

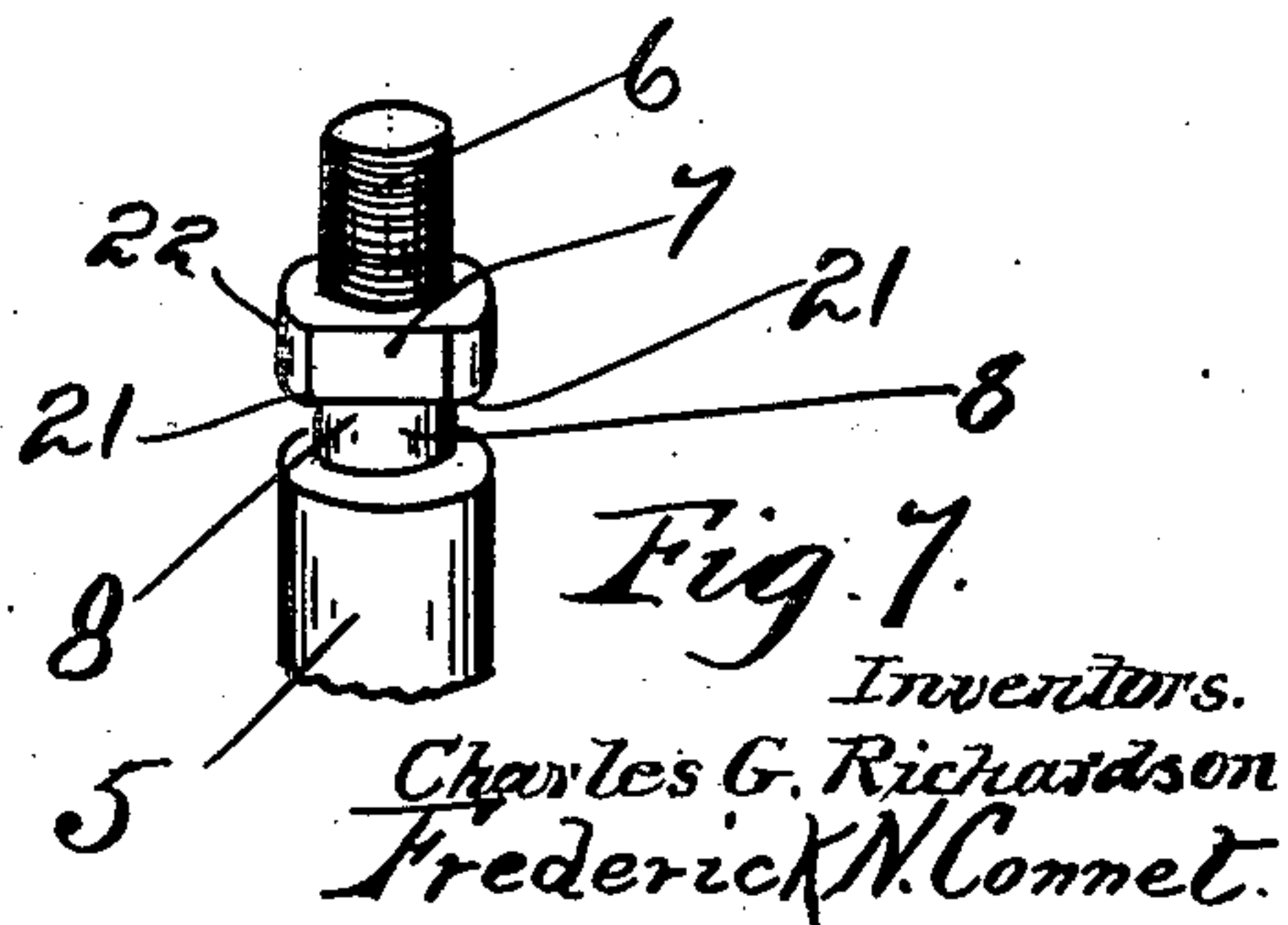
