

(No Model.)

2 Sheets—Sheet 1.

H. H. CRAIGIE.
WATER CLOSET.

No. 410,269.

Patented Sept. 3, 1889.

Fig. 1.

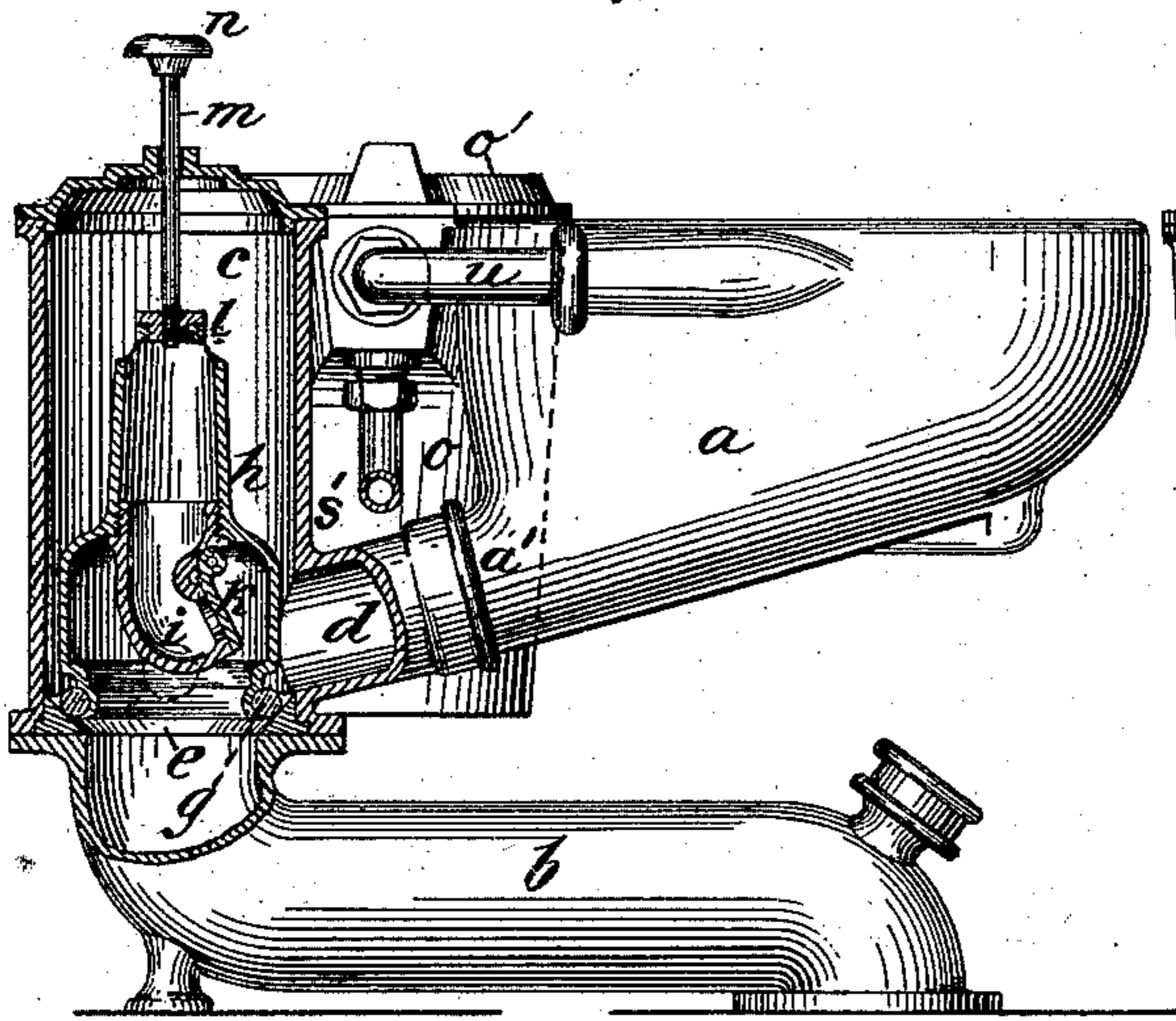


Fig. 2.

