

(No Model.)

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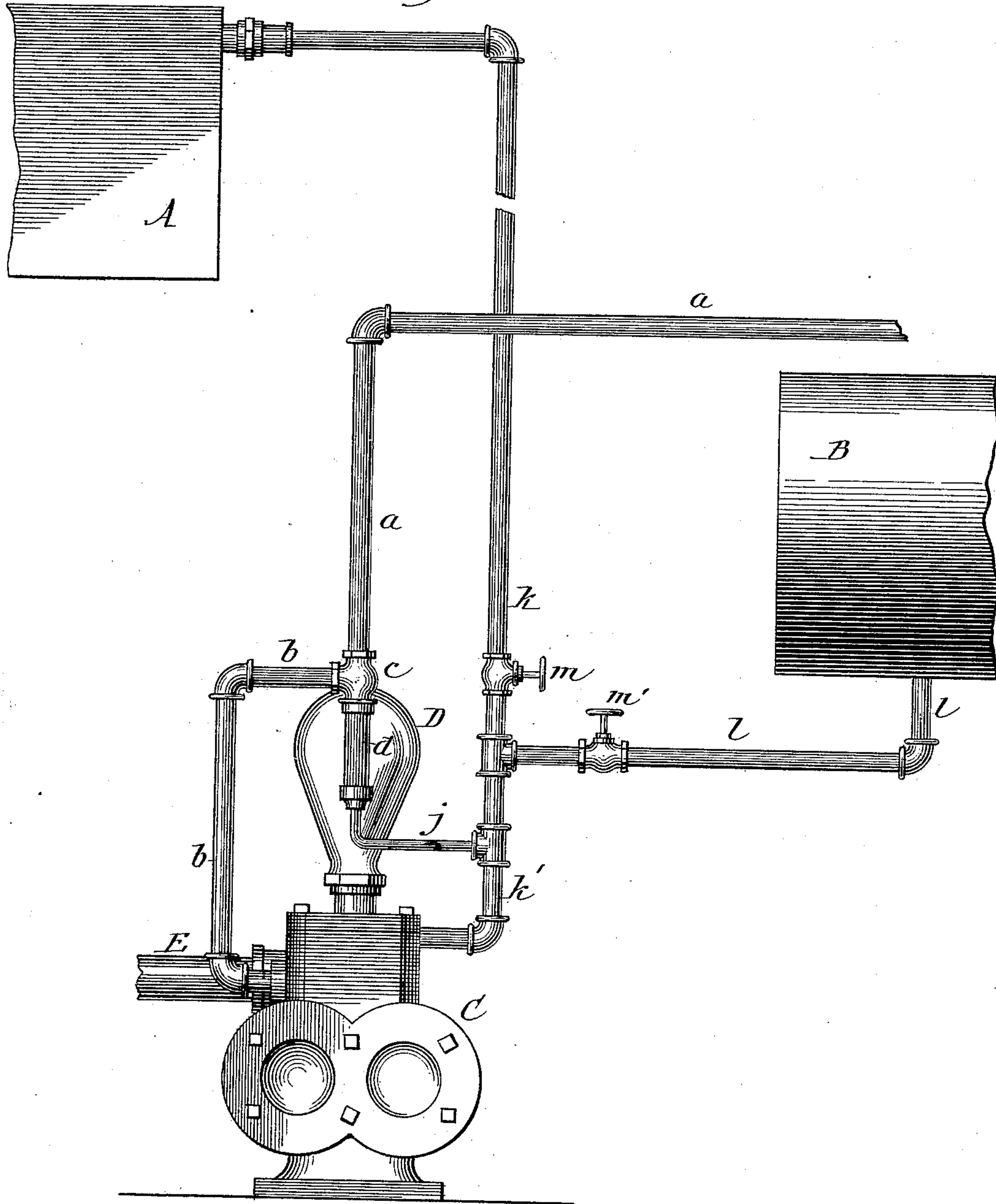
J. W. STEVENS.

APPARATUS FOR FEEDING BOILERS OR WATER TANKS.

No. 405,615.

Patented June 18, 1889.

