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

F16B  DEVICES FOR FASTENING OR SECURING CONSTRUCTIONAL ELEMENTS OR
MACHINE PARTS TOGETHER, e.g. NAILS, BOLTS, CIRCLIPS, CLAMPS, CLIPS,
WEDGES, JOINTS OR JOINTING (couplings for transmitting rotation F16D)

NOTES
1. Attention is drawn to:
   a. the Note following group E04B 1/38;
   b. the following places:
      A44B  Buckles, slide fasteners
      A47G 3/00  Ornamental heads for nails, screws, or the like
      B42F 3/00  Means, not using staples, for attaching sheets temporarily together
      (C14B 17/08)  {Fastening devices, e.g. clips for leather-stretching used in apparatus or machines for
                      manufacturing or treating skins, hides, leathers or furs}
      E01B 9/10  Screws or bolts for railway sleepers
      E01B 11/00  Rail joints
      E04  Connections for building
      E04D 13/08  Clamping means for down pipes for roof drainage
      E04G 5/04  Fastening scaffolds against buildings
      E04G 7/00  Scaffolding couplings
      E05C  Bolts for fasteners for wings, specially for doors or windows
      F16C 29/10  Locking bearings for parts moving only linearly
      F16G 17/00  Hooks as integral parts of chains
      F16L  Pipe joints
      F16L 3/00  Supports for pipes, cables or protective tubing, e.g. hangers, holders, clamps, cleats, clips, brackets
      F16L 33/02  Clips for connecting hoses to rigid members
      H01F 7/00  Magnetic holding devices
      H02N 13/00  Electrostatic holding devices.

2. Groups F16B 2/00 - F16B 47/00 take precedence over group F16B 1/00.
3. {In this main group, it is desirable to add the indexing codes of F16B 2200/00}

WARNINGS
1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following
   CPC groups:
   F16B 7/08  covered by  F16B 5/12, F16B 7/04, F16L 3/00
   F16B 7/12  covered by  F16B 7/105
   F16B 7/16  covered by  F16B 7/14, F16B 2007/16
   F16B 13/10  covered by  F16B 13/08, F16B 2013/10
   F16B 13/13  covered by  F16B 13/002, F16B 13/12
   F16B 21/14  covered by  F16B 21/12, F16B 2021/14
   F16B 25/02  covered by  F16B 25/103
   F16B 25/04  covered by  F16B 25/00, F16B 25/106
   F16B 25/06  covered by  F16B 25/00, F16B 25/106
   F16B 25/08  covered by  F16B 25/00, F16B 25/106
   F16B 33/04  covered by  F16B 33/02, F16B 2033/04
   F16B 37/10  covered by  F16B 37/0842, F16B 37/0871

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.
Devices for securing together, or preventing relative movement between, constructional elements or machine parts

- Fasteners made by sintering powders
- by the use of a shape-memory material
- Friction-reducing coatings
- by the use of a magnetic material
- by the use of an explosive charge
- by the use of a hydraulic action
- by the use of a pneumatic action
- (establishing a good electrical connection)
- having differing thermal expansion coefficients
- (Ceramic-to-metal-connections)
- (means for avoiding incorrect assembly or positioning)
- Means for securing elements after operation (means for bringing members to rest)
- (locking of actuators)
- by sticking together
- Joining sheets or plates in abutting parts being at different temperature
- the sheets, plates or panels having holes
- with snap action
- Joining sheets, plates or panels in abutting relationship
- (both sheets, plates or panels having a groove)
- (the sheets, plates or panels having holes)
- (by moving the sheets, plates, or panels substantially in their own plane, perpendicular to the abutting edge)
- (a tongue on the edge of one sheet, plate, or panel co-operating with a groove in the edge of another sheet, plate, or panel)

Fastenings for constructional elements or machine parts in general (couplings for transmitting rotation)

- Friction-grip releasable fastenings (for cables or ropes, e.g. cleats)
- internal, i.e. with spreading action
- external, i.e. with contracting action
- using screw-thread elements
- using bands
- using pivoting jaws
- using sliding jaws
- using wedges
- using rollers or balls
- using cams, levers, eccentrics, or toggles
- Clips, i.e. with gripping action effected solely by the inherent resistance to deformation of the material of the fastening
- (two stable positions)
- of resilient material, e.g. rubbery material
- of metal
Fastenings for constructional elements or machine parts in general

