

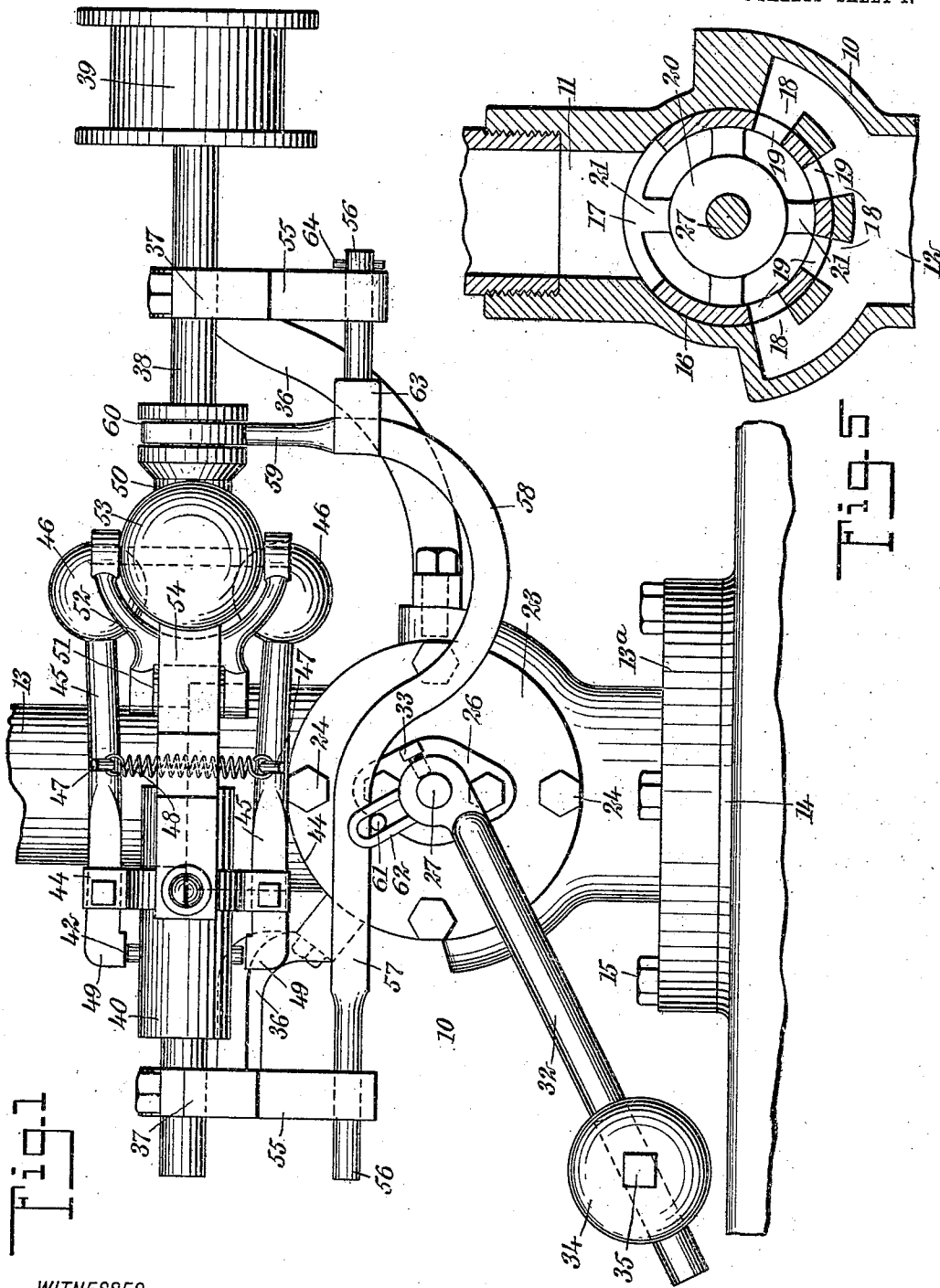
L. E. HUNT.
ENGINE GOVERNOR.

APPLICATION FILED OCT. 30, 1908.

955,073.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.



