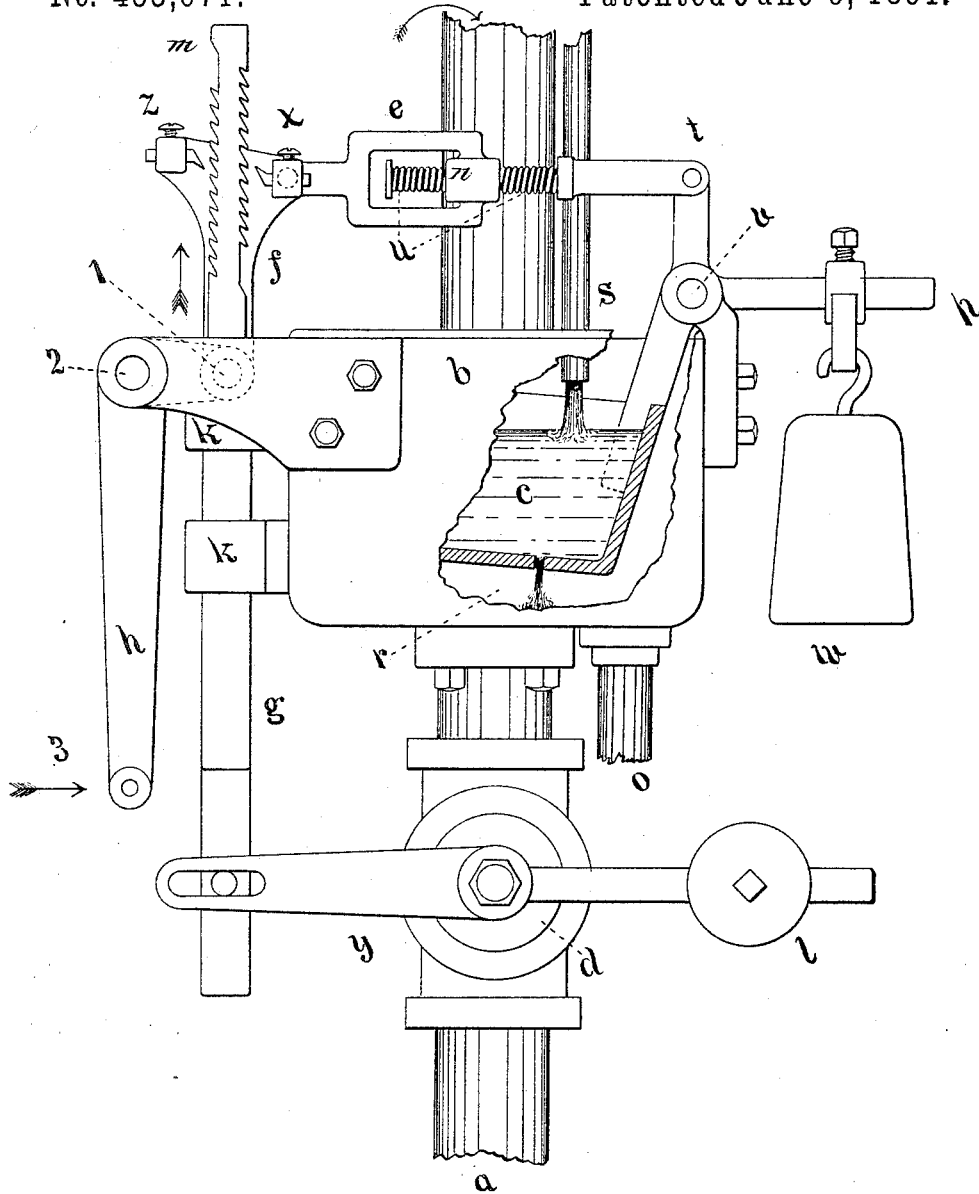


(No Model.)

T. SHAW.  
GOVERNOR FOR STEAM PUMPS.

No. 453,671.

Patented June 9, 1891.



Witnesses  
E. H. Fragar.  
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# UNITED STATES PATENT OFFICE.

THOMAS SHAW, OF PHILADELPHIA; PENNSYLVANIA.

## GOVERNOR FOR STEAM-PUMPS.

SPECIFICATION forming part of Letters Patent No. 453,671, dated June 9, 1891.

Application filed March 30, 1891. Serial No. 386,890. (No model.)

### *To all whom it may concern:*

Be it known that I, THOMAS SHAW, of the city and county of Philadelphia, Pennsylvania, have invented a new and Improved Governor for Steam-Pumps; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists in the movable bucket in connection with a double pawl and crank-levers connected with said pawl, actuated from a motor, all operating in the manner and for the purpose hereinafter described.

The object of the invention is to enable slight alteration in the height of a column of water to have positive control over the throttle-valve in disregard of variable or excessive friction of said valve, all operating in the manner and for the purpose hereinafter described.

In order to enable others to use and practice my invention, I will proceed to describe its construction and operation.

On reference to the accompanying drawing, which forms part of this specification, *a* represents ordinary steam-pipe leading downward to steam-chest of ordinary steam or air motor. Said pipe is provided with ordinary throttle-valve *d*, actuated by ordinary lever *y*, provided on one end with an ordinary balance-weight *l*, and is slotted on the opposite end for reception of sliding pin shown connected with vertical moving rod *g*, said rod playing freely in bearings *k* in a vertical direction and is provided on its upper end with a double row of ratchet teeth, hooked in opposite directions and located on opposite sides in the manner shown on the drawing and for the purpose hereinafter described.