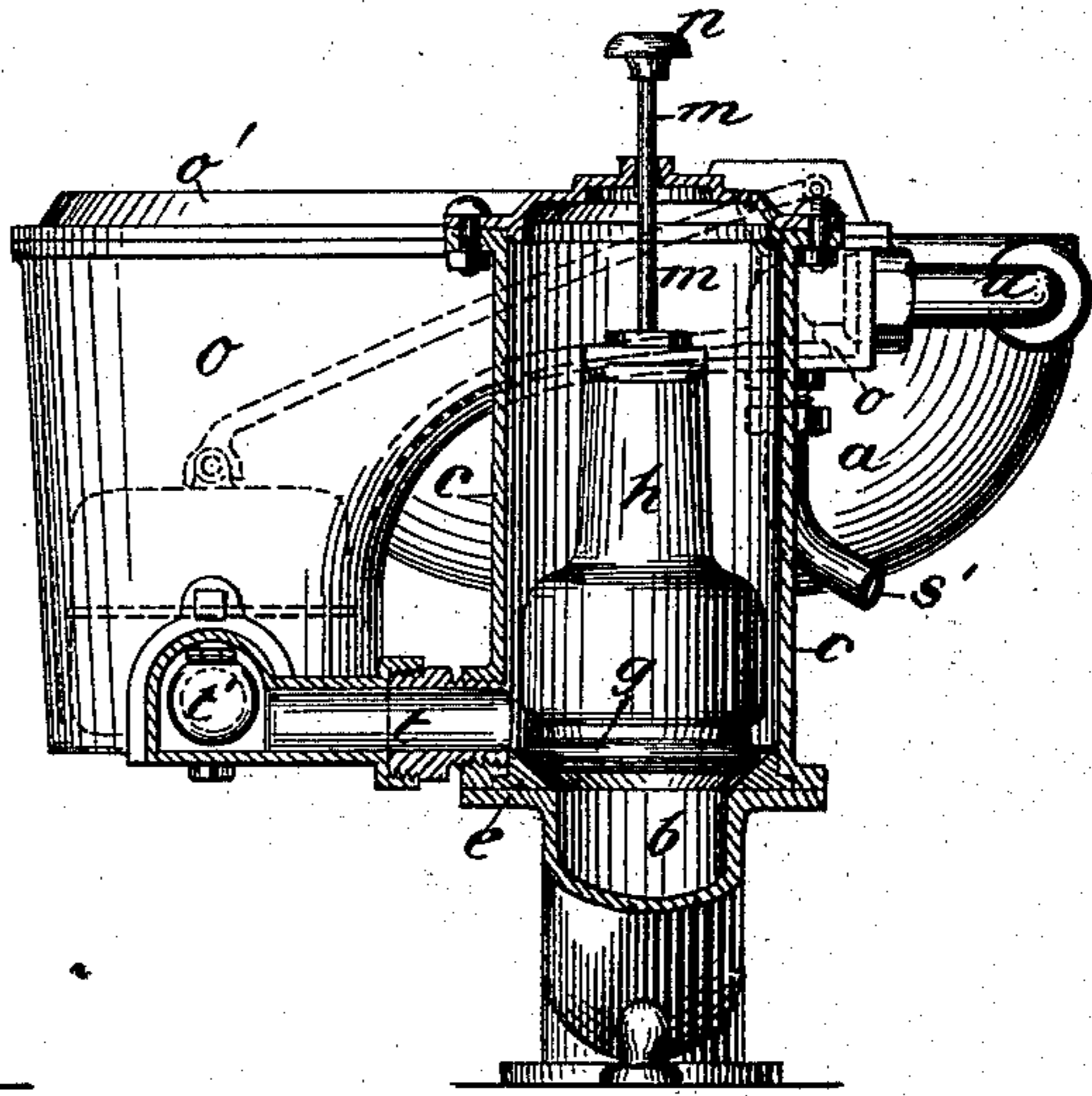


Fig. 3.