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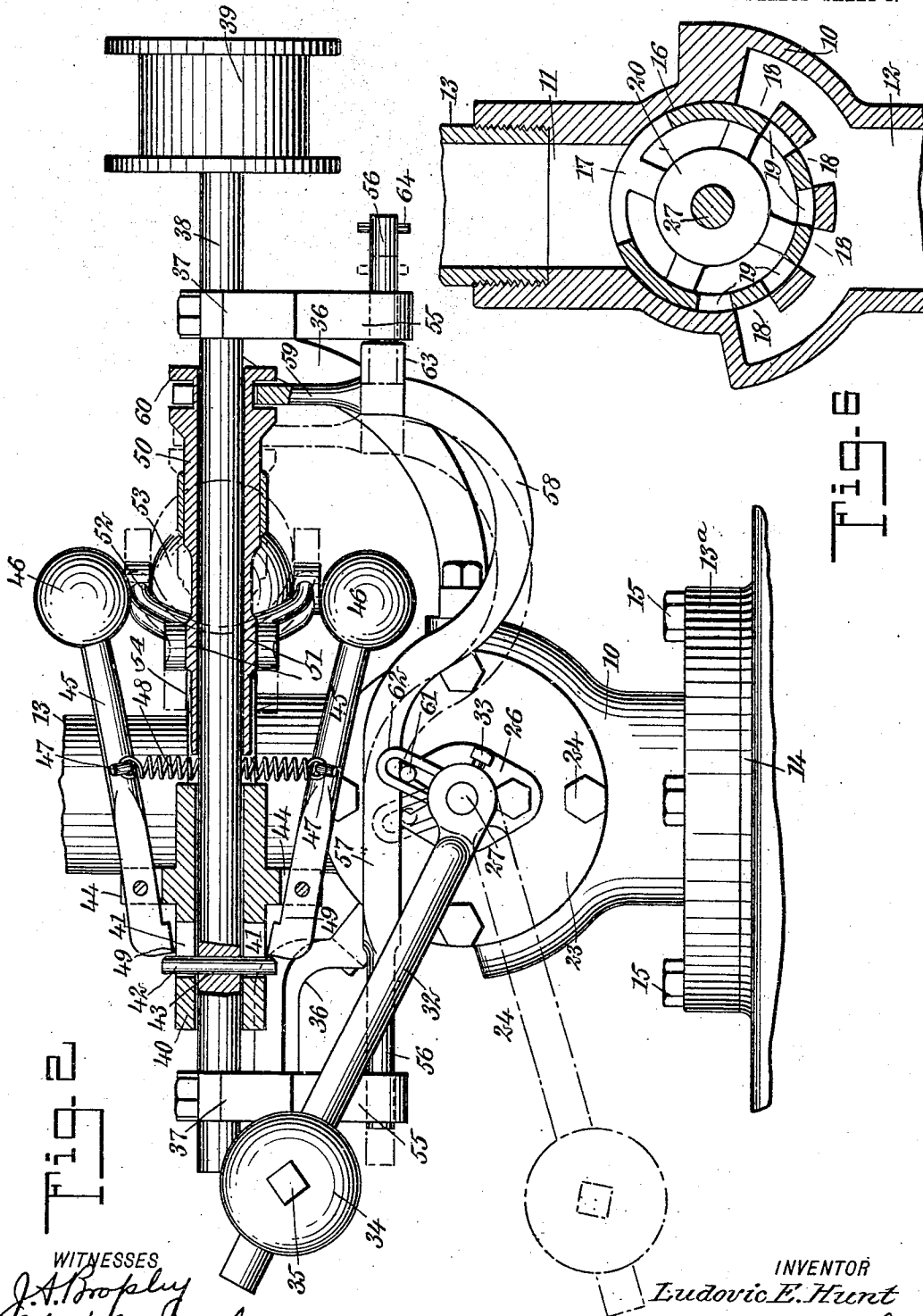


Fig. 2

Fig. 8

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3 SHEETS—SHEET 3.

