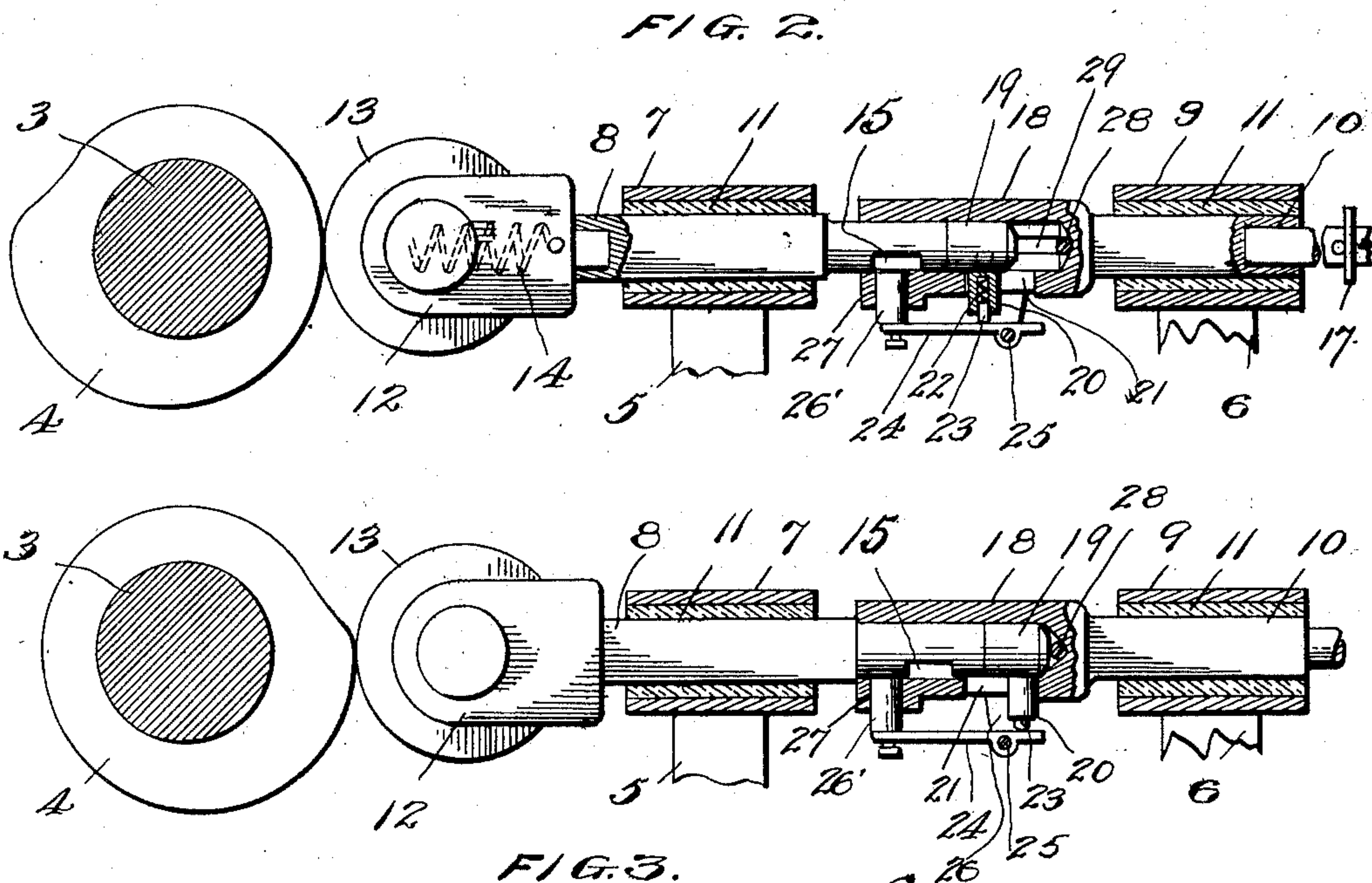
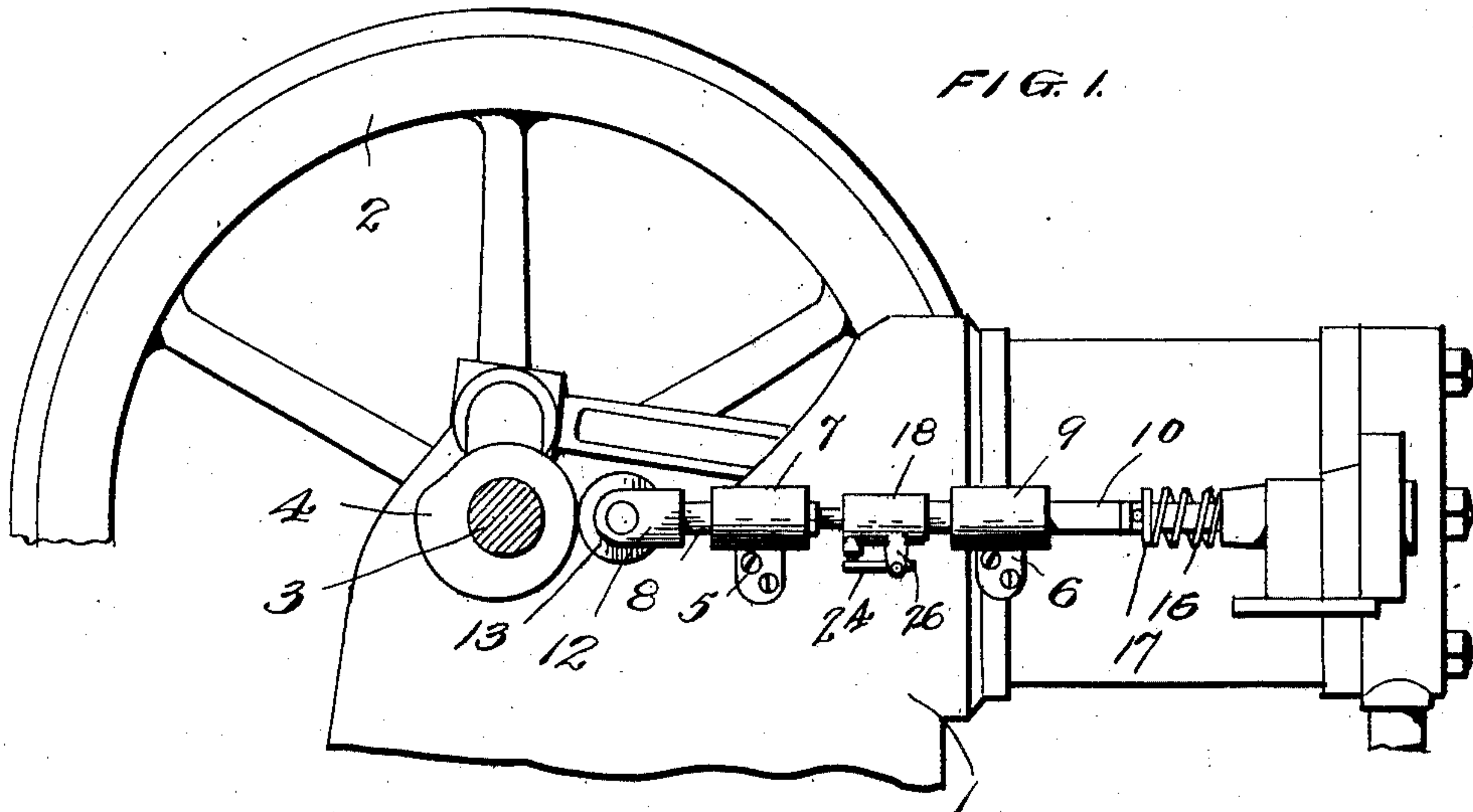


