

Screw Locking Devices of Disconnected Joins

Screw locking devices secure reliable locking of screws and nuts and protect them from spontaneous screwing off

The screw locking technique is always determined only by the design engineer and it is **forbidden** to replace it with any other technique

Screw locking devices are divided into **4 general groups** according to the way of locking:

1 – tight locking devices

2 – by building up the **friction forces in the screw thread and at the bearing end walls of nuts and screws**

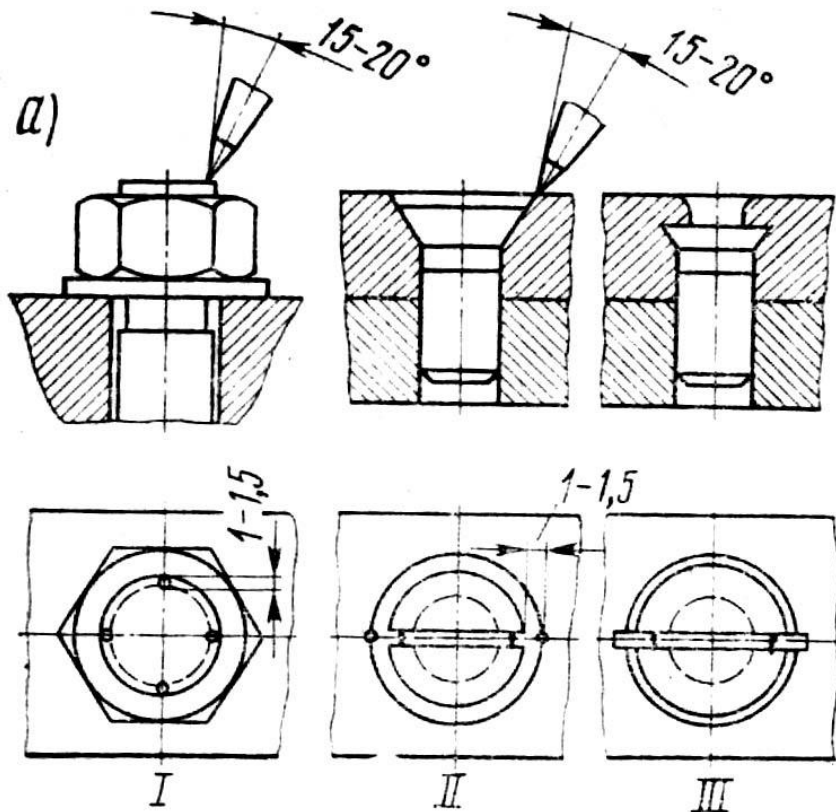
3 – by using special holding lock, which guarantee tight connection between the body of the detail and the threaded couple

4 – by combining above mentioned types

Screw Locking Devices of Disconnected Joins

Tight Locking (punching, embossing, planchet)

Is used in joins which during the exploitation conditions are rarely subjected to disassembly



I – Screw locking of nuts by punching

II – Screw locking of the screws by punching

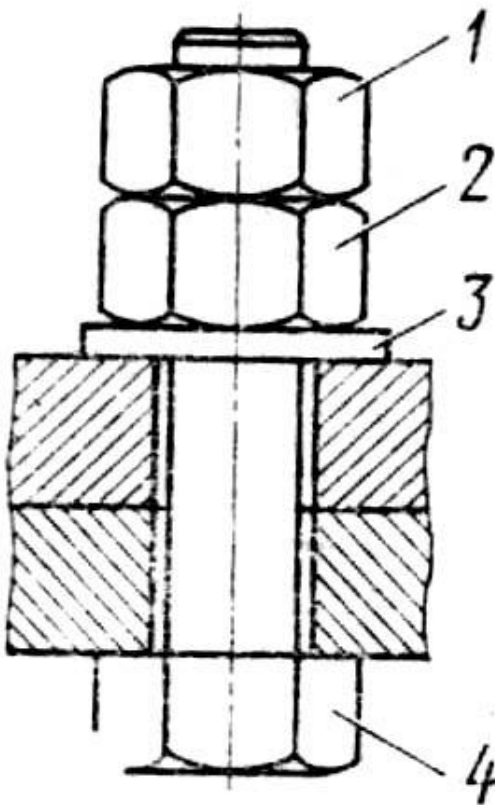
III – Screw locking of the screws by embossing, it is used when the head of the screw fits flush into the metal detail.

Screw locking device of disconnected joinings

By increase of forces of a friction

Retaining plugs (winded on a bolt after a tightening of the basic nut)

It is applied at screw locking device carving tips of pull-rods of steering, earing carving tips of **fastening engines struts** etc.

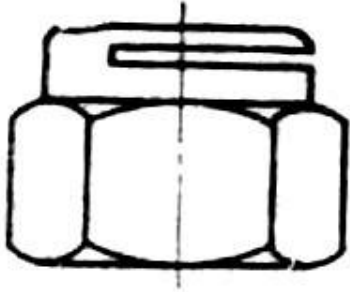


- 1 – retaining plug
- 2 – basic nut
- 3 – washer
- 4 – screw

Screw locking device of disconnected joinings

By increase of forces of a friction

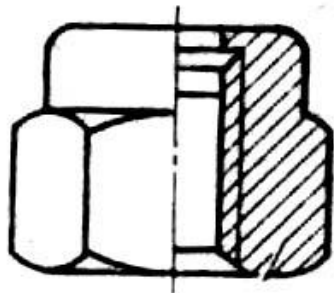
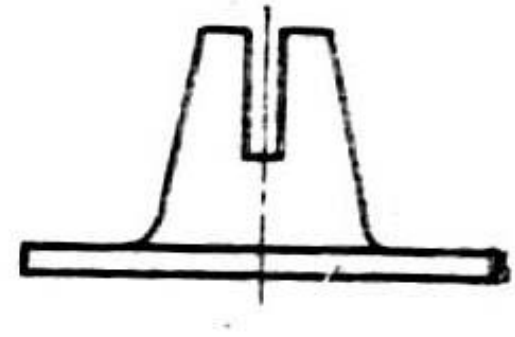
Selflocking plugs



Plug with a cut, which are perpendicular to the axis of a thread.

It is used as power plugs and retaining plugs

Plug with a cut, along the axis of thread.
(axial cut)

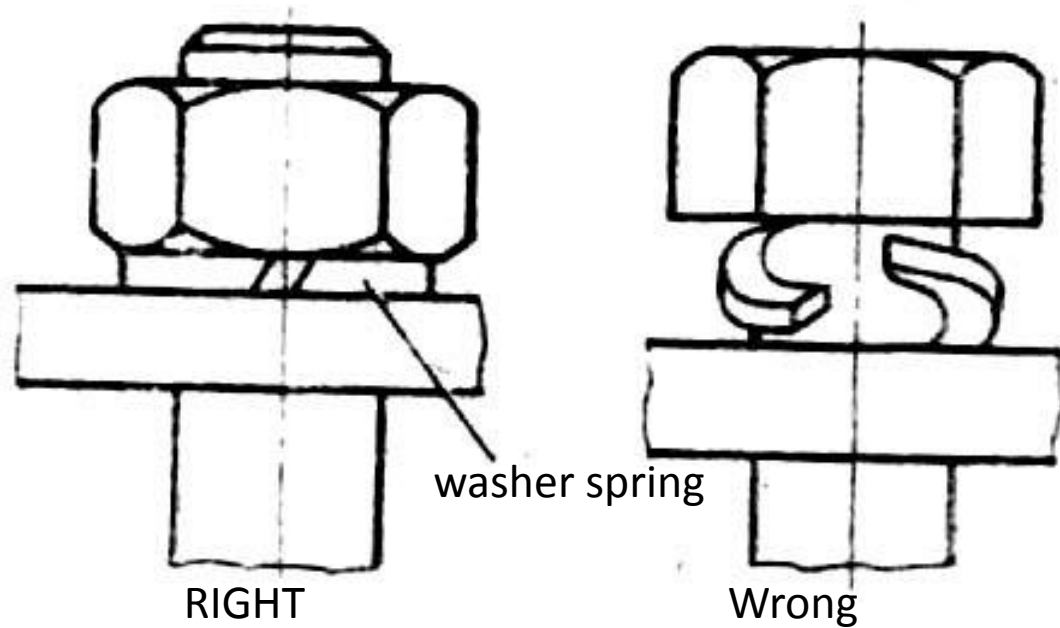


Plug with nylon or fiber annular.
Applied for slightly stressed details.
At temperatures above 150°C and liquid presence reliability screw locking devices sharply decreases.

