

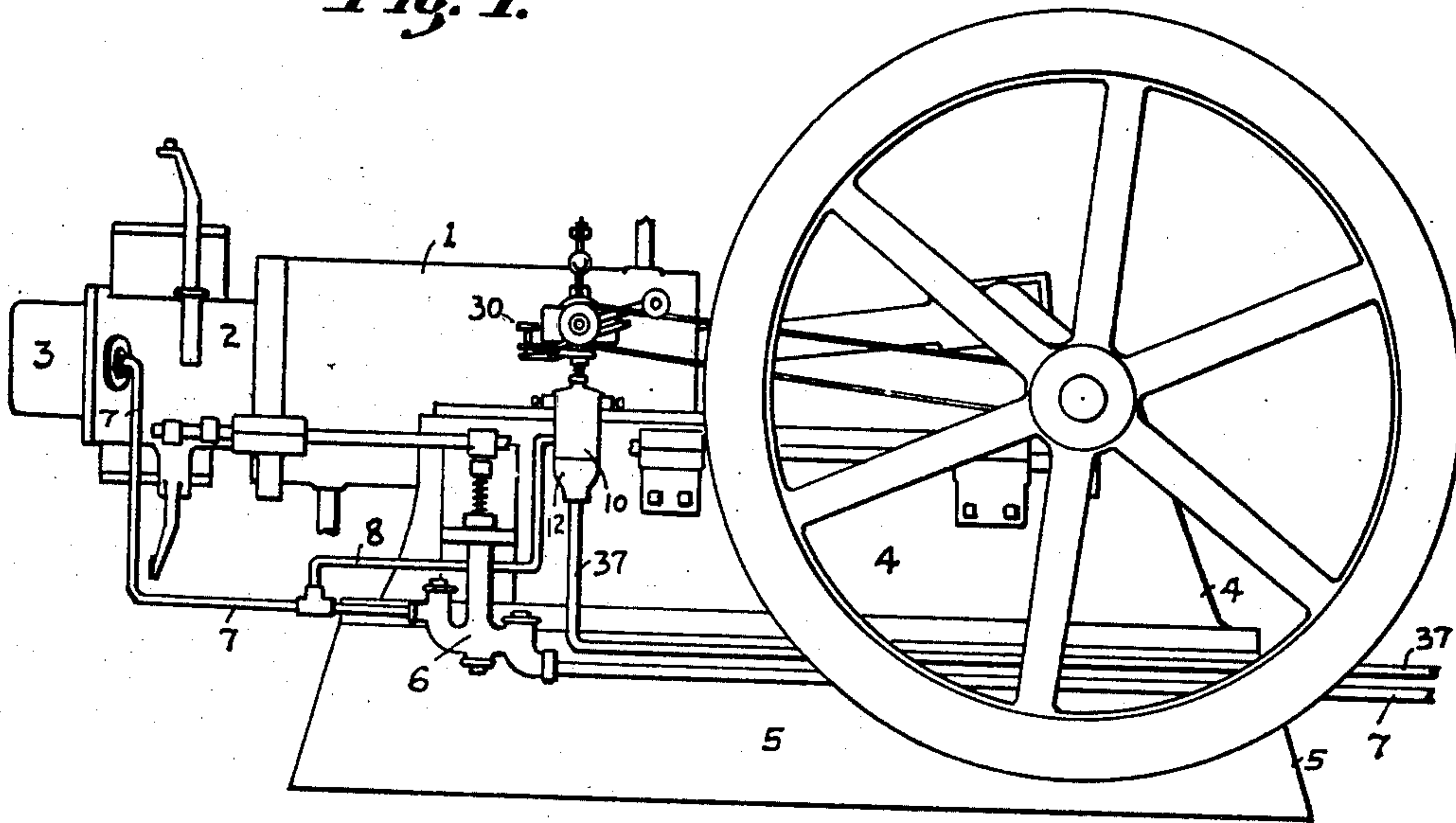
P. M. ALLMON.  
INTERNAL COMBUSTION ENGINE.  
APPLICATION FILED AUG. 1, 1907.

