

CPC**COOPERATIVE PATENT CLASSIFICATION****F16B****DEVICES FOR FASTENING OR SECURING CONSTRUCTIONAL ELEMENTS OR MACHINE PARTS TOGETHER, e.g. NAILS, BOLTS, CIRCLIPS, CLAMPS, CLIPS, WEDGES, JOINTS OR JOINTING****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](#) to [F16B 47/00](#) take precedence over group [F16B 1/00](#).

WARNING

F16B

(continued)

The following IPC groups are not used in the CPC scheme. Subject matter covered by these 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 " " [F16B 7/105](#)

F16B 7/16 " " [F16B 7/14](#)

F16B 13/10 " " [F16B 13/08](#)

F16B 13/13 " " [F16B 13/002](#), [F16B 13/12](#)

F16B 21/14 " " [F16B 21/12](#), [F16B 21/125](#)

F16B 25/02 " " [F16B 25/00](#)

F16B 25/04 " " [F16B 25/00](#)

F16B 25/06 " " [F16B 25/00](#)

F16B 25/08 " " [F16B 25/00](#)

F16B 33/04 " " [F16B 33/02](#)

F16B 37/10 " " [F16B 37/0842](#), [F16B 37/0871](#)

F16B 1/00

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

- F16B 2001/0007 . {Fasteners made by sintering powders}
- F16B 1/0014 . {by the use of a shape-memory material}
- F16B 2001/0021 . {Friction-reducing coatings}
- F16B 2001/0028 . {by the use of a material of the hooks-and-loops type}
- F16B 2001/0035 . {by the use of a magnetic material}
- F16B 2001/0042 . {by the use of an explosive charge ([F16B 19/125](#), [F16B 31/005](#) take precedence)}
- F16B 1/005 . {by the use of a hydraulic action}
- F16B 1/0057 . {by the use of a pneumatic action}
- F16B 2001/0064 . {and establishing a good electrical connection}
- F16B 1/0071 . {with markings, colours, indicators or the like (for indicating tensile load [F16B 31/02](#))}
- F16B 2001/0078 . {having differing thermal expansion coefficients}
- F16B 2001/0085 . {Ceramic-to-metal-connections}
- F16B 2001/0092 . {with means for avoiding incorrect assembly or positioning}
- F16B 1/02 . Means for securing elements of mechanisms after operation (means for bringing members to rest [F16D](#))
- F16B 1/04 . . disengaged by movement of the actuating member of the element (locking of actuators [G05G](#), e.g. [G05G 5/00](#))

Fastenings for constructional elements or machine parts in general (couplings for transmitting rotation [F16D](#))

F16B 2/00

Friction-grip releasable fastenings (for cables or ropes, e.g. cleats [F16G 11/00](#)) {(connections of rods or tubes, e.g. of non-circular section, mutually, including resilient connections [F16B 7/00](#))}

- F16B 2/005
 - {Means to increase the friction-coefficient}
- F16B 2/02
 - Clamps, i.e. with gripping action effected by positive means other than the inherent resistance to deformation of the material of the fastening
- F16B 2/04
 - . internal, i.e. with spreading action ([F16B 2/14](#) to [F16B 2/18](#) take precedence)
- F16B 2/06
 - . external, i.e. with contracting action ([F16B 2/14](#) to [F16B 2/18](#) take precedence)
- F16B 2/065
 - . . {using screw-thread elements ([F16B 2/08](#) to [F16B 2/12](#) take precedence)}
- F16B 2/08
 - . . using bands
- F16B 2/10
 - . . using pivoting jaws
- F16B 2/12
 - . . using sliding jaws
- F16B 2/14
 - . using wedges
- F16B 2/16
 - . using rollers or balls {(clamps for rods or tubes telescopically engaged [F16B 7/1409](#); used in anti-theft monitors, e.g. as used for articles of clothing in shops [E05B 73/0017](#))}
- F16B 2/18
 - . using cams, levers, eccentrics, or toggles {(for connections of rods or tubes engaged telescopically [F16B 7/1418](#), [F16B 7/1427](#), [F16B 7/1454](#))}
- F16B 2/185
 - . . {using levers}
- F16B 2/20
 - Clips, i.e. with gripping action effected solely by the inherent resistance to deformation of the material of the fastening
- F16B 2/205
 - . {with two stable positions}
- F16B 2/22
 - . of resilient material, e.g. rubbery material {([F16B 2/205](#) takes precedence)}
- F16B 2/24
 - . . of metal
- F16B 2/241
 - . . . {of sheet metal}
- F16B 2/243
 - {internal, i.e. with spreading action}
- F16B 2/245
 - {external, i.e. with contracting action}
- F16B 2/246
 - {the clip being released by tilting the clip or a part thereof to a position in which the axis of the openings surrounding the gripped elements is parallel to, or coincides with, the axis of the gripped elements}
- F16B 2/248
 - {of wire}
- F16B 2/26
 - . of pliable, non-resilient material, e.g. plant tie
- F16B 3/00**
 - **Key-type connections; Keys** ([F16B 2/00](#) takes precedence; for rods or tubes mutually [F16B 7/00](#))
- F16B 3/005
 - {the key being formed by solidification of injected material (joining of preformed parts by applying molten plastics [B29C 65/40](#); non-disconnectible pipe joints obtained using a hardenable filler [F16L 13/11](#))}
- F16B 3/04
 - using keys formed of wire or other flexible material, to be inserted through an opening giving access to grooves in the adjacent surfaces of the parts to be connected
- F16B 3/06
 - using taper sleeves

