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MEANS FOR REMOVING AND SEALING THE BOTTOM
OF A VESSEL ADAPTED FOR HIGH PRESSURE
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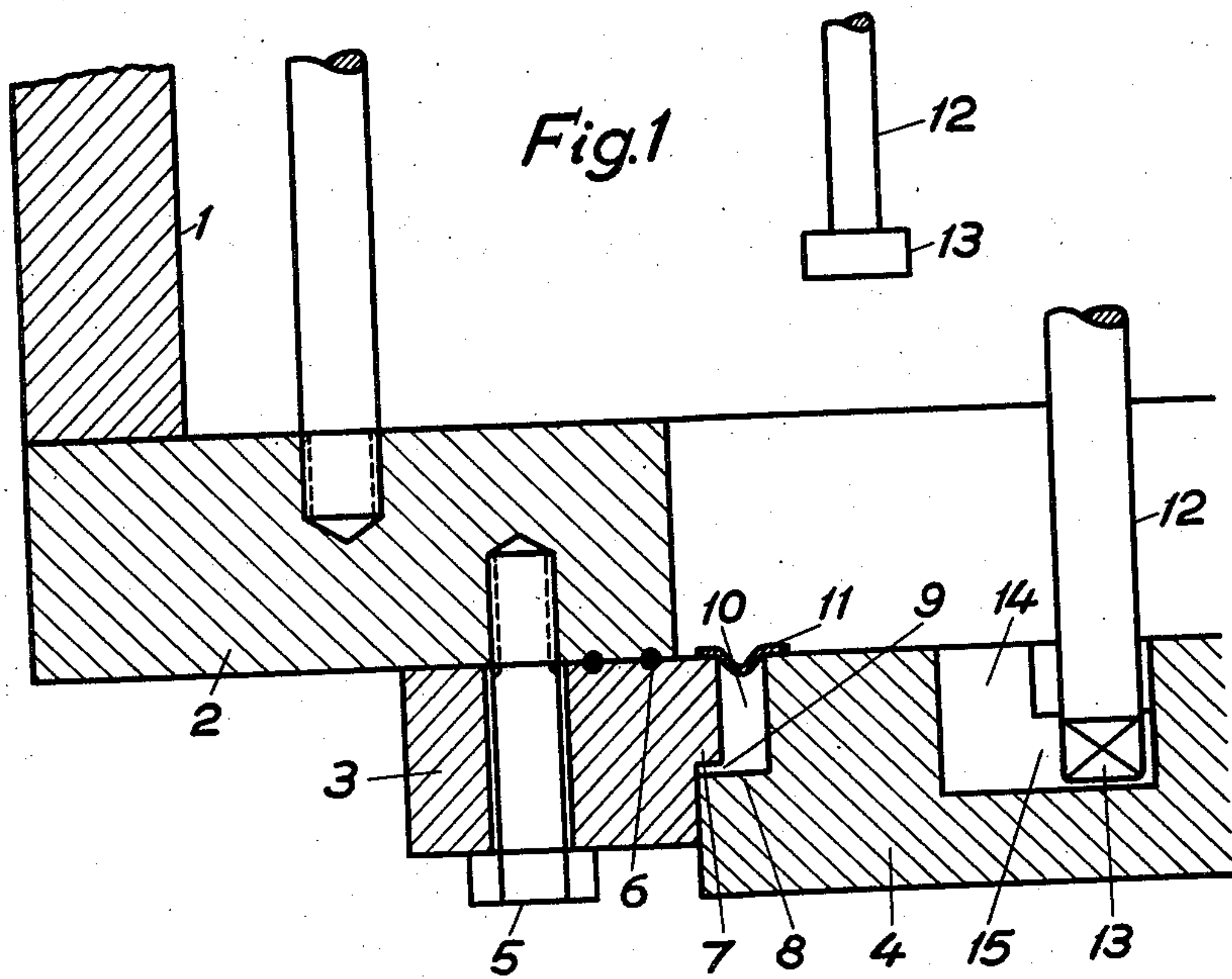


