

No. 684,593.

Patented Oct. 15, 1901.

E. P. WAGGONER.
WATER FEEDING APPARATUS.

(Application filed July 25, 1898.)

(No Model.)

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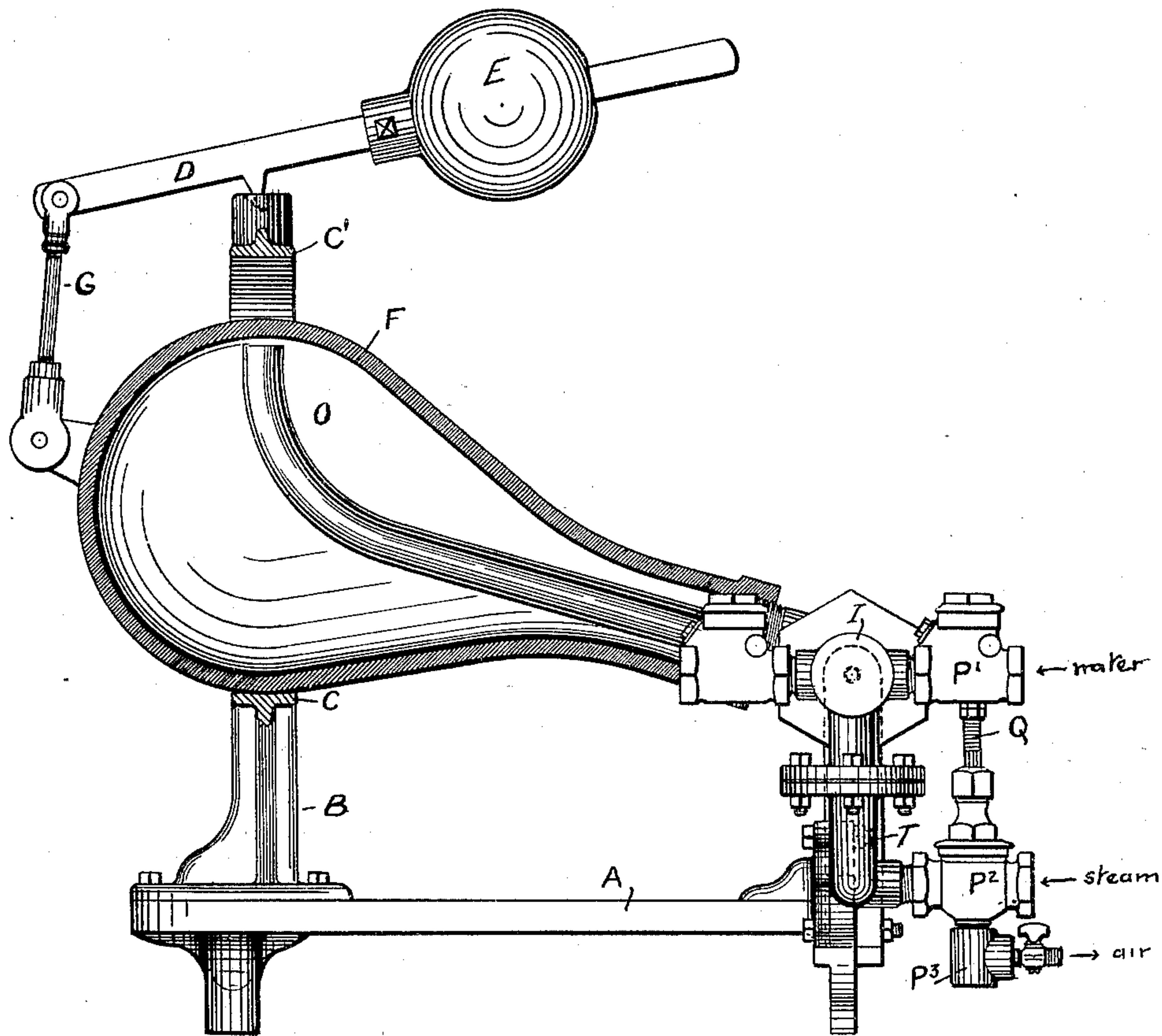


Fig. 1.

