

(No Model.)

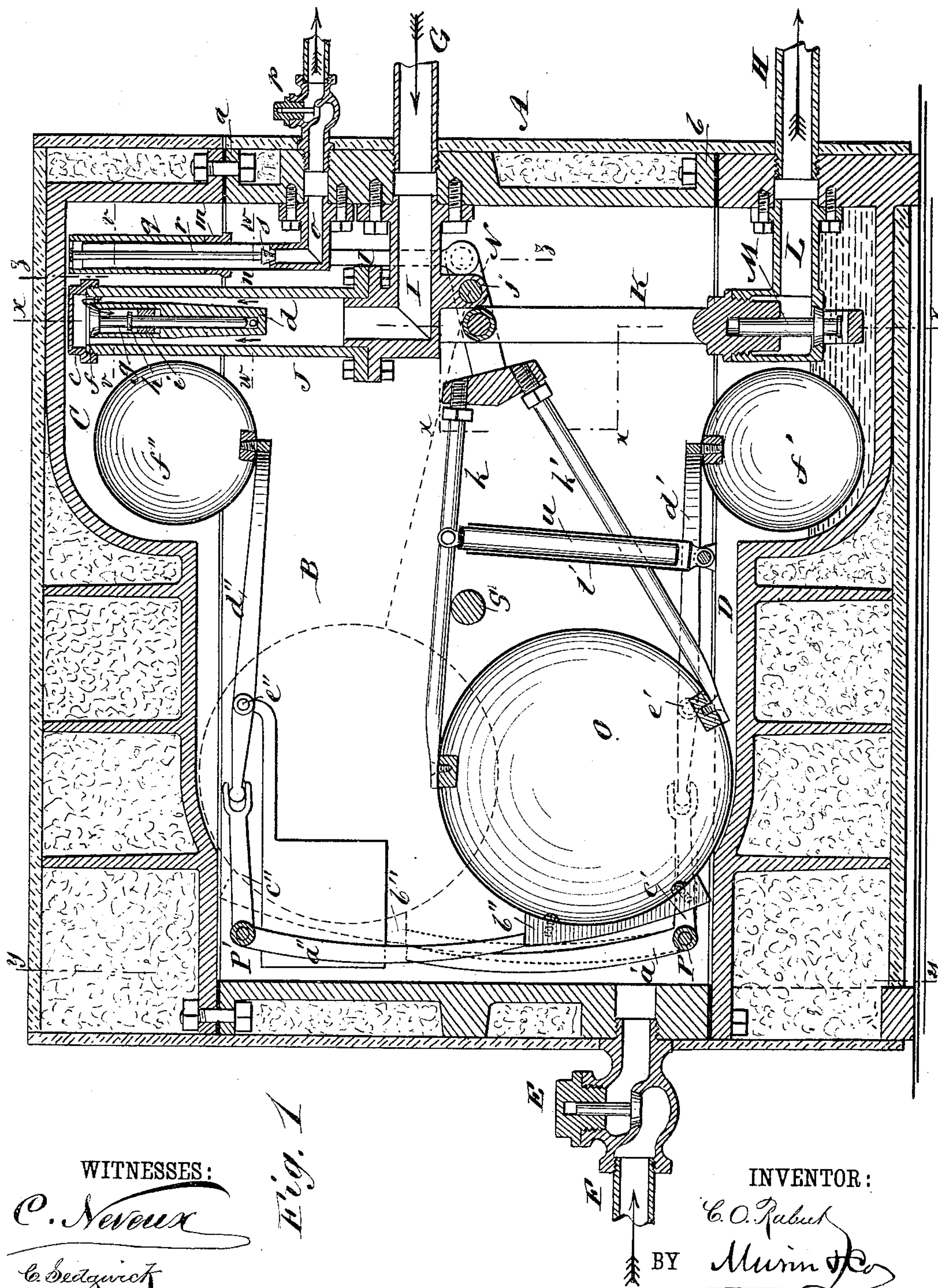
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C. O. RABUT.

AUTOMATIC WATER FEEDER FOR STEAM BOILERS.

No. 353,882.

Patented Dec. 7, 1886.



WITNESSES:

C. Neveu
C. Sedgwick

Fig. 1

INVENTOR:

C. O. Rabut
Murin & Co
ATTORNEYS.

(No Model.)