5/0036 . . . [and using hook and slot or keyhole-type connections]
5/004 . . . [and using C-shaped clamps]
5/0044 . . . [and using interlocking keys of circular, square, rectangular or like shape]
5/0048 . . . [hinge-like]
5/0052 . . . [the interlocking key acting as a dovetail-type key]
5/0056 . . . [by moving the sheets, plates or panels or the interlocking key perpendicular to the main plane]
5/006 . . . [and using ring-shaped clamps]
5/0064 . . . [and using C-shaped clamps]
5/0068 . . . [and using I-shaped clamps with flanges moving towards each other]
5/0072 . . . [and using screw-thread]
5/0076 . . . [and using expanding clamps]
5/008 . . . [by a rotating or sliding and rotating movement]
5/0084 . . . [characterised by particular locking means]
5/0088 . . . [with locking means moving substantially perpendicular to the main plane, e.g. pins, screws]
5/0092 . . . [with locking means rotating about an axis parallel to the main plane and perpendicular to the abutting edge, e.g. screw, bayonet]
5/0096 . . . [by using permanent deformation]
5/01 . . . [by means of fastening elements specially adapted for honeycomb panels]
5/02 . . . [by means of fastening members using screw-thread (F16B 5/0004 takes precedence; construction of screw-threaded connections F16B 25/00 - F16B 39/00)]
5/0208 . . . [using panel fasteners, i.e. permanent attachments allowing for quick assembly]
5/0216 . . . [the position of the plates to be connected being adjustable]
5/0225 . . . [allowing for adjustment parallel to the plane of the plates]
5/0233 . . . [allowing for adjustment perpendicular to the plane of the plates]
5/0241 . . . [with the possibility for the connection to absorb deformation, e.g. thermal or vibrational]
5/025 . . . [specially designed to compensate for misalignment or to eliminate unwanted play]
5/0258 . . . [using resiliently deformable sleeves, grommets or inserts (F16B 43/001 takes precedence)]
5/0266 . . . [using springs]
5/0275 . . . [the screw-threaded element having at least two axially separated threaded portions (F16B 5/0283 takes precedence)]
5/0283 . . . [with an externally threaded sleeve around the neck or the head of the screw-threaded element for adjustable fastening a plate or frame or the like to a fixed element]
5/0291 . . . [the threaded element being driven through the edge of a sheet plate with its axis in the plane of the plate]
5/04 . . . [by means of riveting (rivets F16B 19/04)]
5/045 . . . [without the use of separate rivets]
5/06 . . . [by means of clamps or clips (F16B 5/0004 takes precedence; friction-grip releasable fastenings in general F16B 2/00)]
5/0607 . . . [joining sheets or plates to each other (F16B 5/0092; F16B 21/082 take precedence)]
5/0614 . . . [in angled relationship]
5/0621 . . . [in parallel relationship (fastened by a drive-pin F16B 19/1081; fastened by a device locking by rotation F16B 21/02)]
5/0628 . . . [allowing for adjustment parallel or perpendicular to the plane of the sheets or plates]
5/0635 . . . [fastened over the edges of the sheets or plates]
5/0642 . . . [the plates being arranged one on top of the other and in full close contact with each other]
5/065 . . . [the plates being one on top of the other and distanced from each other, e.g. by using protrusions to keep contact and distance]
5/0657 . . . [at least one of the plates providing a raised structure, e.g. of the doghouse type, for connection with the clamps or clips of the other plate]
5/0664 . . . [at least one of the sheets or plates having integrally formed or integrally connected snap-in-features]
5/0685 . . . [Joining sheets or plates to strips or bars (F16B 5/0092 takes precedence)]
5/0692 . . . [joining flexible sheets to other sheets or plates or to strips or bars (tent fastenings E04H 15/64; coping elements for swimming pools with fixing means for sealing foil E04H 4/142; greenhouses of flexible synthetic material A01G 9/1407; end or aperture-closing arrangements or devices for sacks or bags B65D 33/16)]
5/07 . . . [by means of multiple interengaging protrusions on the surfaces, e.g. hooks, coils,]
5/08 . . . [by means of welds or the like (welding B23K)]
5/10 . . . [by means of bayonet connections (F16B 5/0092 takes precedence); fastening devices locking by rotation F16B 21/02)]
5/12 . . . [Fastening strips or bars to sheets or plates, e.g. rubber strips, decorative strips for motor vehicles, by means of clips (friction- grip releasable fastenings in general F16B 2/00; fastening rods or tubular parts to flat surfaces at an angle F16B 9/00)]
5/121 . . . [fastened over the edge(s) of the sheet(s) or plate(s)]
5/123 . . . [Auxiliary fasteners specially designed for this purpose]
5/125 . . . [one of the auxiliary fasteners is comprising wire or sheet material or is made thereof]
5/126 . . . [at least one of the sheets, plates, bars or strips having integrally formed or integrally connected snap-in-features]
5/128 . . . [a strip with a C-or U-shaped cross section being fastened to a plate such that the fastening means remain invisible, e.g. the fastening being completely enclosed by the strip]
7/00 Connections of rods or tubes, e.g. of non-circular section, mutually, including resilient connections ([F16B 11/008; F16B 17/00 take precedence;] umbrella frames A45B 25/02; welding or soldering of connections B23K; vehicle connections in general B60D; railway couplings B61G; bicycle frames B62K; couplings for transmitting rotation F16D; couplings for tubes conveying fluids F16L)]
Fastenings for constructional elements or machine parts in general

[Fastenings for constructional elements or machine parts in general]

7/02 . . . with conical parts
7/025 . . . (with the expansion of an element inside the tubes due to axial movement towards a wedge or conical element (for rods or tubes telescopically engaged F16B 7/1463))
7/04 . . . Clamping or clipping connections (friction-grip releasable fastenings in general F16B 2/00)
7/0406 . . . (for rods or tubes being coaxial (F16B 7/10 takes precedence))
7/0413 . . . (for tubes using the inner side thereof (F16B 7/023 takes precedence))
7/042 . . . . . (with a locking element, e.g. pin, ball or pushbutton, engaging in a hole in the wall of at least one tube)
7/0426 . . . (for rods or for tubes without using the inner side thereof)
7/0433 . . . (for rods or tubes being in parallel relationship)
7/044 . . . (for rods or tubes being in angled relationship)
7/0446 . . . (for tubes using the inner side thereof (F16B 7/023 takes precedence))
7/0453 . . . (the tubes being drawn towards each other (F16B 7/0473 takes precedence))
7/046 . . . . . . . (by rotating an eccentric-mechanism)
7/0466 . . . . . . . (by a screw-threaded stud with a conical tip acting on an inclined surface)
7/0473 . . . . . . . (with hook-like parts gripping, e.g. by expanding, behind the flanges of a profile)
7/048 . . . (for rods or for tubes without using the inner side thereof)
7/0486 . . . (forming an abutting connection of at least one tube)
7/0493 . . . (forming a crossed-over connection)
7/06 . . . Turnbuckles (for cables, ropes, or wire F16G 11/12)
7/10 . . . Telescoping systems (for vertically adjustable chairs A47C 3/20; telescopic steering columns B62D 1/18; for scaffolding E04G 25/04; (telescopic masts, poles or the like E04H 12/182; telescopic door or window holders E05C 17/30); telescopic props for mining E21D 15/14 - E21D 15/46; stands or trestles as supports for apparatus or articles placed thereon (F16M 11/26))
7/105 . . . (locking in discrete positions, e.g. in extreme extended position)
7/14 . . . locking in intermediate {non-discrete} positions ((the rod or tube being locked by a tilting clip F16B 2/246))
7/1409 . . . (with balls or rollers urged by an axial displacement of a wedge or a conical member)
7/1418 . . . (with a clamping collar or two split clamping rings tightened by a screw or a cammed latch member)
7/1427 . . . (with cammed or eccentrical surfaces co-operating by relative rotation of the telescoping members or by rotation of an external collar)
7/1436 . . . . . . . (with rollers or balls)
7/1445 . . . (with a rubber bushing gripping inside the outer telescoping member by a radial expansion due to its axial compression (F16B 7/1463 takes precedence))
7/1454 . . . (with a clamp locking the telescoping members by swinging a handle provided with a locking cam (F16B 7/1418 takes precedence))
7/1463 . . . (with the expansion of an element inside the outer telescoping member due to the axial movement towards a wedge or a conical member)
7/1472 . . . (with a clamping screw perpendicular to the axis of the telescoping members)
7/1481 . . . (with a gripping helical spring)
7/149 . . . (with a sleeve or ring having a tapered or conical surface (F16B 7/1463 takes precedence))
2007/16 . . . {locking only against movement in one direction}
7/18 . . . using screw-thread elements {(F16B 7/025 takes precedence; for turnbuckles F16B 7/06)}
7/182 . . . (for coaxial connections of two rods or tubes)
7/185 . . . (with a node element)
7/187 . . . (with sliding nuts or other additional connecting members for joining profiles provided with grooves or channels (channel nuts per se F16B 37/045))
7/20 . . . (using bayonet connections)
7/22 . . . (using hooks or like elements)
9/00 Connections of rods or tubular parts to flat surfaces at an angle (with a part of or on one member entering a hole in the other and involving plastic deformation F16B 17/006; friction-grip releasable fastenings in general F16B 2/00; making press-fit connections B23P 11/00; B23P 19/00; fluid-tight connecting of pipes to reservoirs, sheets, or the like F16L, e.g. joining pipes (or rods conveying fluids) to walls F16L 41/00)