Fig.4

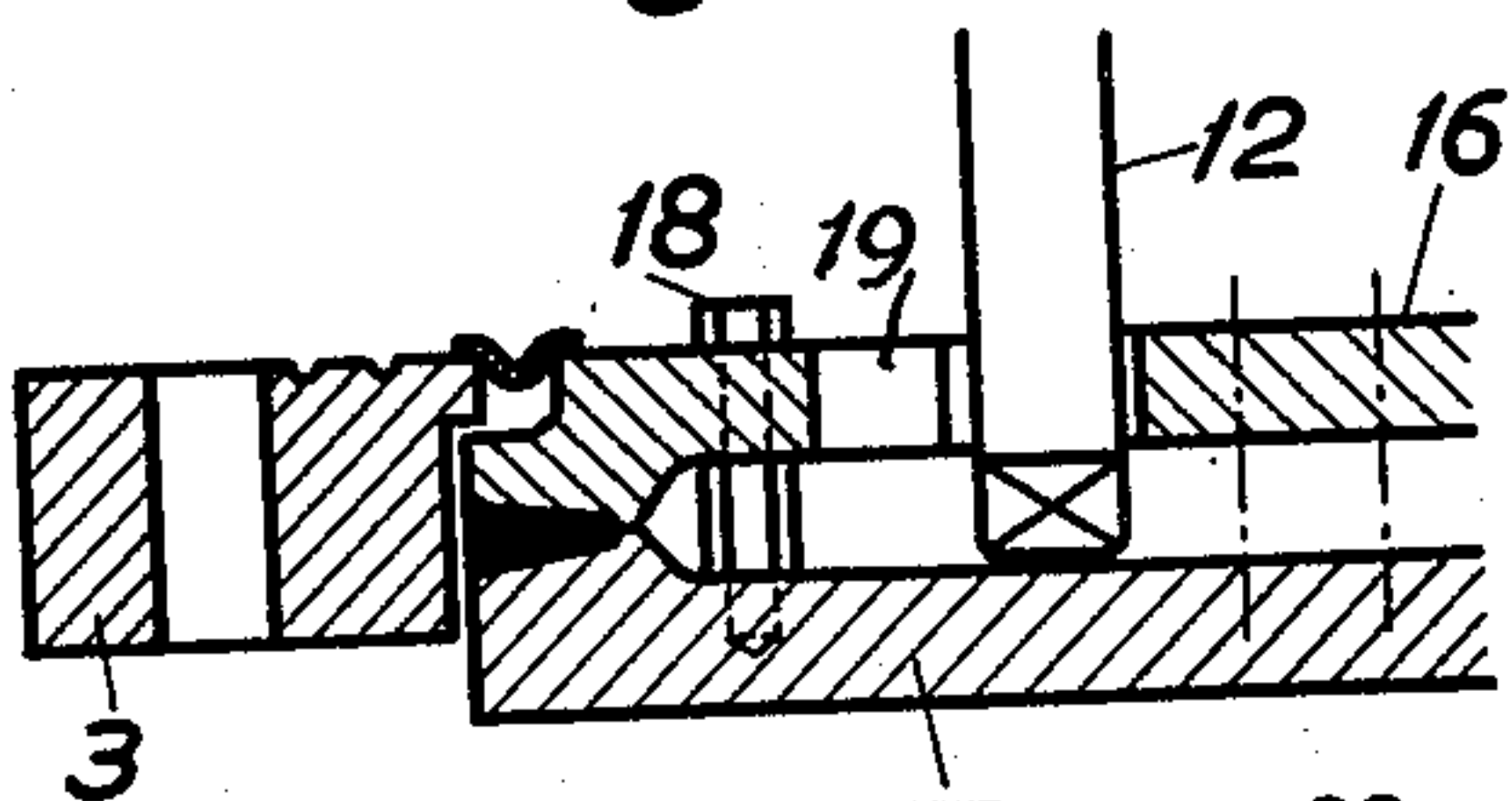


Fig.2

