

CPC COOPERATIVE PATENT CLASSIFICATION

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

ENGINEERING IN GENERAL

F16 ENGINEERING ELEMENTS AND UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS; THERMAL INSULATION IN GENERAL

F16L PIPES; JOINTS OR FITTINGS FOR PIPES; SUPPORTS FOR PIPES, CABLES OR PROTECTIVE TUBING; MEANS FOR THERMAL INSULATION IN GENERAL

NOTES

- In this subclass, the following terms are used with the meanings indicated:
 - "pipe" means a conduit of closed cross-section, which is specially adapted to convey fluids, materials or objects;
 - "hose" means a pipe, as defined above, which has flexibility as an essential characteristic.
- Attention is drawn to the following places:

A61M 39/00	Tube connectors, tube couplings or branch units, specially adapted for medical use
B05B 1/20	Perforated pipes
{B60T 17/04}	{Arrangement of piping or air hoses in brake systems}
B63B 35/03	Pipe-laying vessels
B64D 39/04	Adaptation of hose constructions for refuelling aircraft during flight
{B65G 51/00}	{Conveying articles through pipes or tubes by fluid flow or pressure}
{B65G 53/00}	{Conveying materials in bulk through pipes or tubes}
B67D 7/38	Arrangements of hoses in apparatus for transferring liquids, e.g. fuel, from bulk to vehicles or portable containers
E01D 19/10	Fastening of pipes or cables to bridges
E03B	Water supply installations
E03D 11/17	Means for connecting water-closet bowls to the flushing pipe
E03D 11/18	Siphons for water-closets
E03F 3/04	Pipes or fittings specially adapted to sewers
E04D 13/08	Down pipes for roof drainage; Clamping means therefor
E04F 17/00	Vertical ducts, channels in buildings, e.g. chimneys
E21F 1/04	Air ducts for ventilation of mines or tunnels; Connections therefor
E21F 17/02	Suspension devices for tubes or the like in mines or tunnels
F01N	Gas flow silencers or exhaust apparatus for machines or engines
{F16B 7/00}	{Connections of rods or tubes}
F16N 21/00	Conduits, junctions for lubrication systems
F17C 3/02	Thermal insulation of vessels not under pressure for storing liquefied or solidified gases, e.g. Dewar flask
{F17D}	{Pipe-line systems, pipe-lines}
F22B 37/10	Water tubes of steam boilers
F23J 13/04	Joints, connections for chimneys or flues
F24H 9/12	Connecting circulation pipes to heaters
F28F 9/04	Arrangements for sealing elements into header boxes or end plates of heat-exchangers
G21C 15/22	Structural association of coolant tubes with headers or other pipes in nuclear reactors
H02G 3/04	Protective tubing or conduits for electric cables
H02G 3/26	Installations of electric cables or lines, or protective tubing on or in walls, ceilings or floors.

WARNINGS

- The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

F16L 3/21	covered by	F16L 3/2053 , F16L 3/2056 ;
F16L 13/013	covered by	F16L 13/007 ;
F16L 19/03	covered by	F16L 19/0212 ;
F16L 59/05	covered by	F16L 59/021 .
F16L 101/14	covered by	

F16L

F16L

(continued)

2. {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.}

1/00	Laying or reclaiming pipes; Repairing or joining pipes on or under water	3/006	. {for pipes with a rectangular cross-section}
1/024	. Laying or reclaiming pipes on land, e.g. above the ground (F16L 1/12 takes precedence)	3/01	. for supporting or guiding the pipes, cables or protective tubing, between relatively movable points, e.g. movable channels
1/0243	. . {above ground (F16L 1/026 takes precedence)}	3/012	. . {using reels (cores for coiled material, e.g. reels, in general B65H 75/00)}
1/0246	. . . {at a certain height off the ground}	3/015	. . using articulated- or supple-guiding elements
1/026	. . in or on a frozen surface	3/02	. partly surrounding the pipes, cables or protective tubing (bands or chains F16L 3/14)
1/028	. . in the ground (F16L 1/026 takes precedence)	3/04	. . and pressing it against a wall or other support
1/032	. . . the pipes being continuous (F16L 1/038 takes precedence)	3/06	. . with supports for wires
1/036	. . . the pipes being composed of sections of short length (F16L 1/038 takes precedence)	3/08	. substantially surrounding the pipe, cable or protective tubing
1/038	. . . the pipes being made <i>in situ</i>	3/085	. . {for pipes being in an angled relationship to each other}
1/06	. . Accessories therefor, e.g. anchors	3/10	. . divided, i.e. with two {or more} members engaging the pipe, cable or protective tubing
1/065	. . . {fixed on or to vehicles}	3/1008	. . . {with two members engaging the pipe, cable or tubing, both being made of thin band material completely surrounding the pipe (F16L 3/1033 takes precedence)}
1/09	. . . for bringing two tubular members closer to each other	3/1016	. . . . {the members being joined by means of two screws}
1/10	. . . for aligning	3/1025	. . . . {the members being joined by quick acting means}
1/11	. . . for the detection or protection of pipes in the ground	3/1033	. . . {with two members engaging the pipe, cable or tubing, the two members being joined only on one side of the pipe}
1/12	. Laying or reclaiming pipes on or under water	3/1041	. . . . {and being adapted to accommodate pipes of various diameters}
1/123	. . {Devices for the protection of pipes under water}	3/105	. . . {one member carrying a substantially radial tightening element}
1/126	. . {on or close to the surface}	3/1058	. . . {one member being flexible or elastic}
1/14	. . between the surface and the bottom	3/1066	. . . {with three or more members surrounding the pipe}
1/15	. . . vertically	3/1075	. . . {with two members, the two members being joined with a hinge on one side and fastened together on the other side}
1/16	. . on the bottom	3/1083	. . . {with two members, the two members being hooked in on one side and fastened together on the other side}
1/161	. . . {the pipe being composed of sections of short length}	3/1091	. . . {with two members, the two members being fixed to each other with fastening members on each side}
1/163	. . . {by varying the apparent weight of the pipe during the laying operation}	3/11	. . . and hanging from a pendant (F16L 3/14 takes precedence)
1/165	. . . {by towing the pipe on or near the bottom}	3/12	. . comprising a member substantially surrounding the pipe, cable or protective tubing
1/166	. . . {Reclaiming pipes}	3/1203	. . . {with a pair of arms moved automatically to closed position by overcenter spring}
1/168	. . . {under ice}	3/1207	. . . {the ends of the member and the fixing elements being placed on both sides of the pipe}
1/18	. . . the pipes being S- or J-shaped and under tension during laying	3/1211	. . . {with a substantially-radial tightening or securing member}
1/19	. . . . the pipes being J-shaped	3/1215	. . . {the pipe being fixed by rotation of an element}
1/20	. . Accessories therefor, e.g. floats, weights	3/1218	. . . {the pipe being only supported and not fixed}
1/201	. . . {Anchor rods}		
1/202	. . . {fixed on or to vessels}		
1/203	. . . . {the pipes being wound spirally prior to laying}		
1/205	. . . . {Pipe-laying ships (F16L 1/225 , F16L 1/23 and F16L 1/235 take precedence)}		
1/206	. . . . {Apparatus for forming or coating the pipes}		
1/207	. . . . {Pipe handling apparatus}		
1/225	. . . Stingers		
1/23	. . . Pipe tensioning apparatus		
1/235	. . . Apparatus for controlling the pipe during laying		
1/24	. . . Floats; Weights		
1/26	. Repairing or joining pipes on or under water		
1/265	. . {Underwater vehicles moving on the bottom}		
3/00	Supports for pipes, cables or protective tubing, e.g. hangers, holders, clamps, cleats, clips, brackets (anchors for holding pipes on or under the ground F16L 1/06; {sound-damping supports F16L 55/035; supports for insulated pipes F16L 59/135})		
3/003	. {devices for holding the open end of a hose}		

