

(No Model.)

2 Sheets—Sheet 1.

M. H. COLLOM.
SPEED GOVERNOR.

No. 417,770.

Patented Dec. 24, 1889.

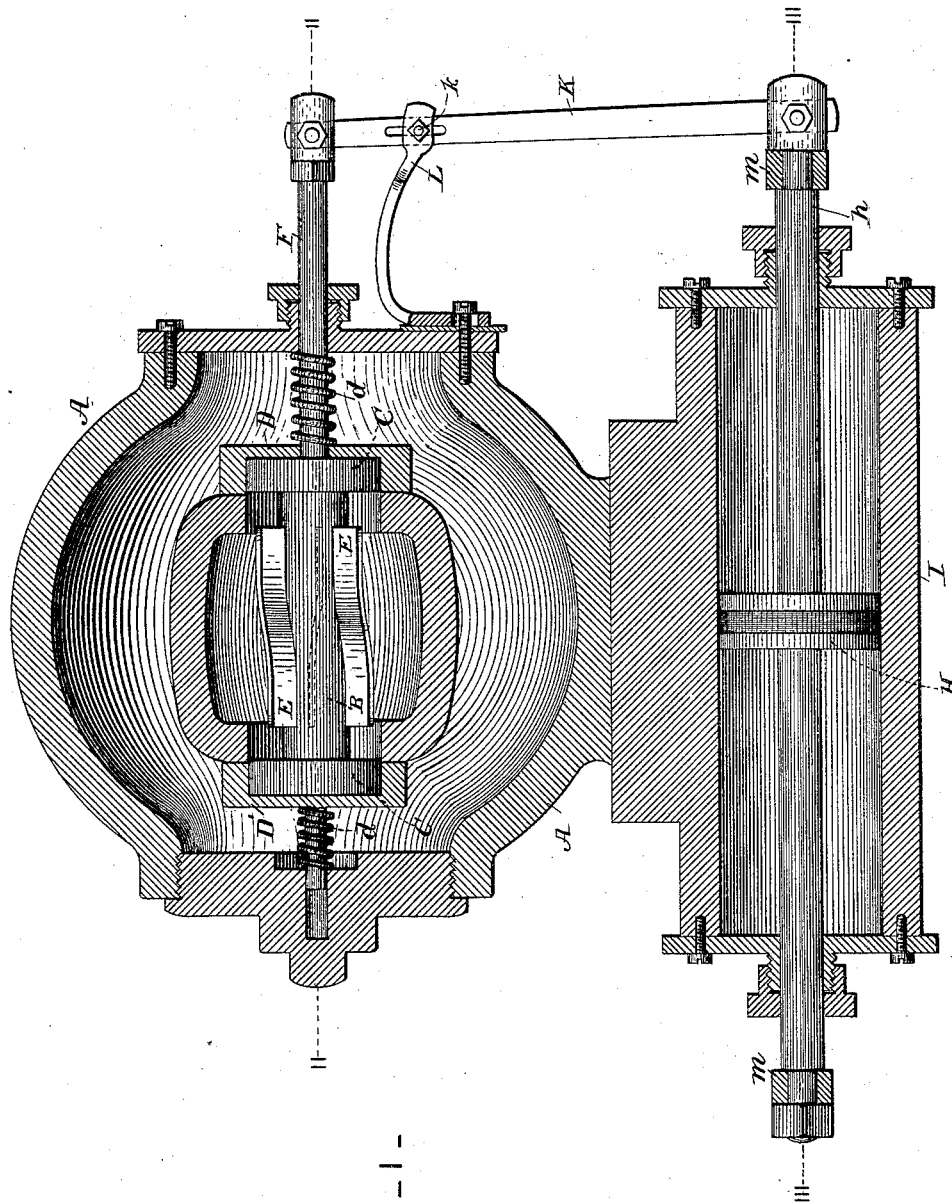


FIG. 1 -

Attest:
B. D. Allen
Orlando King

Inventor:
Martin H. Colton.