976,770.

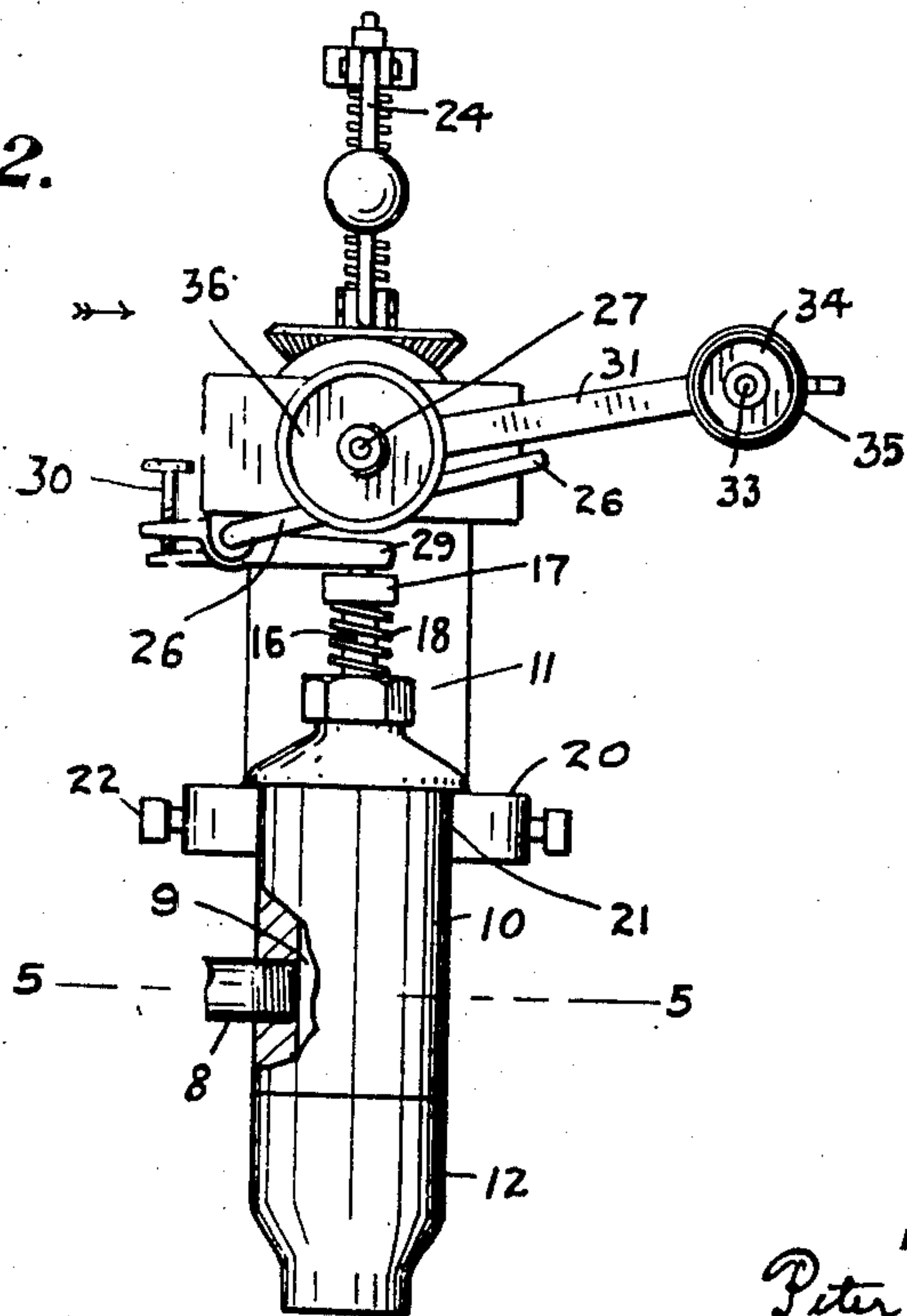
Patented Nov. 22, 1910.