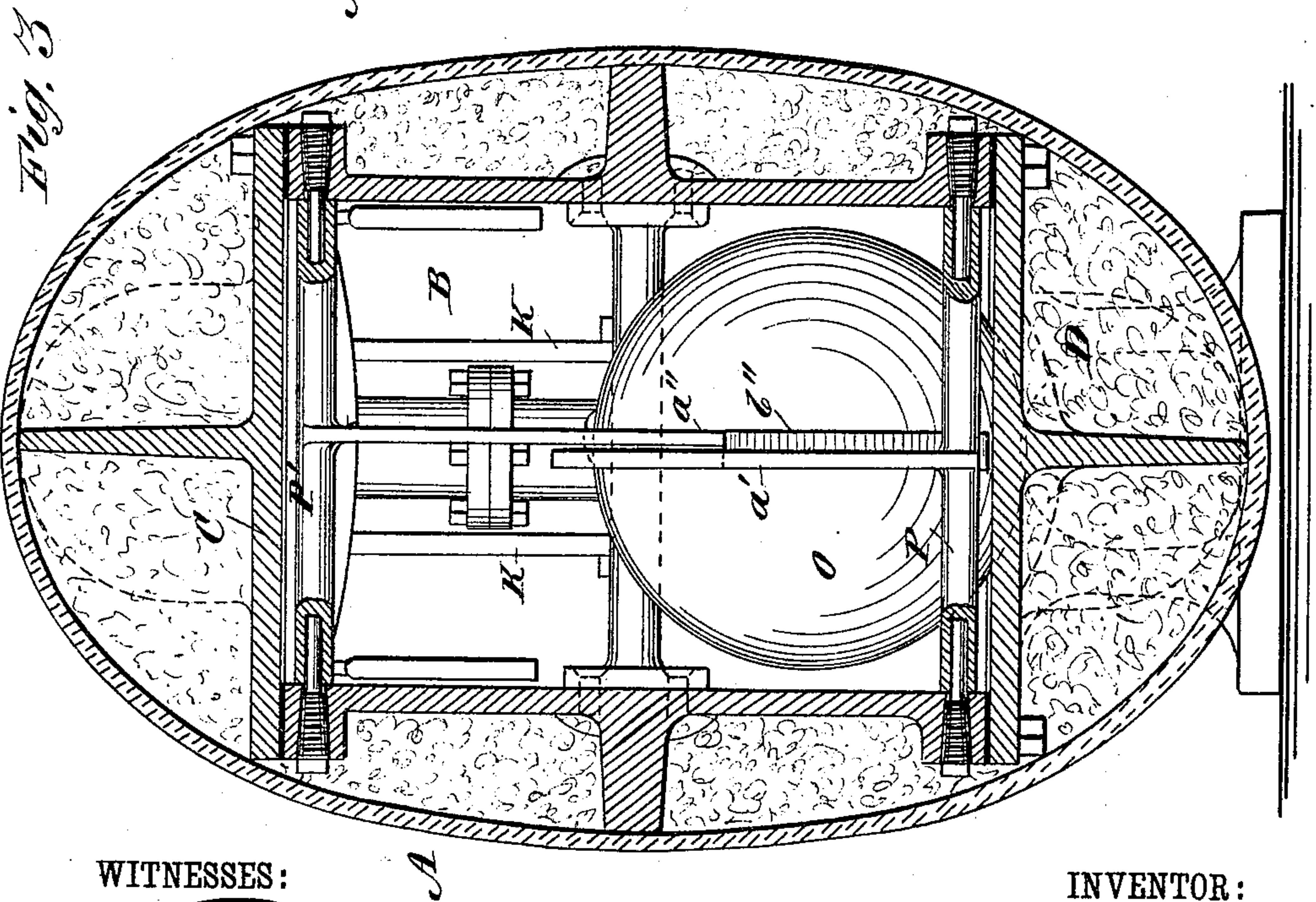
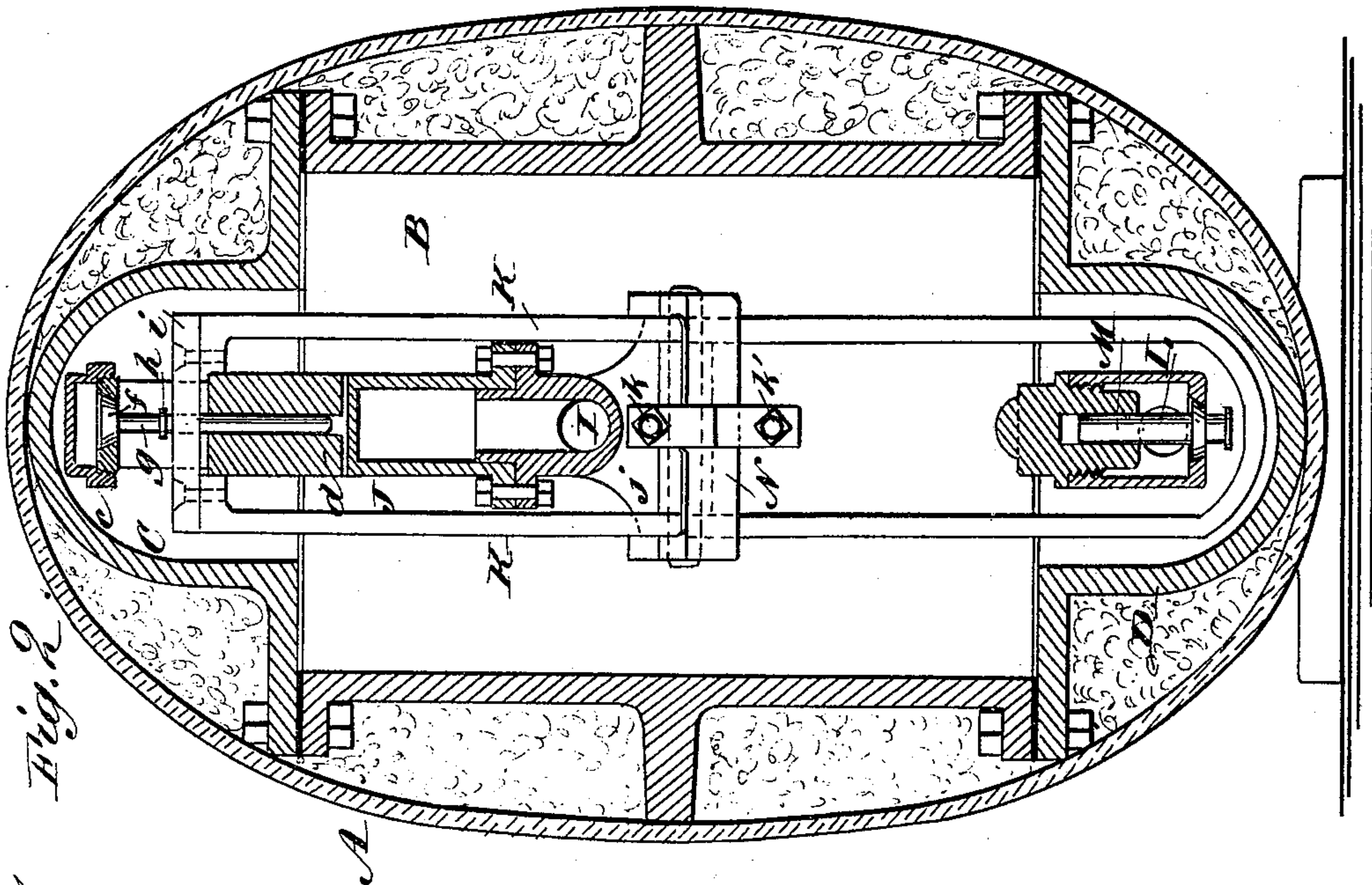
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WITNESSES:

