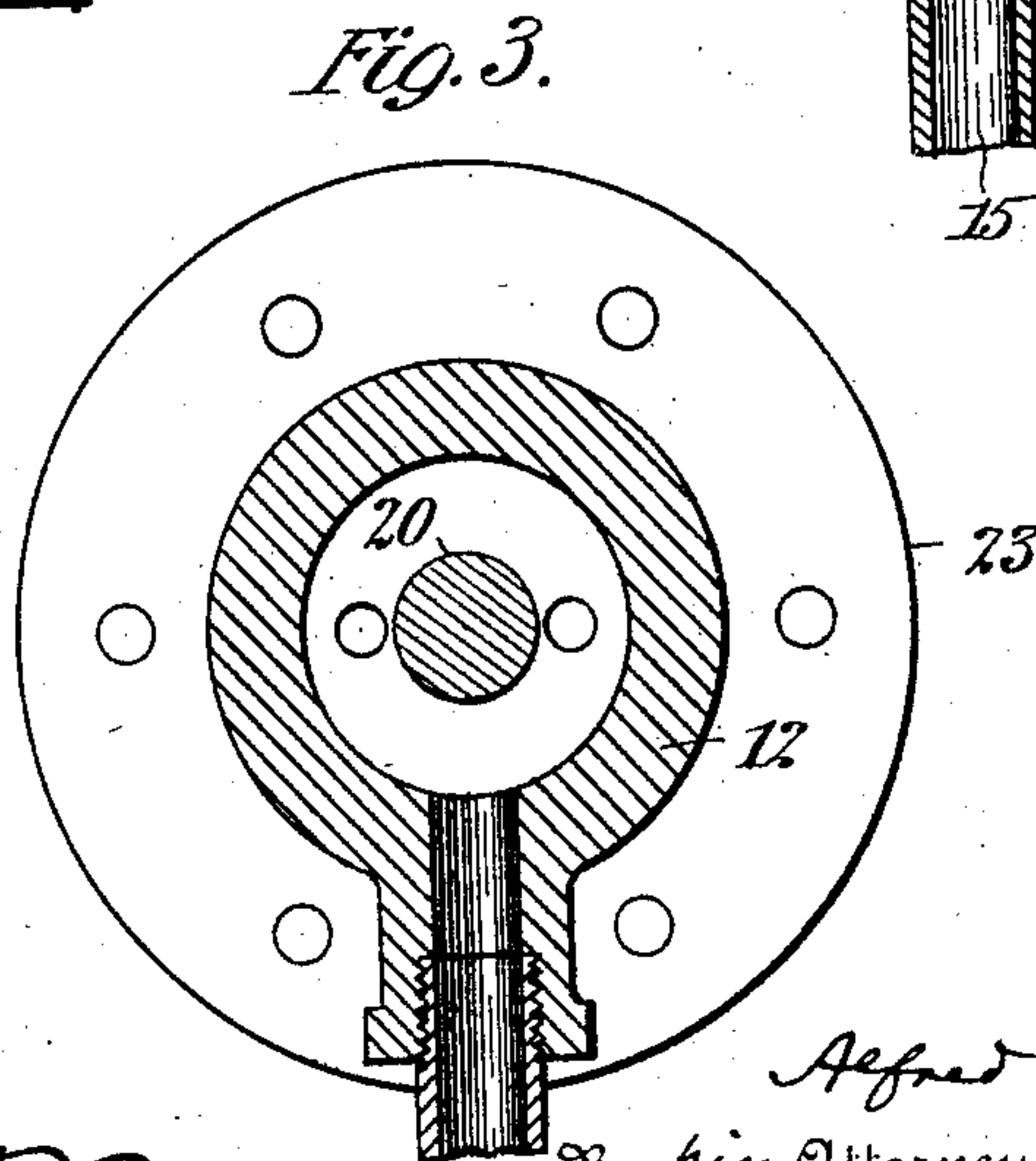
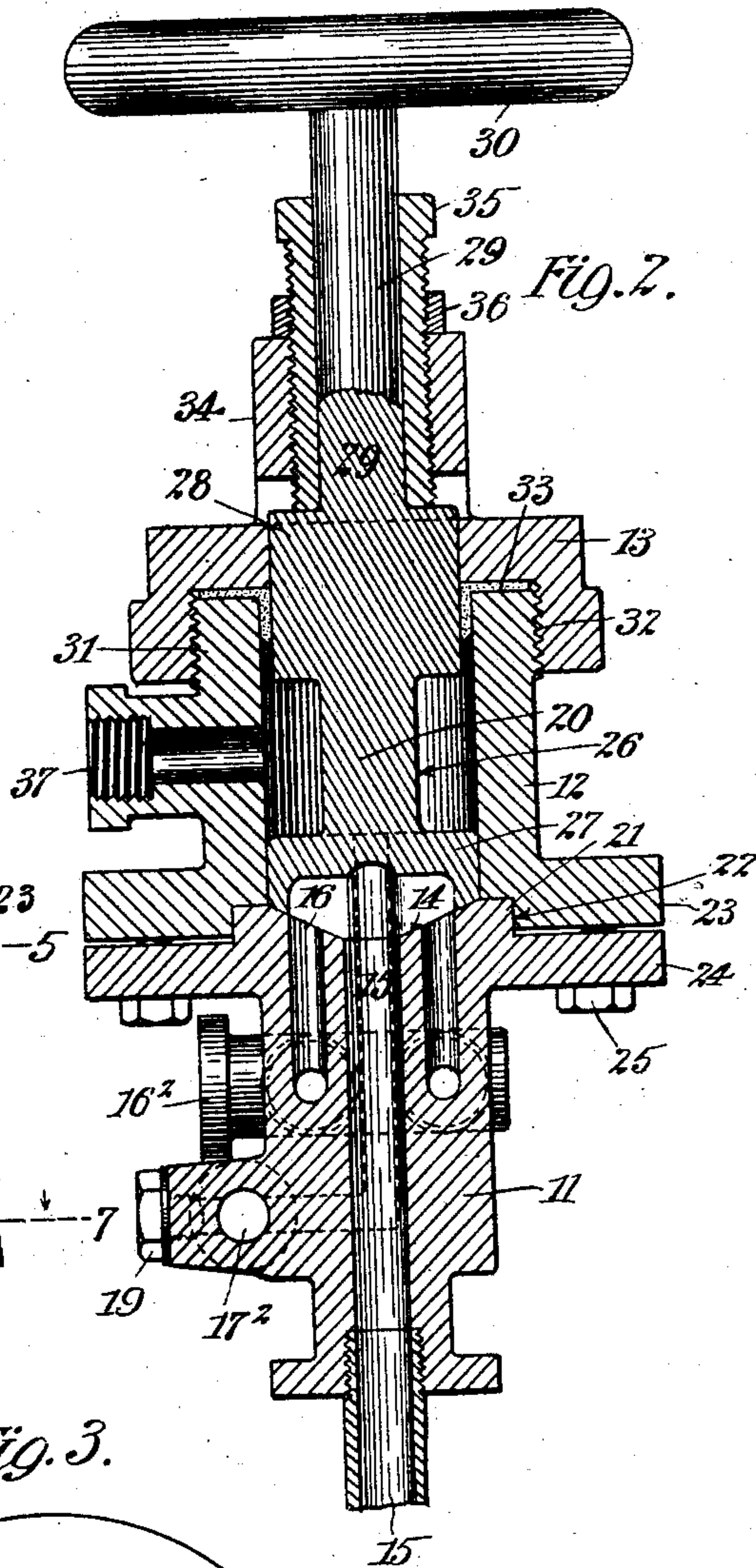