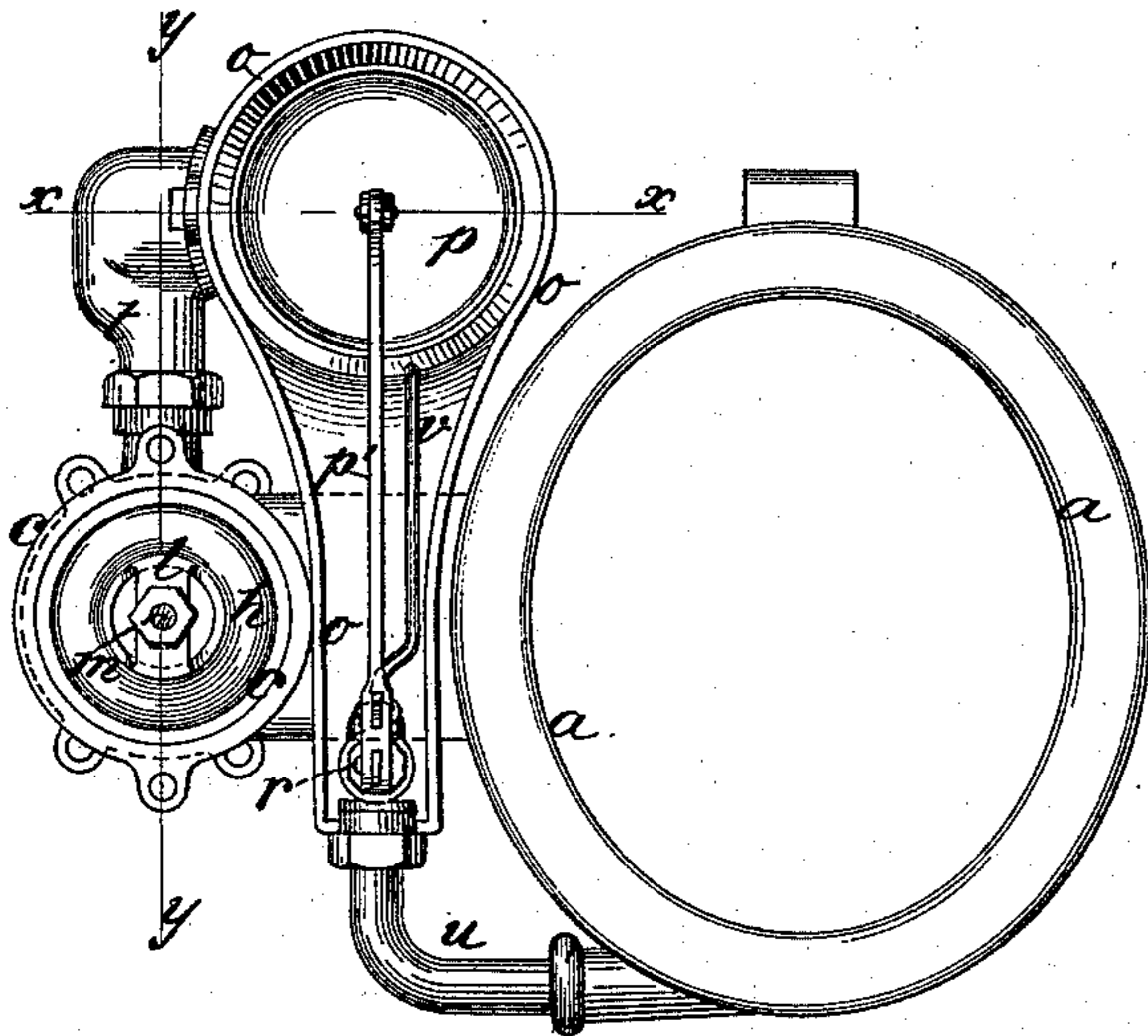


Fig. 5.