2 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*



WITNESSES:

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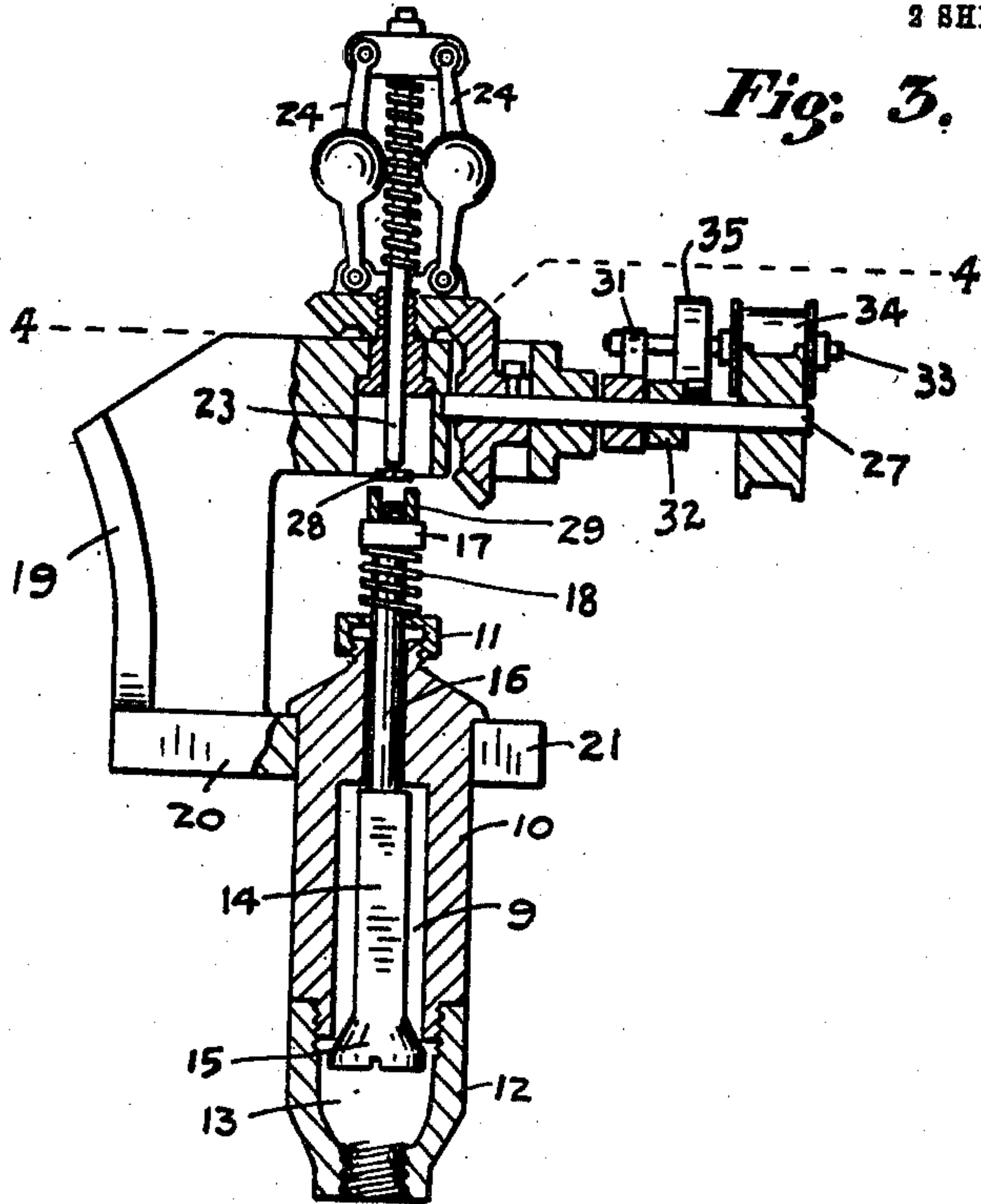
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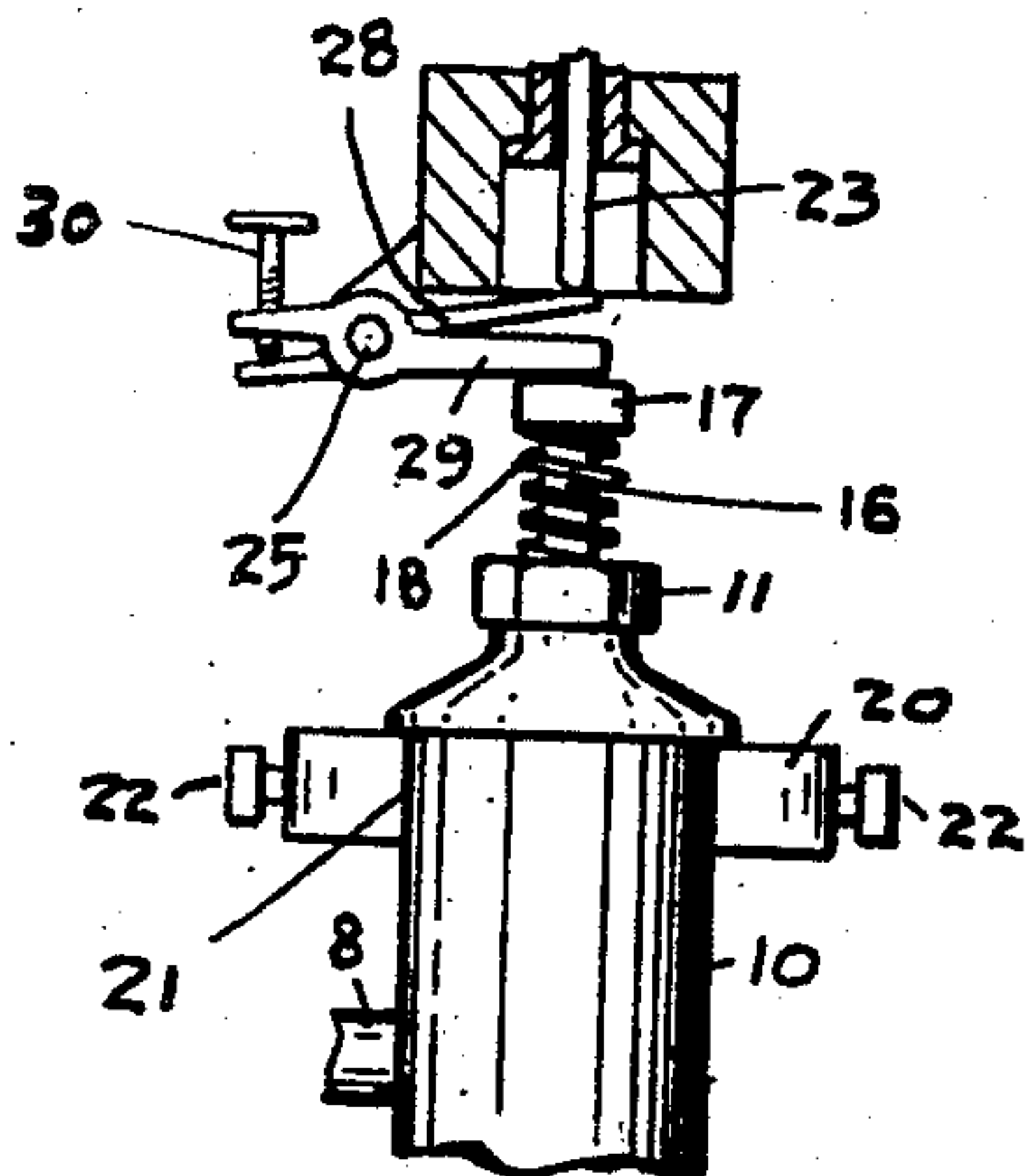
Patented Nov. 22, 1910.