Screw locking device of disconnected joinings

By increase of the forces of friction

With the help of washer slot and continuous spring



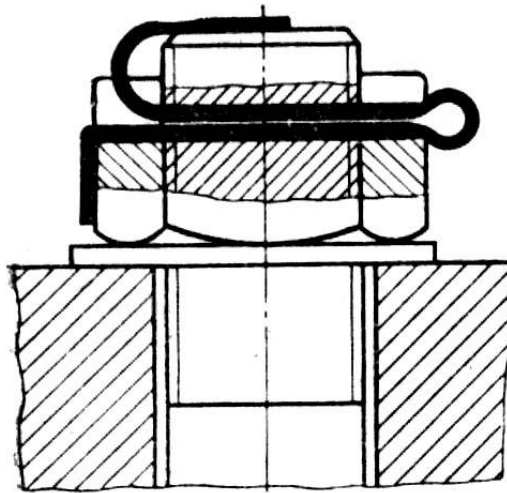
Provide stability of forces of friction in carving and smooth vibratory loadings

Washer springs are produced with left winding for screws with right thread and with right winding for screws with left thread

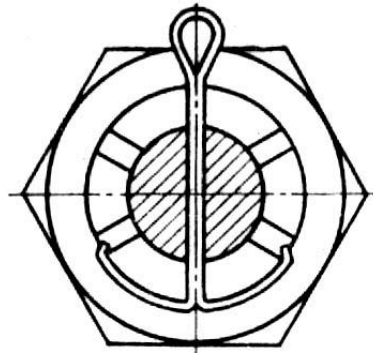
Screw locking device of disconnected joinings

Screw locking by special lock pins

Separating pin– is used in the most responsible connections, exposed to the extreme vibration



WRIGHT

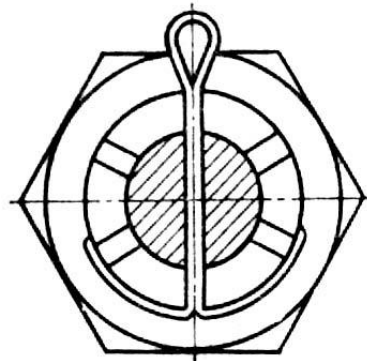
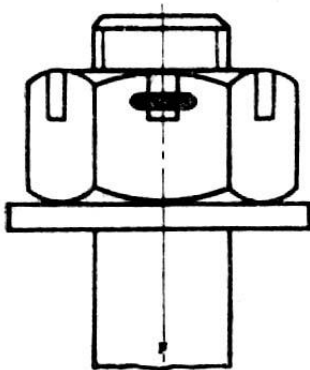


The slotted nut (clasp nut) and screw with slot in threaded part are used for pin screw locking device.

It is necessary to observe the following rules for pin screw locking device:

- to select pin according to the diameter of the slot;
- the length of pin must be selected in dependence to diameter of a bolt;
- it is forbidden to use pins secondarily;
- pin must be located in the bottom of the screw slot;
- the ends of the pin branches, coming from screw slots, are pressed closely to the nut flat and lead it in the slot adjoining.

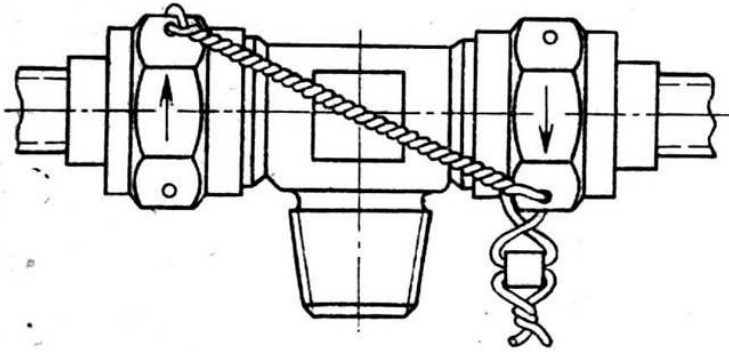
WRONG



Screw locking device with detachable connections Screw locking device with special locks

Screw locking device with the help of wire (Nuts, bolts, fittings must have a hole for wire)

Correct

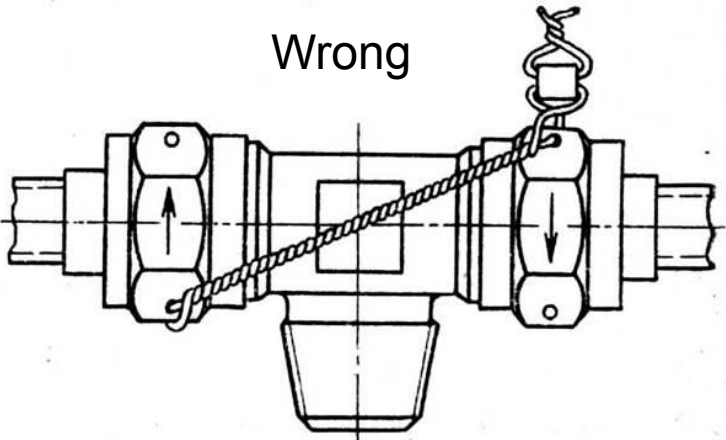


Threaded pairs are connected between each other or with details of construction in such way, that tighten wire prevent screw of details.

The length of convolute part of wire must not touch other detail.

The tern length of convolute wire must be 5-8 mm depending on its diameter.

Wrong



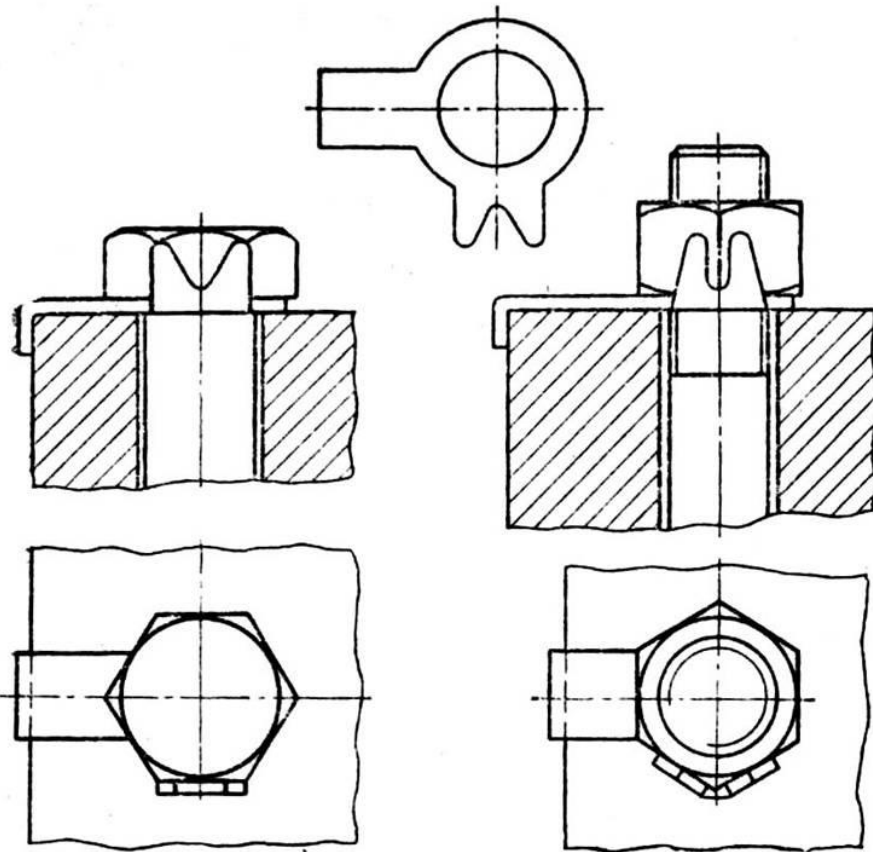
Secondary application of wire **is prohibited**

Wire which is made from low carbon steel which is plated and its brand may be KO or brass Л62 and Л68 with circular cross-section 0.8-1.2 mm in diameter is used as screw looking devise.