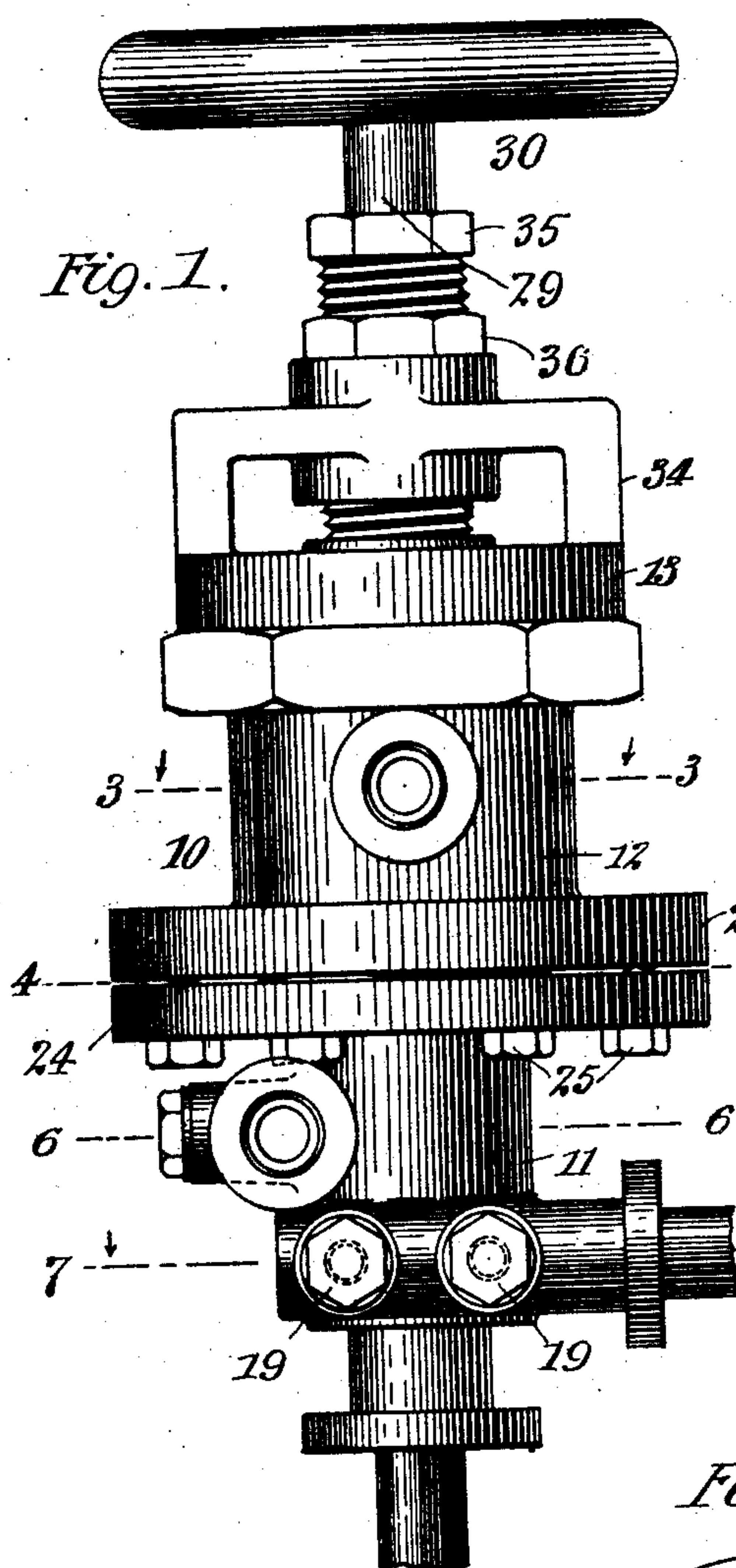


