

G. CLARK.
PUMP VALVE.
APPLICATION FILED NOV. 26, 1906.

948,132.

Patented Feb. 1, 1910.

Fig. 3.

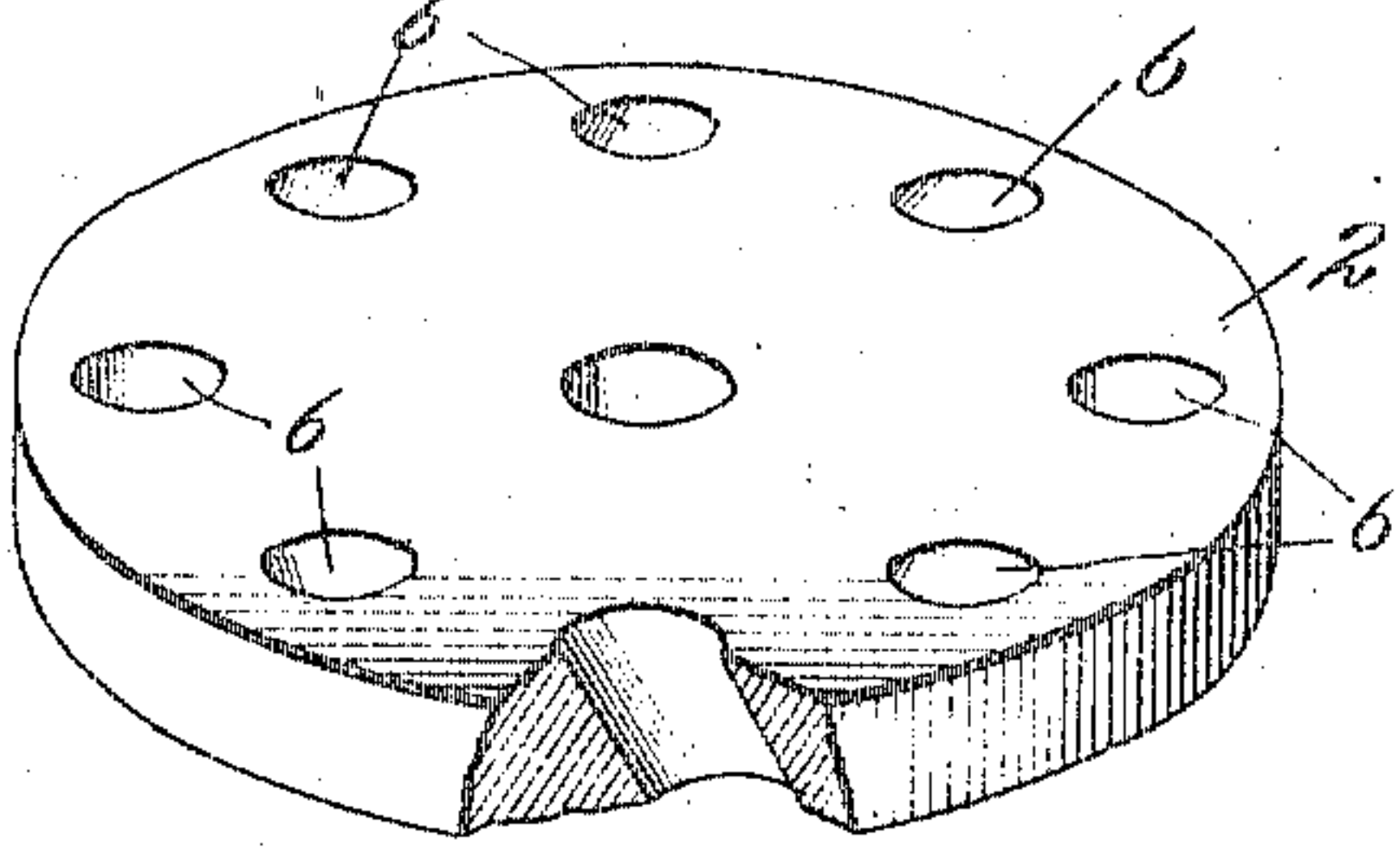


Fig. 4.

