

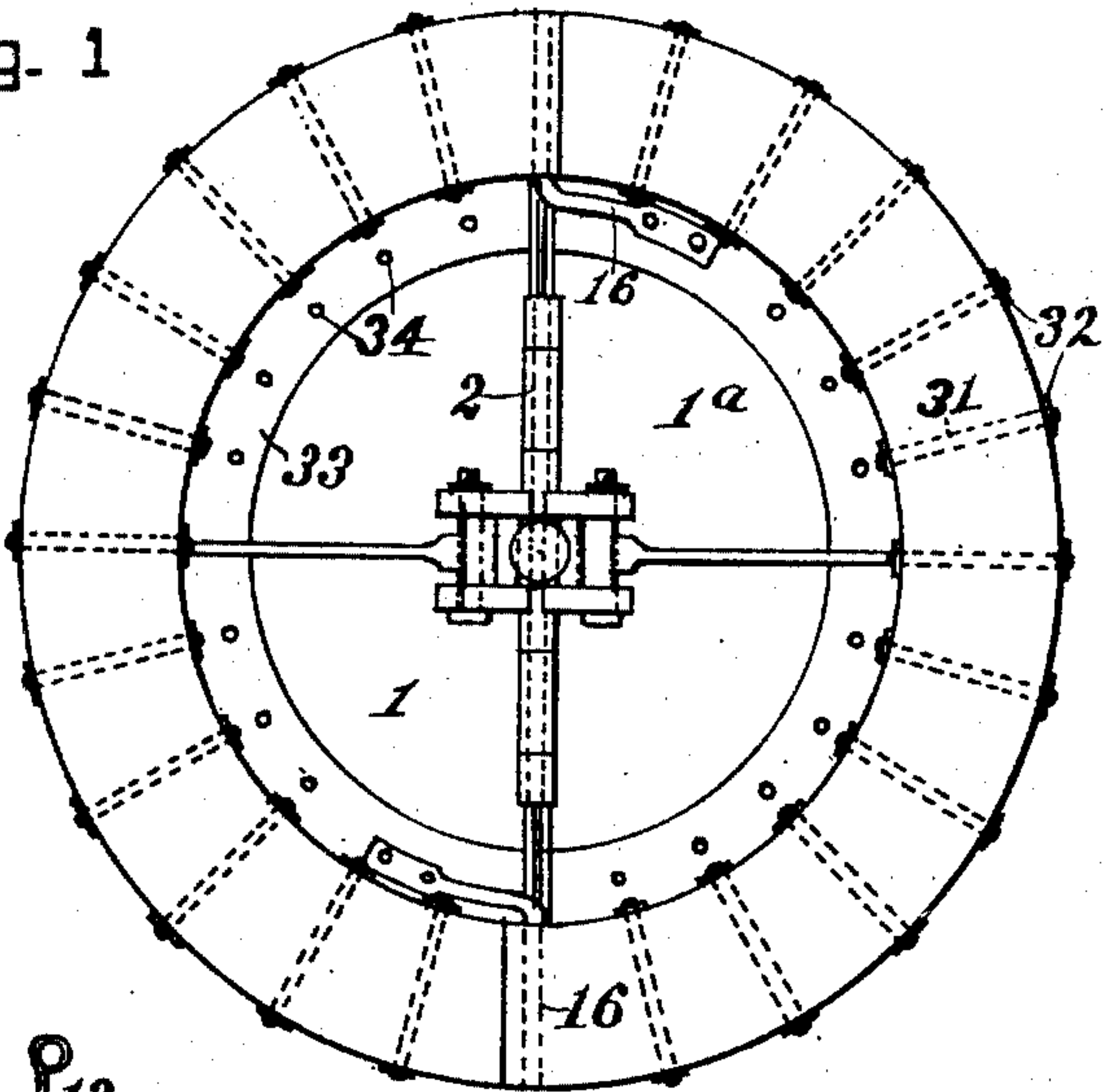
No. 868,574.

PATENTED OCT. 15, 1907.

F. MAIHAMA.  
LEAK STOPPER.

APPLICATION FILED SEPT. 4, 1906.

Fig. 1



2 SHEETS—SHEET 1.

Fig. 5.

