

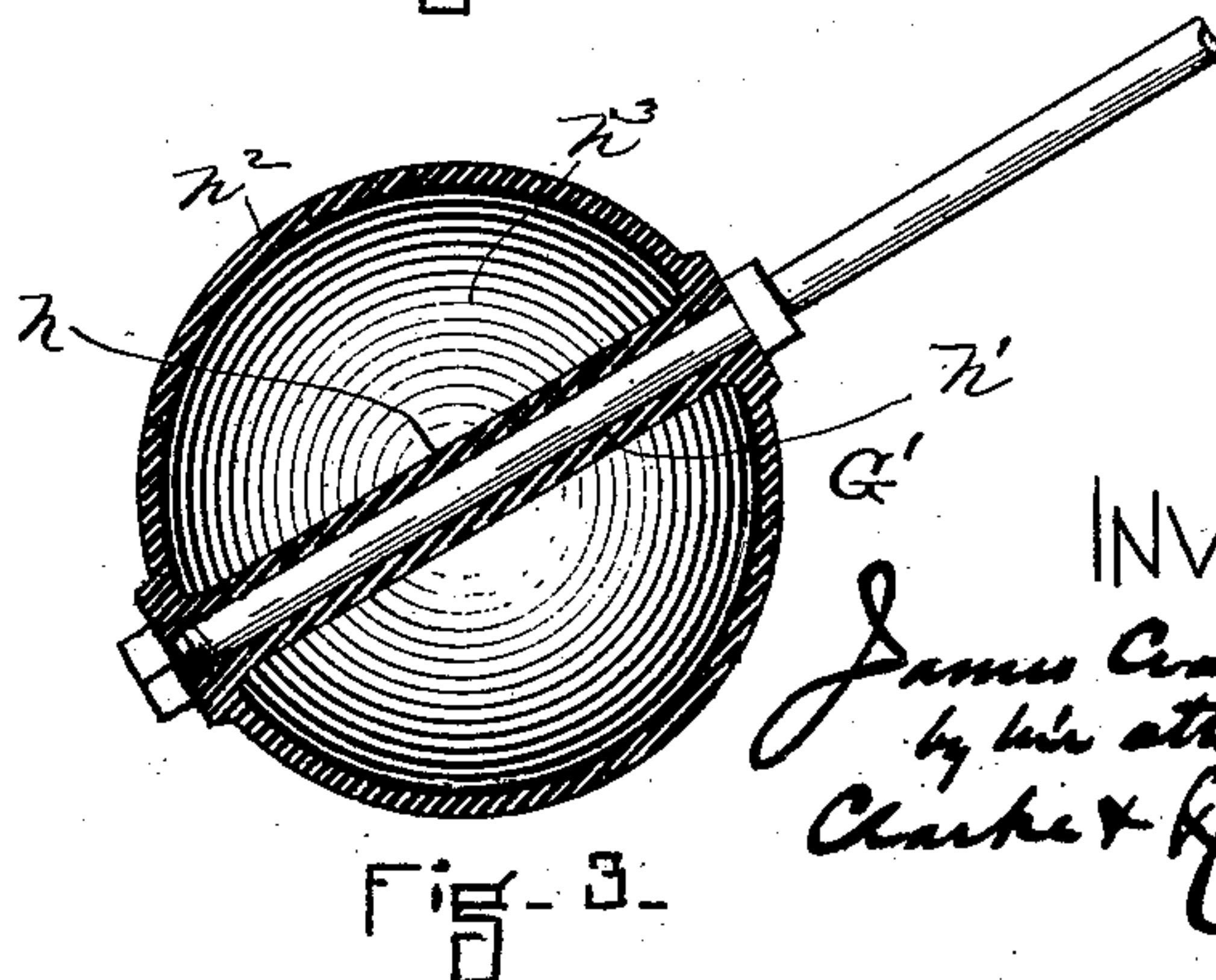
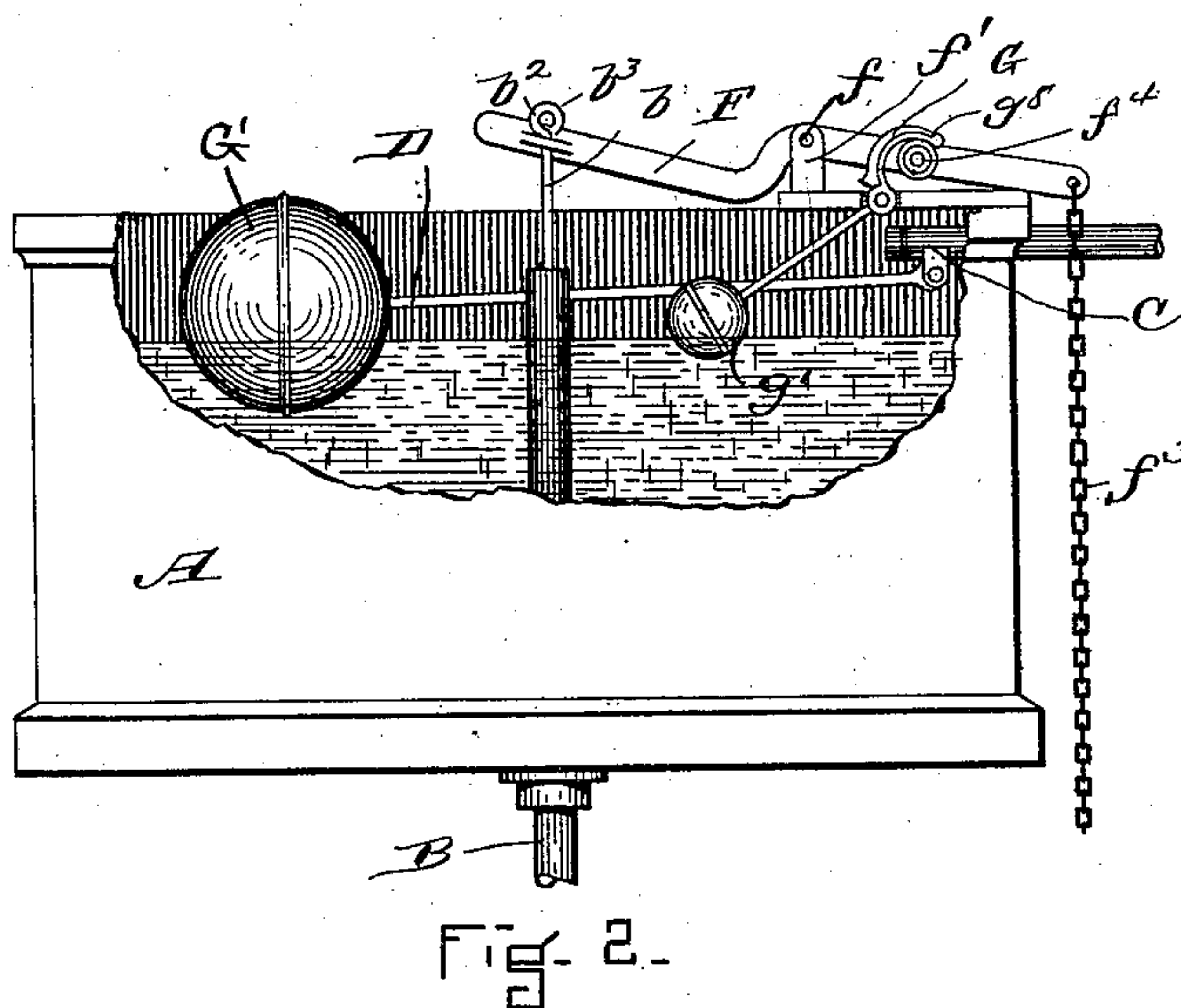