No. 866,861.

PATENTED SEPT. 24, 1907.

A. HOFFBAUER.
HYDRAULIC COCK.
APPLICATION FILED OCT. 24, 1905.

2 SHEETS—SHEET 1.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 4.

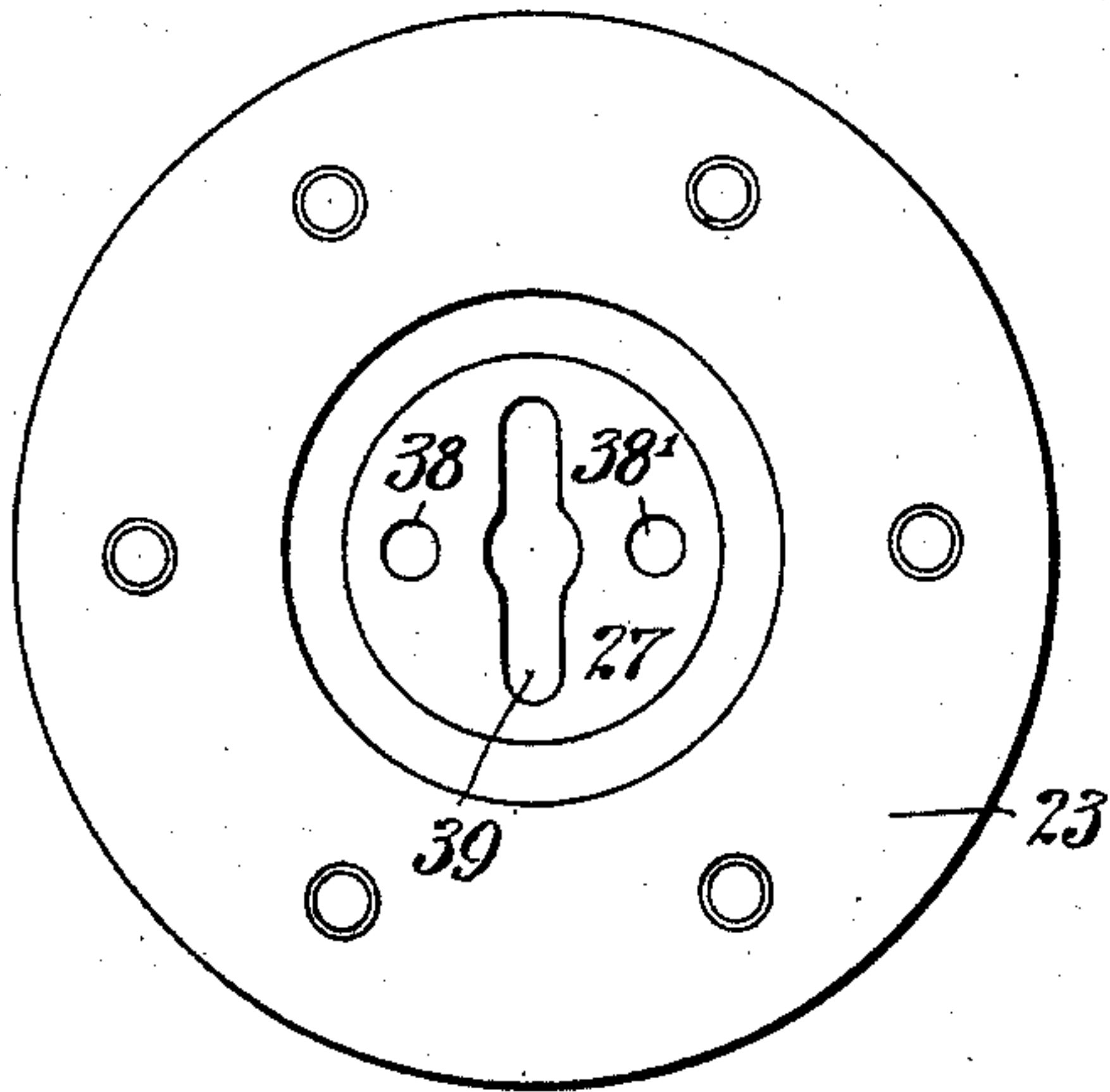


Fig. 5.

