2 Sheets—Sheet 1.

J. A. RIGBY.

Governor.

No. 202,121. **Patented April 9, 1878.**

Fig. 1.

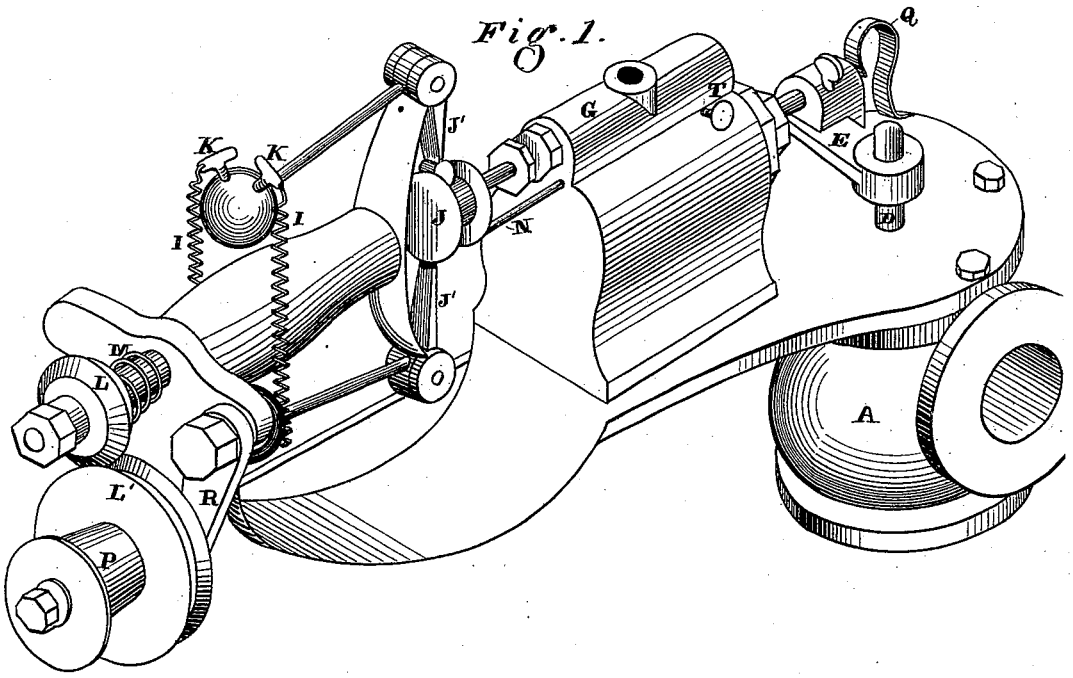
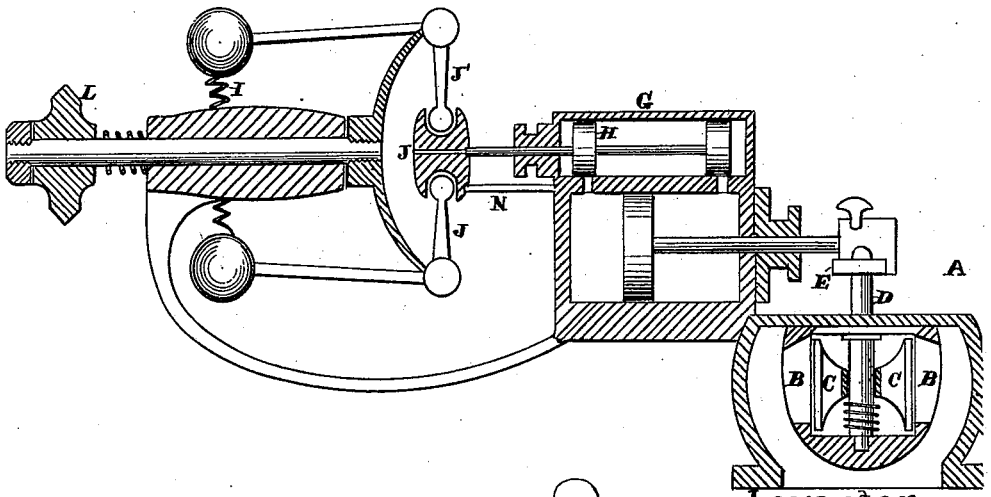


Fig. 2.



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2 Sheets—Sheet 2.

J. A. RIGBY.

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Fig. 3.