- 3/1222 . . . {the member having the form of a closed ring, e.g. used for the function of two adjacent pipe sections}
- 3/1226 . . . {elongated supports, e.g. to support a curved pipe}
- 3/123 . . . and extending along the attachment surface
- 3/1233 {the member being of metal, with or without an other layer of other material}
- 3/1236 {the member being of a material other than metal}
- 3/127 . . . and extending away from the attachment surface
- 3/13 . . . and engaging it by snap action {(F16L 3/1203 takes precedence)}
- 3/133 . . . and hanging from a pendant (F16L 3/14 takes precedence)
- 3/137 . . . and consisting of a flexible band
- 3/14 . Hangers in the form of bands or chains
- 3/16 . with special provision allowing movement of the pipe (F16L 3/01 takes precedence; supporting pipes or cables inside other pipes or sleeves F16L 7/00)
- 3/18 . . allowing movement in axial direction
- 3/20 . . allowing movement in transverse direction
- 3/202 . . . the transverse movement being converted to a rotational movement (F16L 3/215 takes precedence)
- 3/205 . . . having supporting springs
- 3/2053 {the axis of each spring being parallel with the direction of the movement of the pipe}
- 3/2056 {the axis of at least one spring being oblique or perpendicular to the direction of the movement of the pipe}
- 3/21 providing constant supporting spring force
- 3/215 . . . the movement being hydraulically or electrically controlled
- 3/217 hydraulically
- 3/22 . specially adapted for supporting a number of parallel pipes at intervals
- 3/221 . . {having brackets connected together by means of a common support}
- 3/222 . . {having single supports directly connected together}
- 3/223 . . each support having one transverse base for supporting the pipes (F16L 3/23, F16L 3/237 take precedence)
- 3/2235 . . . {each pipe being supported by a common element fastened to the base}
- 3/227 . . . each pipe being supported by a separate element fastened to the base
- 3/23 . . for a bundle of pipes or a plurality of pipes placed side by side in contact with each other (F16L 3/237 takes precedence)
- 3/233 . . . by means of a flexible band
- 3/2332 {having a single plastic locking barb}
- 3/2334 {the barb having a plurality of serrations}
- 3/2336 {having two or more locking barbs (F16L 3/2338 takes precedence)}
- 3/2338 {having at least one metal locking barb}
- 3/237 . . for two pipes
- 3/24 . with a special member for attachment to profiled girders
- 3/26 . specially adapted for supporting the pipes all along their length, e.g. pipe channels or ducts {(channels for electric cables formed by wire H02G 3/0443)}
- 5/00 Devices for use where pipes, cables or protective tubing pass through walls or partitions** ({passing insulated pipes through walls F16L 59/121; arrangements for leading electric cables or lines through walls, floors or ceilings H02G 3/22})
- 5/02 . Sealing
- NOTE**
- Group F16L 5/14 takes precedence over groups {F16L 5/022, F16L 5/025, F16L 5/027 and} F16L 5/04 - F16L 5/12.
- 5/022 . . {by welding}
- 5/025 . . {the pipe being movable (F16L 5/10 takes precedence)}
- 5/027 . . {by means of a joint of the quick-acting type}
- 5/04 . . to form a firebreak device
- 5/06 . . by means of a swivel nut compressing a ring or sleeve
- 5/08 . . by means of axial screws compressing a ring or sleeve
- 5/10 . . by using sealing rings or sleeves only
- 5/12 . . the pipe being cut in two pieces
- 5/14 . . for double-walled or multi-channel pipes
- 7/00 Supporting of pipes or cables inside other pipes or sleeves, e.g. for enabling pipes or cables to be inserted or withdrawn from under roads or railways without interruption of traffic** (sleeves for supporting pipes, cables or protective tubing, between relatively movable points F16L 3/01, {fixation devices of optical cables in ducts G02B 6/508, installation of electric cables H02G 1/08})
- 7/02 . and sealing the pipes or cables inside the other pipes, cables or sleeves
- Pipes**
- 9/00 Rigid pipes**
- 9/003 . {with a rectangular cross-section (ducting arrangements in air-conditioning or ventilation F24F 13/02)}
- 9/006 . {specially profiled (F16L 9/003 takes precedence)}
- 9/01 . of wood (F16L 9/16 - F16L 9/22 take precedence)
- 9/02 . of metal (F16L 9/16 - F16L 9/22 take precedence)
- 9/04 . . Reinforced pipes
- 9/042 . . . {the reinforcement comprising one or more layers of a helically wound cord, wire or strip (F16L 9/047 takes precedence)}
- 9/045 {using profiled strips}
- 9/047 . . . {comprising reinforcement rings}
- 9/06 . Corrugated pipes
- 9/08 . of concrete, cement, or asbestos cement, with or without reinforcement (F16L 9/16 - F16L 9/22 take precedence)
- 9/085 . . {Reinforced pipes}
- 9/10 . of glass or ceramics, e.g. clay, clay tile, porcelain (F16L 9/16 - F16L 9/22 take precedence)
- 9/105 . . {of glass}
- 9/12 . of plastics with or without reinforcement (F16L 9/16 - F16L 9/22 take precedence)
- 9/121 . . {with three layers}

- 9/123 . . {with four layers}
- 9/125 . . {electrically conducting}
- 9/127 . . the walls consisting of a single layer
- 9/128 . . . Reinforced pipes
- 9/133 . . the walls consisting of two layers
- 9/14 . Compound tubes, i.e. made of materials not wholly covered by any one of the preceding groups ([F16L 9/16 - F16L 9/22 take precedence](#))
- 9/147 . . comprising only layers of metal and plastics with or without reinforcement
- 9/153 . . comprising only layers of metal and concrete with or without reinforcement
- 9/16 . wound from sheets or strips, with or without reinforcement
- 9/165 . . {of metal}
- 9/17 . obtained by bending a sheet longitudinally and connecting the edges
- 9/18 . Double-walled pipes; Multi-channel pipes or pipe assemblies
- 9/19 . . Multi-channel pipes or pipe assemblies
- 9/20 . . {Pipe assemblies}
- 9/21 . made of sound-absorbing materials or with sound-absorbing structure
- 9/22 . Pipes composed of a plurality of segments
- 11/00 Hoses, i.e. flexible pipes**
- 11/005 . {consisting completely or partially of material other than fibres, plastics or metal}
- 11/02 . made of fibres or threads, e.g. of textile {which may or may not be impregnated, or provided with an impermeable layer, e.g. fire-hoses}
- 11/04 . made of rubber or flexible plastics
- 11/042 . . {formed by bending a sheet and connecting the edges (covers for the protection of the insulation [F16L 59/10](#); rigid pipes [F16L 9/17](#))}
- 11/045 . . {with four or more layers without reinforcement}
- 2011/047 . . {with a diffusion barrier layer}
- 11/06 . . with homogeneous wall ([F16L 11/11 takes precedence](#))
- 11/08 . . with reinforcements embedded in the wall ([F16L 11/11 takes precedence](#))
- 11/081 . . . {comprising one or more layers of a helically wound cord or wire (in combination with braided layers [F16L 11/088](#))}
- 11/082 {two layers}
- 11/083 {three or more layers}
- 11/085 . . . {comprising one or more braided layers (in combination with layers of a helically wound core or wire [F16L 11/088](#))}
- 11/086 {two layers}
- 11/087 {three or more layers}
- 11/088 . . . {comprising a combination of one or more layers of a helically wound cord or wire with one or more braided layers}
- 11/10 . . with reinforcements not embedded in the wall ([F16L 11/11 takes precedence](#))
- 11/11 . . with corrugated wall {([F16L 11/24 takes precedence](#))}
- 11/111 . . . {with homogeneous wall}
- 11/112 . . . having reinforcements embedded in the wall
- 11/115 . . . having reinforcements not embedded in the wall
- 11/118 . . . having arrangements for particular purposes, e.g. electrically conducting
- 11/1185 {electrically conducting}
- 11/12 . . with arrangements for particular purposes, e.g. specially profiled, with protecting layer, heated, electrically conducting ([F16L 11/11 takes precedence](#))
- 11/121 . . . {specially profiled cross sections}
- 11/122 . . . {Hoses provided with integrated fixing means, e.g. hooks}
- 11/124 . . . {Distinguishing marks for hoses}
- 11/125 . . . {non-inflammable or heat-resistant hoses}
- 11/127 . . . electrically conducting
- 11/133 . . . buoyant
- 11/14 . made of rigid material, e.g. metal or hard plastics
- 11/15 . . corrugated ([F16L 11/16 takes precedence](#))
- 11/16 . . wound from profiled strips or bands
- 11/18 . . Articulated hoses, e.g. composed of a series of rings
- 11/20 . Double-walled hoses {, i.e. two concentric hoses}
- 11/22 . Multi-channel hoses
- 11/24 . wound from strips or bands ([F16L 11/16 takes precedence](#))
- 11/26 . made of sound-absorbing materials or with sound-absorbing structure
- Pipe joints; Hose nipples** ({hose connections for pneumatic tyre valves [B60C 29/066](#); } special adaptations of pipe joints for use with watercloset bowls [E03D 11/13](#); {for steam boilers [F22B 37/107](#)})
- 13/00 Non-disconnectible pipe-joints, e.g. soldered, adhesive or caulked joints** (joints for rigid pipes of plastics [F16L 47/00](#); {non-disconnectible pipe-joints to walls or other pipes, the joined pipe axis being perpendicular to the plane of the wall or to the axis of the other pipe [F16L 41/082](#)})
- 13/002 . {for pipes having a rectangular cross-section}
- 13/004 . {Shrunk pipe-joints}
- 13/007 . specially adapted for joining pipes of dissimilar materials ({joints between metal and plastic pipes [F16L 47/24](#)})
- 13/013 . . Accessories therefor
- 13/02 . Welded joints
- 13/0209 . . {Male-female welded joints ([F16L 13/0245](#) and [F16L 13/0254 take precedence](#))}
- 13/0218 . . {having an inner or outer ring ([F16L 13/0245](#) and [F16L 13/0254 take precedence](#))}
- 13/0227 . . . {having an inner ring}
- 13/0236 . . . {having an outer ring}
- 13/0245 . . {with holes in the sleeve or spigot being filled with weld}
- 13/0254 . . {the pipes having an internal or external coating}
- 13/0263 . . . {having an internal coating}
- 13/0272 . . . {having an external coating}
- 13/0281 . . {cold welded (non-electric welding without the application of heat [B23K 20/00](#))}
- 13/029 . . {for concrete pipes}
- 13/04 . . with arrangements for preventing overstressing
- 13/06 . . . with tension relief of the weld by means of detachable members, e.g. divided tension rings, bolts in flanges
- 13/08 . Soldered joints {(specially adapted for connecting metal hoses to rigid members [F16L 33/26](#))}
- 13/10 . Adhesive or cemented joints
- 13/103 . . {Adhesive joints (for hoses [F16L 33/34](#))}
- 13/106 . . {Tools}