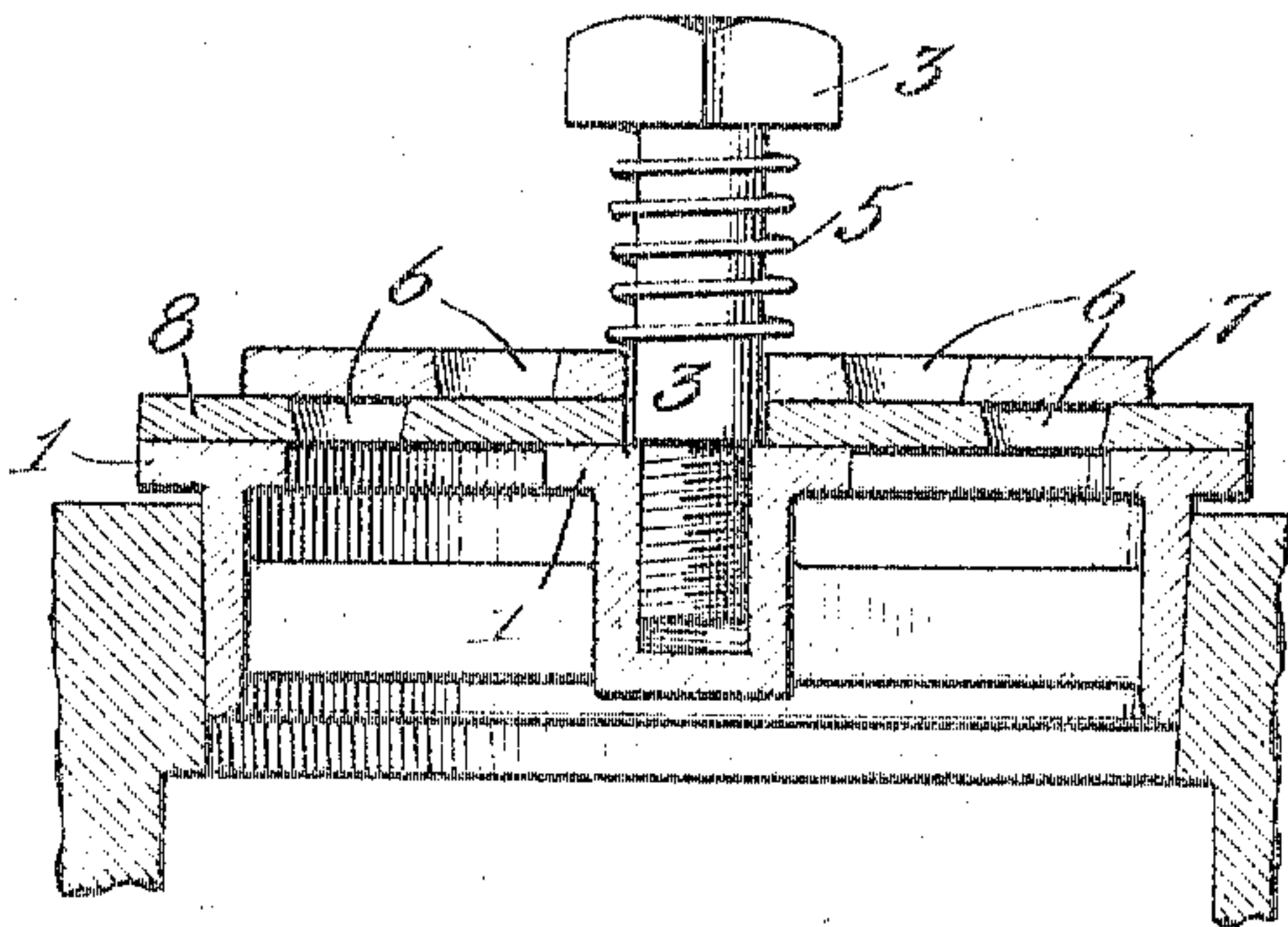


Fig. 1.

