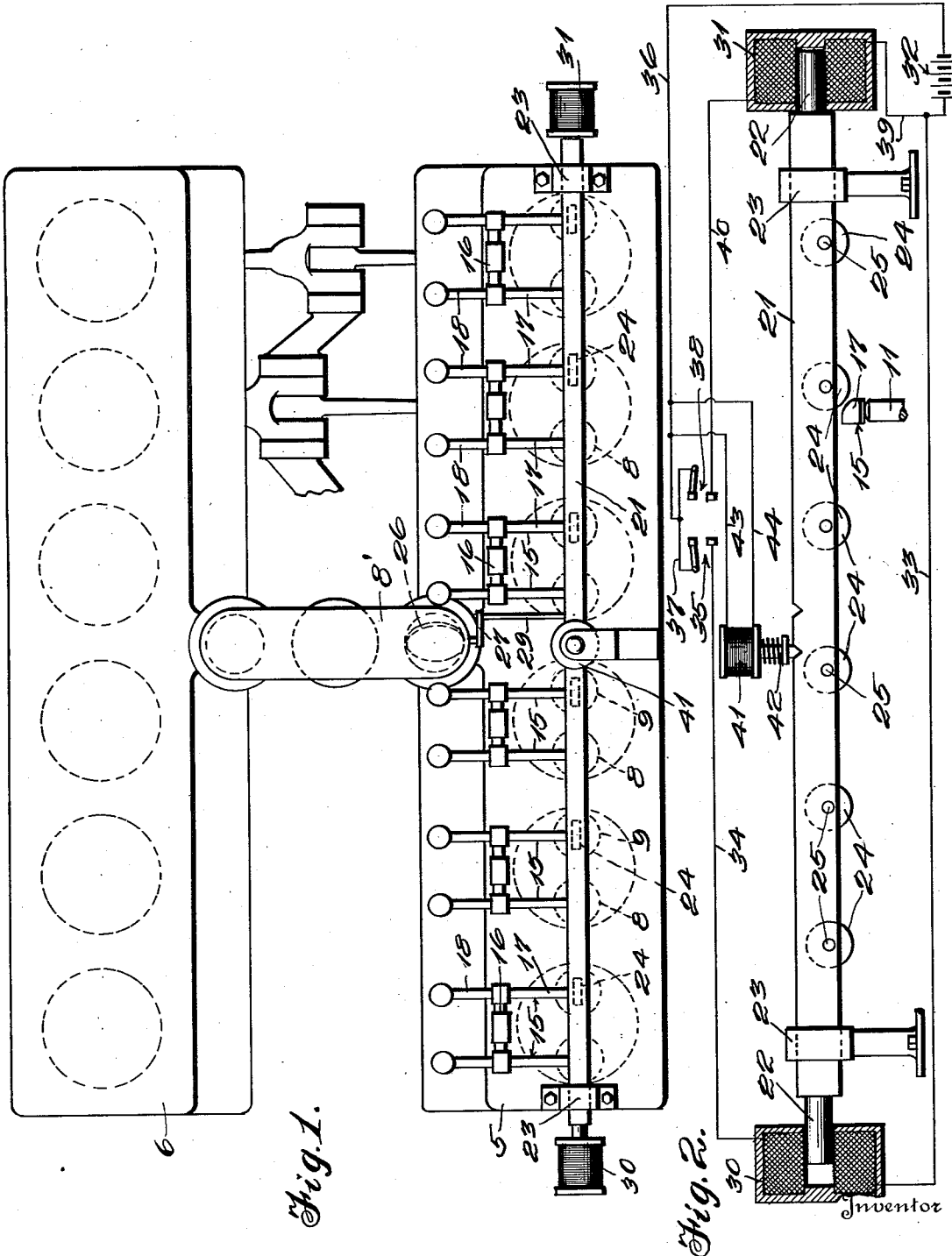


1,201,055.



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E. L. JONES.
 MULTIPLE CYLINDER MOTOR.
 APPLICATION FILED MAY 4, 1916.

1,201,055.

Patented Oct. 10, 1916.
 2 SHEETS—SHEET 2.