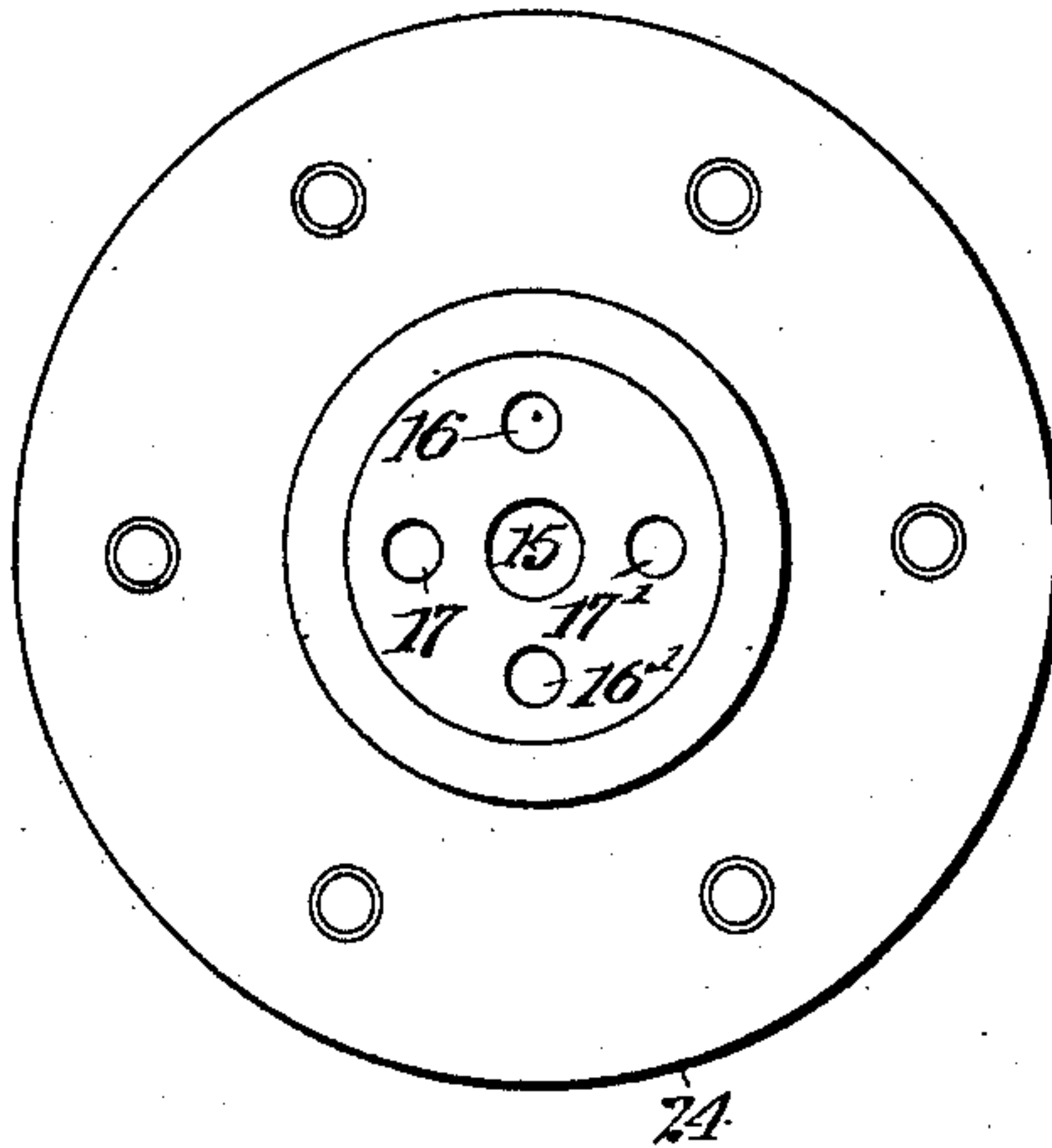


Fig. 6.

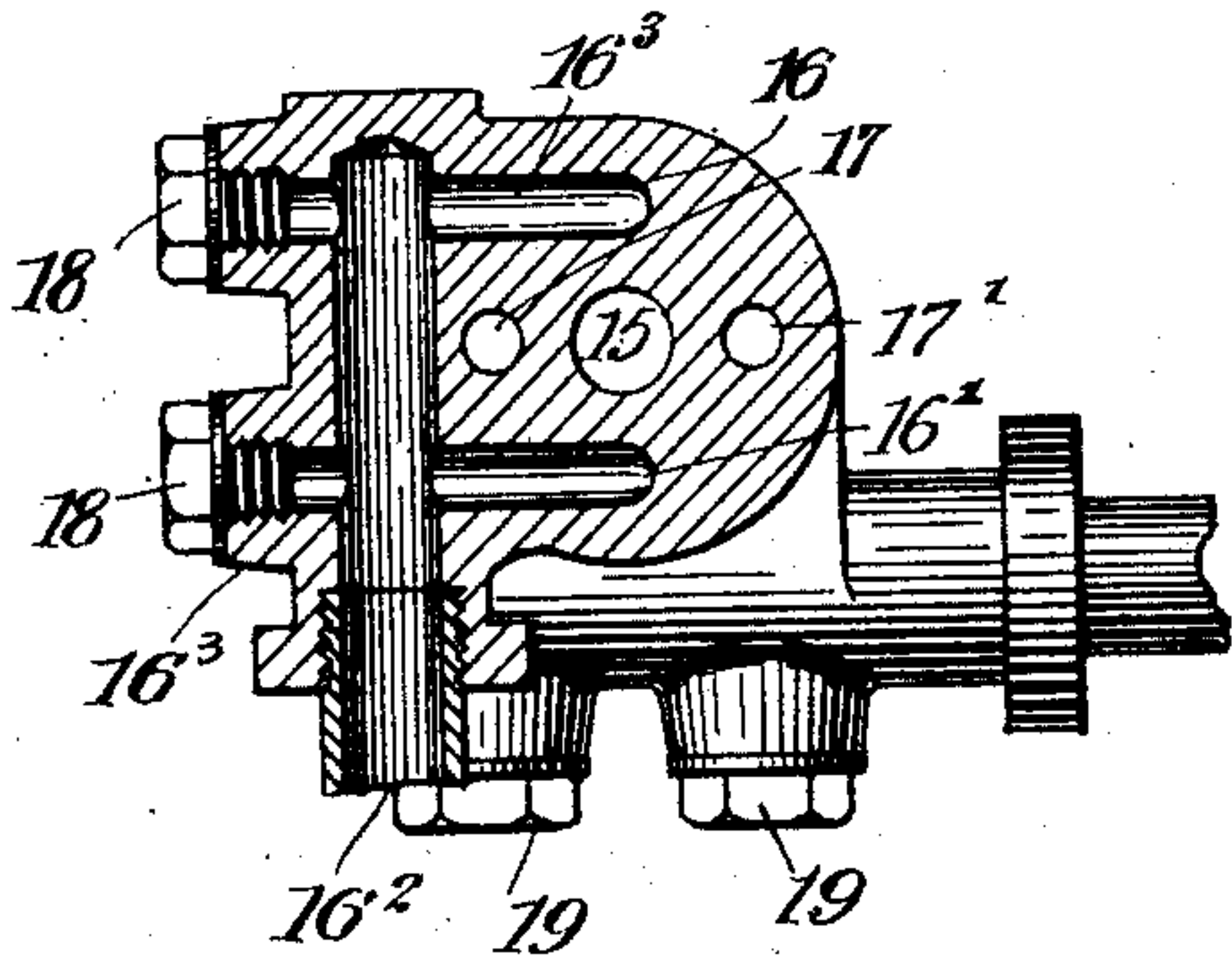


Fig. 7.