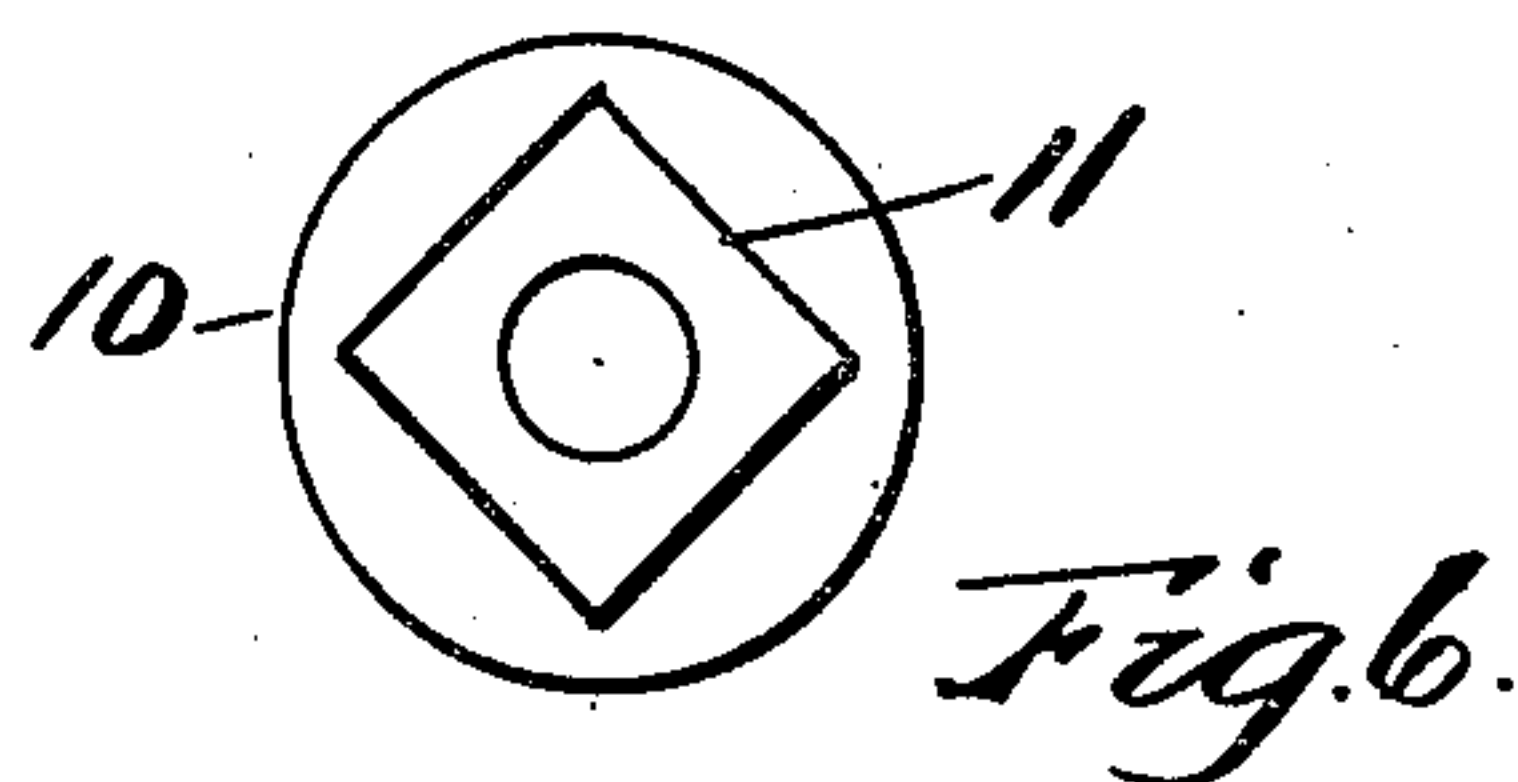
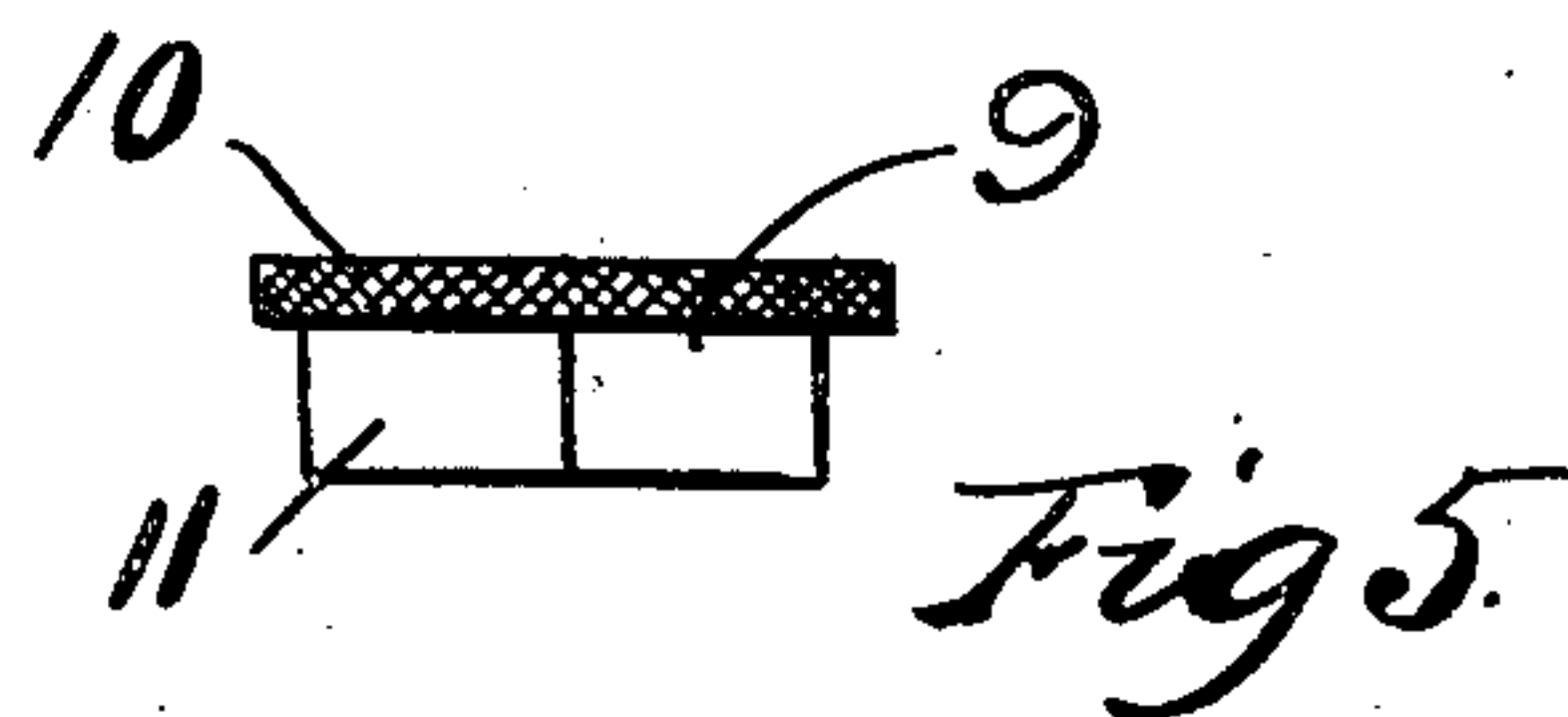