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(No Model.)

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Fig. 1

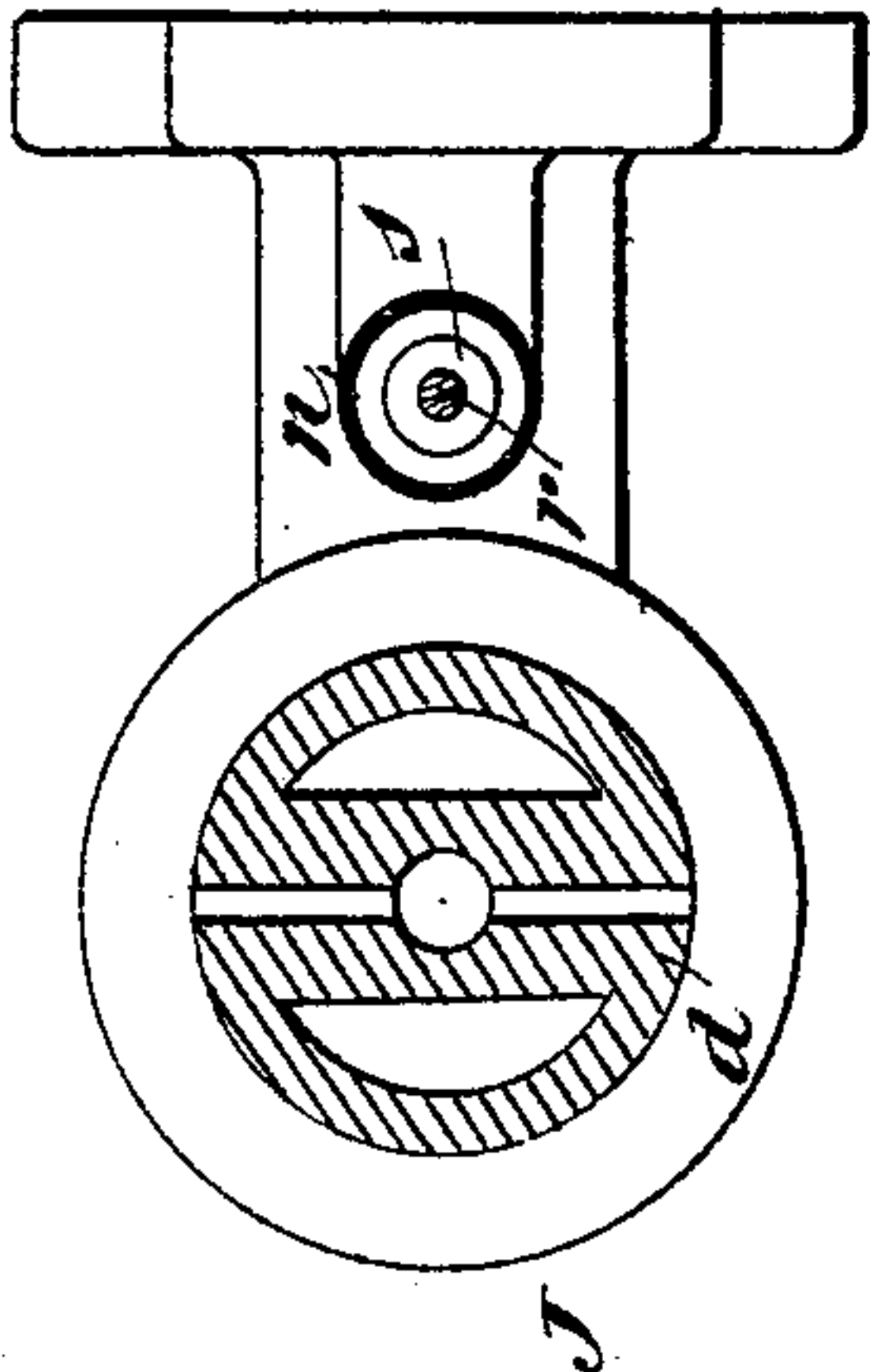