*Fig. 1.*



Witnesses  
*Albert H. Adams.*  
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(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

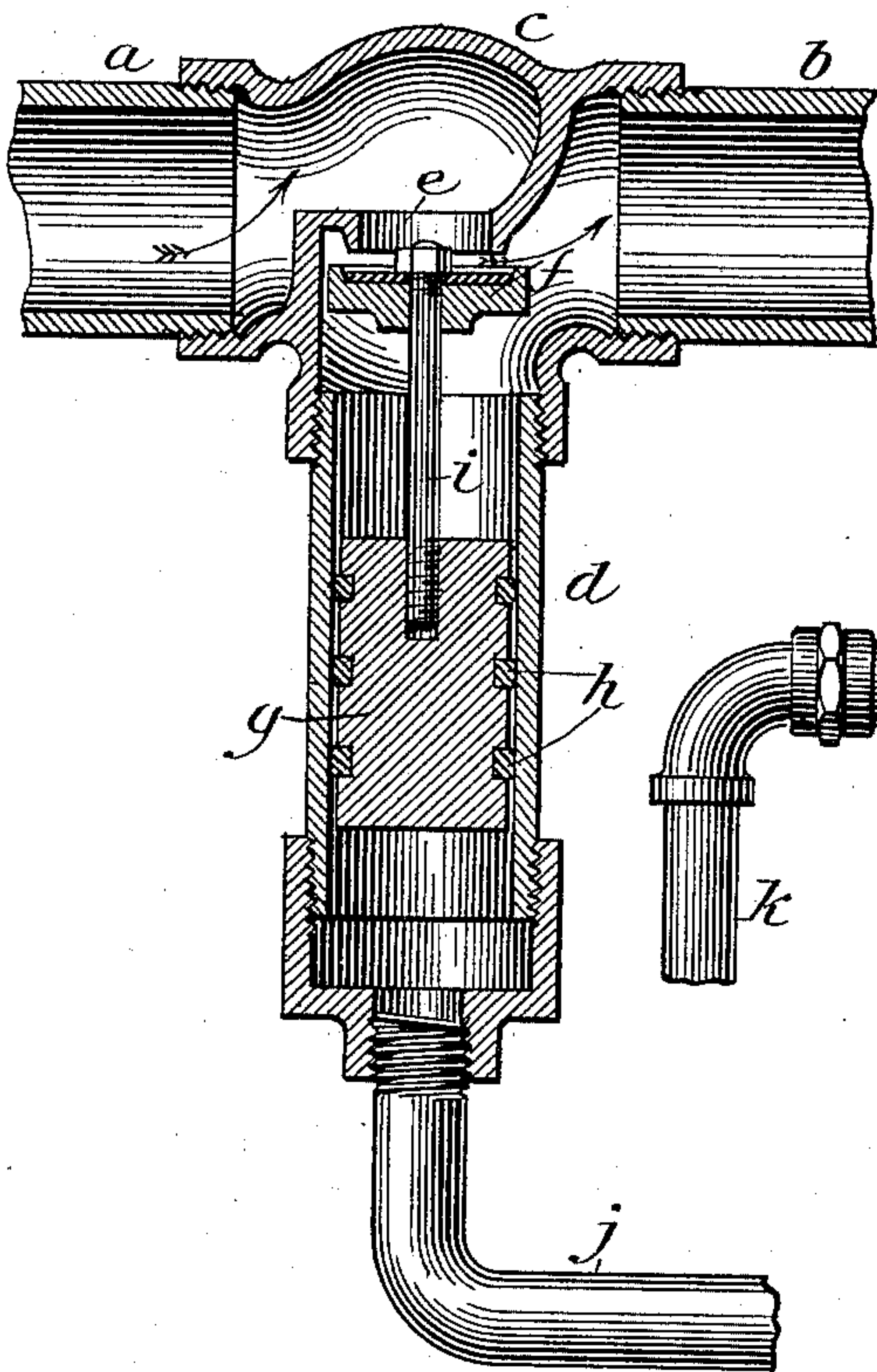


Fig. 3.