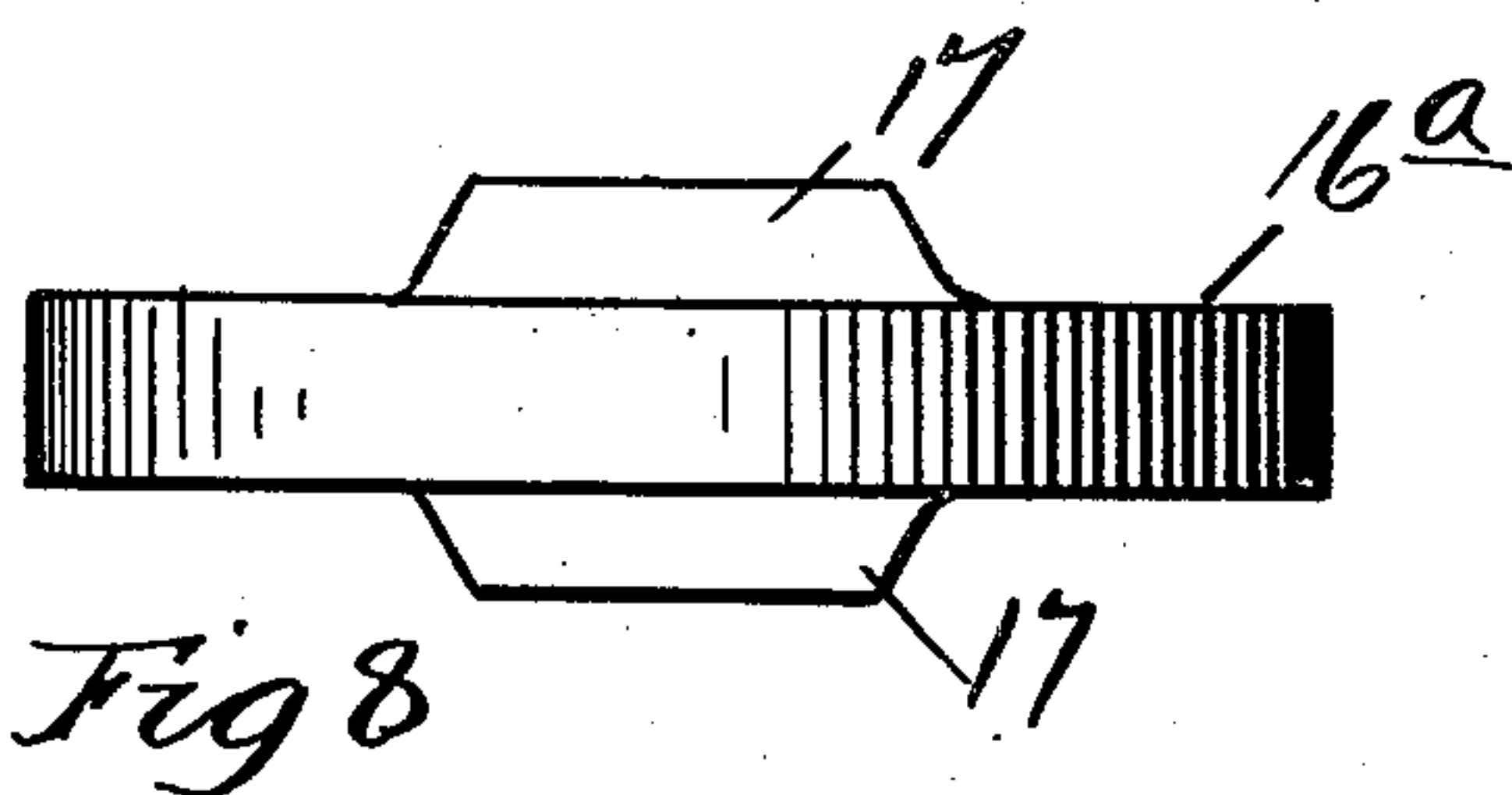