Fig. 2

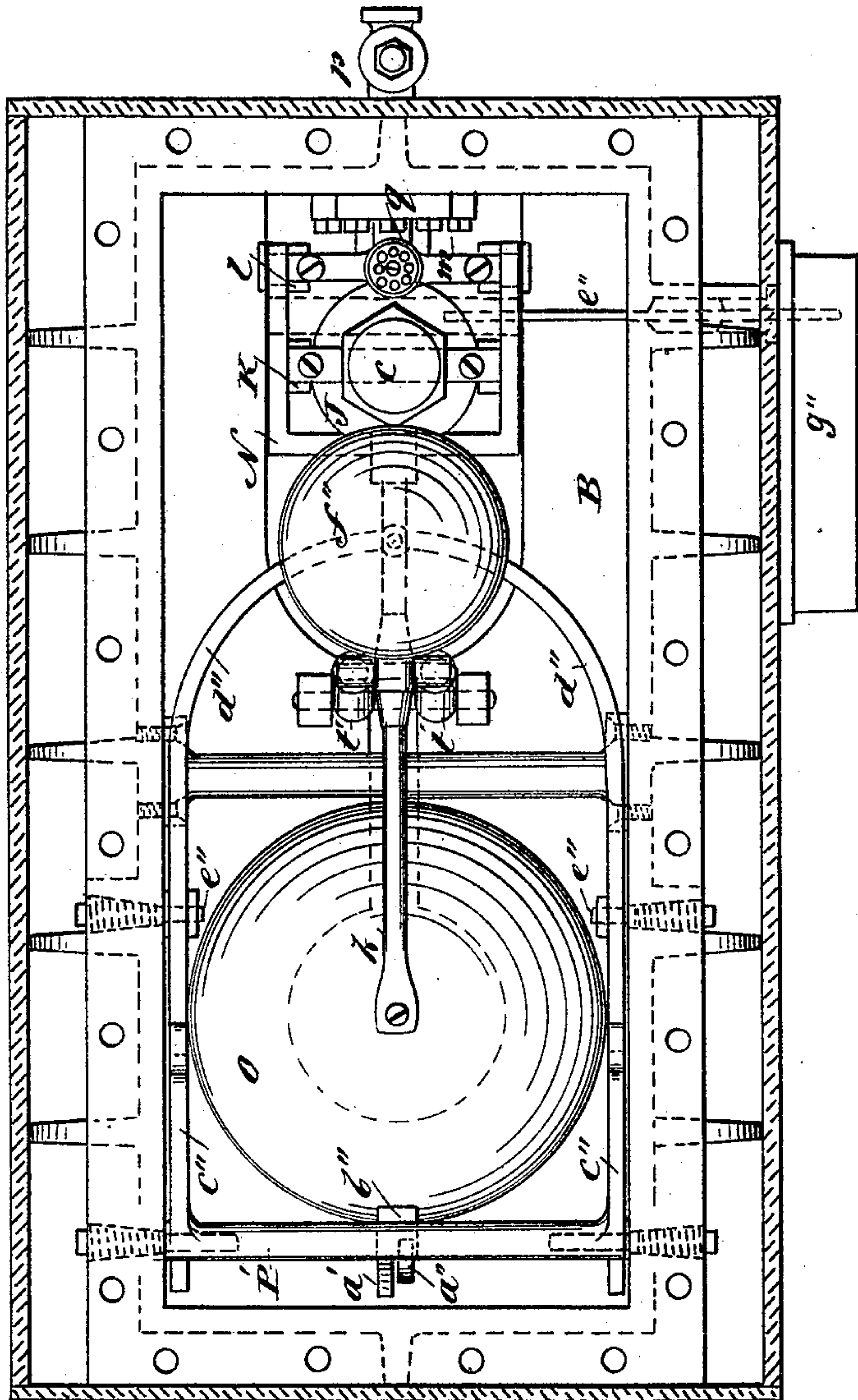


Fig. 3

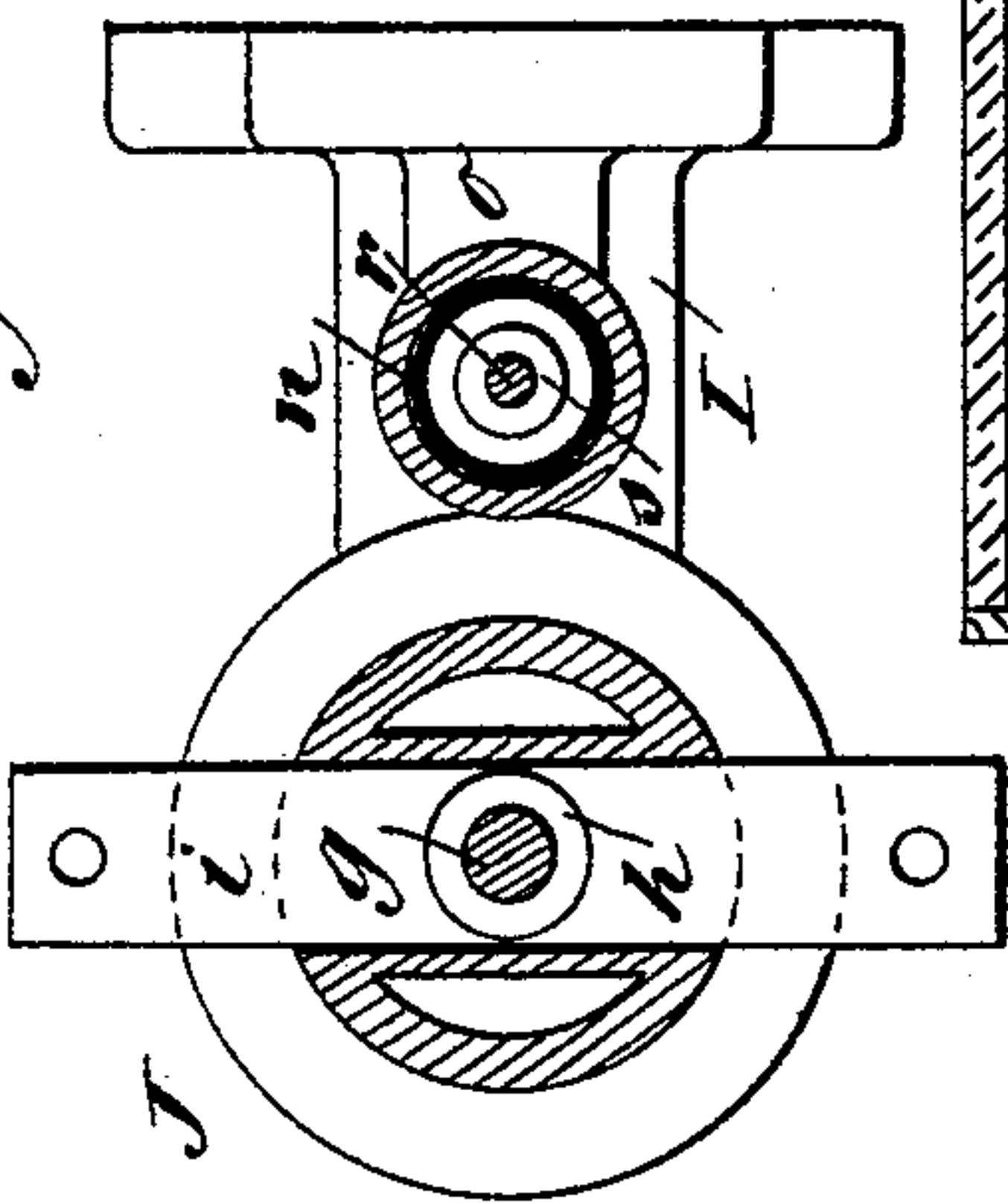


Fig. 4

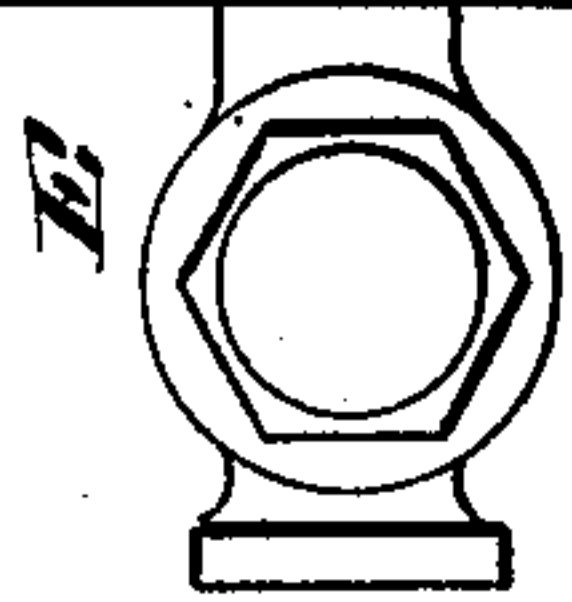
