

No. 618,878.

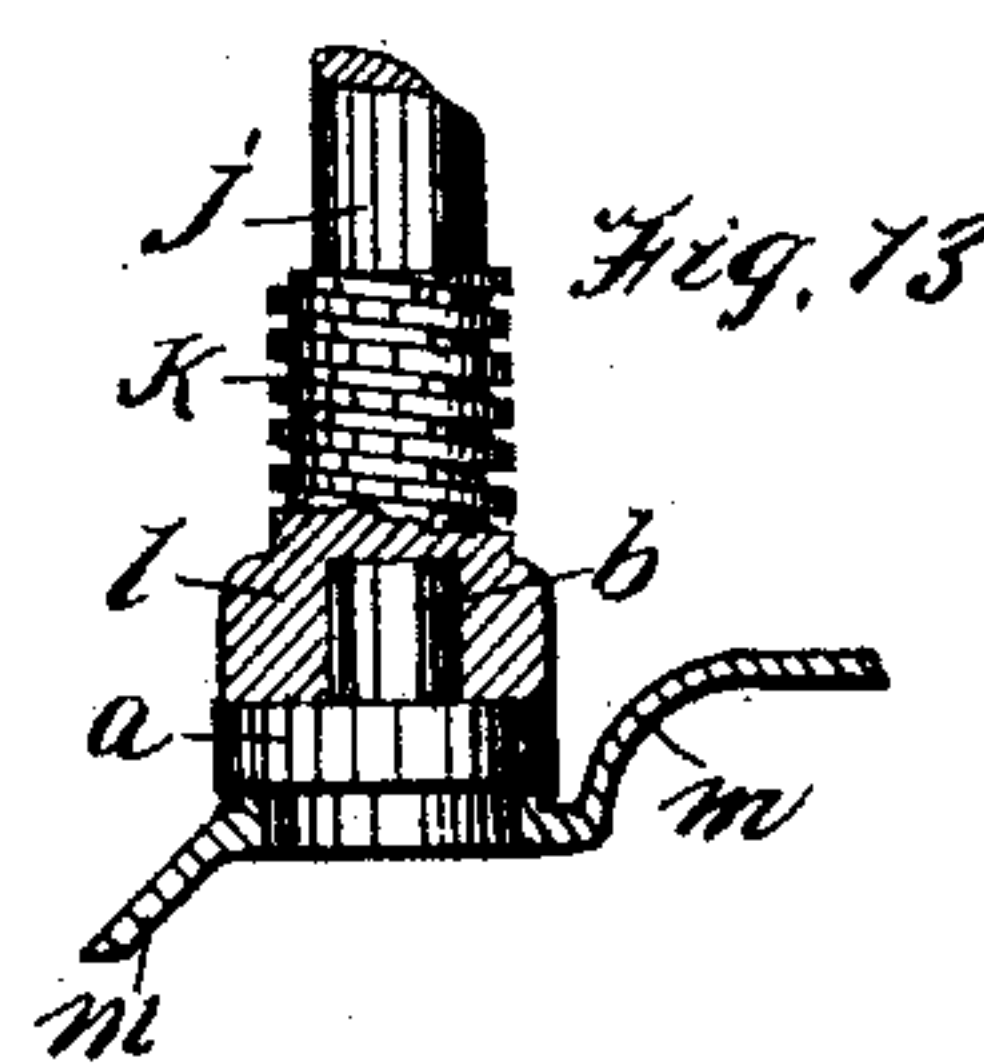
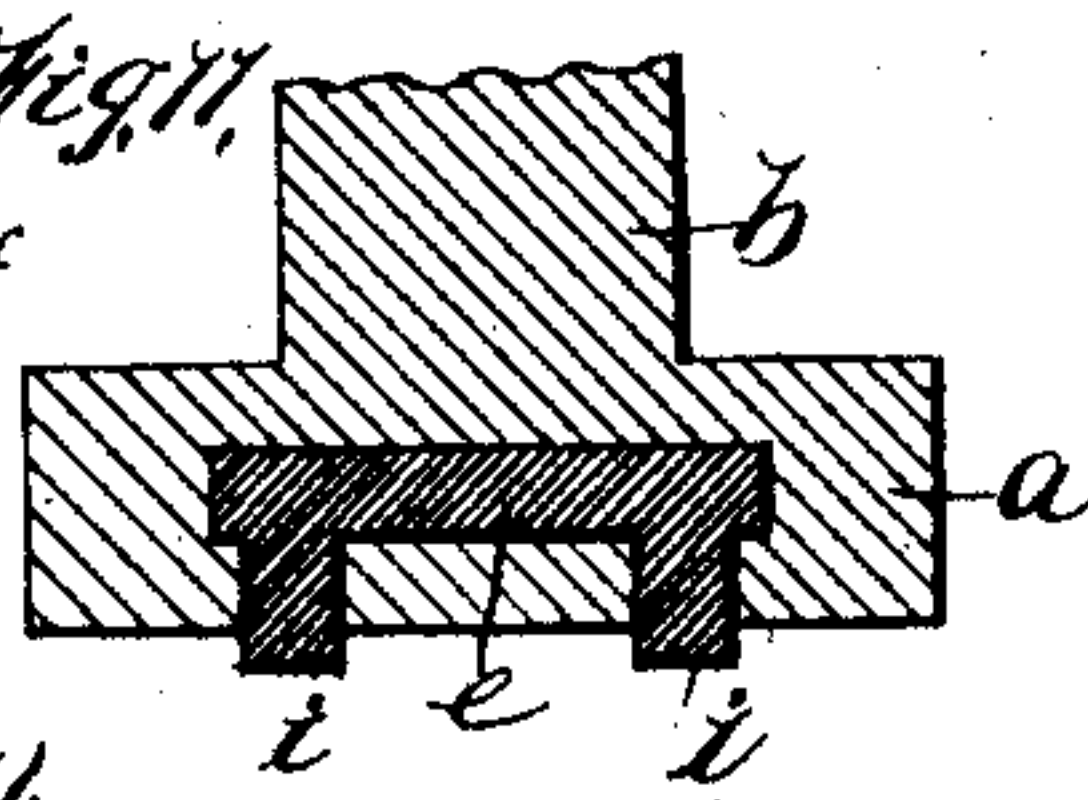