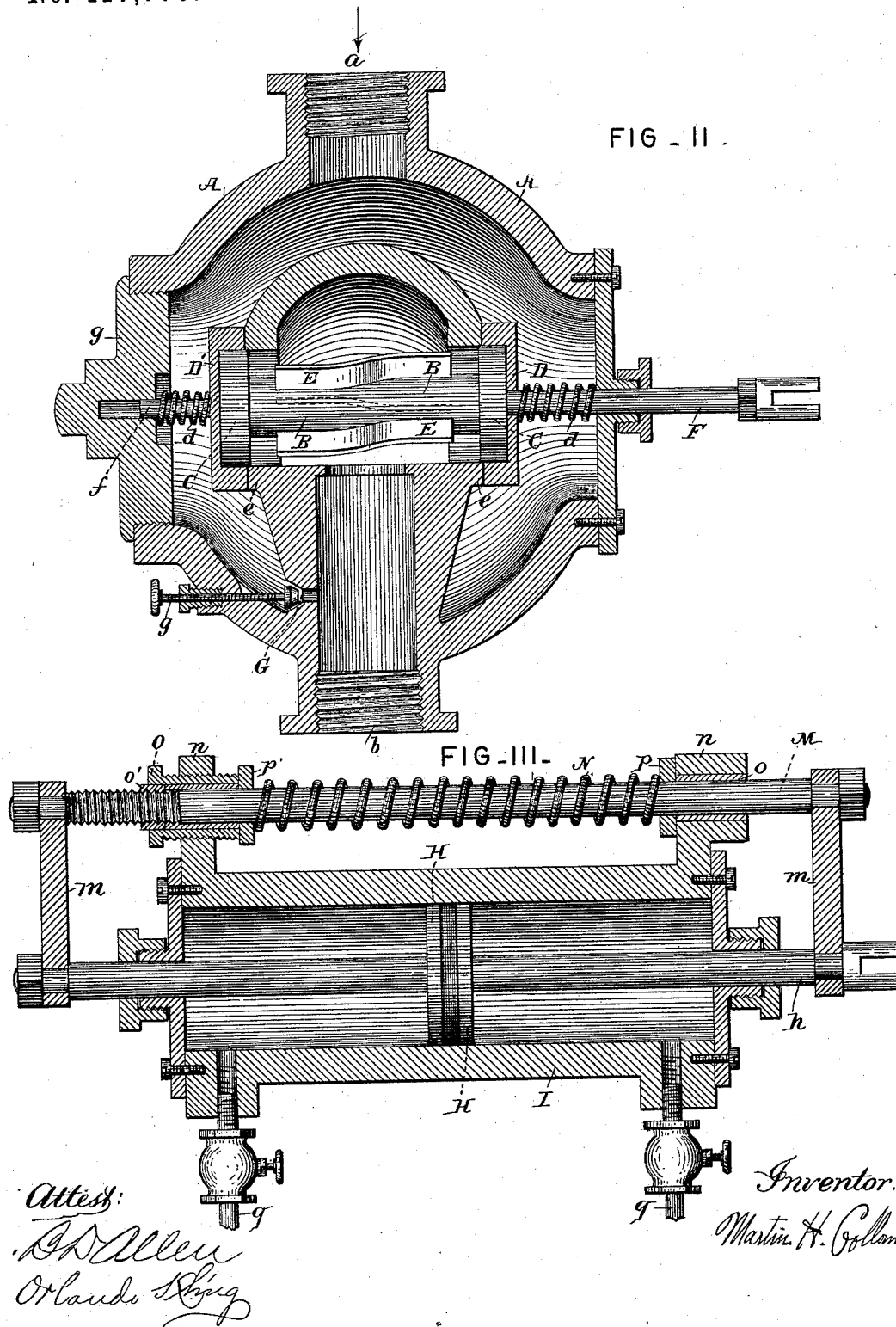
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UNITED STATES PATENT OFFICE.

MARTIN H. COLLOM, OF DENVER, COLORADO, ASSIGNOR TO THE COLLOM
STEAM PUMP GOVERNOR COMPANY, OF SAME PLACE.

SPEED-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 417,770, dated December 24, 1889.

Application filed April 6, 1889. Serial No. 306,210. (No model.)

To all whom it may concern:

Be it known that I, MARTIN H. COLLOM, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful
5 Improvement in Speed-Governors, which improvement is fully set forth in the following specification.

My invention has reference to speed-regulators particularly designed for steam-pumps,
10 though the improvements may wholly or in part be applied to other purposes, as will readily be understood by those skilled in the art to which the invention relates.

