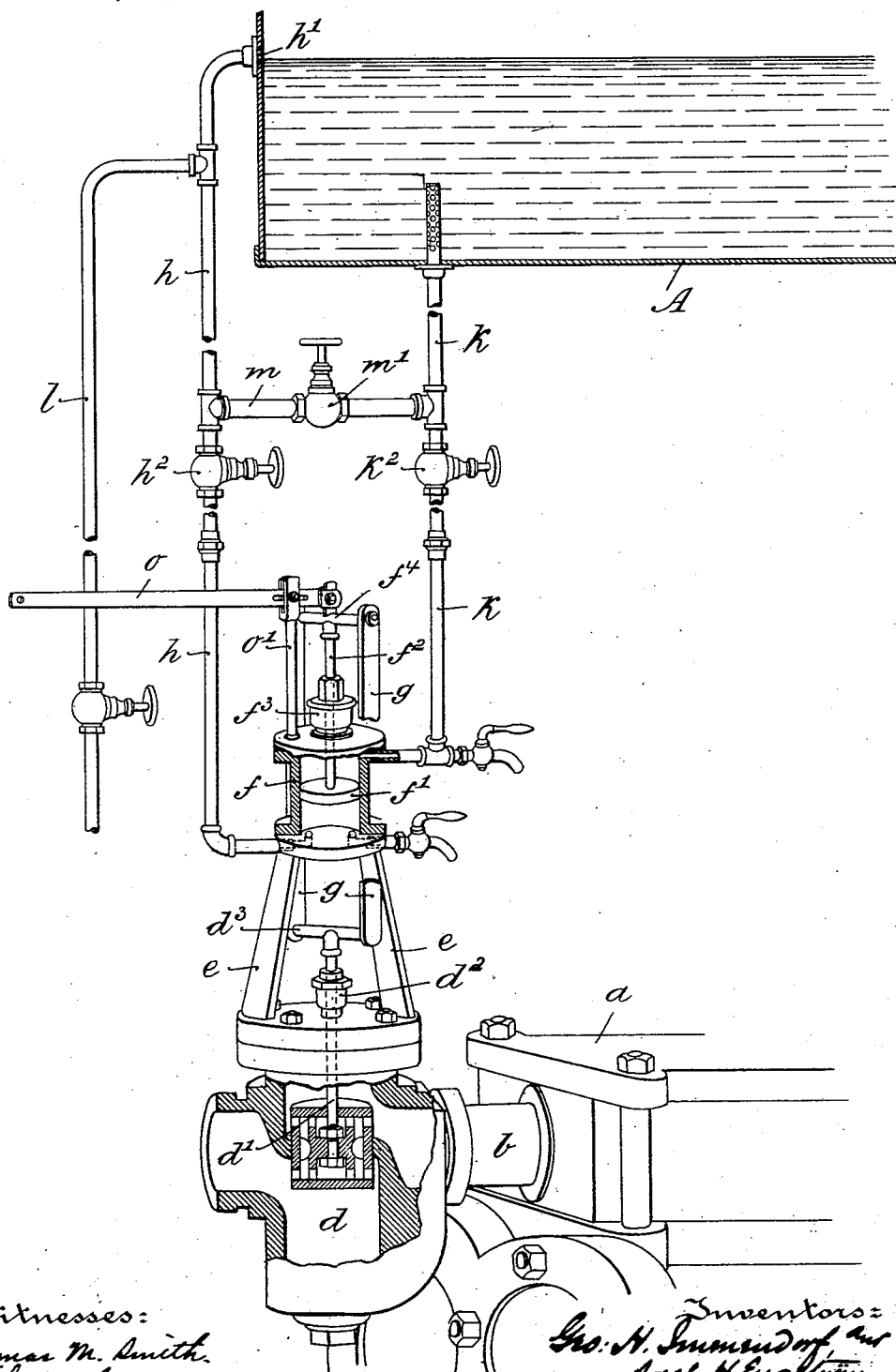


(No Model.)

G. H. IMMENDORF & A. H. ENGSTRÖM.
TANK PUMP GOVERNOR.

No. 569,134.

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Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE H. IMMENDORF AND AXEL H. ENGSTROM, OF PHILADELPHIA, PENNSYLVANIA; SAID ENGSTROM ASSIGNOR TO SAID IMMENDORF.

TANK-PUMP GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 569,134, dated October 6, 1896.

Application filed January 20, 1896. Serial No. 576,074. (No model.)

To all whom it may concern:

Be it known that we, GEORGE H. IMMENDORF, a citizen of the United States, and AXEL H. ENGSTROM, a subject of the King of Sweden and Norway, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Tank-Pump Governors, of which the following is a specification.

Our invention has relation to an automatic governor for tank-pumps; and in such connection it relates to the construction of such a governor.

The principal objects of our invention are, first, to provide a governor for tank-pumps, comprising a valve located upon the steam-supply to the pump, which valve is regulated automatically by variations in pressure between the normal or predetermined quantity of water to be stored in the tank and the amount of discharge to the tank, and, second, to provide in such a governor a valve located on the steam-supply to the pipe, a piston suitably connected to said valve, a cylinder traversed by said piston, a stand-pipe leading to one end of said cylinder and adapted to contain water of a height corresponding to the normal or predetermined height of water required in the tank, and a pipe leading from the tank to the opposite end of said cylinder, whereby the valve is regulated by variations in pressure existing between the normal pressure required in the tank and the amount of discharge to the tank.