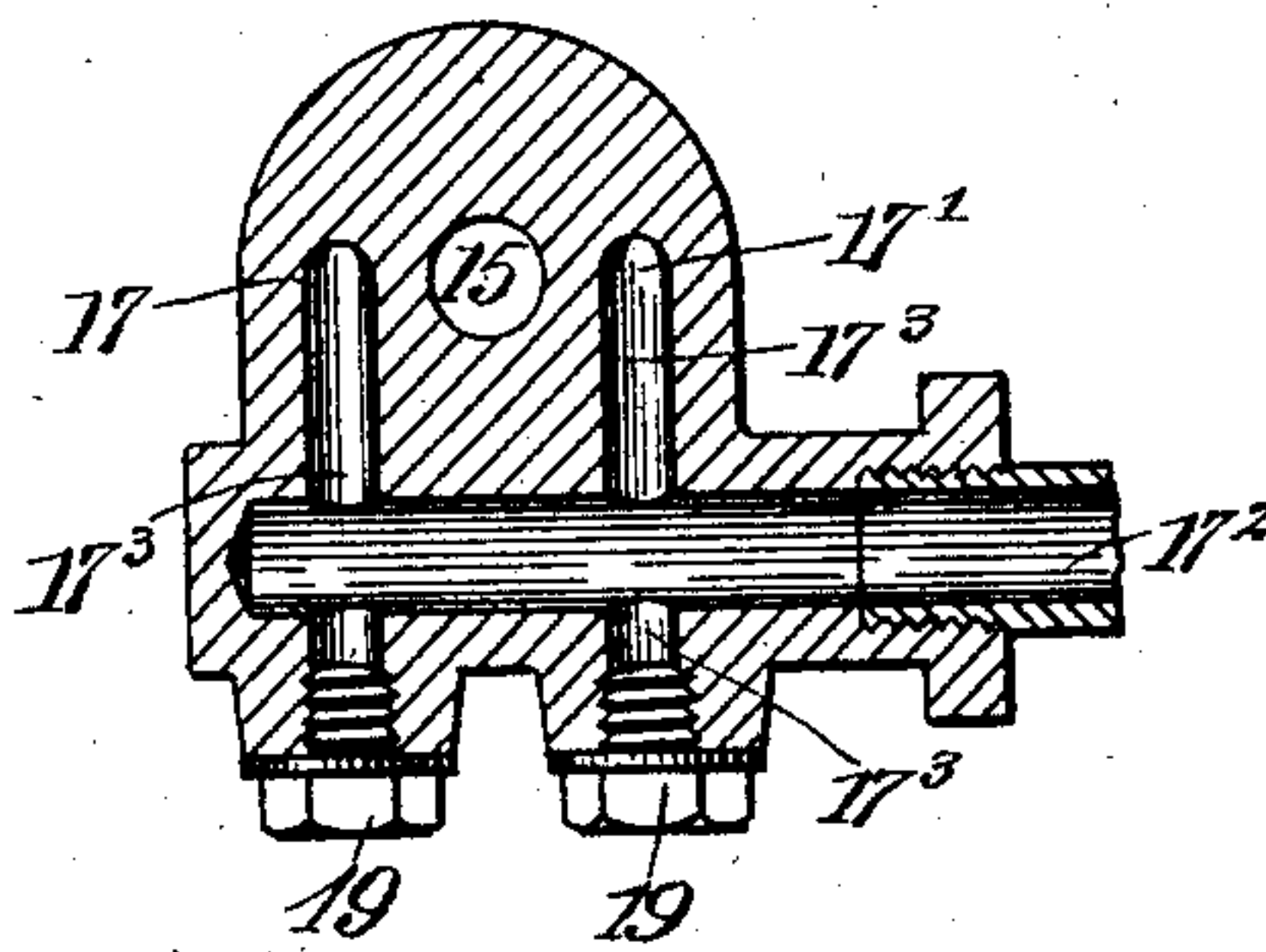


Fig. 8.