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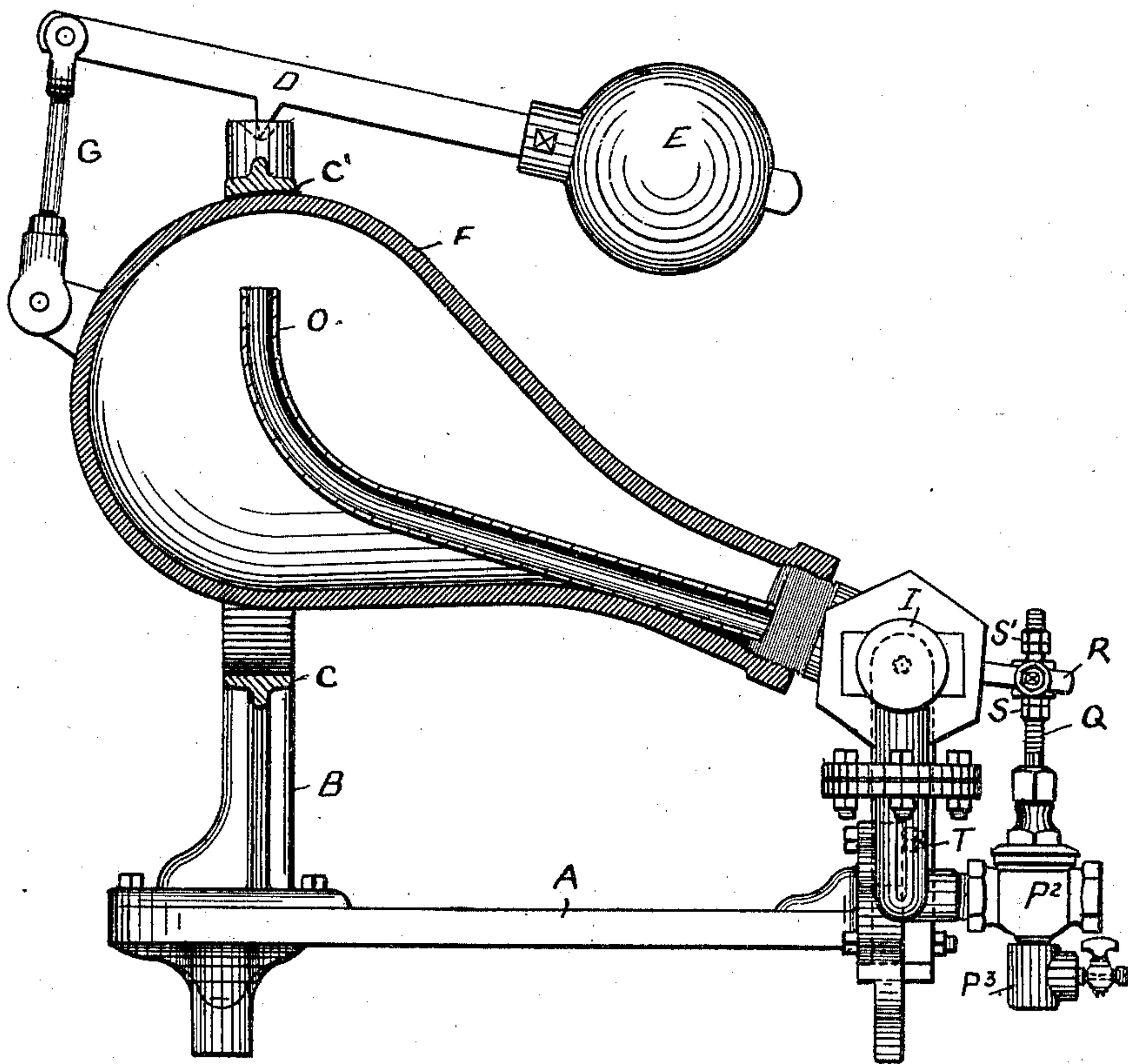