- F16B 4/00** **Shrinkage connections, e.g. assembled with the part at different temperature; Force fits** (restricted to metal parts or objects [B23P 11/02](#)); **Non-releasable friction-grip fastenings** (F16B 2/00 takes precedence; {using members with a shape-memory material [F16B 1/0014](#)})
- F16B 4/002 . {engaging or disengaging by means of fluid pressure}
- F16B 4/004 . {Press fits, force fits, interference fits, i.e. fits without heat or chemical treatment ([F16B 4/002](#) takes precedence)}
- F16B 4/006 . {Shrinkage connections, e.g. assembled with the parts being at different temperature}
- F16B 4/008 . . {using heat-recoverable, i.e. shrinkable, sleeves}
- F16B 5/00** **Joining sheets or plates, {e.g. panels}, to one another or to strips or bars parallel to them** ({[F16B 17/002](#) takes precedence}; by sticking together [F16B 11/00](#); dowel connections [F16B 13/00](#); pins, including deformable elements [F16B 19/00](#); covering of walls [E04F 13/00](#); fastening signs, plates, panels or boards to a supporting structure, fastening readily-detachable elements, e.g. letters to signs, plates, panels, or boards, [G09F 7/00](#))
- F16B 5/0004 . {Joining sheets, plates or panels in abutting relationship ([F16B 5/01](#) takes precedence)}
- F16B 5/0008 . . {by moving the sheets, plates or panels substantially in their own plane, perpendicular to the abutting edge}
- F16B 5/0012 . . . {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}
- F16B 5/0016 {with snap action}
- F16B 5/002 . . . {both sheets, plates or panels having a groove, e.g. with strip-type connector}
- F16B 5/0024 . . . {the sheets, plates or panels having holes, e.g. for dowel- type connections}
- F16B 5/0028 . . . {using I-shaped connectors (with flanges moving towards each other [F16B 5/0068](#))}
- F16B 5/0032 . . {by moving the sheets, plates, or panels or the interlocking key parallel to the abutting edge}
- F16B 5/0036 . . . {and using hook and slot or keyhole-type connections}
- F16B 5/004 . . . {and using C-shaped clamps}
- F16B 5/0044 . . . {and using interlocking keys of circular, square, rectangular or like shape}
- F16B 5/0048 {hinge-like}
- F16B 5/0052 . . . {the interlocking key acting as a dovetail-type key}
- F16B 5/0056 . . {by moving the sheets, plates or panels or the interlocking key perpendicular to the main plane}
- F16B 5/006 . . . {and using ring-shaped clamps}
- F16B 5/0064 . . . {and using C-shaped clamps}
- F16B 5/0068 . . . {and using I-shaped clamps with flanges moving towards each other}
- F16B 5/0072 {and using screw-thread}
- F16B 5/0076 . . . {and using expanding clamps}
- F16B 5/008 . . {by a rotating or sliding and rotating movement}

- F16B 5/0084 . . {characterised by particular locking means (not used, see subgroups)}
- F16B 5/0088 . . . {with locking means moving substantially perpendicular to the main plane, e.g. pins, screws}
- F16B 5/0092 . . . {with locking means rotating about an axis parallel to the main plane and perpendicular to the abutting edge, e.g. screw, bayonet}
- F16B 5/0096 . {by using permanent deformation}
- F16B 5/01 . by means of fastening elements specially adapted for honeycomb panels
- F16B 5/02 . by means of fastening members using screw-thread ({F16B 5/0004 takes precedence}; construction of screw-threaded connections F16B 25/00 to F16B 39/00)
- F16B 5/0208 . . {using panel fasteners, i.e. permanent attachments allowing for quick assembly}
- F16B 5/0216 . . {the position of the plates to be connected being adjustable}
- F16B 5/0225 . . . {allowing for adjustment parallel to the plane of the plates}
- F16B 5/0233 . . . {allowing for adjustment perpendicular to the plane of the plates}
- F16B 5/0241 . . {with the possibility for the connection to absorb deformation, e.g. thermal or vibrational}
- F16B 5/025 . . {specially designed to compensate for misalignment or to eliminate unwanted play}
- F16B 5/0258 . . {using resiliently deformable sleeves, grommets or inserts (F16B 43/001 takes precedence)}
- F16B 5/0266 . . {using springs}
- F16B 5/0275 . . {the screw-threaded element having at least two axially separated threaded portions (F16B 5/0283 takes precedence)}
- F16B 5/0283 . . {with an externally threaded sleeve around the neck or the head of the screw-threaded element for adjustably fastening a plate or frame or the like to a fixed element}
- F16B 5/0291 . . {the threaded element being driven through the edge of a sheet plate with its axis in the plane of the plate}
- F16B 5/04 . by means of riveting (rivets F16B 19/04)
- F16B 5/045 . . {without the use of separate rivets}
- F16B 5/06 . by means of clamps or clips ({F16B 5/0004 takes precedence}; friction-grip releasable fastenings in general F16B 2/00)
- F16B 5/0607 . . {joining sheets or plates to each other (F16B 5/0692, F16B 21/082 take precedence)}
- F16B 5/0614 . . . {in angled relationship}
- F16B 5/0621 . . . {in parallel relationship (fastened by a drive-pin F16B 19/1081; fastened by a device locking by rotation F16B 21/02)}
- F16B 5/0628 {allowing for adjustment parallel or perpendicular to the plane of the sheets or plates}
- F16B 5/0635 {fastened over the edges of the sheets or plates}
- F16B 5/0642 {the plates being arranged one on top of the other and in full close contact with each other}
- F16B 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}

- F16B 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}
- F16B 5/0664
 - {at least one of the sheets or plates having integrally formed or integrally connected snap-in-features}
- F16B 2005/0671
 - {with unlocking by rotation}
- F16B 2005/0678
 - . . . {in abutting relationship}
- F16B 5/0685
 - . . {Joining sheets or plates to strips or bars ([F16B 5/0692](#) takes precedence)}
- F16B 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](#))}
- F16B 5/07
 - . by means of multiple interengaging protrusions on the surfaces, e.g. hooks, coils,
- F16B 5/08
 - . by means of welds or the like ([welding B23K](#))
- F16B 5/10
 - . by means of bayonet connections ([F16B 5/0092](#) takes precedence); fastening devices locking by rotation [F16B 21/02](#))
- F16B 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](#))
- F16B 5/121
 - . . {fastened over the edge(s) of the sheet(s) or plate(s)}
- F16B 5/123
 - . . {Auxiliary fasteners specially designed for this purpose}
- F16B 5/125
 - . . . {one of the auxiliary fasteners is comprising wire or sheet material or is made thereof}
- F16B 5/126
 - . . {at least one of the sheets, plates, bars or strips having integrally formed or integrally connected snap-in-features}
- F16B 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}
- F16B 7/00**
 - Connections of rods or tubes, e.g. of non-circular section, mutually, including resilient connections** ([F16B 11/008](#), [F16B 17/002](#) 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](#))
- F16B 7/02
 - . with conical parts
- F16B 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](#))}
- F16B 7/04
 - . Clamping or clipping connections ([friction-grip releasable fastenings in general F16B 2/00](#))
- F16B 7/0406
 - . . {for rods or tubes being coaxial ([F16B 7/10](#) takes precedence)}
- F16B 7/0413
 - . . . {for tubes using the innerside thereof ([F16B 7/025](#) takes precedence)}
- F16B 7/042
 - {with a locking element, e.g. pin, ball or pushbutton, engaging in a hole in the wall of at least one tube}