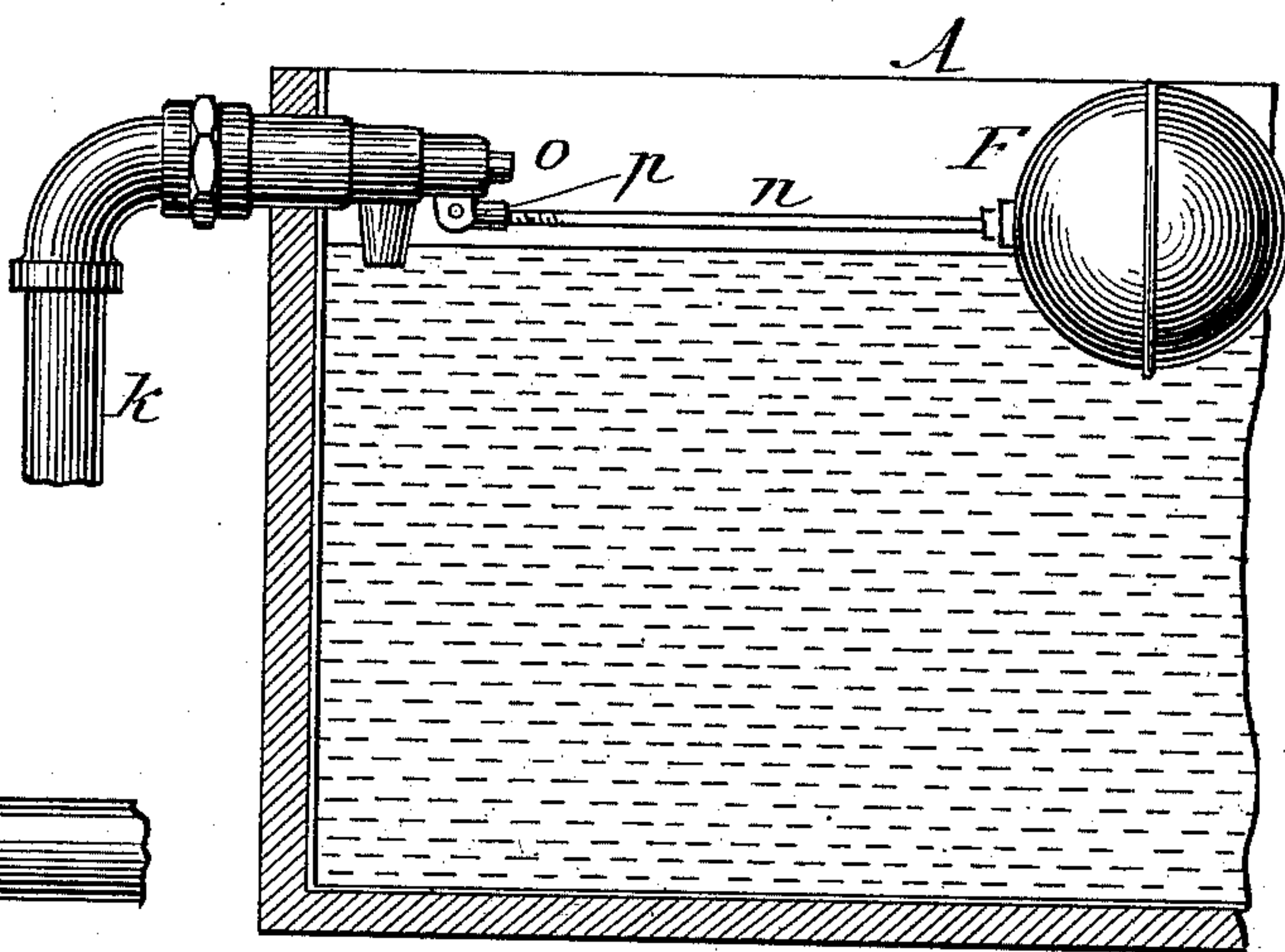
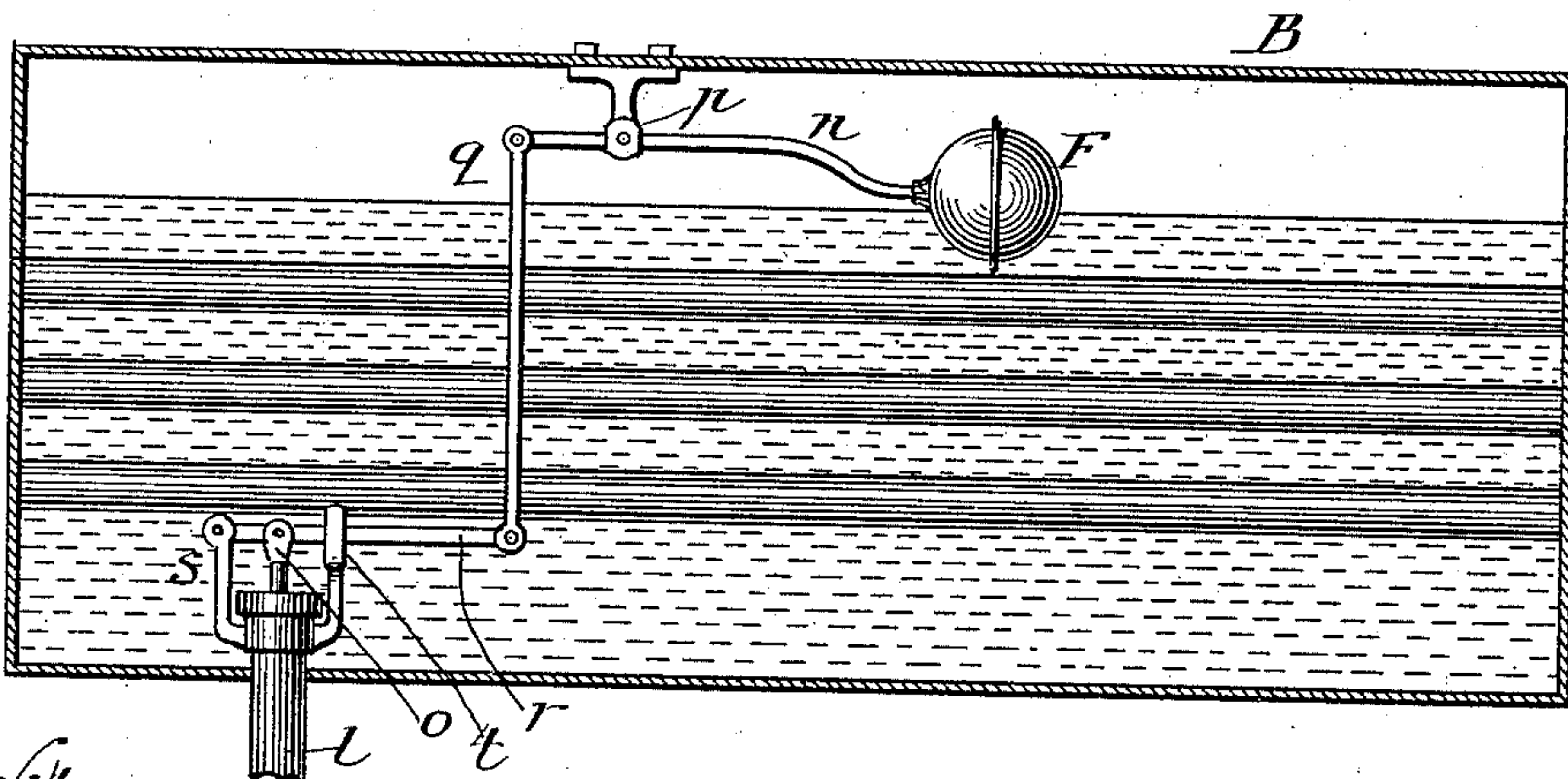


