

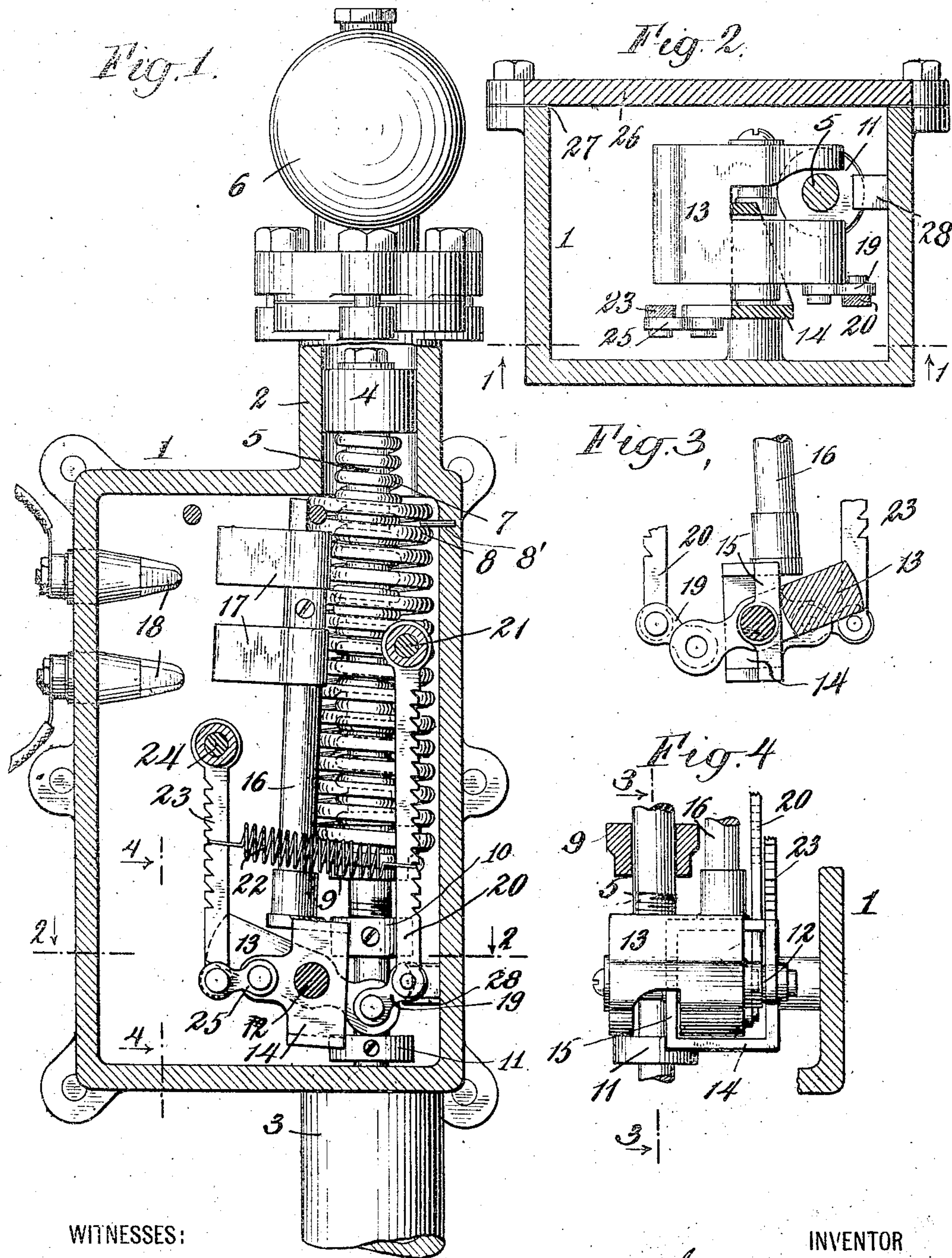
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I. J. BABCOCK.