- 13/11 . . using materials which fill the space between parts of a joint before hardening
- 13/113 . . . {for concrete pipes}
- 13/116 . . . {for socket pipes}
- 13/12 . with a seal made of lead, caulked packing, or the like
- 13/122 . . {for male-female connections ([F16L 13/124](#) and [F16L 13/126](#) take precedence)}
- 13/124 . . {for concrete pipes}
- 13/126 . . {Attachments}
- 13/128 . . {Tools}
- 13/14 . made by plastically deforming the material of the pipe, e.g. by flanging, rolling
- 13/141 . . {by crimping or rolling from the outside}
- 13/142 . . . {with a sealing element inserted into the female part before crimping or rolling}
- 13/143 . . . {with a sealing element placed around the male part before crimping or rolling}
- 2013/145 . . {Tools specially adapted therefor}
- 13/146 . . {by an axially moveable sleeve}
- 13/147 . . {by radially expanding the inner part ([F16L 13/168](#) and [E21B 43/103](#) take precedence)}
- 13/148 . . {specially designed to ensure an intended leakage until correct deformation}
- 13/16 . . the pipe joint consisting of overlapping extremities having mutually co-operating collars
- 13/161 . . . {the pipe or collar being deformed by crimping or rolling}
- 13/163 {one collar being bent over the other}
- 13/165 . . . {the pipe or collar being deformed by an axially movable sleeve}
- 13/166 . . . {Deformed by radially expanding an inner part ([F16L 13/168](#) takes precedence)}
- 13/168 . . . {for screw threaded pipes ([E21B 43/103](#) takes precedence)}
- 15/00 Screw-threaded joints** {(hose connections with parts screwed directly on or into the hose [F16L 33/24](#); joining pipes to wall [F16L 41/00](#)); **Forms of screw-threads for such joints**
- 15/001 . {with conical threads}
- 15/002 . . {with more than one threaded section}
- 15/003 . . {with sealing rings}
- 15/004 . . {with axial sealings having at least one plastically deformable sealing surface (with sealing rings [F16L 15/003](#))}
- 15/005 . {for thin-walled pipes having at least their extremities deformed so as to have the shape of screw-threads}
- 15/006 . {with straight threads}
- 15/007 . . {with more than one threaded section}
- 15/008 . . {with sealing rings}
- 15/009 . . {with axial sealings having at least one plastically deformable sealing surface (with sealing rings [F16L 15/008](#))}
- 15/02 . allowing substantial longitudinal adjustment by use of a long screw-threaded part
- 15/04 . with additional sealings
- 15/06 . characterised by the shape of the screw-thread
- 15/08 . with supplementary elements ([F16L 15/04](#), [F16L 41/00](#) and [F16L 43/02](#) take precedence)
- 17/00 Joints with packing adapted to sealing by fluid pressure** ({for hoses [F16L 33/16](#)} compensating devices [F16L 51/00](#))
- 17/02 . with sealing rings arranged between outer surface of pipe and inner surface of sleeve or socket
- 17/025 . . the sealing rings having radially directed ribs
- 17/03 . . having annular axial lips
- 17/032 . . . {the sealing rings having only one lip}
- 17/035 . . . the sealing rings having two lips parallel to each other
- 17/04 . . with longitudinally split or divided sleeve
- 17/06 . with sealing rings arranged between the end surfaces of the pipes or flanges or arranged in recesses in the pipe ends or flanges
- 17/063 . . {forming a whole with the pipe or joint (for screw-threaded joint [F16L 15/06](#))}
- 17/067 . . Plastics sealing rings
- 17/073 . . . the sealing rings having two lips parallel to each other
- 17/08 . . Metal sealing rings
- 17/10 . the packing being sealed by the pressure of a fluid other than the fluid in or surrounding the pipe
- 19/00 Joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts** ({screw-threaded joints [F16L 15/00](#); [F16L 17/00](#) takes precedence; if using bolts or equivalent connecting means [F16L 23/00](#); {electrically insulating [F16L 25/02](#); adjustable joints, joints allowing movement [F16L 27/00](#); specially adapted for pipes of brittle material [F16L 49/06](#))}
- 19/005 . {comprising locking means for the threaded member (locking of screws or nuts per se [F16B 39/00](#))}
- 19/02 . Pipe ends provided with collars or flanges, integral with the pipe or not, pressed together by a screwed member
- 19/0206 . . {the collar not being integral with the pipe}
- 19/0212 . . {using specially adapted sealing means}
- 19/0218 . . . {comprising only sealing rings}
- 19/0225 . . . {without sealing rings}
- 19/0231 . . {with specially adapted means for positioning the threaded member behind the collar}
- 19/0237 . . {specially adapted for use with attachments, e.g. reduction units, T-pieces, bends or the like (branch units per se [F16L 41/02](#); bends per se [F16L 43/00](#); pipe units with cleaning aperture per se [F16L 45/00](#))}
- 19/0243 . . {specially adapted for use with coated pipes}
- 19/025 . . the pipe ends having integral collars or flanges
- 19/028 . . . the collars or flanges being obtained by deformation of the pipe wall
- 19/0283 {and having a bell-mouthed shape}
- 19/0286 {and being formed as a flange}
- 19/04 . using additional rigid rings, sealing directly on at least one pipe end, which is flared either before or during the making of the connection
- 19/041 . . {the ring being an insert ([F16L 19/043](#) takes precedence)}
- 19/043 . . {with additional sealing means}
- 19/045 . . . {consisting of cutting edges on one of the connecting parts which penetrate into the wall of the pipe}