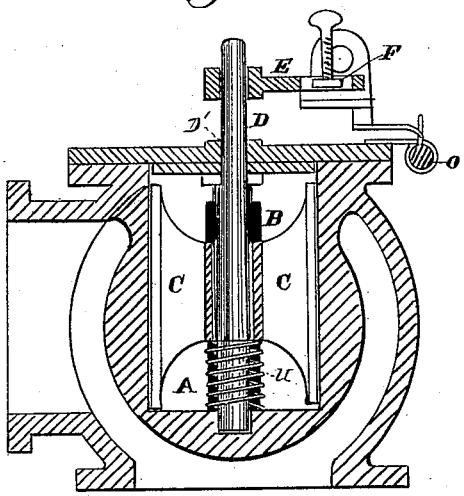
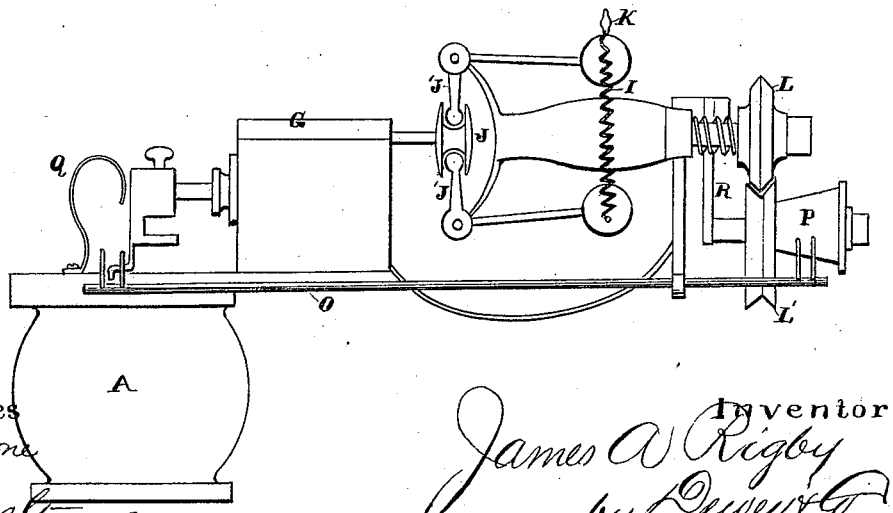


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES A. RIGBY, OF CARSON CITY, NEVADA.

IMPROVEMENT IN GOVERNORS.

Specification forming part of Letters Patent No. **202,121**, dated April 9, 1878; application filed February 6, 1878.

To all whom it may concern:

Be it known that I, JAMES A. RIGBY, of Carson City, county of Ormsby, State of Nevada, have invented an Improvement in Governors; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to an improvement in steam-engine governor and a novel method of employing the same, by which I am enabled to regulate the speed of all classes of steam-engines, particularly those that are subjected to severe and sudden changes in the resistance to the power they supply.

My invention consists in a novel construction for a main governor-valve, and, in combination with it, an operating-engine the valve of which is controlled and the admission of steam regulated by a revolving-ball governor. This governor is mounted upon a spindle having a pulley upon its outer end, which is driven by the frictional contact of another pulley, and this latter pulley is so mounted that the breakage of a belt allows it to immediately swing out of contact with the first pulley. A spring upon the governor-spindle then acts to draw it back, and with it the valve-stem and valve, so as to shut off steam from its cylinder, and this allows the main steam-valve to be closed, so as to stop the engine or reduce its speed.

In the accompanying drawings, Figure 1 is a view of my governor. Fig. 2 is a section of the valve, globe, operating-cylinder, and valve-chamber. Fig. 3 is a section taken transversely through the main valve and its chamber. Fig. 4 is an end view, showing driving-pulleys.

A is the main valve-chamber, having steam-ports B B and a passage for steam around the outside of the vertical valve-seat. C is the main steam-valve, made with two pairs of wings, to act as a counter-balance to the draft of steam when the valve is open, as the steam, in passing from the valve-chamber, has a tendency to make the valve cover the ports. D is the main valve-stem, turning in a step at bottom, and it extends out through the top, having a vibrating crank, E, secured to its upper end. This crank is moved by means of a crank-pin and sliding box, F, that is secured to the end of a piston-rod of the small engine or governor-cylinder G. Steam is admitted into this cylinder by a piston-valve, H, which is perfectly balanced; but a rotary or any other form of valve might be used.

The valve which I use in the present case is operated by a small revolving-ball governor, having spiral springs I I, arranged as shown, for the purpose of overcoming the centrifugal force of the balls. These springs are attached to the governor-balls by thumb-screws K K, and can be tightened or loosened, thus increasing or diminishing the speed of the engine at will.