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JOEL W. STEVENS, OF CHICAGO, ILLINOIS, ASSIGNOR TO HIMSELF AND  
ROBERT BINES, OF SAME PLACE.

## APPARATUS FOR FEEDING BOILERS OR WATER-TANKS.

SPECIFICATION forming part of Letters Patent No. 405,615, dated June 18, 1889.

Application filed January 2, 1889. Serial No. 295,244. (No model.)

*To all whom it may concern:*

Be it known that I, JOEL W. STEVENS, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented certain new and useful Improvements in Apparatus for Feeding Boilers or Water-Tanks, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of pipes, showing the manner of applying my improvements. Fig. 2 is a vertical section of the main valve. Fig. 3 is a longitudinal section of a tank. Fig. 4 is a longitudinal section of the boiler.

The object of this invention is to provide an arrangement of pipes and construction of valve so that the steam-pressure and water will balance each other and operate automatically in operating the pump and in maintaining the desired height or depth of water in boilers or tanks, or both, as may be desired. The apparatus shown is more particularly designed for filling a tank at the top of a building which is to be used in operating elevators; but I do not limit it to this use, as it will be found desirable and advantageous for other purposes.

In the drawings, A indicates a tank. B is a boiler. C is a pump. D is an air-chamber. E is a water-supply pipe. F is a hollow metal float. These parts are constructed in any of the usual and well-known forms, and are arranged in reference to each other as may be found most convenient in the building within which they are to be located.

The boiler shown has applied to it what is known as an "under feed;" but it will be readily understood that by carrying the pipe around or back to the end of the boiler a top feed may be applied, as may be desired.

The pipe *a* leads from the steam-dome of the boiler to the cap *c* of the valve-section *d*, which section is branched, and leading therefrom is the steam-pipe *b*, which conveys steam to the steam-chest of the pump. The water-pipe *k' k* leads from the pump to the upper part of the tank A and in proximity to the pump. A branch *j* leads to the lower end of the valve-section *d*, another branch *l* leads to the boiler B, and the pipes *k l* are provided with cut-off valves *m m'*. The pipe *k* termi-

nates within the tank A with a valve *o*, which is operated by the float F and its lever-arm *n*, which arm is pivoted at *p*, and is bent upward so as to come in contact with and operate the valve *o*, so as to close the same when a sufficient height of water is reached in the tank, and to open the valve when the water falls below its upper limit. There is nothing especially new in providing a float operating to open or close a valve as the water descends below or reaches the desired limit of depth, and any well-known form of valve operated by a float may be used in place of the one shown. A similar float is shown in the boiler B; but when the water is admitted below, as shown, the arrangement of the float-valve apparatus differs somewhat, as in this case the lever-arm *n* passes beyond the pivot *p* and is pivoted or hinged to a rod *q*, which descends between the tubes to the space below, and is there connected with the lever *r*, which passes through the guide-arm *t* and is pivoted to the arm *s*, the valve-rod being pivoted to the lever *r* between the two arms *s* and *t*, as shown.