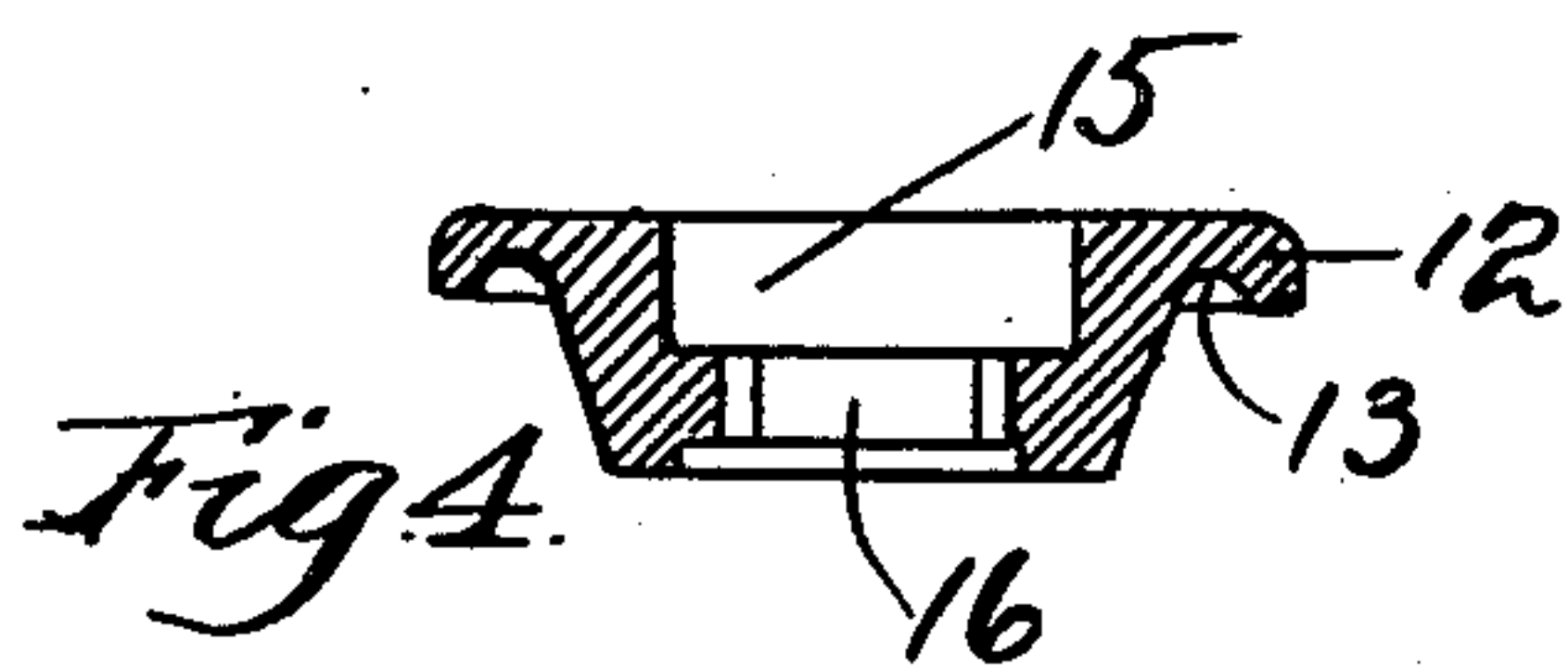
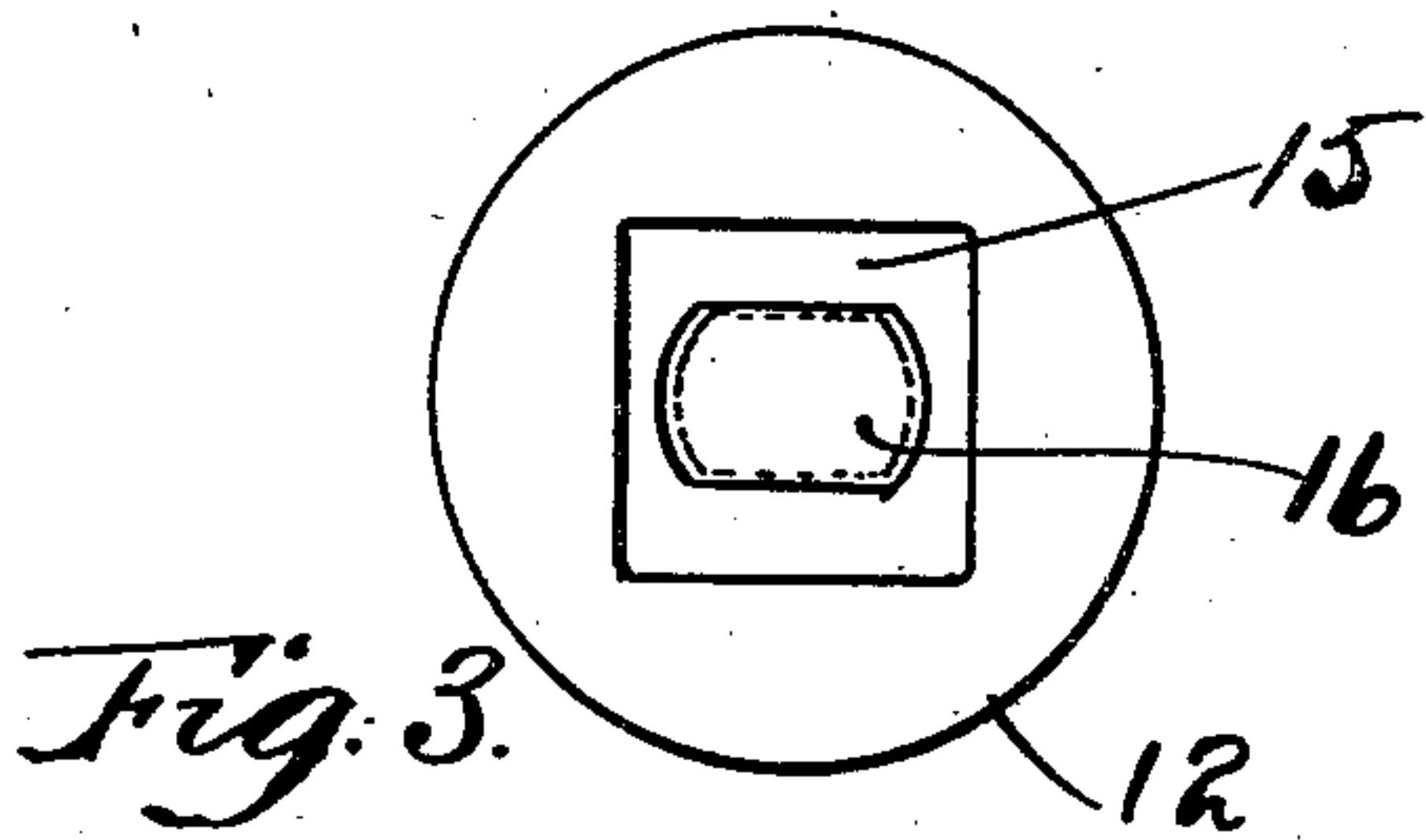