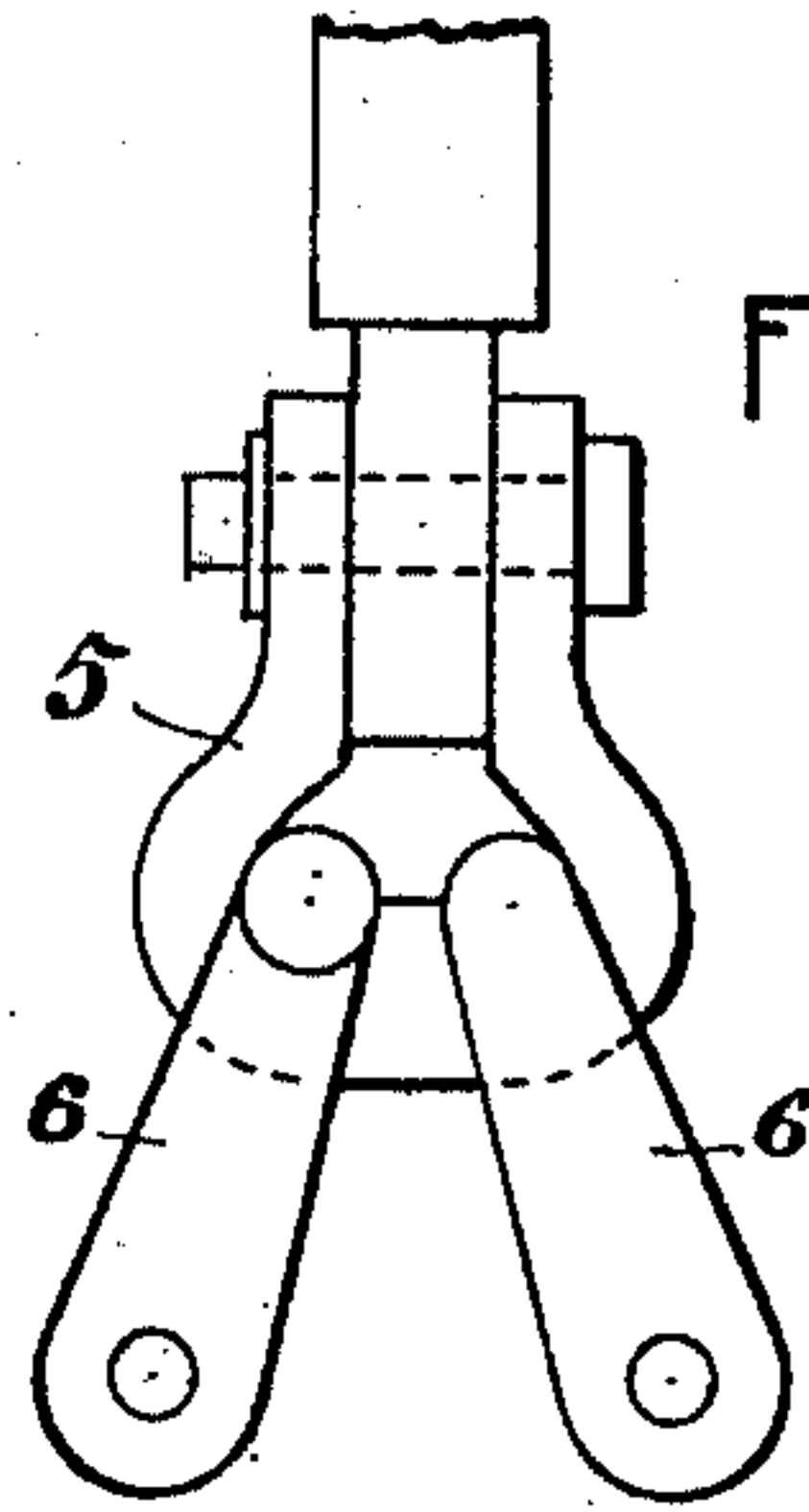


Fig. 6.