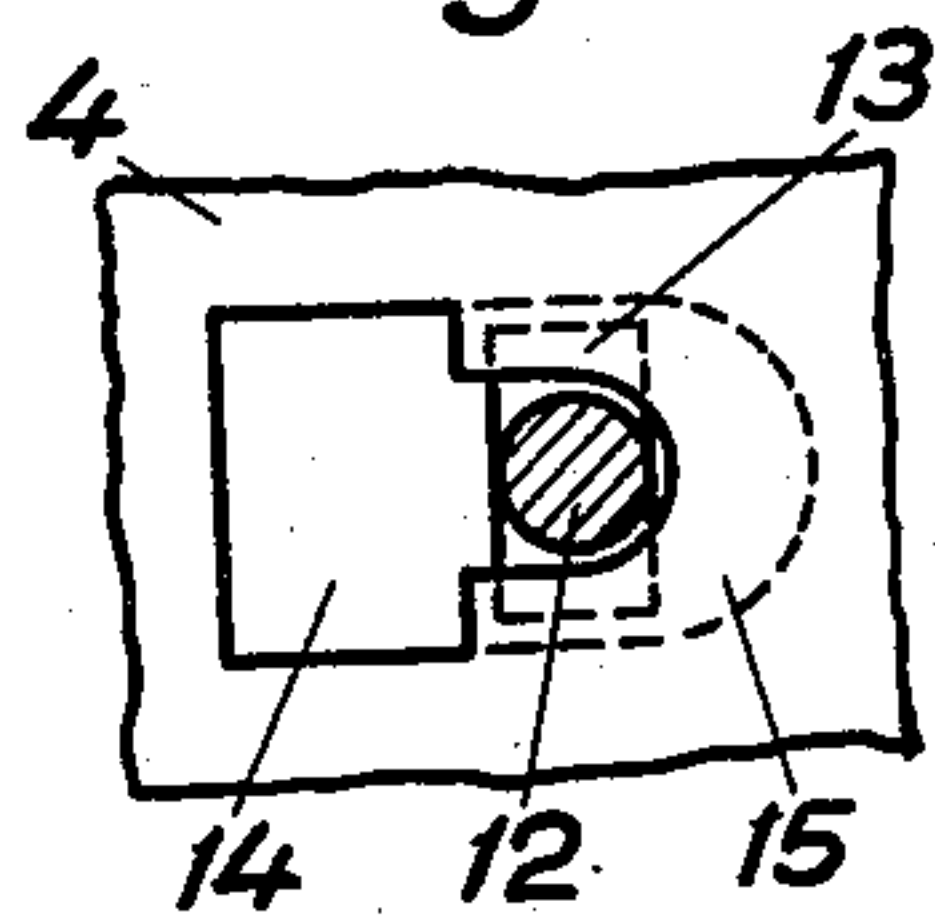
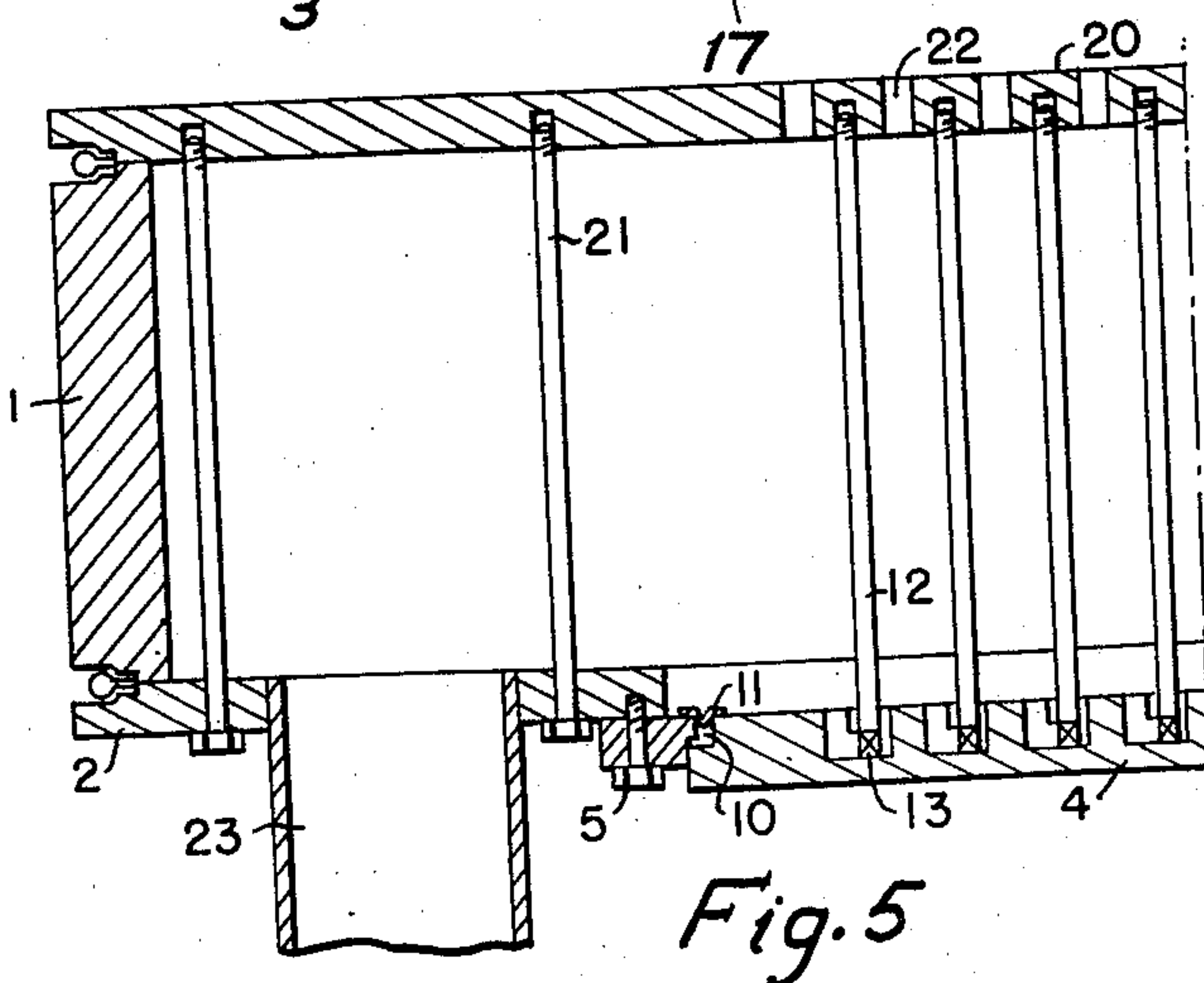
