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(54) Improvements relating to a set of clamps for a structure of cylindrical rods

(57) A clamp for joining rods, tubes, or the like comprises a closable clamp body having at least two sockets, each of which is capable of receiving rods extending in at least two perpendicular directions. The clamp may be made of two halves 1,2 which are effectively identical except for the conformation of threaded hole 3 in 1 whilst hole 4 in 2 is plain. When the halves are held by a screw through holes 3 and 4, surfaces 5 can grip a horizontal rod and 6 one or more vertical ones.

An additional socket 8, for vertical rods only may be provided (Fig. 5).

A supplementary clamp is shown in Fig. 9. This comprises two half-cylinders 10,11 urged together by screw 14 to grip a rod etc. 15 and, via jaws 12, the grooves 7 on the double and triple clamps in Figs. 1 and 5.

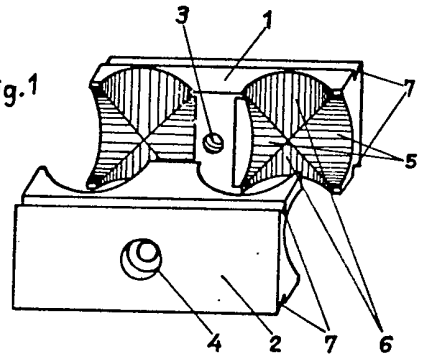

Fig.1

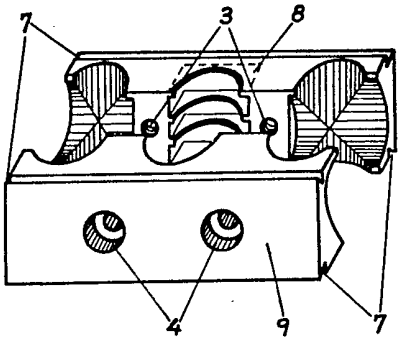

Fig.5

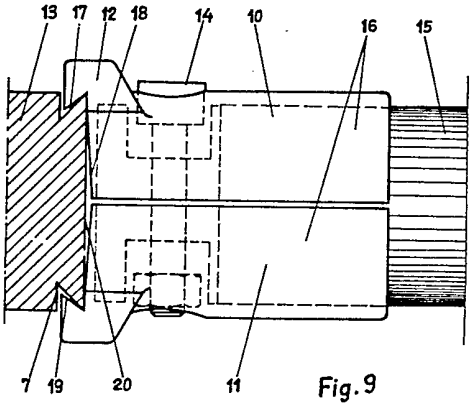

Fig.9

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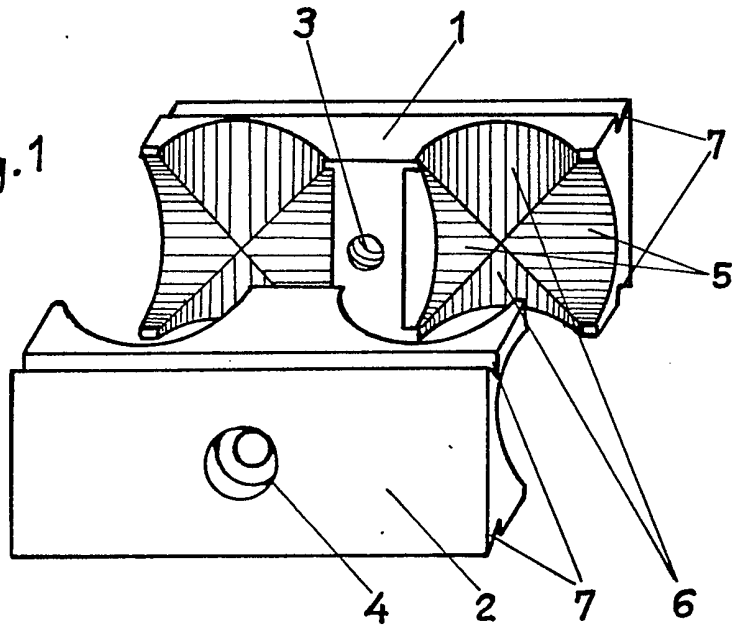
The drawing(s) originally filed was/were informal and the print here reproduced is taken from a later filed formal copy.