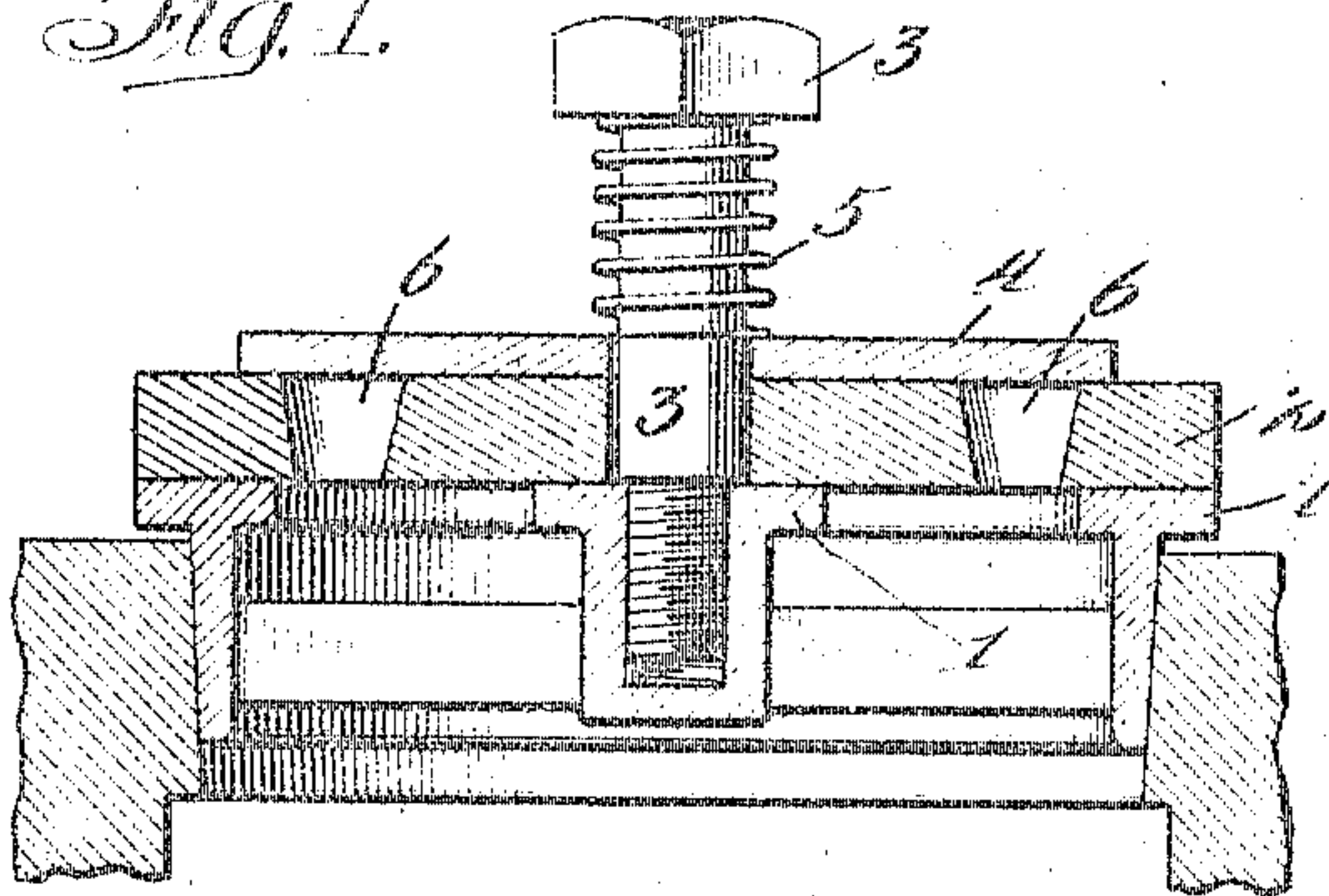


Fig. 5.