Our invention, stated in general terms, consists of a governor for tank-pumps constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and scope of our invention will be more fully understood from the following description, taken in connection with the accompanying drawing, forming part hereof, illustrating in perspective, partially sectioned, a governor for tank-pumps embodying features of our invention and showing the connections of the same with a tank and the steam-chest of a pump.

Referring to the drawing, *a* represents the steam-chest of the pump, and *b* the steam-supply pipe entering the same. On the pipe

b is located an ordinary steam-balanced valve *d*, the stem *d'* of which extends through the packing-box *d*². To the upper end of the stem *d'* is secured a head or cross-bar *d*³. Above the valve *d*, and supported by a suitable framework *e* thereon, is a cylinder *f*, traversed by a piston *f'*, provided with a stem *f*², extending through the packing-box *f*³ in the upper head of the cylinder *f*. This stem *f*² is provided with a head or cross-bar *f*⁴. The ends of the cross-bar *d*³ are connected with the ends of the cross-bar *f*⁴ by means of the rods *g*.

It is manifest from the above description that a movement up or down of the piston *f'* will, through the rods *g*, cause a corresponding up-and-down movement to the stem *d'* and valve *d*. The lower end of the cylinder *f* is connected with a stand-pipe *h* of a height determined by the height of water required in the water-tank *A*, supplied by the pump. The pipe *h* has an opening or inlet *h'* at its upper end in communication with the tank *A* and maintains a constant and uniform pressure of water upon the under side of the piston *f'*.

The upper end of the cylinder *f* is connected with the bottom of the tank *A* by means of a pipe *k*, which transfers the pressure of water in the tank to that portion of the cylinder *f* above the piston *f'*. It is obvious that the piston *f'* is thus under two pressures, one of the water in the stand-pipe *h*, which is constant and represents the required height or pressure of water in the tank *A*, while the other is the pressure of water in the tank-pipe *k*, which is variable, depending upon the quantity or pressure of water discharged into the tank from the pump.

Should now the water in the tank *A* decrease by reason of excessive drain thereon or a decrease in amount pumped therein, the pressure of water in the stand-pipe *h* will immediately raise the piston *f'*, and through its connections open the valve *d*, whereupon an increased amount of steam is admitted to the pump and an increase of water discharged from the pump is created. If, however, the tank be filled too rapidly and the water rises above the outlet of the stand-pipe *h* to an overflow-pipe *l*, the pressure of water in the

pipe k , which then becomes greater than that in the stand-pipe h , will depress the piston f' , thus shutting off the valve d , decreasing the amount of steam fed to the pump, and hence
 5 diminishing the amount of water discharged to the tank.

On the stand-pipe h and tank-pipe k are placed, respectively, regulating-valves h^2 and k^2 , by means of which the pressures on the
 10 piston may be nicely adjusted.

The overflow-pipe l is connected to the stand-pipe h at a height corresponding to that of the water to be maintained in the tank, and should, by reason of accident, the tank
 15 be filled to the outlet h' of the pipe h the water will overflow and be conducted off through the overflow-pipe l .

Between the pipes h and k and above the valves h^2 and k^2 is placed the branch pipe m ,
 20 connecting the two pipes and provided with a valve m' , which controls the communications between the two pipes h and k . When this valve m' is opened, the pressures in the pipes h and k become equalized and the valve
 25 d ceases to be operated automatically.

If required, a weighted lever-arm o , pivoted to a bracket o' of the cylinder f and pivotally connected to the stem f^2 of the piston f' , may assist in counterpoising said piston and the
 30 valve d connected thereto.

Having thus described the nature and objects of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A governor for tank-pumps, consisting
 35 of a valve located on the steam-supply to the pump, a cylinder, a piston traversing said

cylinder and connected with said valve, a stand-pipe leading to one end of said cylinder and opening into the tank at its other end at a height above the normal height of water in
 40 said tank, an overflow-pipe connected to said stand-pipe at a height corresponding to the normal height of water in the tank, and a pipe connecting the opposite end of the cylinder with said tank, substantially as and for
 45 the purposes described.

2. A governor for tank-pumps, consisting of a valve located on the steam-supply to the pump, a cylinder, a piston traversing said
 50 cylinder and suitably connected with said valve, a stand-pipe leading to one end of said cylinder and filled with water to a height corresponding to the height of water required in the tank, and a pipe connecting the opposite end of the cylinder with the tank, whereby
 55 said piston is operated by variations in pressure of the water in the tank and thereby through its connections regulates the steam supply to the pump, a branch pipe connecting said stand-pipe and tank-pipe together
 60 and a valve controlling said branch pipe and adapted when opened to equalize the pressures in the stand and tank pipes, substantially as and for the purposes described.

In testimony whereof we have hereunto set
 65 our signatures in the presence of two subscribing witnesses.

GEO. H. IMMENDORF.
 AXEL H. ENGSTROM.

Witnesses:

J. WALTER DOUGLASS,
 THOMAS M. SMITH.