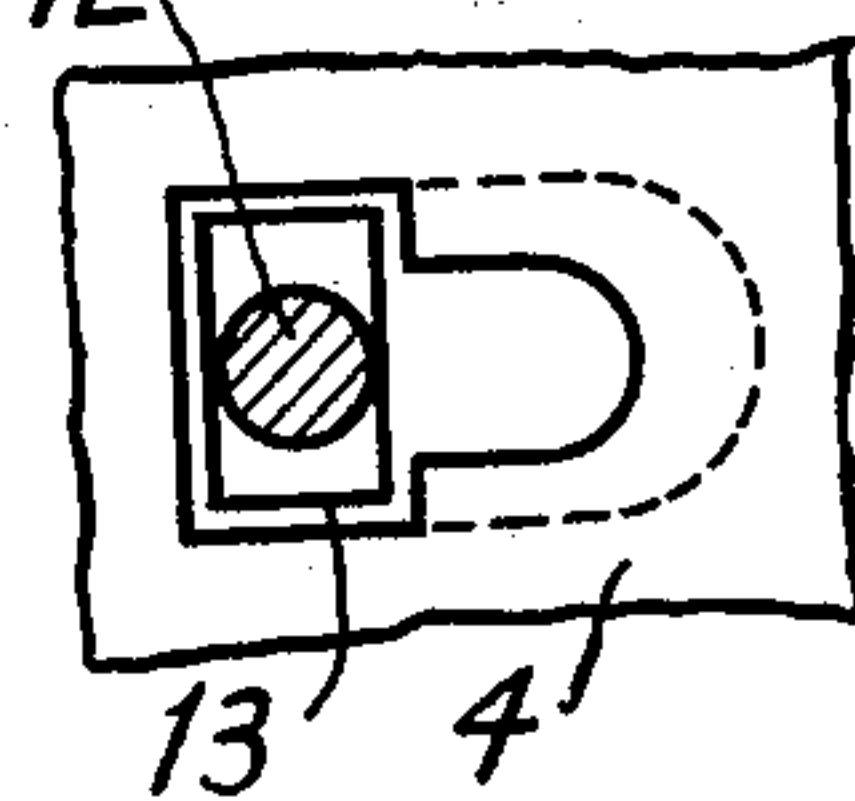