GOVERNOR.

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WITNESSES:

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IRA J. BABCOCK, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL BRAKE AND ELECTRIC COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

GOVERNOR.

No. 874,284.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed November 7, 1906. Serial No. 342,345.

To all whom it may concern:

Be it known that I, IRA J. BABCOCK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Governors, of which the following is a specification.

This invention concerns fluid pressure governors and has reference, more particularly, to governors for air brake systems such as are used upon railway cars to close the circuit of an electric motor driving an air compressor when the pressure in the air reservoir falls to a predetermined minimum, and to open the circuit again when the pressure in the reservoir is raised to a predetermined maximum.

The object of my invention is to effect certain improvements in the construction of governors of the type disclosed in an application filed September 15, 1905, by John J. Nef, and serially numbered 278,561, in which is employed a rod moved in one direction by fluid pressure and in the other by a spring, and a toggle for operating a circuit controller mounted transverse to the rod and buckled on one side or the other by parts on the rod between which the toggle has a limited amount of movement free of the rod. My invention is directed at improving the mechanical construction of such governors, reducing the size thereof and mounting the parts of the toggle and its actuating spring in such manner that free movement and reliable operation thereof is insured.

I have illustrated the preferred embodiment of my invention in the accompanying drawings in which

Figure 1 is a sectional elevation of the governor, the section being on line 1—1 of Fig. 2, Fig. 2 is a transverse section on line 2—2 of Fig. 1, Fig. 3 is a detail view of the parts of the toggle in section on line 3—3 of Fig. 4, and Fig. 4 is a detail view in section on line 4—4 of Fig. 1.

Referring to the drawings, the parts of the governor are mounted within a rectangular casing 1 having two integral cylindrical extensions 2 and 3 at opposite sides thereof. The extension 2 forms a cylinder in which a piston 4 is adapted to reciprocate and this piston is carried on one end of a rod 5 whose other end is adapted to reciprocate in a bearing within the extension 3. Secured to the end of the extension 2 is a conductor 6 pro-

viding a passage-way from the compressed air reservoir to the extension 2 so that the pressure within the reservoir is communicated to the outer surface of piston 4 and tends to move the piston and the rod 5 downwardly in Fig. 1. Such movement is opposed by two springs 7 and 8. Loose on rod 5 is a collar 9. A spring 7 encircles rod 5 and bears at one end against collar 9 and at the other against piston 4; this spring is under tension from compression. Encircling spring 7 is a second spring 8 secured at one end to the collar 9 and at the other to the casing as indicated at 8'; this spring is under tension by being extended. This arrangement of the spring devices for moving rod 5 in one direction offers important advantages; by it the maximum length of spring and therefore the maximum sensitiveness is obtained in an apparatus of the minimum size and also the same total length of spring is employed throughout variations in the limits between which the system is to operate. To arrange the governor for operating between comparatively low pressure limits, the inner or compression spring is made shorter and the outer or extension spring made longer, and for operating between comparatively high pressure limits the reverse arrangement is employed, thus using practically the same total length of spring, and therefore the same size casing, in all cases.

Secured on rod 5 are two stops or abutments 10 and 11, of any suitable construction but preferably consisting of collars; one or both of these collars are adjustable on the rod, as by threading a portion of the rod and the interior of the collar, to permit of properly adjusting the operation of the governor, a suitable locking device being preferably provided for holding the collar in its adjusted position. Between these abutments extends a toggle for operating a circuit controller, the stops 10 and 11 being spaced apart by such a distance as will permit a limited amount of free movement of the toggle between them.

Formed on the bottom of the casing 1 is a stud 12 forming a bearing for one member 13 of the toggle and also for the circuit controller 14. These two parts are independently pivoted on the stud 12 but the toggle member is adapted to actuate the circuit controller. For this purpose the toggle member 13 is bifurcated, as shown in Fig. 2,

and the inner end of the circuit controller 14 is of rectangular shape with one side 15 thereof lying between the bifurcated arms of the toggle member 13, as shown in Fig. 4.