2 SHEETS—SHEET 2.

*Fig. 3.*



*Fig. 6.*





# UNITED STATES PATENT OFFICE.

PETER M. ALLMON, OF PARKER, INDIANA.

INTERNAL-COMBUSTION ENGINE.

976,770.

Specification of Letters Patent.

Patented Nov. 22, 1910.

Application filed August 1, 1907. Serial No. 386,672.

To all whom it may concern:

Be it known that I, PETER M. ALLMON, a citizen of the United States, and residing at Parker, in the county of Randolph, State of Indiana, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

My invention relates to improvements in internal-combustion engines wherein the fuel such as kerosene, or an unrefined oil, is introduced into the engine by means of a pump and wherein a release device or valve in the supply pipe between the pump and the discharge-end, is employed as a means to regulate the amount of oil that is injected into the engine.

Objects of my invention are to provide a by-pass valve and mechanism adapted to be controlled by a speed governor which will be certain and reliable in operation, simple and economical in construction and which will be durable and not liable to get out of order or repair. These and other objects which will become apparent as the specification of my invention proceeds, are accomplished by the mechanism hereinafter specified, defined in the claims, and illustrated in the accompanying drawings, wherein similar characters of reference refer to corresponding parts throughout the several views, in which—

Figure 1 is a side view of an internal combustion engine wherein my invention is embodied. Fig. 2 is an enlarged side view and Fig. 3 is an enlarged transverse sectional view of the governor mechanism and by-pass valve removed. Fig. 4 is a horizontal sectional view taken on the line 4—4 Fig. 3. Fig. 5 is a horizontal sectional view taken on the line 5—5 Fig. 2. Fig. 6 is a vertical sectional view taken on the line 6—6 Fig. 4.

My invention is shown in operative position on an internal combustion engine of the type hereinbefore referred to, and as illustrated in Fig. 1. The cylinder 1 is provided with the usual vaporizer-chest 2 and the ignition-box 3, and is secured to the bed frame 4 that is bolted to the foundation 5.

Leading through the pump 6 and into the vaporizer-chest 2 at its end distant from the cylinder and in a direction disposed toward the ignition box 3 is the supply-pipe 7. The pump is suitably supported in position as

shown and is of such construction, and is actuated by the engine in such manner that the fuel oil is propelled through the supply pipe 7 and injected into the vaporizer-chest. 60

By reason of the ever varying performance required of the engine and also of the varying quality and character of the oil used the effectual and economical performance of the engine cannot be obtained by the injection into it of the certain predetermined quota of oil propelled as aforesaid by the pump. To accomplish the perfect regulation of the amount of oil so pumped which shall properly be permitted to pass into the vaporizer-chest, is one of the chief objects of this invention. 70

Connected to the supply-pipe 7 at a point between the pump and the entrance of the vaporizer-chest is the overflow-pipe 8, which is turned upwardly and secured to and leads into the vertical central cylindrical chamber 9 of the by-pass valve which consists of a cylindrical body 10 provided with the stuffing-box 11 and having its lower portion shouldered and threaded to receive the threaded bottom portion 12 having the recess 13 of diameter suitably larger than that of chamber 9 so that the plunger 14 that has the enlarged conically shaped head 15 moves freely therein and about which there may be ample space for the passage of the oil which will enter the chamber 9. The main portion of the plunger 14 is prismatic in cross section as shown in Fig. 5, the purpose of which is to present the minimum amount of resistance to the oil that will flow through the chamber 9 as will be presently referred to. The stem 16 of the plunger is retained slidingly in position, is circular in cross section, shouldered at its upper end and provided with the nut 17 against which nut and the cap of the stuffing-box 11 the coil-spring 18 impinges and thereby sustains the plunger in uppermost position so that the head 15 accurately closes the lower end of the vertical chamber 9. Disposed in proper position to be belted to the main shaft of the engine is a centrifugal governor supported on the frame 19 adapted to be bolted to the cylinder. The extended plate 20 of the frame is provided with the slotted opening 21 to receive and wherein the by-pass valve may be held in immovable position by tightening the set-screws 22 as shown in Fig. 3, Fig. 5, and Fig. 6. 110