Fig. 2

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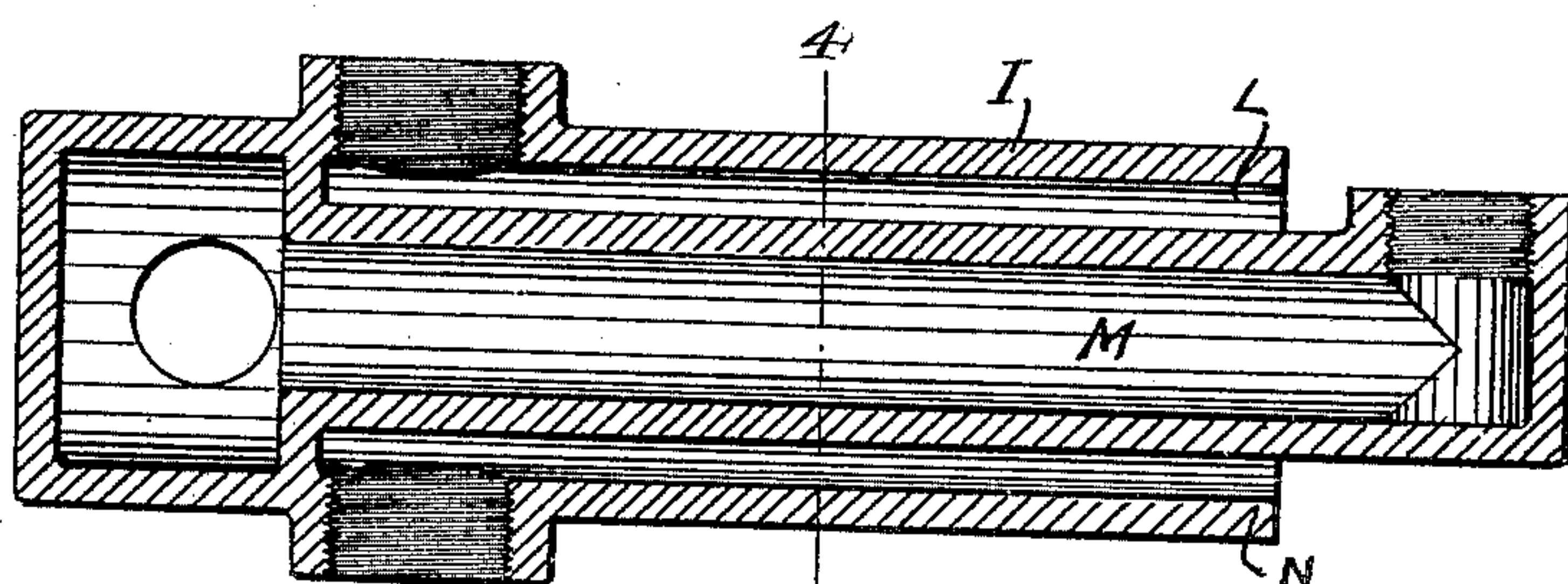


Fig. 3.

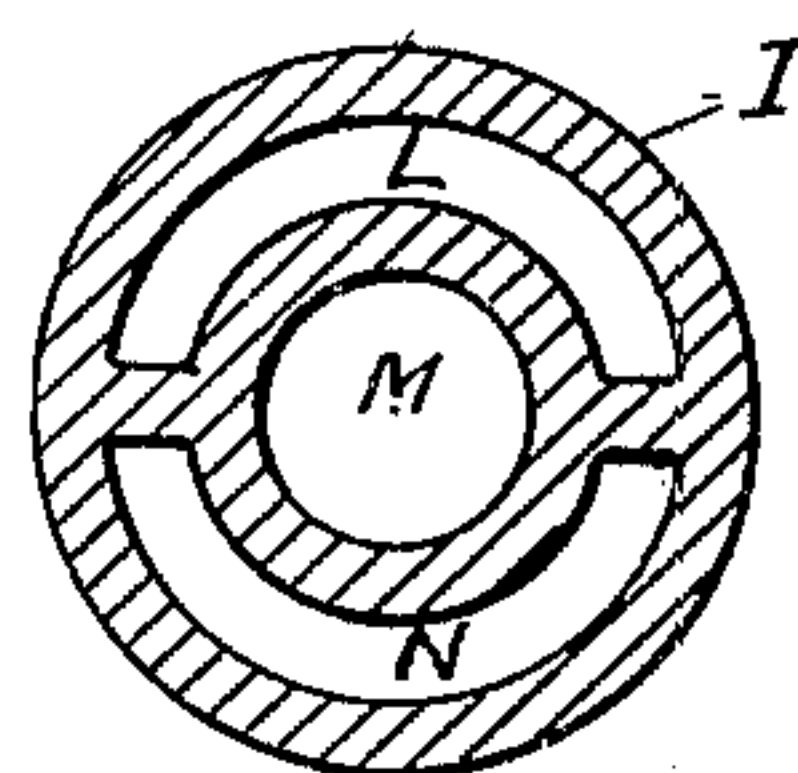


Fig. 4.