- F16B 7/0426 . . . {for rods or for tubes without using the innerside thereof}
- F16B 7/0433 . . {for rods or tubes being in parallel relationship}
- F16B 7/044 . . {for rods or tubes being in angled relationship}
- F16B 7/0446 . . . {for tubes using the innerside thereof ([F16B 7/025](#) takes precedence)}
- F16B 7/0453 {the tubes being drawn towards each other ([F16B 7/0473](#) takes precedence)}
- F16B 7/046 {by rotating an eccentric-mechanism}
- F16B 7/0466 {by a screw-threaded stud with a conical tip acting on an inclined surface}
- F16B 7/0473 {with hook-like parts gripping, e.g. by expanding, behind the flanges of a profile}
- F16B 7/048 . . . {for rods or for tubes without using the innerside thereof}
- F16B 7/0486 {forming an abutting connection of at least one tube}
- F16B 7/0493 {forming a crossed-over connection}
- F16B 7/06 . Turnbuckles ([for cables, ropes, or wire F16G 11/12](#))
- F16B 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](#); telescope props for mining [E21D 15/14](#) to [E21D 15/46](#); stands or trestles as supports for apparatus or articles placed thereon {[F16M 11/26](#)})
- F16B 7/105 . . {locking in discrete positions, e.g. in extreme extended position}
- F16B 7/14 . . locking in intermediate {non-discrete} positions {(the rod or tube being locked by a tilting clip [F16B 2/246](#))}
- F16B 7/1409 . . . {with balls or rollers urged by an axial displacement of a wedge or a conical member}
- F16B 7/1418 . . . {with a clamping collar or two split clamping rings tightened by a screw or a cammed latch member}
- F16B 7/1427 . . . {with cammed or eccentric surfaces co-operating by relative rotation of the telescoping members or by rotation of an external collar}
- F16B 7/1436 {with rollers or balls}
- F16B 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)}
- F16B 7/1454 . . . {with a clamp locking the telescoping members by swinging a handle provided with a locking cam ([F16B 7/1418](#) takes precedence)}
- F16B 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}
- F16B 7/1472 . . . {with a clamping screw perpendicular to the axis of the telescoping members}
- F16B 7/1481 . . . {with a gripping helical spring}
- F16B 7/149 . . . {with a sleeve or ring having a tapered or conical surface ([F16B 7/1463](#) takes precedence)}
- F16B 2007/16 . . . {locking only against movement in one direction}
- F16B 7/18 . using screw-thread elements {([F16B 7/025](#) takes precedence; for turnbuckles [F16B 7/06](#))}

- F16B 7/182
 - . {for coaxial connections of two rods or tubes}
- F16B 7/185
 - . {with a node element}
- F16B 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](#))}
- F16B 7/20
 - using bayonet connections
- F16B 7/22
 - using hooks or like elements

F16B 9/00 **Connections of rods or tubular parts to flat surfaces at an angle**
([F16B 17/002](#) takes precedence); 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 to walls [F16L 41/00](#))

- F16B 9/02
 - Detachable connections
- F16B 9/023
 - . {using clamps or clips}
- F16B 9/026
 - . {using screw-thread elements}

F16B 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](#))

- F16B 11/002
 - {by pressing the elements together so as to obtain plastic deformation (shrinkage connections, force fits [F16B 4/00](#); pin-and-hole connections [F16B 17/00](#))}
- F16B 11/004
 - {by cold pressure welding}
- F16B 11/006
 - {by gluing (gluing of plastics material [B29C 65/48](#))}
- F16B 11/008
 - . {of tubular elements or rods in coaxial engagement}

F16B 12/00 **Jointing of furniture or the like, e.g. hidden from exterior** ([F16B 2/00](#) to [F16B 11/00](#) take precedence; fastening means per se [F16B 13/00](#) to [F16B 47/00](#); wood-working [B27](#))

- F16B 12/02
 - Joints between panels and corner posts
- F16B 12/04
 - Non-loosenable joints for non-metal furniture parts, e.g. glued
- F16B 2012/043
 - . {using carpentry joints other than mortise and tenon joints, e.g. using multiple tenons}
- F16B 2012/046
 - . {using mortise and tenon joints}
- F16B 12/06
 - Non-loosenable joints for metal furniture parts
- F16B 12/08
 - . without use of separate connecting elements
- F16B 12/10
 - using pegs, bolts, tenons, clamps, clips, or the like (glued [F16B 12/04](#); fastening means per se [F16B 15/00](#) to [F16B 47/00](#))
- F16B 2012/103
 - . {Sleeves or dowels for connection fittings}
- F16B 2012/106
 - . {Connection bolts for connection fittings}
- F16B 12/12
 - . for non-metal furniture parts, e.g. made of wood, of plastics
- F16B 12/125
 - . . {using mortise and tenon joints}
- F16B 12/14
 - . . using threaded bolts or screws
- F16B 2012/145
 - . . . {Corner connections}

