

(No Model.)

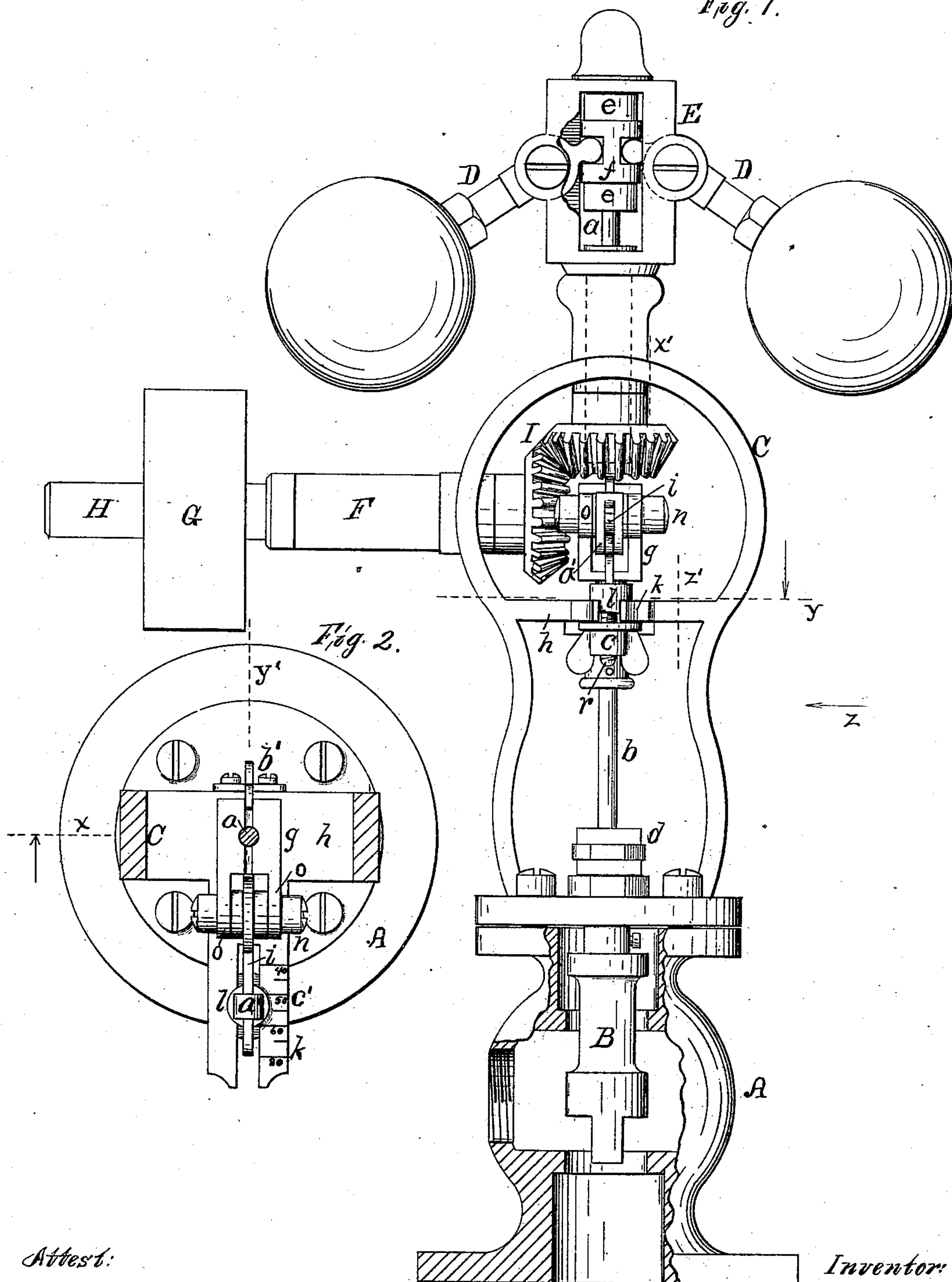
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L. P. LANGLOIS.  
GOVERNOR FOR ENGINES.

No. 361,067.