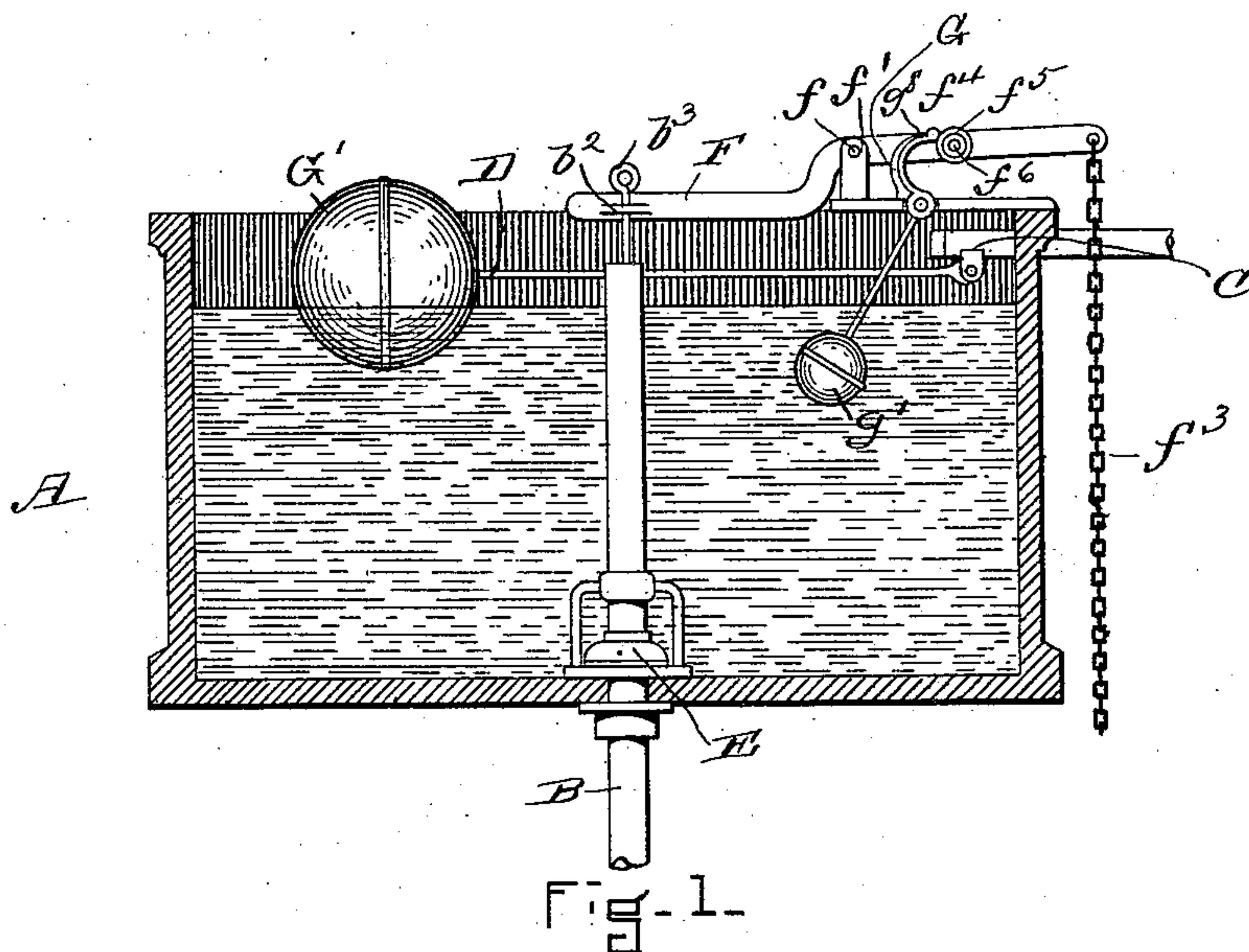
(No Model.)