F16B 12/16	. . . .	using self-tapping screws
F16B 12/18	. . . .	using drawing bars
F16B 12/20	. . .	using clamps, clips, wedges, sliding bolts, or the like
F16B 12/2009	. . . .	{actuated by rotary motion}
F16B 2012/2018	. . . . .	{pin and drum securing device; drum has cam surface to engage the head of the pin}
F16B 12/2027	. . . . .	{with rotating excenters or wedges}
F16B 12/2036	. . . . .	. {with rotating excenters or wedges acting on a head of a pin or screw}
F16B 2012/2045	. . . . .	{pin and drum securing device; drum has screw to engage the head of the pin}
F16B 12/2054	. . . . .	{with engaging screw threads as securing means for limiting movement}
F16B 12/2063	. . . . .	. {with engaging screw threads as tightening means}
F16B 2012/2072	. . . . .	{Pin and drum securing devices; Drums having lever with cam surface to engage the head of the pin}
F16B 2012/2081	. . . . .	{having a fitting providing slanted access for a screwdriver as actuator}
F16B 2012/209	. . . . .	{having an integrated lever as actuator}
F16B 12/22	. . .	using keyhole-shaped slots and pins
F16B 12/24	. . .	using separate pins, dowels, or the like
F16B 12/26	. . .	using snap-action elements
F16B 12/28	. .	for metal furniture parts
F16B 12/30	. . .	using threaded bolts
F16B 12/32	. . .	using clamps, clips, wedges, sliding bolts, or the like
F16B 12/34	. . .	using keyhole-shaped slots and pins
F16B 12/36	. . .	using separate pins, dowels or the like
F16B 12/38	. . .	using snap-action elements
F16B 12/40	. .	Joints for furniture tubing
F16B 2012/403	. .	{with inserts for joining tubes coaxially}
F16B 2012/406	. .	{Cove joints for joining two cylindrical members}
F16B 12/42	. .	connecting furniture tubing to non-tubular parts {(connecting table tops to underframes A47B 13/003)}
F16B 12/44	. .	Leg joints; Corner joints
F16B 2012/443	. .	{with two-dimensional corner element, the legs thereof being inserted in hollow frame members}
F16B 2012/446	. .	{with three-dimensional corner element, the legs thereof being inserted in hollow frame members}
F16B 12/46	. .	Non-metal corner connections
F16B 2012/463	. . .	{for wooden members without additional elements}
F16B 2012/466	. . .	{using mortise and tenon joints}
F16B 12/48	. .	Non-metal leg connections (F16B 12/46 takes precedence)

- F16B 12/50
 - . . Metal corner connections
- F16B 2012/505
 - . . . {having a corner insert which is inserted in mitered profiled members}
- F16B 12/52
 - . . Metal leg connections (F16B 12/50 takes precedence)
- F16B 12/54
 - . Fittings for bedsteads or the like
- F16B 12/56
 - . . Brackets for bedsteads; Coupling joints consisting of bolts or the like; Latches therefor
- F16B 12/58
 - . . Tapered connectors for bed rails
- F16B 12/60
 - . . Fittings for detachable side panels

- F16B 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)
- F16B 13/001
 - . {with means for preventing rotation of the dowel}
- F16B 13/002
 - . {self-cutting}
- F16B 13/003
 - . . {with a separate drilling bit attached to or surrounded by the dowel element}
- F16B 13/004
 - . . {with a drilling sleeve driven against a tapered or spherical plug}
- F16B 13/005
 - . {formed in integral series but easily separable}
- F16B 2013/006
 - . {with sealing means}
- F16B 2013/007
 - . {to be fastened in undercut holes}
- F16B 2013/008
 - . {used for mining purposes}
- F16B 2013/009
 - . {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}
- F16B 13/02
 - . in one piece with protrusion or ridges on the shaft
- F16B 13/025
 - . . {of rolled sheet material}
- F16B 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)
- F16B 13/045
 - . . {having axially compressing parts allowing the clamping of an object tightly to the wall}
- F16B 13/06
 - . . combined with expanding sleeve ({F16B 13/045 and F16B 13/08 take precedence})
- F16B 13/061
 - . . . {of the buckling type}
- F16B 13/063
 - . . . {by the use of an expander}
- F16B 13/065
 - {fastened by extracting the screw, nail or the like}
- F16B 13/066
 - {fastened by extracting a separate expander-part, actuated by the screw, nail or the like}
- F16B 13/068
 - {expanded in two or more places}
- F16B 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
- F16B 13/0808
 - . . . {by a toggle-mechanism}

- F16B 13/0816 . . . {with a wedging drive-pin}
- F16B 13/0825 . . . {with a locking element, e.g. sleeve, ring or key co-operating with a cammed or eccentric surface of the dowel body}
- F16B 13/0833 . . . {with segments or fingers expanding or tilting into an undercut hole (F16B 13/0858 takes precedence)}
- F16B 13/0841 . . . {with a deformable sleeve member driven against the abutting surface of the head of the bolt or of a plug}
- F16B 13/085 . . . {with a drive-nail deflected by an inclined surface in the dowel body (nails with spreading shaft F16B 15/04)}
- F16B 13/0858 . . . {with an expansible sleeve or dowel body driven against a tapered or spherical expander plug (F16B 13/004 takes precedence)}
- F16B 13/0866 . . . {with prongs penetrating into the wall of the hole by a retractile movement of a threaded member}
- F16B 13/0875 . . . {with elastic discs or spring washers anchoring in the hole}
- F16B 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)}
- F16B 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)}
- F16B 2013/10 . . {with gripping parts moved into their final position in relation to the body of the device by a separate operation}
- F16B 2013/105 . . . {with a toggle-mechanism}
- F16B 13/12 . . . Separate metal {or non-separate or non-metal} dowel sleeves fastened by inserting the screw, nail or the like {(F16B 13/0808 takes precedence)}
- F16B 13/122 . . . {made from a sheet-metal blank}
- F16B 13/124 . . . {fastened by inserting a threaded element, e.g. screw or bolt (F16B 13/122, F16B 13/128 take precedence)}
- F16B 13/126 . . . {fastened by inserting an unthreaded element, e.g. pin or nail (F16B 13/122, F16B 13/128 take precedence)}
- F16B 13/128 . . . {with extending protrusions, e.g. discs, segments, ridges, fingers or tongues (F16B 13/122 takes precedence)}
- F16B 13/14 . . . Non-metallic plugs or sleeves {(not used, see F16B 13/002- F16B 13/12)}; Use of liquid, loose solid or kneadable material therefor
- F16B 13/141 . . . {Fixing plugs in holes by the use of settable material}
- F16B 13/142 . . . {characterised by the composition of the setting material or mixture (F16B 13/143 takes precedence)}
- F16B 13/143 . . . {using frangible cartridges or capsules containing the setting components}
- F16B 13/144 {characterised by the shape or configuration or material of the frangible cartridges or capsules}
- F16B 13/145 {characterised by the composition of the setting agents contained in the frangible cartridges or capsules}
- F16B 13/146 {with a bag-shaped envelope or a tubular sleeve closed at one end, e.g. with a sieve-like sleeve, or with an expandable sheath}
- F16B 2013/147 . . . {Grout with reinforcing elements or with fillers, e.g. fibres, flakes, balls, wires}