Patented Apr. 12, 1887.

*Fig. 1.*



*Attest:*

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*By E. B. Whitmore, Atty.*

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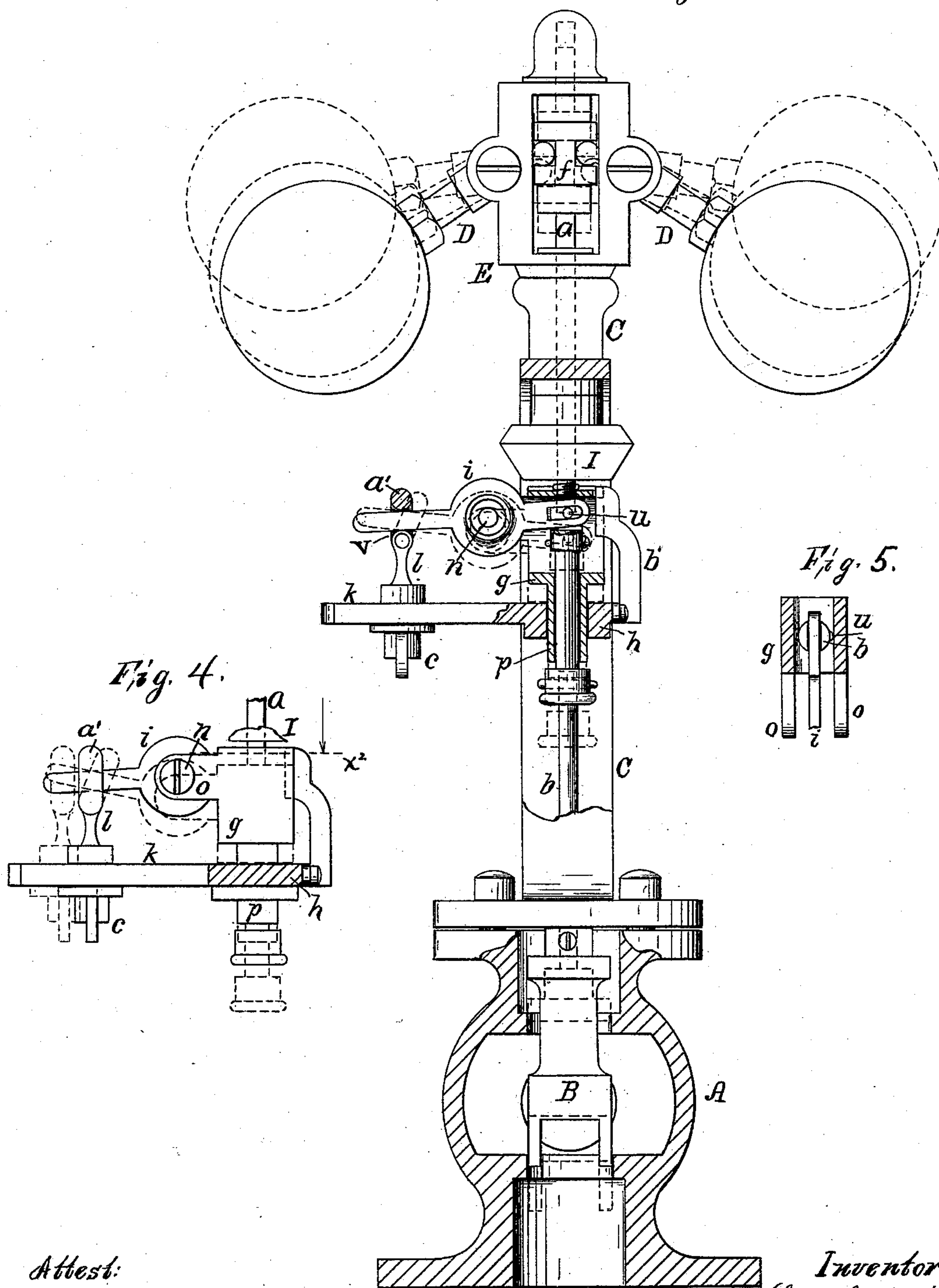
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

LOUIS P. LANGLOIS, OF ROCHESTER, NEW YORK.

