, signalling, or supervising the conveyance of a product **[2]**

3/03 • for controlling, signalling, or supervising the conveyance of several different products following one another in the same conduit, e.g. for switching from one receiving tank to another **[2]**

3/05 • • the different products not being separated (separation of contaminants by distillation B01D 3/00) **[2]**

3/08 • • the different products being separated by "go-devils", e.g. spheres (cleaning devices moved along the inside of pipe-lines by a fluid B08B 9/053) **[2]**

3/10 • for taking out the product in the line (investigating or analysing materials by determinating their chemical or physical properties G01N) **[2]**

3/12 • for injecting a composition into the line **[2]**

3/14 • for eliminating water (separation of liquids B01D, e.g. B01D 17/00; separation of gases or vapours B01D 53/00) **[2]**

3/16 • for eliminating particles in suspension (from liquids by sedimentation B01D 21/00; separation by filtration or otherwise B01D 24/00-B01D 51/00; centrifugal apparatus B04) **[2]**

3/18 • for measuring the quantity of conveyed product (measuring volume or volume flow, in general G01F) **[2]**

5/00 Protection or supervision of installations (arrangements for protecting foundations E02D 31/00; protecting pipes from damage or internal or external wear F16L 57/00, against corrosion or scale F16L 58/00; investigation of the fluid-tightness of structures G01M 3/00) **[2]**

5/02 • Preventing, monitoring, or locating loss **[2]**

5/04 • • by means of a signalling fluid enclosed in a double wall **[2]**

5/06 • • using electric or acoustic means **[2]**

5/08 • Protection of installations or persons from the effects of high voltage induced in the pipe-line (emergency protective circuit arrangements H02H) **[2]**