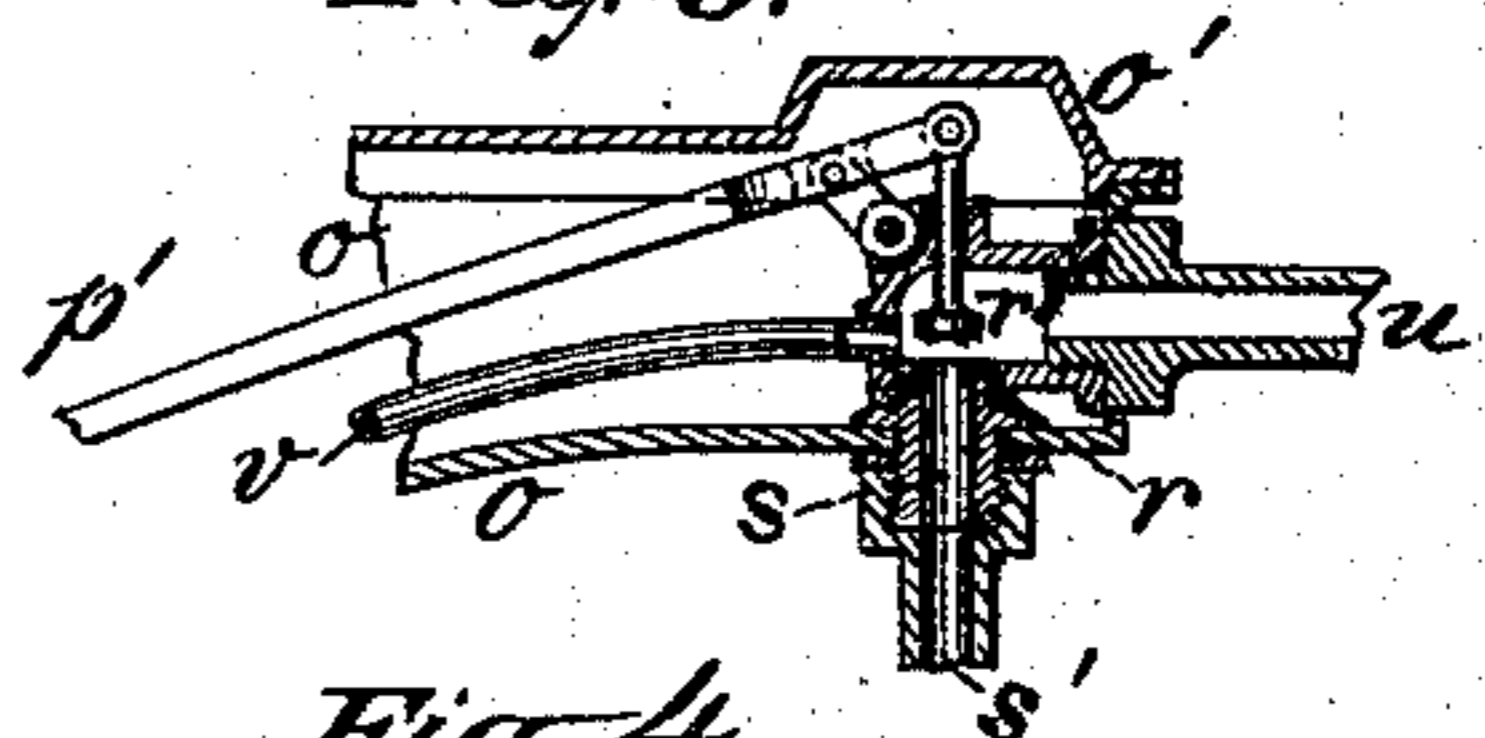
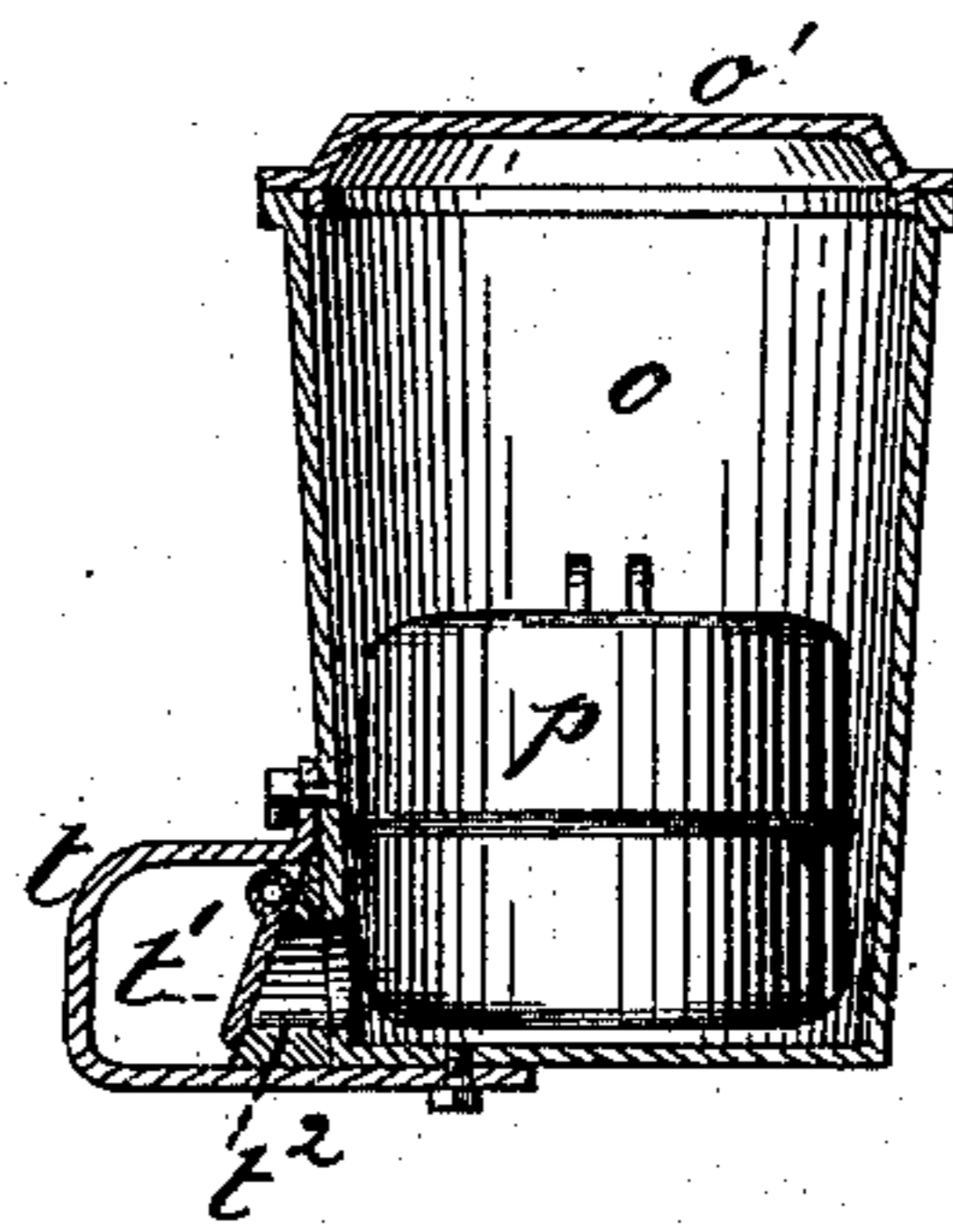