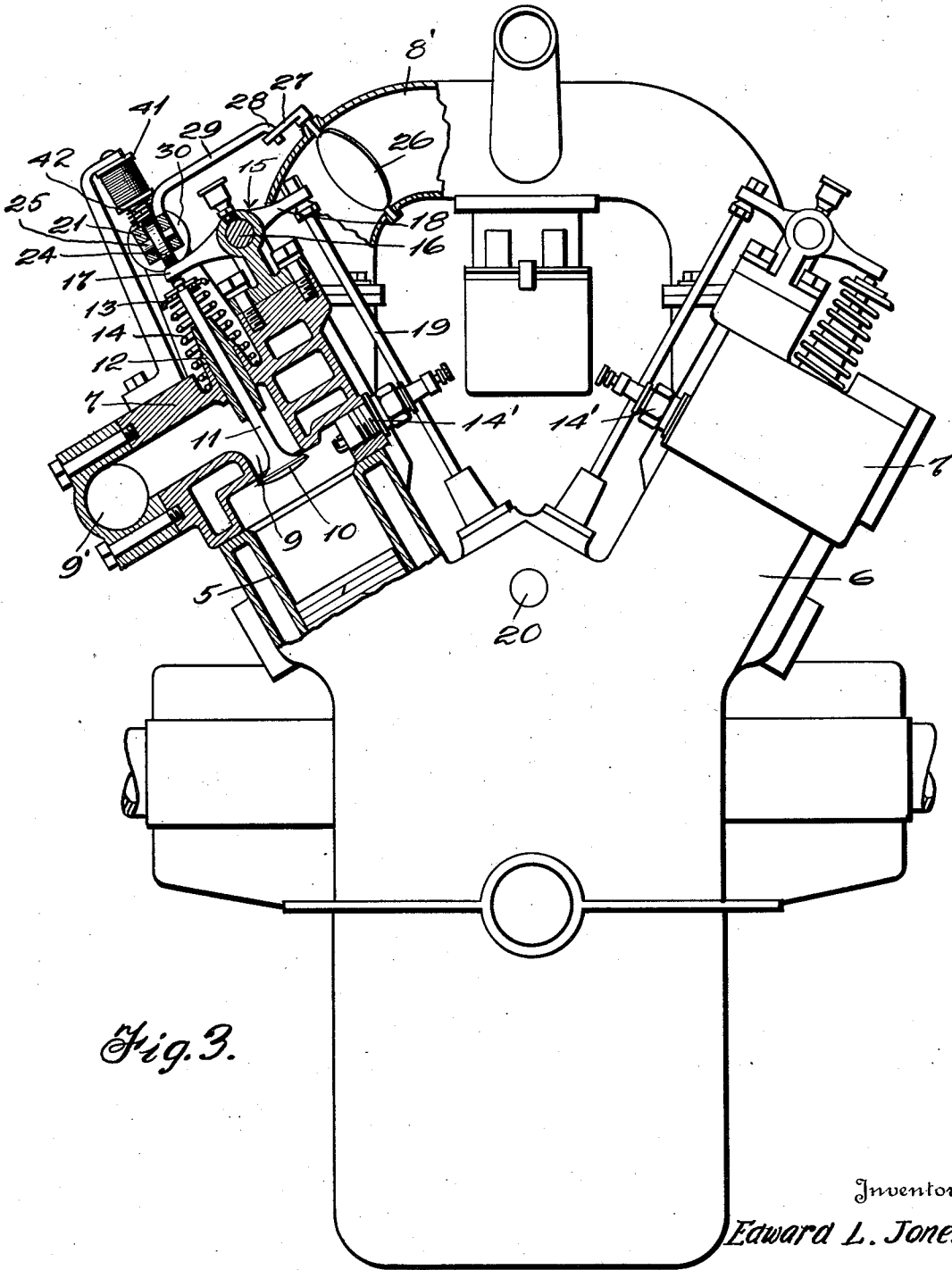


Fig. 3.

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UNITED STATES PATENT OFFICE.

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MULTIPLE-CYLINDER MOTOR.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EDWARD L. JONES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Multiple-Cylinder Motors, of which the following is a specification.

My invention relates to improvements in internal combustion engines of the multiple cylinder type and particularly to an engine of this character provided with means to control the number of cylinders used therein and thereby control its thermal efficiency.

In an internal combustion motor for driving automobiles, it is desirable and important to have great power for quick acceleration and hill climbing. When an automobile is traveling on a level, or on a road with a slight grade, very little power is required. During this period of time, which is a large percentage of the driving time, the large motor which is necessary for the quick acceleration and hill climbing, is working very inefficiently due to the light load under which it is operating.

The purpose of this invention is to provide means to control, from the driver's seat, a number of the cylinders of a multiple cylinder motor, so that all the cylinders may be used when great power is required and a fewer number of cylinders when a smaller amount of power is required. With such means the motor is found to work at a high efficiency with a light load, resulting in marked economy in the consumption of fuel. It is found from practical experience with a twelve-cylinder motor, and particularly a motor of the double six V-type, that when six cylinders only are used, the motor is practically free of vibration and that when only a relatively small proportion of the total horse-power is required, marked economy is obtained by using only six of the cylinders.

Other objects and advantages of the invention will be apparent during the course of the following description.

Referring to the drawings wherein is illustrated a preferred embodiment of my invention, Figure 1 is a partly diagrammatic plan view of a twelve cylinder motor, showing my invention applied thereto, Fig. 2 is a side elevation of an electrically actuated operating rod and circuits associated there-

with, and, Fig. 3 is a top view of the motor, parts being shown in vertical section, for the purpose of illustration.

Referring to the drawing, wherein like numerals are employed to designate like parts throughout the same, the numerals 5 and 6 designate the cylinders of the motor. This motor is preferably of the double six V-type, as clearly shown in Fig. 3, the cylinders and associated elements being the same on both sides. A detailed description of one will therefore suffice for both as my invention is only applied to one side or group of cylinders.