WARNING

Group F16B 9/00 is impacted by reclassification into groups F16B 9/01, F16B 9/05, F16B 9/052, F16B 9/054, F16B 9/056, F16B 9/058, F16B 9/07, F16B 9/09.

All groups listed in this Warning should be considered in order to perform a complete search.

9/01 . {Welded or bonded connections}

WARNING

Group F16B 9/01 is incomplete pending reclassification of documents from group F16B 9/00.

Groups F16B 9/00 and F16B 9/01 should be considered in order to perform a complete search.

9/02 . Detachable connections (F16B 9/05 – F16B 9/09 take precedence)

WARNING

Group F16B 9/02 is impacted by reclassification into groups F16B 9/05, F16B 9/052, F16B 9/054, F16B 9/056, F16B 9/058, F16B 9/07, F16B 9/09.

All groups listed in this Warning should be considered in order to perform a complete search.
Fastenings for constructional elements or machine parts in general

9/023 . . . [using clamps or clips]

**WARNING**

Group F16B 9/023 is no longer used for the classification of documents as of August 1, 2018. The content of this group is being reclassified into groups F16B 9/02, F16B 9/05, F16B 9/052, F16B 9/054, F16B 9/056, F16B 9/058, F16B 9/07, F16B 9/09.

All groups listed in this Warning should be considered in order to perform a complete search.

9/026 . . . [using screw-thread elements]

**WARNING**

Group F16B 9/026 is no longer used for the classification of documents as of August 1, 2018. The content of this group is being reclassified into groups F16B 9/02, F16B 9/05, F16B 9/052, F16B 9/054, F16B 9/056, F16B 9/058, F16B 9/07, F16B 9/09.

All groups listed in this Warning should be considered in order to perform a complete search.

9/05 . . . [by way of an intermediate member]

**WARNING**

Groups F16B 9/05-F16B 9/058 are incomplete pending reclassification of documents from groups F16B 9/00, F16B 9/02 - F16B 9/026 and F16B 17/00.

Groups F16B 9/00, F16B 9/02 - F16B 9/026, F16B 9/05 - F16B 9/058 and F16B 17/00 should be considered in order to perform a complete search.

9/052 . . . [the intermediate member having a radial flange secured to the flat surface]

9/054 . . . [the intermediate member being threaded]

9/056 . . . [the intermediate member extending through the flat surface; the rod or tubular part extending through the flat surface]

9/058 . . . [the intermediate member being secured to the rod by transverse fasteners]

9/07 . . . {involving plastic or elastic deformation when assembling (involving plastic deformation with a part of or on one member entering a hole in the other F16B 17/006)}

**WARNING**

Group F16B 9/07 is incomplete pending reclassification of documents from groups F16B 9/00, F16B 9/02 - F16B 9/026 and F16B 17/00.

Groups F16B 9/00, F16B 9/02 - F16B 9/026, F16B 9/07, and F16B 17/00 should be considered in order to perform a complete search.

9/09 . . . [rods and flat surfaces interengaging by projections and mating sockets]

**WARNING**

Group F16B 9/09 is incomplete pending reclassification of documents from groups F16B 9/00, F16B 9/02 - F16B 9/026 and F16B 17/00.

Groups F16B 9/00, F16B 9/02 - F16B 9/026, F16B 9/09, and F16B 17/00 should be considered in order to perform a complete search.

11/00 Connecting constructional elements or machine parts by sticking or pressing them together, e.g. cold pressure welding (non-electric welding in general B23K; methods of using adhesives independently of the form of the surfaces joined C09J 5/00)

11/002 . . . {by pressing the elements together so as to obtain plastic deformation (shrinkage connections, force fits F16B 4/00; pin-and-hole connections involving plastic deformation F16B 17/00)}

11/004 . . . {by cold pressure welding}

11/006 . . . {by gluing (gluing of plastics material B29C 65/48)}

11/008 . . . . [of tubular elements or rods in coaxial engagement]

12/00 Jointing of furniture or the like, e.g. hidden from exterior (F16B 7/00 - F16B 11/00 take precedence; fastening means per se F16B 13/00 - F16B 47/00; wood-working B27)

12/02 . . . Joints between panels and corner posts

12/04 . . . Non-loosenable joints for non-metal furniture parts, e.g. glued

2012/043 . . . . [using carpentry joints other than mortise and tenon joints, e.g. using multiple tenons]

2012/046 . . . . [using mortise and tenon joints]

12/06 . . . Non-loosenable joints for metal furniture parts

12/08 . . . . without use of separate connecting elements

12/10 . . . using pegs, bolts, tenons, clamps, clips, or other like (glued F16B 12/04; fastening means per se F16B 15/00 - F16B 47/00)

2012/103 . . . . [Sleeves or dowels for connection fittings]

2012/106 . . . . [Connection bolts for connection fittings]