- F16B 2013/148 . . . {Means for inhibiting adhesion between dowel or anchor bolt parts and the surrounding grouting composition}

Fastening means without screw-thread (horseshoe nails [A01L 7/10](#); nails for footwear [A43B 23/20](#); thumb-tacks [B43M 15/00](#); for building constructions [E04B 1/38](#); for hand railings [E04F 11/18](#); for fencing [E04H 17/00](#))

F16B 15/00 **Nails; Staples** (surgical staples [A61B 17/064](#); manufacture of nails or staples [B21G](#); {drawing-pins, thumb-tacks [B43M 15/00](#)}; railway spikes [E01B 9/06](#))

- F16B 15/0007 . {with two nail points extending in opposite directions, in order to fix two workpieces together}
- F16B 15/0015 . {Staples}
- F16B 15/0023 . {Nail plates (claw dowels for building structures [E04B 1/49](#); machines for driving in nail plates [B27F 7/15](#))}
- F16B 15/003 . . {with teeth cut out from the material of the plate}
- F16B 15/0038 . . . {only on the perimeter of the plate}
- F16B 15/0046 . . . {from the body of the plate}
- F16B 15/0053 . . {with separate nails attached to the plate}
- F16B 2015/0061 . . {Multipiece-plates}
- F16B 2015/0069 . . {with nails on both sides}
- F16B 2015/0076 . . {with provisions for additional fastening means, e.g. hooks, holes for separate screws or nails, adhesive}
- F16B 2015/0084 . . {with marks to indicate where to strike with the hammer}
- F16B 15/0092 . {Coated nails or staples}
- F16B 15/02 . with specially-shaped heads, e.g. with enlarged surfaces (ornaments for furniture [A47B 95/04](#); removable ornamental heads for nails [A47G 3/00](#))
- F16B 15/04 . with spreading shaft {(dowels with a drive-nail deflected by an inclined surface in the dowel body [F16B 13/085](#))}
- F16B 15/06 . with barbs, e.g. for metal parts; Drive screws
- F16B 15/08 . formed in integral series but easily separable

F16B 17/00 **Connecting constructional elements or machine parts by a part of or on one member entering a hole in the other** (construction of pins, bolts or rivets [F16B 19/00](#); riveting [F16B 19/04](#); means for preventing withdrawal of a pin, spigot or the like from its operative position, stud-and-socket releasable fastenings [F16B 21/00](#))

- F16B 17/002 . {Non-releasable connections, i.e. by means of plastic deformation}
- F16B 17/004 . . {of rods or tubes mutually}
- F16B 17/006 . . {of rods or tubes to sheets or plates}
- F16B 17/008 . . {of sheets or plates mutually}

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

- F16B 19/002 . {Resiliently deformable pins ([F16B 21/06](#) takes precedence)}
- F16B 19/004 . . {made in one piece ([F16B 21/084](#) takes precedence)}

- F16B 2019/006 . . {made in a plurality of pieces}
- F16B 19/008 . {with sealing means}
- F16B 19/02 . Bolts or sleeves for positioning of machine parts, e.g. notched taper pins, fitting pins, sleeves, eccentric positioning rings
- F16B 19/04 . Rivets; Spigots or the like fastened by riveting ([lead seals G09F 3/00](#))
- F16B 2019/045 . . {Coated rivets}
- F16B 19/05 . . Bolts fastening by swaged-on collars ([F16B 19/08](#) takes precedence)
- F16B 2019/055 . . . {deformed by an electro-magnetic action}
- F16B 19/06 . . Solid rivets made in one piece
- F16B 19/08 . . Hollow rivets; Multi-part rivets
- F16B 19/083 . . . {Self-drilling rivets}
- F16B 19/086 . . . {Self-piercing rivets}
- F16B 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](#)

- F16B 2019/1009 {hollow or single-part rivets fastened by a pull-through mandrel}
- F16B 2019/1018 {hollow or single-part rivets fastened by a drive pin}
- F16B 19/1027 {Multi-part rivets}
- F16B 19/1036 {Blind rivets}
- F16B 19/1045 {fastened by a pull - mandrel or the like ([F16B 19/109](#) takes precedence)}
- F16B 19/1054 {the pull-mandrel or the like being frangible}
- F16B 19/1063 {with a sleeve or collar sliding over the hollow rivet body during the pulling operation}
- F16B 19/1072 {the pull-mandrel or the like comprising a thread and being rotated with respect to the rivet, thereby mechanically expanding and fastening the rivet ([nuts fastened by riveting F16B 37/067](#))}
- F16B 19/1081 {fastened by a drive-pin ([F16B 19/109](#) takes precedence)}
- F16B 19/109 {Temporary rivets, e.g. with a spring-loaded pin (special clamping devices for workpieces to be riveted together, e.g. operating through the rivet holes [B21J 15/42](#); hand tools for temporarily connecting sheets before or during assembly operations [B25B 31/005](#))}
- F16B 19/12 . . . fastened by fluid pressure, including by explosion (bolts shot by means of detonation-operated nailing tools into concrete constructions, metal walls or the like [F16B 19/14](#))
- F16B 19/125 {fastened by explosion}
- F16B 19/14 . Bolts or the like for shooting into concrete constructions, metal walls or the like by means of detonation-operated nailing tools ([tools therefor B25C, B27F](#))