Screw locking device with detachable connections

Screw locking device with special locks

Screw locking device with flat lock washer with paw

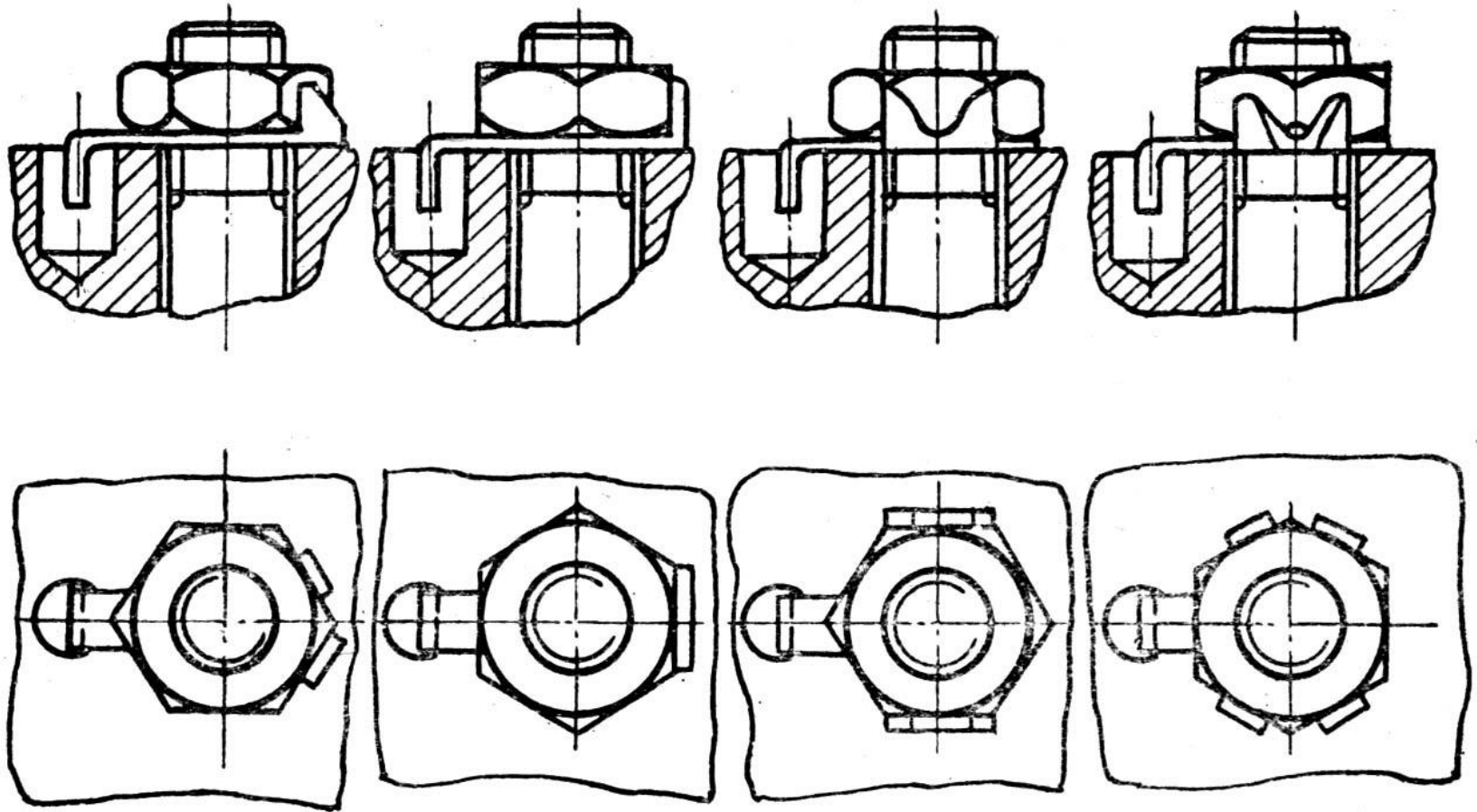


Screw locking device assured by the fact that one paw unbent to the brink of the nut that helps to prevent it's rotation relative to washer and the other unbent to the brink of the detail, in special groove milled in bolt or nut. This helps to prevent rotation of washer relative to the detail or nut.

Flat washers are used once

Screw Locking Device of Disconnected Joinings

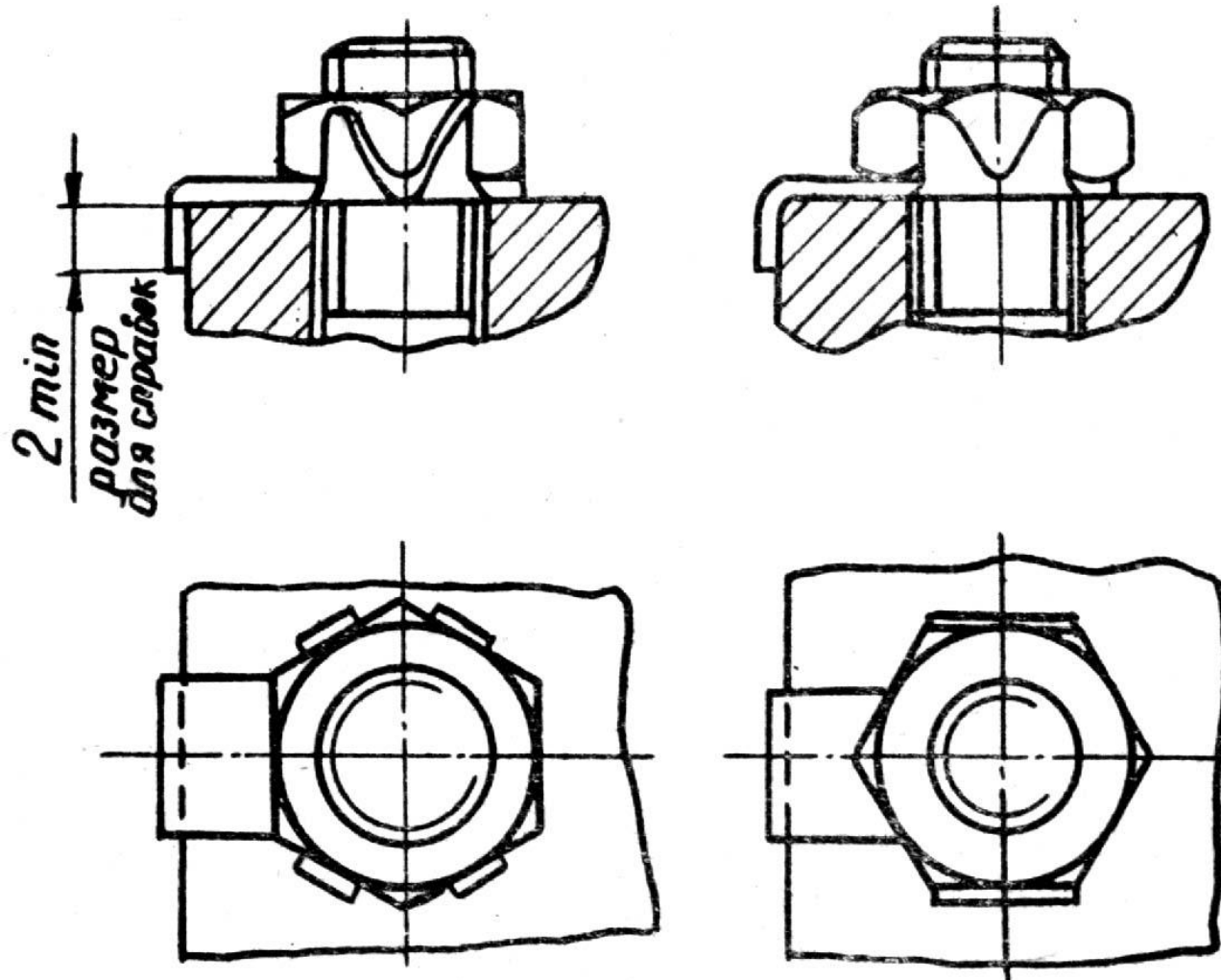
Screw Locking by Special Fixing Arm



The Locking by single-shaped washer, tight tendril of what, bended off perpendicular to the surface of the washer, is inserted in a special hole, and a wide tendril is tightly turned in to the edge of the park.

Screw Locking Device of Disconnected Joinings

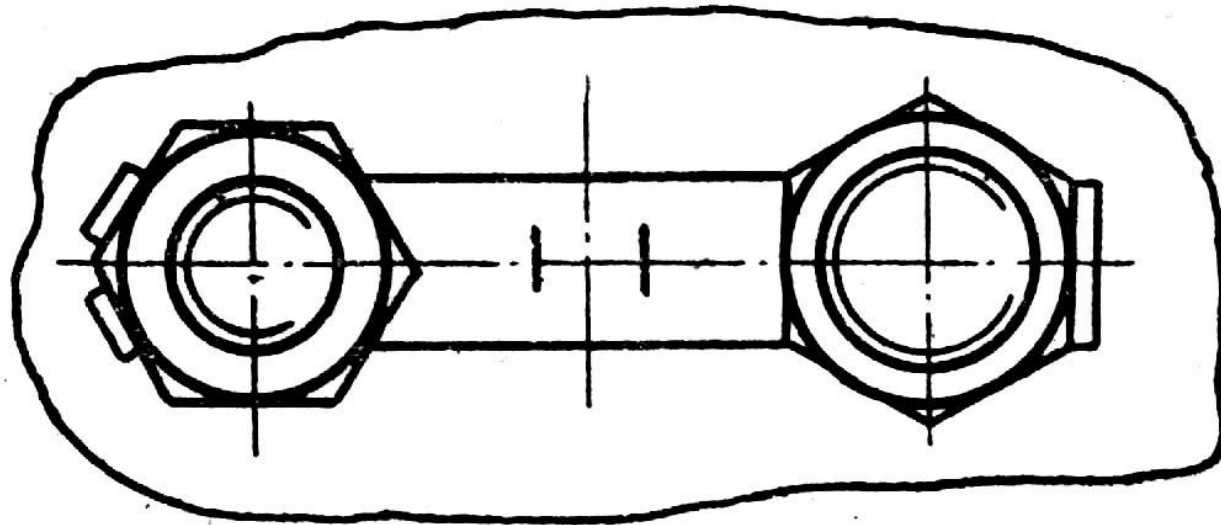
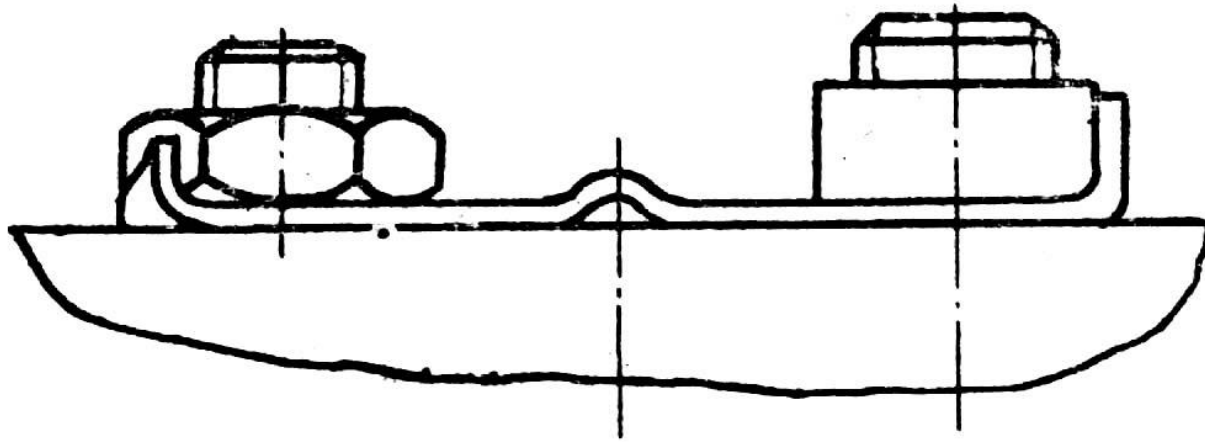
Screw Locking by Special Fixing Arm



The locking by single-shaped washer, one tendril of what is tightly turned in to the but-end of the detail, and the second tendril – to the edge of the park.