The numeral 7 designates the head of the motor having the usual inlet and exhaust ports 8 and 9, having communication with inlet and exhaust manifolds 8' and 9', as is customary. As shown in Fig. 3, the exhaust port 9 is adapted to be covered and uncovered by a valve 10, having a valve stem 11, operating through a bearing 12, fitted within the head 7. The valve stem 11, carries a washer or cap 13 at its outer end, and a spring 14 bears between this cap and the head 7, for the purpose of automatically closing the valve 10 when pressure is removed therefrom. 14' designates the usual spark plug for firing the charge in the cylinder.

The numeral 15 designates a rocker arm of the usual valve operating mechanism. This rocker arm is pivoted between its ends as shown at 16, and embodies arms 17 and 18. As shown in Fig. 1 there are two of these rocker arms, for each cylinder, each operating upon the same fulcrum or pivot, but it is to be understood that my invention is adapted to operate with the exhaust valve arm only. The numeral 19 designates a reciprocatory actuating rod for the rocker arms. This rod is operated by the usual cam shaft 20, not shown in detail herein.

The numeral 21 designates an operating rod, having reduced ends 22 and adapted to slide through bearings 23 rigidly fastened to the head 7. Journaled within openings formed in the rod 21 are rollers 24 carried upon short stub shafts 25. These rollers are adapted to contact with and depress the rocker arms 15 when the rod 21 is shifted longitudinally. In this particular construction there are six rollers, corresponding to the six exhaust valves.

Means are employed to cut off the flow of

the explosive mixture or charge when it is desired to run on only six cylinders, comprising a butter-fly valve 26 arranged within the intake manifold and having its pivot element extending beyond the side thereof. Rigidly connected with this pivot element is a short crank 27 having its arm slotted, and adapted to receive a depending finger 28, carried by an arm 29. This arm 29 is rigidly connected with the rod 21 to move therewith.

It will be apparent from the description thus far given that when the rod 21 is shifted longitudinally of the engine the rollers will come in contact with and depress the rocker arm 15 and thereby unseat the valve 10 and allow the exhaust port to be in free communication with the atmosphere. At the same time the rod 21 is shifted the finger 28 of the arm 29 will swing the crank 27, thereby operating the valve 26 and closing the intake passage 8'.

Electrically actuated means are employed to move the rod 21, comprising solenoid magnets 30 and 31, receiving therein the reduced extensions 22 of the rod 21. These reduced extensions are in the form of soft iron cores to be attracted by and drawn into the magnets 30 and 31. The magnets 31 and 32 are energized from any suitable source of current such as a storage battery 32. The magnet 30 is connected to one pole of the source of current by a wire 33. A wire 34 leads from the magnet 30 to one point of a switch 35.

The numeral 36 designates a common lead or return wire having one end connected with the source of current and the opposite end connected with a short wire 37. This short wire connects the switch 35 and a second switch 38. Connected to the wire 33 is a wire 39 leading to the magnet 31. A wire 40 leads from the opposite pole of the magnet 31 to the switch 38. The switches 35 and 38 may advantageously be of the ordinary push button type. When it is desired to shift the rod 21 to depress the rocker arms the switch 35 is closed. The current then travels through wire 33, magnet 30, wire 34, switch 35, wire 37, and back to the opposite pole of the source of current. When it is desired to again shift the rod 21 to its normal position the switch 38 is closed causing current to flow from one pole of the source of current through wire 39, magnet 31, wire 40, switch 38, wire 37, and back to the opposite pole of the source of current.

Means are employed to prevent the accidental shifting of the rod 21, when in either position, comprising a magnet 41, carrying an armature 42 in the shape of a latch. The end of this latch is adapted to catch in V-

shaped notches formed in the rod 21 and retain it in either the operative or inoperative positions. A spring surrounds the latch 42 and serves to force it into engagement with the rod 21 when the magnet 41 is not energized. The magnet 41 is connected by wires 43 and 44 with the wire 36 as shown, the magnet being arranged in the common return wire so that the latch 42 will be withdrawn from the notch in the rod 21 with which it is engaged when either switch 35 or switch 38 is closed.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. In combination with a multiple cylinder motor comprising inlet and outlet valves, of a reciprocatory rod, rollers carried by said rod and adapted to depress the exhaust valves of a selected number of cylinders, a valve connected in the intake pipe of the motor and adapted to throttle the supply of fuel to said selected cylinders, an arm carried by the reciprocatory rod for actuating said valve when the rod is shifted to the operative position, solenoids arranged at the ends of the rod and adapted to move it in opposite directions, and means to alternately energize the solenoids.

2. In combination with a multiple cylinder motor comprising inlet and exhaust valves, of a reciprocatory rod, rollers carried by said rod and adapted to depress the exhaust valves of a selected number of cylinders, a butter-fly valve arranged within the intake pipe and adapted to throttle the said selected cylinders, an arm carried by the reciprocatory rod for actuating the said butter-fly valve when the rod is shifted to the operative position; solenoids arranged at either end of the reciprocatory rod and adapted to move it in either direction at will, an electrically controlled latch to hold the rod in either of its positions, and means to release the latch when either of the said solenoids are energized.

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

EDWARD L. JONES.

Witnesses:

H. ARTHUR,

E. J. BRADLEY.