5 Formed on this rectangular portion of the circuit controller is a socket to receive the end of a rod 16 of wood or other insulating material, on which are mounted two electrically connected clips 17 adapted to be

10 moved into and out of engagement with two binding posts 18 mounted on the casing 1. The toggle member 13 is of such length that the end thereof lies between the two abutments 10 and 11 and the other member 19 of

15 the toggle is pivotally connected to this end of member 13. Since the toggle member 13 is mounted on a stationary pivot, it will be seen that as the toggle is buckled the member 19 thereof must move axially, and to

20 provide for this movement, I pivot the outer end of the toggle member 19 to a lever 20 which at its other end is pivotally mounted upon a stud 21 formed on the casing 1, so that as the toggle is buckled, the lever 20

25 will swing around on its pivot 21 to permit of the necessary amount of axial movement of the toggle member 19. The spring for effecting the buckling of the toggle is arranged to act upon the lever 20 to cause

30 this buckling movement. This spring is shown at 22, Fig. 1, one end thereof being carried around the lever 20 and the other end around a lever 23, mounted substantially parallel to the lever 20, but spaced apart

35 therefrom. Lever 23 is pivotally mounted at one end upon a stud 24 formed on the casing 1 and at its other end is connected by a link 25 to an off-set on the circuit controller

40 14. In order to adjust the tension of the spring 22 the non-adjacent edges of the levers 20 and 23 may be provided with a series of teeth, as shown, which will serve to hold the ends of the spring in any position in which

45 they are placed. The link 25 coöperates with the offset on the circuit controller to which it is pivotally connected to form an auxiliary toggle, the operation of the governor serving to move the point of pivotal connection of these parts to one side or the

50 other of the line joining the pivotal axis of the opposite end of link 25 and the center of stud 12. On account of the limited amount of angular movement of the members of the auxiliary toggle, the latter has little effect

55 in moving the circuit controller rapidly to open or close the circuit, but when the controller is in either of its extreme positions it is held firmly in that position against displacement by the jarring and vibration to

60 which the governor is subjected or by the movement of the toggle-member 13 before engaging the circuit controller.

Secured on or formed integral with the casing is a stop 28 extending between the

65 abutments or collars 10 and 11 and serving

to prevent excessive movement of the rod 5 in either direction.

In the operation of the governor, the rod 5 and piston 4 reciprocate in response to variations of the pressure within the compressed air reservoir. The arrangement of the springs 7 and 8 and the adjustability of the collars 10 and 11 permit of readily adjusting the governor to open and close the motor circuit at the desired pressures. Fig. 1 shows the parts in the position in which the motor circuit is open. As the pressure within the reservoir and therefore the pressure against the piston 4 falls, the rod 5 is moved upwardly in Fig. 1 and the abutment 11 thereon engages the point of pivotal connection of the two toggle members and moves the ends of the toggle members with it. When this movement has continued to such an extent that the point of pivotal connection of the two toggle members just passes the line of the pivots of the outer ends of the toggle members, the spring 22 acting on the lever 20 quickly buckles the toggle on the side opposite to that on which it is shown as buckled in Fig. 1, carrying the pivoted ends of the toggle members over to a position in which one or both of them engage the abutment 10 and immediately after the movement of the toggle members under the tension of spring 22 begins, the bottom of the bifurcation in the member 13 engages the part 15 of the circuit controller in the manner illustrated in Fig. 3, and turns the circuit controller about stud 12 to a position in which the clips 17 engage and electrically connect binding posts 18, thus closing the motor circuit. When the pressure has been again raised the parts are again moved in a similar manner back to the position shown in Fig. 1, thus opening the motor circuit with a quick-break action.