The governor which I have employed in



this embodiment of my invention is supported on the upper arm of the frame 19 and is so disposed that the stem 23 which is actuated by the centrifugal levers 24 will be immediately above the stem of the plunger 14. Pivoted in suitable bearings formed integrally upon said arm is the transverse shaft 25 turned at a right angle so that its free end 26 will extend angularly and underneath the shaft 27. Secured and retained in position on the shaft 25 are the bars 28 and 29, the latter being rigidly secured on the shaft 25 and vertically bifurcated and adapted to loosely engage the stem of the plunger 14 and bear against the nut 17 secured thereon. The bar 28 is movably secured on the shaft 25, is flat in cross section and adapted to engage the lower end of the stem 23. The extended rear ends provided on these bars 28 and 29 are so formed as to register with each other and are connected adjustably by the set-screw 30 whereby the vertical distance apart of the forward ends of these bars 28 and 29 may be varied. By this construction and combination of parts the tension at which the valve will operate may be easily varied so that oil of varied density or consistency may be effectively handled. There will be no lost motion between the governor stem and the valve; and the valve will respond quickly and positively to the action of the governor. Further advantages are that slight resistance is presented to the oil that enters the valve, and such wear as there may be at the head 15 will be uniform and the effectiveness of the valve will not be impaired in the least. Very light packing in the stuffing-box 11 is necessary as the function thereof is merely to prevent possible overflow of oil about the stem of the plunger, which is fitted, as shown in Fig. 3 to move freely in the bore provided therefor.

31 designates an arm loosely journaled on the shaft 27 and sustained in position by the collar 32, the lug 31<sup>a</sup> is provided on this arm and is so positioned as to be above the extended end 26 of the shaft 25. The arm 31 is provided with the shaft 33 bearing the loosely journaled pulley 34 which is adapted to ride idly on the governor belt. The arm 31 is suitably weighted by the weight 35 secured to the shaft 33.

36 designates a suitable pulley secured to the shaft 27 of the governor and about which pulley the belt from the main shaft of the engine is passed.

It will be understood that the engine has the usual arrangement of valves, for the intake, combustion and exhaustion, usual in engines of the type shown.

To start the engine the ignition-box 3 is heated in the usual way. The fly-wheel of the engine is then moved whereby the supply valve is opened and a charge of air is drawn

in by the suction produced by the forward movement of the piston. Coincidentally with the rearward movement of the piston a charge of oil is injected by the pump into the vaporizer-chest, which charge of oil is instantly vaporized and with the compression upon the volatilized mixture of air and vaporized oil by the rearward movement of the piston, the mixture is ignited and the piston driven forwardly and the further action of the engine proceeds in the usual manner.

In the use of the engine equipped with my invention, the operation of the invention is as follows: If a quick reduction of load being handled by the engine occurs the engine will immediately increase its speed; simultaneously with such increase of speed the governor (the parts of which are so set and adjusted that when the engine is operating normally the plunger 14 of the by-pass valve will occupy the closed position as shown in Fig. 3) will cause the plunger 14 to move downwardly thereby opening the chamber 9 which will permit the oil which is being propelled by the pump to follow the line of least resistance and which oil instead of passing into the vaporizer-chest 2 will pass through the chamber 9 and will be conveyed through the discharge pipe 37 back to the source of supply.

By this combination and arrangement of the various parts the speed of the engine will be quickly regulated and great economy of fuel is obtained.

In case of breakage of the governor belt the weight imposed upon the arm 31 will cause it to instantly descend whereby the lug 31<sup>a</sup> actuating the arm 26 will cause the bar 29 to press the plunger 14 to the extreme open position whereby the entire quota of oil being propelled by the pump 6 will be permitted to pass through the chamber 9 of the by-pass valve and into the discharge pipe 37. If it is desired to voluntarily throw the engine out of operation the arm 31 is rotated upwardly by the hand and brought down with the lug 31<sup>a</sup> against the portion of the arm 26 nearer the shaft 25, when the same actuation of the plunger 14 as above described, is effected.