- 19/046 . . . {consisting of a soft ring}
- 19/048 . . {specially adapted for use with attachments, e.g. reduction units, T-pieces, bends or the like (branch units [per se F16L 41/02](#); bends [per se F16L 43/00](#); pipe units with cleaning aperture [per se F16L 45/00](#))}
- 19/05 . . with a rigid pressure ring between the screwed member and the exterior of the flared pipe end
- 19/055 . . . {the pressure ring being rotatably connected to the threaded member}
- 19/06 . . in which radial clamping is obtained by wedging action on non-deformed pipe ends
- 19/061 . . {a pressure ring being arranged between the clamping ring and the threaded member or the connecting member}
- 19/062 . . {specially adapted for use with attachments, e.g. reduction units, T-pieces, bends or the like (branch units [per se F16L 41/02](#); bends [per se F16L 43/00](#); pipe units with cleaning aperture [per se F16L 45/00](#))}
- 19/063 . . {by means of conical threaded surfaces}
- 19/065 . . the wedging action being effected by means of a ring
- 19/0653 . . . {the ring being rotatably connected to one of the connecting parts}
- 19/0656 . . . {integral with one of the connecting parts}
- 19/07 . . adapted for use in socket or sleeve connections
- 19/075 . . specially adapted for spigot-and-socket joints {for pipes of the same diameter}
- 19/08 . . with metal rings which bite into the wall of the pipe ([F16L 19/045](#) takes precedence)}
- 19/083 . . {the longitudinal cross-section of the ring not being modified during clamping}
- 19/086 . . . {with additional sealing means}
- 19/10 . . the profile of the ring being altered
- 19/103 . . . {with more than one ring per pipe end being used}
- 19/106 . . . {the ring comprising a shoulder against which the pipe end abuts}
- 19/12 . . . with additional sealing means
- 19/14 . . . the rings being integral with one of the connecting parts
- 21/00 Joints with sleeve or socket ([F16L 13/00](#), [F16L 15/00](#), [F16L 17/00](#), [F16L 19/00](#), [F16L 25/0027](#), [F16L 27/00](#), [F16L 37/00](#)) take precedence** {; specially adapted to be made of plastics or to be used with pipes made of plastics [F16L 47/06](#); specially adapted for pipes of brittle material [F16L 49/02](#))}
- 21/002 . {Sleeves or nipples for pipes of the same diameter; Reduction pieces (with elastic sealing rings [F16L 21/022](#))}
- 21/005 . . {made of elastic material, e.g. partly or completely surrounded by clamping devices (comprising packing adapted to sealing by fluid pressure [F16L 17/04](#), [F16L 11/20](#); hose clips [F16L 33/02](#))}
- 21/007 . {clamped by a wedging action}
- 21/02 . . with elastic sealing rings between pipe and sleeve or between pipe and socket, e.g. with rolling or other prefabricated profiled rings ([F16L 21/06](#), [F16L 21/08](#) take precedence {; sealing ring with radial ribs [F16L 17/025](#); sealing ring with axial lips [F16L 17/03](#)}; if adjustability is essential [F16L 27/00](#))}
- 21/022 . . {used with sleeves or nipples for pipes of the same diameter, or with reduction pieces ([F16L 21/025](#) takes precedence)}
- 21/025 . . Rolling sealing rings
- 21/03 . . placed in the socket before connection ([F16L 21/022](#), [F16L 21/025](#) take precedence)
- 21/035 . . placed around the spigot end before connection ([F16L 21/022](#), [F16L 21/025](#) take precedence)
- 21/04 . . in which sealing rings are compressed by axially-movable members {(for joints using a threaded member [F16L 19/07](#); quick acting couplings [F16L 37/00](#); devices for covering leaks from inside a pipe [F16L 55/162](#))}
- 21/045 . . . {the members passing through the sealing rings}
- 21/05 . . comprising a first ring being placed on a male part and a second ring in the sleeve or socket
- 21/06 . . with a divided sleeve or ring clamping around the pipe-ends (flanged joints [F16L 23/00](#); couplings of the quick-acting type [F16L 37/00](#))
- 21/065 . . {tightened by tangentially-arranged threaded pins}
- 21/08 . . with additional locking means ([F16L 17/035](#), [F16L 17/04](#), [F16L 21/04](#), [F16L 21/06](#) take precedence; {screwed joints [F16L 19/08](#)}; couplings of the quick-acting type [F16L 37/00](#))
- 23/00 Flanged joints ([F16L 13/00](#), [F16L 17/00](#), [F16L 19/00](#) take precedence; adjustable joints [F16L 27/00](#); for hoses [F16L 33/00](#); couplings of the quick-acting type [F16L 37/00](#); for double-walled or multi-channel pipes or assemblies [F16L 39/00](#); connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics [F16L 47/00](#); specially adapted for pipes of brittle material pipe [F16L 49/00](#))**
- 23/003 . {Auxiliary devices}
- 23/006 . {Attachments}
- 23/02 . . the flanges being connected by members tensioned axially ([F16L 23/12](#) takes precedence)
- 23/024 . . characterised by how the flanges are joined to, or form an extension of, the pipes
- 23/026 . . . by welding
- 23/028 . . . the flanges being held against a shoulder
- 23/0283 {the collar being integral with the pipe}
- 23/0286 {the shoulder not being formed from the pipe}
- 23/032 . . characterised by the shape or composition of the flanges
- 23/036 . . characterised by the tensioning members, e.g. specially adapted bolts or C-clamps
- 23/04 . . the flanges being connected by members tensioned in the radial plane ([F16L 23/12](#) takes precedence)
- 23/06 . . connected by toggle-action levers (quick acting couplings tightened by toggle-action levers [F16L 37/20](#))
- 23/08 . . connection by tangentially arranged pin and nut
- 23/10 . . . with a pivoting or swinging pin

- 23/12 . specially adapted for particular pipes
- 23/125 . . {with an internal or external coating}
- 23/14 . . for rectangular pipes
- 23/16 . characterised by the sealing means
- 23/162 . . {the pipe ends abutting each other}
- 23/165 . . {comprising a viscous mass, e.g. hardenable}
- 23/167 . . {in connection with the appearance or detection of leaks}
- 23/18 . . the sealing means being rings
- 23/20 . . . made exclusively of metal
- 23/22 . . . made exclusively of a material other than metal
- 23/24 . . specially adapted for unequal expansion of the parts of the joint
- 25/00 Constructive types of pipe joints not provided for in groups F16L 13/00 - F16L 23/00 (adjustable or allowing movement F16L 27/00; with fluid cut-off means F16L 29/00; quick-acting F16L 37/00; for double-walled or multi-channel pipes F16L 39/00; connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00; specially adapted for pipes of brittle material F16L 49/00) ; Details of pipe joints not otherwise provided for, e.g. electrically conducting or insulating means}**
 - 25/0009 . {Joints for pipes with a square or rectangular cross-section}
 - 25/0018 . {Abutment joints}
 - 25/0027 . {Joints for pipes made of reinforced concrete}
 - 25/0036 . {Joints for corrugated pipes}
 - 25/0045 . . {of the quick-acting type}
 - 25/0054 . . {with specially shaped sealing rings}
 - 25/0063 . . {with two corrugated pipes being directly connected to each other}
 - 25/0072 . {Joints for pipes of dissimilar materials (non-disconnectable joints for pipes of dissimilar materials F16L 13/007; joints between metal and plastic pipes F16L 47/24)}
 - 25/0081 . {Pipe joints comprising a liquid or fusible seal}
 - 25/009 . {Combination of a quick-acting type coupling and a conventional one}
 - 25/01 . specially adapted for realising electrical conduction between the two pipe ends of the joint or between parts thereof
 - 25/02 . Electrically insulating joints or couplings
 - 25/021 . . {for screw-threaded joints}
 - 25/023 . . {for joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts}
 - 25/025 . . {for joints with sleeve or socket}
 - 25/026 . . {for flanged joints}
 - 25/028 . . {for branching pipes, for joining pipes to walls}
 - 25/03 . . in non-disconnectable pipe joints
 - 25/04 . comprising a collar or ring having a threaded pin rigid with the pipe-encircling member
 - 25/06 . comprising radial locking means
 - 25/065 . . {the locking means being actuated by radial screws}
 - 25/08 . . in the form of screws, nails or the like
 - 25/10 . Sleeveless joints between two pipes, one being introduced into the other
 - 25/12 . Joints for pipes being spaced apart axially
- 25/14 . Joints for pipes of different diameters or cross-section
- 27/00 Adjustable joints, Joints allowing movement (of the quick-acting type F16L 37/50; for double-walled or multi-channel pipe assemblies F16L 39/04; {connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/00; connecting arrangements specially adapted for pipes of brittle material F16L 49/00})**
 - 27/02 . Universal joints, i.e. with mechanical connection allowing angular movement or adjustment of the axes of the parts in any direction
 - 27/023 . . {Universal and rotating joints}
 - 27/026 . . {Universal and axially displaceable joints}
 - 27/04 . . with partly spherical engaging surfaces
 - 27/042 . . . {comprising two pipes normally at right angles to each other}
 - 27/044 . . . {specially adapted for tubing between vehicles}
 - 27/047 . . . held in place by a screwed member having an internal spherical surface
 - 27/053 . . . held in place by bolts passing through flanges
 - 27/06 . . . with special sealing means between the engaging surfaces
 - 27/067 the sealing means being actuated by the medium pressure
 - 27/073 one of the cooperating surfaces forming the sealing means
 - 27/08 . allowing adjustment or movement only about the axis of one pipe
 - 27/0804 . . {the fluid passing axially from one joint element to another}
 - 27/0808 . . . {the joint elements extending coaxially for some distance from their point of separation}
 - 27/0812 {with slide bearings}
 - 27/0816 {having radial sealing}
 - 27/082 {having axial sealing}
 - 27/0824 {with ball or roller bearings}
 - 27/0828 {having radial bearings (connections of quick-acting couplings maintained by balls or rollers under radial pressure F16L 37/22)}
 - 27/0832 {having axial bearings}
 - 27/0837 . . . {the joint elements being bends}
 - 27/0841 {forming an angle of less than 90 degrees}
 - 27/0845 {forming an angle of 90 degrees}
 - 27/0849 . . {the fluid being turned through an angle when passing from one joint element to another}
 - 27/0853 . . . {with spherical hinge}
 - 27/0857 . . . {with hinge and bellows sealing}
 - 27/0861 . . {Arrangements of joints with one another and with pipes or hoses}
 - 27/0865 . . . {between vehicles}
 - 27/087 . . Joints with radial fluid passages
 - 27/093 . . . of the "banjo" type, i.e. pivoting right-angle couplings
 - 27/10 . comprising a flexible connection only {, e.g. for damping vibrations}
 - 27/1004 . . {introduced in exhaust pipes for hot gases}
 - 27/1008 . . {comprising a swivel nut or collar engaging the pipe}
 - 27/1012 . . {Flanged joints}
 - 27/1017 . . {Joints with sleeve or socket}