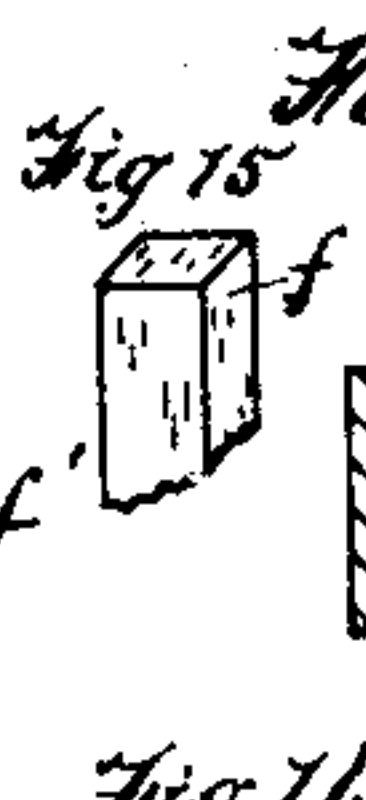
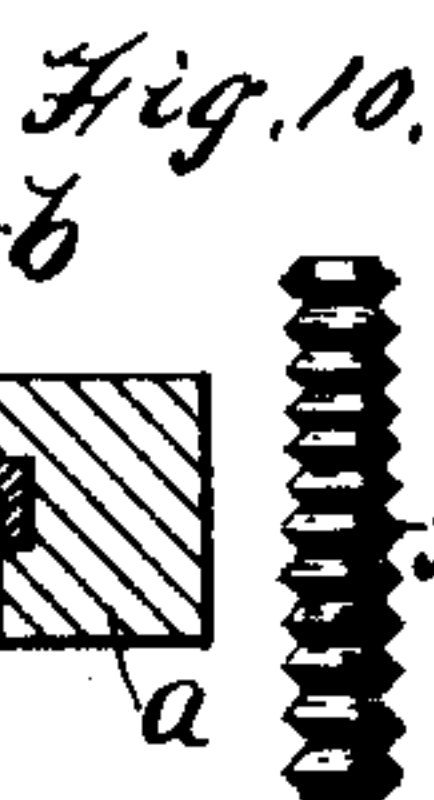
