(No Model.)

# G. M. BOLE & A. D. HAMILTON.

## STOP GOVERNOR.

No. 428,064. Patented May 20, 1890.

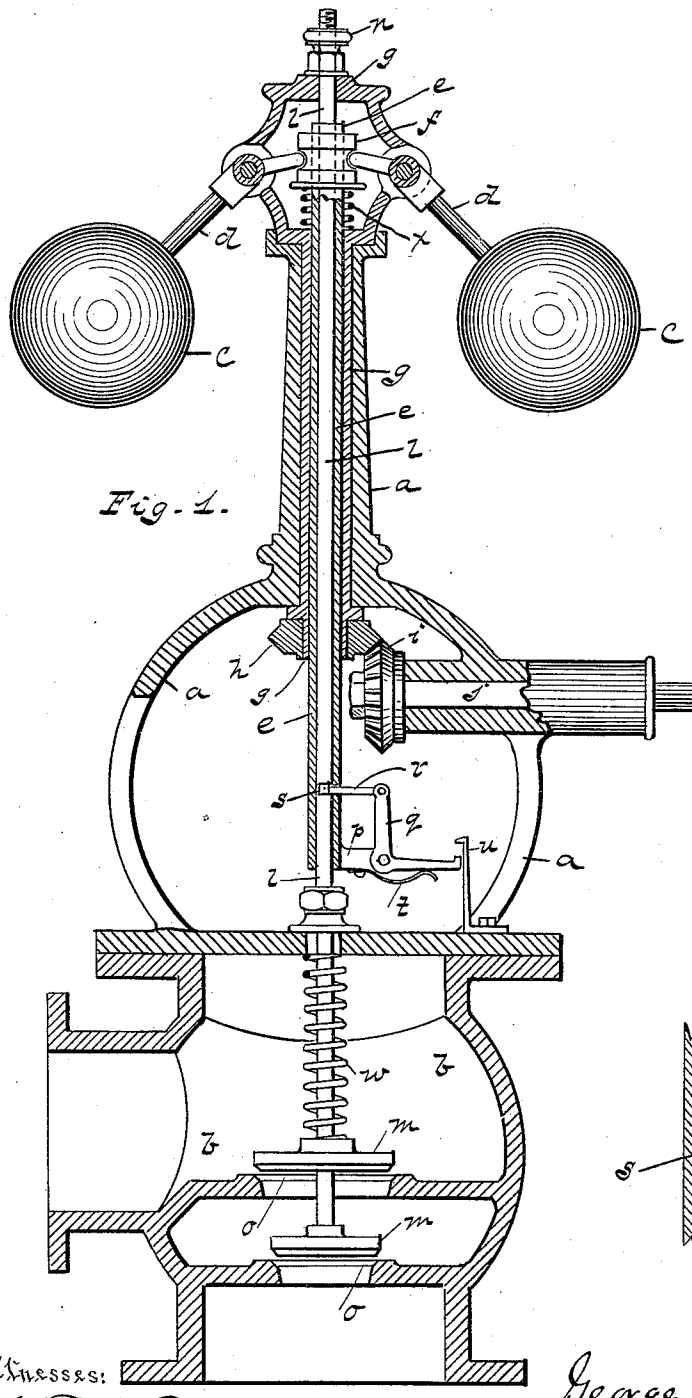

Fig. 1.

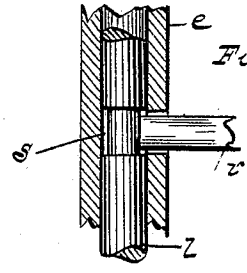

Fig. 2.

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# UNITED STATES PATENT OFFICE.

GEORGE M. BOLE AND ALBERT D. HAMILTON, OF PITTSBURG, PENNSYLVANIA.

## STOP-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 428,064, dated May 20, 1890.

Application filed August 30, 1889. Serial No. 322,442. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE M. BOLE and ALBERT D. HAMILTON, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Stop-Governors; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to an improved automatic stop-governor, and has for its object a device whereby the steam may be shut off from the cylinder should the governor-belt become disengaged from its pulley; and with this end in view our invention consists in certain details of construction and combination of parts, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a sectional elevation of a steam-governor provided with our invention. Fig. 2 is an enlarged sectional elevation of the inner valve-stem, showing the annular groove formed in the same.