- 27/1021 . . {comprising an intermediate resilient element, e.g. a ring}
- 27/1025 . . {Abutment joints}
- 27/103 . . in which a flexible element, e.g. a rubber-metal laminate, which undergoes constraints consisting of shear and flexure, is sandwiched between partly curved surfaces
- 27/107 . . the ends of the pipe being interconnected by a flexible sleeve
- 27/108 . . . the sleeve having the form of a bellows with only one corrugation
- 27/1085 {the bellows being externally or internally reinforced}
- 27/11 . . . the sleeve having the form of a bellows with multiple corrugations
- 27/111 the bellows being reinforced
- 27/113 . . the ends of the pipe being interconnected by a rigid sleeve
- 27/1133 . . . {the sleeve being longitudinally divided}
- 27/1136 . . . {the sleeve comprising a screwed member}
- 27/12 . . allowing substantial longitudinal adjustment or movement (by use of screw-thread F16L 15/02)
- 27/125 . . {having axial and rotary movement}
- 29/00 Joints with fluid cut-off means (quick-acting joints with cut-off means F16L 37/28)**
- 29/002 . {joints with taps (taps in general F16K 5/00)}
- 29/005 . {joints with cut-off devices which can be perforated (cut-off devices with a breakable closure member in general F16K 13/04)}
- 29/007 . {Joints with cut-off devices controlled separately (takes precedence; operating means for cut-off devices in general F16K 31/00)}
- 29/02 . with a cut-off device in one of the two pipe ends, the cut-off device being automatically opened when the coupling is applied
- 29/04 . with a cut-off device in each of the two pipe ends, the cut-off devices being automatically opened when the coupling is applied
- 31/00 Arrangements for connecting hoses to one another or to flexible sleeves (F16L 33/00 takes precedence)**
- 31/02 . for branching hoses
- 33/00 Arrangements for connecting hoses to rigid members; Rigid hose connectors, i.e. single members engaging both hoses**
- 33/003 . {comprising elements arranged in the hose walls}
- 33/006 . {for hoses of plastics other than artificial rubber}
- 33/01 . adapted for hoses having a multi-layer wall
- 33/02 . Hose-clips
- 33/021 . . {with the ends bent around each other}
- 33/023 . . {fixed by bending one end of the strap}
- 33/025 . . tightened by deforming radially extending loops or folds
- 33/03 . . Self-locking elastic clips
- 33/035 . . fixed by means of teeth or hooks
- 33/04 . . tightened by tangentially-arranged threaded pin and nut
- 33/06 . . . in which the threaded pin is rigid with the hose-encircling member
- 33/08 . . in which a worm coacts with a part of the hose-encircling member that is toothed like a worm-wheel
- 33/085 . . . {with a scroll-type screw}
- 33/10 . . with a substantially-radial tightening member
- 33/12 . . with a pivoted or swinging tightening or securing member, e.g. toggle lever
- 33/14 . . with a taping-bolt, i.e. winding up the end of the hose-encircling member
- 33/16 . with sealing or securing means using fluid pressure
- 33/18 . characterised by the use of additional sealing means
- 33/20 . Undivided rings, sleeves or like members contracted on the hose or expanded in the hose by means of tools; Arrangements using such members
- 33/207 . . only a sleeve being contracted on the hose
- 33/2071 . . . {the sleeve being a separate connecting member}
- 33/2073 {directly connected to the rigid member}
- 33/2075 {by quick acting}
- 33/2076 {by plastic deformation}
- 33/2078 {connected to the rigid member via an intermediate element}
- 33/213 . . only a sleeve being expanded inside the hose
- 33/22 . with means not mentioned in the preceding groups for gripping the hose between inner and outer parts
- 33/221 . . {the external piece comprising segments hingedly connected to an interior part}
- 33/222 . . {the external piece comprising segments pressed against the hose by wedge shaped elements}
- 33/223 . . {the sealing surfaces being pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts}
- 33/224 . . . {a clamping ring being arranged between the threaded member and the connecting member}
- 33/225 . . {a sleeve being movable axially}
- 33/226 . . . {the sleeve being screwed over the hose}
- 33/227 . . {the hose being introduced into or onto the connecting member and automatically locked (F16L 37/084 takes precedence)}
- 33/228 . . {a flexible wire being coiled upon the hose}
- 33/23 . . the outer parts being segmented, the segments being pressed against the hose by tangentially arranged members
- 33/24 . with parts screwed directly on or into the hose (F16L 33/22 takes precedence)
- 33/245 . . {the inner or outer part being moulded in situ}
- 33/26 . specially adapted for hoses of metal
- 33/28 . for hoses with one end terminating in a radial flange or collar
- 33/30 . comprising parts inside the hoses only (F16L 33/24 takes precedence)
- 33/32 . comprising parts outside the hoses only (F16L 33/24 takes precedence)
- 33/34 . with bonding obtained by vulcanisation, gluing, melting, or the like
- 35/00 Special arrangements used in connection with end fittings of hoses, e.g. safety or protecting devices**
- 35/005 . {Nozzles}
- 37/00 Couplings of the quick-acting type (radially binding sleeves F16L 17/04, F16L 21/06; connecting hoses to rigid members F16L 33/00; connections made automatically when vehicles are brought together B60D, B61G; specially adapted for lubricating devices F16N 21/00)**
- 37/002 . {which can be controlled at a distance}
- 37/004 . {using magnets}

- 37/006 . . {plug-cocks}
- 37/008 . . {for branching pipes; for joining pipes to walls}
- 37/02 . . in which the connection is maintained only by friction of the parts being joined ([F16L 37/22 takes precedence](#))
- 37/025 . . {with an inner elastic part pressed against an outer part by reason of its elasticity}
- 37/04 . . with an elastic outer part pressing against an inner part by reason of its elasticity ([with locking members F16L 37/08](#))
- 37/05 . . . tightened by the pressure of a mechanical element
- 37/06 . . . tightened by fluid pressure
- 37/08 . . in which the connection between abutting or axially overlapping ends is maintained by locking members ([F16L 37/22 - F16L 37/26 take precedence](#))
- 37/082 . . {using an element which is hinged on one end of the pipe-ends and which is maintained in locked position by a screw tightened against the other pipe-end}
- 37/084 . . combined with automatic locking
- 37/0841 . . . {by means of a transversally slidable locking member surrounding the tube}
- 37/0842 . . . {by means of a ring which is split into a plurality of component parts which are held in place by means of a resilient ring member}
- 37/0844 . . . {by means of a ring pivoting so as to lie against the tube}
- 37/0845 . . . {by means of retaining members associated with the packing member}
- 37/0847 . . . {by means of hooks ([F16L 37/096, F16L 37/098 take precedence](#))}
- 37/0848 {rocking freely}
- 37/086 . . . by means of latching members pushed radially by spring-like elements
- 37/088 . . . by means of a split elastic ring
- 37/091 . . . by means of a ring provided with teeth or fingers
- 37/0915 {with a separate member for releasing the coupling}
- 37/092 . . . by means of elements wedged between the pipe and the frusto-conical surface of the body of the connector
- 37/0925 {with rings which bite into the wall of the pipe}
- 37/096 . . . by means of hooks hinged about an axis
- 37/098 . . . by means of flexible hooks
- 37/0982 {with a separate member for releasing the coupling}
- 37/0985 {the flexible hook extending radially inwardly from an outer part and engaging a bead, recess or the like on an inner part ([F16L 37/0982 takes precedence](#))}
- 37/0987 {the flexible hook being progressively compressed by axial tensile loads acting on the coupling}
- 37/10 . . using a rotary external sleeve or ring on one part
- 37/101 . . . {in which the coupling is coaxial with the pipe}
- 37/103 . . . {the connection being maintained by the eccentricity of the two parts of the joint}
- 37/105 . . . {the rotating sleeve having on its inner surface several axially spaced and circumferentially discontinuous threads which engage with the threads on the male part which are also spaced axially and circumferentially discontinuous}
- 37/107 . . . Bayonet-type couplings
- 37/113 . . . the male part having lugs on its periphery penetrating into the corresponding slots provided in the female part
- 37/12 . . using hooks, pawls or other movable or insertable locking members ([F16L 37/084 takes precedence](#))
- 37/1205 . . . {using hooks hinged about an axis placed behind a flange and which act behind the other flange}
- 37/121 . . . {using freely rocking hooks ([F16L 37/1215 takes precedence](#))}
- 37/1215 . . . {using hooks provided with a screw-thread adapted to engage and mesh with an appropriate corresponding part}
- 37/122 . . . {using hooks tightened by a wedge section}
- 37/1225 . . . {using a retaining member the extremities of which, e.g. in the form of a U, engage behind a shoulder of both parts}
- 37/123 . . . {using a retaining member in the form of a wedge}
- 37/1235 . . . {the connection taking place from inside the pipes}
- 37/124 . . . using bolts, fixed to a flange, which are able to tilt in slots of another flange, and being maintained there by the tightening of nuts
- 37/127 . . . using hooks hinged about an axis ([F16L 37/1215 takes precedence](#))}
- 37/133 . . . using flexible hooks ([F16L 37/1215 takes precedence](#))}
- 37/138 . . . using an axially movable sleeve
- 37/14 . . . Joints secured by inserting between mating surfaces an element, e.g. a piece of wire, a pin, a chain
- 37/142 {where the securing element is inserted tangentially}
- 37/144 {the securing element being U-shaped}
- 37/146 {the securing element being a rigid pin, screw or the like}
- 37/148 {the securing element being flexible ([F16L 37/144 takes precedence](#))}
- 37/15 the element being a wedge
- 37/16 . . . Joints tightened by the action of a wedge-shaped hinged hooks
- 37/18 . . . Joints tightened by eccentrics or rotatable cams
- 37/20 . . . Joints tightened by toggle-action levers
- 37/22 . . in which the connection is maintained by means of balls, rollers or helical springs under radial pressure between the parts
- 37/23 . . by means of balls
- 37/24 . . in which the connection is made by inserting one member axially into the other and rotating it to a limited extent, e.g. with bayonet action
- 37/242 . . {in which the rotation takes place between the eccentric parts}
- 37/244 . . the coupling being co-axial with the pipe