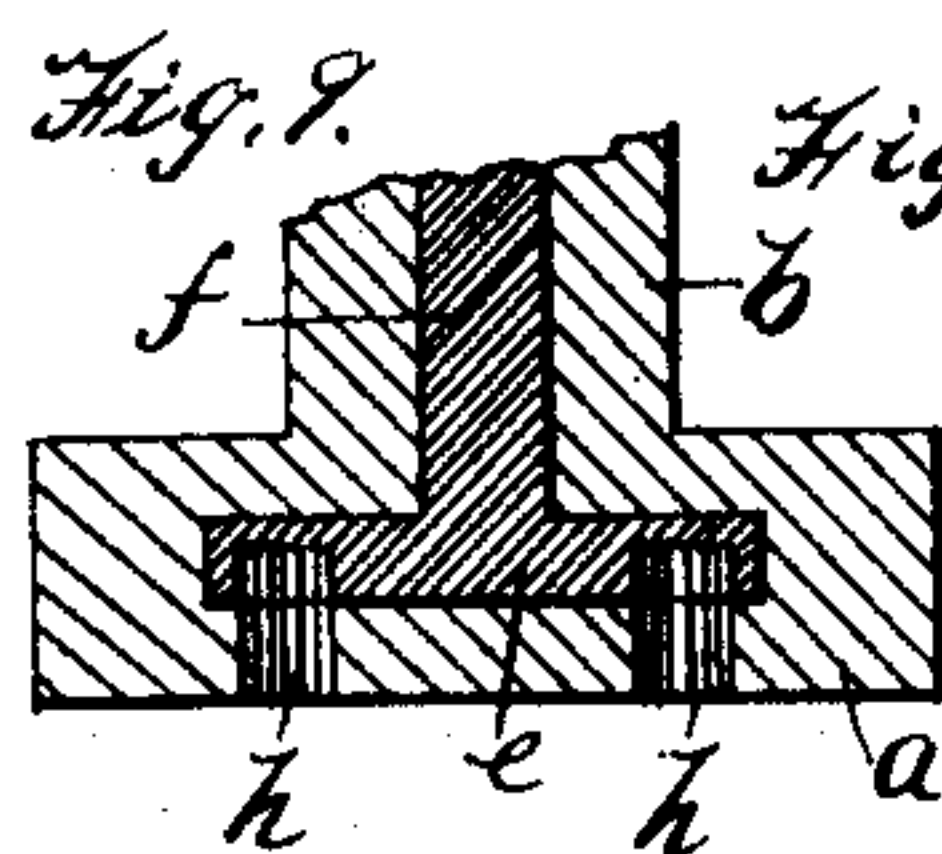
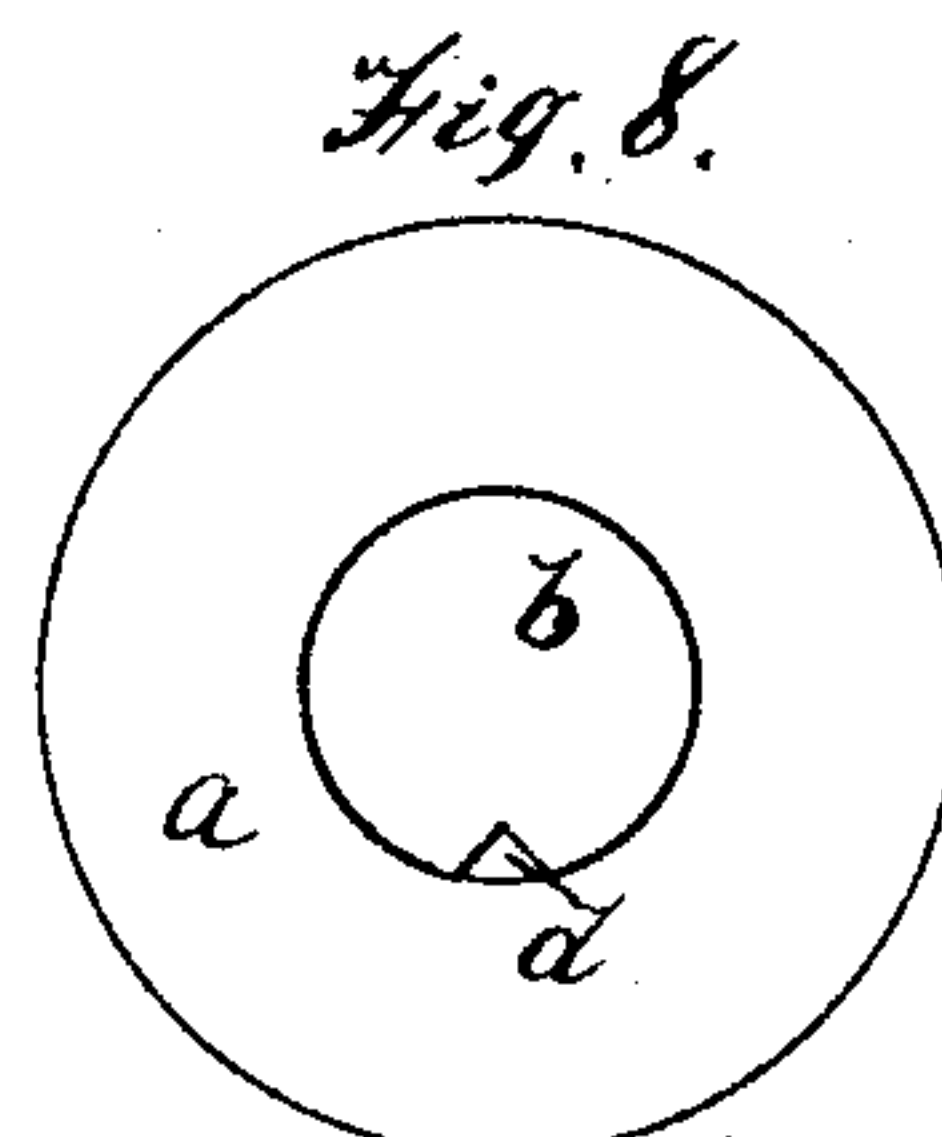
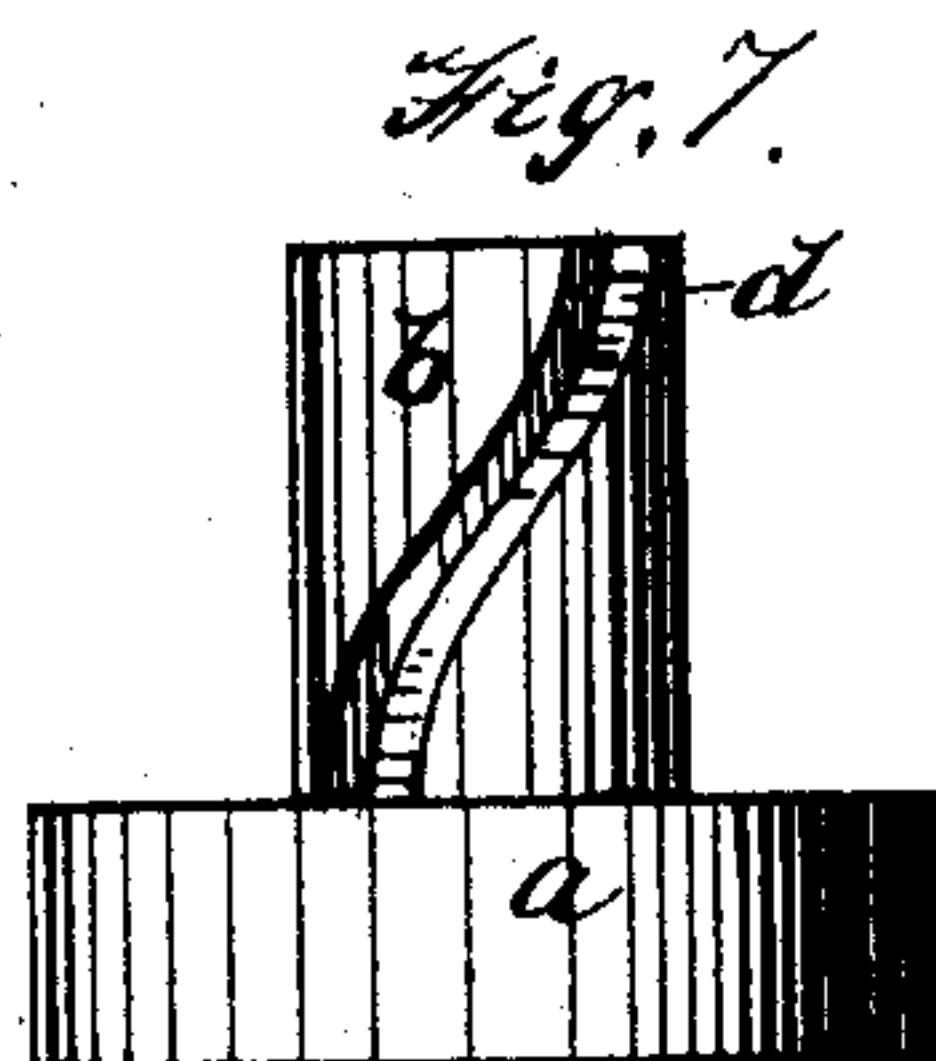