Screw locking devices of disconnected joints

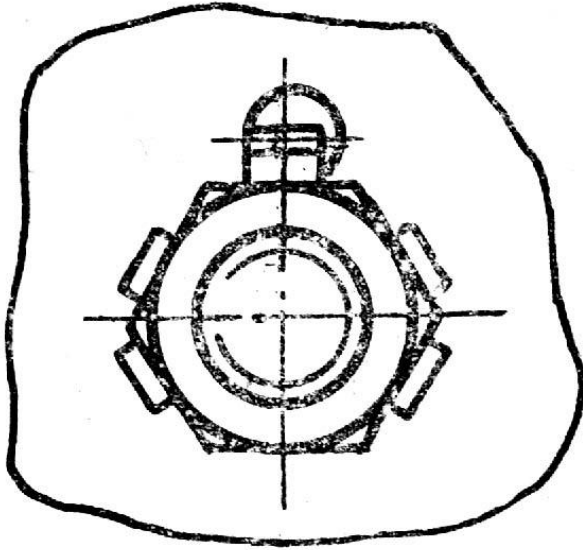
Screw locking by special fixing



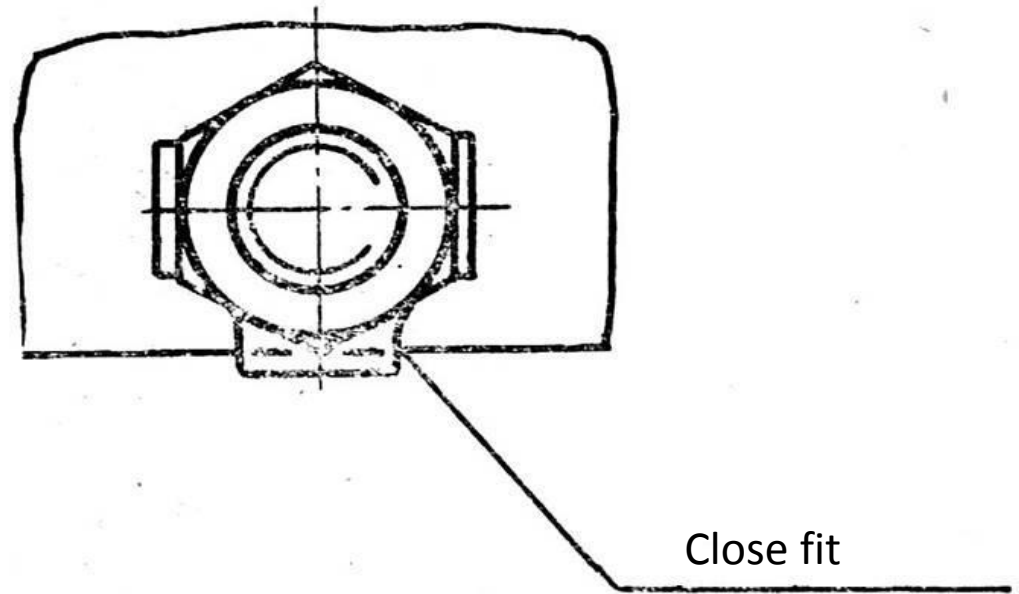
plugging with double washer

Screw locking devices of disconnected joints

Screw locking by special fixing



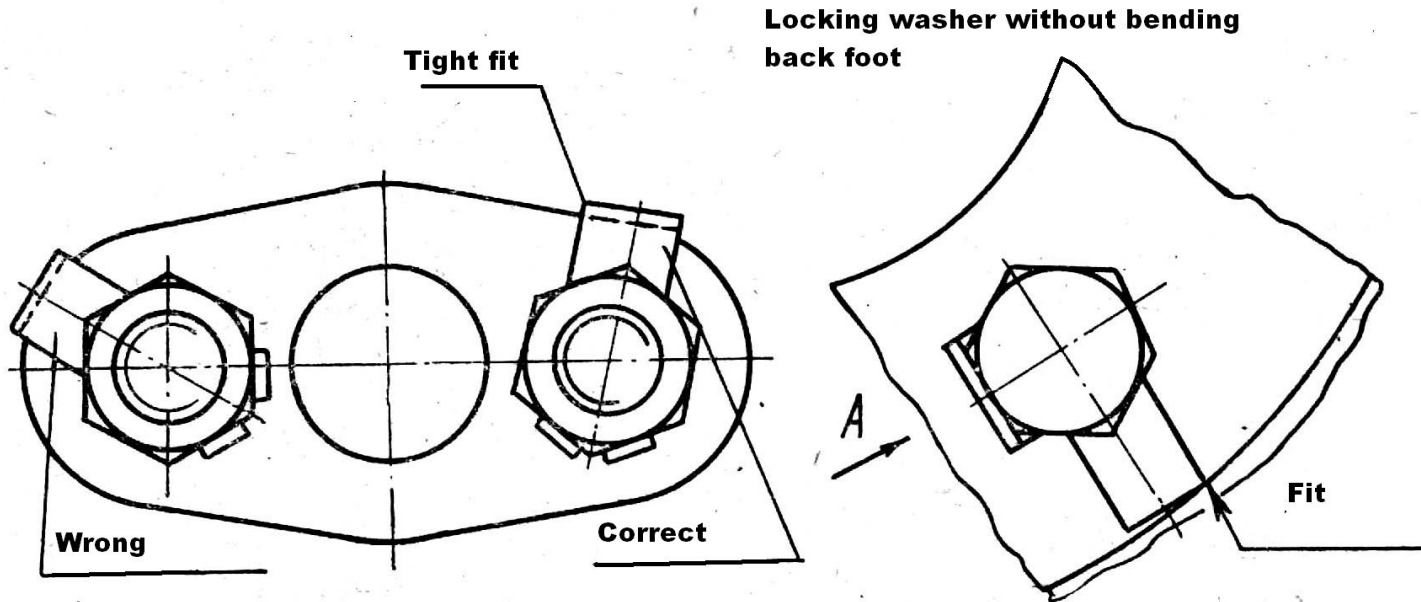
Bend of washer petals on the hexahedron face of a screw (bolt) in position of washer, deployed to the side of unscrewing to its stop by tip in the socket of the detail.



Bend of washer petals on the hexahedron face of a screw (bolt) in position of washer, deployed to the side of unscrewing to its stop by paw in the butt end of detail.

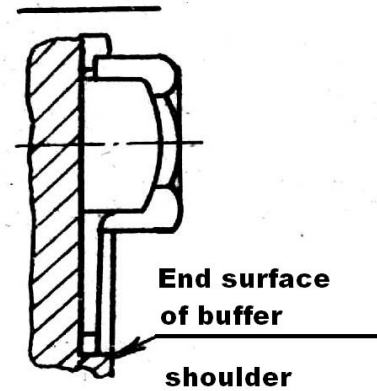
Screw Locking Device of Disconnected Joins