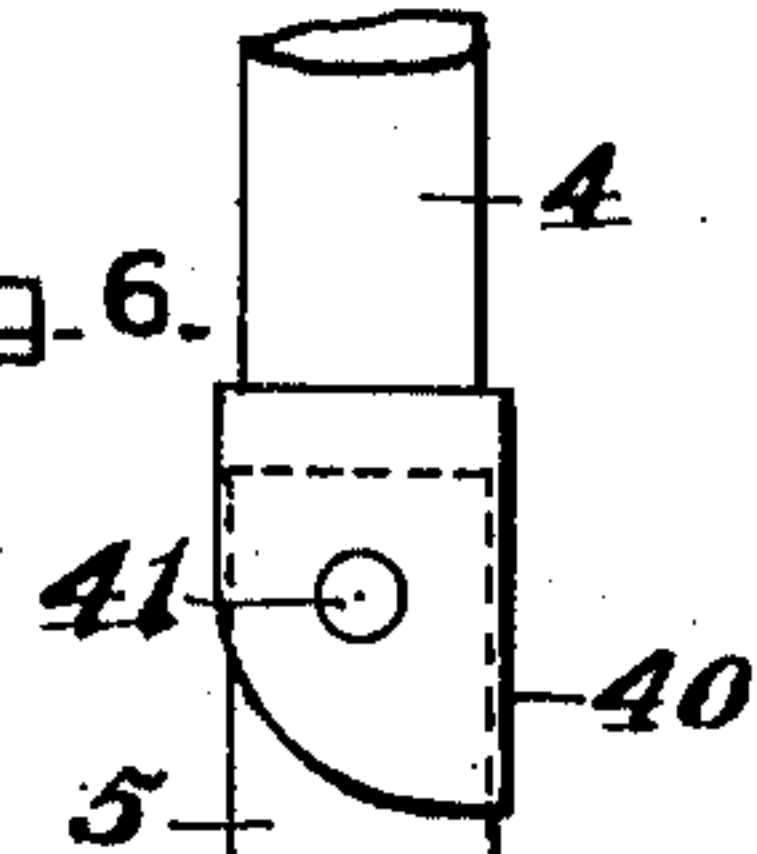


Fig. 7.