12/12 . . . for non-metal furniture parts, e.g. made of wood, of plastics

12/125 . . . . . [using mortise and tenon joints]

12/14 . . . . using threaded bolts or screws

2012/145 . . . . . [Corner connections]

12/16 . . . . using self-tapping screws

12/18 . . . . using drawing bars

12/20 . . . . using clamps, clips, wedges, sliding bolts, or the like

12/2009 . . . . . [actuated by rotary motion]

2012/2018 . . . . . [pin and drum securing device; drum has cam surface to engage the head of the pin]

12/2027 . . . . . [with rotating excenters or wedges]

12/2036 . . . . . [with rotating excenters or wedges acting on a head of a pin or screw]

2012/2045 . . . . . [pin and drum securing device; drum has screw to engage the head of the pin]

12/2054 . . . . . [with engaging screw threads as securing means for limiting movement]
Fastenings for constructional elements or machine parts in general

F16B

12/2063 . . . . . . . [with engaging screw threads as tightening means]

12/2072 . . . . . . . (Pin and drum securing devices; Drums having lever with cam surface to engage the head of the pin)

12/2081 . . . . . . . (having a fitting providing slanted access for a screwdriver as actuator)

12/209 . . . . . . . [having an integrated lever as actuator]

12/22 . . . . . . . using keyhole-shaped slots and pins

12/24 . . . . . . . using separate pins, dowels, or the like

12/26 . . . . . . . using snap-action elements

12/28 . . . . . . . for metal furniture parts

12/30 . . . . . . . using threaded bolts

12/32 . . . . . . . using clamps, clips, wedges, sliding bolts, or the like

12/34 . . . . . . . using keyhole-shaped slots and pins

12/36 . . . . . . . using separate pins, dowels or the like

12/38 . . . . . . . using snap-action elements

12/40 . . . . . . . Joints for furniture tubing

12/403 . . . . . . . [with inserts for joining tubes coaxially]

12/406 . . . . . . . (Cove joints for joining two cylindrical members)

12/42 . . . . . . . connecting furniture tubing to non-tubular parts ([connecting table tops to underframes A47B 13/003])

12/44 . . . . . . . Leg joints; Corner joints

12/443 . . . . . . . (with two-dimensional corner element, the legs thereof being inserted in hollow frame members)

12/446 . . . . . . . (with three-dimensional corner element, the legs thereof being inserted in hollow frame members)

12/46 . . . . . . . Non-metal corner connections

12/463 . . . . . . . [for wooden members without additional elements]

12/466 . . . . . . . [with mortise and tenon joints]

12/48 . . . . . . . Non-metal leg connections (F16B 12/46 takes precedence)

12/50 . . . . . . . Metal corner connections

12/505 . . . . . . . [having a corner insert which is inserted in mitered profiled members]

12/52 . . . . . . . Metal leg connections (F16B 12/50 takes precedence)

12/54 . . . . . . . Fittings for bedsteads or the like

12/56 . . . . . . . Brackets for bedsteads; Coupling joints consisting of bolts or the like; Latches therefor

12/58 . . . . . . . Tapered connectors for bed rails

12/60 . . . . . . . Fittings for detachable side panels

13/00 Dowels or other devices fastened in walls or the like by inserting them in holes made therein for that purpose (nails F16B 15/00; self-locking pins or bolts in general, stud-and-socket releasable fastenings F16B 21/00; dowels or bolts for railroad sleepers E01B 9/00; ans means for anchoring structural elements or bulkheads specially adapted to foundation engineering E02D 5/74; bolts or dowels used while laying bricks or casting concrete sleepers E04B 1/38; setting anchoring bolts in shafts, tunnels or galleries E21D 20/00; anchoring bolts for shafts, tunnels or galleries E21D 21/00)

13/001 . . . . . . . [with means for preventing rotation of the dowel]

13/002 . . . . . . . [self-cutting]

13/003 . . . . . . . [with a separate drilling bit attached to or surrounded by the dowel element]

13/004 . . . . . . . [with a drilling sleeve driven against a tapered or spherical plug]

13/005 . . . . . . . [formed in integral series but easily separable]

13/006 . . . . . . . [with sealing means]

13/007 . . . . . . . [to be fastened in undercut holes]

13/008 . . . . . . . [used for mining purposes]

13/009 . . . . . . . [Double sleeve dowels, i.e. the first sleeve is fixed in a hole by the action of a second sleeve and one of the sleeves receives a nail, a screw or the like]

13/02 . . . . . . . in one piece with protrusions or ridges on the shaft

13/025 . . . . . . . [of rolled sheet material]

13/04 . . . . . . . with parts gripping in the hole or behind the reverse side of the wall after inserting from the front ([F16B 13/002 and F16B 13/12 take precedence; friction-grip releasable fastenings in general F16B 2/00]

13/045 . . . . . . . [having axially compressing parts allowing the clamping of an object tightly to the wall]

13/06 . . . . . . . combined with expanding sleeve ([F16B 13/045 and F16B 13/08 take precedence])

13/061 . . . . . . . [of the buckling type]

13/063 . . . . . . . [by the use of an expander]

13/065 . . . . . . . [fastened by extracting the screw, nail or the like]

13/066 . . . . . . . [fastened by extracting a separate expander-part, actuated by the screw, nail or the like]

13/068 . . . . . . . [expanded in two or more places]

13/08 . . . . . . . with separate [or non-separate] gripping parts moved into their final position in relation to the body of the device without further manual operation

13/0808 . . . . . . . [by a toggle-mechanism]

13/0816 . . . . . . . [with a wedging drive-pin]

13/0825 . . . . . . . [with a locking element, e.g. sleeve, ring or key co-operating with a cammed or eccentrical surface of the dowel body]

13/0833 . . . . . . . [with segments or fingers expanding or tilting into an undercut hole (F16B 13/0858 takes precedence)]

13/0841 . . . . . . . [with a deformable sleeve member driven against the abutting surface of the head of the bolt or of a plug]

13/085 . . . . . . . [with a drive-nail deflected by an inclined surface in the dowel body (nails with spreading shaft F16B 15/04)]]

13/0858 . . . . . . . [with an expandable sleeve or dowel body driven against a tapered or spherical expander plug (F16B 13/004 takes precedence)]