Fig. 3

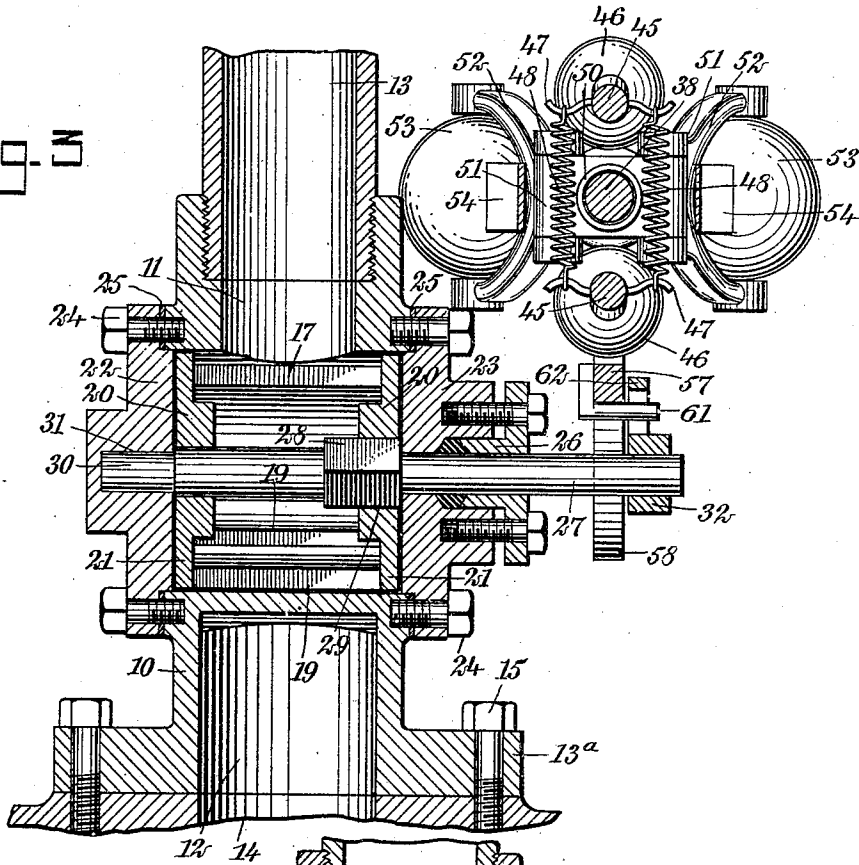
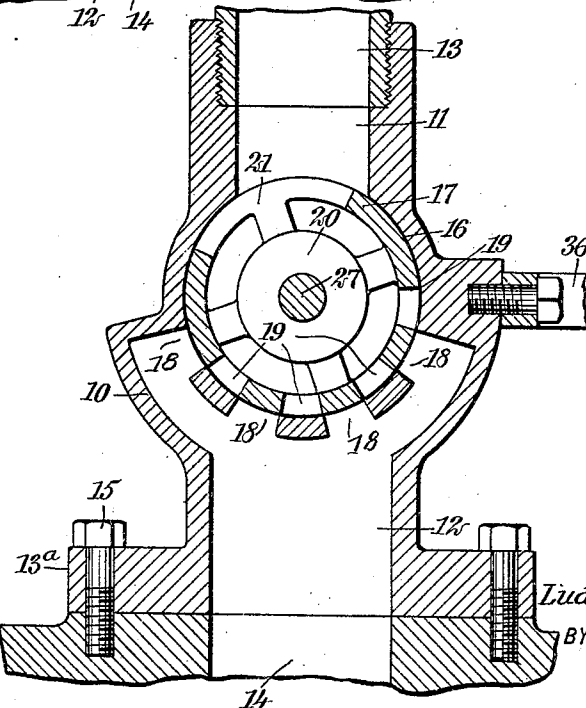


Fig. 4



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UNITED STATES PATENT OFFICE.

LUDOVIC ESTES HUNT, OF SOMERSET, KENTUCKY.

ENGINE-GOVERNOR.

955,073.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed October 30, 1902. Serial No. 460,209.

To all whom it may concern:

Be it known that I, LUDOVIC ESTES HUNT, a citizen of the United States, and a resident of Somerset, in the county of Pulaski and State of Kentucky, have invented a new and Improved Engine-Governor, of which the following is a full, clear, and exact description.

This invention relates to engine governors for regulating the flow of motive fluid to motors such as steam, compressed air and other engines, and more particularly to a device of this class comprising a valve for regulating the flow of motive fluid, means for initially opening the valve to start the engine, means centrifugal means for maintaining the valve open, and similar means for closing the valve, the last-mentioned means being controlled and rendered operative by the first-mentioned means.