Fig.1



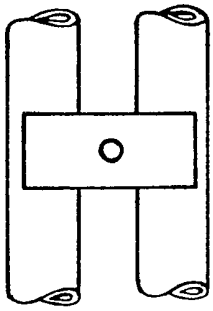


Fig. 2

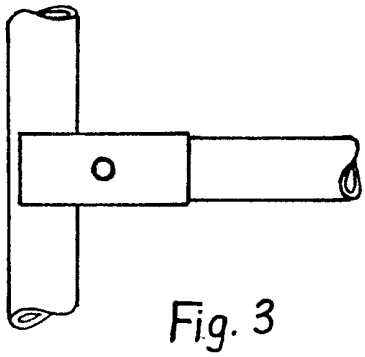


Fig. 3

Fig. 4

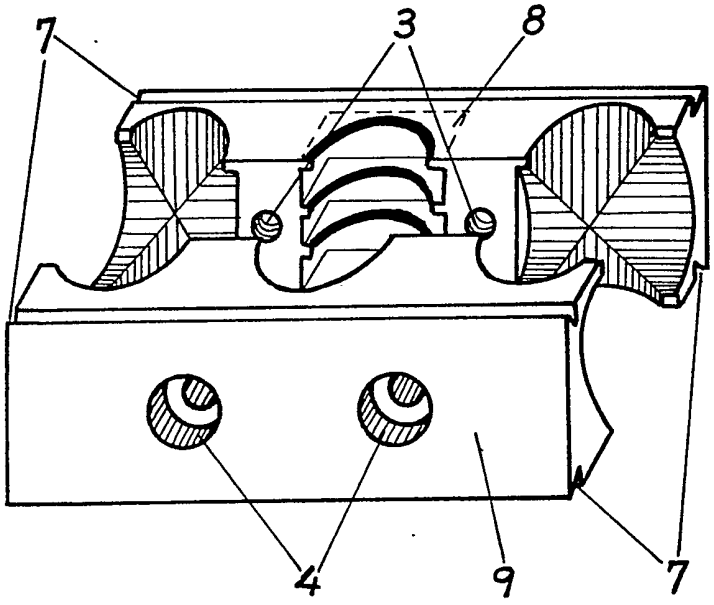


Fig.5

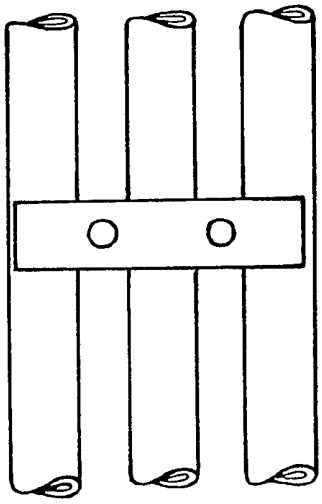


Fig.6

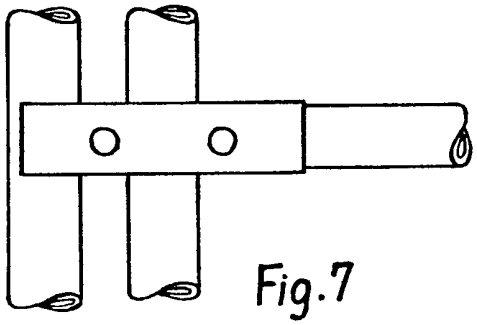


Fig.7

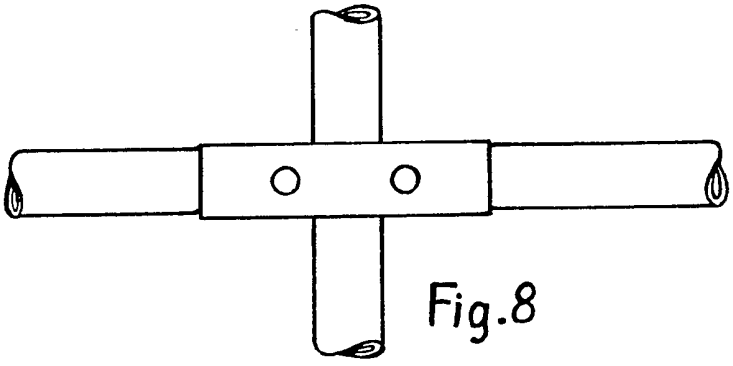


Fig.8

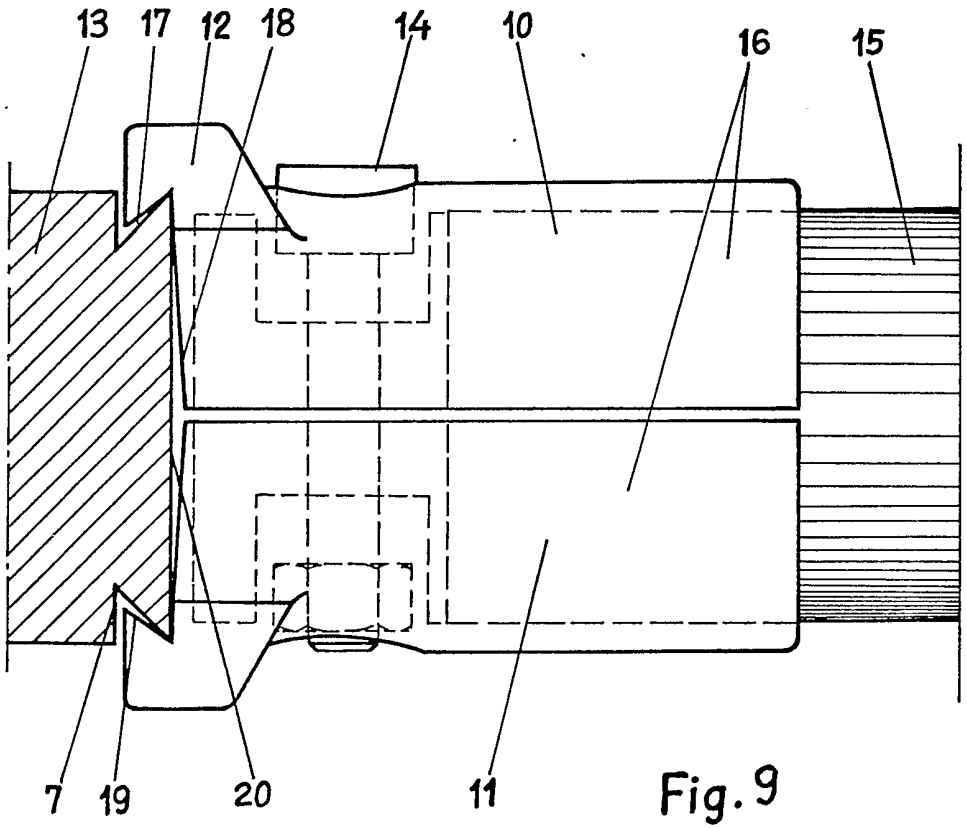


Fig. 9

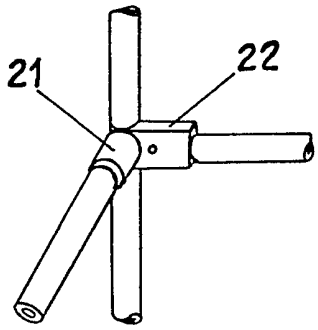


Fig.10

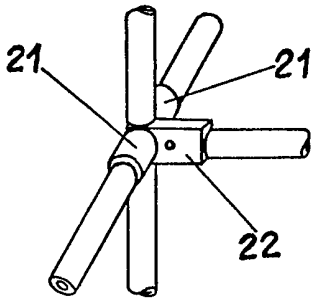


Fig.11

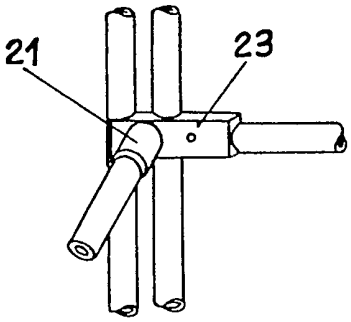


Fig.12

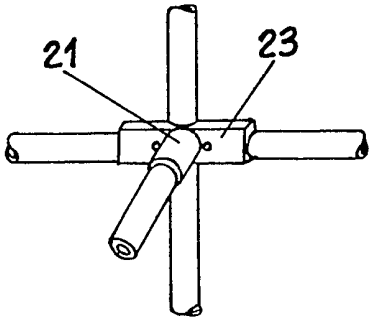


Fig.13

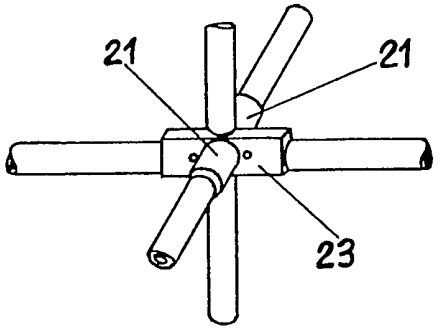


Fig.14

SPECIFICATION

Improvements relating to a set of clamps for a structure of cylindrical rods

This invention relates to clamps, especially to clamps for rods or pipes.

It also concerns a set of clamps, which are preferably of three types, which will be referred to herein as single, double and triple. The double and triple clamps can be used by themselves, that is to say they can alone provide certain types of joint, or may be used in conjunction with the single clamps, whereas the single clamps are not intended to be used separately, being in general always combined with double or triple clamps, depending on the configuration of the joint which it is intended to create.