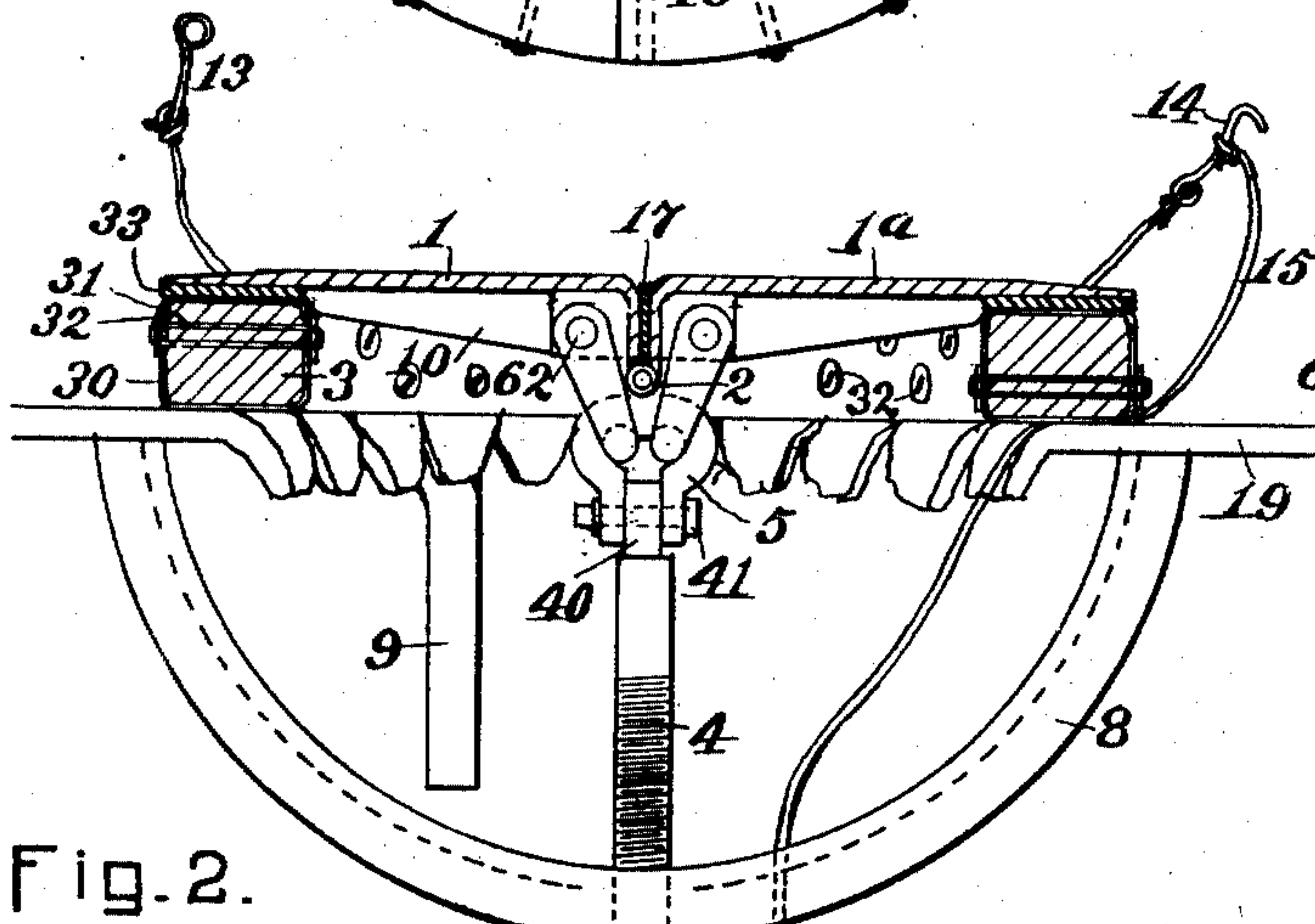
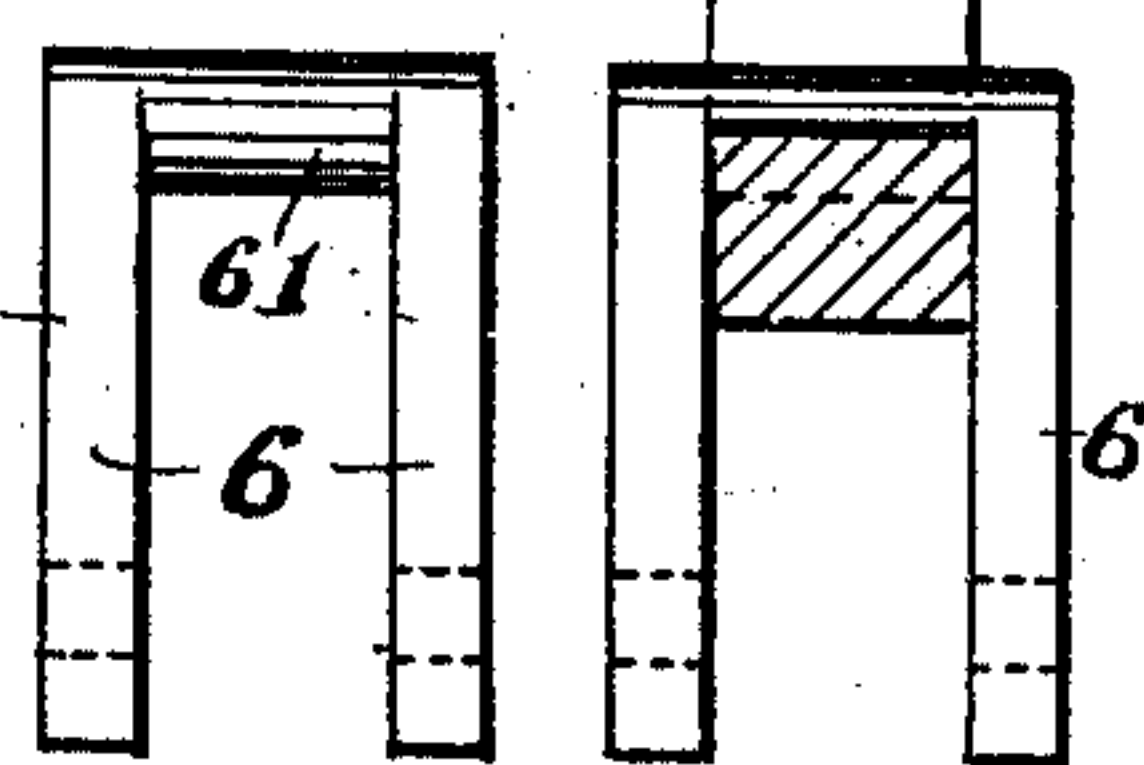
