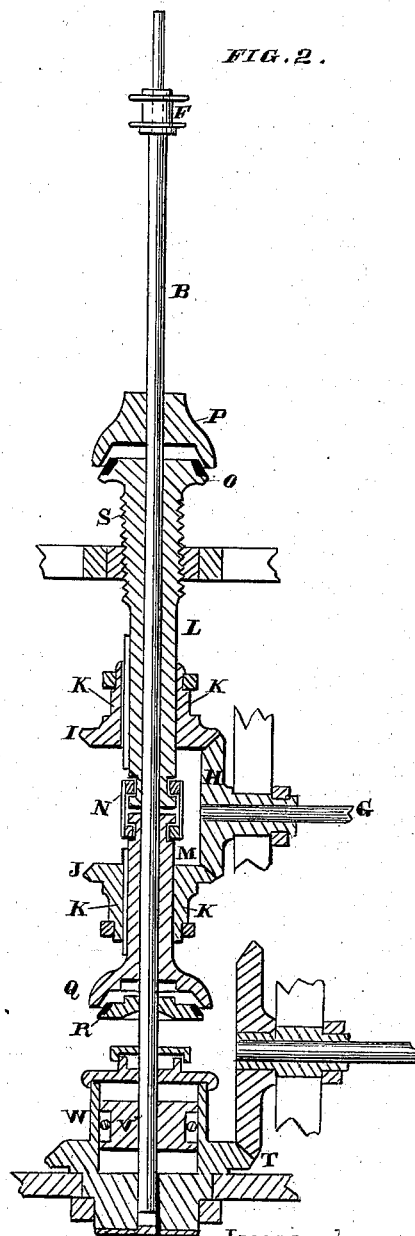
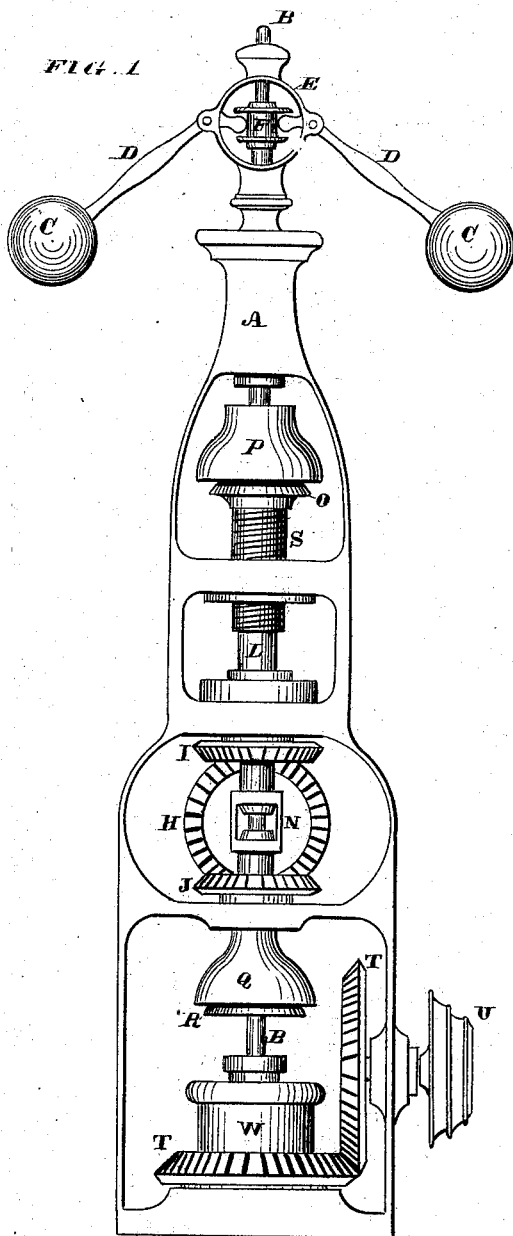


I. M. SCOTT.  
Automatic Governor and Cut-Off Attachment.  
No. 219,179.      Patented Sept. 2, 1879.



Witnesses

Frank A. Brooke  
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# UNITED STATES PATENT OFFICE.

IRVING M. SCOTT, OF SAN FRANCISCO, CALIFORNIA.

## IMPROVEMENT IN AUTOMATIC GOVERNOR AND CUT-OFF ATTACHMENTS.

Specification forming part of Letters Patent No. **219,179**, dated September 2, 1879; application filed July 9, 1879.

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

Be it known that I, IRVING M. SCOTT, of the city and county of San Francisco, and State of California, have invented an Automatic Governor and Cut-Off Attachments; and I hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements in governors, such as are usually connected with cut-off or other engine valves to regulate the amount of steam supplied; and it consists in a novel combination of a governor-spindle, regulating balls, and driving-gear with a pair of oppositely-acting friction-clutches and a double bevel-gearing, by which the valve or its attachments is actuated differentially and the speed of the engine regulated.

The sleeve upon which the two central portions of the coupling are secured has a screw formed upon it, and passes through a stationary nut and the bevel-gearing, so that when the upper coupling is engaged by reason of the increased speed of the engine the regulating attachments will be so moved as to reduce the supply of steam by the action of the bevel-gearing. At the same time the screw is turned in its nut so as to carry the upper coupling out of contact, when the gearing and valve attachment cease their motion.

If the speed of the engine becomes too slow, the governor-balls correspondingly close, and the lower coupling is brought into action, thus reversing the movement of the gearing and valve attachments, and at the same time turning the screw in the opposite direction until this coupling is out of contact.

The sleeve is coupled at its center, so that while moving up and down as one the parts are allowed to rotate freely in opposite directions, as is required by the action of the bevel-gearing.

The friction-clutches are so constructed as to have one elastic portion, which serves as a cushion and to make and break the connection gradually.