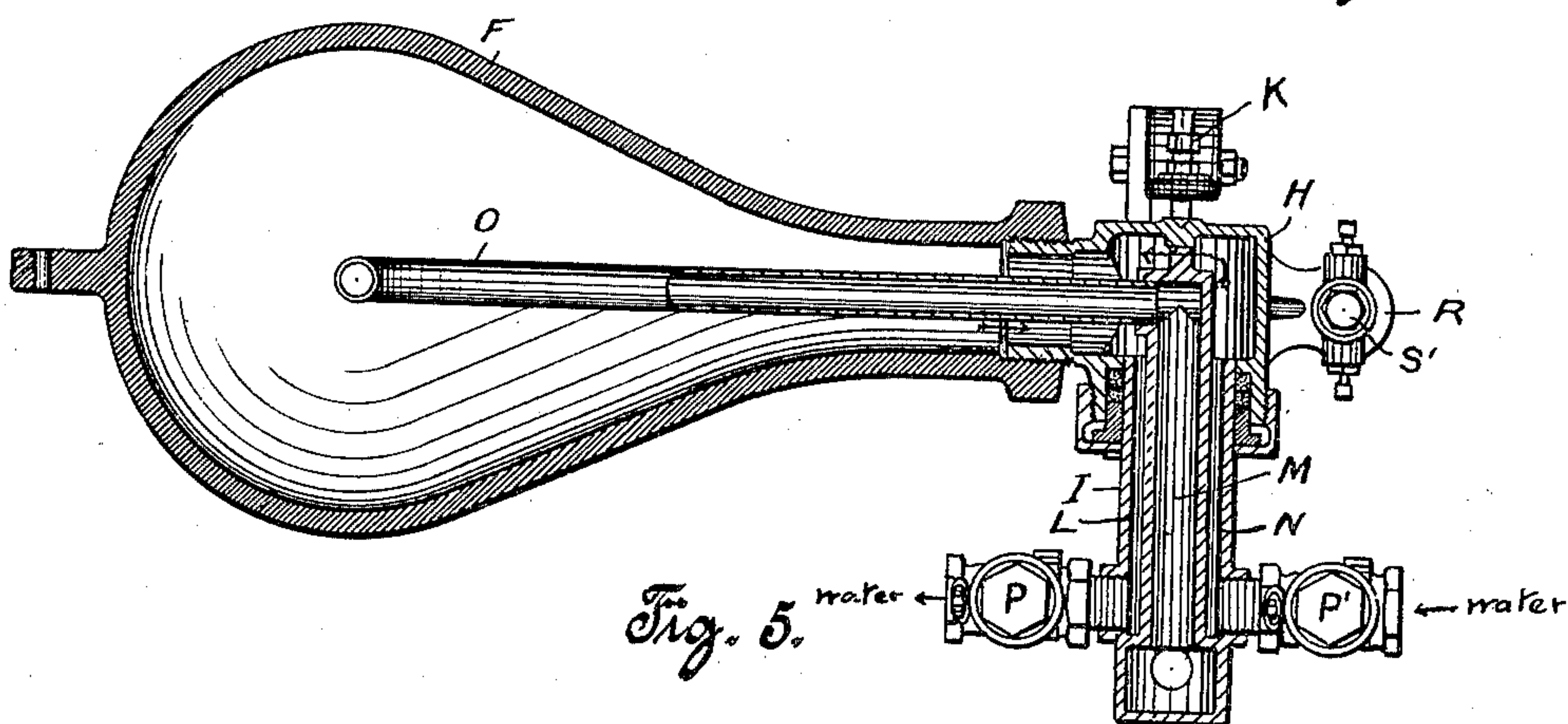


Fig. 5.