13/0866 . . . . . . . [with prongs penetrating into the wall of the hole by a retractile movement of a threaded member]

13/0875 . . . . . . . [with elastic discs or spring washers anchoring in the hole]

13/0883 . . . . . . . [with split rings or wire between the threads of the dowel body or in grooves near a conical surface (F16B 13/0825 takes precedence)]

13/0891 . . . . . . . [with a locking element, e.g. wedge, key or ball moving along an inclined surface of the dowel body (F16B 13/0816, F16B 13/0825, F16B 13/0883 take precedence)]

2013/06 . . . . . . . [with gripping parts moved into their final position in relation to the body of the device by a separate operation]

2013/010 . . . . . . . [with a toggle-mechanism]
Fastenings for constructional elements or machine parts in general

17/00 Connecting constructional elements or machine parts by a part of or one member entering a hole in the other [and involving plastic deformation] (riveting F16B 19/04)

WARNING

Group F16B 17/00 is impacted by reclassification into groups F16B 9/02, F16B 9/05 - F16B 9/09. All groups listed in this Warning should be considered in order to perform a complete search.

17/004 . (of rods or tubes mutually)
17/006 . (of rods or tubes to sheets or plates)
17/008 . (of sheets or plates mutually (joining sheets by riveting without the use of separate rivets F16B 5/045))

19/00 Bolts without screw-thread; Pins, including deformable elements [in screwed connections F16B 29/00]; Rivets (means for preventing withdrawal F16B 21/00)

19/002 . (Resiliently deformable pins (F16B 21/06 takes precedence))
19/004 . . (made in one piece (F16B 21/084 takes precedence))
19/006 . . (made in a plurality of pieces)
19/008 . . (with sealing means)
19/002 . (Bolts or sleeves for positioning of machine parts, e.g. notched taper pins, fitting pins, sleeves, eccentric positioning rings)
19/004 . (Rivets; Spigots or the like fastened by riveting (lead seals G09F 3/00))
19/0045 . (Coated rivets)
19/005 . (Bolts fastening by swaged-on collars (F16B 19/08 takes precedence))
19/0055 . . (deformed by an electro-magnetic action)
19/006 . (Solid rivets made in one piece)
19/008 . (Hollow rivets; Multi-part rivets)
19/003 . . (Self-drilling rivets)
19/006 . . (Self-piercing rivets)
19/10 . . . fastened by expanding mechanically

NOTES

1. Subject matter relating to hollow or single-part rivets fastened by a pull-through mandrel is classified in F16B 19/1045
2. Subject matter relating to hollow or single-part rivets fastened by a drive pin is classified in F16B 19/1081

2019/1009 . . . (hollow or single-part rivets fastened by a pull-through mandrel)
2019/1018 . . . (hollow or single-part rivets fastened by a drive pin)
19/1027 . . . (Multi-part rivets)
19/1036 . . . (Blind rivets)
Fastening means without screw-thread

21/02 . . . Releasable fastening devices locking by rotation (with snap-action F16B 21/06; studs or coupling pins with resilient protrusions F16B 21/08)

21/04 . . . with bayonet catch

21/06 . . . Releasable fastening devices with snap-action (quickly-detachable or mountable nuts to threaded bolts F16B 37/084)

21/07 . . . in which the socket has a resilient part (F16B 21/065 takes precedence)

21/071 . . . [the socket being integrally formed with a component to be fasted, e.g. a sheet, plate or strip]

21/073 . . . [the socket having a resilient part on its inside]

21/075 . . . [the socket having resilient parts on its inside and outside]

21/076 . . . [the socket having a resilient part on its outside (F16B 21/075 takes precedence)]

21/078 . . . [the socket having a further molded-in or embedded component, e.g. a ring with snap-in teeth molded into it (F16B 21/065 takes precedence)]

21/08 . . . in which the stud, pin, or spigot has a resilient part (F16B 21/065, F16B 21/125, F16B 21/165, F16B 37/043 take precedence); wall-dowels F16B 37/043

21/082 . . . [the stud, pin or spigot having two resilient parts on its opposite ends in order to connect two elements]

21/084 . . . [with a series of flexible ribs or fins extending laterally from the shank of the stud, pin or spigot, said ribs or fins deforming predominantly in a direction parallel to the direction of insertion of the shank]

21/086 . . . [the shank of the stud, pin or spigot having elevations, ribs, fins or prongs intended for deformation or tilting predominantly in a direction perpendicular to the direction of insertion]

21/088 . . . [the stud, pin or spigot being integrally formed with the component to be fastened, e.g. forming part of the sheet, plate or strip]

21/09 . . . Releasable fastening devices with a stud engaging a keyhole slot

21/10 . . . by separate parts (F16B 21/06 takes precedence); key-type connection F16B 3/00; locking screws or nuts against rotation by such means F16B 39/04)

21/12 . . . with locking-pins or split-pins thrust into holes

21/125 . . . [radially resilient or with a snap-action member, e.g. elastic tooth, pawl with spring, resilient coil or wire]

21/126 . . . with grooves or notches in the pin or shaft

21/165 . . . [with balls or rollers (for connections of rods or tubes engaged telescopically F16B 7/1409)]

21/18 . . . with circlips or like resilient retaining devices, (i.e. resilient in the plane of the ring or the like); Details (spring-washers for locking nuts F16B 39/24; adjusting rings F16B 43/00)

21/183 . . . [internal, i.e. with spreading action]

21/186 . . . [external, i.e. with contracting action]

21/20 . . . for bolts or shafts without holes, grooves, or notches for locking members ({by rings resilient in their plane F16B 21/18})

21/205 . . . [the connecting means having gripping edges in the form of a helix]

Fastening means using screw-thread (wall-dowels F16B 13/00; manufacture of threaded fastening means B21H, B21K, B23G; screws or bolts for railway sleepers E01B 9/10; screw mechanisms F16H)

23/00 Specially shaped [nuts or] heads of bolts or screws for rotations by a tool ([detachable ornamental heads for screws A47G 3/00; screwdrivers, wrenches B25B])

23/0007 . . . [characterised by the shape of the recess or the protrusion engaging the tool (F16B 23/0069 and F16B 23/0076 take precedence)]

23/0015 . . . [substantially rectangular, e.g. one-slot head]

23/0023 . . . [substantially cross-shaped]