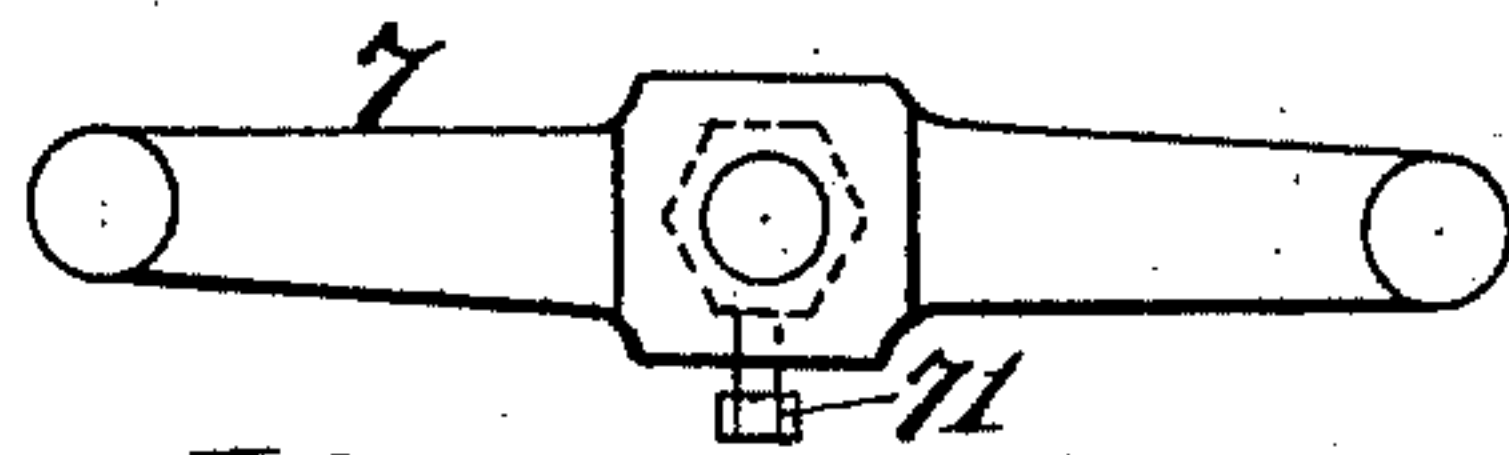