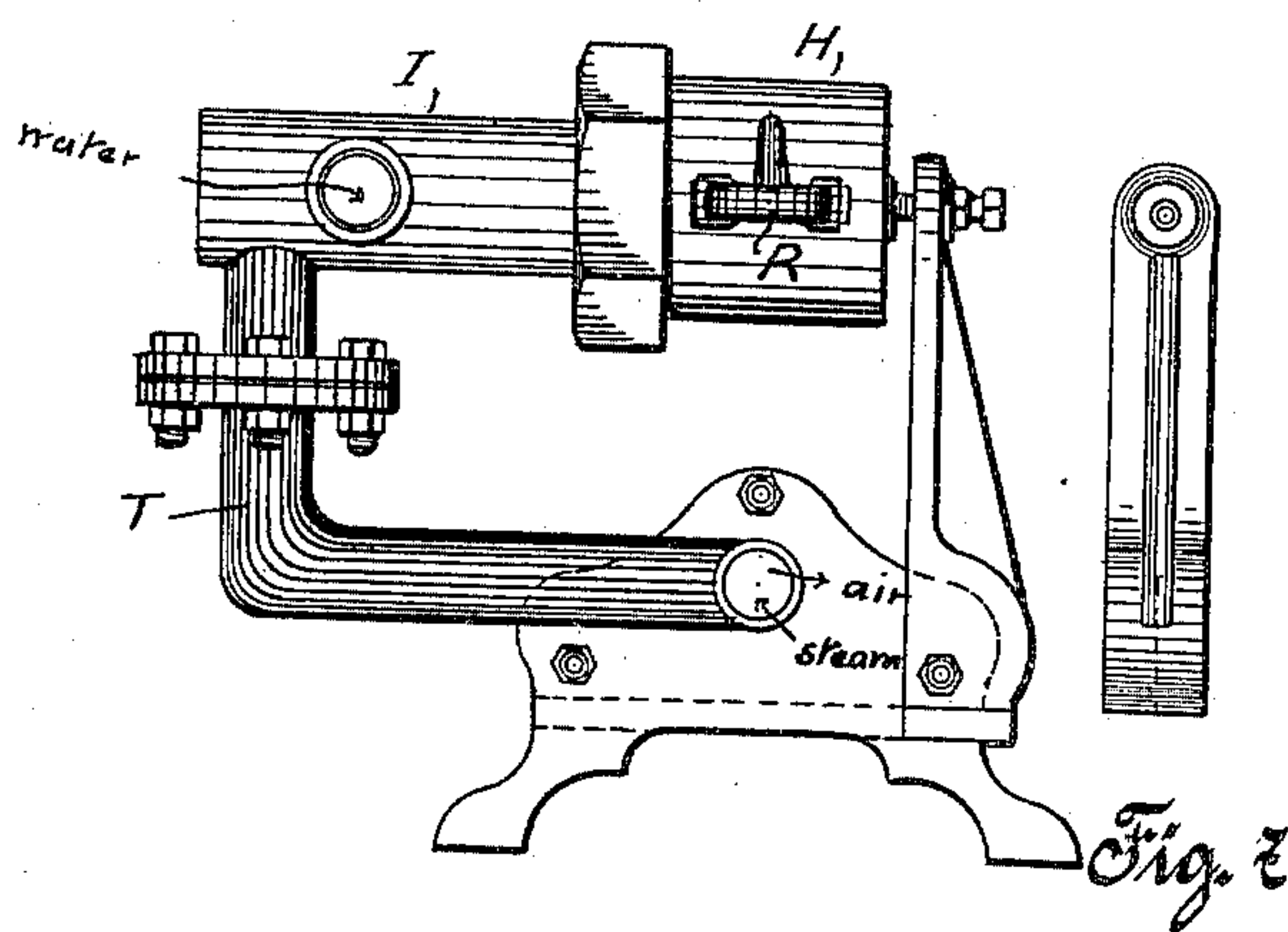


Fig. 6.

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UNITED STATES PATENT OFFICE.

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WATER-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 684,593, dated October 15, 1901.

Application filed July 25, 1898. Serial No. 686,878. (No model.)

To all whom it may concern:

Be it known that I, EDWARD P. WAGGONER, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Water-Feeding Apparatus, of which the following is a specification.

My invention relates to automatic water-feeding apparatus, particularly applicable for freeing steam-pipes from the water of condensation and returning said water to the steam-boiler or for feeding water to a boiler; and it consists of certain novel parts and combinations pointed out in the concluding claims.

In the accompanying drawings I have shown my water-feeding apparatus embodied in the form which is at present preferred by me; but it will be understood that various modifications and changes may be made without departing from the spirit of my invention and without exceeding the scope of the claims.

In said drawings, Figure 1 is a side view of an automatic water-feeding apparatus involving my present invention, the swinging tank being shown in section and as in its depressed position. Fig. 2 is a side view of said apparatus, the swinging tank being illustrated as in its elevated position and some of the parts shown in Fig. 1 being omitted for clearness of illustration. Fig. 3 is a horizontal section of my water-feeding apparatus. Fig. 4 is a front elevation of the parts shown at the right of Fig. 3. Fig. 5 is a side view of the part seen at the right of Fig. 4. Fig. 6 is an enlarged sectional detail of a part shown in Fig. 3. Fig. 7 is a cross-section on line 7 7, Fig. 6.