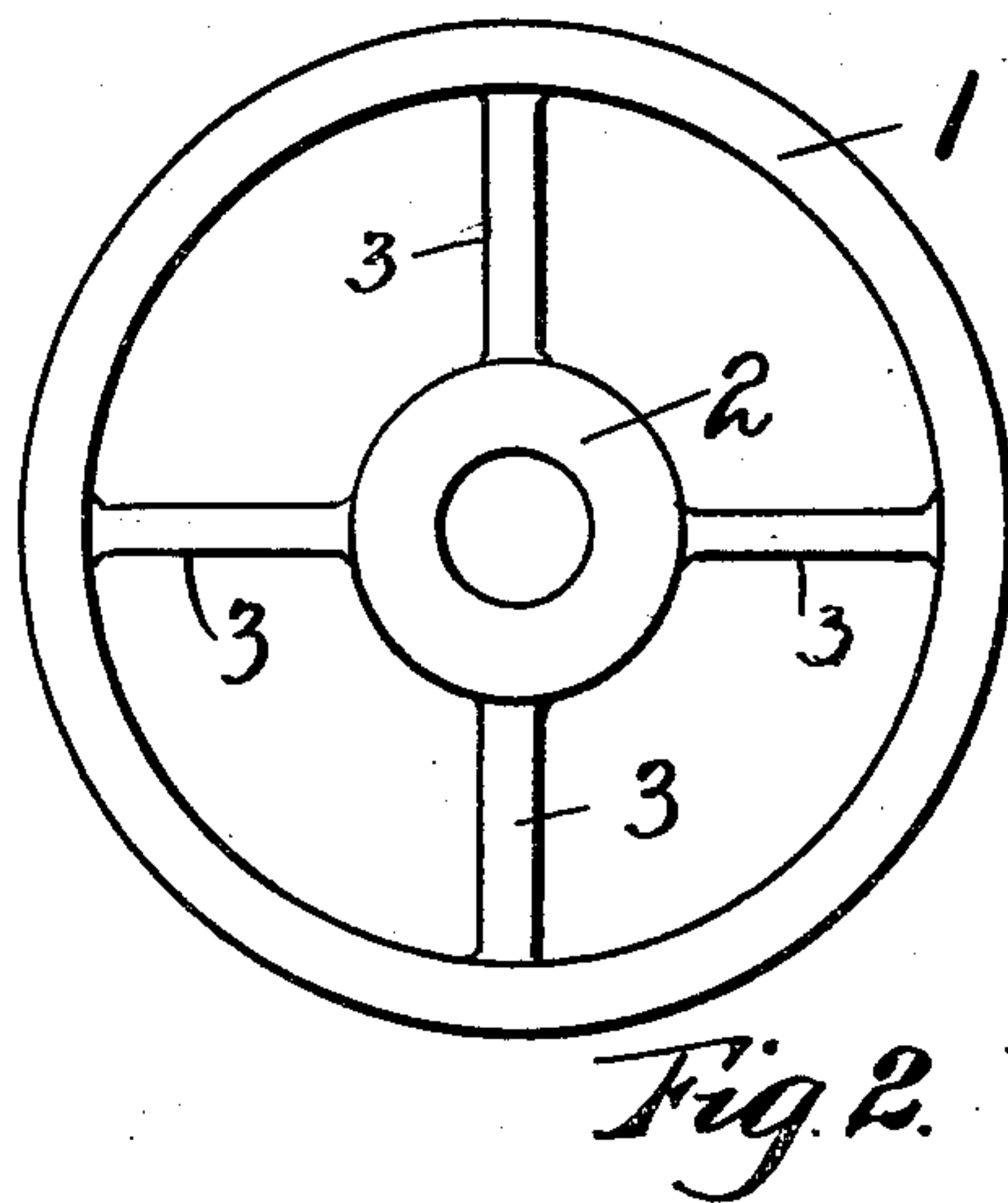
