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HYDROCARBON MOTOR.

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903,772.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 2.

Fig. 2.

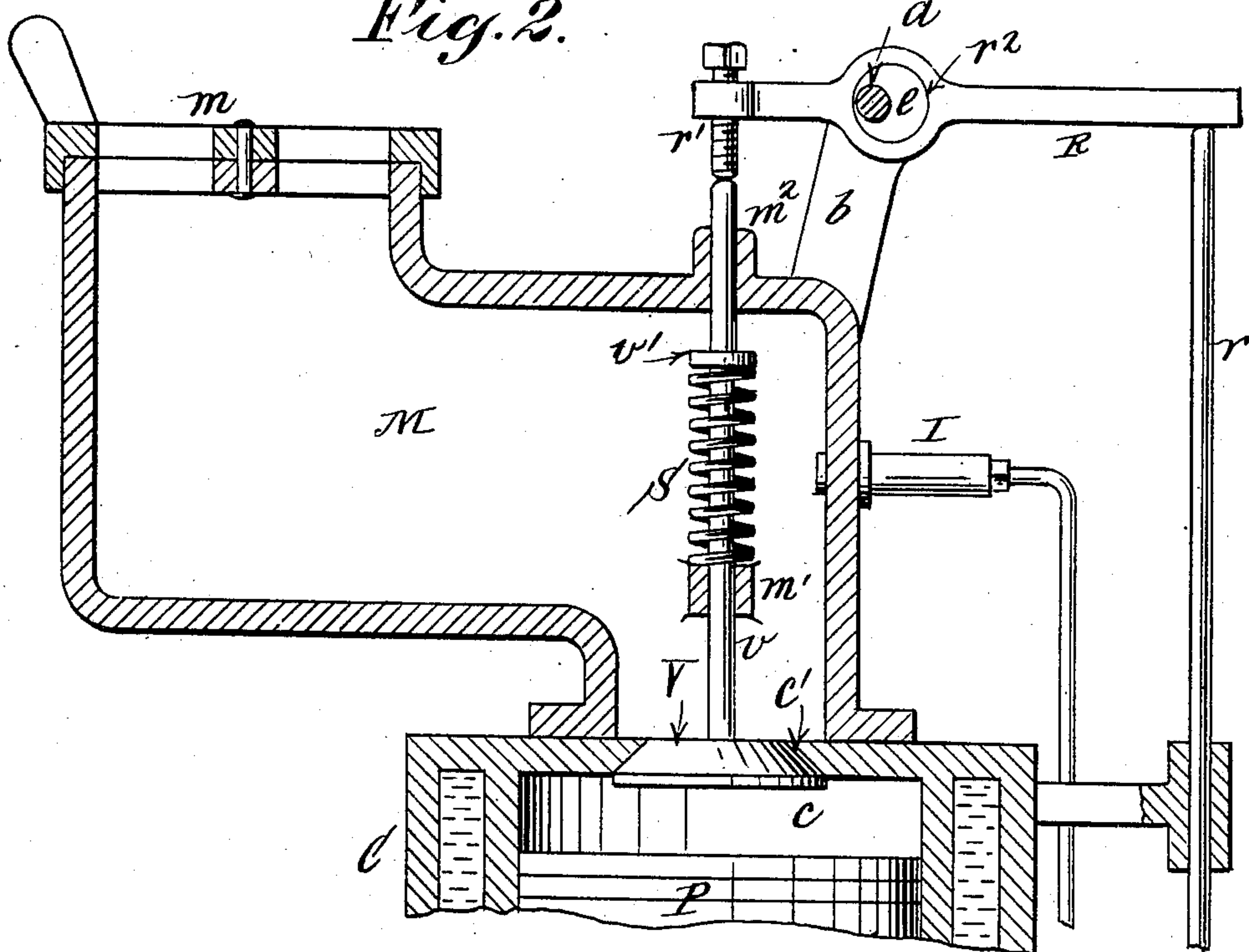
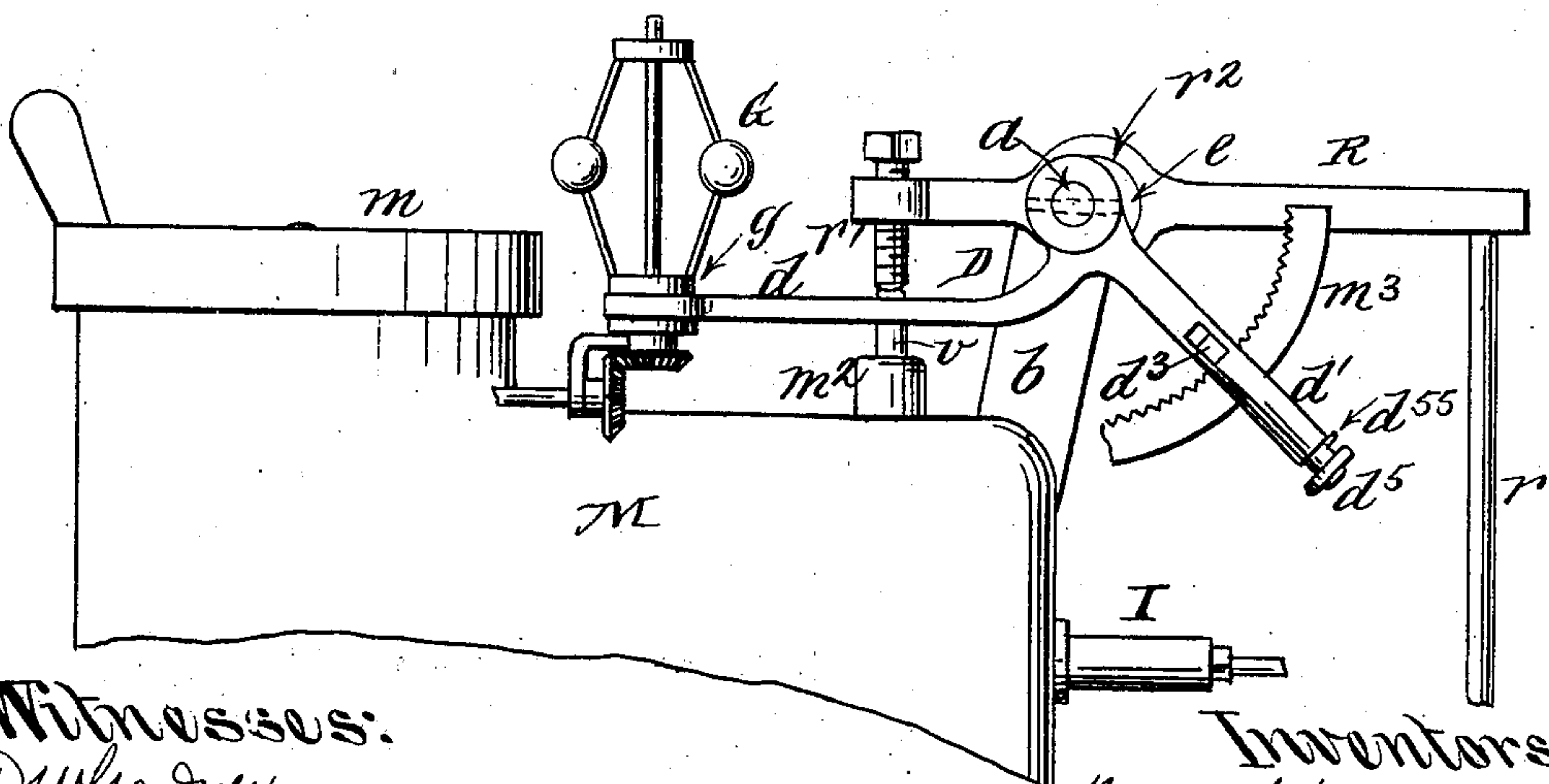