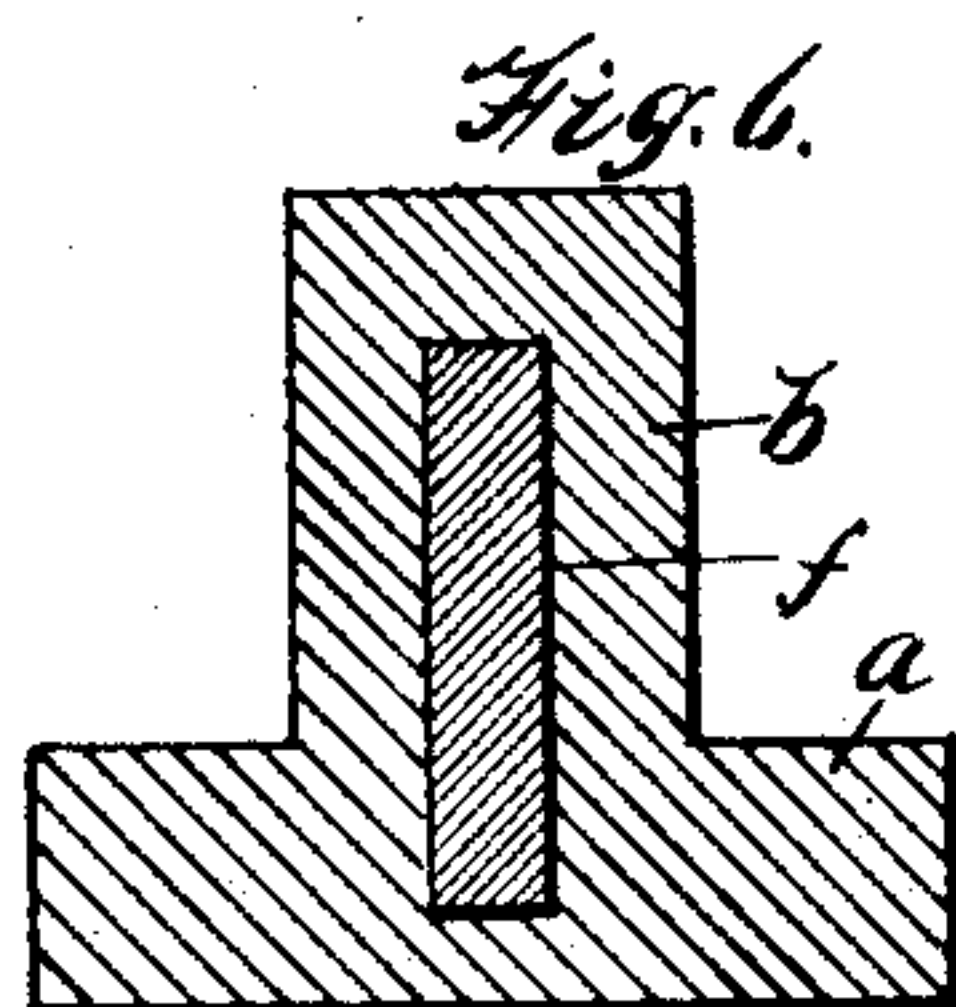
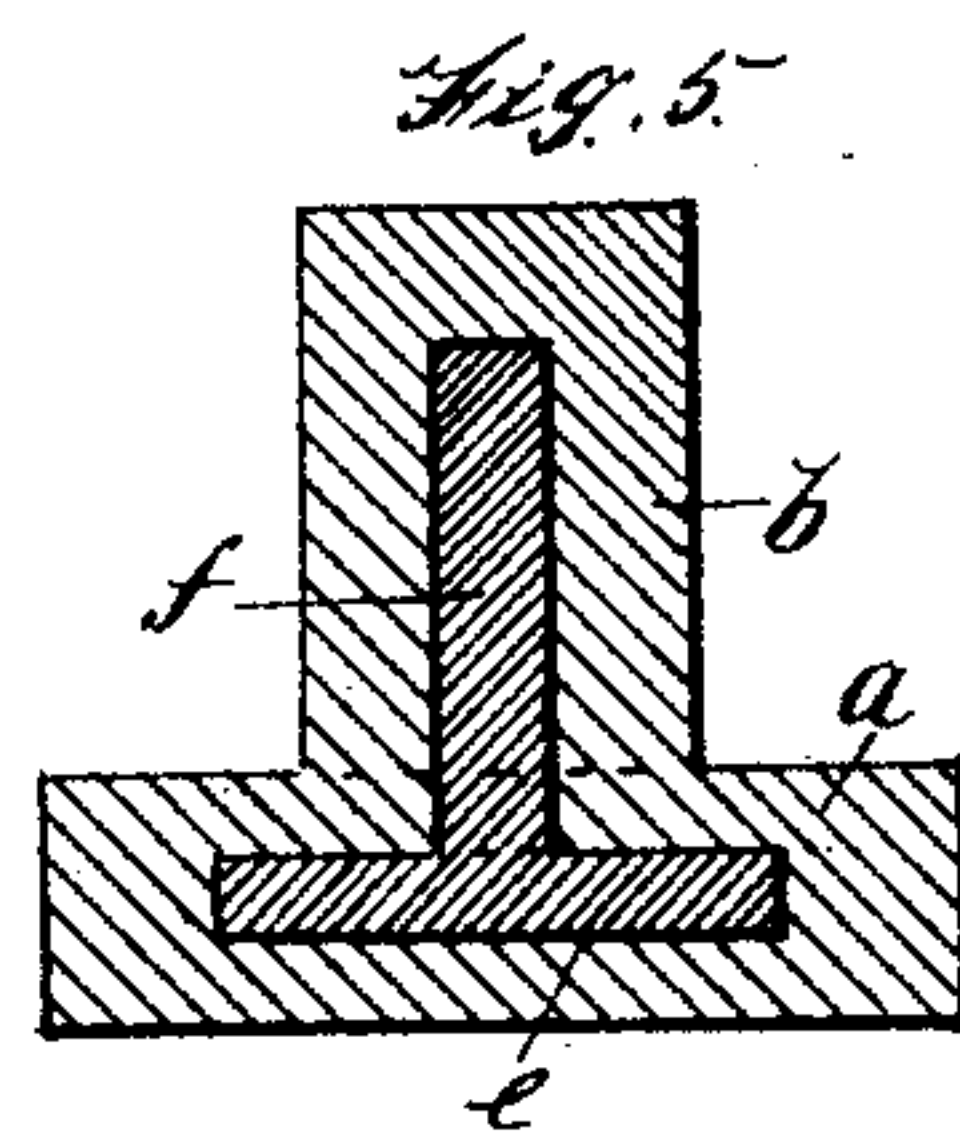