The object of the invention is to furnish a
15 regulator which may be used as an attachment to steam-pumps whether new or already in use, which will supply to the piston just the amount of steam necessary to do the work required and no more, and which will auto-
20 matically cut off the supply of steam and slow down the speed of the piston in case of failure in the supply of water or other liquid, thus preventing the pump from running away and avoiding the damage that would result
25 therefrom.

In carrying out this invention the steam-supply pipe is provided with a main regulating-valve, which in its normal position or position of rest closes said pipe. The valve-
30 stem of this main valve is connected with and operated by a pressure-actuated device, which may be a piston working in a suitable cylinder connected by pipes with either the steam or water cylinder of the pump, but preferably with the former. The main valve being
35 normally closed, the pump is run at a minimum speed under light duty by a small amount of steam supplied by a suitable by-pass valve. When, however, the steam thus supplied is
40 insufficient to move the piston against the pressure opposed to it, the pressure accumulates behind the pump-piston and is immediately communicated to the valve-actuating piston, causing it to open the main valve and
45 pass the amount of steam required to operate the pump-piston. As soon as the pump-cylinder exhausts at the end of each stroke, the main valve at once returns to its normal position, cutting off the steam. This closing of
50 the main valve at each stroke is an important feature of the invention, since thereby per-

fect control of the steam-supply is maintained. Should the water-supply fail and the pump merely "suck air," the main valve will remain closed, because, there being but little resist-
55 ance to the motions of the pump-cylinder, but little steam will be called for, and this the by-pass valve will secure.

The invention includes certain special features of construction and combinations of
60 parts, as hereinafter described.

Referring to the accompanying drawings, which form part of this specification, Figure I is a horizontal section of a regulator constructed in accordance with the invention;
65 Fig. II, a vertical section through the main valve on line II, Fig. I; and Fig. III, a vertical section through the governor-cylinder on line III, Fig. I.

The chamber A, approximately spherical
70 in form, is adapted to be connected in the steam-pipe at any suitable point between the boiler and pump, the steam entering at *a* and discharging at *b*. The main valve, which is inclosed in said chamber and controls the
75 passage of steam to the discharge-pipe *b*, consists of a rod or plug B, adapted to move in a transverse opening through said pipe *b*, which is closed at the upper end, as shown, and provided with cross-heads C and caps D
80 D', which constitute the valves proper, and are normally pressed by springs *d* against valve-seats *e*. The plug B is provided with wings E, the spaces between which allow the steam to pass freely when either cap D or D'
85 is open. Cap D' has a guide-stem *f*, which plays in a hole in screw-plug *g*, which closes the side of the chamber. Cap D can slide on the rod F, to which plug B is connected, and which passes through a stuffing-box in the
90 side of chamber A. It will be noted that in the position of the parts as shown in the drawings, (which is the normal position,) the main valve is closed; but if the rod F moves inward cap D' will be lifted, (cap D remain-
95 ing closed,) allowing steam to enter pipe *b* from chamber A. If rod F moves outward, cap D will be lifted in like manner. It will also be noted that if the valve be open on either side it must be fully closed before it
100 can open on the other.

G represents a small by-pass valve in pipe

b, through which a certain regulated amount of steam is supplied to the steam-cylinder. Stem *g* of this valve is threaded and passes through a threaded boss in the wall of chamber A, so that by turning said stem the size of the valve-opening can be regulated.

The main valve is actuated by the governor-piston H, which works in a cylinder I alongside of the valve-chamber A. The rod *h* of this piston is connected with the stem F of the main valve by a lever K, pivoted at *k* in an adjustable fulcrum piece or bracket L. Said fulcrum piece or bracket is made adjustable, so that the motion imparted to stem F from rod *h* may be made relatively greater or less, as desired.

Piston H normally (*i. e.*, when the main valve is closed) rests at about the center of cylinder I, being controlled by the spring-actuated rod M, with which piston-rod *h* is connected at each end by bars *m*, so that the piston H follows the motions of said rod. Rod M is supported in openings in lugs *n*, which are part of the casting of cylinder I, said rod being provided with sleeves *o o'* fixed thereon. Sleeve *o* is of such size as to fit loosely in the opening in one of lugs *n* aforesaid, while sleeve *o'* fits in a compression-nut O, which is screwed into the other lug. Collars *p p'* are mounted loosely on rod M, and between them is a spiral spring N, which bears at opposite ends against said collars. Any movement of piston H will compress spring N in one direction or the other, and when the force-moving piston H is withdrawn said spring will return the parts to their normal position.