What I claim as my invention and desire to secure by Letters Patent, is—

1. In an internal combustion engine of the kind described, a fuel-supply pump operated by the engine, a supply pipe leading from the pump to the engine, a governor actuated by the engine and having its stem disposed downwardly, a valve having its stem sustained yieldingly upwardly in normally closed position and adapted to be engaged by the stem of the governor, a device whereby the said governor stem and the said valve stem may be moved to and held at varied distances apart, a pipe leading from



the supply pipe and into the said valve at a point above the seat thereof.

2. In an internal combustion engine of the kind described, a fuel-supply pump operated by the engine, a supply pipe leading from the pump to the engine, a frame, a centrifugal governor mounted thereon to be actuated by the engine and having its stem disposed downwardly, a by-pass valve supported thereunder on said frame and having its stem sustained yieldingly upwardly in normally closed position and adapted to be engaged by the stem of the governor, an adjustable device supported by the said frame and capable of being operated between the said stems whereby the said stems may be moved to and held at varied distances apart, a pipe leading from the supply-pipe and into said by-pass valve at a point above the seat thereof.

3. In an apparatus for regulating internal combustion engines, the combination of a fuel-supply pump, a supply pipe leading from the pump to the engine, a pipe leading from the said supply pipe, a valve in said pipe having a stem therein to sustain this valve normally in closed position, a frame, a centrifugal governor mounted thereon and driven by a belt from the engine the governor-stem being disposed downwardly a weighted arm loosely journaled on the horizontal shaft operable by the governor having a pulley-wheel adapted to rest upon said belt and said arm being provided with the lug 31<sup>a</sup> on its side, a shaft journaled on said frame having its end 26 bent at an angle to be engaged by the said lug, a lever 29 secured to said shaft to engage the valve plunger, and a lever 28 loosely journaled on the shaft 25 having its one end to engage the governor-stem, means carried by said levers whereby the distance between same may be adjusted, substantially as described.

4. In an apparatus for regulating internal combustion engines, the combination with a fuel supply pump operated by the engine, a fuel-supply pipe leading from the pump to the engine, a pipe leading from the supply-pipe, a governor adapted to be actuated by the engine and having its stem disposed downwardly, a valve in said pipe to be con-

trolled by said governor consisting of a body having a vertical chamber provided with a stuffing-box at its top and a lateral inlet opening for the said pipe, a removable- 55 cup shaped bottom portion having its internal diameter larger than that of the said chamber and provided with an opening, a plunger of diameter smaller than that of the chamber, its lower end being flared and 60 adapted to close the bottom of the chamber and its upper end being adapted to pass through said stuffing-box and having a removable head thereon, a spring to press the plunger upwardly, substantially as de- 65 scribed.

5. In an apparatus for regulating internal combustion engines, a fuel supply pump adapted to be operated by the engine, a fuel supply-pipe leading from the pump to the 70 engine, a pipe leading from the supply pipe, a governor adapted to be actuated by the engine and having its stem disposed downwardly, a valve in said pipe that leads from the fuel supply pipe, said valve being dis- 75 posed beneath the governor and consisting of a body having a vertical cylindrical chamber provided with a stuffing-box at its top and having a lateral opening for said pipe, a removable cup-shaped bottom por- 80 tion having its internal diameter larger than that of the said chamber and provided with an opening therein, a plunger of diameter smaller than that of the chamber and being 85 prismatic in form, its lower end being conical shaped and flared to a diameter slightly larger than that of the chamber the upper end of the said plunger being adapted to pass through said stuffing-box and having a re- 90 movable head thereon, a spring between said head and the stuffing-box, to press the plunger upwardly, means to maintain the gov- ernor-stem and plunger at varied distance apart, substantially as described.

In testimony whereof I have signed my 95 name to this specification in the presence of two subscribing witnesses.

PETER M. ALLMON.

Witnesses:

ETHEL L. LISTER,  
THOMAS L. RYAN.