3 Sheets—Sheet 1.

J. CRAWFORD.
SERVICE BOX FOR WATER CLOSETS.

No. 414,942.

Patented Nov. 12, 1889.



WITNESSES.

J. M. Dolan
A. E. McDonald

INVENTOR.

James Crawford
by his atty
Clarke & Raymond

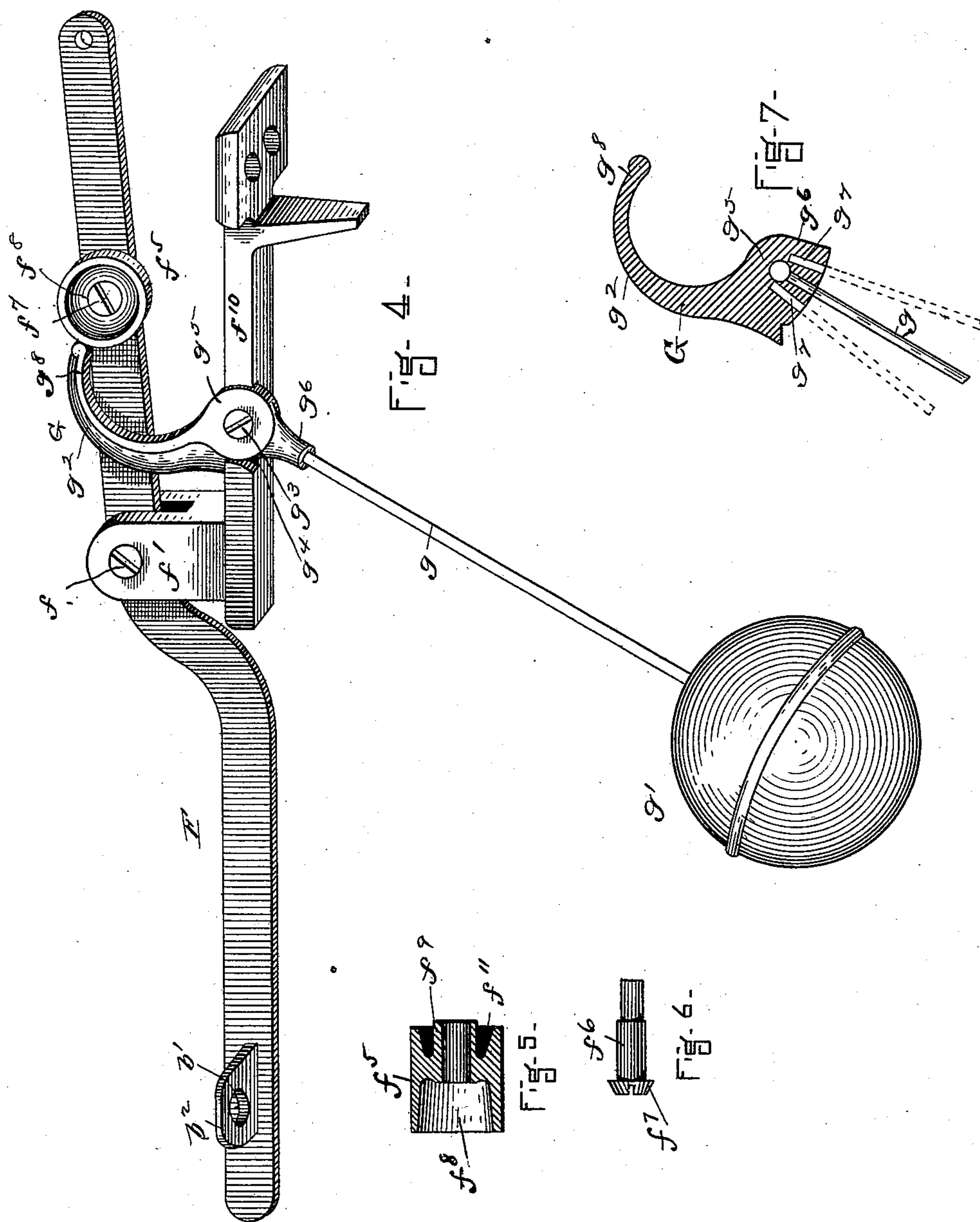
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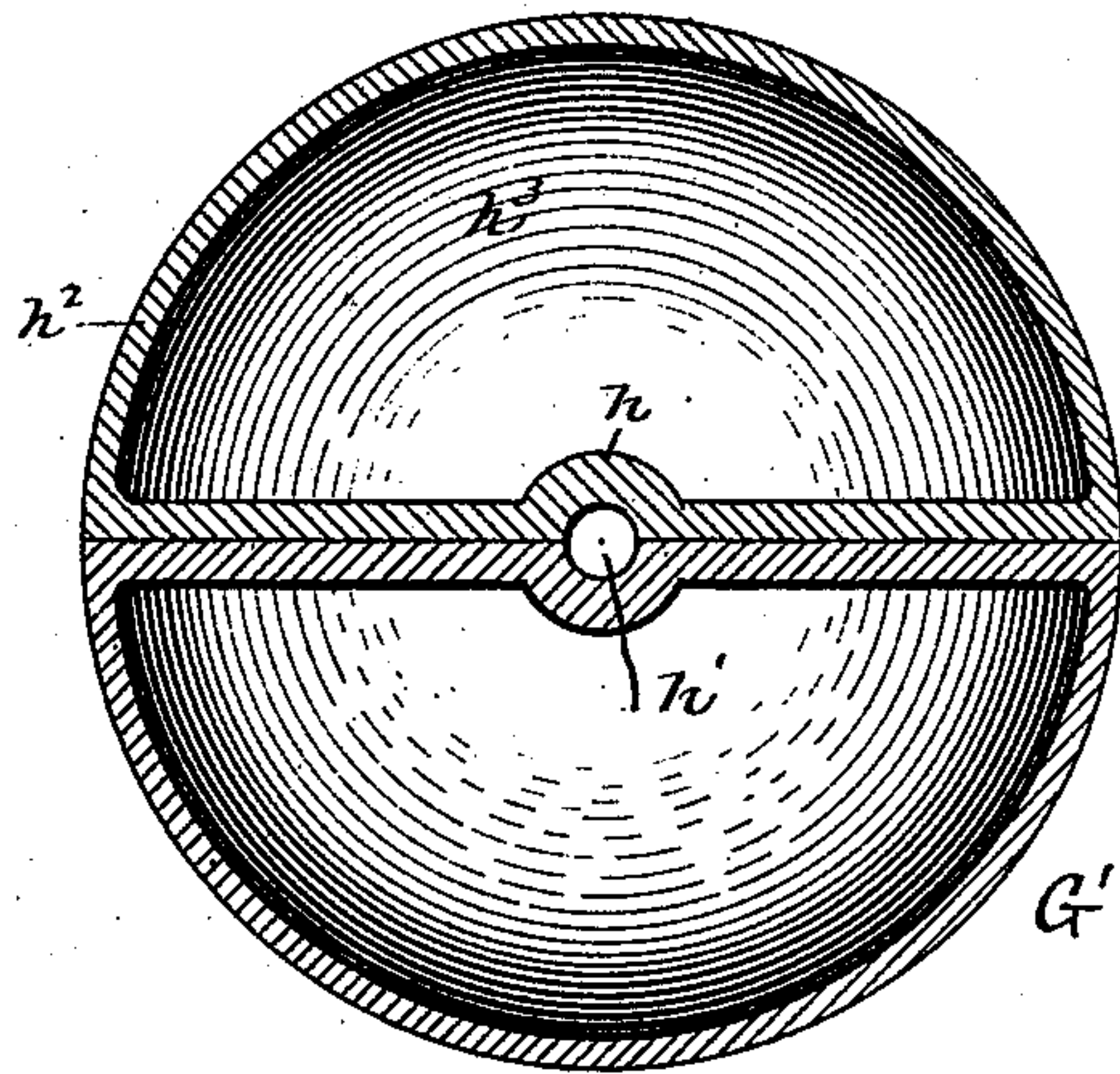