Before proceeding to a more detailed description of my invention, it should be clearly understood that the same is particularly useful in connection with steam engines of different types, and has been shown for example in the accompanying drawings in combination with a rotatable cylindrical valve having a plurality of ports for controlling the flow of motive fluid. Any other form of valve suited to the purpose can be employed, for example, flat valves or square valves, which are not rotated, but are moved slidably to open or close the valve ports. The valve can be initially operated by hand or otherwise, to start the engine, the first centrifugal weights, operable at substantially low speeds, serve to hold the valve open when the engine has started, and the further centrifugal weights, operable at higher speeds, to close the valve again, if the engine exceeds a predetermined speed, the valve being so controlled that after it is closed by the action of the last-mentioned centrifugal weights it subsequently opens when the speed of the latter decreases again.

An object of the invention is to provide a simple, inexpensive and efficient governor for engines of various types, by means of which the flow of motive fluid such as steam, compressed air, water or gas to the engine can be controlled, in which the governor itself, can be employed to start the engine, which is positive in its action, and which controls

the passage of motive fluid to the engine with certainty.

A further object of the invention is to provide a device of the class described in which the valve controlling the motive fluid is maintained open by the centrifugal action of a part of the governor, this centrifugal part being operable at a comparatively low speed of revolution, and in which the valve can be closed by another centrifugal part of the governor, which is operable at a higher speed of revolution and which is controlled by the first part.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side elevation of an embodiment of my invention showing the governor parts in the positions which they occupy when the engine is not running; Fig. 2 is a similar view showing the governor parts in the positions which they occupy when operating to close the valve when the engine has exceeded a predetermined speed; Fig. 3 is a transverse section of the governor; Fig. 4 is a transverse section showing the valve for controlling the motive fluid, closed; Fig. 5 is a similar view, showing the valve open; and Fig. 6 is a similar view showing the valve again closed by the action of the governor.

Referring more particularly to the drawings, I provide a valve casing 10 having an inlet 11 and an outlet 12. The inlet is connected by means of a suitable pipe 13, with the source of motive fluid supply, such for example, as a boiler. The outlet is connected with the motor, for example, by means of a laterally extended flange 13^a secured at the inlet 14 of the steam chest or the like, by means of bolts 15. In the form of my invention shown in the drawings, the casing has a cylindrical part 16 in which is rotatably arranged a valve 17. The cylindrical portion of the casing has ports 18 adapted to register with corresponding openings 19 in the valve. The latter is hollow

and at the ends has hubs 20 joined with the body of the valve by means of spokes or ribs 21. The casing is open at opposite sides and has casing heads 22 and 23 secured in position by means of bolts 24 or the like and provided with suitable gaskets 25 to insure that the casing is tightly closed.

The head 23 has a stuffing-box 26 through which extends a valve stem 27 having a portion 28 of angular cross-section adapted to fit into a similarly formed opening 29 in one of the hubs 20 of the valve, so that the valve is constrained to turn with the stem. The end 30 of the stem is journaled in a suitable bearing recess 31 of the head 23. At the opposite end, the stem extends through the stuffing-box 26 and has secured thereto an arm 32 rigidly held in place by means of a set screw 33 or in any other suitable manner. The arm carries a slidable weight 34 adapted to be moved longitudinally of the arm and to be secured in any one of a plurality of positions by means of a set screw 35, or in any other convenient manner.

The casing carries rigid supports 36 extending in opposite directions and having at their ends alined bearings 37 in which is journaled a spindle 38. At one end, the spindle has a pulley 39 which can be connected by means of a belt with a suitable part of the motor, so that the spindle can be actuated from the latter. A sleeve 40 is slidably arranged upon the spindle and has slots 41 at opposite sides, through which extend the projecting ends 42 of a pin arranged in a transverse opening 43 of the spindle. The sleeve has bifurcated extensions 44 between the prongs of which are pivoted levers 45, having at their ends suitably formed members 46 which constitute centrifugally operable governor weights. The levers have studs 47 connected by suitable helical or other springs 48, which tend normally to draw the weights 46 together to swing the ends 49 of the levers out of possible engagement with the pin 42.