Fig.3



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MEANS FOR REMOVING AND SEALING THE BOTTOM OF A VESSEL ADAPTED FOR HIGH PRESSURE

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3 Claims. (Cl. 220-55)

Containers which are under high pressure are in some cases made in the form of shallow, preferably cylindrical, vessels with plane covers and bottoms. Such vessels have to be absolutely pressure-tight, but at the same time it is necessary for certain reasons that the cover or the bottom can be removed in a simple manner. In order to give the vessel the necessary strength, the cover and the bottom are held together by a plurality of bolts.

The invention relates to a construction by which the bottom of the vessel may be removed and replaced in a simple way.

The principal feature of the invention is that the bolts and the bottom are arranged in such a way that when the bottom is to be removed the pull of the bolts on the bottom is cancelled by displacing the bottom radially.

According to the invention an arrangement for removing and sealing the bottom of a circular high pressure container of large diameter which bottom is held pressed against the wall of the container by bolts fixed in the cover of the container, is characterised in that the lower ends of the bolts are formed with hammer heads, that the bottom consists of an outer part fixed on the cylindrical wall, a ring flange attachable to said outer part, and the actual bottom part, which is inserted in the ring flange with limited axial play, the latter two parts being sealed together by a resilient sealing means, and that the actual bottom part has grooves, the upper cross-section of which corresponds to the cross-section of the bolt shank and the hammer head, while the lower portions of the grooves are enlarged for receiving the heads when the bottom parts are displaced radially.

Various embodiments of the invention will now be described by way of example with reference to the accompanying drawing, in which

Figure 1 is a sectional view of a corner of a container,

Figures 2 and 3 show the position of a bolt with respect to the bottom,

Figure 4 shows a modified form of the invention, and

Figure 5 is a vertical section showing a part of a complete container embodying the means according to Figures 1, 2, 3.

Referring to Figure 1, the wall of the container is designated by 1. The bottom is assumed to consist of a ring shaped part 2, a ring flange 3 and the actual bottom 4. The ring flange 3 is fixed to the part 2 by screws 5 and is sealed thereto by means of conventional sealing means, such as aluminium wires 6, and it has a shoulder 7 on its inner side. The bottom 4 has a flange 8. When the bottom 4 is inserted into the container, there is a small amount of play 9 between the opposite surfaces of the shoulder 7 and the flange 8. The gap 10 between the ring flange 3 and the bottom 4 is bridged by a resilient sealing member 11 of thin sheet, the cross-section of which is formed by a small semi-circular portion and two diametrically opposed flanges which are attached, preferably by projection welding, to the parts 3 and 4, respectively. Due to the small diameter of the semi-circular portion the sealing means 11 withstands high pressure.

A large number of bolts 12 hold together the cover (see Figure 5), and the bottom 4 of the container. Each bolt is provided with a head 13 of rectangular cross-section, shown on a smaller scale above Figure 1.