Fig. 8.

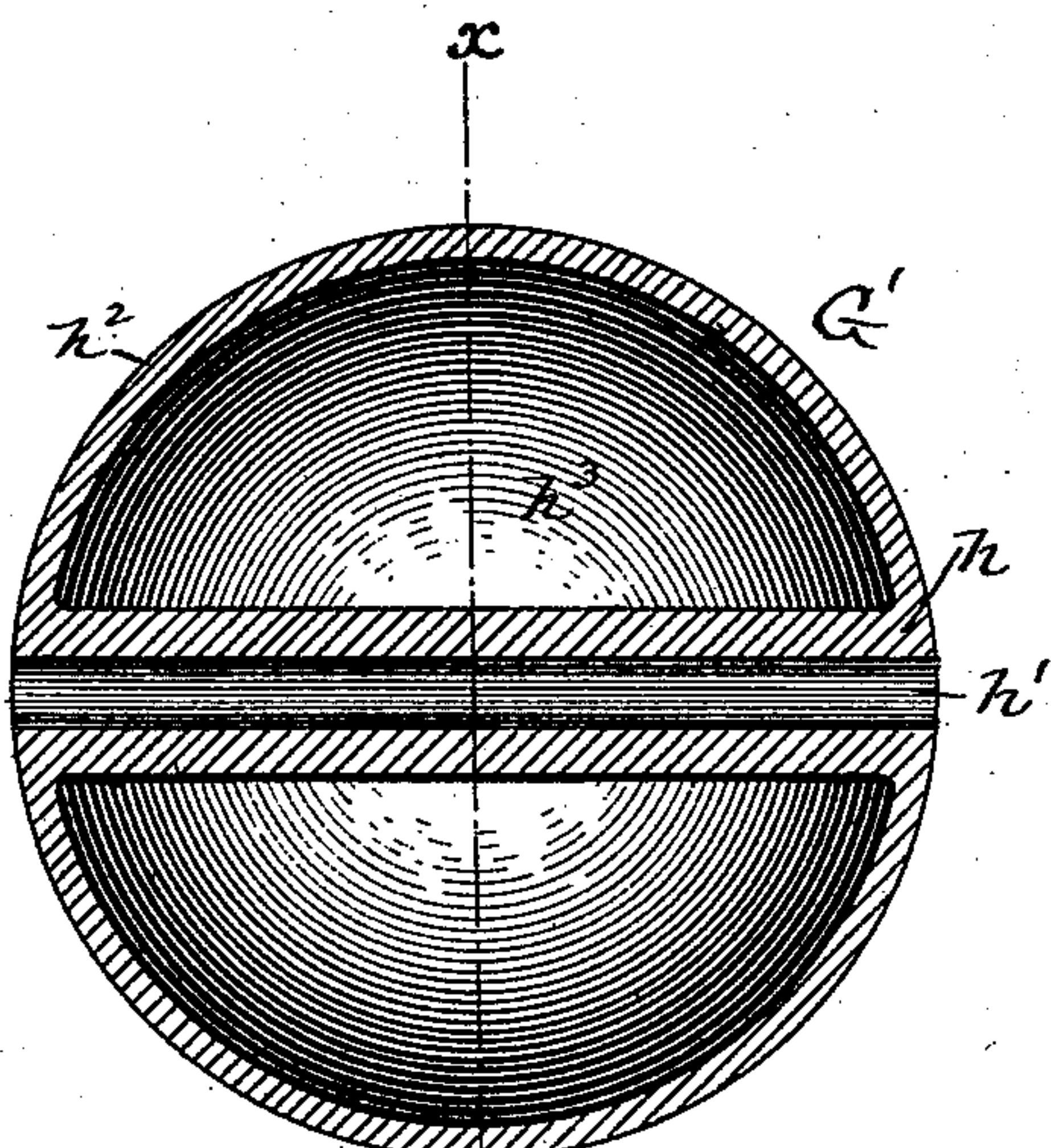


Fig. 9.