*b* is a metallic box bolted with ordinary clamps to pipe *a* and furnishes support for the bearings *k* and other portions of the apparatus shown.

*c* is a bucket swung from journal-point *v*, located to swing freely in a vertical direction in said box *b*, and is provided with an aperture *r* for the escape of fluids, and is, in connection with tube *s*, for inlet of fluids, all for the purpose hereinafter described. Lever *p* and weight *w* are connected with the same

axle or journal as bucket *c* for counterbalancing effect.

*t* is a crank-arm connected with the same shaft *v* as bucket *c* and weight *w*, to which crank-arm is pivoted a spring pitman-arm *e*, provided with ordinary spiral springs *u*, which have elastic hold of the yoke *e*, the portion *n* being bored for free play of a central pin, which pin is covered by said springs *u*. The said pitman-arm *e* has pivoted connection with the double pawl *f* on the back of said pawl, (not shown in the drawing,) all operating in the manner and for the purpose hereinafter described. The double pawl *f* is pivoted on bell-crank *h* at point 1. (Shown with dotted lines.) Said bell-crank is vibrated back and forth in the direction of arrow 3, and the lower end of bell-crank lever is connected with an ordinary pitman-arm with any suitable part of an operating-motor. The effect of this vibration of said crank-arm is to give a vertical motion to double pawl *f*, all operated in the manner and for the purpose hereinafter described. The said pipe *s* leads from the overflow-line of tank connected with engine that is to be controlled by this character of governor, and *o* is a waste-pipe leading waste waters off to any desired locality. The throttle-valve *d* is arranged when shut off by separate aperture through the throttle-valve or otherwise to permit enough steam or air to pass to permit a slow motion of the engine with a closed throttle, the intention being that the motor shall never cease moving so long as controlled by this sensitive governor.

The governor is operated and controls a steam or air motor in this wise, presuming, for example, that the governor is to control the engine or motor by the height of water in ordinary tank, such as usually used in and about large buildings. In that case the pipe *s* is run from the governor to a point in the tank, where the desired elevation of water is to be maintained. The balance-weight *w* is adjusted on lever *p*, so as to tilt the bucket *c* in an upward direction when said bucket *c* is empty of fluid contents, the effect of which causes the crank-arm *t* to pull pitman-arm *e* and the pawl-arm *f* in a direction to throw the tooth of the pawl *z* into the rack of rod *g*. The steam or air motor in the meantime is

moving slowly, and therefore vibrating crank-lever *h*, which in turn vibrates in a vertical direction pawl *f*, thus causing the tooth *z* on every downward stroke to pull said rod *g* downward, and its connection with the lever *y* of the throttle opens said throttle-valve, and a succession of the strokes of pawl *f* pulls said rod to its utmost limit downward when the throttle is wide open and the motor is run to its full capacity, which ultimately will cause the aforementioned tank to be filled with water up to the line set by said tube *s*, the effect of which is to cause an overflow in said pipe, which flows into said bucket *c* more rapidly than it can escape at the aperture *r*, and ultimately fills said bucket with water or to a point where excess of weight of water overcomes the counterbalance-weight *w*, and the bucket drops one or more inches sufficient to throw the pawl *f* in the opposite direction and cause the tooth *z* of said pawl to engage in the tooth-rack of rod *g*, which by successive strokes elevates said rod *g* and closes said throttle to the aforementioned first position, rendering it possible for an alteration of one inch of water in the height of the aforementioned tank to have full control of the motor that actuates the pumps, notwithstanding alteration and frictional resistance of throttle-valve, for the reason that said alteration of water is required to effect only the lateral movement of double pawl *f*, while the motor by direct connection with lever *h* exercises all the force necessary to open or close the throttle-valve, thus constructing a governor with the highest sensitive qualities, enabling a column of water one inch high, representing the small fraction of one twenty-eighth of a pound pressure per square inch, to control a throttle-valve of a large engine that may require one hundred pounds to remove the same, and it has proven this perfection of work in actual practice.

It will be evident that the said sensitive

governor operated in the manner described can be variously modified without any alteration in the result. It will also be evident that it can be made applicable for controlling throttles for various purposes. I therefore do not wish to confine myself to the exact configuration here shown.

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

1. The combination, with the valve of a steam-pipe and ratchet-bar connected therewith, of a constantly-reciprocating double pawl, a counterbalance-bucket, and connections between the bucket and double pawl controlling the engagement of the latter with the ratchet, substantially as described.

2. The combination, with the valve of a steam-pipe and ratchet-bar connected therewith, of a reciprocating double pawl, a counterbalance-bucket, and a pitman connecting the pawl and bucket, the parts of the pitman being united by springs, substantially as described.

3. The combination, with the counterbalance-steam-valve and counterbalance-bucket, of a constantly-reciprocating pawl controlled by the bucket and connections between the pawl and steam-valve, substantially as described.

4. The combination, with the counterbalance-valve, of a casing mounted on the pipe, a counterbalance-bucket within the casing, a tank-pipe emptying into the bucket, a crank and pitman connected to the bucket, a double pawl controlled by the pitman, a sliding ratchet-bar mounted in guides on the case and connected to the counterbalance-valve, and a reciprocating device connected to the pawl, substantially as described.

THOMAS SHAW.

Witnesses:

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