Screw Locking Device by special fasteners



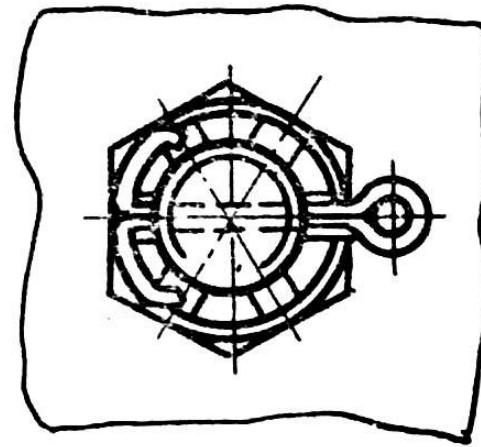
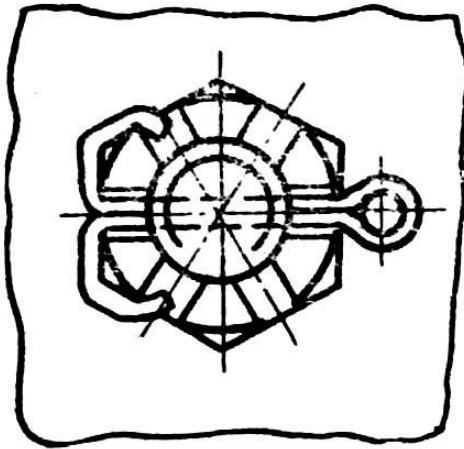
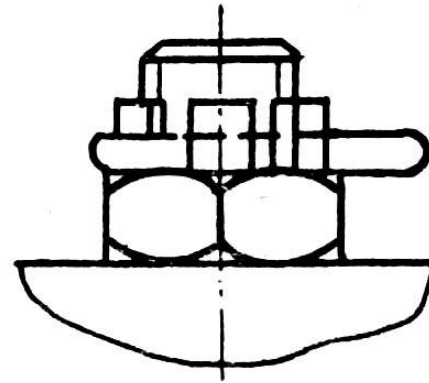
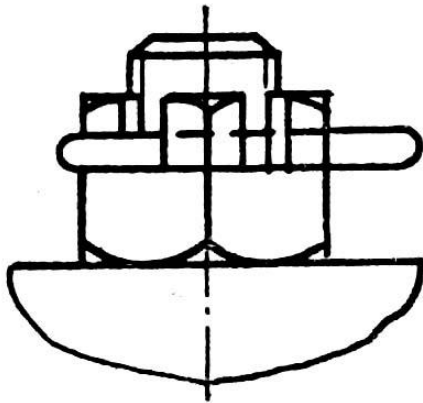
View A returned

Installing the washer on flange



Screw Locking Device of Disconnected Joins

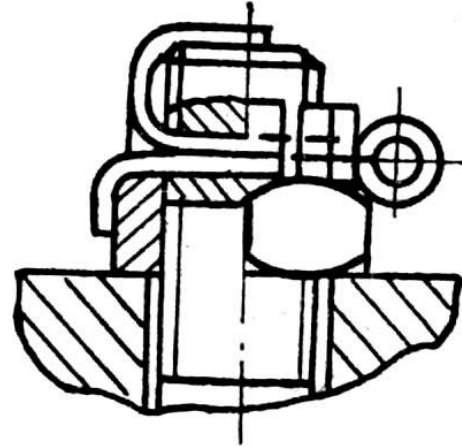
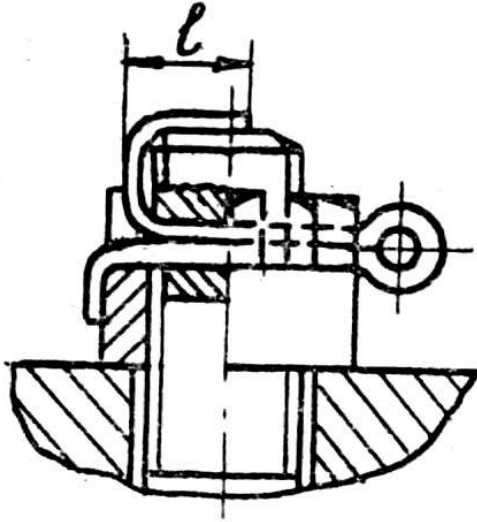
Screw locking device with special fasteners



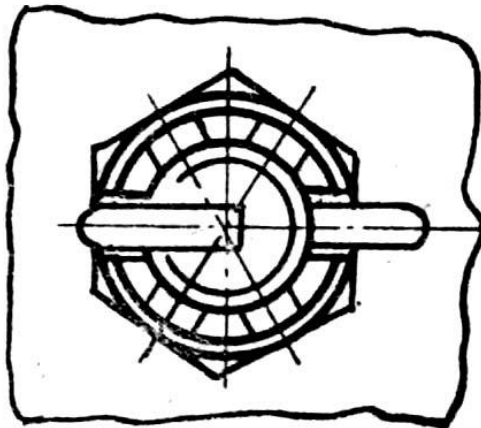
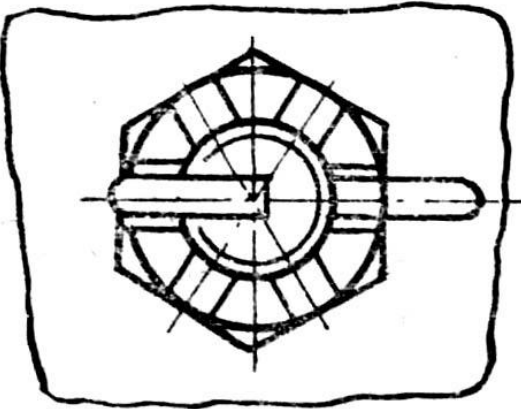
Locking pins, ends of which are scattered, tightly pressed against the faces (cylindrical part) and nuts are folded into the slots nuts

Screw locking device of detachable joints

Screw locking by means of special clampers



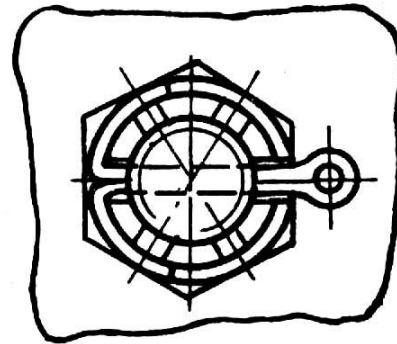
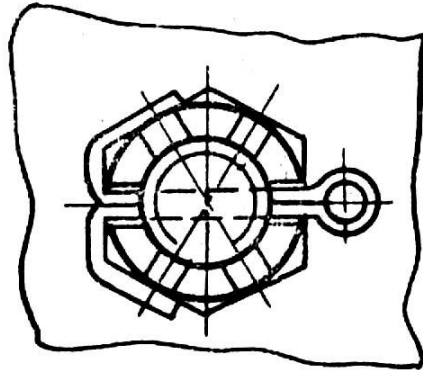
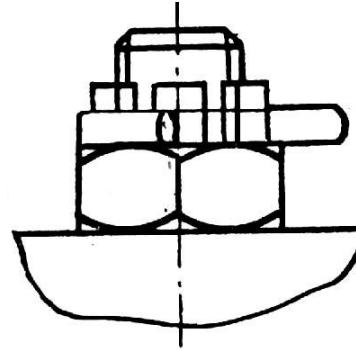
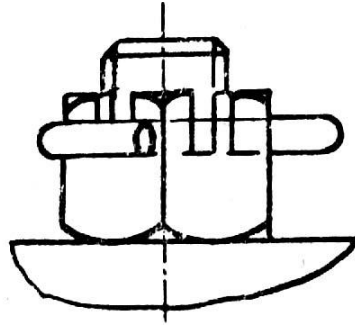
Screw locking by means of splint one end of which is tightly pressed to the bolt front edge and another is pressed to the nut flat.