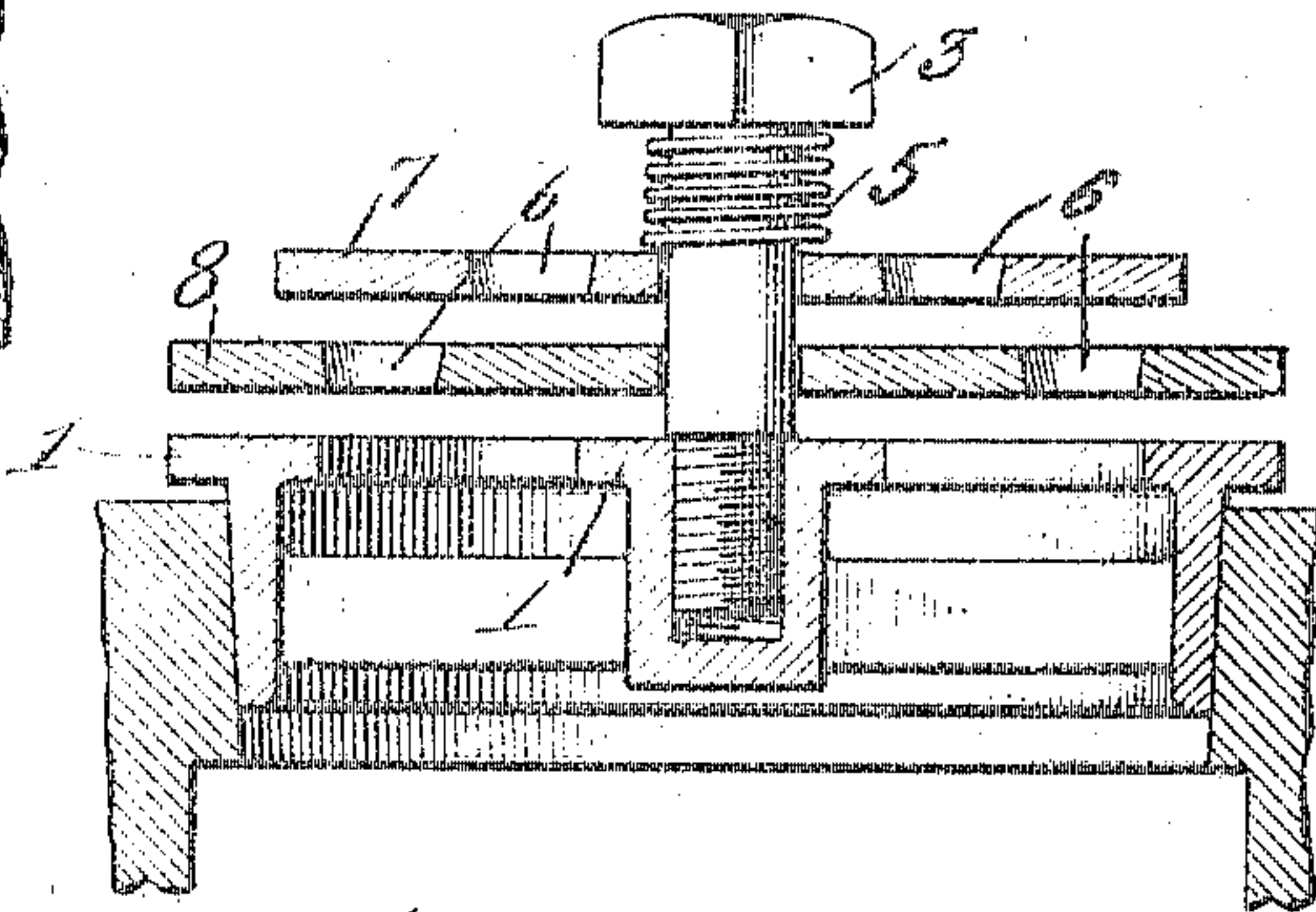


Fig. 2.