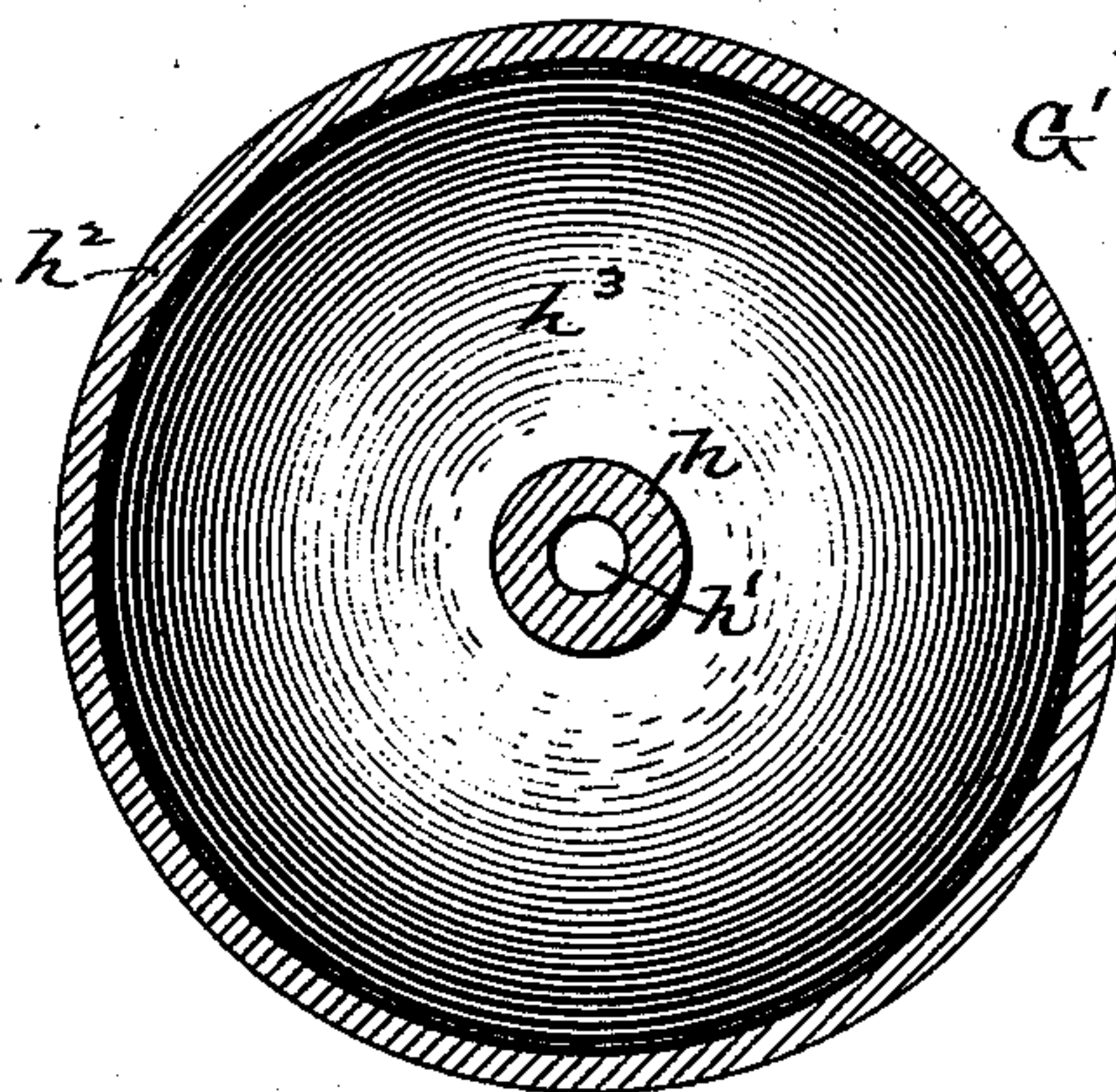


Fig. 10.

WITNESSES.

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UNITED STATES PATENT OFFICE.

JAMES CRAWFORD, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO JOSEPH H. YOUNG, OF SAME PLACE.

SERVICE-BOX FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 414,942, dated November 12, 1889.

Application filed December 24, 1888. Serial No. 294,508. (No model.)