$$l = 0,5 \div 0,75d$$

Screw locking device of detachable joints

Screw locking by means of special clampers

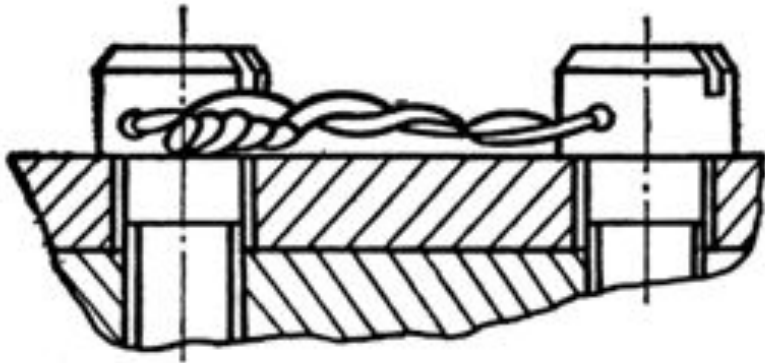


For the use in hard-to-reach places

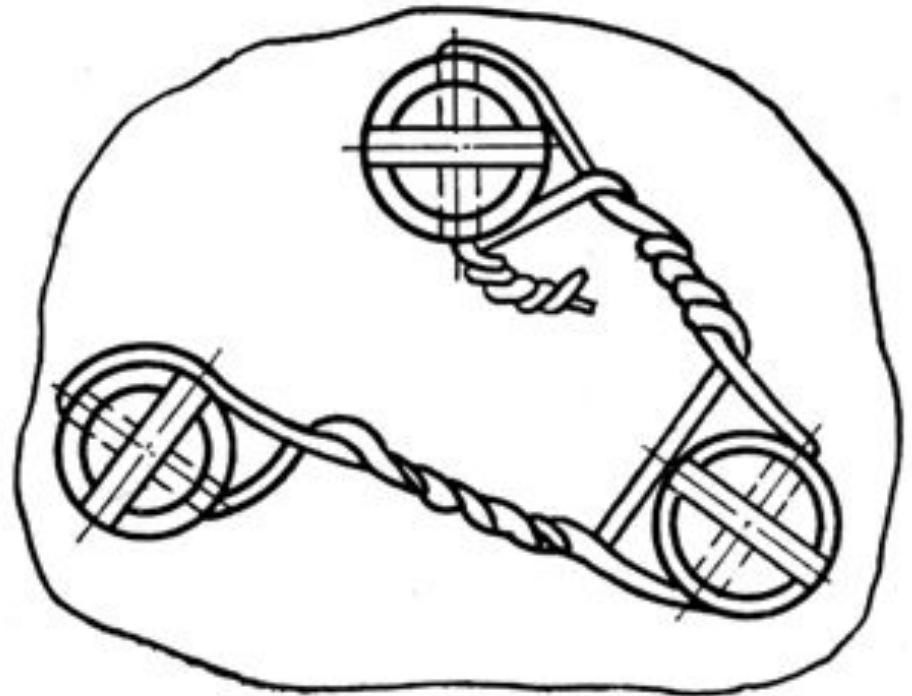
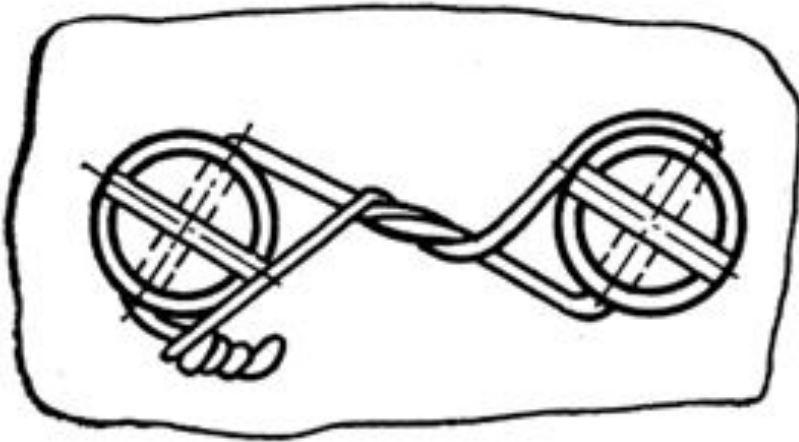
Screw locking by means of splint which ends are opened and tightly pressed to screw nut flats (of the cylindrical parts of nut) and must be folded on the next flat not less than on 2 mm

Screw locking device of solderless connections

Screw locking device by special latches



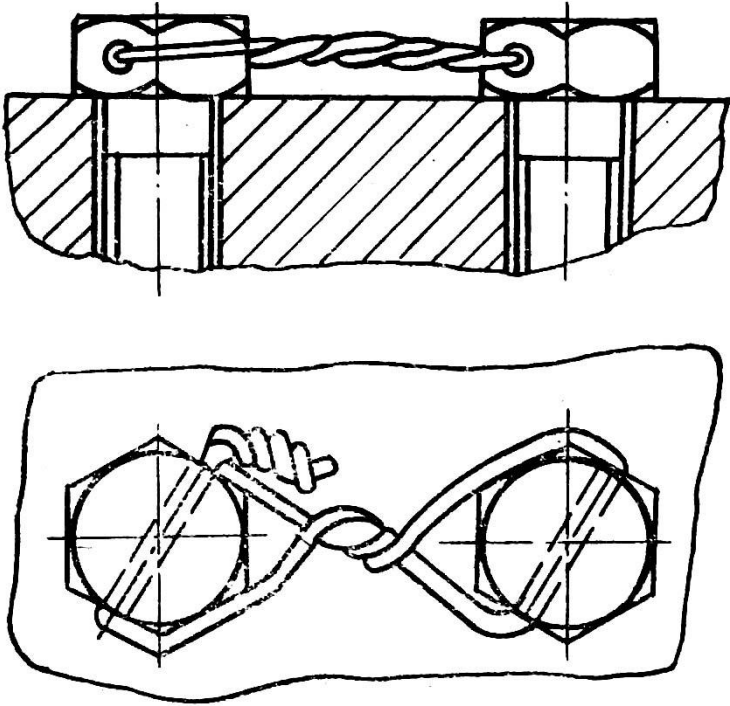
By locking three or more details



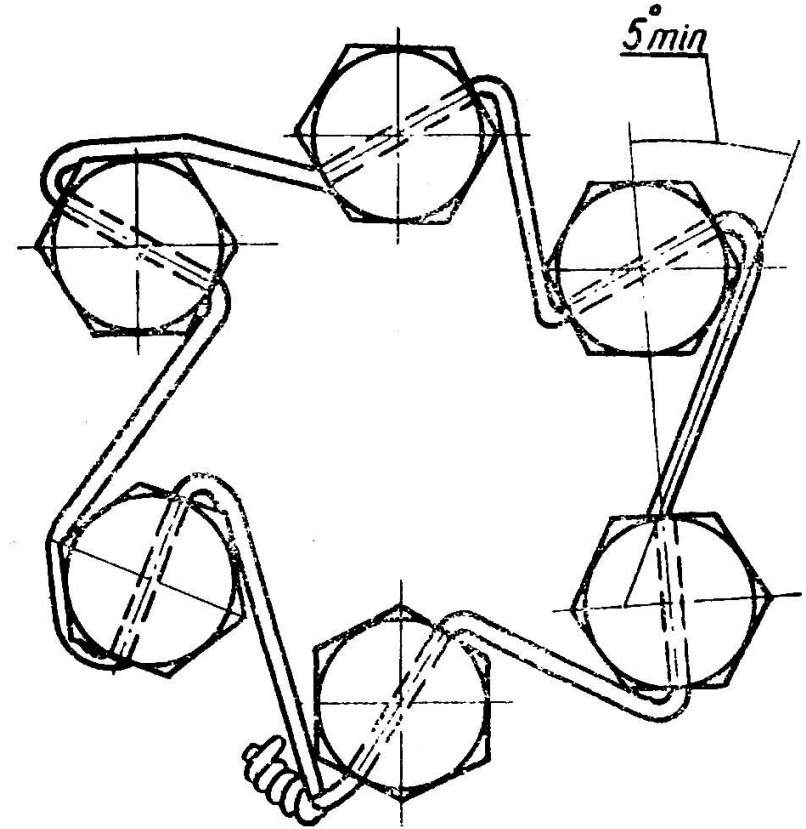
Locking screws with the help of wire

Screw locking device of solderless connections

Screw locking device by special latches



Locking two bolts with the help of wire

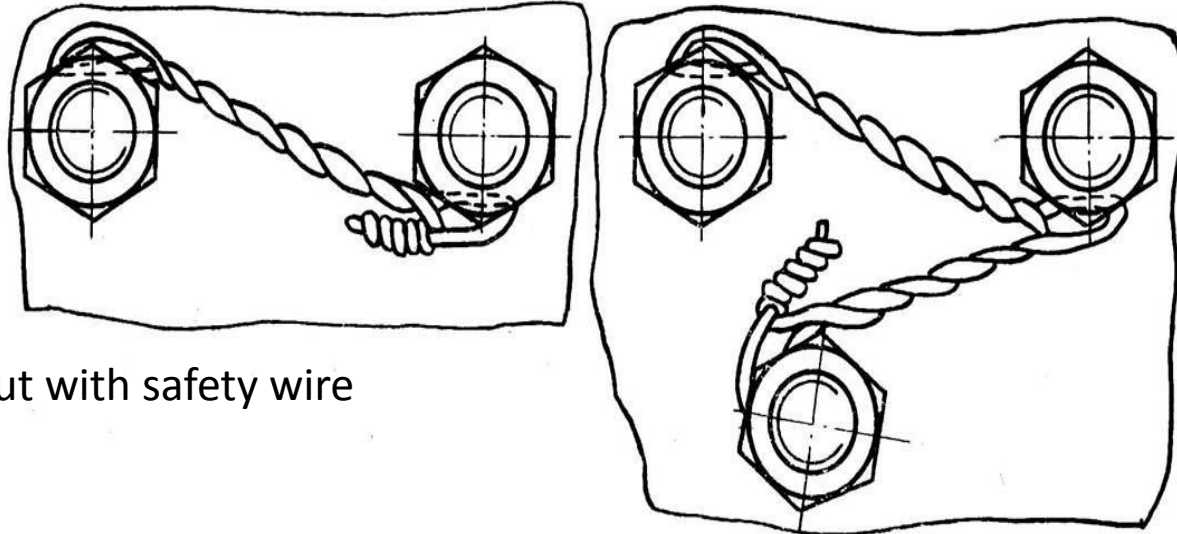


Locking a group of bolts with the help of wire

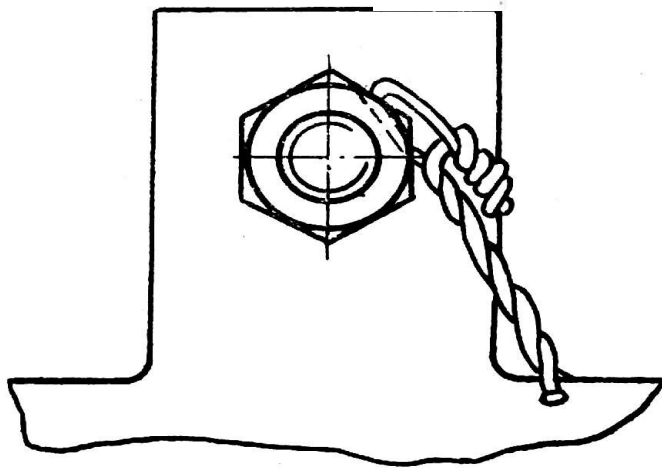
Screw locking devices of disconnected joints