The structure shown in the drawings may be thus described.

A is the base, to which is attached an upright B, provided with stops C C'.

D is a lever fulcrumed on the upright B and carrying an adjustable counterweight E, and F is a swinging tank, to which the lever D is connected by a link G. The swinging tank F is attached to or terminates in a hood H, Fig. 3, which fits over and is free to turn on the end of a tubular support I. Said hood H is provided at one side with a hollow trun-

nion having a stuffing-box J and at its opposite side with internal and external bearing-faces, the internal bearing-face being engaged with a portion of the support I, Fig. 3.

K is an adjustable bearing which terminates in a point engaged with the external bearing-face of the hood H, and thereby facilitates turning of the hood H and prevents movement of the hood by the pressure within the same.

The support I contains the various passages L, M, and N through it, projects into the hollow trunnion of the hood H, and supports a pipe O, which forms a continuation of the passage M and extends within the swinging tank, terminating near the top thereof. The construction of said tubular support, I with its separate and distinct passages, is clearly shown in Figs. 6 and 7.

M is a central passage through which steam is admitted to and air escapes from the swinging tank F by way of the pipe connection T, Fig. 4, and the valves P² and P³, presently described. Surrounding the central passage M of the tubular support and communicating with the internal chamber of the hollow trunnion are the two passages L and N, one for the admission of water into the swinging tank F and the other for the escape of water therefrom.

P' P are check-valves which control the water entering through the passage N to the swinging tank F and leaving said tank through the passage L.

P² is a valve controlling the steam entering through passage M to the swinging tank F, and P³ is a valve controlling the air leaving the swinging tank F through the passage M.

Q is a common stem of valves P² and P³, which is movable through an opening in an extension R of the swinging tank F and is provided with nuts S S', by means of which the valves P² and P³ are operated simultaneously.

The operation of the apparatus may be thus described: Assume the swinging tank to be in the position shown in Fig. 2. Water of condensation or water for supplying the boilers, being under at least sufficient pressure to overcome the gravity if the supply is from below or by gravity or weight of water if from

above, lifts the disk of the check-valve P' and flows through passage N into the swinging tank F. During this entrance of the water air from the swinging tank escapes through the pipe O, passage M, and valve P³, which is open, while the other valve P² is closed. When the weight of the water in the swinging tank overbalances the counterweight E, the swinging tank descends into contact with the stop C, the hood H, to which the swinging tank is attached, turning on the tubular support I and bearing K, Fig. 1. As the tank descends the extension R comes in contact with the nut S' on the valve-stem Q and raises the valve-stem, thus opening the valve P², closing the valve P³, and thereby admitting steam, which escapes from the boiler through the open valve P². The water in the swinging tank is now subjected to a pressure equal to the pressure in the steam-boiler. As my water-feeding apparatus is placed at a higher elevation than the water-line of the boiler, the weight of water opens the check-valve P and the water flows by gravity through the passage L and the check-valve P into the boiler. When the swinging tank F is empty, the counterbalance E elevates it again into the position shown in Fig. 2, whereupon the extension R abuts against the nut S and depresses the valve-stem, thus closing the valve P² and opening the valve P³, and thereby cutting off the admission of steam from the boiler and permitting the escape of air or any uncondensed steam that may remain in the swinging tank F. The check-valve P is closed by the unbalanced pressure in the boiler, and the pressure of the water-supply opens the check-valve P' and again admits water to the swinging tank F concurrent with the escape through the valve P³ of air or any steam remaining uncondensed in the swinging tank, and, as will be observed by those skilled in the art, the tank is filled against atmospheric pressure only.

Water-feeding apparatus designed for the same use as my invention are subjected to relatively high pressures and are operated by small power. When such apparatus are used in connection with high pressures of steam, their stuffing-boxes must be tight to avoid leakage, thus involving friction to be overcome by the relative weights of the water in the swinging tank and the counterbalance. By dispensing with one of the trunnions or joints common in such structures as heretofore made friction is reduced and the device is made more positive and certain in its action.