It will be seen that when the toggle is straightened by either of the abutments 10 and 11, and when the toggle is buckled by the spring 22 on one side or the other of the line of centers, the member 19 thereof moves axially in addition to turning on its pivot. By pivoting the outer end of this member to the free end of the pivoted lever 20, this axial movement is free and unobstructed except by the spring 22 which is adjusted along the levers 20 and 23 to give the desired tension. Free and positive movement of the parts is thus obtained and there is no binding of the parts.

The movement of the circuit controller as thus described also buckles the auxiliary toggle consisting of the members 14 and 25, the same spring 22 serving to buckle both this and the main toggles. The buckling of the auxiliary toggle serves to hold the circuit controller in either of its two positions to which it was moved by the main toggle.

A cover-plate 26 is provided for the open

130

end of the casing 1 and a gasket 27 is provided around the edge of the casing 1 so that the casing may be partially filled with oil including the extension 2 on both sides of the piston 4. This oil not only serves to lubricate all of the operating parts but also aids in extinguishing a spark drawn by opening the circuit of the motor at the binding posts 18. Preferably a vent is provided in the cover to permit the escape of gases generated in breaking the circuit.

Suitable lugs are formed on the casing to facilitate securing the governor to its support in the proper position with the rod 5 horizontally disposed, as, for instance, to the under side of a car-body when the governor is used in railway car braking system.

Having described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure, a spring for moving the rod in the opposite direction, a toggle, a pivoted lever carrying one of the members of the toggle, parts moving with said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring acting on the toggle to continue movement thereof started by one of said parts and a movable circuit controller actuated by said toggle, substantially as set forth.

2. In a fluid pressure governor, the combination of a casing, a rod mounted to reciprocate therein, means within the casing for moving said rod in one direction by fluid pressure and in the other by a spring, a toggle and a pivoted lever carrying one of the members thereof within the casing, parts on said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring acting on the toggle to continue movement thereof started by one of said parts, a movable circuit controller within the casing actuated by said toggle and oil within the casing submerging said parts, substantially as set forth.

3. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure, a spring for moving the rod in the opposite direction, a toggle, a pivoted lever to which the free end of one of the toggle members is pivoted, parts moving with said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring acting on the toggle to continue movement thereof started by one of said parts and a movable circuit controller actuated by said toggle when the latter is operated by the spring acting thereon, substantially as set forth.

4. In a fluid pressure governor, the combination of a reciprocating rod, means for moving

said rod in one direction by fluid pressure, a spring for moving the rod in the opposite direction, a toggle, a pivoted lever carrying one of the members of said toggle, parts moving with said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring acting on the toggle to continue movement thereof started by one of said parts, a movable circuit controller independently pivoted on the same axis as one of the members of said toggle and a loose connection between said toggle member and controller whereby the former actuates the latter when operated by the spring acting thereon, substantially as set forth.

5. In a fluid pressure governor, the combination of a reciprocating rod, a piston thereon, means for moving said rod in one direction by fluid pressure on said piston, means for moving the rod in the opposite direction, a toggle mounted transverse to said rod, a pivoted lever carrying one of the members of said toggle, parts moving with said rod adapted to engage said toggle on opposite sides of the pivotal connection of the members thereof, said parts being separated to permit movement of the toggle independently of the rod, a spring tending to buckle the toggle, a movable circuit controller and a loose connection between the toggle and controller whereby the former actuates the latter when buckled by said spring, substantially as set forth.

6. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure, a spring for moving the rod in the opposite direction, a toggle, a pivoted lever carrying one of the members of said toggle, parts moving with said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring connected to said lever and adapted to continue movement of said toggle started by one of said parts and a movable circuit controller actuated by said toggle, substantially as set forth.

7. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure, a spring for moving the rod in the opposite direction, a toggle, a pivoted lever carrying one of the members of said toggle, parts moving with said rod adapted to engage said toggle and spaced apart to permit movement of the toggle between them, a spring connected to and adjustable along said lever, a movable circuit controller independently pivoted on the same axis as one of the members of said toggle and means whereby said toggle member actuates said controller, substantially as set forth.