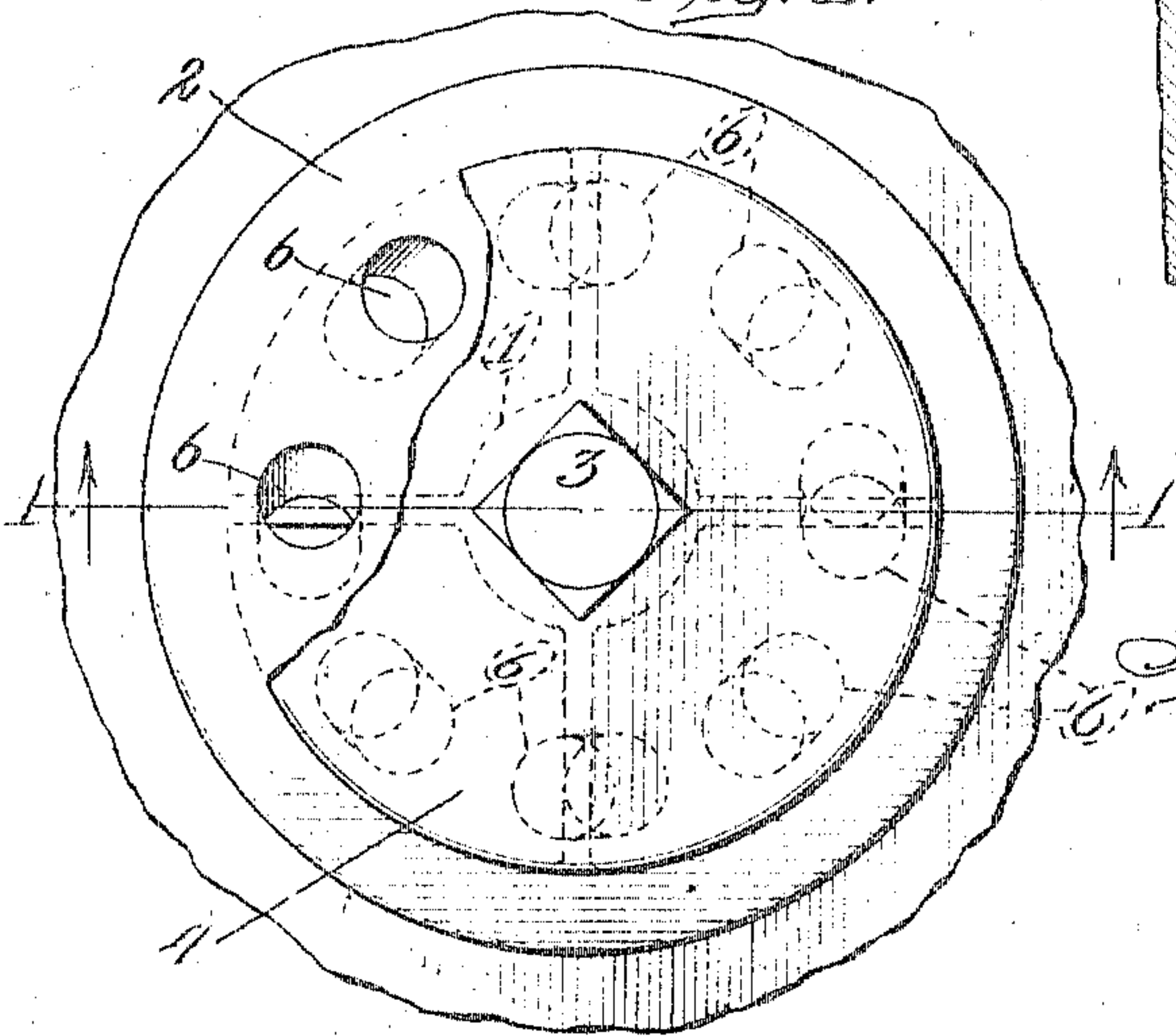


Fig. 6.