In the bottom 4 there are grooves 14, the upper cross-section of which corresponds to the cross-section of the bolt shank plus the cross-section of the head. The bottom of the groove 14 is enlarged to form a space 15 which receives the bolt head 13 when the parts 3 and 4 are displaced to the left, as shown in Figures 1 and 2. When the bottom is to be removed, the screws 5 are unscrewed, the bottom 4 is lifted as much as the play 9 allows and is displaced to the right, as shown in Figure 3, so that the bolt heads 13 lie in the grooves 14. When the bottom is to be inserted in the container, the reverse procedure is adopted.

The above described container has the disadvantage that manufacture of the grooves 14 and spaces 15 is a costly and time-consuming operation.

Figure 4 illustrates how the manufacture can be simplified. In this figure the bottom 4 consists of two plates 16 and 17 arranged in spaced parallel relationship, the distance between the plates being somewhat larger than the depth of the bolt heads. The upper plate 16 is provided with a hole 19, the cross-section of which corresponds to the cross-section of the bolt shank and the bolt head. The lower plate 17 is solid. The plates are welded together along their periphery and held together by means of a large number of bolts 18 threaded into the plate 17.

Figure 5 illustrates a part of the container comprising the arrangement according to Figures 1, 2, and 3 and showing the bottom 4 and the cover 20 held together by the bolts 12 and with the ring shaped portion 2 of the bottom secured to the cover by bolts 21. For the removal of the bottom 4, the bolts 5 are unscrewed and the parts 3 and 4 are displaced toward the right as indicated by the arrow so that the bolt heads will lie below the grooves 14 and the bottom 4 can then be moved downwardly. The same arrangement is applied in the modified arrangement according to Figure 4. In the drawing outlet openings 22 are shown in the cover 20 of the container and inlet tubes 23 are provided for the pressure medium.

I claim as my invention:

1. Arrangement for removing and sealing the bottom of a cylindrical high pressure container of large diameter, which bottom is held pressed against the wall of the container by bolts fixed in the cover of the container, wherein the ends of the bolts are formed with hammer heads, wherein the bottom consists of an outer ring shaped part fixed on the cylindrical wall, a ring flange attached to said outer part, and the actual bottom part which is inserted in the ring flange with limited axial play, the latter two parts being sealed together by a resilient sealing means and wherein the actual bottom part has grooves the upper cross-section of which corresponds to the cross-section of the bolt shank and the hammer head, while the lower portions of the grooves are enlarged for receiving the heads when the bottom parts are displaced radially.

2. Arrangement for removing and sealing the bottom of a cylindrical high pressure container of large diameter, which bottom is held pressed against the wall of the container by bolts fixed in the cover of the container, wherein the ends of the bolts are formed with hammer heads, wherein the bottom consists of an outer ring shaped part fixed on the cylindrical wall, a ring flange attached to said outer part, and the actual bottom part which is inserted in the ring flange with limited axial play, the latter two parts being sealed together by a resilient sealing means wherein the actual bottom part consists of two parallel plates, one of which is provided with

3

holes having a cross-section which corresponds to the cross-section of the bolt shank and the bolt head, and wherein the plates are spaced apart a distance which is somewhat larger than the depth of the bolt heads and are welded together along their periphery and held together by means of bolts.

3. Arrangement for removing and sealing the bottom of a high pressure container of large diameter having a cylindrical side wall, which bottom is held pressed against the said cylindrical wall of the container by bolts fixed in the cover of the container, wherein the lower ends of the bolts are formed with hammer heads, wherein the bottom comprises an outer ring shaped part fixed on the said cylindrical wall, a ring flange attached to said outer part, and the actual bottom part which is inserted

4

in the ring flange with limited vertical play, the actual bottom part having an outer flange on its lower side surface, and the said ring flange having an inner shoulder overlapping the said outer flange, and wherein the ring flange and the actual bottom are sealed together by a resilient sealing means and wherein the actual bottom part has undercut portions so as to form abutments for receiving the said hammer heads.

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