According to the invention we provide a clamp for joining rods, tubes, or the like (herein called "rods") comprising a closable clamp body having at least two sockets for rods, each of said sockets being capable of receiving rods extending in at least two perpendicular directions.

In order to understand the characteristic features of the set of clamps which is the object of the invention, drawings are attached which must be regarded as intended by way of example only, allowing a wide range of options and in no way restricting the system. In the said drawings:

Figure 1 is an exploded perspective view of a double clamp according to the invention.

This clamp is designed to provide joints between two rods. The rods can be connected in parallel, at right angles to one another, or end to end, as shown respectively in Figs. 2, 3 and 4.

The clamp body comprises two halves 1 and 2 which are for practical purposes identical, with the sole difference that the first half 1 has a threaded bore 3 in its central area while the second half 2 has a corresponding plain bore 4, a difference which is absent if the clamp is closed by a conventional nut and bolt system, which detracts from the aesthetic appearance of the clamp.

When the clamp is closed by a bolt passed through the plain bore 4 and screwed into the threaded bore 3, there is formed on either side of the central area a holder having sockets to receive the ends of two rods at right-angles to each other, the axes of the sockets intersecting at the centre of the holder cavity. To form these holders each clamp part 1 has a cavity provided with part-cylindrical hollows of the same diameter as the outside diameter of the rods. Three such hollows are preferably provided, two being coaxial and the third extending perpendicular to them. All this allows the clamp to grip both vertical and horizontal rods. Whilst the vertical rods (which are perpendicular to the longitudinal direction of the clamp) can pass through the clamp by virtue of the aligned hollows mentioned above, an end of the horizontal rod (parallel with the longitudinal direction of the clamp) must be within the clamp, penetration of this rod into the clamp being limited by the central area of the clamp through which the locking bolt passes. The vertical rods will remain clamped by the walls 6 of the parts 1 and 2 while the horizontal rods will be clamped by the walls 5.

Both parts 1 and 2 are preferably provided with grooves 7 extending longitudinally and on the upper and lower faces of the parts 1, 2, the purpose of which grooves will be explained hereinafter.