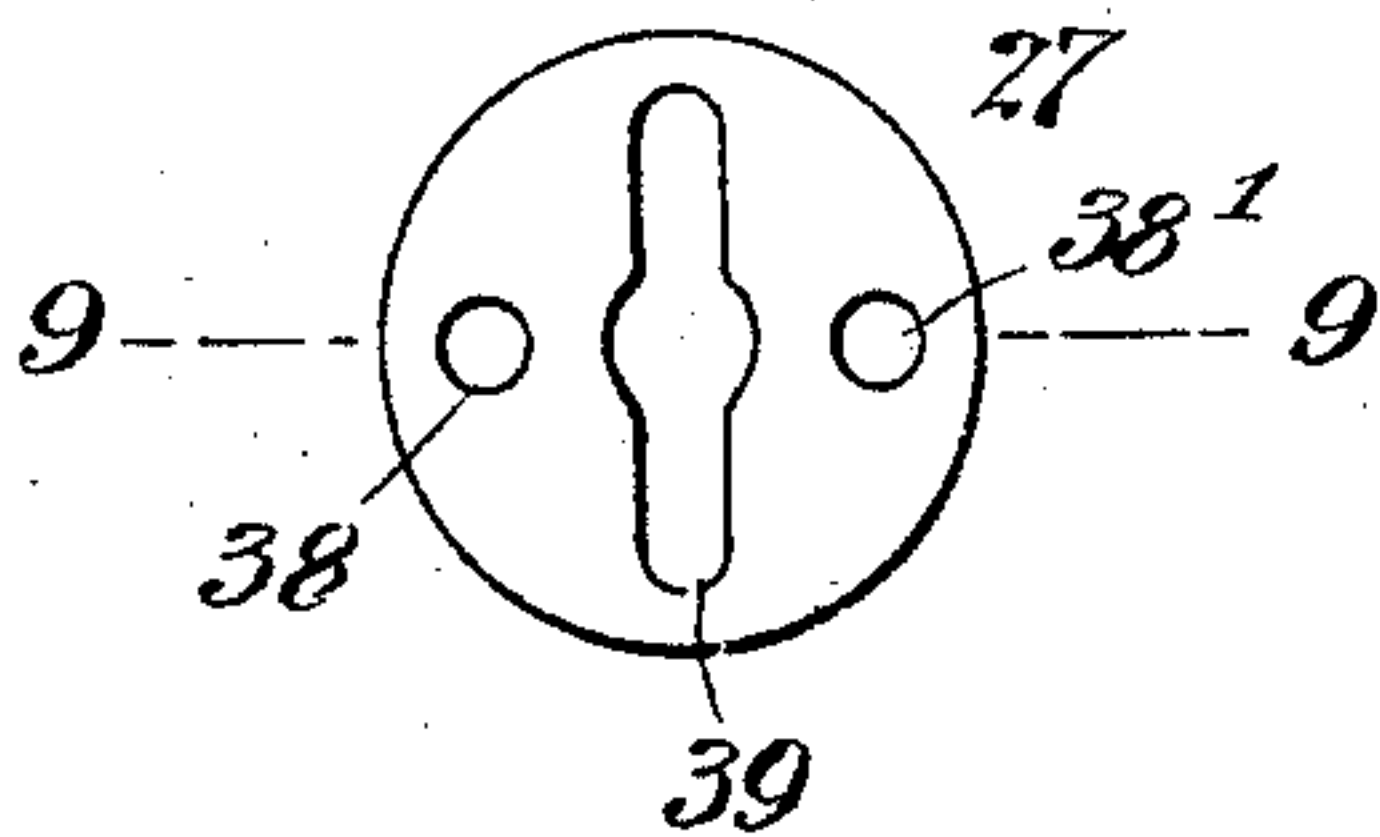
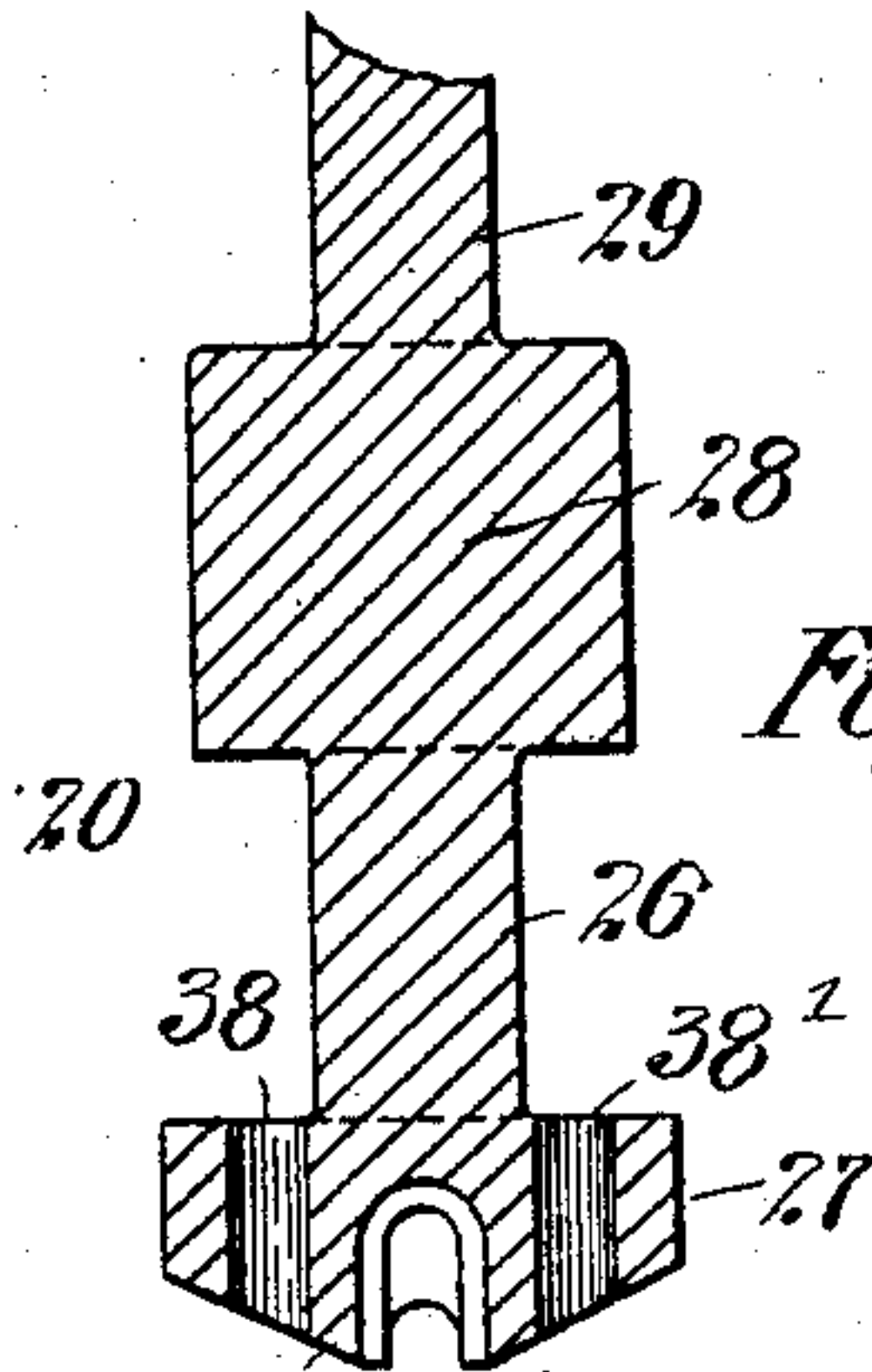


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALFRED HOFFBAUER, OF NEW YORK, N. Y.