Fig. 2.

Fig. 8.



WITNESSES.

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2 SHEETS—SHEET 2.

Fig. 3.

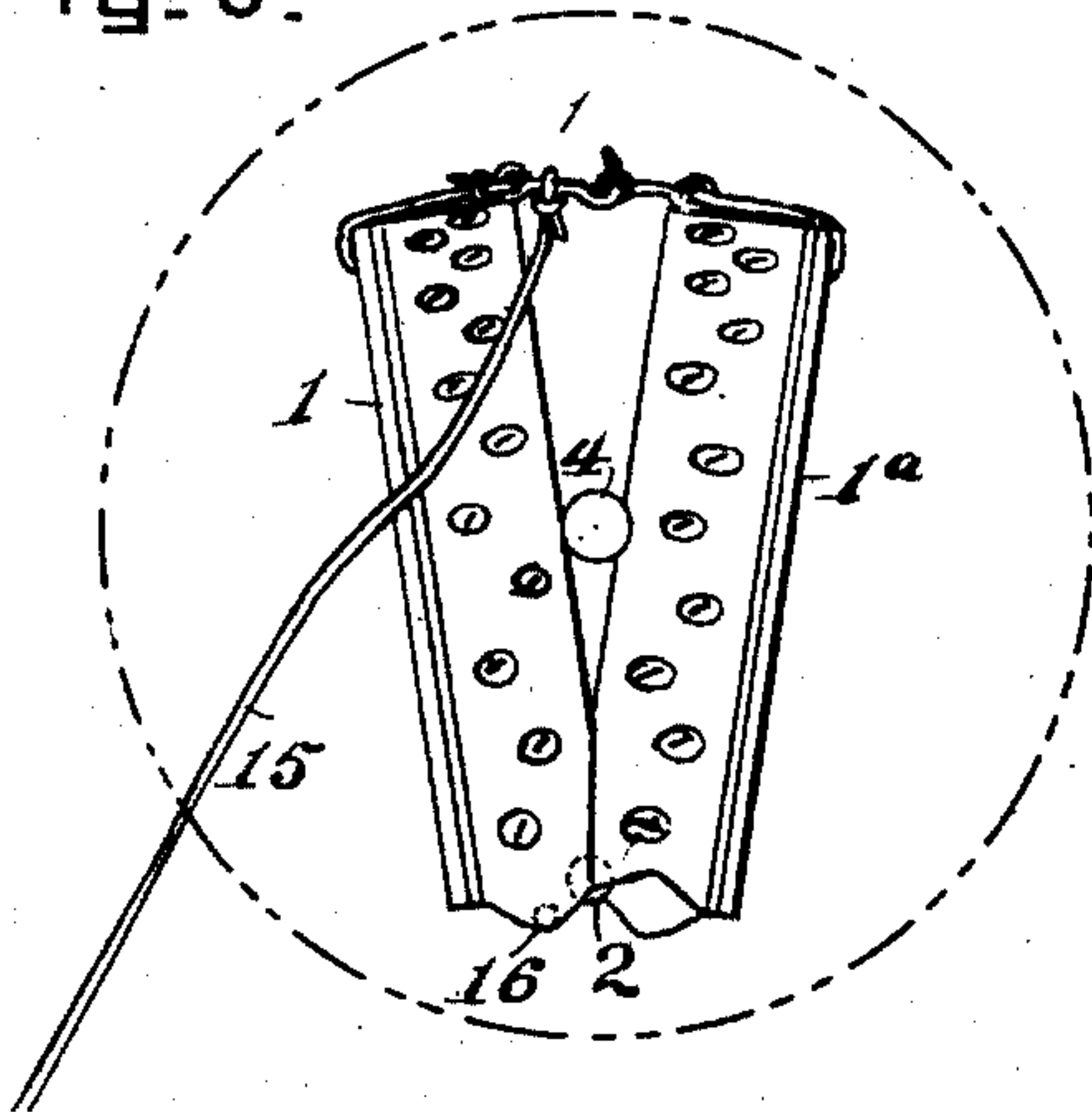
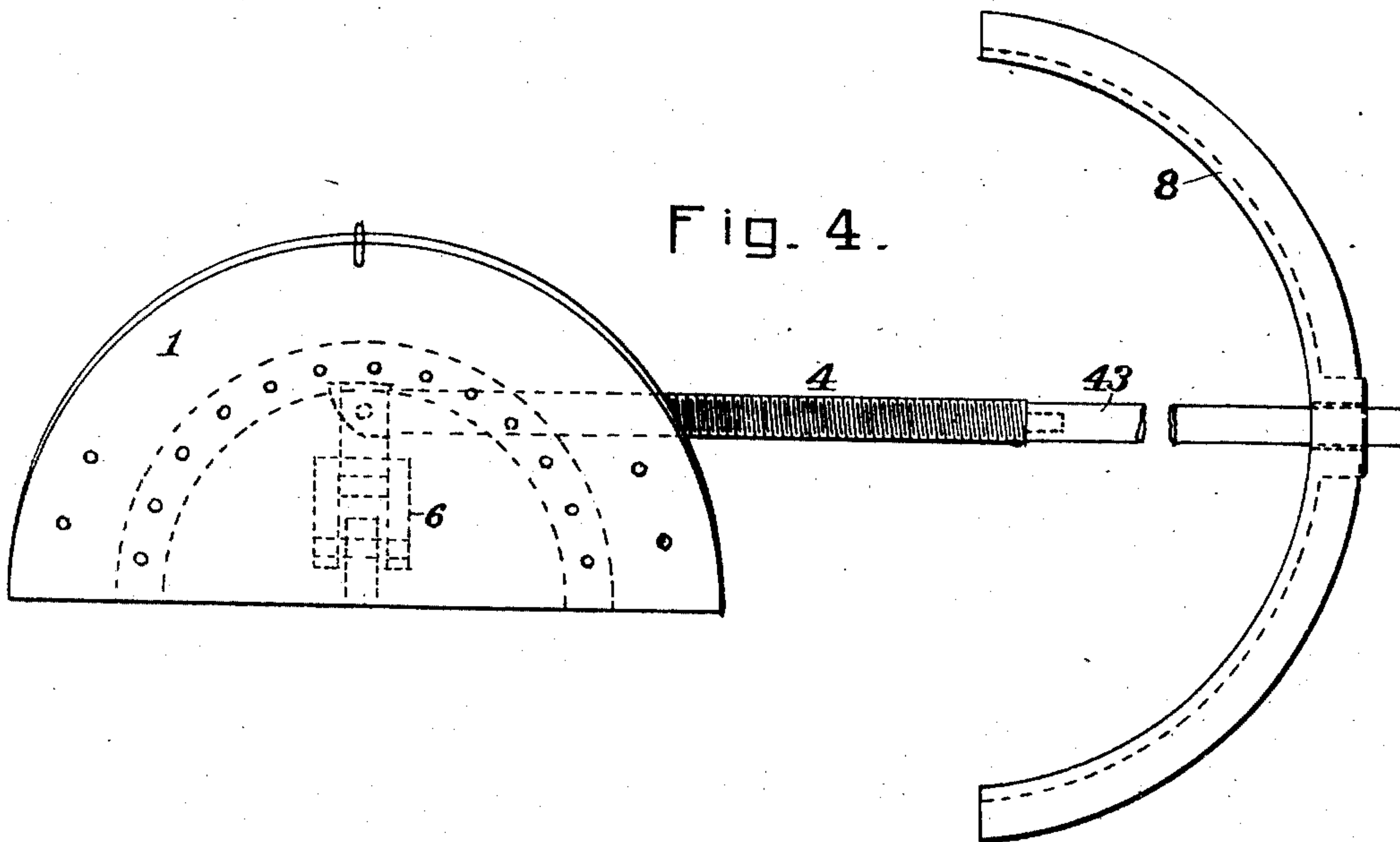


Fig. 4.



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# UNITED STATES PATENT OFFICE.

FRANK MAIHAMA, OF THE UNITED STATES NAVY.

## LEAK-STOPPER.

No. 868,574.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed September 4, 1906. Serial No. 333,255.