F16B 21/00	Means for preventing relative axial movement of a pin, spigot, shaft or the like and a member surrounding it (riveted or deformable spigots F16B 19/04; for gudgeon pins F16J 1/18); Stud-and-socket releasable fastenings
F16B 21/02	<ul style="list-style-type: none"> • Releasable fastening devices locking by rotation (with snap-action F16B 21/06; studs or coupling pins with resilient protrusions F16B 21/08)
F16B 21/04	<ul style="list-style-type: none"> • with bayonet catch
F16B 21/06	<ul style="list-style-type: none"> • Releasable fastening devices with snap-action ({quickly-detachable or mountable nuts to threaded bolts F16B 37/0842})
F16B 21/065	<ul style="list-style-type: none"> • {with an additional locking element}
F16B 21/07	<ul style="list-style-type: none"> • in which the socket has a resilient part ({F16B 21/065 takes precedence})
F16B 21/071	<ul style="list-style-type: none"> • {the socket being integrally formed with a component to be fastened, e.g. a sheet, plate or strip}
F16B 21/073	<ul style="list-style-type: none"> • {the socket having a resilient part on its inside}
F16B 21/075	<ul style="list-style-type: none"> • {the socket having resilient parts on its inside and outside}
F16B 21/076	<ul style="list-style-type: none"> • {the socket having a resilient part on its outside (F16B 21/075 takes precedence)}
F16B 21/078	<ul style="list-style-type: none"> • {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)}
F16B 21/08	<ul style="list-style-type: none"> • 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 13/00)
F16B 21/082	<ul style="list-style-type: none"> • {the stud, pin or spigot having two resilient parts on its opposite ends in order to connect two elements}
F16B 21/084	<ul style="list-style-type: none"> • {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}
F16B 21/086	<ul style="list-style-type: none"> • {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}
F16B 21/088	<ul style="list-style-type: none"> • {the stud, pin or spigot being integrally formed with the component to be fastened, e.g. forming part of the sheet, plate or strip}
F16B 21/09	<ul style="list-style-type: none"> • Releasable fastening devices with a stud engaging a keyhole slot
F16B 21/10	<ul style="list-style-type: none"> • 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)
F16B 21/12	<ul style="list-style-type: none"> • with locking-pins or split-pins thrust into holes
F16B 21/125	<ul style="list-style-type: none"> • {radially resilient or with a snap-action member, e.g. elastic tooth, pawl with spring, resilient coil or wire}
F16B 2021/14	<ul style="list-style-type: none"> • {Details of locking-pins or split-pins}
F16B 21/16	<ul style="list-style-type: none"> • with grooves or notches in the pin or shaft
F16B 21/165	<ul style="list-style-type: none"> • {with balls or rollers (for connections of rods or tubes engaged telescopically F16B 7/1409)}
F16B 21/18	<ul style="list-style-type: none"> • 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)
F16B 21/183	<ul style="list-style-type: none"> • {internal, i.e. with spreading action}

- F16B 21/186 {external, i.e. with contracting action}
- F16B 21/20 . . for bolts or shafts without holes, grooves, or notches for locking members
{(by rings resilient in their plane [F16B 21/18](#))}
- F16B 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](#))

F16B 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](#))}

- F16B 23/0007 . {characterised by the shape of the recess or the protrusion engaging the tool
([F16B 23/0069](#) and [F16B 23/0076](#) take precedence)}
- F16B 23/0015 . . {substantially rectangular, e.g. one-slot head}
- F16B 23/0023 . . {substantially cross-shaped}
- F16B 23/003 . . {star-shaped or multi-lobular, e.g. Torx-type, twelve-point star}
- F16B 23/0038 . . {substantially prismatic with up to six edges, e.g. triangular, square,
pentagonal, Allen-type cross-sections}
- F16B 23/0046 . . {having one eccentric circular or polygonal recess or protrusion}
- F16B 23/0053 . {with a conical or prismatic recess for receiving a centering pin of the tool
apparatus}
- F16B 23/0061 . {with grooves, notches or splines on the external peripheral surface designed
for tools engaging in radial direction ([F16B 23/003](#) takes precedence)}
- F16B 23/0069 . {with holes to be engaged with corresponding pins on the tool or protruding pins
to be engaged with corresponding holes on the tool}
- F16B 23/0076 . {causing slipping of the tool in loosening rotation, i.e. disabling unscrewing
unless another tool is used ([F16B 31/027](#) takes precedence)}
- F16B 23/0084 . {with a threaded engagement between the head of the bolt or screw and the
tool}
- F16B 23/0092 . {with a head engageable by two or more different tools ([F16B 23/0076](#) takes
precedence)}

F16B 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](#))}

- F16B 25/0005 . {of the helical wire type (Threaded wire-inserts [F16B 37/12](#))}
- F16B 25/001 . {characterised by the material of the body into which the screw is screwed}
- F16B 25/0015 . . {the material being a soft organic material, e.g. wood or plastic
([F16B 25/0031](#) takes precedence)}
- F16B 25/0021 . . {the material being metal, e.g. sheet-metal or aluminium ([F16B 25/0031](#)
takes precedence)}
- F16B 25/0026 . . {the material being a hard non-organic material, e.g. stone, concrete or
drywall ([F16B 25/0031](#) takes precedence)}
- F16B 25/0031 . . {the screw being designed to be screwed into different materials, e.g. a
layered structure or through metallic and wooden parts}