A second sleeve 50 is slidably arranged upon the spindle 38 and has lateral extensions 51, upon which are pivoted bifurcated levers 52 each having a suitably formed, preferably spherical weight 53 mounted between the prongs thereof. The weights 53 are secured by means of comparatively stiff leaf springs 54 to the sleeve 40. These springs tend to force the weights 53 toward each other and to hold them in normal positions.

Underneath each of the bearings 37 is a downwardly extending guide 55, which slidably receives an end 56 of a sliding bar 57. The latter has a portion 58 downwardly offset to permit the weights 46 and 53 to rotate freely. Near one end the sliding bar has an upwardly extending fork 59, the sides of which movably engage those of an annu-

lar recess 60 near the end of the sleeve 50. A stud 61 carried by the sliding bar engages a slotted extension 62 of the arm 32. Adjacent to one of the guide extensions 55, the sliding bar has stops 63 and 64 which limit its movement in the direction of its length.

In the initial positions of the parts of the governor, that is, when the engine is not in operation, the ports 18 of the valve are closed by corresponding parts of the valve between the valve openings 19. When it is desired to start the engine, the arm 32 is manually or otherwise lifted against the gravitational action of the weight 34, and the valve stem is thereby rotated to move the valve so that the openings 19 register with the ports 18. Steam or other motive fluid can then enter the motor through the valve and the engine starts, as is customary, at first slowly. The upward movement of the arm has at the same time caused the sliding bar to move in the direction of its length and to carry with it the sleeves 50 and 40. The movement of the sleeves is limited by the pin 42 which comes in contact with the ends of the slots 41. The engine operates, and rotates the spindle as soon as the valve has been opened. The initial, comparatively slow movement of the spindle causes the lighter weights 46 to swing outward under the influence of centrifugal action against the tension of the springs 48. The outward movement of the weights 46 swings the levers so that the ends 49 assume positions in front of the pin 42. As soon as the arm 32 is released, the weight 34 tends to return it to its depressed position, thereby again closing the valve. But the sleeve 40 cannot move longitudinally of the spindle, as the lever ends 49 serve as stops. Consequently, these centrifugal weights act to hold the valve open, and the engine continues to operate.

The centrifugal weights 53 and their springs 54 are so designed that they do not move apart appreciably until a certain safe speed of the engine has been exceeded. As soon as this occurs, the weights 53 swing outward and move the sleeve 50 longitudinally of the spindle toward the sleeve 40. This movement of the sleeve 50 causes the sliding bar to move in the direction of its length, and through the engagement of the stud 61 with the slotted extension 62, causes the valve to rotate so that the ports 19 are closed to reduce the speed of the engine to a normal point. The reduction in speed of the engine subsequently permits the weights to swing inward toward the spindle, and thus return the sleeve 50 to its original position, carrying with it the sliding bar and again opening the valve or increasing the valve opening, to permit the motive fluid to pass through the same as before. If the engine is stopped entirely, the weights 46 also

swing toward the spindle so that the sleeve 40 is again free to move. The weight 34 then swings the arm downward and all the parts are again in their initial positions. It will be understood that unless the levers 45 are arranged so as to lock the sleeve 40, the movement outward of the weights 53 would merely slide the sleeve 40 longitudinally of the spindle, whereby the valve would remain unaffected.

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

1. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for opening said valve, centrifugal means for holding said valve open, and centrifugal means for closing said valve.

2. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for initially opening said valve, centrifugal means for maintaining said valve open, and centrifugal means for closing said valve, said last-mentioned means being rendered operative by said first centrifugal means.

3. A governor, comprising a valve for regulating the flow of motive fluid to a motor, said valve having an initial, open position, a second, closed position, and a third, open position, means for maintaining said valve open, and means for closing said valve, said first means controlling said last-mentioned means.

4. A governor, comprising a valve for regulating the flow of motive fluid to a motor, said valve having an initial, open position, a second, successive, closed position, and a third, successive, open position, centrifugal means for maintaining said valve open, and centrifugal means for moving said valve into said second position, said last-mentioned means being inoperative until said first-mentioned means become operative.

5. A governor comprising a valve for regulating the flow of motive fluid to a motor, a lever for initially opening said valve, weights centrifugally operable to maintain said valve open, and other weights centrifugally operable to close said valve, said first weights and said other weights being operable at different speeds of revolution.

6. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for initially opening said valve, means tending to close said valve, rotatable weights centrifugally operable to maintain said valve open, means tending to render said weights inoperative, other rotatable weights centrifugally operable to close said valve, and means tending to render said other weights inoperative, said first mentioned weights being operable at a lower speed of revolution than said other weights.

7. A governor comprising a valve for reg-

ulating the flow of motive fluid to a motor, said valve having a plurality of positions, the first of said positions being a closed one, the second of said positions being an open one, the third of said positions being a closed one, means for moving said valve into said second position from said first position, centrifugal means for maintaining said valve in said second position, and centrifugal means for moving said valve from said second position to said third position, said last-mentioned means being inoperative until said second means are operative.

8. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for initially opening said valve to start the motor, a rotatable weight adapted to be centrifugally operated to hold said valve open, a second rotatable weight adapted to be centrifugally operated to close said valve, and means for rotating said weights from the motor.

9. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for initially opening said valve to start the motor, a spindle rotatable from the motor, centrifugally operable weights carried by said spindle, means controlled by said weights for maintaining said valve open, other centrifugal weights carried by said spindle and operable to close said valve, and means tending to hold said first weights and said other weights inoperative, said first weights being operable at a lower speed of revolution of said spindle than said other weights.

10. A governor comprising a valve for regulating the flow of motive fluid to a motor, a spindle operatively connected with the motor, a member movable longitudinally of said spindle and carrying centrifugally operable weights, a second member movable longitudinally of said spindle and having other centrifugally operable weights, said first weights when operated serving to lock said first member against movement in one direction, said other weights being controlled by said first member and controlling said valve, and means for resisting the centrifugal operation of said first weights and said other weights.

11. A governor comprising a valve for regulating the flow of motive fluid to a motor, means for initially operating said valve to start the motor, a spindle operatively connected with a rotating part of the motor, a sleeve movable on said spindle, centrifugal means for locking said sleeve against movement in one direction, a second sleeve movable on said spindle, centrifugal means on said second sleeve for moving the same away from said first sleeve when said first sleeve is locked, and means controlled by the movement of said second sleeve for operating said valve.

12. A governor comprising a valve for regulating the flow of motive fluid to a motor, a spindle operatively connected with the motor, a sleeve movable on said spindle, 5 centrifugally operable weights carried by said sleeve and adapted to lock the same against movement in one direction when centrifugally displaced, a second sleeve movable on said spindle and carrying other centrifugally operable weights connected with 10 said first sleeve, a sliding member controlled by said second sleeve and operatively connected with said valve, and springs for resisting the displacement of said weights from their normal positions, said first 15 weights being adapted to be centrifugally displaced at a lower speed of revolution than said other weights.

13. A governor comprising a valve for 20 regulating the flow of motive fluid to a motor, a spindle adapted to be rotated by the motor, a sleeve movable on said spindle and having slots, a pin carried by said spindle and projecting through said slots, levers 25 pivoted on said sleeve and adapted to have their ends moved into engagement with said pin, whereby said sleeve is locked against movement longitudinally of said sleeve, weights carried by said levers, springs connecting said levers, a second sleeve movable 30 on said spindle, centrifugally operable weights pivotally mounted upon said second sleeve and having springs secured to said

first sleeve, and a sliding bar having a movable connection with said second sleeve and 35 controlling said valve.

14. A governor comprising a valve for regulating the flow of motive fluid to a motor, an arm rigid with said valve and weighted, whereby said arm tends to hold 40 said valve in an initially closed position, a spindle adapted to be operatively connected with the motor and having a slotted sleeve movable thereon, said spindle having a pin projecting through the slots of said sleeve, 45 levers pivoted upon said sleeve and carrying weights, springs connecting said levers, said weights, when said spindle is operated, tending to displace said levers into positions whereby they engage said pin to lock 50 said sleeve against movement longitudinally of said spindle, a second sleeve movable on said spindle and having pivoted members carrying weights, springs connecting said weights and said first sleeve, and a slide bar 55 having a movable engagement with said second sleeve and provided with a stud, said arm having a slotted extension receiving said stud.

In testimony whereof I have signed my 60 name to this specification in the presence of two subscribing witnesses.

LUDOVIC ESTES HUNT.

Witnesses:

EDGAR MURRELL,
C. FRED HUNT.