*To all whom it may concern:*

Be it known that I, FRANK MAIHAMA, a subject of the Emperor of Japan, and a member of the United States Navy, have invented certain new and useful  
5 Improvements in Leak-Stoppers, of which the following is a specification.

My invention relates to improvements in leak-stoppers such as are intended for stopping leaks made by shot holes.

10 The object of my invention is to improve and simplify such devices generally and in particular to fit them for application of the sealing member thereof to the outer surface of the ship where it will more effectually close the hole, and also to adapt them to close  
15 shot holes irrespective of whether or not these holes are through or near a frame.

My invention comprises the parts and combinations of parts which are hereinafter described and particularly pointed out in the claims.

20 In the accompanying drawings my invention is shown in the form now preferred by me.

Figure 1 is an inner face view of the stopper. Fig. 2 is a view, partially in cross-section, in a plane perpendicular to that of Fig. 1. Fig. 3 is an end view of  
25 the stopper folded as for passing through a shot hole. Fig. 4 is a side view of the stopper folded. Figs. 5 and 6 are detail views showing the manner of connecting the binding bar thereto. Fig. 7 shows a stirrup in detail. Fig. 8 shows the wrench or nut turning yoke  
30 in plan.

The form of leak-stopper most commonly used comprises, as its main features, a stopper disk faced with a packing material, a bar adapted to bridge the hole and a bolt passing through bar and disk. The disk is  
35 non-collapsible and must therefore be applied to the inner surfaces, the bar being placed outside. A shot in passing through a ship's side makes a hole with edges more or less ragged and rough and therefore not well suited to the making of a water tight joint; also  
40 in cases where the hole is through or near a frame, it is impossible to apply the stopper effectively, if at all.

In my form of stopper the stopper-disk is made foldable or collapsible, so that it may be passed outward through the hole and then opened and seated upon  
45 the outer smooth surface of the ship's side and where the position of the ship's frame in no way interferes with its use. The device as illustrated in the accompanying drawings is constructed and used as follows.

The stopper disk is made foldable or collapsible, so  
50 that it may be passed through the hole it is intended to close and then be expanded. The manner of doing this which I now prefer is to make it of two semi-circular disks 1 and 1<sup>a</sup>, hinged together on their straight sides. The inner face of this disk is preferably provided with packing material adapted to accommodate

itself to irregularities of surface and to contribute to the tightness of the joint. For this purpose I prefer to use cellulose, as it possesses qualities which well fit it for the purpose. I apply it as an annular ring 3, inclosed within a fabric covering 30, this latter being preferably of canvas. This packing ring is made  
60 in two halves corresponding with the halves 1 and 1<sup>a</sup> of the disk. I prefer that the parts of this ring be secured, as by vulcanizing, to half-rings 33, of a rubber fabric, which latter is secured to the plates 1 and 1<sup>a</sup>, as by rivets 34.

The plates 1 and 1<sup>a</sup> have their straight sides turned inward to form the hinge 2, at a point near the plane of the inner surface of the packing ring 3, so that it may be folded as shown in Figs. 3 and 4 without necessity  
70 for undue compression of the packing ring.

The bolt by which the stopper-disk is held should be pivotally connected to the disk so that they may freely fold together and also so that it may fold down in the general plane of the pivot 2. The connection preferred  
75 and shown is as follows:

The plates 1 and 1<sup>a</sup> each has a rib 10 to which is pivoted a stirrup or clevis 6 by pivots 62. These stirrups consist of sides 60 and a connecting pivot bar 61. The pivot bars 61 of both stirrups pass through a second  
80 clevis 5 which in turn is pivoted to the flattened end 40 of the bolt 4. This last pivot pin 41 extends at right angles to the pivot 2 connecting the two plates 1 and 1<sup>a</sup>, so that the bolt may fold down into the plane of this latter pivot.

The bolt 4 is threaded for the reception of a nut 42, and is preferably provided with a removable extension 43, secured thereto as by a threaded tip and socket, as shown at 44. I provide a wrench member for turning up the nut 42, the same consisting of a bar 7 provided with out-turned handles 70 and with a socket for tightly receiving and holding the nut 42. After the stopper has been put in place and the nut screwed down tightly, the bar 7 may be removed from the nut, as may also the extension 43 of the bolt. These parts  
95 project to such a distance that unless removable they might at times be seriously in the way. The nut 42 may be held within the bar 7 by a set screw 71.

I prefer that the cross-bar be made in the form of a yoke 8, so that it may span over a frame if necessary. In Fig. 2 I have shown a member 9 which typifies a frame, thus showing how the stopper will apply as well in such position as in any other.