HYDRAULIC COCK.

No. 866,861.

Specification of Letters Patent.

Patented Sept. 24, 1907.

Application filed October 24, 1905. Serial No. 284,166.

To all whom it may concern:

Be it known that I, ALFRED HOFFBAUER, a citizen of the United States, residing at Brooklyn, New York city, in the county of Kings and State of New York, have invented certain new and useful Improvements in Hydraulic Cocks, of which the following is a full, clear, and exact description.

My invention relates to a form of hydraulic valve or cock.

10 In the use and control of practically all forms of hydraulic apparatus, such as pumps, rams, engines, elevators, etc., it is necessary to use valves, and particularly a valve in which the working fluid may be alternately directed into one or another passage. For
15 this purpose various forms of cock or valve have been proposed, and particularly forms in which packing material is utilized to seal the joints of the movable parts, but so far as I am aware, there is no perfectly satisfactory valve of this sort owing to the wear of the
20 packing material when moved across the ports through which the fluid is controlled.

The object of my present invention is to provide a hydraulic cock in which packing material is not depended on for closing the ports, and further one which
25 shall be simple and easy to construct and having a minimum number of parts.

A further object of the invention is to provide a balanced hydraulic cock which shall wholly avoid leakage, which shall compensate itself for wear, and
30 which shall not bind on its seat under any circumstances.

With these and other objects in view my invention consists in the construction, combination, location and arrangement of parts, all as will be more fully
35 hereinafter set forth, as shown in the accompanying drawings, and finally particularly pointed out in the appended claims.

In the drawings, Figure 1 is a side elevation of a hydraulic cock embodying the principles of my invention; Fig. 2 is a sectional view of the same; Fig. 3 is a sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrows; Fig. 4 is a view taken generally on the line 4—5 of Fig. 1, looking upward; Fig. 5 is a view generally on the line 4—5 of Fig. 1
45 looking downward; Fig. 6 is a sectional view on the line 6—6 of Fig. 1; Fig. 7 is a similar view on the line 7—7 of Fig. 1; Fig. 8 is a detail view showing the face of the valve member proper; Fig. 9 is a longitudinal sectional view of the same on the line 9—9 of Fig. 8.

50 The most efficient way which has been found of constructing a hydraulic valve, especially one in which considerable pressures are employed, is to hold the valve against its seat by the pressure of the fluid. In this way the force becomes greater in proportion
55 to the greater pressure, and accordingly the greater

need of intimate contact between the valve and seat. In practice, however, it is necessary to construct the valve of considerable size, and inasmuch as the fluid pressure is often very great, the total force holding the valve against its seat is vastly greater than is necessary or desirable. I provide a balanced valve and one in which leakage around the fittings is avoided. In addition I secure a form of rotary hydraulic cock which reverses supply and exhaust connections to any desired apparatus at each actuation. Referring
65 to the drawings and to the various views and reference signs appearing thereon, in which like parts are designated by the same reference sign wherever they occur, 10 indicates generally a valve casing formed in three general parts respectively designated as 11, 12 and 13
70 in the drawing. The part 11 which I shall term the valve seat chamber comprises in its preferred form a metallic casing having a valve seat 14 machined upon its upper face. This valve seat may be flat or round or of any other form, but I prefer to make it slightly
75 coned inward, terminating in a longitudinal duct or passage 15 which extends through the valve seat chamber for a purpose which will be later described.

In addition to the duct 15 I provide certain additional ports 16, 16', and 17, 17', which are disposed
80 annularly around the central duct 15. I have shown these ports as 4 in number and equi-distantly spaced from each other and from the center, although this is not absolutely essential. The ports 16, 16', are connected together and terminate in a single outlet pas-
85 sage 16². The ports 17, 17', are likewise merged together into a single outlet passage 17². In Figs. 6 and 7 of the drawings, I have illustrated a convenient practical way of accomplishing this, from which it will be seen that the ports 16, 16', are drilled laterally into by
90 drill holes 16³, the passage 16², being afterwards drilled to intersect the hole 16³ so as to form a common outlet therefor. 18 indicate ordinary plugs which serve to stop up the improper outlets made by the holes 16³. In like manner the ports 17, 17', are intersected by
95 drill holes 17³ which connect with the passage 17². 19 indicate the plugs for the holes 17³. These details are, of course, merely a convenient arrangement, and cored passages or passages formed in any other way would serve equally well, it being merely essential to connect
100 the corresponding ports in the valve 14 together into single outlet passages.

There is a valve 20 guided within the valve chamber 12. I arrange the valve chamber 12 in concentric relation to the valve seat 14, and for this purpose I provide
105 the valve seat 14 with a concentric peripheral edge or shoulder 21 entering a corresponding recess 22 within the valve chamber 12.

23, 24, indicate flanges upon the valve chamber and valve seat chamber which are conveniently drawn to-
110

gether by bolts or screws 25. In this way the valve chamber is accurately centered with respect to the valve seat.

The valve 20 may be formed in various different ways, but a convenient construction is illustrated in which a shank 26 has a chambered head 27 at its lower end forming the valve member proper and a cylindrical enlargement 28. I shall term the recessed head 27 the valve member, and the cylindrical enlargement 28 I shall term the counter-balancing head on account of the function of this part which will later appear.