Upon the lower part of the governor-spindle is a piston, which works closely in an air-cylinder, and its office is to sustain the spindle and prevent a too sudden closing of the balls in the event of the breaking of the driving-

belt, and thus relieves the moving parts of jar or sudden strain. It also prevents sudden variations of the governor-balls by means of its elasticity.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of my governor. Fig. 2 is a vertical section.

A is the frame which supports the governor, and B is the spindle. In the present case I have shown the governor-balls C secured to the outer ends of the arms D, which are hinged in the sides of the yoke E, so that their inner ends will engage with a grooved sleeve, F, which is secured to the spindle, the action of this portion of the device being similar to that in general use.

The stem G, by which the governor, cut-off, or other valve is actuated, is driven by the bevel-gear wheel H and the two gear-wheels I J, which mesh with it above and below, respectively, so that when one of these gears is temporarily connected with the spindle, as will be hereinafter described, the stem G will be rotated in one direction, while the other gear will rotate it in the opposite direction.

The stem G may connect with a screw-stem, which will actuate cut-off plates, as shown in a patent granted to myself and W. R. Eckart June 25, 1867, or in any similar obvious manner.

The gears I J have hubs and flanges K, so that they are mounted and turn in cross-bars in the frame A, as shown. Two sleeves, L M, pass through the hubs of these gear-wheels, one through I and the other through J, extending upward and downward to a considerable distance, and they have feathers moving in seats or ways in the hubs, so that the sleeves may move up and down within the hubs and outside of the spindle independent of any motion the latter may have, and they serve to actuate the gears, as will be hereinafter described. These sleeves meet at a point between the gears I J, and their ends are grooved, so that a coupling ring or clasp, N, may be fitted to unite the sleeves, but at the same time allow them to rotate in opposite directions, as will be required from the connection of the gears I J with the single gear H.

In order to connect the constantly-rotating

spindle with either the upper sleeve, L, and its gear I or the lower sleeve, M, and its gear J, I form a friction-clutch at the upper end of the sleeve L and one at the lower end of the sleeve M, as follows: At the top of the sleeve L is formed or secured a conical or semi-globular head, O, which is preferably made of rubber or other elastic material. A cup-shaped socket, P, into which this head will fit, is keyed to the spindle at a point just above the head O. The lower end of the sleeve M has a similarly-shaped socket, Q, while an elastic head, R, to fit it, is keyed to the spindle below it, as shown. The upper end of the sleeve L has screw-threads cut upon it at S, and a nut held or formed in the frame A receives this screw.

The operation will then be as follows: The governor-spindle is rotated by the bevel-gear wheels T and a belt to the pulley U. When the speed is so great as to separate the balls widely the spindle will be depressed, and will bring the upper cup or socket, P, into contact with the head O, when the friction will turn the sleeve L, and through it the gear-wheel I, the gear H, and the stem G, thus closing the ingress-valve or altering the cut-off to reduce the steam used. At the same time the screw S will carry the sleeve downward until the head O is out of contact with its socket, when the gears and the valve-stem G will cease to be acted upon. If the governor runs slowly and the balls drop together, the spindle will be raised, when the head R will be brought into contact with the socket Q upon the lower part of the sleeve M. This reverses the movement of the stem G by the action of the lower gear, J, upon the gear H, when the two sleeves (united as they are at the center) will be again carried up by the action of the screw S. In this manner the varying speed of the governor will cause the couplings at the upper and the lower ends of the sleeves to be alternately brought into contact, and this will turn the stem G in one direction or the other, according to the coupling which may be engaged.

The vertical movement of the sleeves by means of the screw S makes my governor exceedingly delicate and sensitive.

The lower end of the spindle has a piston or plunger, V, secured to it, and this piston works in a tight cylinder, W. Any sudden increase of speed, which forces the spindle down, compresses the air in this cylinder, thus acting as an elastic cushion to break the force of the shock.

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

1. The governor-spindle B, with its driving-gear T and balls C, said spindle having the two parts P and R of the clutches secured to it, in combination with the sleeves L M, connected together by the coupling-ring N, and loosely surrounding the spindle, and provided with the parts O and Q of the clutches, whereby said sleeves are actuated from above or below by the fall or rise of the spindle, substantially as herein described.

2. The sleeves L M, surrounding the spindle B, and moving vertically through the hubs of the gears I J by means of feathers while turning with them, in combination with the coupling-ring N, whereby the sleeves are allowed to turn in opposite directions while moving vertically as one piece, substantially as and for the purpose herein described.

3. The sleeves L and M, passing through the gears I J and coupled at the center, so as to have independently rotary motions, said sleeves having secured to their outer ends the parts O and Q of the friction-clutches, in combination with the spindle B, having secured to it above and below the sleeves the parts P and R of the clutches, and operating substantially as herein described.

4. The clutches O P and Q R, each consisting of the elastic globular or coned head and the corresponding socket, in combination with the sleeves L M, the bevel-gearing H I J, and the valve-operating stem G, and the vertically-moving spindle with its actuating-balls C, whereby either of the clutches may be thrown into contact and the bevel-gears caused to turn the valve-stem to right or left, substantially as herein described.

5. The sleeves L M, passing through the gears I J and surrounding the spindle B of the governor, and caused to rotate with it by means of the clutches, as shown, in combination with the screw S, whereby the sleeves are moved up or down by their rotation and carried out of contact with the actuating clutch or coupling, substantially as and for the purpose herein described.

6. The governor-spindle B, with its balls C, sleeves L M, gears H I J, and clutches, as shown, in combination with the air-cylinder W and the plunger V, whereby a cushion is provided against the sudden action of the governor, substantially as herein described.

IRVING M. SCOTT.

Witnesses:

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