To insure a tight joint between the pivoted edges of plates 1 and 1<sup>a</sup>, I provide a packing strip 17 extending  
105 along the joint. I also provide at one end of each of the half-ring packing members 3, a curved wire or rod 16 which has one end secured to the plates 1 or 1<sup>a</sup>, and its other end extending across the end of the packing member and adapted when the halves are opened out to

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press firmly into the end of the other packing member 3. For this purpose they should be slightly off the axis of the pivot 2.

When about to use my stopper the two halves are 5 folded together as shown in Figs. 3 and 4, the bolt 4 folding down also. The halves are provided, one, with a ring, or eye 13 secured to it by a cord, and the other with a hook 14 adapted to enter the eye 13 and hold the two halves folded together, as is shown in Fig. 10 3. To the hook 14 is attached a cord 15. With the parts folded as in Figs. 3 and 4, they are passed outward through the shot hole, the hook 14 disengaged from the eye 13 by pulling upon the cord 15, whereupon the two halves of the disk will open out, in which position it is 15 of sufficient size to cover the hole. In Fig. 3 the broken-line circle is intended to show the size of shot hole that stopper is intended for. The yoke 8 is then placed over the bolt or draw bar 4, the nut and its bar 7 put in place and screwed down upon the yoke until 20 everything is drawn tight and the leak stopped as well as may be. Seating upon the smooth outer surface this may be done much more effectively than if it seated upon the roughened inner surface. It is also possible to easily and effectively stop a hole located upon a 25 frame.

To prevent excessive distorting and flattening of the shape of the packing ring 3, I prefer that it have, what are in effect, tufting cords 31 passed through the same at frequent intervals and provided with fabric wash- 30 ers 32. These will assist in preserving the outline of the ring and prevent undue flattening.

While the construction and arrangement of the parts which I have shown and described are those preferred by me, these may be widely varied in detail without 35 departing from the essential features of my invention. These include the folding or collapsing of the stopper disk so that it may be passed through the hole and then opened so as to make the joint against the smooth outer skin.

40 Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. A leak-stopper comprising two semi-circular plates of rigid material and a packing ring in halves secured to the inner surfaces of said plates, the hinge for said plates 45 being located in a plane approximating that of the inner surface of said packing ring, a securing bolt having a

compound hinged connection with said plates permitting the plates to hinge together and the bolt to swing between the plates, a bridging yoke and means for engaging said bolt and yoke.

2. A leak-stopper comprising a disk composed of two 50 parts hinged together, a packing ring similarly divided into two parts and secured to the inner surface of said disk, a rod carried by each plate disposed substantially parallel with the hinge and within the end of the packing 55 ring carried by its plate and adapted when the plates are opened to tightly engage the end of that part of the packing ring carried by the other plate, and means for securing said plate in position over the hole.

3. A leak-stopper comprising a disk composed of two 60 plates having their connected edges flanged inward and hinged, a packing ring upon the inner surfaces of said plates, a packing strip between the hinge flanges, a securing bolt hingedly connected with said plates and adapted to fold down parallel with the plate hinge, and a bridg- 65 ing yoke adapted to be engaged by said bolt.

4. A leak-stopper comprising two plates flanged on their meeting edges and hinged by said flanges, a packing strip between said flanges, a packing ring divided into two parts 70 and secured to the inner faces of said plates about their edges, means for forcing the abutting ends of said packing rings together when the plates are opened out, a releas- able catch for holding said plates folded for passing through the hole, and means for securing said plates 75 against the outer surface of the ship from within.

5. A leak-stopper comprising two plates inwardly flanged on their meeting edges and hinged together by said flanges, a packing ring secured to the inner surface of said plates, a securing bolt hinged to said plates, and a bridging 80 yoke adapted to be engaged by said bolt.

6. A leak-stopper comprising two plates inwardly flanged on their meeting edges, and hinged together by said flanges, a packing ring in two semi-circular halves secured to the inner surface of the plates, means carried by one said plate adapted to engage the opposed end of 85 the packing ring upon the other plate to secure a tight joint when the device is opened out, a securing bolt pivoted to both plates to fold down towards their pivot, and a yoke adapted to be engaged by said bolt.

7. A leak-stopper comprising two hinged plates adapted 90 to be folded together for passage through the hole, a stirrup hinged to each of said plates, a clevis connected with each stirrup, a securing bolt pivoted to said clevis, and a bridge bar or yoke adapted to be engaged by said bolt.

In testimony whereof, I have hereunto affixed my signa- 95 ture this 25th day of August 1906, in the presence of two witnesses.

FRANK MAIHAMA.

Witnesses:

ROBT. P. MCADAMS,  
JOE T. KUSUMI.