

No. 646,505.

Patented Apr. 3, 1900.

J. N. RUNDLE.  
GOVERNOR.

(Application filed Oct. 27, 1898.)

(No Model.)

Fig. 1.

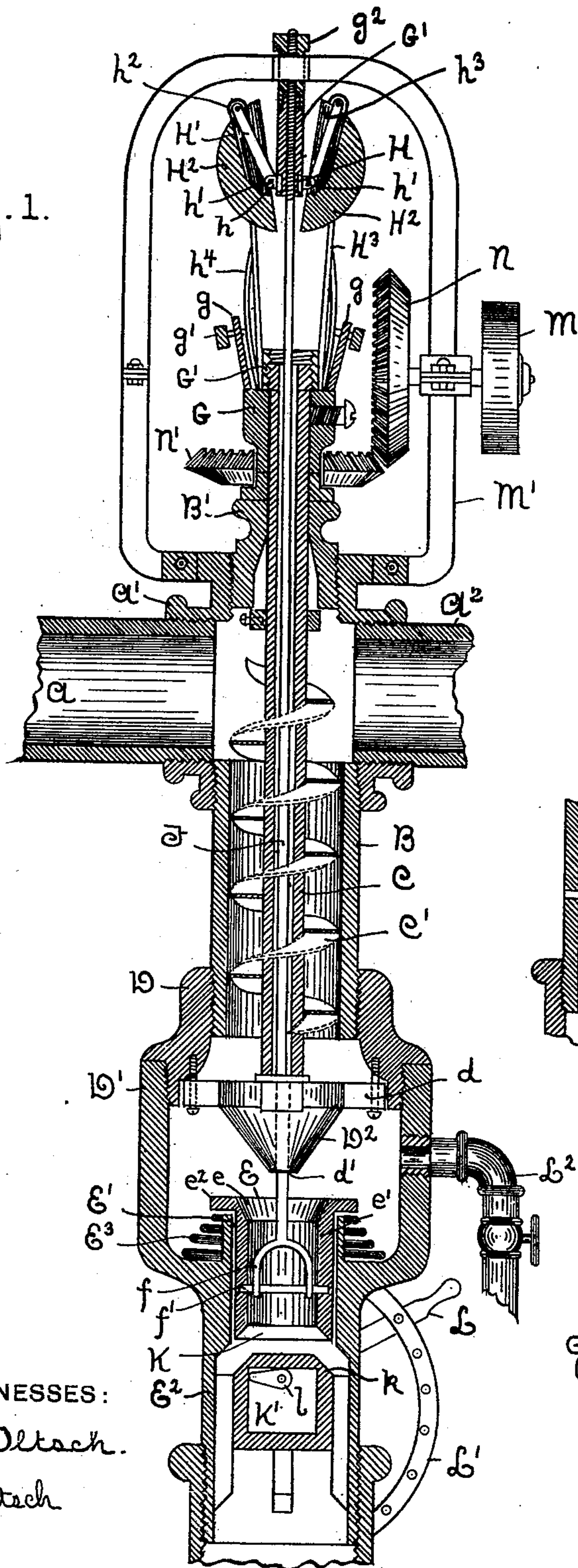
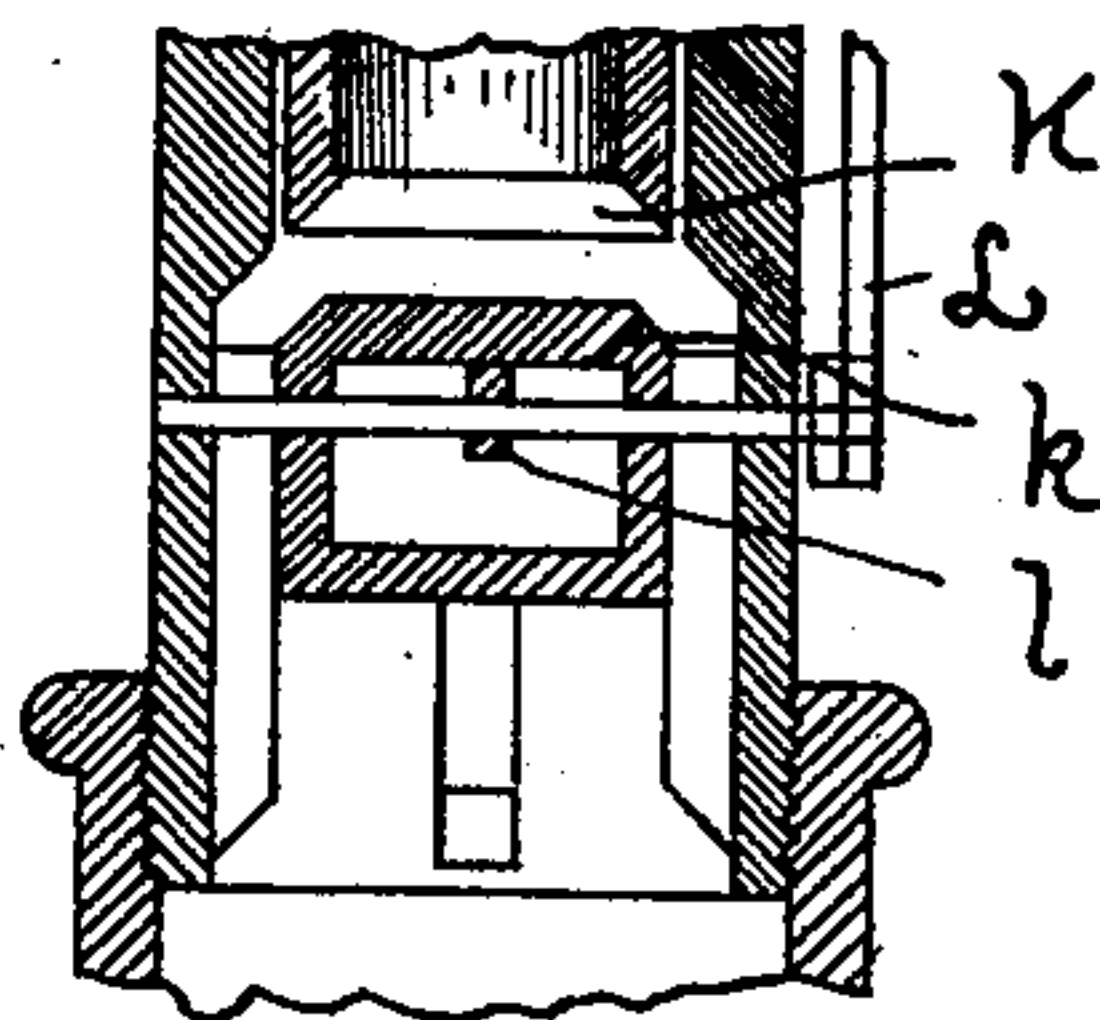