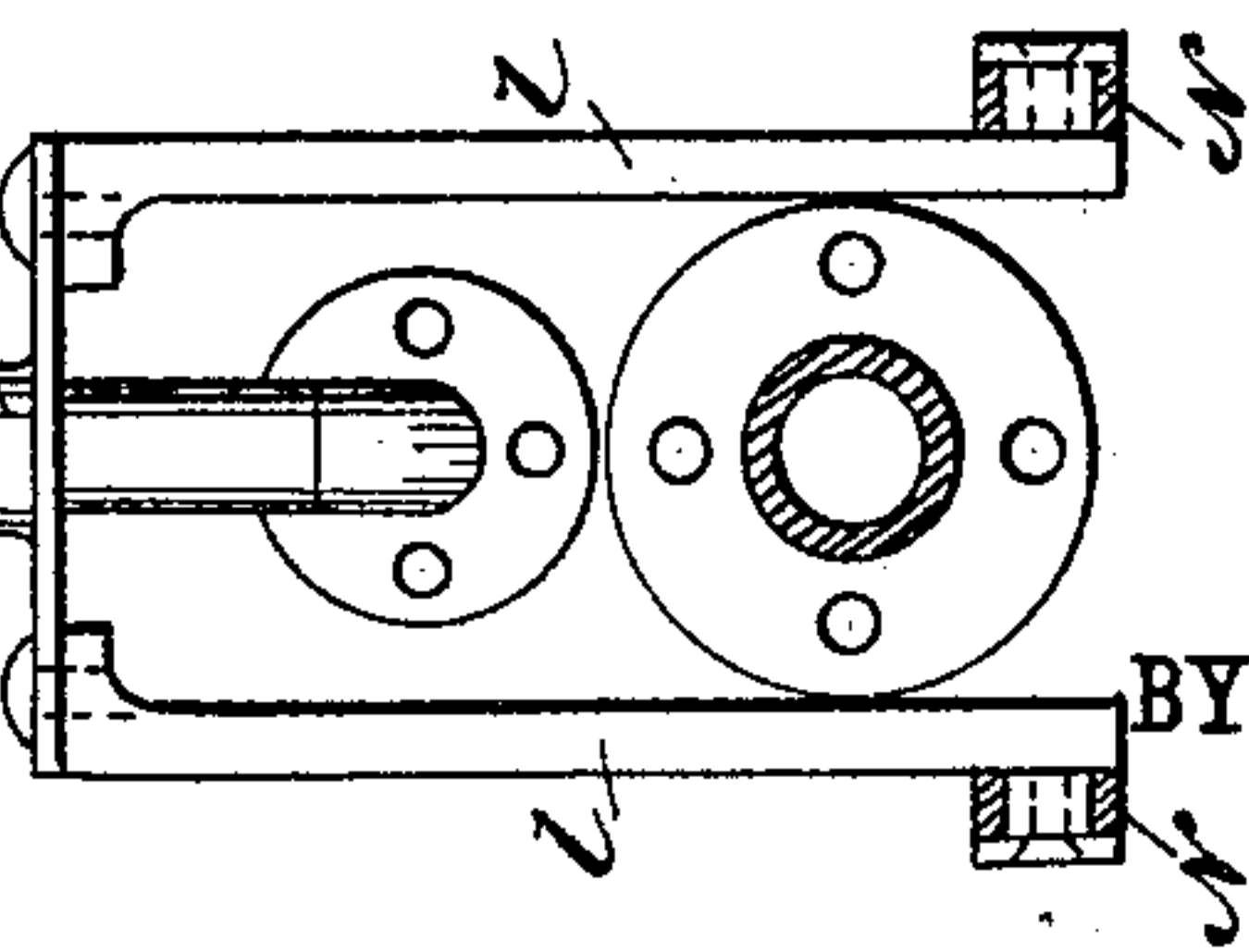


Fig. 5



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UNITED STATES PATENT OFFICE.