23/003 . . . [star-shaped or multi-lobular, e.g. Torx-type, twelve-point star]

23/0038 . . . [substantially prismatic with up to six edges, e.g. triangular, square, pentagonal, Allen-type cross-sections]

23/0046 . . . [having one eccentric circular or polygonal recess or protrusion]

23/0053 . . . [with a conical or prismatic recess for receiving a centering pin of the tool apparatus]
Fastening means using screw-thread

25/00 Screws that cut thread in the body into which they are screwed, e.g. wood screws {(F16B 35/065 takes precedence; joining sheets or plates using screws with two separate threads F16B 5/0275, using screws with adjustment sleeves F16B 5/0283)}

25/0005 . . . (of the helical wire type (threaded wire-inserts F16B 37/12))

25/001 . . . (characterised by the material of the body into which the screw is screwed)

25/0015 . . . (the material being a soft organic material, e.g. wood or plastic (F16B 25/0031 takes precedence))

25/0021 . . . (the material being metal, e.g. sheet-metal or aluminium (F16B 25/0031 takes precedence))

25/0026 . . . (the material being a hard non-organic material, e.g. stone, concrete or drywall (F16B 25/0031 takes precedence))

25/0031 . . . (the screw being designed to be screwed into different materials, e.g. a layered structure or through metallic and wooden parts)

25/0036 . . . (characterised by geometric details of the screw)

25/0042 . . . (characterised by the geometry of the thread, the thread being a ridge wrapped around the shaft of the screw)

25/0047 . . . . . . (the ridge being characterised by its cross-section in the plane of the shaft axis)

25/0052 . . . . . . (the ridge having indentations, notches or the like in order to improve the cutting behaviour)

25/0057 . . . . . . (the screw having distinct axial zones, e.g. multiple axial thread sections with different pitch or thread cross-sections)

25/0063 . . . . . . (with a non-threaded portion on the shaft of the screw)

25/0068 . . . . . . (with multiple-threads, e.g. a double thread screws)

25/0073 . . . . . . (characterised by its pitch, e.g. a varying pitch)

25/0078 . . . . . . (with a shaft of non-circular cross-section or other special geometric features of the shaft)

25/0084 . . . . . . (characterised by geometric details of the tip)

25/0089 . . . . . . (the screw having wings)

25/0094 . . . . . . (the screw being assembled or manufactured from several components, e.g. a tip out of a first material welded to shaft of a second material)

25/10 . . . Screws performing an additional function to thread-forming, e.g. drill screws (or self-piercing screws)

25/103 . . . . . . (by means of a drilling screw-point, i.e. with a cutting and material removing action)

25/106 . . . . . . (by means of a self-piercing screw-point, i.e. without removing material)

27/00 Bolts, screws, or nuts formed in integral series but easily separable, particularly for use in automatic machines {(arrangements for feeding screws or nuts in spanners, wrenches or screw-drivers with built-in magazines B25B 23/06)}

29/00 Screwscrews connection with deformation of nut or auxiliary member while fastening {(Nuts fastened to surfaces by riveting F16B 37/065); members deformed for locking screws, bolts or nuts F16B 39/22)}

31/00 Screwscrews connections specially modified in view of tensile load; Break-bolts (shape of thread (F16B 33/02; in couplings F16D 9/001))

32/00 Features common to bolt and nut

33/00 . . . . . . (Means for preventing rotation of screw-threaded elements (F16B 39/00 takes precedence))

33/04 . . . . . . (Sealing; Insulation (by means of washers F16B 43/001))

33/06 . . . . . . (Non-metallic fasteners using screw-thread)

33/08 . . . . . . (Corrosion preventing means)

33/02 . . . . . . (Shape of thread; Special thread-forms ((F16B 25/00 takes precedence; used to remove paint or dirt layers F16B 35/007, F16B 37/002); used as screw-locking device F16B 39/30))

2031/002 . . . . . . (Breakbolts loosening due to an electromagnetic action)

2031/005 . . . . . . (Breakbolts loosening due to the action of an explosive charge)

2031/007 . . . . . . (Break-bolts loosening at high temperature)

2031/002 . . . . . . (using an ultrasonic transducer)

2031/004 . . . . . . (with the bottom of the nut or of the head of the bolt having gaps which close as the bolt tension increases, e.g. with lips or with a load-indicating flange)

2031/025 . . . . . . (with a gauge pin in a longitudinal bore in the body of the bolt)

2031/027 . . . . . . (with a bolt head causing the fastening or the unfastening tool to lose the grip when a specified torque is exceeded)

2031/028 . . . . . . (with a load-indicating washer or washer assembly)

2031/04 . . . . . . (for maintaining (a) tensile load)

2031/043 . . . . . . (Prestressed connections tensioned by means of liquid, grease, rubber, explosive charge, or the like (hydraulic bolt tensioners B25B 29/02))

2031/046 . . . . . . (by means of an explosive charge)

31/06 . . . . . . (having regard to possibility of fatigue rupture)
Fastening means using screw-thread

33/06 . Surface treatment of parts furnished with screw-thread, e.g. for preventing seizure (or fretting (corrosion preventing means F16B 33/008; settable coatings for locking threaded members F16B 39/225; deformable coatings for locking threaded members F16B 39/34))

35/00 Screw-bolts; Stay-bolts; Screw-threaded studs; Screws; Set screws (F16B 33/008 takes precedence; joining sheets or plates using screws with two separate threads F16B 5/0275; using screws with adjustment sleeves F16B 5/0283); thread cutting screws F16B 25/00)

NOTE
The fastening of heads of screws or heads of bolts to surfaces is classified in F16B 37/04

35/002 . (onto which threads are cut during screwing (F16B 37/002 takes precedence)

35/005 . (Set screws; Locking means therefor)

35/007 . (Removing paint or dirt layers covering the threaded part of nut-like members)

35/02 . divided longitudinally

35/04 . with specially-shaped head or shaft in order to fix the bolt on or in an object (locking the bolt against turning in the object by the use of accessory parts F16B 39/00)

35/041 . . . (Specially-shaped shafts (shape of thread F16B 33/02))

35/042 . . . (for retention or rotation by a tool, e.g. of polygonal cross-section)

35/044 . . . (Specially-shaped ends)