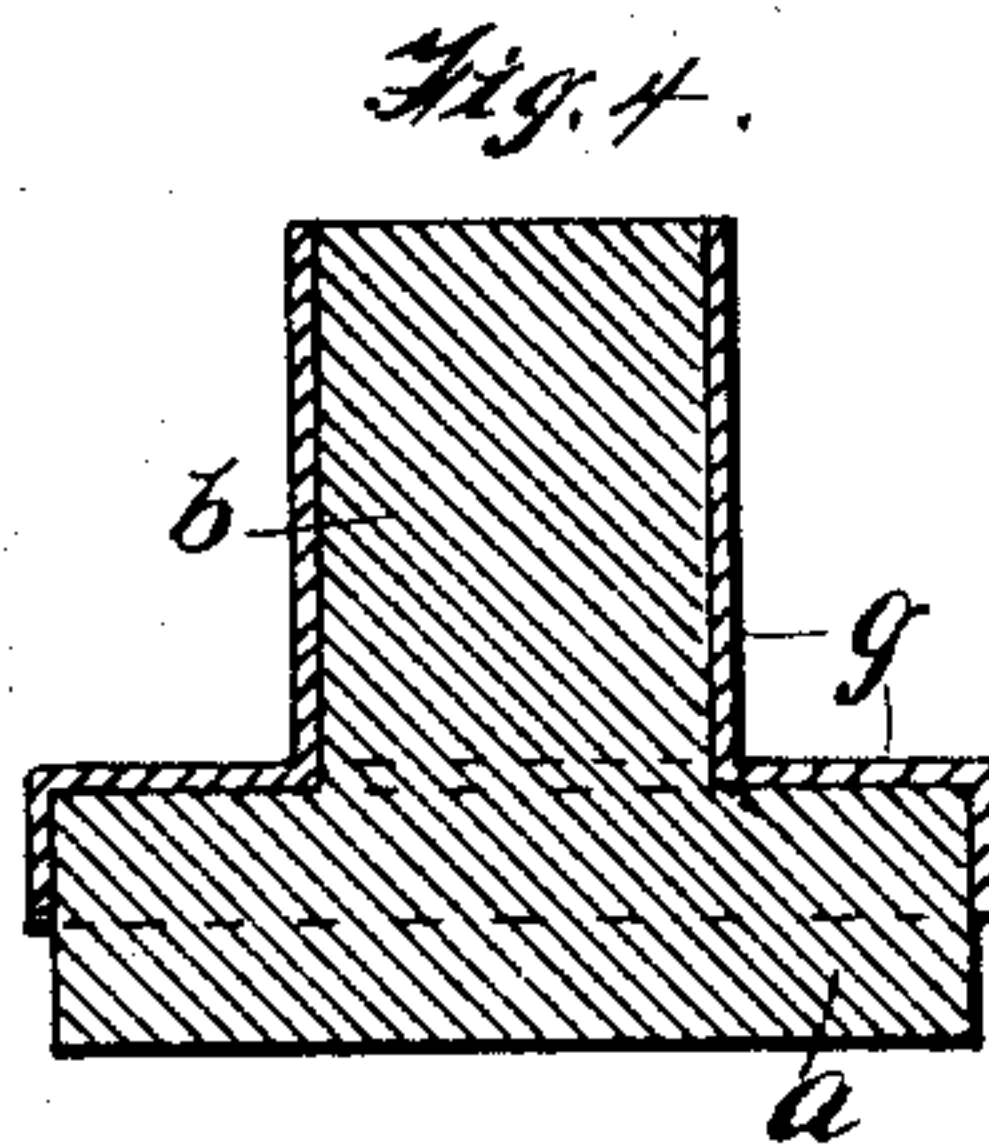
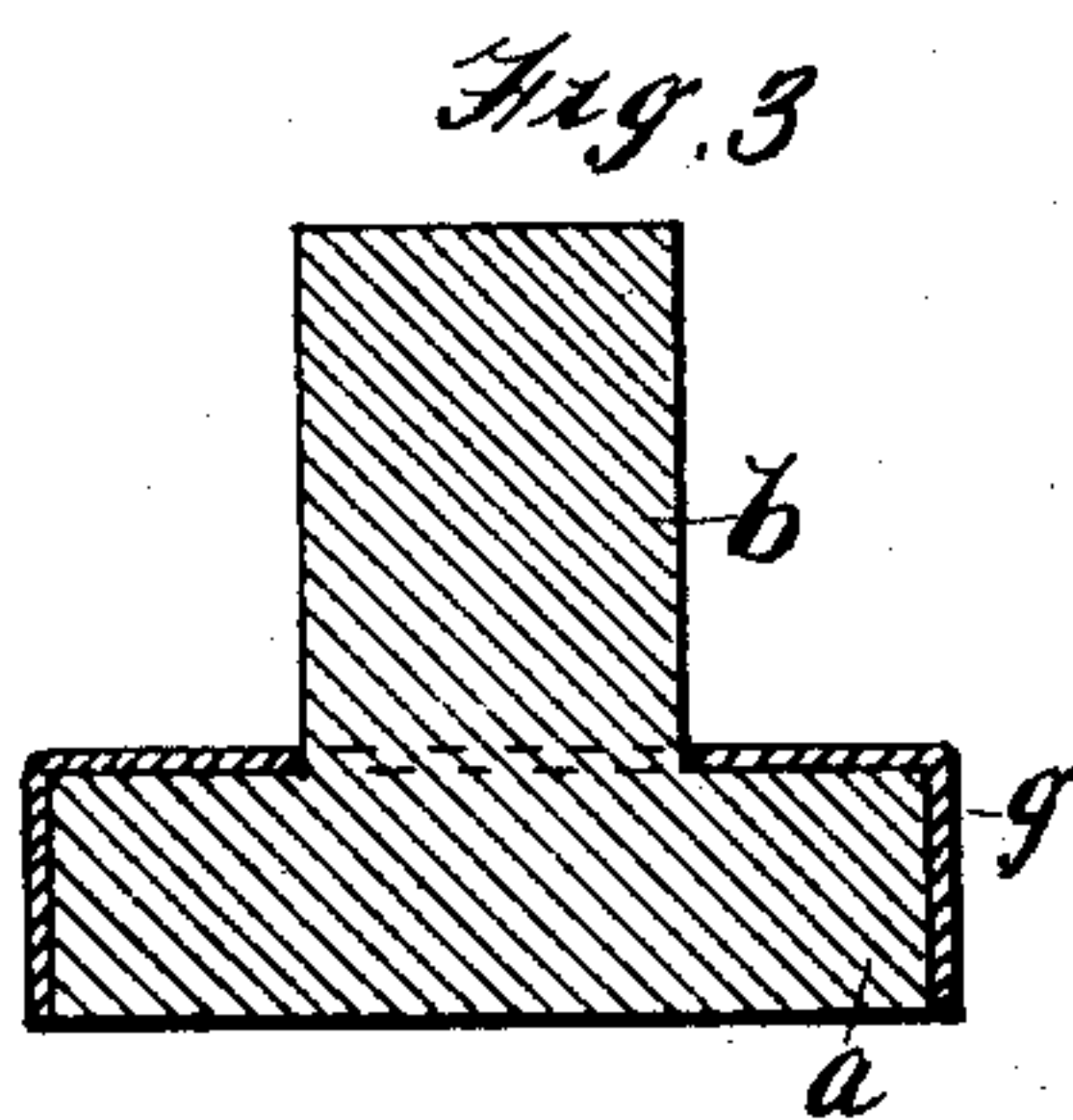