My improved apparatus is not only simple in construction and economical in manufacture, but is extremely positive in action and capable of withstanding without injury or undue wear the strains to which such devices are subjected.

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

1. In a water-feeding apparatus, the com-

bination with a movable tank, and means for admitting water thereto and discharging water therefrom; of a stationary pipe for admitting steam and exhausting air, substantially as and for the purpose described.

2. In a water-feeding apparatus, the combination with a movable tank, and means for admitting water thereto and discharging water therefrom; of a stationary pipe contained within said tank for admitting steam and exhausting air, substantially as and for the purpose specified.

3. In a water-feeding apparatus, the combination with a movable tank, and means for admitting water thereto and discharging water therefrom; of a stationary pipe for admitting steam and exhausting air, valves for controlling the admission of steam and the exhaustion of air through the stationary pipe, and means operated by the movement of said tank to control the valves, substantially as and for the purpose set forth.

4. In a water-feeding apparatus, the combination with a swinging tank, and means for admitting water thereto and discharging water therefrom; of a stationary pipe contained within said tank for admitting steam and exhausting air, valves for controlling the admission of steam and the exhaustion of air through the stationary pipe, and means operated by the swinging of said tank to control the valves, substantially as and for the purpose described.

5. In a water-feeding apparatus, the combination of a movable tank, and a support fixed relatively to the tank and provided with means for admitting water to the tank and discharging water therefrom, and with a stationary passage for admitting steam to the tank and exhausting air therefrom, substantially as and for the purpose specified.

6. In a water-feeding apparatus, the combination of a swinging tank, and a support fixed relatively to the tank and provided with means for admitting water to the tank and discharging water therefrom, and with a stationary passage projecting within said tank for admitting steam and exhausting air, substantially as and for the purpose set forth.

7. In a water-feeding apparatus, the combination of a movable tank having a hollow trunnion, and a support for the trunnion fixed relatively to the tank and provided with means for admitting water to the tank and discharging water therefrom, and with a stationary passage for admitting steam to the tank and exhausting air therefrom, substantially as and for the purpose described.

8. In a water-feeding apparatus, the combination of a movable tank having a hollow trunnion, and a support for the trunnion fixed relatively to the tank and provided with means communicating with the internal chamber of the trunnion for admitting water to the tank and discharging water therefrom, and with a stationary passage extending through said chamber of the trunnion and

into the tank for admitting steam and exhausting air, substantially as and for the purpose specified.

9. In a water-feeding apparatus, the combination of a swinging tank, a support fixed relatively to the tank and provided with means for admitting water to the tank and discharging water therefrom, and with a passage for admitting steam to the tank and exhausting air therefrom, and a hood encircling the end of said support and movable relatively thereto, said hood being attached to the swinging tank, substantially as and for the purpose set forth.

10. In a water-feeding apparatus, the combination of a movable tank, a support fixed relatively to the tank and provided with means for admitting water to the tank and discharging water therefrom, and with a passage projecting within said tank for admitting steam to the tank and exhausting air therefrom, and a hood encircling the end of said support and movable relatively thereto, said hood being attached to the swinging tank, substantially as and for the purpose described.

11. In a water-feeding apparatus, the combination of a movable tank, a support fixed relatively to the tank, means for admitting water to the tank and discharging water therefrom and for admitting steam and exhausting air, a hood encircling the support and movable relatively thereto, said hood being attached to the movable tank, and a bearing for engaging the hood and preventing move-

ment thereof by the pressure within said hood, substantially as and for the purpose specified.

12. In a water-feeding apparatus, the combination of a movable tank, a support fixed relatively to the tank, means for admitting water to the tank and discharging water therefrom and for admitting steam and exhausting air, a hood encircling one end of the support and provided with internal and external bearing-faces, the internal face being engaged with a part of the support, and a bearing for engaging the external bearing-face of the hood, substantially as and for the purpose specified.

13. In a water-feeding apparatus, the combination of a movable tank, a support fixed relatively to the tank, means for admitting water to the tank and discharging water therefrom and for admitting steam and exhausting air, a hood having one side provided with a trunnion encircling one end of the support, and a bearing for engaging the opposite side of the hood, substantially as and for the purpose described.

14. In a water-feeding apparatus, the combination of a movable tank, a support fixed relatively to the tank and provided with separate passages for the admission and discharge of water, and a stationary passage for the admission of steam and the exhaustion of air, substantially as and for the purpose set forth.

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