35/045 . . . (for retention or rotation by a tool (specially shaped heads of bolts or screws for rotation by a tool F16B 23/00))

35/047 . . . . . (for preventing cross-threading, i.e. preventing screwing of bolt and nut)

35/048 . . . . . (Specially-shaped necks (F16B 35/06 takes precedence))

35/06 . . Specially-shaped heads (special shape in order to rotate the bolt F16B 23/00; ; separate hook adaptors for bolts F16B 43/025)

35/065 . . . . with self-countersink-cutting means

37/00 Nuts or like thread-engaging members (specially shaped for rotations by a tool F16B 23/00))

37/002 . . (cutting threads during screwing; removing paint or dirt layers covering threaded shanks)

37/005 . . (into which threads are cut during screwing)

2037/007 [with a blind hole]

37/02 . made of thin sheet material (fastening to surfaces F16B 37/04 ; used as lock-nuts F16B 39/14)

37/04 . Devices for fastening nuts to surfaces, e.g. sheets, plates ((nuts fastened behind a wall by a toggle-mechanism F16B 13/0808; threaded inserts F16B 37/122; measures against loss of bolts, nuts or pins F16B 41/002))

37/041 . . . (Releasable devices (F16B 37/044, F16B 37/045 take precedence))

37/042 . . . . (locking by rotation)

37/043 . . . . (with snap action)

37/044 . . . . (Nut cages)

37/045 . . . . (specially adapted for fastening in channels, e.g. sliding bolts, channel nuts)

37/046 . . . . (with resilient means for urging the nut inside the channel)

37/047 . . . . (Barrel nuts)

37/048 . . . . {Non-releasable devices (F16B 37/044, F16B 37/045 and F16B 37/06 take precedence)}

37/06 . by means of welding or riveting

37/061 . . . . (by means of welding)

37/062 . . . . (by means of riveting)

37/064 . . . . . (with the use of separate rivets)

37/065 . . . . . (by deforming the material of the nut)

37/067 . . . . . (the material of the nut being deformed by a threaded member generating axial movement of the threaded part of the nut, e.g. blind rivet type)

37/068 . . . . . (by deforming the material of the support, e.g. the sheet or plate)

37/08 . Quickly-detachable (or mountable) nuts, e.g. consisting of two or more parts; Nuts movable along the bolt after tilting the nut

37/0807 . . . . {Nuts engaged from the end of the bolt, e.g. axially slideable nuts}

37/0814 . . . . {movable along the bolt after tilting the nut}

37/0821 . . . . {in two halves pivotally connected}

37/0828 . . . . . (with a longitudinal slit through the annular wall of the nut for enabling expansion of the nut, e.g. for easy removal)

37/0835 . . . . . (with balls engaging threads or grooves on the shaft of the bolt)

37/0842 . . . . . (fastened to the threaded bolt with snap-on-action, e.g. push-on nuts for stud bolts (F16B 37/0857 takes precedence; snap-on-action of a pin, spigot, shaft or the like and a member surrounding it F16B 21/06))

37/085 . . . . . (with at least one unthreaded portion in both the nut and the bolt)

37/0857 . . . . . (with the threaded portions of the nut engaging the thread of the bolt by the action of one or more springs or resilient retaining members (F16B 37/0821 and F16B 37/0835 take precedence))

37/0864 . . . . . (with the threaded portions of the nut engaging the thread of the bolt by pressing or rotating an external retaining member such as a cap, a nut, a ring or a sleeve (F16B 37/0835 takes precedence))

37/0871 . . . . . (engaging the bolt laterally, i.e. without the need to engage the end of the bolt)

37/0878 . . . . . (in one piece, e.g. C-shaped nuts)

37/0885 . . . . . (in two halves hingedly connected)

37/0892 . . . . . (in two or more pieces, e.g. assemblies made by two C-shaped nuts mutually interlocked, or retained by an additional member (F16B 37/0885 takes precedence))

37/12 . with thread-engaging surfaces formed by inserted coil-springs, discs, or the like; Independent pieces of wound wire used as nuts; Threaded inserts for holes (mounting devices B25B 27/143))

37/122 . . . {Threaded inserts, e.g. "rampa bolts")

37/125 . . . . . (the external surface of the insert being threaded)

37/127 . . . . . (and self-tapping)

37/14 . Cap nuts; Nut caps or bolt caps

37/145 . . . . . (Sleeve nuts, e.g. combined with bolts)

37/16 . Wing-nuts (F16B 37/14 takes precedence)
Fastening means using screw-thread

F16B

39/00  Locking of screws, bolts or nuts ((F16B 35/005 takes precedence); locking of bottle closures B65D; locking of rail-fastening bolts for permanent ways E01B 9/12; locking of fastening means for railway fishplates E01B 11/38; locking devices for valves or cocks F16K)

NOTE
In this group, heads of screws or bolts are put on a par with nuts as far as pertains to locking; an object into which a screw is threaded is put on a par with a nut.

39/01 . specially adapted to prevent loosening at extreme temperatures

39/02 . in which the locking takes place after screwing down (F16B 39/01 takes precedence; split-pins, circlips, or the like for preventing relative axial movement only F16B 21/10; fastening nuts by welding or riveting F16B 37/06)

39/021 . [by injecting a settable material after the screwing down]

39/023 . [by driving a conic or wedge-shaped expander through the threaded element]

39/025 . [by plastic deformation of a part of one of the threaded elements into a notch or cavity of the other threaded element (F16B 39/103 and F16B 39/106 take precedence)]

39/026 . [by swaging the nut on the bolt, i.e. by plastically deforming the nut]

39/028 . [by means of an auxiliary bolt or threaded element whose action provokes the deformation of the main bolt or nut and thereby its blocking]

39/04 . with a member penetrating the screw-threaded surface of at least one part, e.g. a pin, a wedge, cotter-pin, screw

39/06 . with a pin or staple parallel to the bolt axis

39/08 . with a cap interacting with the nut, connected to the bolt by a pin or cotter pin

39/10 . by a plate, (spring, wire) or ring immovable with regard to the bolt or object [and mainly perpendicular to the axis of the bolt] (F16B 39/08 takes precedence)

39/101 . [with a plate, spring, wire or ring holding two or more nuts or bolt heads which are mainly in the same plane]