Where a top feed is used, the float-valve apparatus will not differ essentially from that shown for the tank in Fig. 3.

The valve-section *d* is provided at its upper end with a cap *c*, containing a valve-seat *e* and a valve *f*, constructed substantially as shown in Fig. 2. This cap may have the form or connection shown in either of the Figs. 1 and 2. The valve *f* is provided with a stem *i*, which connects it with a plunger *g*, which plunger is provided with grooves *h*, by means of which the plunger is given a water-packing.

In operation, steam passing through the pipe *a* passes through the section or cap *c* by means of the valve-opening *e*, and from this continues down or into the steam-chest of the pump, and so long as the steam continues flowing the pump will continue its operation and elevate water through the pipes *k k'* to the tank A, the valve *m'* being closed. This operation will continue until the float F rises so as to close the valve *o*, which produces a back-pressure that is communicated through the pipe *j* into the section *d*, raising the plunger and valve *f*, so as to shut off the steam and stop the action of the pump, steam-



pressure remaining in the pipe *a*, and exerting its pressure upon the valve *f*, so that, as soon as sufficient water is taken from the tank *A* to lower the float and open the valve *o*, the steam-pressure will force down the valve *F* and again communicate with the pump and put it into operation, which operation will continue until the float *F* is again raised to the limit-line and the valve *o* again closed, and when the pump has continued so as to exert a water-pressure on the pipe exceeding that of the steam-pressure, the plunger *g* will again close the valve *e f* and shut off the steam. By this arrangement the tank is kept full by the automatic action of the pump and steam and water pressures, so that no excessive strain is produced upon the water-pipes, and any overflow of the tank is prevented, as the inflow of water ceases when the float reaches its predetermined limit. The same arrangement of pipes and valves also acts in feeding water to the boiler. When the boiler is to be filled, the valve *m'* is opened, and the valve *m* may be closed when water is flowing to the tank; but if the tank is full it is immaterial whether this valve is closed or not, as the water then flows through the pipe *l* into the boiler, and when the water-limit of the boiler is reached the float operates the valve to shut off the water, as with the tank, and the excess of water-pressure elevates the plunger *g*, closing the valve *e f*, as before, and stopping the pump. By this arrangement no overfilling of the boiler or overstrain upon the pipes can take place, for the reason before stated, that when the water-pressure exceeds the steam-pressure steam to the pump is shut off and the action of the pump ceases automatically. This automatic arrangement for equalizing or balancing the steam and water pressures will be found exceedingly useful in preventing the overflow of tanks which are located at the top of business-buildings, and it also prevents any disaster or injury to the rooms below the tanks or to the pipes by reason of any want of attention, or oversight on the part of the operator.

As shown, the arrangement of steam and water pipes is connected both with the elevated water-tank and the steam generator or boiler; but it is not necessary to make both connections, as this automatic arrangement will be found as valuable for either one as for both, and in many cases where feed-water attachments are already applied to the boiler the boiler-connection may be omitted, and in cases where it is desired only for applying feed-water to the boiler the tank-pipe may be omitted.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a water-receiving vessel and a supply-pump connected therewith, of a valve-section located in the steam-supply pipe of the pump, normally held open by the steam-pressure and adapted to be automatically closed by the back-pressure from the water-supply pipe of the tank to cut off the steam-supply, substantially as described.
2. The combination, with a steam-pump, a water-receiving vessel connected therewith, and a pipe for supplying steam to the pump, of a valve-section located in the steam-supply pipe of the pump and provided with an opening *e*, the plunger *g*, located beneath said opening and carrying a valve *f*, and the back-pressure pipe *j*, substantially as described.
3. The combination of a steam-pump, a boiler, a water-receiving vessel, a pipe for supplying steam to the pump, pipes for conveying water from the pump to the water-receiving vessel and boiler, a valve-section located in the steam-supply pipe of the pump, a back-pressure pipe leading to said valve-section, and a valve normally held open by steam-pressure and automatically closed by the back-pressure of water, substantially as described.

JOEL W. STEVENS.

Witnesses:

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HARRY T. JONES.