Fig. 2.



WITNESSES:  
George Oltsch.  
Hugo Oltsch

James N. Rundle.  
INVENTOR  
BY *Fredk Benjamin*  
ATTORNEY.



# UNITED STATES PATENT OFFICE.

JAMES NELSON RUNDLE, OF SANTA BARBARA, CALIFORNIA.

## GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 646,505, dated April 3, 1900.

Application filed October 27, 1898. Serial No. 694,673. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES NELSON RUNDLE, a citizen of the United States, residing at Santa Barbara, in the county of Santa Barbara and State of California, have invented certain new and useful Improvements in Governors for Steam-Engines, of which the following is a specification.

My invention relates, primarily, to governors for pumps or other classes of machinery of a reciprocating nature where there is nothing rotary from which to conduct a governor-belt; and it consists, in general terms, in combining with the governor-valve and its spindle and with the governor-arms a rotatable worm or spiral arranged in the steam-pipe to receive the force of the steam on its way to the engine or machine, whereby said arms are revolved and caused to control the valve.

It further consists in the various other combinations and details of construction hereinafter described and claimed.

In the drawings which form a part of this application, Figure 1 is a vertical sectional view through a governor and accessory mechanism embodying my invention. Fig. 2 is a detail of a safety-valve.

A represents a steam-pipe leading from any boiler, and A' a coupling upon said pipe. A<sup>2</sup> shows a pipe leading from another boiler. Into one side of this coupling takes a casing-tube B at right angles to the pipe, while to the opposite side, in line with the tube, is fitted a stuffing-box B', in which revolves the tubular shaft C, carrying the worm or spiral C', that traverses the casing-tube and receives the force of the steam rushing therethrough and is turned thereby at a speed depending upon the steam-pressure. To the lower end of the tube is secured a section-coupling D, connecting it with the valve-box D' and carrying a bridge d, in which the lower end of the tubular shaft is stepped and to which is secured the valve-seat D<sup>2</sup>, having port d' therethrough.

E is the governor-valve, flaring at e to engage the valve-seat, tubular at e' to fit and play in the eduction-passage E', connecting with the pipe E<sup>2</sup>, which leads to the pump or other engine, and flanged at e<sup>2</sup> to rest upon a coiled spring E<sup>3</sup>, which tends to close it against its seat and thereby cut off the flow of steam.

A valve-rod F passes through the tubular shaft C and valve-seat D<sup>2</sup> and at its lower end is forked at f to engage a pin f', whereby it is secured to the valve that it may lift the latter against its seat when raised by the governor and throw it down against the force of the coiled spring when depressed.

To the tubular shaft above the stuffing-box is secured a sleeve or collar G, hereinafter termed a "steady-rest," and above this steady-rest is a second stuffing-box G', screwed upon the end of the shaft. From the top of the steady-rest project upstanding arms g, which receive set-screws g' for a purpose directly to be explained. Upon the screw-threaded upper end of the valve-rod is supported a sleeve G', held in adjusted position by jam-nut g<sup>2</sup>, and this sleeve carries a loose collar or yoke H, having ears h, receiving pivot-pins h' from the lower ends of governor arms or links H', which at their upper or outer ends are pivotally secured to lugs h<sup>2</sup> from the balls or weights H<sup>2</sup>, these latter being preferably formed as hemispheres having slots h<sup>3</sup> in their contiguous faces for the reception of the links and pressed together beneath the pivotal connection with the links by plate-springs H<sup>3</sup>, to which they are attached, the tension of which is controlled and adjusted by the above-mentioned set-screws g' and by auxiliary or supplemental springs h<sup>4</sup> of shorter length, upon which the set-screws act. These supplemental springs may, however, be omitted. The springs H<sup>3</sup> will be adjusted to have a slightly-greater tension than the coiled spring E<sup>3</sup>, which acts directly upon the valve, so that upon any decrease in the speed of revolution they may overcome the latter and close the hemispheres, depressing the valve-spindle and moving the valve away from its seat, while with an increase in speed the coil-spring will immediately aid the centrifugal force in closing the valve, thus giving a very sensitive action.

It is sometimes desirable to entirely shut off steam from the engine as soon as the force inducing the action of the governor becomes so feeble as to enable the springs H<sup>3</sup> to entirely close the hemispheres and throw the valve entirely open. To this end a seat K is formed upon the lower end of the valve to close against an opposing seat k when said



valve is fully open and its sustaining-spring compressed. This second seat may be upon the upper truncate end of a movable valve K', adjustable in position by lever L and cam l and secured in adjusted position by locking the lever into any one of a series of perforations along the segment L' or otherwise. An exhaust-pipe L<sup>2</sup> leads from the valve-box to carry off waste or dead steam.