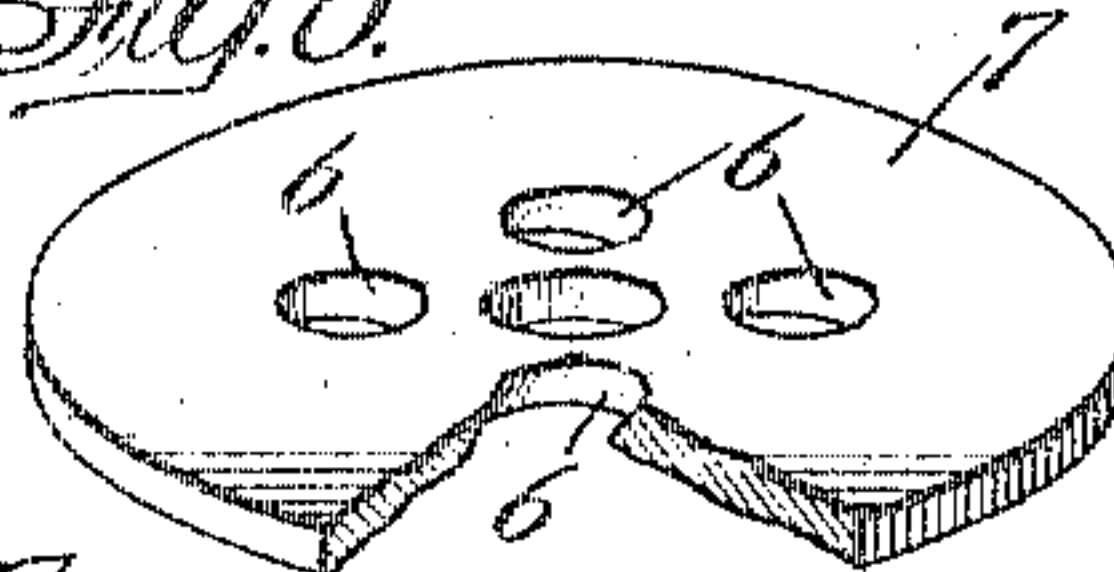
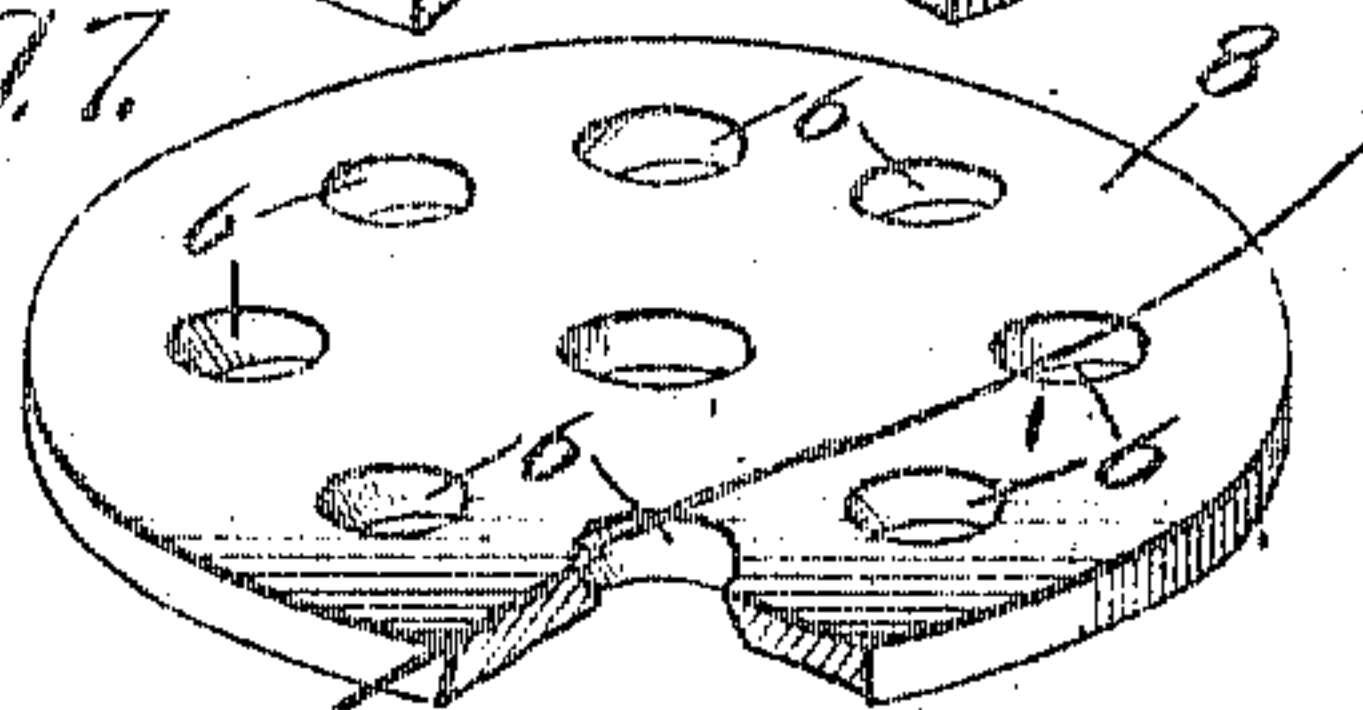


Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE CLARK, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ECONOMIC SPECIALTY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PUMP-VALVE.

948,132.

Specification of Letters Patent.

Patented Feb. 1, 1910.

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To all whom it may concern:

Be it known that I, GEORGE CLARK, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pump-Valves, of which the following is a specification.

This invention relates to improvements in pump valves and has for its object to provide an improved construction in valves of this character such that the rush of water through the valve, when open, will serve to rotate the valve disks or plates on their seats, and thus prevent their opposed surfaces from wearing irregularly so as to eventually cause leakage.

The invention will be fully understood from the following description of the construction illustrated in the accompanying drawing, in which,—

Figure 1 is a sectional elevation of a valve constructed in accordance with my invention, the section being taken on line 1 of Fig. 2. Fig. 2 is a top plan view thereof. Fig. 3 is a perspective detail of the valve plate or disk of the construction shown in Figs. 1 and 2. Fig. 4 is a sectional elevation of a multiple disk form of valve embodying the invention. Fig. 5 is a similar view of the same construction showing the valve open. Figs. 6 and 7 are perspective details of the perforated valve disks of the construction shown in Figs. 4 and 5.

In its general construction the valve shown in Figs. 1-3 is of that familiar type commonly employed in the water ends of steam and power pumps. It comprises a circular seat 1, usually made of brass, and a circular valve plate or disk 2, usually made of rubber, that is adapted to rise and fall upon the valve seat 1, this disk being held in place and guided in its rising and falling movements by a central bolt 3 around which a washer 4 and coil spring 5 are placed to normally hold the valve disk down. In the ordinary operation of this valve, the disk 2 will be lifted against the tension of the spring 5 by pressure of water beneath it, thus permitting this water to flow through into the space above the valve. Immediately the pressure ceases, however, or is reversed so as to be exerted upon the top of the valve, the disk closes down and prevents the return of the water through the valve. My improvement in this case con-

sists in providing the valve disk 2 with oblique or inclined surfaces so arranged that the upward flow of the water through the valve will give the disk a rotary impulse each time the valve opens. As herein shown, such inclined surfaces are provided by perforating the valve disk with a number of holes 6 arranged in a circular series about the central axis of the disk and individually arranged with their axes uniformly inclined in the same direction with respect to the axis of the disk. The upper ends of these holes are covered by the washer 4 when the valve is closed, and are thus prevented from serving as channels through which the water above the valve may escape, but the same pressure of water which forces the valve disk 2 off its seat, will also raise the washer 4 above the surface of the disk far enough to permit a flow through the aperture 6 sufficient to bring about the intended rotary impulse of the valve disk. And the constant succession of rotary impulses which result as the valve continues to open and close, constantly changes the presentation of the wearing surfaces to each other and so prevents any uneven wear which might otherwise result and which would tend to produce leakage.