Fig. 4.



WITNESSES

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INVENTOR

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by Chas. M. Higgins.
Attorney

(No Model.)

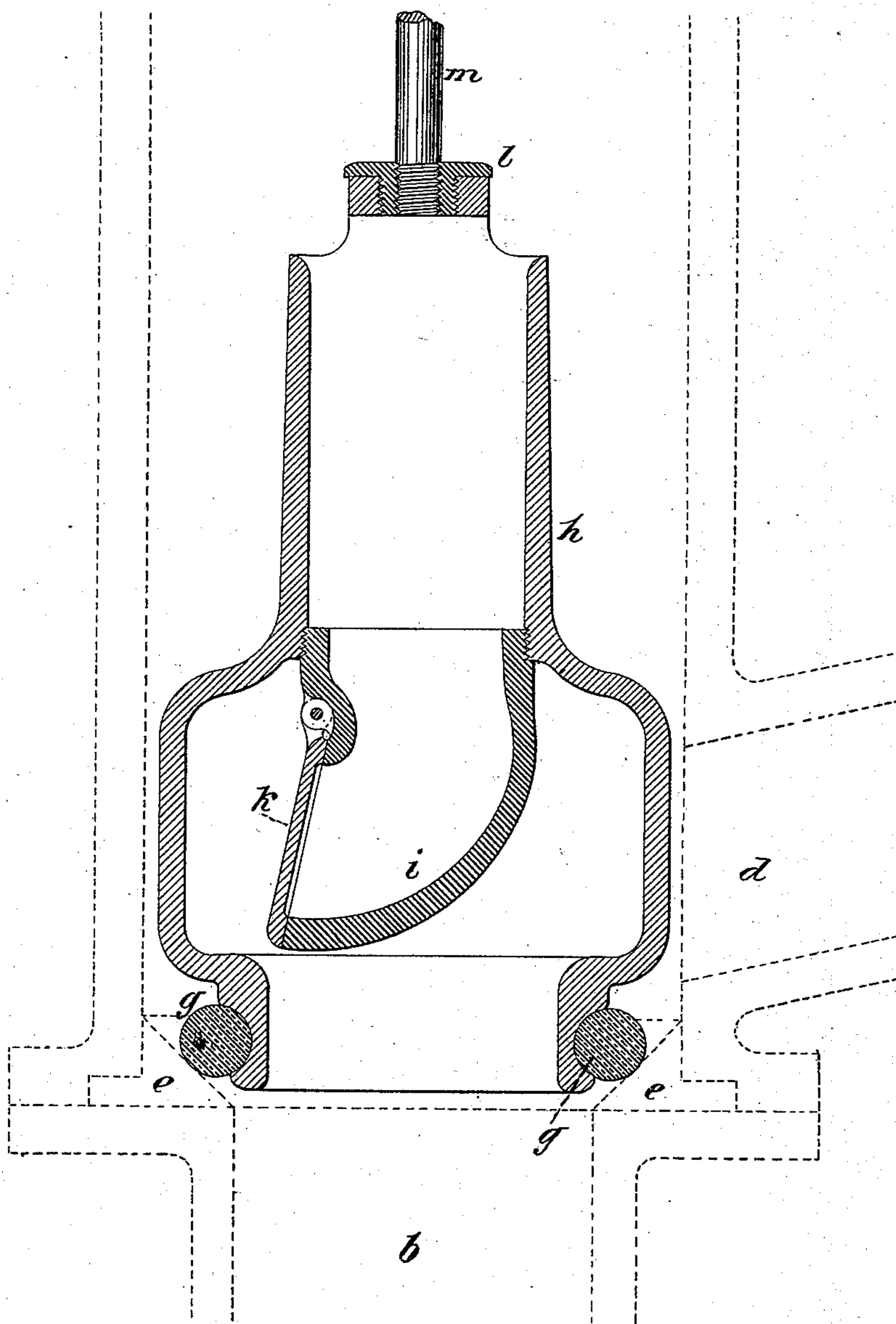
2 Sheets—Sheet 2.