Where the engine drives rotary parts, the spiral or Archimedean screw may be omitted and the tubular shaft driven by other means—as, for instance, by a belt traveling over a pulley M, having its shaft mounted in a bracket M', secured to a fixed support, such as a flange, upon the coupling A' and carrying a bevel-gear N, meshing into a bevel-pinion N', keyed to the sleeve G or steady-rest, which, as already stated, is secured to and revolves with said tubular shaft. With this construction the governor-valve will be operated in the same way as before, and should the belt run off the pulley or break steam may be instantly shut off from the engine by the closing of said governor-valve against the lower or safety cut-off valve.

I claim—

1. The combination of the tubular rotary shaft, means sensitive to the flow of steam for driving it, the governor-valve and its seat, the valve-spindle passing through the shaft, the steady-rest, the links connected with the upper end of the valve-spindle and with the governor-weights, the said governor balls or weights attached to the upper end of the springs, and said springs carried by the steady-rest, and acting against the weights to close them, as described.

2. The combination of the tubular rotary shaft, means sensitive to the flow of steam for driving it, the governor-valve and its seat, the lower valve-seat against which the governor-valve closes to cut off the steam from the engine, the valve-spindle connected to the governor-valve and passing through the tubular shaft, the steady-rest, the links connected with the upper end of the valve-spindle, and with the governor-weights, the said governor-weights attached to the said springs carried by the steady-rest, and acting against the weights to close them, as described.

3. The combination of the tubular rotary shaft, means sensitive to the flow of steam for driving it, the governor-valve and its seat, the valve-spindle passing through the shaft, the steady-rest, the links connected with the upper end of the valve-spindle and with the governor-weights, the said governor-weights attached to the upper end of springs, the said springs carried by the steady-rest and acting against the weights to close them, and the spring of less tension acting upon the

governor-valve to lift the latter toward its seat, as described.

4. The combination of the tubular rotary shaft, the worm or spiral thereon, the tubular casing in which it works, the steam-pipe, the governor-valve and its seat, the valve-spindle playing through the tubular shaft, the steady-rest, the links connected with the valve-rod, the governor-weights connected with said links and to springs, and the said springs carried by the steady-rest, and acting against the weights to close them, as set forth.

5. The combination of the tubular rotary shaft, the worm or spiral thereon, the tubular casing in which it works, the steam-pipe, the stuffing-box opposite the casing, the steady-rest secured to the tubular shaft to revolve therewith above the stuffing-box, the governor-valve and its seat, the valve-rod playing through the tubular shaft, the links connected with the valve-rod above the steady-rest, the governor-weights connected with the upper ends of said links, the springs connected with and acting upon the weights to close them, and the spring acting upon the valve to aid in lifting it, substantially as set forth.

6. In a governor, the combination with a tubular rotary shaft, of the valve-rod playing therethrough, the valve-seat and valve, the governor arms or links connected to the valve-rod at its upper end the hemispherical weights connected to the upper ends of said levers and recessed to receive them, and the springs secured to and pressing against said weights, as set forth.

7. The combination with the governor arms or links the weights secured to the upper ends of said links, the valve-rod, the steady-rest, the springs carried thereby and pressing against the weights, and means for adjusting the tension of the springs, as described.

8. The combination with the valve-rod, the governor arms or links, the weights secured to the upper ends of said links, the steady-rest, its upstanding arms, the springs carried by the steady-rest and pressing against the weights, and the set-screws for adjusting the tension of the springs, as set forth.

9. The combination with the valve-rod, the governor arms or links, the weights secured to the upper ends of said links the steady-rest provided with upstanding arms, the plate-springs carried by the steady-rest and pressing against the weights, the auxiliary springs pressing against the plate-springs, and the set-screws adjustable against said auxiliary springs substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES NELSON RUNDLE.

Witnesses:

RUFUS D. SMITH,  
THOS. H. HICKS.