Screw locking device with special fixings

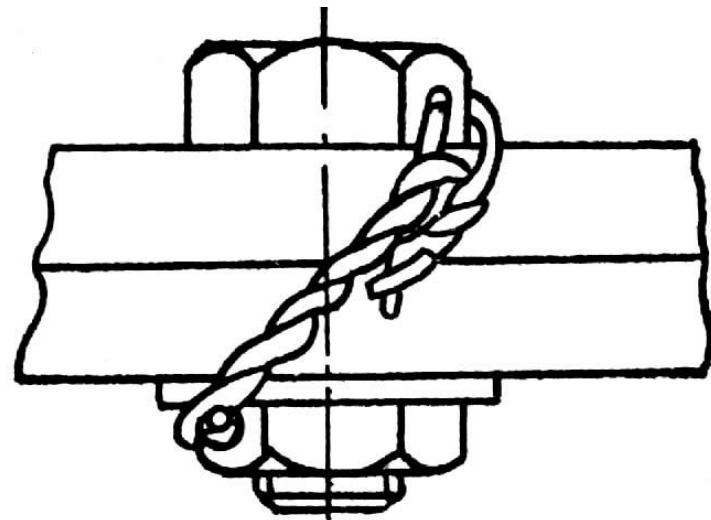
During the plugging of 2 or more details



Plugging of nut with safety wire



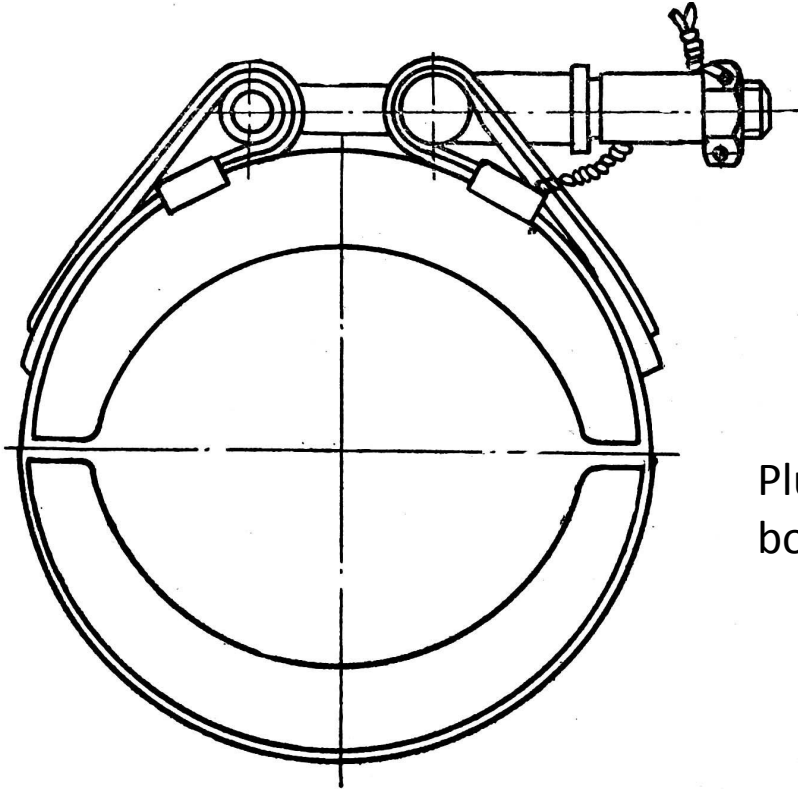
Plugging of single nut with safety wire



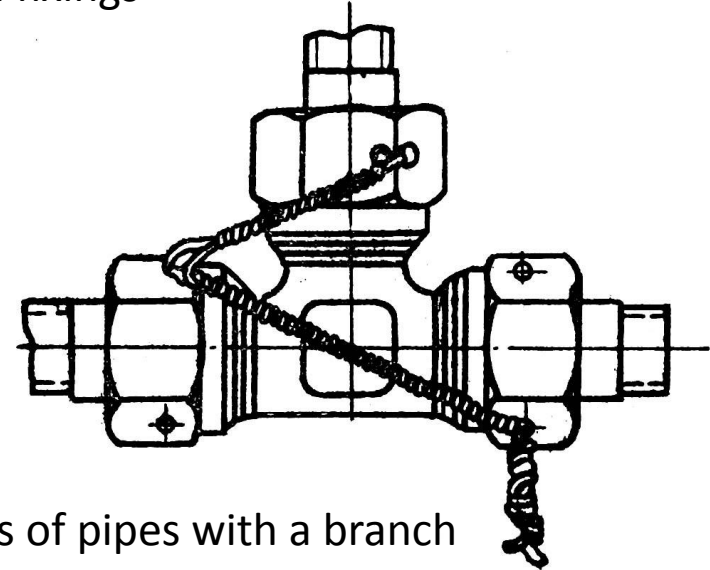
Plugging of screw joint with wire

Screw locking devices of disconnected joints

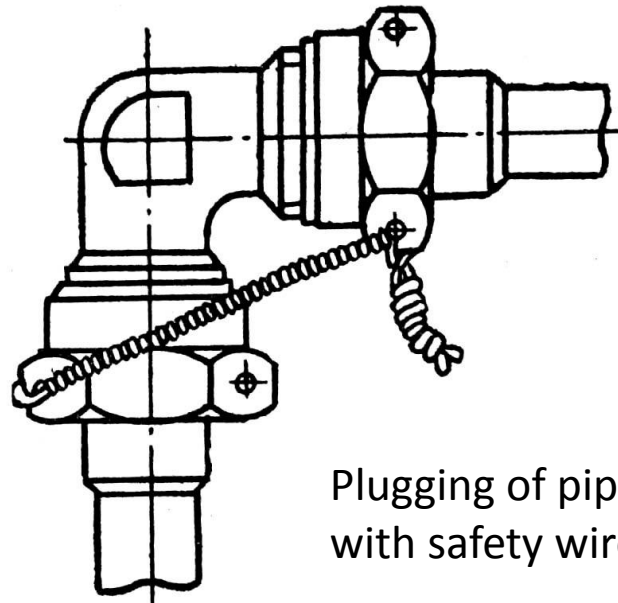
Screw locking device with special fixings



Plugging ring of swiped screws collars



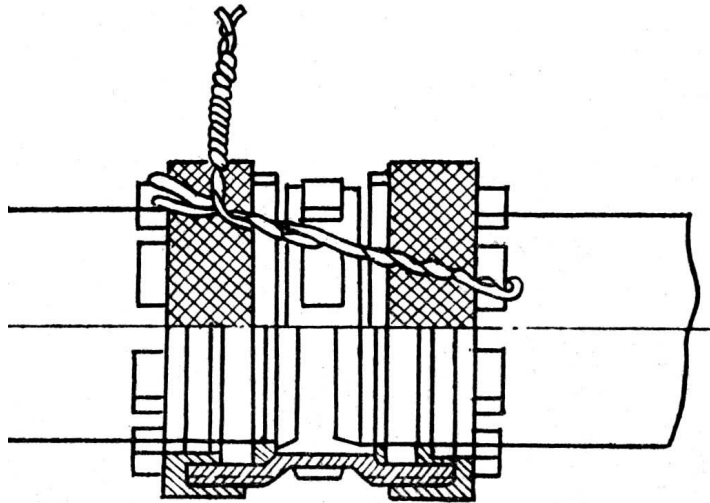
Plugging of joints of pipes with a branch box with safety wire



Plugging of pipes with triangle with safety wire

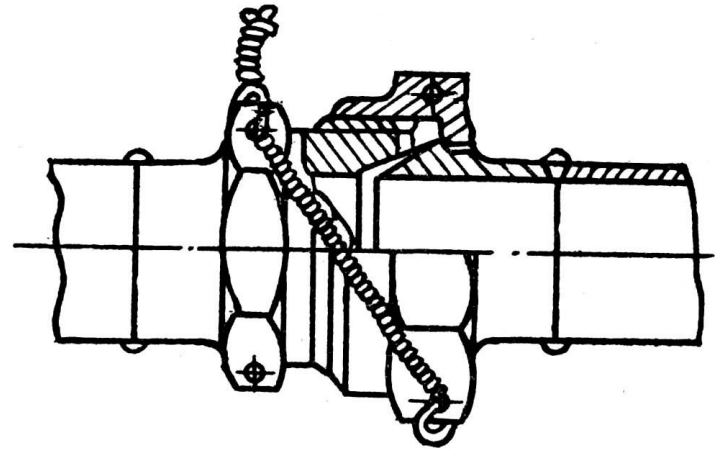
Screw locking device of disconnected joints