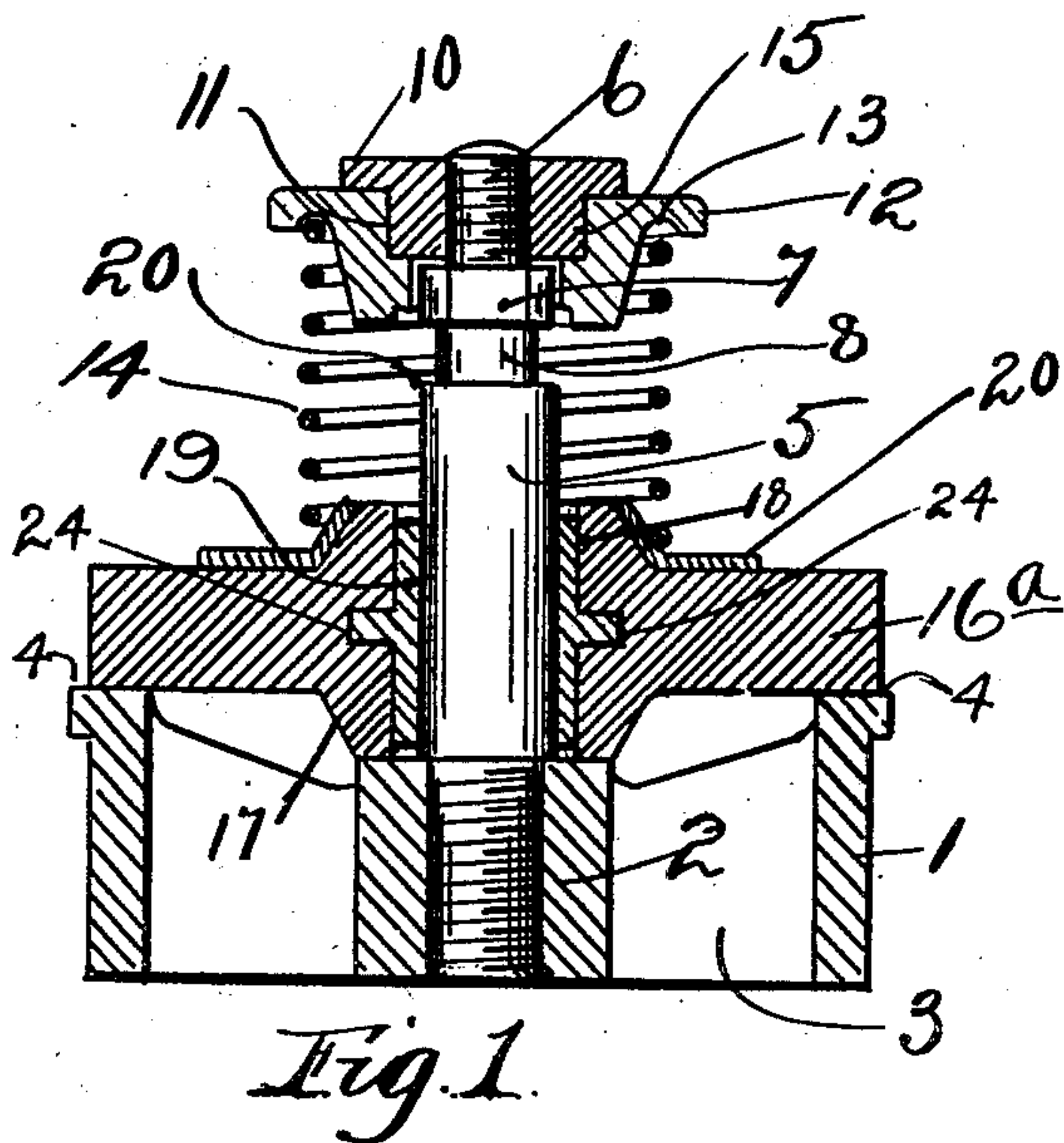
No. 863,449.