The pipes *q q* connect cylinder I with either the steam or water cylinder of the pump and are provided with ordinary plug-valves *r*. The pipes *q q* communicate with opposite sides of the governor-piston H, and their other ends are likewise connected with opposite sides of the pump-piston.

The operation of the regulator when connected with the steam end of the pump is as follows: The by-pass valve G is opened far enough to furnish sufficient steam to run the pump at a minimum speed and under the lightest duty. So long as this valve passes sufficient steam to overcome the pressure opposed to the working-piston, the main valve remains closed; but whenever the water-pressure is above this limit the speed of the pump-piston is checked and steam begins to accumulate behind it. This pressure is communicated by one of the pipes *q* to the corresponding side of governor-piston H, forcing the latter from the center of its cylinder I toward one end thereof, carrying with it rod M, and thereby compressing spring N. The motion of piston H is communicated through lever K to the stem F of the main valve, which thereupon moves off its center, opening either cap D' or D and allowing the requisite quantity of steam to pass into pipe *b*. The pump-piston is thereby moved to the end

of its stroke and the cylinder exhausts, relieving the pressure in governor-cylinder I and permitting the pressure of spring N to return piston H to its normal position, thereby closing the main valve. It may be that on the return-stroke of the pump-piston more steam will be required than is supplied by the by-pass valve, when the same operation will be repeated, except that the main valve will move in the opposite direction. So long as this condition continues, the governor-piston (and consequently the main valve) will move back and forth with each stroke of the pump-piston; but the main valve closes at each reciprocation, thus cutting off and renewing the supply of steam at each stroke of the piston in such quantity as may be necessary to move the latter. Should the conditions of working suddenly change—as, for example, by the supply of water giving out—the main valve would remain closed, since the steam supplied through the by-pass valve would run the pump-piston so fast as to prevent accumulation of pressure. By attaching the pipes *q q* to the water-cylinder of the pump the action would be the same, the piston H in that case being operated by water instead of steam. On account, however, of the grit and sediment contained in the water it is preferable to connect the governor-cylinder with the steam end of the pump.

To connect the regulator with steam-pumps already in use, it is only necessary to tap the main steam-pipe and connect chamber A therein, and to connect the steam or water cylinder with the governor-cylinder I by the small pipes *q*.

It is obvious that modifications may be made in the details of construction shown and described without departing from the spirit of my invention, and that parts thereof may be used without the whole.

Having now fully explained the principle of my invention and the manner in which the same may be practically carried out, what I claim, and desire to secure by Letters Patent, is—

1. In a regulator, the combination, with a steam-supply pipe, of a balanced valve normally closing said pipe, but adapted to open by motion in either direction, a valve-actuating device or piston, a chamber or cylinder therefor connected on both sides of said piston with the steam or water cylinder, and a spring tending to close the main valve, so that said main valve must completely close after each stroke before it can open to supply the steam for the succeeding stroke, substantially as described.

2. The combination of the normally-closed balanced main valve, the governor-piston and cylinder for actuating the same, and the by-pass valve, substantially as described.

3. The combination, with the balanced main valve and the by-pass valve, of the governor-cylinder provided with pressure-communicating pipes at each end of the governor-piston,

a spring holding said piston normally at about the center of said cylinder, and a lever connecting the rod of said piston with the stem of the main valve, substantially as described.

4. The combination, with the governor-cylinder and piston adapted for operation by variations of pressure, of a balanced valve seated in the supply-pipe and normally closing the same, but adapted to open in either direction, connections between said piston and said valve, a spring controlling the positions of said parts, and a by-pass valve in said supply-pipe, substantially as described.

5. The combination, with the pressure-actuated governor-piston, of a normally-closed balanced valve in the supply-pipe, said valve comprising caps normally closing ports on opposite sides of said pipe, a valve-stem and cross-heads thereon adapted by the motion of said stem to unseat one or the other of said caps, substantially as described.

6. The combination of the normally-closed balanced main valve adapted to open by motion in either direction, the by-pass valve, the governor-cylinder having pipes for connection with the steam or water cylinder, the piston of said governor-cylinder, an actuating-rod connected with the piston-rod, a spring surrounding said rod and adapted to be compressed by the latter's motion in either direction, and a lever connecting the rod of the governor-piston with the main valve-stem, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

MARTIN H. COLLOM.

Witnesses:

B. D. ALLEN,
ORLANDO KLING.