To all whom it may concern:

Be it known that I, JAMES CRAWFORD, of Cambridge, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Service-Boxes for Water-Closets, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to the application to the actuating-lever of the valve of a service-box of a float catch or latch adapted to operate to engage the lever automatically upon the downward movement of one end as it is actuated to operate or lift the valve, and to hold the lever in such position—viz., in a position which opens or holds open the valve—and after the draft upon the lever has been released and until the water in the tank has fallen sufficiently to cause the latch to become disengaged from the lever by the change in the relation of the latch to the lever caused by the falling of the float which operates it.

In the drawings, Figure 1 is a view in vertical section representing the float-latch as disengaged from the catch on the actuating-lever and the valve as closed. Fig. 2 represents the position of the parts when the float-latch has engaged the catch on the actuating-lever and the valve is opened. Fig. 3 is a detail view illustrating a form of float herein-after specified. Fig. 4 is an enlarged view, in perspective, illustrating the float-latch, actuating-lever, and catch. Figs. 5, 6, and 7 are detail views of the roll, its stud, and the float-latch, respectively; and Figs. 8, 9, and 10 are detail sectional views of the ball-float.

A represents the service-box.

B is the outlet or escape pipe.

C indicates the position of the valve or cock at the end of the supply-pipe.

D represents the float-lever for operating the same.

E is the valve controlling the opening to the exhaust or outlet pipe B. It may be of any desired form or construction, and the float represented in the drawings is known as a ball-float.

The valve E is connected with the operating-lever F by a rod *b*, the rod passing through a hole *b'* in a lug *b²*, extending from

the side of the lever and having an eye or head *b³*. This causes the valve-rod a limited extent of independent or lost motion in relation to the end of the actuating-lever F. The actuating-lever is pivoted at *f* to a bracket *f'*, attached to the box, and its outer end has attached to it the draft or pull chain or cord *f³*. The lever also has upon its side, at a point between the fulcrum and the outer end, a catch *f⁴*. This preferably is made in the form of a roll *f⁵*, (see Fig. 1,) and is attached to the lever by a shouldered stud *f⁶*, the stud having a head *f⁷*, which enters the cavity *f⁸* of the roll, and the roll having a sleeve *f⁹*, which forms the bearing on the barrel of the stud, and extends a trifle beyond the inner edge *f¹¹* of the roll to bear against the side of the lever.

G is the float-latch. It comprises a rod or lever *g*, having at its lower end the float *g'*, and at its upper end the curved section *g²*, which forms the engaging part of the latch—that is, the part which engages the catch on the lever.

As the catch is represented in the form of a roll, the latch is curved to receive and close upon the roll. The float-latch preferably is pivoted at *g³* to the bracket *f¹⁰*, the bracket having formed in it a recess *g⁴*, formed in its side, of a size to receive the hub *g⁵* of the float-latch. This brings the latch in line with the catch. I prefer that a section *g²* of the lever be made integral with the hub *g⁵*, but separate from the rod *g*, and I have formed upon the hub the barrel or extension *g⁶* to receive and hold the end of the rod *g*.

As it will be desirable in some instances to change the angle of the rod *g* in relation to the latch *g²*, I have represented in Fig. 7 a slight modification of the hub *g⁵* and the latch *g²*, the hub being represented as larger than that represented in Fig. 4, and having a number of radial holes *g⁷*, into either one of which the end of the rod *g* may be fastened. These radial holes thus provide for the change in the angle of the lever *g* and latch above referred to. The floats *g' g'* may be made of metal in the usual way; or they may be made of vulcanized rubber, and when made of vulcanized rubber I prefer that there extend diametrically through the float a core *h*, having a hole *h'*, to receive the end of the

float-lever. This provides for uniting the lever to the float without causing the rod to enter the cavity of the float, and thereby provides a water-tight construction, as well as an easy method of securing the float to the end of the lever. The float in such case would comprise the shell h^2 , the perforated core above spoken of, and the cavity h^3 .

The detail view, Fig. 3, shows the core h formed integral or homogeneous with the ball float, so that there is no joint between said core and the shell of the float.

Fig. 9 is a view similar to Fig. 2, but with the float-lever omitted, and Figs. 8 and 10 are sections at right angles to the sections Figs. 3 and 9 and transverse of the core h , Fig. 8 showing the core and float as being made in two halves united together, with the halves of the core integral with the halves of the shell, and Fig. 10 showing the core and float integral and jointless throughout.

In use, the tank being full of water, the actuating-lever and the float-valve have the relation to each other represented in Fig. 1—that is, the float is submerged in the water, but at one side, upon a perpendicular line of the fulcrum g^3 , and the catch f^4 is disengaged from the latch g^2 ; but on account of the tendency of the float to rise to the level of the water the latch is automatically operated to close upon the catch when the catch is moved into a position to permit such operation.