Screw locking by special clamps

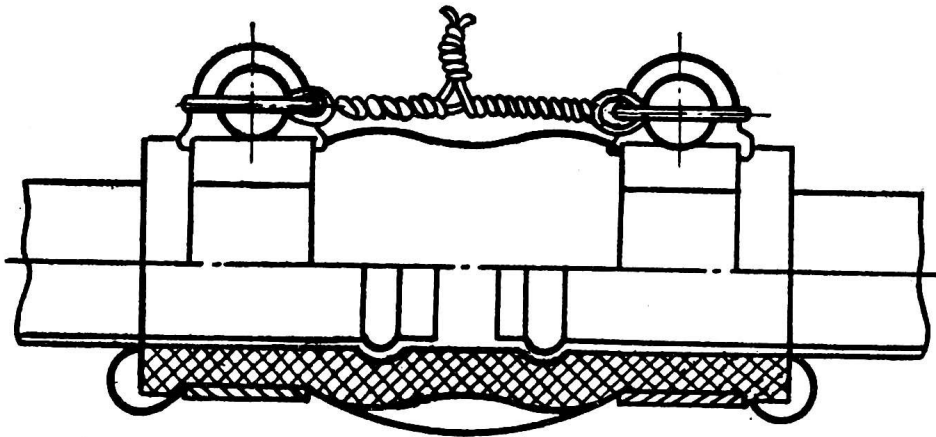


Latching of two pipes by wire

Latching by a wire of nipple connection of pipes

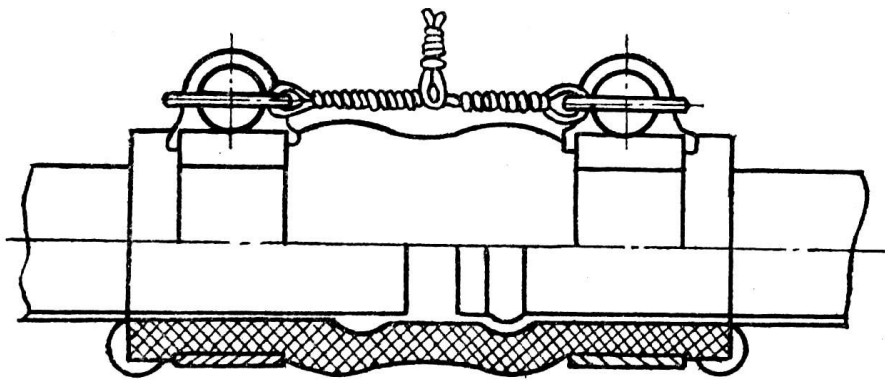


Latching by a wire of flexible connection of two pipes by two collars

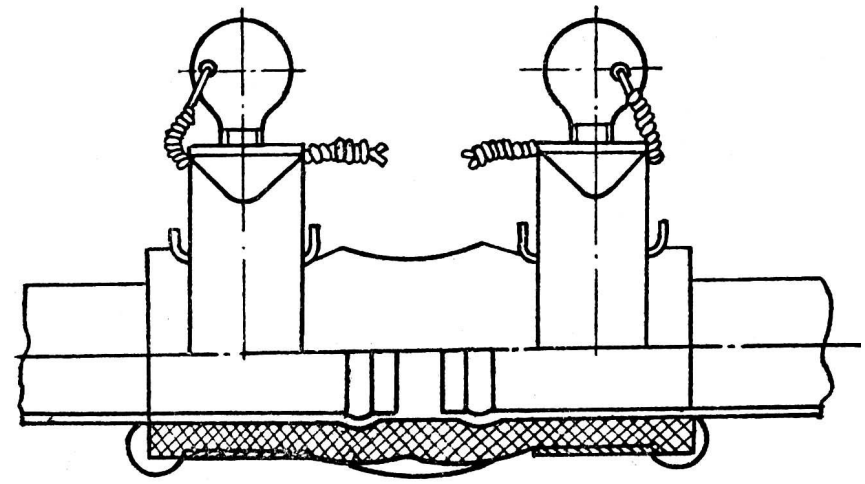


Screw locking device of disconnected joints

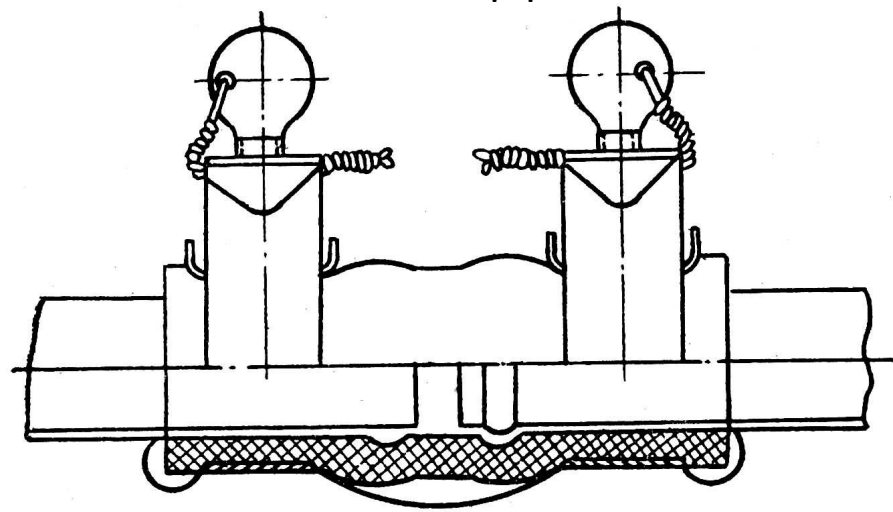
Screw locking by special clamps



Latching by a wire of flexible connection of a pipe with armature



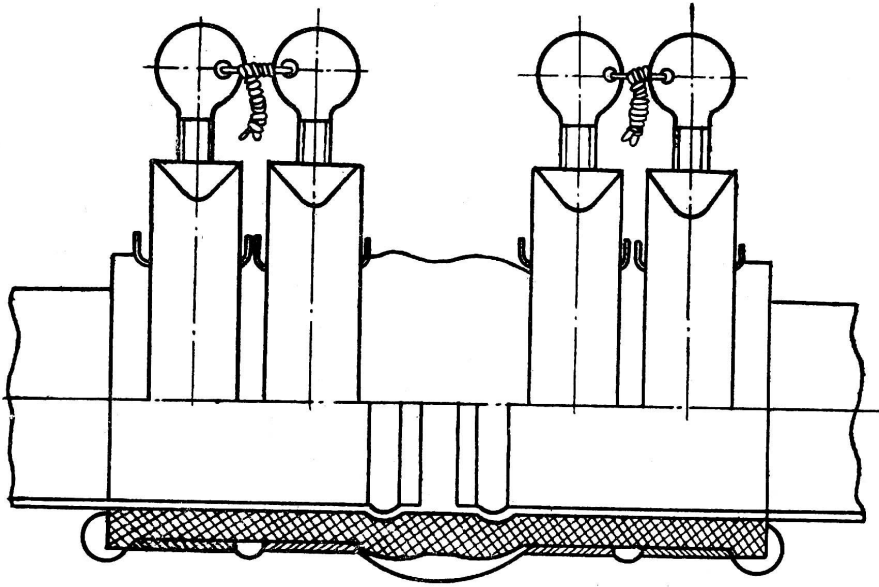
Latching by a wire of flexible connection of two pipes by a muff and two collars



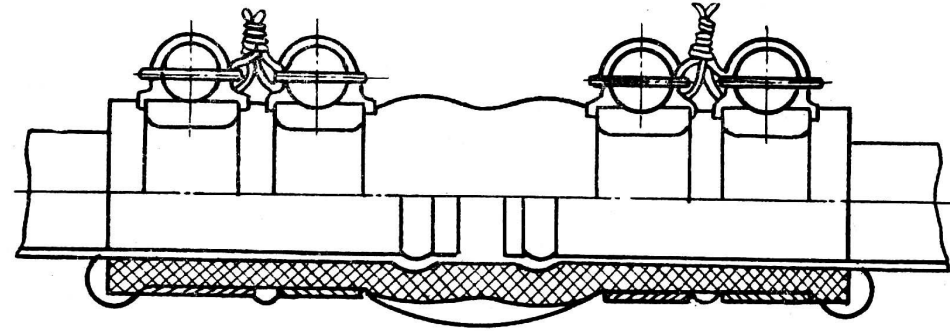
Latching by a wire of flexible connection of a pipe with armature

Screw-locking device of disconnected joinings

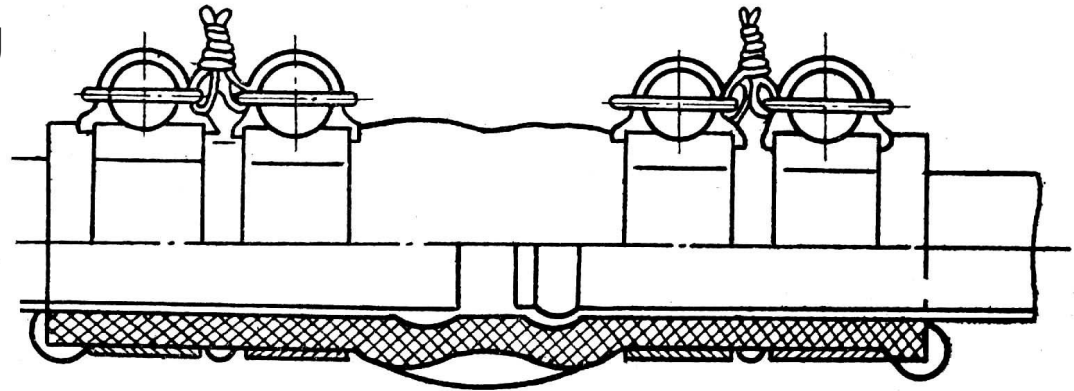
Locking with the help of special fixers



Flexible-connection wire locking of pipeline with the help of coupling and clamp



Flexible-connection wire locking of two pipes with the help of coupling and four clamps



Flexible-connection wire locking of the pipe and armature with the help of coupling and 4 clamps