Figures 2, 3 and *4* are schematic representations of the various joints which can be made using the double clamps and two rods.

Figure 5 is an exploded perspective view of a triple clamp.

Like the double clamp, the triple clamp is designed so that its ends are capable of gripping a rod which is at right-angles to the longitudinal direction of the clamp and also a rod which is parallel to that direction, but the centre area of the clamp is only capable of gripping a rod which is perpendicular to the longitudinal direction of the clamp.

It also comprises two halves 8 and 9 and the difference between them, as in the case of the double clamp, resides in the bores 3 and 4 and, in the same way as in the double clamp, the upper and lower faces of the two have longitudinally extending grooves.

The difference as compared with the double clamp is that the triple clamp, in the closed position, has a central cylindrical socket the axis of which is perpendicular to the longitudinal direction of the clamp and that, being restricted by the two central areas through which the locking bolts pass, this cavity is only capable of gripping rods which extend at right-angles to the longitudinal direction of the clamp.

Figures 6, 7 and 8 show schematically the joints which can be made using the triple clamp and three rods, the axes of which are all in the same plane.

Figure 9 shows the single clamp and the way in which it is used.

The single clamp is a sleeve which consists of two internally-cylindrical halves 10 and 11 which are of the same diameter as the outside of the rod which is being clamped, the said parts being provided with jaws 12 which engage in the grooves 7 of the double or triple clamps 13. They are designed to be locked to each other by a bolt 14 passed through one half and screwed into the other, or as shown, by means of a nut and bolt.

In contrast to the double and triple clamps, this clamp not only grips the rod, but grips both the double or triple clamp 13 by means of the jaws 12 and the rod 15 which is at

right-angles to the plane formed by the rods which are clamped by the clamp 13.

The walls 17 of the jaws 12 and 18 at the ends of the halves 10 and 11 form an angle which is slightly greater than that formed by the walls 19 and 20 of the double or triple clamps 13, which is necessary to accommodate the normal tolerances on the outside diameter of the rods 15, the walls 17 of jaws 12 remaining in contact with those 19 of the grooves 7 when the diameter of the rod 15 is at its maximum, that is to say when the tolerance is at its maximum and the walls 18 are in contact with those 20 of the clamp 13, when the rod 15 is of the minimum size, that is to say when the tolerance is at the minimum.

Figures 10, 11, 12, 13 and 14 show schematicaly the most usual joints which can be made using double clamps 22 and triple clamps 23 in conjunction with one or two single clamps 21.

CLAIMS

1. A clamp for joining rods, tubes, or the like (herein called "rods") comprising a closable clamp body having at least two sockets for rods, each of said sockets being capable of receiving rods extending in at least two perpendicular directions.

2. A clamp according to claim 1, wherein the clamp body comprises two substantially-similar halves.

3. A clamp according to claim 2, wherein each of said two sockets is formed by cooperating cavities in the two clamp body halves, each cavity having part cylindrical hollows extending in two perpendicular directions.

4. A clamp according to claim 2 or 3 wherein each half includes at least one hole to receive a bolt to enable the clamp body to be closed.

5. A clamp according to claim 1, wherein the bolt holes are located between said two sockets.

6. A clamp according to any preceding claim, wherein a third socket, which is capable of receiving either one rod or two coaxial rods only, is located between said two sockets.

7. A clamp according to any preceding claim, including means whereby at least one other rod can be attached thereto extending perpendicular to all rods clamped in said two sockets.

8. A clamp according to claim 7, wherein said means includes a sleeve formed in two halves, means for clamping the two sleeve halves together with an end of a rod held between them, and gripper means on the sleeve halves for gripping cooperating surfaces on the clamp body when the sleeve halves are clamped together.

9. A clamp according to claim 7, wherein the gripper means comprises a pair of jaws, each being provided at one end of one of the sleeve halves, and the cooperating surfaces on the clamp body comprise a pair of spaced, parallel grooves for receiving these jaws.

10. A clamp according to any preceding claim and substantially as herein described, with reference to the drawings.

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