To put our invention into practice we provide a shell or frame *a*, of suitable size and form of construction, and secure the same on the top of the valve-chamber *b* in the ordinary manner. The governor-balls *c* and levers *d* are of ordinary form and operate in a grooved piece *f*, firmly attached to a tube *e*, extending downward to a point near the base of the frame *a*. Surrounding this tube *e* is a sleeve *g*, which supports the governor-balls *c*, and is provided on its lower end with a small bevel-pinion *h*, which meshes with another *i*, attached to the driving-shaft *j*, which operates the governor. This shaft *j* is provided with a small pulley *k* and connected with the engine in the ordinary manner. Within the tube *e* is a valve-rod *l*, which extends into the valve-chamber *b*, and is provided with suitable balance-valves *m*. At the top of this valve-rod *l* is a nut *n*, which is used to keep the valves *m* set slightly above the seats *o*, in order that steam may be admitted to first start the engine.

At the lower end of the tube *e* is an outwardly-extending bearing *p*, which supports a bell-crank *q*, having a small inwardly-projecting lever *r* pivoted thereto. The inner end of this lever *r* engages with a groove *s*, formed about the valve-stem *l*. A spring *t* beneath this bell-crank *q* serves to keep the said lever *r* engaged with the groove *s*. A small vertically-placed trip *u* is arranged within reach of the outer end of the crank *q* and is adapted to release the lever *r* from the groove *s* when the valves *m* and their connections are elevated to a certain point. A spiral spring *w* on the top of the valves *m* and another *x* between the grooved piece *f* and the sleeve *g* serve to instantly close the valves *m* when the trip *u* has released the valve-rod *l*.

In operation the pulley *k* is revolved, which rotates the pinions *h i*, the sleeve *g*, and puts the balls *c* in motion. The balls *c* as the speed increases operate the valves *m* in a manner well known to the art. Should the belt connected to the pulley *k* break or become disengaged from the same, the balls *c* instantly drop, which elevates the tube *e* and carries the bell-crank *q* upward until the same comes in contact with the trip *u*, which releases the valve-rod *l* by removing the short lever *r* from the groove *s*, and the valves *m* instantly close as far as the nut *n* will permit by the pressure of steam combined with the springs *w*, thereby reducing the speed of the engine to a moderate speed.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In combination with a governor such as described, the valve-rod *l*, provided with an annular groove and inclosed within the vertically-moving tube *e*, the bell-crank *q*, attached to the said tube *e*, the short lever *r*, engaging with said groove *s* of the valve-rod, and a suitable trip *u*, whereby the valves *m* may instantly close when the valve-rod *l* has been elevated to a given point, substantially as set forth.

2. In a governor substantially as described, the combination, with a suitable case and a vertical sleeve therein geared to the transverse shaft and carrying the weighted levers, of a vertically-movable valve-stem carrying a grooved collar at its upper end to receive the inner ends of the levers, and tripping mechanism for normally maintaining the valve-stem at a given elevation and which is automatically released therefrom on an upward movement of said valve-stem beyond the point of its normal elevation, as and for the purpose described.

3. In a governor substantially as described, the combination, with vertical rotary sleeve suitably mounted in a case and carrying the weighted levers, of another internal sleeve fitted in said rotary sleeve and having a grooved collar at its upper extremity, a valve-stem fitted in said internal sleeve and having the valves at the lower end thereof, and tripping devices which engage the valve-stem to hold the latter at a given elevation and which are automatically released from said stem when the latter and the internal sleeves are elevated by the dropping of the weighted levers, as and for the purpose described.

4. In a governor substantially as described, the combination, with a vertical rotary sleeve carrying the weighted levers, of an internal sleeve fitted within the rotary sleeve and having a grooved collar at its upper end to receive the inner ends of the weighted levers, a valve-rod passing through the internal sleeve and its collar and provided in its upper end with a nut for adjusting the rod longitudinally within the internal sleeve, and a trip device which engages the valve-rod to normally sustain the latter at a given elevation, as and for the purpose described.

In testimony that we claim the foregoing we hereunto affix our signatures this 10th day of August, A. D. 1889.

GEORGE M. BOLE. [L. S.]
ALBERT D. HAMILTON.

In presence of—
M. E. HARRISON,
C. C. LEE.