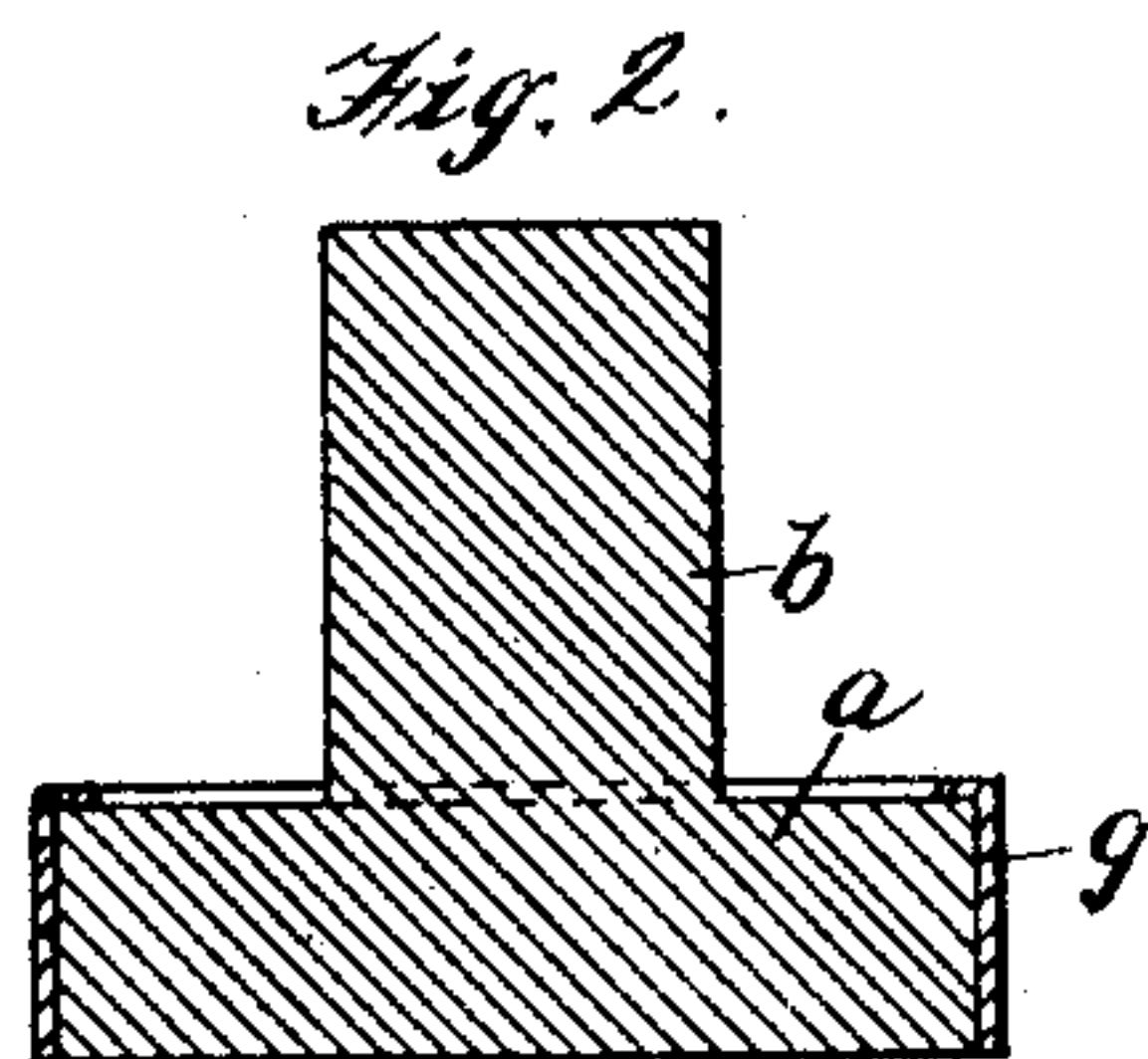
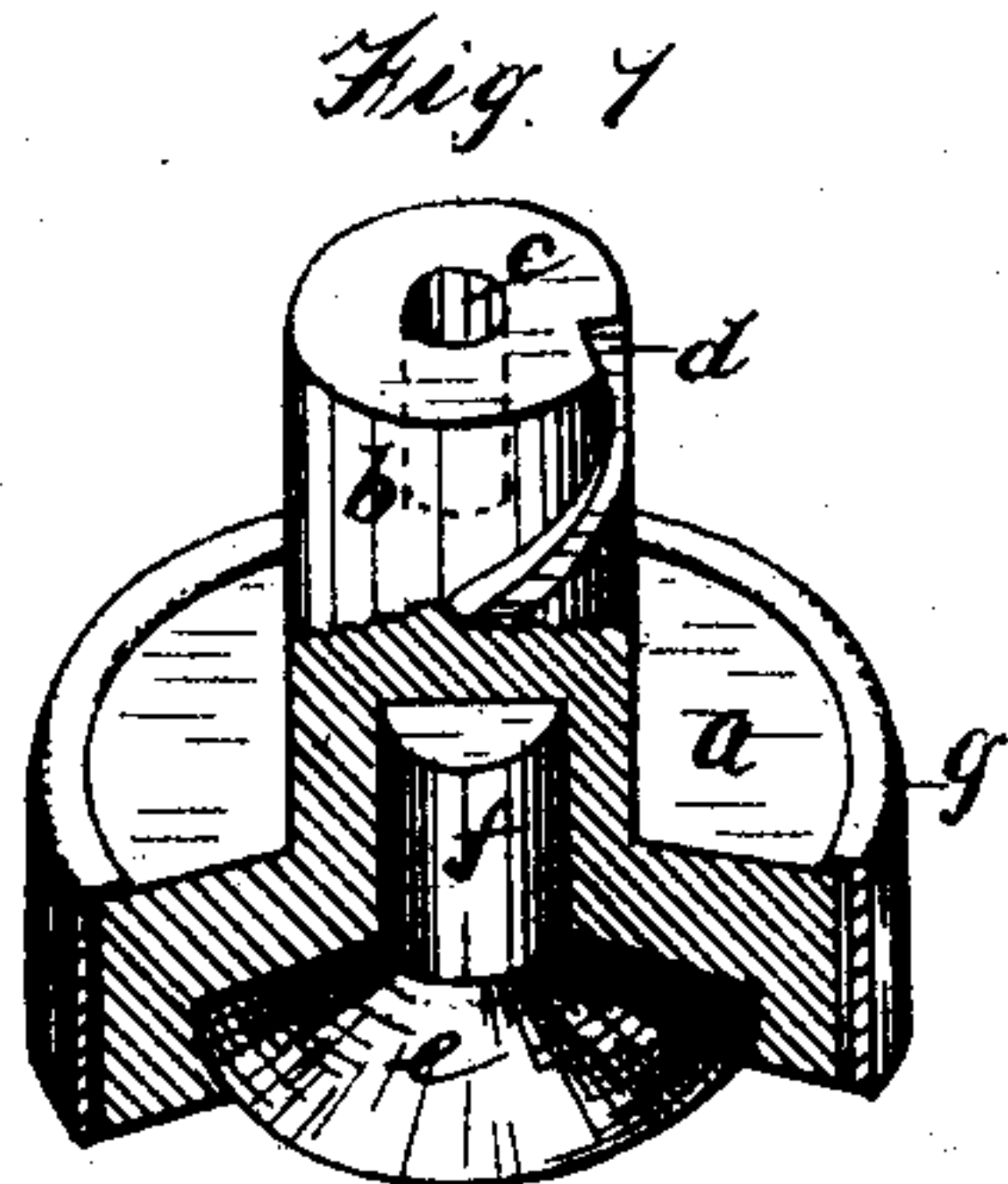
Patented Feb. 7, 1899.