CHARLES OCTAVE RABUT, OF NEW YORK, N. Y.

AUTOMATIC WATER-FEEDER FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 353,882, dated December 7, 1886.

Application filed August 4, 1886. Serial No. 210,005. (No model.)

To all whom it may concern:

Be it known that I, CHARLES OCTAVE RABUT, of the city, county, and State of New York, have invented a new and Improved Automatic Water-Feeder for Steam-Boilers, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side sectional elevation of my improved water-feeder for steam-boilers. Fig. 2 is a vertical transverse section taken on line *x x* in Fig. 1. Fig. 3 is a vertical transverse section taken on line *y y* in Fig. 1. Fig. 4 is a plan view with the cover removed. Fig. 5 is a detail view of the air-valve mechanism. Fig. 6 is an enlarged horizontal section taken on line *v v* in Fig. 1, and Fig. 7 is an enlarged horizontal section taken on line *w w* in Fig. 1.

Similar letters of reference indicate corresponding parts in the different figures of the drawings.

The object of my invention is to construct a simple and efficient device for automatically supplying feed-water to boilers.

My invention consists in a system of valves operated by a float controlled by auxiliary floats, also in an arrangement of an air-valve for permitting the escape of air during the filling of the float-chamber.

The casing A, which is formed of a central portion, B, cap C, and a bottom, D, contains all the parts of the apparatus. The cap and bottom are secured to the central portion by bolts, with a suitable intervening packing; and the sides, top, and bottom of the casing are provided with strengthening-ribs.

In one side of the casing is inserted a check-valve, E, of the usual description, communicating with the water-supply pipe F, and in the opposite side of the casing are inserted the pipes G H, which communicate with the boiler above and below the water-line.

To the inner wall of the casing A, opposite the pipe G, is secured an elbow, I, which opens upward and is connected with a valve-casing, J, which extends to the top of the casing A, and is closed by a cap, c. In the valve-casing is placed a hollow core, d, having on its upper end a valve-seat, e, which is closed by a valve, f. The space under the valve communicates, through lateral openings g, with the

interior of the casing A, and the stem of the valve f is provided with a collar, h. A bar, i, apertured to receive the stem of the valve f, extends through the apertures g below the collar h, and is connected with a U-shaped yoke, K, extending to the bottom of the casing A.

Opposite the pipe H a short pipe, L, extends into the casing A, and is provided with a check-valve, M, opening inwardly. The stem of the check-valve M extends downward below the seat of the valve to a point near the horizontal part of the yoke K, so that when the yoke K is raised it will lift the valves f and M; but the distance between the bar i and collar h is made a little less than the distance between the stem of the valve M and the horizontal part of the yoke K to insure the opening of the valve f first, for reasons which will presently be given.

To an ear, j, projecting downward from the elbow I is pivoted a frame, N, in which are inserted on one side of the pivot the divergent arms k k', whose extremities are attached to the top and bottom of the spherical float O. To the frame N, upon the same side of the pivot j, is pivotally connected the yoke K. To the frame at the opposite side of the pivot is secured a pair of rods, l, which are connected with an apertured cross-bar, m, encircling the air-vent pipe n. The air-vent pipe n is attached to an elbow, o, which communicates with the external air through a check-valve, p, screwed into the casing A. The pipe n is open at the top, and is surrounded by a loose tube, q, having perforated top, to which is attached a valve-rod, r, carrying at its lower end a valve, s, having a seat in the upper end of the elbow o. By this arrangement, whenever the connecting-rods l are raised through the action of the float O, they carry the cross-bar m, which fits the tube q, and with it the valve s, allowing the air to escape from the upper part of the casing A.

To the bottom of the casing A is pivoted a cylinder, t, in which is placed a loose plunger, u, whose upper end is pivotally connected with the float-arms k. The cylinder t and piston u serve as a dash-pot for modifying the motion of the float O.

In the bottom of the casing is pivoted the rock-shaft P, carrying at the center thereof

an arm, a' , the upper end of which is arranged to engage a block, b'' , which is secured to the side of the float O. The rock-shaft P is provided at opposite ends, near the side of the casing, with forked arms c' , which extend toward the pipes G H.

A double-armed lever, d' , is arranged to turn on pivots e' at the sides of the casing A, and is provided at its extremities with cylindrical tips fitting into the forks of the arms c' . To the looped end of the lever d' is secured a small float, f' , which extends downward into a cavity formed in the lower part of the casing A for its reception, and also for receiving the pipe L and valve M.