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Fig. 6.



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UNITED STATES PATENT OFFICE.

HUGH H. CRAIGIE, OF NEW YORK, N. Y.

WATER-CLOSET.

SPECIFICATION forming part of Letters Patent No. 410,269, dated September 3, 1889.

Application filed November 3, 1887. Serial No. 254,157. (No model.)

To all whom it may concern:

Be it known that I, HUGH H. CRAIGIE, of the city, county, and State of New York, have invented certain new and useful Improvements in Water-Closets, of which the following is a specification.

My invention applies more especially to what are known as "plunger-closets," in which the contents of the bowl are discharged by raising a plunger-valve in a chamber connected laterally with the bowl and communicating with the trap or sewer-pipe, a float-valve being used to control the flush of water to the bowl and plunger-chamber.

The main objects of my improvements are to reduce the fouling-surface in the operative parts of the closet and confine this fouling-surface to the chamber in which the valve or plunger operates, and also to produce a better distribution of the water-supply and a better flushing or washing effect of the same in the closet, and to provide an overflow through the plunger through which sewer-gas cannot enter, and thereby furnish a much more effective and sanitary closet. To these ends I provide the closet with separate and distinct chambers for the float and for the discharge valve or plunger, the float-chamber not being connected with the bowl directly, but communicating at the base with the base of the plunger-chamber by a passage which has a check-valve opening toward the plunger-chamber, and thereby preventing any backflow to the float-chamber. The water-supply valve controlled by the float is formed with a main branch or jet, which discharges directly into the bowl, and a minor branch or jet discharging directly into the float-chamber. By this means fresh water only enters the float-chamber, and the contents of the bowl are excluded therefrom, so that the float and float-chamber are not exposed to fouling, which is therefore confined to the plunger-chamber. In addition to this the divided flow of the water-supply causes the water to rise more rapidly in the bowl than it does in the float-chamber, so that the water continues to overflow from the bowl through the open top of the tubular plunger-valve, thus giving an effective rinsing action every time the closet is operated, which continues for a short interval until the water rises in the float-

chamber to the normal level, when the overflow ceases. The hollow plunger is provided with a gravitating flap-valve in its internal overflow-passage, which allows the escape of the overflow, but prevents backflow of water or gases. The overflow-passage extends directly downward through the plunger, so that it forms no trap or water seal, and the water is deflected from a direct course as little as is essential to the operative arrangement of the valve.

The improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved water-closet, shown partly in section. Fig. 2 is an end elevation partly in section. Fig. 3 is a plan view. Fig. 4 is a cross-section of the float-chamber in a plane indicated by the line *xx* in Fig. 3. Fig. 5 is an enlarged fragmentary section of the float-valve and the end of the float-chamber, and Fig. 6 is a central vertical section, on an enlarged scale, of the plunger-valve and its chamber.

Referring to Figs. 1, 2, and 3, *a* indicates the bowl of the closet, and *b* the terminal discharge-pipe which lies close to the floor and connects at its lower end with the trap or waste-pipe in the usual way. The upper end of this pipe *b* is connected to the plunger-chamber *c*, which is preferably of upright cylindrical shape having an inclined neck *d* at the base, into which the inclined neck *a* of the bowl fits, as best seen in Fig. 1. The base of the plunger-chamber *c* has a conical seat *e* just above the mouth of the discharge-pipe *b* and below the neck *d*, upon which the valve or plunger *f* seats, as seen in Figs. 1, 2, and 6. This plunger is a tubular hollow casting of a trumpet or bottle shape, the grooved base of which is provided with a rubber ring-packing *g*, which makes a tight joint on the seat *e*, while the narrow neck of the plunger is open at the top but crossed by a central cross-bar or bridge *l*, with which the operating rod or stem *m* connects. This stem slides through a central hole in the cap or cover *c'* of the plunger-chamber, and is provided with an external knob or pull *n* for manipulation in the usual manner, as seen in Figs. 1 and 2. The plunger falls to its seat by its own gravity and closes communication between the bowl and waste-pipe, as seen in Figs. 1,

2, and 6. The plunger is formed with an overflow-passage extending directly downward, so as to form no trap or water seal. This passage is constituted in the construction shown by the contracted upper part or neck of the plunger and by an elbow or bent tube *i*, the top of which is screwed tightly into the tubular neck of the plunger, and having at the bottom a laterally-inclined orifice, which is closed by a hinged gravitating flap *k*, forming a gravitating check-valve opening downward or toward the waste-pipe and closing in the reverse direction, as seen in Figs. 1 and 6.