- F16B 25/0036 . {characterised by geometric details of the screw}
- F16B 25/0042 . . {characterised by the geometry of the thread, the thread being a ridge wrapped around the shaft of the screw}
- F16B 25/0047 . . . {the ridge being characterised by its cross-section in the plane of the shaft axis}
- F16B 25/0052 . . . {the ridge having indentations, notches or the like in order to improve the cutting behaviour}
- F16B 25/0057 . . . {the screw having distinct axial zones, e.g. multiple axial thread sections with different pitch or thread cross-sections}
- F16B 25/0063 {with a non-threaded portion on the shaft of the screw}
- F16B 25/0068 . . . {with multiple-threads, e.g. a double thread screws}
- F16B 25/0073 . . . {characterised by its pitch, e.g. a varying pitch}
- F16B 25/0078 . . {with a shaft of non-circular cross-section or other special geometric features of the shaft}
- F16B 25/0084 . . {characterised by geometric details of the tip}
- F16B 25/0089 . . {the screw having wings}
- F16B 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}
- F16B 25/10 . Screws performing an additional function to thread-forming, e.g. drill screws {or self-piercing screws}
- F16B 25/103 . . {by means of a drilling screw-point, i.e. with a cutting and material removing action}
- F16B 25/106 . . {by means of a self-piercing screw-point, i.e. without removing material}
- F16B 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](#))}
- F16B 29/00** **Screwed 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](#))
- F16B 31/00** **Screwed connections specially modified in view of tensile load; Break-bolts** (shape of thread {[F16B 33/02](#); in couplings [F16D 9/00](#))
- F16B 2031/002 . {Breakbolts loosening due to an electromagnetic action}
- F16B 31/005 . {Breakbolts loosening due to the action of an explosive charge}
- F16B 31/007 . {Break-bolts loosening at high temperature}
- F16B 31/02 . for indicating {the attainment of a particular tensile load} or limiting tensile load {(apparatus for, or method of, determining value of torque or twisting moment for tightening a nut or other member similarly stressed [G01L 5/24](#))}
- F16B 31/021 . . {by means of a frangible part ([F16B 31/025](#), [F16B 31/028](#) take precedence; break members in torque limiters or torque indicators in wrenches or screwdrivers [B25B 23/1415](#))}
- F16B 2031/022 . . {using an ultrasonic transducer}
- F16B 31/024 . . {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}

- F16B 31/025 . . {with a gauge pin in a longitudinal bore in the body of the bolt}
- F16B 31/027 . . {with a bolt head causing the fastening or the unfastening tool to lose the grip when a specified torque is exceeded}
- F16B 31/028 . . {with a load-indicating washer or washer assembly}
- F16B 31/04 . for maintaining {a} tensile load
- F16B 31/043 . . {Prestressed connections tensioned by means of liquid, grease, rubber, explosive charge, or the like (hydraulic bolt tensioners [B25B 29/02](#))}
- F16B 2031/046 . . . {by means of an explosive charge}
- F16B 31/06 . having regard to possibility of fatigue rupture

F16B 33/00**Features common to bolt and nut**

- F16B 33/002 . {Means for preventing rotation of screw-threaded elements ([F16B 39/00](#) takes precedence)}
- F16B 33/004 . {Sealing; Insulation (by means of washers [F16B 43/001](#))}
- F16B 33/006 . {Non-metallic fasteners using screw-thread}
- F16B 33/008 . {Corrosion preventing means}
- F16B 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](#))}
- F16B 2033/025 . . {with left-hand thread}
- F16B 2033/04 . . {in view of tensile load}
- F16B 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](#))}

F16B 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](#)

- F16B 35/002 . {onto which threads are cut during screwing ([F16B 37/002](#) takes precedence)}
- F16B 35/005 . {Set screws; Locking means therefor}
- F16B 35/007 . {Removing paint or dirt layers covering the threaded part of nut-like members}
- F16B 35/02 . divided longitudinally
- F16B 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](#))
- F16B 35/041 . . {Specially-shaped shafts (shape of thread [F16B 33/02](#))}
- F16B 35/042 . . . {for retention or rotation by a tool, e.g. of polygonal cross-section}
- F16B 35/044 . . . {Specially-shaped ends}

- F16B 35/045 {for retention or rotation by a tool (specially shaped heads of bolts or screws for rotation by a tool [F16B 23/00](#))}
- F16B 35/047 {for preventing cross-threading, i.e. preventing skewing of bolt and nut}
- F16B 35/048 . . . {Specially-shaped necks ([F16B 35/06](#) takes precedence)}
- F16B 35/06 . . Specially-shaped heads (special shape in order to rotate the bolt [F16B 23/00](#) {; separate hook adaptors for bolts [F16B 43/025](#))}
- F16B 35/065 . . . {with self-countersink-cutting means}
- F16B 37/00** **Nuts or like thread-engaging members** {(specially shaped for rotations by a tool [F16B 23/00](#))}
- F16B 37/002 . {cutting threads during screwing; removing paint or dirt layers covering threaded shanks}
- F16B 37/005 . {into which threads are cut during screwing}
- F16B 2037/007 . {with a blind hole}
- F16B 37/02 . made of thin sheet material (fastening to surfaces [F16B 37/04](#); {used as lock-nuts [F16B 39/14](#)})
- F16B 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](#))}
- F16B 37/041 . . {Releasable devices ([F16B 37/044](#), [F16B 37/045](#) take precedence)}
- F16B 37/042 . . . {locking by rotation}
- F16B 37/043 . . . {with snap action}
- F16B 37/044 . . {Nut cages}
- F16B 37/045 . . {specially adapted for fastening in channels, e.g. sliding bolts, channel nuts}
- F16B 37/046 . . . {with resilient means for urging the nut inside the channel}
- F16B 37/047 . . . {Barrel nuts}
- F16B 37/048 . . {Non-releasable devices ([F16B 37/044](#), [F16B 37/045](#) and [F16B 37/06](#) take precedence)}
- F16B 37/06 . . by means of welding or riveting
- F16B 37/061 . . . {by means of welding}
- F16B 37/062 . . . {by means of riveting}
- F16B 37/064 {with the use of separate rivets}
- F16B 37/065 {by deforming the material of the nut}
- F16B 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}
- F16B 37/068 {by deforming the material of the support, e.g. the sheet or plate}
- F16B 37/08 . Quickly-detachable {or mountable} nuts, e.g. consisting of two or more parts; Nuts movable along the bolt after tilting the nut {not used, see subgroups}
- F16B 37/0807 . . {Nuts engaged from the end of the bolt, e.g. axially slidable nuts}
- F16B 37/0814 . . . {movable along the bolt after tilting the nut}
- F16B 37/0821 . . . {in two halves pivotally connected}