PATENTED AUG. 13, 1907.

C. G. RICHARDSON & F. N. CONNET.

VALVE.

APPLICATION FILED MAR. 6, 1905.



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UNITED STATES PATENT OFFICE.

CHARLES G. RICHARDSON AND FREDERICK N. CONNET, OF PROVIDENCE, RHODE ISLAND.

VALVE.

No. 863,449.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed March 6, 1905. Serial No. 248,439.

To all whom it may concern:

Be it known that we, CHARLES G. RICHARDSON and FREDERICK N. CONNET, both residents of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Valves; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to valves, and has for its object to improve the construction of that class of pump valve that is opened automatically by the action of the pump piston.

In devices of this class it is essential that a spring shall be used to act upon the valve disk to assist in returning the same quickly to its seat after it has been raised.

On account of the constant reciprocating action to which the working parts of these valves are subjected, they soon become worn and should be inspected regularly and the parts often replaced. Many of the valves are located in positions within the pump casing where it is difficult to get at them for repairs and the use of tools for this purpose is often impossible. It is therefore of utmost importance that the means for retaining these parts shall be so held that they may be readily removed and at the same time secured in such a manner that they cannot work loose and get free to damage the other working parts of the pump.

Some difficulty has been heretofore experienced in devices of this character in that means have been used for permanently locking the collar on the stem, by keys or the like, which renders it difficult to remove the parts for inspection or repair. In other constructions where adjustable means have been used no practical method for locking has been provided.

The essential feature of this improved device is the providing of means whereby the collar that retains the valve spring may be securely locked against a rotary or an outward movement and at the same time that all of the working parts may be free to act and also readily removed without the use of tools but by the use of the thumb and fingers of one hand only. The collar may also be adjusted vertically to regulate the tension of the spring on the valve disk when desired.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— represents a central longitudinal section of the device.

Fig. 2— is a plan view of the valve seat showing the ribs therein. Fig. 3— is a top plan view of the collar showing the square recess therein and the elongated slot for the reception of the spindle. Fig. 4— is a central sectional elevation of said collar. Fig. 5— is a side elevation of the locking nut showing the downwardly projecting portion which engages the corresponding recess in the collar. Fig. 6— is a bottom plan view of said nut showing the projecting squared portion thereon. Fig. 7— is a perspective view of a portion of the spindle showing the flattened portion that engages the corresponding apertures in the collar to prevent the latter from rotating. Fig. 8— represents the valve disk in elevation.

Referring to the drawings at 1 is the valve seat made in the form of a ring that may be secured in the pump (not shown) in the usual manner. This ring is provided with a central hub 2 that is supported in position by the ribs 3, this hub as shown in Fig. 1, does not extend up to the level of the valve seat or upper edge 4 of the ring. Projecting upward from this hub 2 is the stem 5 which stem is preferably made of a separate piece of material and secured in said hub either by forcing it into the hub and riveting it in place or by means of a screw thread. The upper end of said stem is turned down at 6 and threaded to receive the nut. Just below the threaded portion the stem is enlarged at 22 and flattened at 7—7 on two sides for the purpose of entering a corresponding slot in the collar. Below this flattened portion the stem has an annular groove or recess 8 into which the collar may be dropped, given a one quarter turn and locked against an endwise movement when desired. At 9 is the lock nut having a knurled flange 10 on its upper edge, and a downwardly extending squared portion 11 that sits into a corresponding recess 15 made to receive it in the upper face of the collar or washer 12. This collar is also recessed on its under side at 13 to receive the upper coil of the spring 14. Through this collar is made a hole 16 with flat sides to engage the corresponding flattened sides of the spindle at 7 by which flat sides said collar is prevented from turning on the spindle.

The valve disk 16^a is preferably made of vulcanized rubber having a raised hub or center portion 17—17 on both its upper and lower faces. Through the center of this hub is a round hole 18 that is provided with a metal bushing 19 to prevent excessive wear by its constantly reciprocating motion on the stem. On the upper side of this disk is a thin metal washer 20 against which the lower coil of the spring rests to prevent it from cutting into the face of the rubber disk. The thickening up of this hub provides a longer bearing sur-

face on the stem, stiffens the central portion of the disk and also allows said disk to receive a central support or bearing on the hub 2 in the ring and further enables us to obtain the advantage of a more ready flow of water through the valve as hereinafter described. The ribs 3—3 are cut away on their upper edges to prevent them from coming in contact with and wearing the under side of the disk. By forming this disk the same on both sides it may readily be reversed when one side becomes worn.

In structures of this class, after a certain period of use the valve becomes worn on the surface that makes contact on the valve seat. In our device we have cut away the ribs to allow the disk to seat itself around the edge of the ring only, as it is found in practice that the disk will accommodate itself much more readily to the hub and ring alone than when it also bears on the ribs. The valve disk is so constructed that when it becomes worn it may be readily reversed and any defect thus remedied.