39/103 . [with a locking cup washer, ring or sleeve surrounding the nut or bolt head and being partially deformed on the nut or bolt head, or on the object itself]

39/105 . . [locking the bolt head or nut into a hole or cavity, e.g. with the cup washer, ring or sleeve deformed into a dimple in the cavity]

39/106 . . [with a deformable locking element, e.g. disk or pin above the bolt head or nut, flattened into a hole or cavity within which the bolt head or nut is positioned]

39/108 . . [with a locking washer under the nut or bolt head having at least one tongue or lug folded against the nut or bolt head, or against the object itself (F16B 39/103 takes precedence)]

39/12 . by means of locknuts

39/122 . . [foseen with mating surfaces inclined, i.e. not normal, to the bolt axis]

39/124 . . . [with helically inclined mating surfaces]

39/126 . . . [causing radial forces on the bolt-shaft (F16B 39/36 takes precedence)]

39/128 . . . . [by means of eccentricical or spiral interengaging parts]

39/14 . . . made of thin sheet material or formed as spring-washers (locknuts per se made of thin sheet metal F16B 37/02)

39/16 . . in which the screw-thread of the locknut differs from that of the nut

39/18 . . . . . in which the locknut grips with screw-thread in the nuts as well as on the bolt

39/20 . . by means of steel wire or the like (F16B 39/10 takes precedence)

39/22 . in which the locking takes place during screwing down or tightening (F16B 39/01 takes precedence)

39/225 . . [by means of a settable material]

39/24 . . by means of washers, spring washers, or resilient plates that lock against the object (locking to the screw-thread F16B 39/14 (, F16B 39/34), F16B 39/36)

39/26 . . with spring washers fastened to the nut or bolt-head

39/28 . . by special members on, or shape of, the nut or bolt (F16B 39/26 takes precedence; locknuts F16B 39/12)

39/282 . . . Locking by means of special shape of work-engaging surfaces, e.g. notched or toothed nuts

39/2825 . . . . . [causing the bolt to tilt]

39/284 . . . Locking by means of elastic deformation ((F16B 39/2825, F16B 39/36, ) F16B 39/38 take precedence)

39/286 . . . . caused by saw cuts

39/30 . . . Locking exclusively by special shape of the screw-thread

39/32 . . . Locking by means of a pawl or pawl-like tongue

39/34 . . . Locking by deformable inserts or like parts

39/36 . . . with conical locking parts, which may be split, including use of separate rings co-operating therewith

39/38 . . . with a second part of the screw-thread which may be resiliently mounted (F16B 39/30 takes precedence)

41/00 Measures against loss of bolts, nuts, or pins; Measures against unauthorised operation of bolts, nuts or pins ((locking of screws, bolts or nuts F16B 39/00; ) seals G09F 3/00)

41/002 . . [Measures against loss of bolts, nuts or pins (devices for fastening nuts to surfaces F16B 37/04)]

41/005 . . [Measures against unauthorised operation of bolts, nuts or pins (F16B 23/0007, F16B 23/0061, F16B 23/0069, F16B 23/0076 and F16B 31/02 take precedence; locks, keys E05B; for valves, taps or cocks F16K 35/00; for pipe-joints with swivel-nuts F16L 19/005)]

41/007 . . . [by means of two housings hingedly connected which enclose the bolt head]

43/00 Washers or equivalent devices; Other devices for supporting bolt-heads or nuts (circulars F16B 21/18; for indicating tensile load F16B 31/02; forming a whole with the bolt or nut F16B 33/00; locking bolts or nuts by means of a fixed plate or ring, or washer-like resilient plates F16B 39/10, F16B 39/24)]
Fastening means using screw-thread

43/001. [for sealing or insulation]
43/002. [with special provisions for reducing friction]
43/003. [with a special hole shape in order to allow a quick mounting or dismounting of the washer, e.g. with a keyhole slot (F16B 43/005 takes precedence)]
43/004. [with a radial cut in order to improve elasticity of the washer (F16B 43/005 takes precedence)]
43/005. [engaging the bolt laterally to allow a quick mounting or dismounting of the washer, i.e. without the need to engage over the end of the bolt (F16B 43/009 takes precedence)]
43/006. . . [in two or more parts hingedly connected]
43/007. . . [in two or more parts]
2043/008. [with a cavity for receiving the bolt head in order to make a flush surface]
43/009. [with a wedging effect in order to adjust the height of the washer]
43/02. [with special provisions for engaging surfaces which are not perpendicular to a bolt axis or do not surround the bolt]
43/025. . . [for surfaces not surrounding the bolt, e.g. hook adaptors for bolts]

45/00 Hooks; Eyes (if the attaching parts or means are concerned, groups F16B 13/00, F16B 15/00, F16B 19/00, F16B 25/00, F16B 35/00, F16B 47/00 take precedence; for hanging pictures or the like A47G 1/16; towing hooks for ships B63B 21/58; for hoisting or hauling purposes B66C; hooks or eyes with integral parts designed to facilitate quick attachment to cables or ropes at any point F16G 11/14)
45/02. Hooks with a pivoting [or elastically bending] closing member
45/025. . . [manoeuvrable remotely with a cable, chain, rod or the like]
45/04. Hooks with a sliding closing member
45/06. Hooks with two symmetrically-pivoting hook parts

47/00 Suction cups for attaching purposes; Equivalent means using adhesives [(devices using adhesives, suction or magnetism for hanging or supporting pictures or the like A47G 1/17; vacuum work holders B25B 11/005; anchoring of ships using suction B63B 21/27; suction cups for handling glass B65G 49/061; load-engaging elements for cranes using suction means B66C 1/02)]
47/003. [using adhesives for attaching purposes (using adhesives for connecting constructional elements F16B 11/006)]
47/006. [the suction cups being activated by the rotation of a cranked lever arm]

2200/00 Constructional details of connections not covered for in other groups of this subclass
2200/10. Details of socket shapes
2200/20. Connections with hook-like parts gripping behind a blind side of an element to be connected
2200/205. . . the hook being a separate retainer
2200/206. . . dovetail-like connections
2200/30. Clamping arrangements where clamping parts are received in recesses of elements to be connected
2200/403. . . threaded clamping parts
2200/406. . . clamping parts being collars, bushings or wedges
2200/50. Flanged connections