15 The float-chamber *o*, in which the float and the float-valve are placed, is distinct from the plunger-chamber, as shown best in Figs. 2 and 3. This float-chamber is preferably broad and deep at one end and narrow and shallow at the other, and, as shown in Figs. 2 and 3, the deep end being nearly cylindrical to receive the cylindrical hollow sheet-metal float *p*, which nearly fills the same. The narrow portion of the float-chamber lies between the plunger-chamber and the bowl at right angles to the connecting-necks *d* *a'*, as seen in Figs. 1 and 3, and in the narrow end is fixed the ball-cock or supply-valve *r*, as seen best in Figs. 3 and 5. This ball-cock is of the usual construction, with a valve-disk *r'*, operated by the lever *p'*, to which is connected the float *p*, and the ball-cock has also an inlet *s*, which connects with the water-supply pipe *s'* and terminates interiorly in a valve-seat, on which the disk *r'* seats. The valve is novel, however, in that the discharge therefrom is divided into two jets or branches of different capacities, the main branch *u*, above the valve-seat, being connected directly to the flushing-rim of the bowl, while the minor branch *v* discharges into the float-chamber, this branch being in the form of a small tube, which is prolonged from the valve into the deep part of the chamber, so that the water is not dispersed or spattered about in the narrow part of the chamber when the discharge takes place. The float-chamber has no direct communication with the bowl, as heretofore; but the base of the float-chamber and the base of the plunger-chamber are connected by a tube or passage *t*, which is provided with a check-valve *t'*, which opens in the direction of the flow from the float-chamber to the plunger-chamber, but closes in the reverse direction. The check-valve *t'* is an inclined gravitating flap hinged on an inclined seat *t''*, which is clamped between the side of the float-chamber and the flanged end of the pipe *t*, as will be understood from Figs. 2, 3, and 4. Normally when the plunger is seated the water will rise in the bowl and plunger-chamber to a level with the open top of the hollow plunger, where any overflow will escape down through the hollow plunger and through the check-valve *k* into the water-pipe. The water in the float-chamber will of course stand at the same level, and the rise of the float will

close the supply-valve and keep the water at said level. As soon, however, as the plunger is raised the contents of the bowl will be discharged rapidly into the waste-pipe, and the water from the float-chamber will simultaneously flow through the pipe *t* into the valve-chamber and thence into the waste-pipe. As the float descends in the float-chamber, the supply-valve will be opened and a voluminous jet of water will be discharged into the bowl through the branch *u*, thus cleansing and flushing the bowl, while a smaller jet will flow into the float-chamber through the pipe *v*. When, therefore, the plunger is dropped back to its seat, the said jets will continue to flow while the float remains down below its normal level, and the bowl will therefore quickly fill up to its normal level and overflow at the top of the plunger, as before described. The float-chamber will, however, fill slowly to its normal level on account of its relatively small supply through the minor branch *v*, so that consequently the water will continue to flow into the bowl and overflow the plunger for a considerable interval before the float rises to the normal level and cuts off the flow, thus insuring a voluminous flow into the bowl and plunger-chamber and a rinsing out of the plunger every time the closet is used, which conduces greatly to cleanliness and efficiency in the operations of the closet. It will be noted that as there is no direct communication between the float-chamber and the bowl the contents of the bowl never enter the float-chamber, and, as there is only clean water discharged into the float-chamber from the supply-valve, which can flow freely out of the float-chamber through the check-valve *t'*, while no back-flow can take place, the float and float-chambers are protected from any fouling from the contents of the bowl. The check-valve *t'* might be omitted from the passage *t* without sacrificing all the advantages of the described construction; but the use of the check-valve is of course preferable.