- 37/2445 . . . {in which a male cylindrical element is introduced into a female cylindrical element, each element containing several threads axially spaced and circumferentially discontinuous which engage with each other as a result of the rotation of one of the elements}
- 37/248 . . . Bayonet-type couplings
- 37/252 . . . the male part having lugs on its periphery penetrating in the corresponding slots provided in the female part
- 37/256 . . the coupling not being coaxial with the pipe
- 37/26 . . in which the connection is made by transversely moving the parts together, with or without their subsequent rotation
- 37/28 . . with fluid cut-off means
- 37/30 . . with fluid cut-off means in each of two pipe-end fittings
- 37/32 . . . at least one of two lift valves being opened automatically when the coupling is applied
- 37/33 the lift valves being of the ball type
- 37/34 at least one of the lift valves being of the sleeve type, i.e. a sleeve is telescoped over an inner cylindrical wall
- 37/35 at least one of the valves having an axial bore
- 37/36 with two lift valves being actuated to initiate the flow through the coupling after the two coupling parts are locked against withdrawal
- 37/367 . . . with two gate valves or sliding valves
- 37/373 . . . with two taps or cocks
- 37/38 . . with fluid cut-off means in only one of the two pipe-end fittings
- 37/40 . . . with a lift valve being opened automatically when the coupling is applied
- 37/407 the lift valve being of the ball type
- 37/413 the lift valve being of the sleeve type, i.e. a sleeve being telescoped over an inner cylindrical wall
- 37/42 the valve having an axial bore communicating with lateral apertures
- 37/44 . . . with one lift valve being actuated to initiate the flow through the coupling after the two coupling parts are locked against withdrawal
- 37/46 . . . with a gate valve or sliding valve
- 37/47 . . . with a tap or cock
- 37/48 . . for fastening a pipe on the end of a tap
- 37/50 . . adjustable; allowing movement of the parts joined
- 37/505 . . {allowing substantial longitudinal adjustment or movement (by means of screw-thread F16L 15/02)}
- 37/52 . . Universal joints, i.e. with a mechanical connection allowing angular movement or adjustment of the axes of the parts in any direction
- 37/53 . . allowing adjustment or movement only about the axis of one pipe
- 37/54 . . for pipes under pressure which are supported only on one side
- 37/56 . . for double-walled or multi-channel pipes {or pipe assemblies}
- 37/565 . . {Concentric pipes}
- 37/58 . . the extremities of the two halves of the joint being pressed against each other without being locked in position
- 37/60 . . with plug and fixed wall housing
- 37/62 . . pneumatically or hydraulically actuated
- 39/00 Joints or fittings for double-walled or multi-channel pipes or pipe assemblies**
- 39/005 . . {for concentric pipes}
- 39/02 . . for hoses
- 39/04 . . allowing adjustment or movement {(of the multiline swivel type F16L 39/06)}
- 39/06 . . of the multiline swivel type, e.g. comprising a plurality of axially mounted modules
- 41/00 Branching pipes; Joining pipes to walls**
(F16L 39/00 takes precedence {; characterised by couplings of the quick-acting type F16L 37/008; specially adapted to be made of plastics or to be used with pipes made of plastics F16L 47/26 })
- 41/001 . . {the wall being a pipe plate (details or component parts of steam super heaters F22G 3/00; heat exchangers F28)}
- 41/002 . . {of concrete, cement or asbestos-cement}
- 41/004 . . {Joining to walls at other than 90 degrees (F16L 41/002, F16L 41/008 take precedence)}
- 41/005 . . {adjustable and comprising a hollow threaded part in an opening}
- 41/007 . . {adjustable and comprising a bend}
- 41/008 . . {for connecting a measuring instrument (connecting means for pressure measuring apparatus G01L 19/0007)}
- 41/02 . . Branch units, e.g. made in one piece, welded, riveted
- 41/021 . . . {T- or cross-pieces (F16L 41/025, F16L 41/026, F16L 41/028 take precedence)}
- 41/023 . . . {Y- pieces (F16L 41/025, F16L 41/026, F16L 41/028 take precedence)}
- 41/025 . . . {with rectangular cross-section}
- 41/026 . . . {with a layer protecting against erosion}
- 41/028 . . . {of concrete, cement or asbestos-cement}
- 41/03 . . comprising junction pieces for four or more pipe members
- 41/04 . . Tapping pipe walls, i.e. making connections through the walls of pipes while they are carrying fluids; Fittings therefor
- 41/045 . . . {without removal of material (F16L 41/065 takes precedence)}
- 41/06 . . making use of attaching means embracing the pipe
- 41/065 {without removal of material}
- 41/08 . . Joining pipes to walls or pipes, the joined pipe axis being perpendicular to the plane of the wall or to the axis of another pipe (F16L 41/02 takes precedence)
- 41/082 . . . {Non-disconnectible joints, e.g. soldered, adhesive or caulked joints}
- 41/084 {Soldered joints}
- 41/086 . . . {fixed with screws}
- 41/088 . . . {fixed using an elastic grommet between the extremity of the tube and the wall}
- 41/10 . . the extremity of the pipe being screwed into the wall
- 41/12 . . using attaching means embracing the pipe
- 41/14 . . by screwing an intermediate part against the inside or outside of the wall {(F16L 41/086 takes precedence)}
- 41/16 . . the branch pipe comprising fluid cut-off means
- 41/18 . . the branch pipe being movable

- 43/00 Bends; Siphons (with cleaning apertures [F16L 45/00](#))**
- 43/001 . {made of metal}
 - 43/002 . . {and formed from sheet having a circular passage}
 - 43/003 . . {having a rectangular cross-section}
 - 43/005 . . {Return bends (coiled tube furnaces for thermal non-catalytic cracking of hydrocarbon oils [C10G 9/20](#))}
 - 43/006 . . {telescopic}
 - 43/007 . {made of concrete, cement or asbestos-cement}
 - 43/008 . {made from plastic material}
 - 43/02 . adapted to make use of special securing means
- 45/00 Pipe units with cleaning aperture and closure therefor**
- 47/00 Connecting arrangements or other fittings specially adapted to be made of plastics or to be used with pipes made of plastics {(connections for hoses of plastics [F16L 33/006](#))}**
- 47/005 . {the first pipe being joined to the ends of two other pipes placed one inside the other, e.g. gas pipe with protective sheath}
 - 47/02 . Welded joints; Adhesive joints
 - 47/03 . . Welded joints with an electrical resistance incorporated in the joint
 - 47/04 . with a swivel nut or collar engaging the pipe
 - 47/06 . with sleeve or socket formed by or in the pipe end
 - 47/065 . . {with sealing rings arranged between outer surface of pipe and inner surface of sleeve or socket, the sealing rings being placed previously on the male part}
 - 47/08 . . with sealing rings arranged between the outer surface of one pipe end and the inner surface of the sleeve or socket, the sealing rings being placed previously in the sleeve or socket
 - 47/10 . . . the sealing rings being maintained in place by additional means
 - 47/12 . . with additional locking means
 - 47/14 . Flanged joints
 - 47/145 . . {for rectangular pipes}
 - 47/16 . Screw-threaded joints
 - 47/18 . Adjustable joints; Joints allowing movement
 - 47/20 . based principally on specific properties of plastics
 - 47/22 . . using shrink-down material
 - 47/24 . . for joints between metal and plastics pipes
 - 47/26 . for branching pipes; for joining pipes to walls; Adaptors therefor
 - 47/265 . . {Reduction units}
 - 47/28 . . Joining pipes to walls or to other pipes, the axis of the joined pipe being perpendicular to the wall or to the axis of the other pipe
 - 47/285 . . . {with fluid cut-off means in the branching pipe}
 - 47/30 . . . using attaching means embracing the pipe
 - 47/32 . . Branch units, e.g. made in one piece, welded, riveted
 - 47/34 . . Tapping pipes, i.e. making connections through walls of pipes while carrying fluids; Fittings therefor
 - 47/345 . . . {making use of attaching means embracing the pipe}