H. J. CRINER.  
EXHAUST VALVE REGULATOR.  
APPLICATION FILED DEC. 23, 1910.

998,327.

Patented July 18, 1911.



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# UNITED STATES PATENT OFFICE.

HARRY J. CRINER, OF BURLINGTON, IOWA.

## EXHAUST-VALVE REGULATOR.

998,327.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed December 23, 1910. Serial No. 599,030.

*To all whom it may concern:*

Be it known that I, HARRY J. CRINER, a citizen of the United States, residing at Burlington, in the county of Des Moines and State of Iowa, have invented certain new and useful Improvements in Exhaust-Valve Regulators, of which the following is a specification.

My invention relates to improvements in exhaust valve regulators, and has for its object the provision of an improved regulator for operating the exhaust valves of engines of the four cycle type.

To attain the desired object my invention comprises a shaft reciprocally moved by a cam on the fly wheel shaft and an abutment intermittently interposed between the reciprocating shaft and the valve stem to operate the latter, the invention residing specifically in the means for interposing said abutment to cause the parts to move together and in the novel features of construction and combination and arrangement of parts for service substantially as shown in the accompanying drawing and as hereinafter described.

Figure 1 represents a side elevation of an engine having my improved valve regulator applied thereto. Fig. 2 represents an enlarged side elevation with the operating parts shown in section showing said parts in the position they occupy at the beginning of the first cycle stroke, and, Fig. 3 is a similar view showing the position of the parts as the engine makes the fourth cycle or exhaust stroke.

In the drawings, the numeral 1 denotes the engine, having the fly wheel 2 mounted on the shaft 3 which is provided with the cam 4, while suitably secured to the engine are the brackets 5 and 6 having respectively the bearings 7 for the slide rod 8 and the bearing 9 for the valve rod 10, each of said bearings being preferably squared to receive a squared portion of the rod to prevent rotative movement thereof and having a suitable packing 11 to minimize the frictional heat.

Suitably secured to the outer end of the slide rod 8 is the yoke 12 having rotatably secured thereto the anti-friction roller 13 which is held against the cam 4 of the fly wheel shaft by the coil spring 14, while formed in the said slide rod near the other end and on the under side of the rod is the angular recess 15.