It will be readily seen that while the float-chamber has no connection with the bowl which allows the water from the bowl to flow directly from the bowl to the chamber, yet the float-chamber may be said to be connected at the base with the base of the bowl through the passage *t*, chamber *c*, and neck *d*, the check-valve *t'* in said passage preventing backflow from the bowl. Hence so far as the main advantage of this construction is concerned the passage *t* might connect directly to the base of the bowl, instead of to the base of the bowl through the parts *c* *d*; but it is better to connect by way of the chamber *c*, as shown, since the current discharged from the float-chamber into chamber *c* produces a better rinsing effect on the plunger.

My improved construction of plunger with the trapless overflow-passage through it and the gravitating check-valve closing against an approximately vertical seat may be used

with or without the other features of my invention. It has the advantage over other constructions of overflow-plungers that the sewer-gas is effectually excluded without the formation of any water seal or trap, and consequently without rendering the passage "air-bound" by the confining of compressed air therein, which prevents the proper action of the overflow. The first descent of overflow water acts against the lower edge of the valve to open it, and thereby relieves the air-pressure on the valve, so that it offers no obstruction to the passage of the water. In the case of a sudden flow of water (as when a pail of slops is suddenly poured into the closet) the water is deflected to one side by the curved or inclined wall of the elbow *l* opposite the valve, and is thrown against the valve with all the force due to its volume and its fall, thereby forcing the valve open against the pressure of any air that may be confined beneath it.

I claim as my invention—

1. In a water-closet, the combination, with the bowl and a valve controlling the discharge thereof, of a float-chamber communicating at the base with the base of the bowl, with a check-valve in the communicating passage opening outwardly from the float-chamber, a float in said float-chamber, and a water-supply valve governed by said float discharging into the bowl and into said float-chamber, substantially as set forth.

2. In a water-closet, the combination, with a bowl, a discharge-pipe, and a valve or plunger between the two, of a chamber inclosing said plunger and communicating with the bowl, a float-chamber distinct from the bowl and plunger-chamber, a passage between the base of the float-chamber and plunger-chamber, a check-valve in said passage opening toward the plunger-chamber, and a float-valve in the float-chamber discharging into the bowl and the float-chamber, substantially as herein set forth.

3. The combination, in a water-closet, with a bowl and a valve controlling the discharge thereof, of a float-chamber communicating at the base with the base of the bowl, a check-valve in said communication opening outwardly from the float-chamber, a float in said float-chamber, a supply-valve governed by said float, and two discharge-jets from said valve of different volumes, the main jet discharging directly into the bowl and the minor jet into the float-chamber, substantially as and for the purpose set forth.

4. In a water-closet of the described class, the combination, with the separate float-chamber having no direct connection with the bowl, but communicating therewith through a passage at the base having a check-valve, with a float in said chamber, and a supply-valve controlled thereby having a main dis-

charge-pipe *u*, connected to the bowl, and minor pipe *v*, prolonged into the body of the float-chamber, substantially as and for the purpose set forth.

5. In a plunger-closet, a hollow plunger formed with a trapless overflow-passage through it, in combination with a gravity check-valve closing said passage to exclude sewer-gas, and which valve alone is interposed between the soil-pipe and the exterior air, whereby the retention in said passage of water to constitute a water seal is prevented, substantially as set forth.

6. In a plunger-closet, a hollow plunger formed with an overflow-passage within it extending directly downward to the lower part of the plunger, bending laterally therein and terminating in an approximately vertical seat, in combination with a check-valve hinged at its upper edge seating against said seat by gravity to exclude sewer-gas and opening freely to permit the escape of overflow-water, substantially as set forth.

7. In a plunger-closet, the combination of a hollow plunger formed with an enlarged base and a contracted upper portion and having an overflow-elbow fastened within its enlarged base and forming a downward continuation of the contracted upper portion, whereby said upper portion and elbow constitute a trapless overflow-passage extending down from the top of the plunger and terminating laterally in an approximately vertical seat within the enlarged base, and a gravitating check-valve consisting of a hinged flap seating against said seat, substantially as and for the purpose set forth.

8. In a plunger-closet, a hollow plunger formed with a trapless overflow-passage extending directly downward within it and thence laterally and terminating in an approximately vertical seat, with an inclined surface opposite said seat and adapted to deflect the descending water laterally toward said seat, in combination with a gravity check-valve adapted to close against said seat and to be opened by the impact of the descending water deflected by said inclined surface, substantially as set forth.

9. A plunger in a plunger water-closet comprising an overflow-tube slightly curved at its lower end so that the opening is out of perpendicular, a flap-valve hinged at its upper sides and covering said opening, said opening being sufficiently inclined to permit the valve to shut by gravity, and an enlargement around the lower end of the overflow-tube to hold the packing and fill the seat at the bottom of the plunger-chamber.

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Witnesses:

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