- 49/00 Connecting arrangements, e.g. joints, specially adapted for pipes of brittle material, e.g. glass, earthenware**
- 49/02 . Joints with a sleeve or socket
 - 49/04 . Flanged joints
 - 49/06 . Joints in which sealing surfaces are pressed together by means of a member, e.g. swivel nut, screwed on, or into, one of the joint parts
 - 49/08 . Adjustable joints; Joints allowing movement
- 51/00 Expansion-compensation arrangements for pipe-lines (telescopic pipes [F16L 27/12](#))**
- 51/005 . {for concrete pipe-lines}
 - 51/02 . making use of bellows or an expansible folded or corrugated tube
 - 51/021 . . {having a rectangular cross-section}
 - 51/022 . . {with a single corrugation}
 - 51/023 . . {consisting of flexible rings}
 - 51/024 . . {non-metallic (flexible pipe connections [F16L 27/10](#))}
 - 51/025 . . {with several corrugations}
 - 51/026 . . {with interior reinforcement}
 - 51/027 . . {with external reinforcement}
 - 51/028 . . {with the expansion or contraction of each corrugation being limited}
 - 51/029 . . {consisting of flexible rings}
 - 51/03 . . comprising two or more bellows
 - 51/035 . . . {for cancelling the axial loading resulting from fluid pressure}
 - 51/04 . making use of bends, e.g. lyre-shaped
- 53/00 Heating of pipes or pipe systems; Cooling of pipes or pipe systems**
- WARNING**
- Group [F16L 53/00](#) is impacted by reclassification into groups [F16L 53/70](#) and [F16L 53/75](#).
- Groups [F16L 53/00](#), [F16L 53/70](#), and [F16L 53/75](#) should be considered in order to perform a complete search.
- 53/30 . Heating of pipes or pipe systems
 - 53/32 . . using hot fluids
 - 53/34 . . using electric, magnetic or electromagnetic fields, e.g. using induction, dielectric or microwave heating
 - 53/35 . . Ohmic-resistance heating
 - 53/37 . . . the heating current flowing directly through the pipe to be heated
 - 53/38 . . . using elongate electric heating elements, e.g. wires or ribbons
 - 53/70 . Cooling of pipes or pipe systems

WARNING

Group [F16L 53/70](#) is incomplete pending reclassification of documents from group [F16L 53/00](#).

Groups [F16L 53/00](#) and [F16L 53/70](#) should be considered in order to perform a complete search.

- 53/75 . . using cooling fins

WARNING

Group [F16L 53/75](#) is incomplete pending reclassification of documents from group [F16L 53/00](#).

Groups [F16L 53/00](#) and [F16L 53/75](#) should be considered in order to perform a complete search.

- 55/00** **Devices or appurtenances for use in, or in connection with, pipes or pipe systems (the preceding groups and groups [F16L 57/00](#), [F16L 59/00](#) take precedence; repairing or joining pipes on or under water [F16L 1/26](#); nozzles [B05B](#); cleaning of pipes [B08B 9/02](#); {arrangements of draining devices for water main or service pipe systems [E03B 7/08](#);} devices for preventing bursting of water pipes by freezing [E03B 7/10](#); {draining devices for hydrants [E03B 9/14](#);} for domestic plumbing installations [E03C 1/00](#); {steam traps for draining of liquids from enclosures containing gases or vapours [F16T](#)}; arrangements for sealing leaky tubes or conduits of heat-exchangers [F28F 11/00](#))**
- 55/005 . {Devices restraining ruptured tubes from whipping}
- 55/02 . Energy absorbers; Noise absorbers (in valves [F16K 47/00](#))
- 55/027 . . Throttle passages
- 55/02709 . . . {in the form of perforated plates}
- 55/02718 {placed transversely}
- 55/02727 {placed parallel to the axis of the pipe}
- 55/02736 . . . {using transversal baffles defining a tortuous path}
- 55/02745 . . . {by passing through a mass of particles or a porous member}
- 55/02754 . . . {using a central core throttling the passage}
- 55/02763 . . . {using an element with multiple tubes}
- 55/02772 . . . {using spirally or helically shaped channels}
- 55/02781 . . . {The regulating element being provided with radial outputs}
- 55/0279 . . . {The fluid flowing two or more times longitudinally in opposite directions, e.g. using parallel or concentric tubes}
- 55/033 . . Noise absorbers ([F16L 55/027](#) takes precedence)
- 55/0331 . . . {by inserting an elongated element in the pipe}
- 55/0332 . . . {by inserting a body of compressible material in the pipe}
- 55/0333 . . . {by means of an active system}
- 55/0335 . . . {by means of external rings}
- 55/0336 . . . {by means of sound-absorbing materials}
- 55/0337 . . . {by means of a flexible connection}
- 55/0338 . . . {by means of a membrane}
- 55/035 . . . in the form of specially adapted hangers or supports
- 55/04 . Devices damping pulsations or vibrations in fluids ([F16L 55/02](#) takes precedence)}
- 55/041 . . {specially adapted for preventing vibrations (flexible pipe connections [F16L 27/10](#))}
- 55/043 . . {specially adapted for protecting instruments from water hammer or vibrations}
- 55/045 . . specially adapted to prevent or minimise the effects of water hammer
- 55/05 . . . Buffers therefor
- 55/052 Pneumatic reservoirs

- 55/053 the gas in the reservoir being separated from the fluid in the pipe
- 55/054 the reservoir being placed in or around the pipe from which it is separated by a sleeve-shaped membrane
- 55/055 . . . Valves therefor
- 55/07 . Arrangement or mounting of devices, e.g. valves, for venting or aerating or draining ([apparatus for draining F16T](#))
- 55/09 . Air conditioning, e.g. de-watering, in pneumatic systems
- 55/10 . Means for stopping flow from or in pipes or hoses ([F16L 29/00](#), [F16L 37/28](#) take precedence; valves [F16K](#))
- 55/1003 . . {by introduction of paste, powder, particles, or the like}
- 55/1007 . . {Couplings closed automatically when broken}
- 55/1011 . . {Soluble closing devices}
- 55/1015 . . {Couplings closed automatically when disengaging force exceeds preselected value ([F16L 55/1007](#) takes precedence)}
- 55/1018 . . {Pivoting closing devices}
- 55/1022 . . {Fluid cut-off devices automatically actuated}
- 55/1026 . . {Fire protection devices (in general [A62C](#))}
- 55/103 . . by temporarily freezing liquid sections in the pipe
- 55/105 . . Closing devices introduced radially into the pipe or hose
- 55/11 . . Plugs ([F16L 55/128](#) takes precedence)}
- 55/1108 . . . {fixed by screwing or by means of a screw-threaded ring}
- 55/1116 . . . {glued or welded}
- 55/1125 . . . {fixed by rotating a limited amplitude}
- 55/1133 . . . {fixed by means of balls}
- 55/1141 . . . {the plug being made of elastic material}
- 55/115 . . Caps ([F16L 55/1286](#) takes precedence)}
- 55/1152 . . . {fixed by screwing or by means of a screw-threaded ring}
- 55/1155 . . . {fixed by rotating a limited amplitude}
- 55/1157 . . . {using hooks, pawls, or other movable or insertable locking members}
- 55/12 . . by introducing into the pipe a member expandable in situ (inflatable cut-off valves [F16K 7/10](#))
- 55/124 . . . introduced radially into the pipe or hose
- 55/128 . . . introduced axially into the pipe or hose
- 55/1283 {Plugging pig}
- 55/1286 {The closing device being a cap}
- 55/13 the closure device being a plug fixed by plastic deformation
- 55/132 the closure device being a plug fixed by radially deforming the packing
- 55/134 by means of an inflatable packing
- 55/136 the closure device being a plug fixed by radially expanding or deforming a split ring, hooks or the like
- 55/16 . Devices for covering leaks in pipes or hoses, e.g. hose-menders
- 55/1604 . . {by means of a by-pass conduit}
- 55/1608 . . {by replacement of the damaged part of the pipe}
- 55/1612 . . {by means of a plug}
- 55/1616 . . {the material forming the pipe or hose being self-sealing}
- 55/162 . . from inside the pipe ([F16L 55/1612](#) takes precedence)}