The valve rod 10 has on one end the exhaust valve, a spring 16 bearing at one end against the jacket of the engine and at the other against the abutment 17 on said rod for normally holding said valve closed, while secured on the other end of the valve rod is the sleeve 18 in which the slide rod 8 moves. Mounted in the said sleeve intermediate the slide rod and the end of the sleeve and having sliding movement therein is the slide block 19 having engaged in one side the barrel 20 which projects outward through a slot 21 in the sleeve and has mounted in it the coil spring 22 for forcing outward and resiliently supporting the pin 23, said pin bearing against the rock lever 24 pivoted by the pin 25 to the lug 26 depending from the sleeve, while secured to one end of the said lever is the abutment block 26 adapted to move in the slot or guideway 27 in the bottom of the outer end of the sleeve.

In the operation of my exhaust valve regulator, upon the first cycle stroke of the engine the slide rod is practically stationary in the position shown in Fig. 2, but on the second cycle stroke the roller 13 rides up the nose of the cam and the slide rod moves toward the exhaust valve, its end moving in the sleeve and forcing the slide block contained therein back against the stationary pin 28 which projects inward through the longitudinal slot 29 in the side of the sleeve. By reference to Fig. 3 it will be seen that when the slide block is in this position the pin 23 will bear on the end of the lever 24 on the opposite side of its pivot from that on which the abutment block 26 is located, but said block contacting with the rod 8 will be unable to move upward in its guideway. On the third cycle stroke or the explosion stroke of the engine the roller will ride off the cam nose onto the true circle portion of the cam wheel and the coil spring 14 will slide the slide rod 8 away from the cylinder, when the recess 15 in the slide rod will come into alinement with the guide-way 27 and the spring pressed pin 23 will move the lever 24 to throw the block 26 into said recess, while on the fourth cycle stroke or exhaust the sleeve and slide rod will be locked together by the abutment block 26 which will be frictionally held therebetween and the movement imparted to the slide rod by the cam will be continued in the valve rod to open the valve, the slide block being carried out in the sleeve into engagement



with the end of the slide rod by the stationary pin bearing thereagainst, as shown in Fig. 3. The pin 23 now bears against the lever 24 to throw it down to draw the abutment block out of engagement with the slide rod, but the frictional engagement between the rod, block and sleeve being sufficient to retain the block therebetween until the engine is ready for the first cycle stroke, when the parts move to the position shown in Fig. 2, the valve being closed and the block out of engagement with the slide rod, when the heretofore described operation is again repeated, the sleeve bearing a lug 30 for limiting the downward movement of the block bearing end of the lever.

From the foregoing description taken in connection with the drawings the construction and operation of my improved exhaust valve regulator will be readily understood and it will be seen that I have provided a simple, durable and efficient valve operating means for the desired purpose.

I claim:

1. The combination with the exhaust valve of an engine, of a valve rod therefor bearing a sleeve, a cam rotated by the engine, a slide rod reciprocated by the cam and having one end moving in the sleeve on the valve rod and having a recess formed in said end, the sleeve having a guideway formed therein, and an abutment moving in said guideway and intermittently moved in said guideway to engage in the recess of the slide rod to lock said rod and the sleeve to move in unison to operate the exhaust valve, said locking mechanism, consisting of a depending lug, a rock-lever operated upon by said lug, and a locking block operated by the movement of said lever to engage the slide block.

2. In an engine, an exhaust valve, a valve rod therefor provided with a sleeve, a cam rotated by the engine, a slide rod reciprocated thereby and having its end engaged in

the sleeve, a slide block mounted in the sleeve and formed with a recess near one end, a resiliently supported pin carried by said block, and a rock-lever fulcrumed to said sleeve and engaged by said pin and moved thereby for locking the slide rod and sleeve to move in unison on each exhaust stroke of the engine and for unlocking said parts on the suction stroke of the engine.

3. In an engine, the combination with the exhaust valve, of a valve rod therefor having a sleeve on its free end, said sleeve having a slot formed therein and a depending lug adjacent the slot, a lever pivoted to the lug and bearing an abutment block on one end, the sleeve having a guide-way formed therein in which said block moves, a cam rotated by the engine, a slide rod engaged and reciprocated by the cam, said rod having its end engaged in the sleeve, a slide block mounted in the sleeve and engaged by the slide rod, a resiliently mounted pin carried by said block projecting through a slot in the sleeve into engagement with the lever, the movement of the block occasioned by the slide rod causing the pin to bear upon the free end of the lever to throw the abutment block up against the slide rod, the rod having a recess formed therein to engage the abutment block on the return movement of the rod, said block locking the rod and sleeve to move together on the exhaust stroke of the engine, and means for shifting the slide block to cause the pin to engage the lever on the opposite side of the pivot to withdraw the abutment block from said locking position on the suction stroke of the engine, substantially as described.

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

HARRY J. CRINER.

Witnesses:

H. M. GITTINGS,  
JOHN LEIGHT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."