A. S. HILLS.

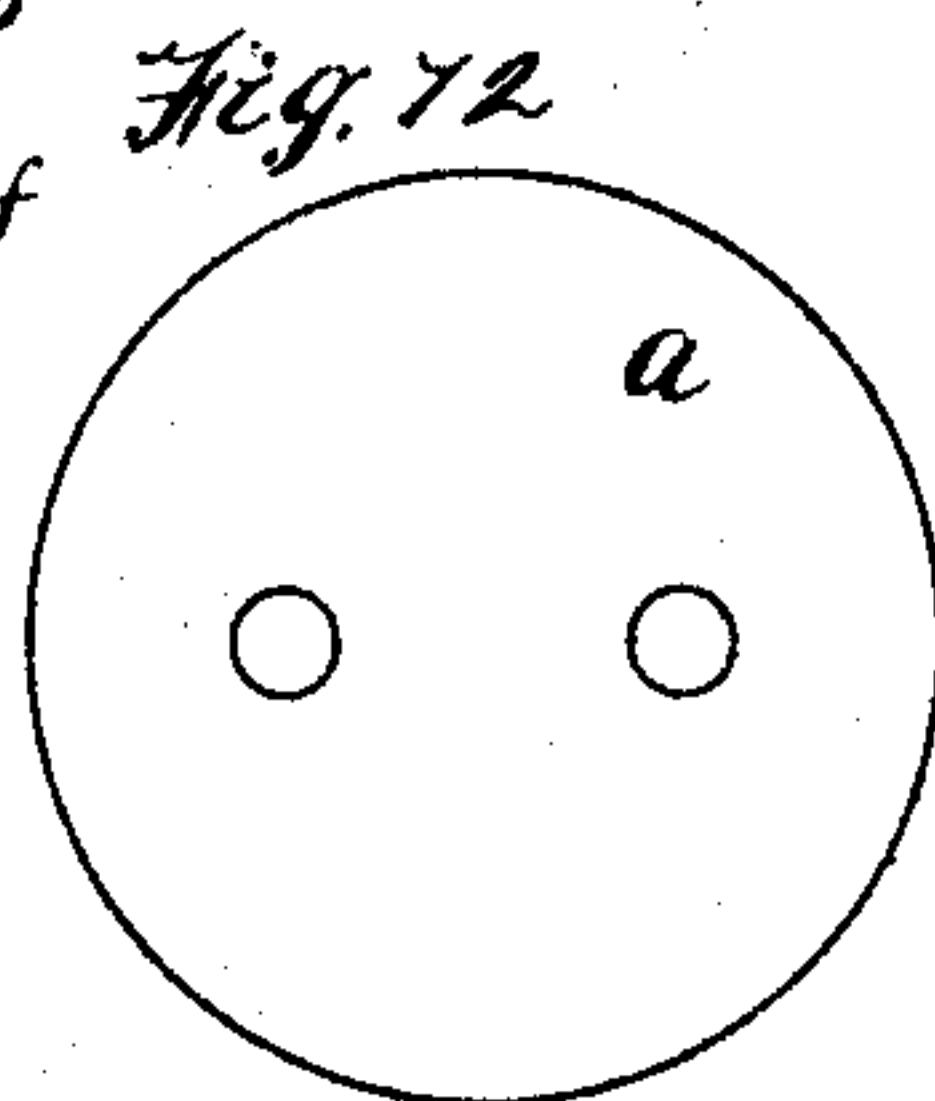
VALVE.

(Application filed Mar. 23, 1897.)

(No Model.)



Witnesses  
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Inventor  
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# UNITED STATES PATENT OFFICE.

ALBERT S. HILLS, OF SPRINGFIELD, MASSACHUSETTS.

## VALVE.

SPECIFICATION forming part of Letters Patent No. 618,878, dated February 7, 1899.

Application filed March 23, 1897. Serial No. 628,830. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT S. HILLS, a citizen of the United States of America, residing in Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Valves, of which the following is a specification, reference being had to the accompanying drawings and letters of reference marked thereon.

My invention relates more especially to that portion of a valve commonly called the "disk," and which is secured to or mounted on the carrier and is moved toward and from the seat.

In the accompanying drawings like letters of reference indicate like parts.