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## HYDROCARBON-MOTOR.

No. 903,772.

Specification of Letters Patent.

Patented Nov. 10, 1908.

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*To all whom it may concern:*

Be it known that we, HERMAN G. W. REICHENBACH, of the city of New York, borough of Brooklyn, county of Kings, and State of New York, ABBOT AUGUSTUS LOW, of Horseshoe, St. Lawrence county, State of New York, and AUGUST WASSMANN, of Halletts Point, Astoria, Queens county, State of New York, citizens of the United States, have invented certain new and useful Improvements in Hydrocarbon-Motors, of which the following is a specification.

Our improvements relate to means for regulating the power and speed of hydrocarbon motors by the adjustment of the stroke or area of opening of the inlet valve which controls communication between the mixing chamber and the combustion chamber substantially as hereinafter set forth, the invention consisting in the arrangement and construction of parts herein described and claimed specifically.

In the accompanying drawings, Figure 1, is a plan of a plurality or gang of cylinders and connections arranged to work in conjunction with each other in a manner well known in the state of the art; Fig. 2, is a sectional elevation taken upon an enlarged scale upon plane of line 2—2, Fig. 1; Fig. 3, is a partial end elevation showing a means for controlling the position of the eccentric shaft; Fig. 4, is a sectional elevation of the outer end of the locking lever; Fig. 5, is an elevation of the outer end of the locking lever.

It is to be understood that our invention is applicable to a hydro carbon motor having one or more operating cylinders C of any suitable type.

The cylinders C shown in the drawings are provided with the mixing chambers M, between which and the combustion chambers  $c$ , is situated the inlet Valve V,—the combustion chamber  $c$ , consisting in the present case of the space between the piston P and the cylinder C.  $m$ , is a damper for regulating the admission of air to the mixing chamber, and I, the usual injector through which the hydro carbon is introduced under pressure to the mixing chamber.