## GOVERNOR FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 361,067, dated April 12, 1887.

Application filed December 29, 1886. Serial No. 222,880. (No model.)

*To all whom it may concern:*

Be it known that I, LOUIS P. LANGLOIS, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Governors for Engines, which improvement is fully set forth in the following specification, and shown in the accompanying drawings.

My invention relates more particularly to that class of governors for steam-engines known as "pendulum" governors; and the object of the invention is to provide a means by which the valve of the governor is made to move through a greater longitudinal distance within the globe than the actuating-points of the ball-levers move when the governor is operating for the purpose of more quickly controlling the flow of steam to the cylinder, thus making the valve more sensitive to changes in the rate of speed of the engine. The improvement is hereinafter fully described, and more particularly pointed out in the claims.

Referring to the drawings, Figure 1 is a side elevation of a governor and valve, showing my improvement attached in place. The globe is in part broken away and centrally longitudinally sectioned, as on the dotted line  $x$  in Fig. 2 and viewed as indicated by the arrow pointed thereon, and the governor-head in part broken away to show more clearly the actuating-point of one of the ball-levers; Fig. 2, a transverse section of the arch and valve-rod, taken as upon the dotted line  $y$  in Fig. 1 and viewed as indicated by the arrow pointed thereon; Fig. 3, a view of the device seen as indicated by arrow  $z$  in Fig. 1, the upper part of the arch being vertically sectioned, as on the dotted line  $x'$  and in part broken away, the globe being centrally longitudinally sectioned, as on the dotted line  $y'$  in Fig. 2, parts being shown in different positions by full and dotted lines, the head and parts immediately connected therewith being shown, as a matter of convenience, in the position in which they are seen in Fig. 1; Fig. 4, a side elevation of some of the parts within the arch and attached thereto, seen in the direction in which Fig. 3 is seen, parts being shown in different positions by full and dotted lines, the cross-bar of the arch being vertically sectioned, as on the dotted

line  $z'$  in Fig. 1, the figure being drawn to more clearly show the union or part that immediately operates the accelerating-lever; and Fig. 5, a view of said union detached, the same being horizontally sectioned, as upon the dotted line  $x''$  in Fig. 4, and seen as indicated by the arrow pointed thereon, the figure being drawn to show more clearly the manner of connecting the valve-rod to the accelerating-lever.

Referring to the parts, A represents the globe of a steam-governor valve; B, the valve proper; C, the arch; D, the ball-levers with balls attached; E, the head; F, the sleeve; G, the driving-pulley; H, the driving-shaft, and I miter-gears for the shaft and head, all, save the arch, being of common construction.

$b$  is the valve-rod, secured to the valve and caused to pass through an ordinary stuffing-box,  $d$ , at the foot of the arch.

$a$  is the union-rod, occupying the axis of the head, within which it moves at its lower end, being secured to a union or head,  $g$ , within the arch. At its upper end this rod is provided with a notched spool,  $f$ , forming a rest to receive the points of the ball-levers and rigid collars  $e e$ , as shown, these parts being common. By means of this construction the union is moved vertically by the action of the ball-levers as the balls rise and fall.

The arch is formed with a horizontal cross-bar,  $h$ , provided with a slotted horizontally-extended part,  $k$ . To this part is secured a horizontally-adjustable stud,  $l$ , held in positions of adjustment upon the part by a thumb-screw,  $c$ , beneath a threaded portion,  $r$ , of the stud, passing down through the slot to receive the thumb-screw.