8. In a fluid pressure governor, the combination of a reciprocating rod, a piston thereon, means for moving said rod in one

direction by fluid pressure on said piston, means for moving the rod in the opposite direction, a toggle mounted transverse to said rod, a pivoted lever carrying one of the members of said toggle, a spring connected to and adjustable along said lever, parts moving with said rod adapted to engage said toggle on opposite sides of the pivotal connection of the members thereof, said parts being separated to permit movement of the toggle independently of the rod, a movable circuit controller and a loose connection between the toggle and controller whereby the former actuates the latter when buckled by said spring, substantially as set forth.

9. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure and means for moving the rod in the opposite direction, a toggle mounted transverse to said rod, a pivoted lever pivotally connected at its free end to the free end of one of the members of said toggle, a second lever, a spring extending between and adjustable along said levers, parts moving with said rod adapted to engage said toggle adjacent to and on opposite sides of the pivotal connection of the members thereof, said parts being separated to permit movement of the toggle independently of the rod, a movable circuit controller and a loose connection between the toggle and controller whereby the former actuates the latter when buckled by said spring, substantially as set forth.

10. In a fluid pressure governor, the combination of a reciprocating rod, means for moving said rod in one direction by fluid pressure, means for moving said rod in the opposite direction by spring pressure including a collar loose on said rod and two concentric coiled springs on said rod fixed to said collar and acting thereon in opposite directions, a circuit controller, and means controlled by the movement of said rod for actuating said circuit controller to open and close circuit with a quick-break action, substantially as set forth.

11. In a fluid pressure governor, the combination of a reciprocating rod, means for moving the same in one direction by fluid pressure, a collar loose on the rod, two concentric coiled springs on said rod fixed at corresponding ends to said collar, the other ends of said springs being fixed one to said rod and the other to a stationary part and one of said springs being compressed and the other extended, a circuit controller and means controlled by the movement of said rod for actuating said circuit controller to

open and close the circuit with a quick-break action, substantially as set forth.

12. In a fluid pressure governor, the combination of a reciprocating rod, means for moving the same in one direction by fluid pressure, a collar loose on the rod, two concentric coiled springs on said rod fixed at corresponding ends to said collar, the other ends of said springs being fixed one to said rod and the other to a stationary part and one of said springs being compressed and the other extended, abutments on said rod, a toggle extending between said abutments and movable between them independently of the rod, a spring for buckling the toggle and a circuit controller actuated by said toggle to open and close the circuit with a quick-break action, substantially as set forth.

13. In a fluid pressure governor, the combination of a member actuated in one direction by fluid pressure and the other by a spring, a toggle controlled by the movement of said member, a spring for buckling the toggle, a movable circuit controller loosely connected to said toggle and actuated thereby, and an auxiliary toggle for holding said circuit controller in the position to which it is moved by said first-named toggle, substantially as set forth.

14. In a fluid pressure governor, the combination of a member actuated in one direction by fluid pressure and the other by a spring, a toggle controlled by the movement of said member, a spring for buckling the toggle, a pivoted circuit controller loosely connected to said toggle and actuated thereby, and a link pivotally connected to said circuit controller and forming therewith an auxiliary toggle adapted to hold said circuit controller in the position to which it is moved by said first-named toggle, substantially as set forth.

15. In a fluid pressure governor, the combination of a member actuated in one direction by fluid pressure and the other by a spring, a toggle controlled by the movement of said member, a movable circuit controller loosely connected to said toggle and actuated thereby, an auxiliary toggle for holding said circuit controller in the position to which it is moved by said first-named toggle, and a single spring for buckling both said toggles, substantially as set forth.

This specification signed and witnessed this 31st day of October, 1906.

IRA J. BABCOCK.

Witnesses:

U. G. CASE,
JOSEPH TEAL.