29 indicates the valve stem upon which is any suitable means 30 by which the valve may be manipulated.

The valve 20 is accurately guided within the valve chamber 12 so as to be freely revoluble therein, to lie against the seat 14. The counter-balancing head 28 is also guided by the valve chamber 12 and also by the part 13 of the valve casing previously referred to, which constitutes part of a stuffing box or gland and forms a fluid tight joint between the valve and its surrounding casing. The valve chamber 12 is conveniently threaded at 31 at the upper portion thereof, while the part 13 which I shall term the packing chamber has internal screw threads 32, so that the packing chamber may be tightly screwed down upon the valve chamber as clearly shown in Fig. 2. When assembled in the above relation there is left between the two an annular space or recess in which I clamp a usual form of hydraulic press packing 33 such as a piece of leather having an L- or U-shaped section. This packing closely embraces the counter-balancing head 28 and forms a fluid tight joint therewith.

In addition to forming a gland or stuffing box for the valve, the packing chamber 13 also serves as a support for a guiding bearing or journal 34 which contains a threaded sleeve 35 which serves to guide the valve stem 29.

36 indicates a lock or jam nut by which the threaded sleeve 35 is held in any position to which it has been adjusted. The lower end of the sleeve 35 abuts against the counter-balancing head 28, and in practice is so adjusted as to bear the valve member revolubly against its seat.

The valve member 27 is adapted to make certain connections between the ports in the valve seat 14 and a supply pipe 37. Connection is also simultaneously made between the alternative ports and the exhaust pipe 15. For this purpose the valve member 27 is recessed to form certain valve openings or cavities, in any convenient way, as for example, in the manner illustrated in Figs. 8 and 9. Referring to these figures, it will be seen that the bottom face 27' of the valve member is formed to correspond with the valve seat 14 and provided with drilled passages 38, 38', which extend clear through the valve member into the space surrounding the shank 26.

39 indicates a recess or cavity within the valve member which lies intermediate the holes 38, 38', and is conveniently drilled or chipped out of the metal so as to form a simultaneous connection of the ports 16, 16', or ports 17, 17', with the exhaust duct 15. The ports 38, 38', are so disposed as to be in register with one or the other set of ports 16, 16', or 17, 17', the recess or cavity 39 registering with the alternative

set in every case. Since the inlet pipe 37 enters the space surrounding the shank 26 of the valve, this pipe may be put in communication with either the ports 16, 16', or 17, 17', according to the way in which the ports 38, 38', are turned. In like manner the exhaust pipe 15 is in communication with the ports 16, 16', or 17, 17', according to the position of the valve member.

The operation is as follows: Supposing the valve to be in the position of Fig. 2, fluid pressure is applied to the pipe 37 from whence it enters and fills the recess around the shank 26 in the valve chamber 12. Within this chamber pressure is exerted in all directions, against the walls, against the valve member 27 and against the counter-balancing head 28. The pressure against the back of the valve member supports the latter against the seat 14, but the entire pressure of the fluid is not expended in this way on account of the counter-balancing effect of the head 28. The upward pressure of the fluid against this head removes a corresponding force from the valve seat, and in practice the area of the head 28 is made less than that of the valve member 27, so that only a certain requisite force shall be applied to press the valve member against its seat. In the position shown in the figures, the holes 38, 38', are in register with the valve ports 17, 17', so that the valve in this position is effective to open communication from the supply 37 to the outlet orifice 17². At the same time the outlet orifice 16² is in communication with the exhaust duct 15 through the recess or cavity 39. When the valve is rotated through an angle of 90° the connections are alternated or reversed.

Whenever the pressure is shut off the valve member does not leave its seat by virtue of the sleeve 35, and whenever an adjustment is required to compensate for wear, this may be readily accomplished by manipulating the sleeve 35 and jam nut 36.

While I have shown and described in detail all of the mechanical particulars and details of the practical valve, I do not desire to be limited or restricted thereto, it being evident that the size, form, proportion and particular details of construction would be widely modified in practice to accord with the different uses to which my hydraulic cock is put.

What I claim, is:—

1. In a hydraulic cock, a valve chamber having an inlet pipe and a valve seat and having a guiding bearing or journal 34, a threaded sleeve in said journal, a lock nut on said sleeve, a valve member revoluble in said sleeve and engaging said seat, said valve member having a counterbalancing head of uniform circular section, and a strip of packing material 33 coöperating with said head, said threaded sleeve bearing against the head of said valve member to keep the same in proper relation upon its seat.

2. A hydraulic cock comprising a valve chamber having an inlet pipe, a valve therein having a counter-balancing head and a valve member having a hole and a recess in its face, a stuffing box or gland surrounding said head, and a valve seat with which said valve member is in revoluble engagement.

3. A hydraulic cock comprising a valve having a counter-balancing head and a valve member having a hole and recess in its face, said valve member being of slightly larger area than said head, and a valve chamber surrounding said valve having an inlet pipe whereby a preponderance of fluid pressure is applied to hold the valve against its seat.

4. A hydraulic cock comprising a casing having a valve

seat and a valve chamber, a valve having a counter-
balancing head, a gland or stuffing box surrounding said
head, holes through said valve arranged to register with
ports in the valve seat, and a recess arranged to register
5 with additional ports in the valve seat.
5. A hydraulic cock comprising a valve casing having
a seat, a valve having a valve member in engagement
with said seat and adapted to direct fluid alternately
into different passages thereof, a shank and a counter-
10 balancing head arranged to counter-balance part of the

fluid pressure against the valve member, and a stem hav-
ing a turning member thereon by which the valve may be
manipulated.

In witness whereof, I subscribe my signature, in the
presence of two witnesses.

ALFRED HOFFBAUER.

Witnesses:

JAMES HARRISON,
FRANK WENZEL.