The union or head  $g$  is formed with parallel projecting parts  $o$ , between which is pivoted a lever,  $i$ , upon a horizontal pin,  $n$ . The outer end of the lever has a bearing upon the stud  $l$ , while the inner end is secured to the valve-rod, said rod being fitted to slide vertically in the sleeve or tubular part  $p$  of the union  $g$ . The sleeve  $p$  is fitted to slide vertically in the cross-bar  $h$  of the arch as the union is moved upward or down by the ball-levers, as stated. The upper end of the valve-rod is bifurcated to receive the end of the lever  $i$ , the latter resting between the branches and



held upon a cross-pin, *u*, the end of the lever being slotted to allow it to move freely on said pin. The lever *i*, as here arranged, acts as a lever of the third order, and it will be understood that, for instance, if the distance between the pin *u*, at which the load is attached to the lever, and the fulcral point *v* is twice that between said point *v* and the pin *n*, where the power is applied, the valve will move through twice the vertical distance that the rod *a* moves from any action of the ball-levers. By adjusting the stud *l* along the part or rest *k* toward or from said pin *n*, the relative simultaneous motions of said valve and rod may be regulated at pleasure.

The lever *i* acts as an accelerating lever or actuator for the valve, and the stud *l* is formed with a loop, *a'*, at its upper end, in which to receive the end of the lever, which loop is pivoted to the stud to swing toward or from the pin *n*, to accommodate the bearing of the lever upon the stud in its vertical movements.

*b'* is a guide for the union *g*, secured rigidly to the cross-bar *h*, and formed to enter near its upper end a notch in said union, which guide serves to hold the union and parts attached more perfectly in place.

By moving the stud *l* toward or from the pivot-pin *n*, the relative motion of the valve is not only varied, but the revolutions of the engine per minute or hour are also decreased or increased in number, said stud *l* on this account being styled a "speeder." In the construction shown the greatest amount of steam will pass the valve when the latter is raised, this being its position when the balls are down. Now, it will be understood that the nearer the stud or speeder is to the bearing of the lever upon the union the farther the valve will be thrown downward by any given motion of the ball-levers. This results from the fact that the nearer the speeder is to said bearing the greater will be the travel of the valve, and as the latter starts from the same upper position each time it must move lower when moving farther. It thus reduces the aggregate or average opening for the flow of steam during any given hour. If the stud or speeder be moved farther away from the pivot *n*, the motion of the valve will be less, and it will work higher, on an average, in the globe and expose a greater aggregate opening for the downflow of steam—that is to say, the engine will run faster under the same average load and head of steam when the speeder is set at a point farther from the pivot *n* than it will if placed nearer said pivot. The upper surface

of the rest *k* is formed with transverse graduation-marks *c'*, to be used as a guide in the matter of adjusting the speeder *l*.

Speeders for engines have before been used in connection with governors; but they have usually worked with much friction, and have been otherwise objectionable.

What I claim as my invention is—

1. A valve of a steam-governor and rod connected therewith, in combination with ball-levers, a union-rod actuated by said ball-levers, the axes of said union-rod and valve-rod being in a straight line, an actuating-lever for said valve-rod operated by said union-rod, said lever resting with its operating end in the line of the axes of said rods, substantially as shown and described.

2. The arch of a governor-valve formed with an internal cross-bar, *h*, and an arm, *k*, extending out from said cross-bar at right angles with the plane of said arch, in combination with a valve, a rod connected with said valve piercing said cross-bar and provided with a pin, *u*, at its upper end, an actuating-lever acting upon said pin, a rest for said lever secured to said arm, and a vertically-moving head to operate said lever, substantially as shown and described.

3. The combination, in a steam-governor, of opposing ball-levers, a union-rod operated by said levers, a union or head secured to said rod within the arch, a lever pivoted to said head, a valve, a rod connecting said valve and lever, an adjustable fulcrum for said lever, and a graduated scale for said rest, substantially as and for the purpose specified.

4. The combination, in a steam-governor, of opposing ball-levers, a union-rod operated by said levers, a union or head secured to said rod, a lever pivoted to said head, a valve, a valve-rod connecting said valve and lever, said union or head being formed with a sleeve within which said valve-rod moves, substantially as shown and described.

5. The combination, in a steam-governor, of opposing ball-levers, a union-rod operated by said levers, a union or head secured to said rod, a lever pivoted to said head, a valve, a rod connecting said valve and levers, and a fulcrum for said lever provided with a pivoted or movable loop in which to receive said lever, substantially as shown and described.

LOUIS P. LANGLOIS.

Witnesses:

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M. L. McDERMOTT.