- F16B 37/0828 . . . {with a longitudinal slit through the annular wall of the nut for enabling expansion of the nut, e.g. for easy removal}
- F16B 37/0835 . . . {with balls engaging threads or grooves on the shaft of the bolt}
- F16B 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)}
- F16B 37/085 . . . {with at least one unthreaded portion in both the nut and the bolt}
- F16B 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)}
- F16B 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)}
- F16B 37/0871 . . {engaging the bolt laterally, i.e. without the need to engage the end of the bolt}
- F16B 37/0878 . . . {in one piece, e.g. C-shaped nuts}
- F16B 37/0885 . . . {in two halves hingedly connected}
- F16B 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)}
- F16B 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)}
- F16B 37/122 . . {Threaded inserts, e.g. "rampa bolts"}
- F16B 37/125 . . . {the external surface of the insert being threaded}
- F16B 37/127 {and self-tapping}
- F16B 37/14 . Cap nuts; Nut caps or bolt caps
- F16B 37/145 . . {Sleeve nuts, e.g. combined with bolts}
- F16B 37/16 . Wing-nuts (F16B 37/14 takes precedence)

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.

- F16B 39/01 . specially adapted to prevent loosening at extreme temperatures
- F16B 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)
- F16B 39/021 . . {by injecting a settable material after the screwing down}
- F16B 39/023 . . {by driving a conic or wedge-shaped expander through the threaded element}

- F16B 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)}
- F16B 39/026 . . {by swaging the nut on the bolt, i.e. by plastically deforming the nut}
- F16B 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}
- F16B 39/04 . . with a member penetrating the screw-threaded surface of at least one part, e.g. a pin, a wedge, cotter-pin, screw
- F16B 39/06 . . . with a pin or staple parallel to the bolt axis
- F16B 39/08 . . with a cap interacting with the nut, connected to the bolt by a pin or cotter pin
- F16B 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)
- F16B 39/101 . . . {with a plate, spring, wire or ring holding two or more nuts or bolt heads which are mainly in the same plane}
- F16B 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}
- F16B 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}
- F16B 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}
- F16B 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)}
- F16B 39/12 . . by means of locknuts
- F16B 39/122 . . . {foreseen with mating surfaces inclined, i.e. not normal, to the bolt axis}
- F16B 39/124 {with helically inclined mating surfaces}
- F16B 39/126 . . . {causing radial forces on the bolt-shaft ([F16B 39/36](#) takes precedence)}
- F16B 39/128 {by means of eccentric or spiral interengaging parts}
- F16B 39/14 . . . made of thin sheet material or formed as spring-washers ([locknuts per se made of thin sheet metal F16B 37/02](#))
- F16B 39/16 . . . in which the screw-thread of the locknut differs from that of the nut
- F16B 39/18 in which the locknut grips with screw-thread in the nuts as well as on the bolt
- F16B 39/20 . . by means of steel wire or the like ([F16B 39/10](#) takes precedence)
- F16B 39/22 . in which the locking takes place during screwing down or tightening ([F16B 39/01](#) takes precedence)
- F16B 39/225 . . {by means of a settable material}
- F16B 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](#))
- F16B 39/26 . . . with spring washers fastened to the nut or bolt-head
- F16B 39/28 . . by special members on, or shape of, the nut or bolt ([F16B 39/26](#) takes precedence; [locknuts F16B 39/12](#))

- F16B 39/282
 - • • Locking by means of special shape of work-engaging surfaces, e.g. notched or toothed nuts
- F16B 39/2825
 - • • • {causing the bolt to tilt}
- F16B 39/284
 - • • Locking by means of elastic deformation ({F16B 39/2825, F16B 39/36,} F16B 39/38 take precedence)
- F16B 39/286
 - • • • caused by saw cuts
- F16B 39/30
 - • • Locking exclusively by special shape of the screw-thread
- F16B 39/32
 - • • Locking by means of a pawl or pawl-like tongue
- F16B 39/34
 - • • Locking by deformable inserts or like parts
- F16B 39/36
 - • • with conical locking parts, which may be split, including use of separate rings co-operating therewith
- F16B 39/38
 - • • with a second part of the screw-thread which may be resiliently mounted (F16B 39/30 takes precedence)

- F16B 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)
 - F16B 41/002
 - {Measures against loss of bolts, nuts or pins (devices for fastening nuts to surfaces F16B 37/04)}
 - F16B 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)}
 - F16B 41/007
 - • {by means of two housings hingedly connected which enclose the bolt head}

- F16B 43/00**
Washers or equivalent devices; Other devices for supporting bolt-heads or nuts (circlips 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})
 - F16B 43/001
 - {for sealing or insulation}
 - F16B 43/002
 - {with special provisions for reducing friction}
 - F16B 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)}
 - F16B 43/004
 - {with a radial cut in order to improve elasticity of the washer (F16B 43/005 takes precedence)}
 - F16B 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)}
 - F16B 43/006
 - • {in two or more parts hingedly connected}
 - F16B 43/007
 - • {in two or more parts}
 - F16B 2043/008
 - {with a cavity for receiving the bolt head in order to make a flush surface}
 - F16B 43/009
 - {with a wedging effect in order to adjust the height of the washer}
 - F16B 43/02
 - with special provisions for engaging surfaces which are not perpendicular to a bolt axis or do not surround the bolt
 - F16B 43/025
 - • {for surfaces not surrounding the bolt, e.g. hook adaptors for bolts}

F16B 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](#))

F16B 45/02

- Hooks with a pivoting {or elastically bending} closing member

F16B 45/025

- . {manoeuvrable remotely with a cable, chain, rod or the like}

F16B 45/04

- Hooks with a sliding closing member

F16B 45/06

- Hooks with two symmetrically-pivoting hook parts

F16B 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](#)}

F16B 47/003

- {using adhesives for attaching purposes (using adhesives for connecting constructional elements [F16B 11/006](#))}

F16B 47/006

- {the suction cups being activated by the rotation of a cranked lever arm}