When in the position represented in said figure, the latch is held from engaging the catch by the contact of its end g^8 with the side of the catch-roll, the chain or cord f^3 being pulled or drawn. The lever F is then caused to take the position represented in Fig. 2—that is, its end f^2 is drawn downward and its inner end moved upward. This upward movement of the inner end lifts the valve E from its valve-seat, the downward movement of the lever brings the catch f^4 into the lower position opposite the mouth of the latch, and the latch is immediately caused to shut upon it automatically by the effort of the submerged float to reach the surface of the water. The draft upon the pull cord or chain, being released, does not effect the closing of the valve, as the float-latch holds the actuating-lever into the position into which it is drawn by the cord or chain, and consequently holds the valve E open until the water in the tank has escaped to such an extent that the float is no longer submerged or even buoyed or supported by the water, and this causes the float then to release the latch from the catch, as the float, being no longer supported, falls or drops to a position which removes the latch from engagement with the catch, or to the position represented in Fig. 1. The inner end of the actuating-lever being heavier than the outer end, this release immediately causes the lever to resume its original position, or that represented in Fig. 1, and the valve E to be closed, shutting off the escape of water from the box. The lowering of the level of

the water in the box has also caused the float-lever D to open the valve or cock controlling the water-supply, and this inlet remains open so long as the box is discharging water, or, in other words, so long as the float-latch is in engagement with the catch on the actuating-lever. When the latch is disengaged from the catch and the actuating-lever resumes its normal position, the float-lever D acts to gradually close the inlet valve or cock, not, however, finally closing the same until the water has reached a level which submerges the ball or float g' and causes it to again act to hold the latch in a position to automatically engage the catch upon its downward movement.

I do not confine myself to the particular form of valve E herein shown and described, as one of the principal advantages of my invention is that it enables the common actuating-lever of a service-box to be used to operate any of the common forms of valve controlling the discharge-openings ordinarily employed in service-boxes. Neither do I confine myself to the especial form and arrangement of the catch and float-latch described, as I consider that my invention includes any construction or organization which causes a latch to automatically engage a catch on the actuating-lever when said latch is automatically governed as to its engagement and disengagement with the catch by the variation in the level of the water of the service-box.

It will be seen that the time of engagement of the latch with the catch depends upon the length of the rod g , or, in other words, to the extent to which the float g' is submerged in the water of the tank.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a service-box for water-closets, the combination, with the valve E and the lever F , connected with the said valve and having the catch f^4 , of the float-latch consisting of the curved arm g^2 , arranged to be normally in contact with the side of said catch, and an arm g , inclined relative to said curved arm and carrying the float g' , whereby, when the outer end of the lever F is depressed to open said valve E , said float will cause said curved arm to ride over, and thus engage said catch and hold the said valve E open until the water in the box falls to a certain level.

2. The combination of a service-box, a valve E , regulating or controlling the escape-passage therefrom, the actuating-lever F , connected at its inner end with said valve, and having the catch f^4 , with the float-latch G , comprising the rod g , the float g' , and curved latch proper g^2 , substantially as described.

3. The combination, with a service-box, of the valve E , the lever F , connected with said valve and having the catch f^4 , consisting of a headed stud provided with a roller, and the float-latch consisting of the curved arm g^2 , arranged to have its end normally in contact with the side of said roller, and the arm g , in-

clined relative to said curved arm and provided with the float g' .

4. The combination, with a service-box, of the lever F, having the catch f^4 , the bracket f' , to which said lever is pivoted, the bracket f'' , having the recess g^4 , and the float-latch pivoted in said recess and consisting of the curved arm g^2 , arranged to be normally in contact with the side of said catch, and the inclined arm g , provided with the float g' .

5. The combination of the valve E, the actuating-lever F, the catch carried thereby, the float-latch G, having a hub g^5 provided with two or more holes g^7 to receive the end of the rod g , whereby its angle in relation to the latch may be varied, substantially as described.

6. A ball-float consisting of a rubber, vulcanite, or gutta-percha shell, and a hollow

core integral or jointless with said shell and having an opening for the reception of the float-rod, and being thus adapted to be attached to the float-rod in a water-tight manner without packing for joints, substantially as set forth.

7. The combination, with the rod g , of the float g' , of india-rubber, vulcanite, or gutta-percha, and consisting of the shell h^2 and the core h , having an opening for the passage of said rod, said core being integral or jointless with the said shell, and being thus adapted to be attached to the said rod in a water-tight manner without packing for joints, substantially as set forth.

JAMES CRAWFORD.

In presence of—

F. F. RAYMOND, 2d,

J. M. DOLAN.