The stem of the valve H has a deeply-grooved wheel or pulley, J, upon the end, and the arms J′ extend inward from the angle at which they, as a part of the bell-crank governor-arms, are pivoted, so that their ends are retained in the groove, as shown, and as the balls and spindle revolve they will revolve within this groove, and by their action they will move the valve back and forward.

The valve-stem is prevented rotating by means of a pin, N, which extends from the wheel J into a hole in the end of the valve-chest or metal of the cylinder, so that the wheel and valve-stem will not be rotated by the action of the rotating arms, but will only receive from it a reciprocating motion.

The governor-balls are small and rotate rapidly, being driven by a pair of friction-wheels, L L′, held in contact by the governor-belt, in such a manner that when the belt breaks or becomes slack the lower wheel swings free from the upper, being mounted upon a crank-arm, R, so as to allow the upper wheel to be pushed away from the frame or standard supporting the governor by a spiral spring, M, on the governor-spindle. This lowers or pushes the ball-governor and its spindle so far back as to close the valve H of the governor-cylinder, thus producing a simple and perfect stop-motion.

N is a metallic finger at the end of the piston-rod, that moves a shifting-bar, O, and by an automatic movement shifts the governor-belt on the cone-pulley P, thus increasing or decreasing the motion, as required, and, by its own action, it will be seen that when the pulleys L L′ are out of contact the pressure

of the spring M forces the pulley L′ out of line with the pulley L, and this draws the governor-spindle and, by means of the arms J, the valve-stem back, so as to close the valve. When the pulleys are brought into contact, their V-shaped groove and edge serve to draw the pulley L′ into line, and, of course, this compresses the spring M, and moves the spindle and valve-stem so as to open the valve H. This admits steam to the cylinder G, and moves its piston so as to turn the crank-arm E, and this turns the valve C so as to open it. The action of the governor-balls is then transmitted through the arms J to the valve H, and the amount of its opening, and through it that of the main valve, is determined.

I overcome a tendency of the governor to overact in several ways:

First, by using very small induction-ports to the governor-cylinder, so that a little vibration of the governor-balls shuts off steam from the governor-cylinder. This port is governed and its size regulated by a screw, T, which operates to enlarge or diminish the size of the opening, and this prevents too free an admission of steam to the cylinder G, which would open the main valve C too suddenly.

Secondly, by a spring-bumper, Q, arranged as shown. When the engine has arrived at the requisite speed and the main steam-valve is about half-way closed, the said spring-bumper will act immediately and cause the valve to begin opening. It also shuts off steam from the governor-cylinder by acting upon the shifting-bar O and the belt on the cone-pulley P, so as to prevent the engine from running above speed when relieved of its work. This spring-bumper, however, is only required when the main valve is balanced, and has a tendency to close of itself.

Thirdly, by a light spring that will open the main a little more than sufficient to keep the engine at speed when running light. I also use an elliptical pulley on the main shaft for the governor-belt, which gives a slight vibrating motion to the balls, thus tending to prevent the piston of the governor-cylinder from going too far either way.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The rotating balanced valve C, with its stem D and crank-arm E, in combination with the steam-cylinder G, with its piston and rod, for the purpose of operating said valve, constructed and arranged as shown, substantially as herein described.

2. The balanced piston-valve H, with its stem and grooved wheel J, in combination with the governor having the arms J′ entering the groove, so as to give the valve a reciprocating motion by its action, substantially as shown and herein described.

3. The pulley L′, mounted upon the crank R, so that the tension of the driving-ball will retain it in contact with the pulley L, but will allow it to swing out of contact when the belt breaks, substantially as shown and herein described.

4. In combination with the horizontal sliding governor-spindle controlling the valve H, the corresponding V-shaped pulleys L L′, constructed as shown and described, and acting to hold the valve open while driving the governor, but allowing it to be closed by a spring when the pulleys are out of contact.

5. The shifting-bar O, operated directly from the main valve by a finger, N, so that a change in the valve-openings will move the driving-belt upon the cone-pulley P, substantially as shown and herein described.

6. The spring-bumper Q, acting against the crank-arm E, so as to open the valve promptly when the pressure from the cylinder G is reduced, substantially as shown and herein described.

7. A governor consisting of the rotating valve C, with its operating-engine G, the valve of said engine being controlled by the governor-balls and pulleys L L′, substantially as shown and herein described.

8. The main valve-spindle D, having the ground joint at D′, in combination with the spring U, to hold the joint to its bearing and prevent leakage, substantially as shown and herein described.

In witness whereof I hereunto set my hand and seal.

JAMES A. RIGBY. [L. S.]

Witnesses:

GEO. H. STRONG,

FRANK A. BROOKS.