Figure 1 is a perspective view with a part broken away, illustrating the details in part of my improved construction. Fig. 2 is a side view in section, illustrating the arrangement of a restraining-ring. Fig. 3 is a like view illustrating a ring of slightly-different form. Fig. 4 is a like view illustrating the ring arranged to cover the stem as well as a portion of the disk. Fig. 5 is a like view illustrating the arrangement of a strengthening-piece. Fig. 6 is a like view illustrating the arrangement of a different form of strengthening-piece. Fig. 7 is a side view of a plane disk and stem, illustrating the recess in the side of the stem. Fig. 8 is a plan view of the same. Fig. 9 illustrates a modification in the form of the strengthening-piece and showing recesses extending from the face of the disk into the strengthening-piece. Fig. 10 is an illustration of a ribbed strengthening-piece. Fig. 11 is a side view in section, showing a strengthening-piece having bosses which project beyond the face of the disk. Fig. 12 is a view of the same as seen from the lower face of the disk. Fig. 13 is a view on a reduced scale, showing a portion of a valve and illustrating the manner of employing my device. Fig. 14 is an isometric perspective showing a single rectangularly-shaped boss projecting beyond the face of the disk. Fig. 15 is an isometric perspective of a part of a stem-strengthening piece rectangular in cross-section, and Fig. 16 is a like view of a strengthening-piece circular in cross-section and provided with anchor-openings.

In detail, *a* indicates the disk; *b*, the stem; *c*, a central opening therein; *d*, a channel in the side thereof; *e*, the stem; *f*, a strengthening-piece, and *g* a strengthening-ring.

The object of my invention is to provide a device having advantage over prior constructions.

The construction and operation are as follows:

The disk *a* and stem *b* are formed in one piece and made of a yielding or semi-elastic material, preferably a compound of rubber, and the valve stem or carrier *l* provided with a recess adapted to receive the stem *b*, substantially as shown in Fig. 13 of the drawings. The recess in the carrier should be of a size to receive the disk-stem when forced therein under slight pressure, so that the disk will not drop from the carrier if held vertically, while at the same time when the disk is seated firmly on the valve-seat a revolution of the carrier will not cause the disk to revolve on the seat and thus wear and tend to destroy the face of the disk where it contacts with the seat, but the carrier will turn upon the disk, thus allowing the disk to be moved directly toward or from the seat without being worn by being moved (other than toward and from) while in contact. A stem-provided disk of this construction, while it will remain in position with sufficient firmness to render the valve operative to its fullest extent, may be easily removed for the purposes of repair. As these disks are frequently subjected to great pressure in the closing of the valve and when constructed of some materials are liable to fracture, I in some cases provide the same with a strengthening-piece, the same being preferably of metal and located within the disk, as seen at *e* in Fig. 1. This may be a plain piece of metal as formed with projections and depressions, and to strengthen the stem I may also provide it with an interior piece *f*. This may be employed in connection with a strengthening-piece in the disk or not, as preferred. Either may, however, be used independently of the other. I prefer that the strengthening-piece be formed with a disk and stem integral and that the outer yielding material be molded around the same. To facilitate the removal of the device from



the carrier when by reason of corrosion or other cause it becomes too tightly fixed thereto, I may provide the disk with recesses *h*, as shown in Fig. 9. These should by preference  
 5 enter the strengthening-plate. A spanner or suitable wrench may then be employed to engage in said recesses and turn the disk, thus easily loosening it. Or as an alternative the strengthening-plate may be provided with  
 10 projections, as shown at *i*, Fig. 11, extending beyond the face of yielding material, between which projections a screw-driver or other device may be placed to turn and loosen the device from the carrier. It will of course be  
 15 seen that these recesses or projections should be located clearly within the area of the valve-seat opening.

In some cases I prefer to provide the strengthening-plate with a centrally-located  
 20 projection, as shown at *j* in Fig. 14, which may be readily grasped by a wrench, a pair of pliers, or other tool and the device loosened thereby.

I may use the stem-strengthening piece separately or with or connected to the disk-strengthening piece, and in some instances I prefer to provide anchorage openings or projections on either or both. In Fig. 10 I illustrate a section of a stem-strengthening piece  
 30 provided with annular projections. In Fig. 15 I illustrate such piece of rectangular shape, and in Fig. 16 I illustrate the stem provided with anchorage-openings.

To avoid the undue spreading of the yielding material, I may provide the same with a thin metal ring *g*, which ring is shown in Figs. 1 and 2 as covering the periphery of the disk and just setting over the edge at the top, while in Fig. 3 I show the same covering the periph-  
 40 ery of the disk and extended over the top to the stem, and in Fig. 4 I show the same covering both stem and disk, except a portion of the periphery and lower face of the latter.

By the employment of an encircling or restraining ring the inner strengthening piece or pieces may be dispensed with in some instances. I am also enabled to form the disk of a more elastic material, which will become seated with the application of less force, and

at the same time if greater force be employed 50 the danger of distortion or injury is avoided.

I in some cases provide the stem with a chamber *c*, which permits the stem to be compressed more easily when it is forced into a recess in the carrier and serves in a measure, 55 when the end of the stem abuts squarely against the base of the recess in the carrier, as a vacuum-chamber to aid in retaining the stem in position. I also in some cases provide the stem with a channel *d*, preferably 60 arranged spirally or inclined. This serves as a channel or outlet for the escape of air and water when the stem fits very tightly in the recess in the carrier and is forced therein.

While these disks are intended, of course, 65 to be used with valves, it will be seen that as the disk is the part of a valve which most frequently requires renewal the disk is intended to be manufactured and sold as an improved and independent article of manu- 70 facture.

Having therefore described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A valve comprising an elastic disk formed 75 with an integral elastic stem, and a strengthening-piece entirely embedded in and surrounded by the elastic material.

2. A valve comprising an elastic disk formed with an integral elastic stem having a groove 80 extending lengthwise in the face thereof, and a strengthening-piece entirely embedded in and surrounded by the elastic material.

3. A valve comprising an elastic disk formed with an integral stem, a strengthening-piece 85 entirely embedded in and surrounded by the elastic material, and a circumferential metal band around the disk.

4. A valve comprising an elastic disk formed with an integral stem a strengthening-piece 90 embedded in the elastic material and formed with wrench-engaging means exposed at the bottom of the valve, substantially as described.

ALBERT S. HILLS.

Witnesses:

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