In the majority of instances the valve will be located in such position in the pump that it can be reached only with difficulty, the hand-hole through which access to the valves is had, being of a size to admit one arm only of a person and the valve being located at arm's length therefrom. In cases where the spring is held by keys, nuts and checknuts or any other means requiring a wrench or other tools to remove them the set tools can be used by the sense of feeling only. It will therefore be seen that the operation will be attended with considerable difficulty, which is entirely obviated by the construction of the improved device herein described in which no tools are required for the removal of the valve.

The lock is readily accessible to the hand, the collar being grasped by the thumb and fingers and pressed down onto the shoulder 20 into the annular recess 8, it is then given a quarter turn which locks it in that position under the extending side 21—21 of the head 22 against the tension of the spring. By thus pressing the collar downward it is carried clear of the squared portion of the nut and said nut is free to be unscrewed from the threaded portion on which it turns easily. The collar is then carried back the one quarter turn and readily removed from the stem thereby permitting the remaining parts, namely the spring and valve disk with its washer 20 to be also easily removed. To replace the parts in position, the valve disk, washer, and spring are slipped over the valve stem; the collar 12 is then placed over the stem and is pressed down over the flattened portion of the stem until it is opposite the recess 8 when it is given a quarter turn. The collar will be thus held automatically in such a position that the nut 9 can be easily screwed on to the stem after which the collar is released by turning it again one quarter round when it will be pressed upwardly by the spring against the nut 9 and its square recess engages the nut to prevent the latter from turning, thus locking the entire device.

The metal bushing of the valve disk 19 is preferably made with the flanged lugs 24—24 to hold it in the rubber and the latter is then molded around the bushing and flange.

The downwardly projecting hub 17 of the valve disk having the shape of a truncated cone will deflect the water outwardly as it strikes upon its surface in rushing upwardly through the valve and will thus materially assist the easy passage of the water.

The construction shown is an extremely practical and simple method for both locking and adjusting and at the same time allows of the parts to be very readily removed for inspection or repair.

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

1. In a device of the character described, the combination of a valve seat, a valve, a stem, a spring, and a locking device upon the stem including a collar to form an abutment for the spring, means engaging said stem to prevent the accidental removal of said collar therefrom, said engaging means being itself normally held from removal from said stem by engagement with said collar, and means whereby said collar may be withdrawn from said engaging means and locked to the stem against an endwise movement to permit the removal of said engaging means from said stem.
2. In a device of the character described, the combination of a valve seat, a valve, a spring, a valve stem, a collar provided with a recessed portion and normally held from turning on said stem, a nut threaded on said stem and arranged to normally engage said recess in said collar to hold said nut from turning, and means whereby said collar may be withdrawn from engagement with the nut and locked to the stem against an endwise movement to permit the removal of said nut from the stem.
3. In a device of the character described, the combination of a valve seat, a valve located on said seat, a spring to hold the valve to its seat, a valve stem, a collar provided with a recessed portion and normally held from turning on said stem and a nut threaded on said stem and arranged to engage said recess in said collar to hold said nut from turning.
4. In a device of the character described, the combination of a valve seat, a valve located on said seat, a spring to hold the valve to its seat, a valve stem, a collar normally held from turning on said stem, a nut threaded on said stem, said collar being provided with a recessed portion to engage and hold said nut from turning, said stem being provided with an annular groove to receive said collar and in which groove said collar may be turned and locked against an endwise movement to hold it from the nut against the spring pressure, allowing the said nut to be readily unscrewed from the stem.
5. In a device of the character described, the combination of a valve seat, a valve, a stem, a spring, and a locking device upon the stem to form an abutment for the spring, said locking device consisting of a screw nut upon the stem, a collar upon the stem normally prevented from turning and engaging the nut to prevent it from turning but movable longitudinally upon the stem, and means whereby the collar may be held against longitudinal movement when separated from the nut so as to permit the removal of the latter from the stem.
6. In a device of the character described, the combination of a valve seat, a stem, a reversible valve having a central extension from both faces around the stem, a spring, and a locking device upon the stem to form an abutment for the spring, said locking device consisting of a screw nut upon the stem, a collar upon the stem normally prevented from turning and engaging the nut to prevent it from turning but movable longitudinally upon the stem, and means whereby the collar may be held against longitudinal movement when separated from the nut so as to permit the removal of the latter from the stem.
7. In a device of the character described, the combination of a reversible valve disk having a central hub extending from both faces thereof, said extensions being in-

integral with the body of the disk, a valve frame having a bearing on its outer portion to receive a corresponding portion of the disk, and a central hub to normally receive and support the hub of the disk.

- 5 8. In a device of the character described, the combination of a valve disk having a central bearing extension or hub, said hub being provided with oblique faces disposed to meet and direct the water passing through the valve, with a valve frame having an outer portion to receive the

outer edge of the disk and a central hub to receive and 10 support the said hub of said disk.

In testimony whereof, we have hereunto set our hands this 2nd day of March A. D. 1905:

CHARLES G. RICHARDSON.
FREDK. N. CONNET.

In presence of—

H. J. BURROUGH,
WM. R. TILLINGHAST.