- 55/163 . . . a ring, a band or a sleeve being pressed against the inner surface of the pipe
- 55/164 . . . a sealing fluid being introduced in the pipe ([F16L 55/1645 takes precedence](#))
- 55/1645 . . . a sealing material being introduced inside the pipe by means of a tool moving in the pipe
- 55/16455 {a part of the tool defining, together with the inner wall of the pipe, an enclosed space into which sealing material is injected}
- 55/165 . . . a pipe {or flexible liner} being inserted in the damaged section
- 55/1651 {the flexible liner being everted}
- 55/1652 {the flexible liner being pulled into the damaged section}
- 55/1653 {and being pressed into contact with the pipe by a tool which moves inside along the pipe}
- 55/1654 {and being inflated}
- 55/1655 {a pipe being formed inside the old pipe by winding strip-material}
- 55/1656 {materials for flexible liners ([hoses in general F16L 11/00](#))}
- 55/1657 {lengths of rigid pipe being inserted ([F16L 55/1658 takes precedence](#))}
- 55/1658 {the old pipe being ruptured prior to insertion of a new pipe}
- 55/168 . . from outside the pipe
- 55/1683 . . . {by means of a patch which is fixed on the wall of the pipe by means of an adhesive, a weld or the like}
- 55/1686 . . . {by winding a tape}
- 55/17 . . . by means of rings, bands or sleeves pressed against the outside surface of the pipe or hose
- 55/1705 {with a substantially radial tightening member}
- 55/171 {the ring or the sleeve being tightened by a wedge section}
- 55/1715 {the ring or the sleeve being tightened by hooks, pawls, or other movable members ([coupling of the quick-acting type F16L 37/12](#))}
- 55/172 the ring, band or sleeve being tightened by a tangentially arranged threaded pin and a nut
- 55/1725 {in which the threaded pin is rigid with the hose encircling member}
- 55/175 . . . by using materials which fill a space around the pipe before hardening
- 55/178 . . . by clamping an outer gasket against a joint with sleeve or socket
- 55/179 . . specially adapted for bends, branch units, branching pipes or the like
- 55/18 . . Appliances for use in repairing pipes ([F16L 55/10 takes precedence](#))
- 55/24 . . Preventing accumulation of dirt or other matter in the pipes, e.g. by traps, by strainers
- 55/26 . . Pigs or moles, i.e. devices movable in a pipe or conduit with or without self-contained propulsion means
- NOTES**
1. Pigs or moles specially adapted for particular applications are classified in the relevant places for the applications, e.g.
- stopping flow from or in pipes or hoses [F16L 55/12](#)
 - repairing pipes [F16L 55/18](#)
 - applying liquids or other fluent materials to the inside of tubes [B05C 7/08](#)
 - cleaning pipes or tubes or systems of pipes or tubes [B08B 9/02](#)
 - welding or cutting [B23K 37/02](#)
 - earth drilling [E21B](#)
 - {separating products [F17D 3/08](#);}
 - cleaning chimneys [F23J 3/02](#)
 - cleaning internal or external surfaces of heat-exchange or heat-transfer conduits [F28G](#)
 - measuring, testing [G01](#)
 - inspection of vessels in nuclear reactors [G21C 17/003](#)
 - inspection or maintenance of pipe-lines or tubes in nuclear installations [G21C 17/017](#)
 - installing electric, or combined optical and electric, cables or lines [H02G](#)
2. In this group, it is desirable to add the indexing codes of group [F16L 2101/00](#).
- 55/265 . . {specially adapted for work at or near a junction between a main and a lateral pipe}
- 55/28 . . Constructional aspects
- 55/30 . . . of the propulsion means, e.g. towed by cables
- 55/32 being self-contained
- 55/34 the pig or mole being moved step by step
- 55/36 jet driven
- 55/38 driven by fluid pressure
- 55/40 . . . of the body
- 55/42 gelled or degradable
- 55/44 expandable
- 55/46 . . Launching or retrieval of pigs or moles
- 55/48 . . Indicating the position of the pig or mole in the pipe or conduit
- 57/00 Protection of pipes or objects of similar shape against external or internal damage or wear** ([{protection under water F16L 1/123;}](#) supporting of pipes inside other pipes or sleeves [F16L 7/00](#); used in connection with end fittings of hoses [F16L 35/00](#); protection thereof during transport [B65D 59/00](#))
- 57/005 . . {specially adapted for the ends of pipes}
- 57/02 . . against cracking or buckling
- 57/04 . . against fire or other external sources of extreme heat
- 57/06 . . against wear ([F16L 57/04 takes precedence](#))
- 58/00 Protection of pipes or pipe fittings against corrosion or incrustation (compound tubes F16L 9/14)**
- 58/02 . . by means of internal or external coatings
- 58/04 . . Coatings characterised by the materials used ([F16L 58/16 takes precedence](#))
- 58/06 . . . by cement, concrete, or the like
- 58/08 . . . by metal
- 58/10 . . . by rubber or plastics
- 58/1009 {the coating being placed inside the pipe}
- 58/1018 {the protective layer being fixed by means of anchoring devices}
- 58/1027 {the coating being a sprayed layer}
- 58/1036 {the coating being a preformed pipe ([F16L 58/1027 takes precedence](#))}
- 58/1045 {the coating being an extruded or a fused layer}
- 58/1054 {the coating being placed outside the pipe}

58/1063	. . . . . {the coating being a sheet wrapped around the pipe}	59/123	. . {Anchoring devices; Fixing arrangements for preventing the relative longitudinal displacement of an inner pipe with respect to an outer pipe, e.g. stress cones}
58/1072	. . . . . {the coating being a sprayed layer}	59/125	. . Helical spacers
58/1081	. . . . . {the coating being a preformed pipe}	59/13	. . Resilient supports
58/109	. . . . . {the coating being an extruded layer}	59/135	. . Hangers or supports specially adapted for insulated pipes
58/12	. . . by tar or bitumen	59/14	. . Arrangements for the insulation of pipes or pipe systems (F16L 59/02 - F16L 59/12 take precedence)
58/14	. . . by ceramic or vitreous materials	59/141	. . {in which the temperature of the medium is below that of the ambient temperature (rigid pipes of wood F16L 9/006 ; vacuum insulation F16L 59/065)}
58/16	. . the coating being in the form of a bandage	59/143	. . {Pre-insulated pipes}
58/18	. specially adapted for pipe fittings	59/145	. . {providing fire-resistance (in general F16L 57/04)}
58/181	. . {for non-disconnectible pipe joints (in general F16L 13/00)}	59/147	. . the insulation being located inwardly of the outer surface of the pipe
58/182	. . {for screw-threaded joints (in general F16L 15/00)}	59/15	. . for underground pipes
58/184	. . {for joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts (in general F16L 19/00)}	59/153	. . for flexible pipes
58/185	. . {for joints with sleeve or socket (in general F16L 21/00)}	59/16	. . Arrangements specially adapted to local requirements at flanges, junctions, valves or the like
58/187	. . {for flanged joints (in general F16L 23/00)}	59/161	. . . {Housings for valves, tee pieces, or the like}
58/188	. . {for branching pipes; for joining pipes to walls (in general F16L 41/00)}	59/163	. . . {Branch units (in general F16L 41/02); Insulation forming a whole with branches}
59/00	Thermal insulation in general	59/165	. . . {Repairing insulated pipes}
59/02	. Shape or form of insulating materials, with or without coverings integral with the insulating materials (chemical aspects see the relevant classes)	59/166	. . . {covering the end of an insulated section}
59/021	. . {comprising a single piece or sleeve, e.g. split sleeve, two half sleeves}	59/168	. . . {Flexible insulating material or covers for flanges, junctions, valves or the like}
59/022	. . . {with a single slit}	59/18	. . . adapted for joints
59/023	. . . . {with a hinge opposite the slit}	59/181	. . . . {Joints in which sealing surfaces are pressed together by means of a member, e.g. a swivel nut, screwed on or into one of the joint parts (in general F16L 19/00)}
59/024	. . . {composed of two half sleeves}	59/182	. . . . {Joints with sleeve or socket (in general F16L 21/00)}
59/025	. . . {with more than two segments}	59/184	. . . . {Flanged joints (in general F16L 23/00)}
59/026	. . {Mattresses, mats, blankets or the like}	59/185	. . . . {Adjustable joints, joints allowing movement (in general F16L 27/00)}
59/027	. . {Bands, cords, strips or the like for helically winding around a cylindrical object}	59/187	. . . . {Arrangements for connecting hoses to one another, to flexible sleeves or to rigid members (in general F16L 31/00 , F16L 33/00)}
59/028	. . {Composition or method of fixing a thermally insulating material}	59/188	. . . . {Couplings of the quick-acting type (in general F16L 37/00)}
59/029	. . {layered}	59/20	. . . . for non-disconnectable joints
59/04	. Arrangements using dry fillers, e.g. using slag wool {which is added to the object to be insulated by pouring, spreading, spraying or the like}	59/21	. . . adapted for expansion-compensation devices
59/06	. Arrangements using an air layer or vacuum	59/22	. . . adapted for bends
59/065	. . using vacuum (F16L 59/075 takes precedence)		
59/07	. . the air layer being enclosed by one or more layers of insulation		
59/075	. . the air layer or the vacuum being delimited by longitudinal channels distributed around the circumference of a tube		
59/08	. Means for preventing radiation, e.g. with metal foil		
59/10	. Bandages or covers for the protection of the insulation, e.g. against the influence of the environment or against mechanical damage (integral with the insulation materials F16L 59/02)		
59/103	. . {Rigid covers for tee pieces}		
59/106	. . {Flexible covers for flanges, junctions, valves or the like}		
59/11	. . Rigid covers for elbows		
59/12	. Arrangements for supporting insulation from the wall or body insulated, e.g. by means of spacers between pipe and heat-insulating material; Arrangements specially adapted for supporting insulated bodies		
59/121	. . {for pipes passing through walls or partitions}		
		2101/00	Uses or applications of pigs or moles
		2101/10	. Treating the inside of pipes
		2101/12	. . Cleaning
		2101/16	. . Coating by application of fluent materials, e.g. painting
		2101/18	. . Lining other than coating
		2101/20	. Expelling gases or fluids
		2101/30	. Inspecting, measuring or testing
		2101/40	. Separating transported fluids
		2101/50	. Pulling cables or the like
		2101/60	. Stopping leaks

F16L

2101/70 . Drill-well operations

2201/00 Special arrangements for pipe couplings

2201/10 . Indicators for correct coupling

2201/20 . Safety or protective couplings

2201/30 . Detecting leaks

2201/40 . for special environments

2201/44 . . sterile

2201/60 . Identification or marking

2201/80 . Dust covers