In the upper portion of the casing A is journaled a rock-shaft, P' , which, together with its connections, is similar to the rock-shaft P, being provided with the arm a'' , extending downward and arranged to engage the block b'' , and provided with the two-forked arm c'' . A lever, d'' , attached to a float, f'' , turns on pivots e'' , and engages the arms c'' in the same manner as the corresponding parts in the lower part of the casing. The float f'' is received in a cavity in the upper part of the casing, which also receives the upper ends of the valve-casing J and the air-vent pipe n .

To economize steam in the operation of the feeder, the casing A is jacketed on all sides with non-conducting material inclosed in an exterior metallic jacket.

The operation of my improved water-feeder for steam-boilers is as follows: All the parts being in the position shown in full lines in Fig. 1—that is, with the float O at the bottom of the casing A, the floats f' f'' depressed, the valves f M closed, and the air-valve s open—water is introduced through the pipe F and valve E, either by its own gravity or by the formation of a vacuum in the float-casing by the condensation of the steam previously introduced into the casing. The float O is held in its lowest position by the engagement of the lever a'' with the block b'' , carried by the float O. When the casing A is nearly full of water, the float f'' is lifted, thus releasing the lever a'' from the block b'' on the float O, permitting the said float to rise, and the rising of the float first releases the air-valve, so that it closes by its own gravity, then opens the valve f , admitting steam from the boiler to the upper part of the casing, thus equalizing the pressure. The further movement of the float opens the valve M. The pressure now being equalized above and below the water in the casing, the water flows by its own gravity into the boiler, being replaced by steam. When the float O has completed its upward excursion, the lever a' , which was pushed forward against the block b' by the buoyancy of the float f' , slips under the block and holds the float in an elevated position until the water in the float-chamber has been discharged into the boiler, when the float f' drops, withdrawing the lever a' from beneath the block, permitting the float O to fall, and the lever a'' ,

being held against the block b'' with a pressure due to the weight of the float f'' , engages the block b'' when the float O reaches the lower portion of its excursion. When the float O is in this position, the valves f M are closed and the air-valve s is open, so that water may enter the float-casing as before. As the water enters air or steam is displaced and escapes through the air-valve and through the check-valve p , the said check-valve serving to prevent the entrance of air whenever a partial vacuum is formed in the float-chamber. When the water reaches the top of the float-chamber the float f'' is again raised, releasing the float O, permitting it to rise and operate the valves as before. The excursions of the float O are limited by the bar S, which extends across the float-chamber between the arms k k' , and which is struck by the arms in alternation as the float rises and falls. When it is desirable to register the amount of water delivered to the boiler by the feeder, the pivot j of the float O is provided with a small spindle, e'' , which extends through a gland in the side of the casing, and is connected with a register, g'' , of the usual well-known construction.

It will be seen that all of the working parts of the feeder are inclosed in and entirely contained by the casing, except in the case of the employment of the registering mechanism; so leakages are not liable to occur and the care of shifting boxes is avoided.

My improved boiler-feeder will automatically feed boiling water to the boiler if the water-supply be placed above the float-chamber, so that the water will enter the chamber by gravity.

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

1. In a boiler-feeder, the combination, with the float-casing communicating with the boiler above and below the water-line, having cavities in its upper and lower portions for receiving the auxiliary floats and the ends of the steam and water pipes, and provided with steam, water, and air valves, of a valve-operating float pivoted in the casing and arranged to open the steam and water valves, and auxiliary floats for holding the float in its elevated or depressed position.

2. The combination, in a boiler-feeder, of the casing A, provided with pipes G H, communicating with the boiler, the float O, the frame N, pivotally supported in the casing, the arms k k' , connecting the frame with the float O, the steam-valve f , the water-valve M, the yoke K, pivoted to the frame N and provided with the cross-bar i , the floats f' f'' , levers d' d'' c' c'' a' a'' , and the float O, provided with the block b'' , arranged to be engaged by the levers a' a'' , substantially as shown and described.

3. The combination, in a boiler-feeder, of the casing A, provided with pipes G H, communicating with the boiler, the float O, the frame N, pivotally supported in the casing, the arms

k k', connecting the frame with the float *O*, the
steam-valve *f*, the water-valve *M*, the yoke *K*,
pivoted to the frame *N* and provided with the
cross-bar *i*, the floats *f' f''*, levers *d' d'' c' c'' a'*
5 *a''*, the float *O*, provided with the block *b''*, the
air-vent pipe *n*, air-valve *s*, pipe *q*, carrying
the air-valve, the apertured cross-bar *m*, and
the connecting-rods *l*, substantially as shown
and described.
10 4. The combination, with the arm *k* of the

float *O*, of the cylinder *t*, pivoted to the bot-
tom of the float-casing, and the plunger *u*,
placed loosely in the cylinder *t*, and pivoted to
the arm *k*, substantially as shown and de-
scribed.

CHARLES OCTAVE RABUT.

Witnesses:

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C. SEDGWICK.