The inlet valve V, is formed with a stem  $v$ , provided with the guides  $m'$ , and  $m^2$ , and it is also provided with a collar  $v$ , between which and the guide  $m'$ , is interposed a coil spring S, which tends constantly to hold

the valve V, to its seat  $c'$ , in the head of the cylinder C. The valve V and rod  $v$ , are depressed against the action of the spring S, through the medium of a rock lever R, actuated by a rod  $r$ , controlled by a cam shaft in the usual manner,—the inner end of said rock lever R, being provided with an adjustable contact  $r'$ , for engagement with the upper end of the valve rod as indicated clearly in Fig. 2. The above description applies to each cylinder used.

$a$ , is a fulcrum shaft upon which the rock levers R, vibrate. This shaft is mounted in the upper ends of rigid brackets  $b$ , projecting from the mixing chamber M, or other stationary part of the apparatus. Rigidly secured to the shaft  $a$ , are eccentrics  $e$ , one for each motor cylinder used. These eccentrics  $e$ , are situated preferably between adjoining brackets  $b$ ,  $b$ , thereby holding the shaft against longitudinal motion, or any other mechanical expedient may be resorted to, to accomplish this latter end. The eccentrics  $e$ , are used as the axial fulcrums for the rock levers R, which are formed with the annular bearings  $r^2$ , fitting over the peripheries of said eccentrics  $e$ , as will be seen more particularly in Fig. 2.

In practice the stroke or opening of the inlet valve V, for the admission of the charge of mingled air and vaporized hydro carbon into the combustion chamber  $c$ , is very slight, not usually exceeding one half inch, so that delicacy of adjustment of stroke is desirable where the valve is used as a means of varying and controlling the speed of the engine, hence our use of the eccentrics  $e$ , as fulcrums for the rock levers R, since it is obvious that by turning the shaft  $a$ , upon its longitudinal axis the effective stroke of the rock levers may be varied with accuracy and delicacy without changing or adjusting the contacts  $r'$ . This adjustment axially of the shaft  $a$ , is effected by means of a controlling lever D, rigidly secured to the fulcrum shaft  $a$ , and this controlling lever D, may be actuated either automatically or positively as may be found most expedient. To this end the inner arm  $d$ , of said controlling lever D, is made to engage with the slide  $g$ , of a governor G which may be of any desired form of construction and actuated by the motor in any manner well known in the art. The other arm  $d'$ , of the controlling lever is provided with a locking device by which the



fulcrum shaft *a*, may be set and secured rigidly in any desired position when it is found expedient to do so, in which case of course the governor *G*, is thrown out of engagement 5 with the motor.

As shown in the drawings this positive locking device consists of a dog *d*<sup>3</sup>, for engagement with the segmental rack *m*<sup>3</sup>, the teeth of which are concentric to the longitudinal axis of the fulcrum shaft *a*. The 10 dog *d*<sup>3</sup>, is attached to the end of a rod *d*<sup>4</sup>, to the outer end of which is swiveled a sleeve *d*<sup>5</sup>. Interposed between the inner end of this swiveled sleeve and a bearing *d*<sup>6</sup>, through 15 which the rod *d*<sup>4</sup>, passes is a coiled spring *d*<sup>7</sup>, which thus tends constantly to throw and hold the dog in engagement with the teeth of the segmental rack. In order to hold the 20 dog *d*<sup>3</sup>, out of engagement with the rack against the resistance of the spring *d*<sup>7</sup>, the swiveled sleeve *d*<sup>5</sup>, is provided with a stud or shoulder *d*<sup>55</sup>, which may be turned into engagement with a shoulder *d*<sup>56</sup>, upon the end of the arm *d*<sup>4</sup>, as indicated in Fig. 5.

25 It will be seen that by our special arrangement of parts the stroke of the inlet valve may be set positively to a prescribed extent; or it may be regulated automatically by the

speed of the motor acting through the medium of the governor. Furthermore the use 30 of the eccentric fulcrums afford a delicacy of adjustment which is of great particular advantage.

What we claim as our invention and desire to secure by Letters Patent is—

In a motor of the character designated, 35 the combination of an inlet valve, a rock lever arranged to actuate said inlet valve, an eccentric fulcrum on which said rock lever is mounted, means for actuating said 40 rock lever, a controlling lever rigidly connected with said eccentric fulcrum, a centrifugal governor arranged to actuate said controlling lever, a locking arm rigidly 45 connected with said eccentric bearing, a spring dog on said locking arm, arranged to engage with a segmental rack, said segmental rack and means for holding said spring dog out of contact with said segmental rack, for the purpose described.

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