In the construction shown in Figs. 4, 5 and 6, the valve is of the multiple leaf type in which a plurality of perforated disks 7 and 8 (usually of metal) are employed, instead of a single thick disk and washer. The perforations 8 and 9 of the disk in this case are inclined as in the construction shown in Fig. 1, but the direction of the inclination of the perforations in two adjacent disks is opposite, so that these disks tend to rotate in opposite directions.

I am aware that it is not new to make a compound valve of the type shown in Cameron patent 157,791 dated Dec. 15, 1874, in which a main disk is provided with water passages through its body and which is surrounded by a supplemental closure disk whereby the capacity of the valve is increased and whereby shock due to sudden closing of the valve is avoided to a considerable extent. The objection to this valve is that both the main valve and the supplemental valve rise and fall in the same places every time so that in a comparatively short while the seats are worn sufficiently to permit the valve to leak.

I am also aware of the Fulton patent for gage cock No. 267,416 dated November 14, 1882, in which the valve is a cylindrical member or rod provided at a point above or
 5 beyond its seat with an annular collar provided with inclined water passages to convert said collar into a sort of propeller or paddle wheel, whereby the water or steam after it passes the seat will be directed
 10 through said propeller and cause the valve rod or member to rotate. This device is inapplicable to pump valves since the propelling veins are located directly in the fluid passage and would thus materially obstruct
 15 the flow. In my device I secure the rotation of the valve disk by shunting or deflecting a portion of the water through the disk itself, that is I place the propelling vein or veins within the body proper of the valve
 20 disk, so that the rotation of the valve is not only secured without obstructing the free passage of the water but is in fact secured in a manner which actually facilitates the discharge of the water and increases the capacity of the valve to the extent of the opening or openings in the valve disk. I prefer providing the valve disk with a sufficient
 25 number of openings to materially increase the capacity of the valve, but it is obvious that it is within the spirit of this invention to reduce the number of openings to one and to reduce the area of this single opening to a size which will be sufficient simply to secure a slight rotation of the valve at each
 30 passage of the water past it.

I claim as my invention:—

1. A pump valve provided with a plurality of superposed plates centrally guided to rise and fall upon the seat, and having inclined surfaces against which the water flowing through the valve will react to produce relative rotation of the plates, substantially as described.

2. A pump valve provided with a plurality of superposed plates centrally guided to rise and fall upon the seat, each plate having inclined apertures against the walls of which the water flowing through the valves will react to individually rotate the plates,
 50 substantially as described.

3. A pump valve provided with a plurality of superposed plates centrally guided to rise and fall upon the seat, each plate having inclined apertures against the walls of which the water flowing through the valve
 55 will react to individually rotate the plates, the inclination of the apertures in the adjacent plates being opposite to each other so as to reverse the direction of their rotary movement, substantially as described.

4. In combination, a valve-seat carrying a central upstanding guide-pin or bolt, a rotatable valve-disk mounted on this pin and adapted to seat against this seat and provided with water-passages extending directly
 60 through its body proper, another valve-disk slidably mounted on said guide-pin and normally closing the water-passages through the aforesaid valve-disk, and means on the guide-pin for normally holding both plates or disks
 65 against their respective seats, one of the passages in the first-named valve disk having an inclined face against which water flowing through the valve will react and rotate said disk not only with respect to the seat
 70 but also with respect to the valve-disk above whose seat it forms.

5. In combination, a valve-seat, a disk seated thereon and provided with water-passages extending directly through its body
 80 proper, and another disk seated on top of the aforesaid disk and normally closing the water-passages therethrough and having a limited vertical movement independently of the lower disk, and means for normally seating
 85 both disks against their respective seats, one of the passages in the first-named valve-disk having an inclined face against which water flowing through the valve will react and rotate said disk not only with respect
 90 to the seat but also with respect to the valve-disk above whose seat it forms.

In testimony, that I claim the foregoing as my invention, I affix my signature in presence of two subscribing witnesses, this
 95 5th day of November, A. D. 1906.

GEORGE CLARK.

Witnesses:

K. A. COSTELLO,
 M. V. McGRATH.