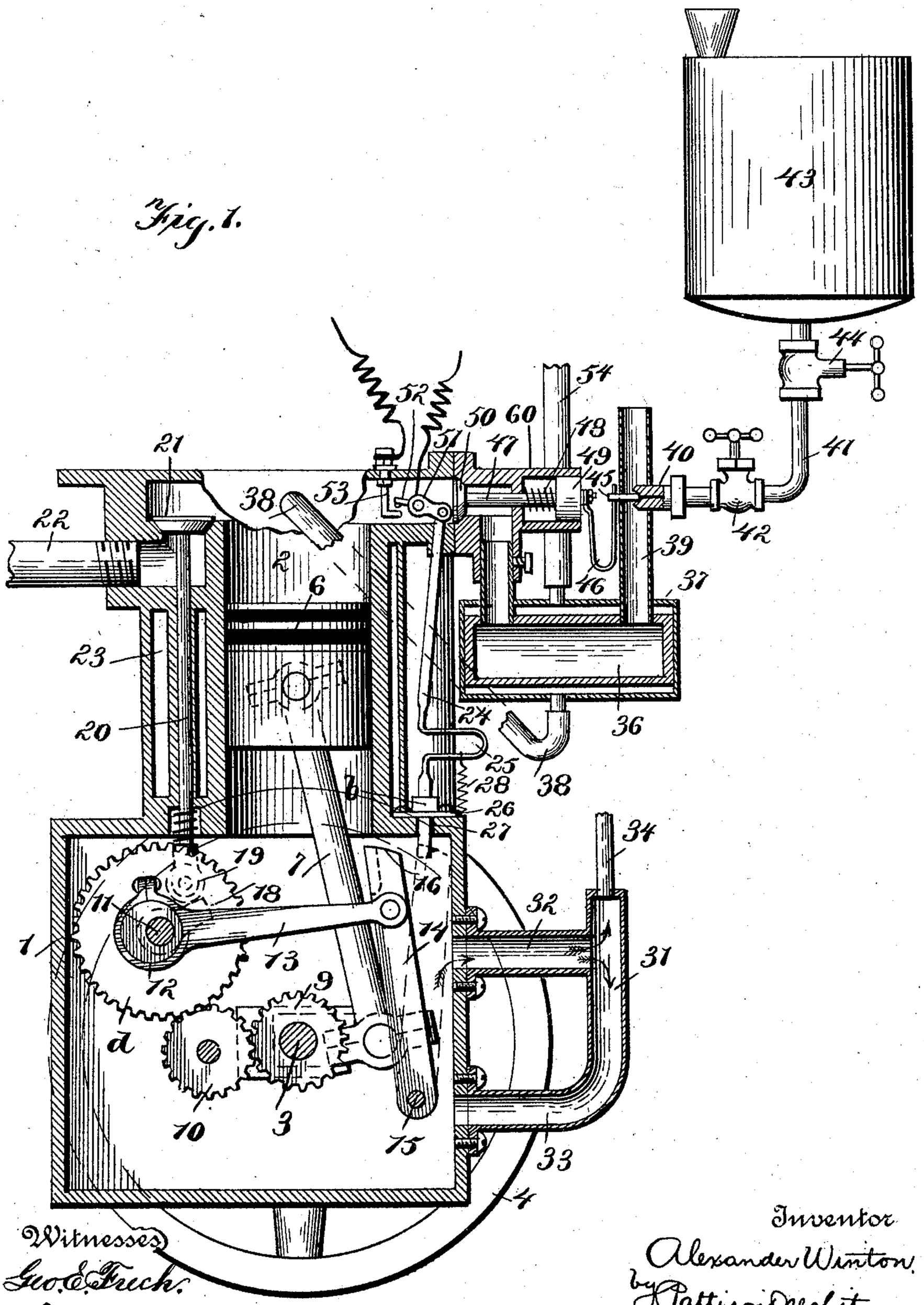
(No Model.) 4 Sheets—Sheet 1.

A. WINTON.

EXPLOSIVE ENGINE.

No. 598,832. Patented Feb. 8, 1898.

Fig. 1.



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(No Model.)

4 Sheets—Sheet 2.

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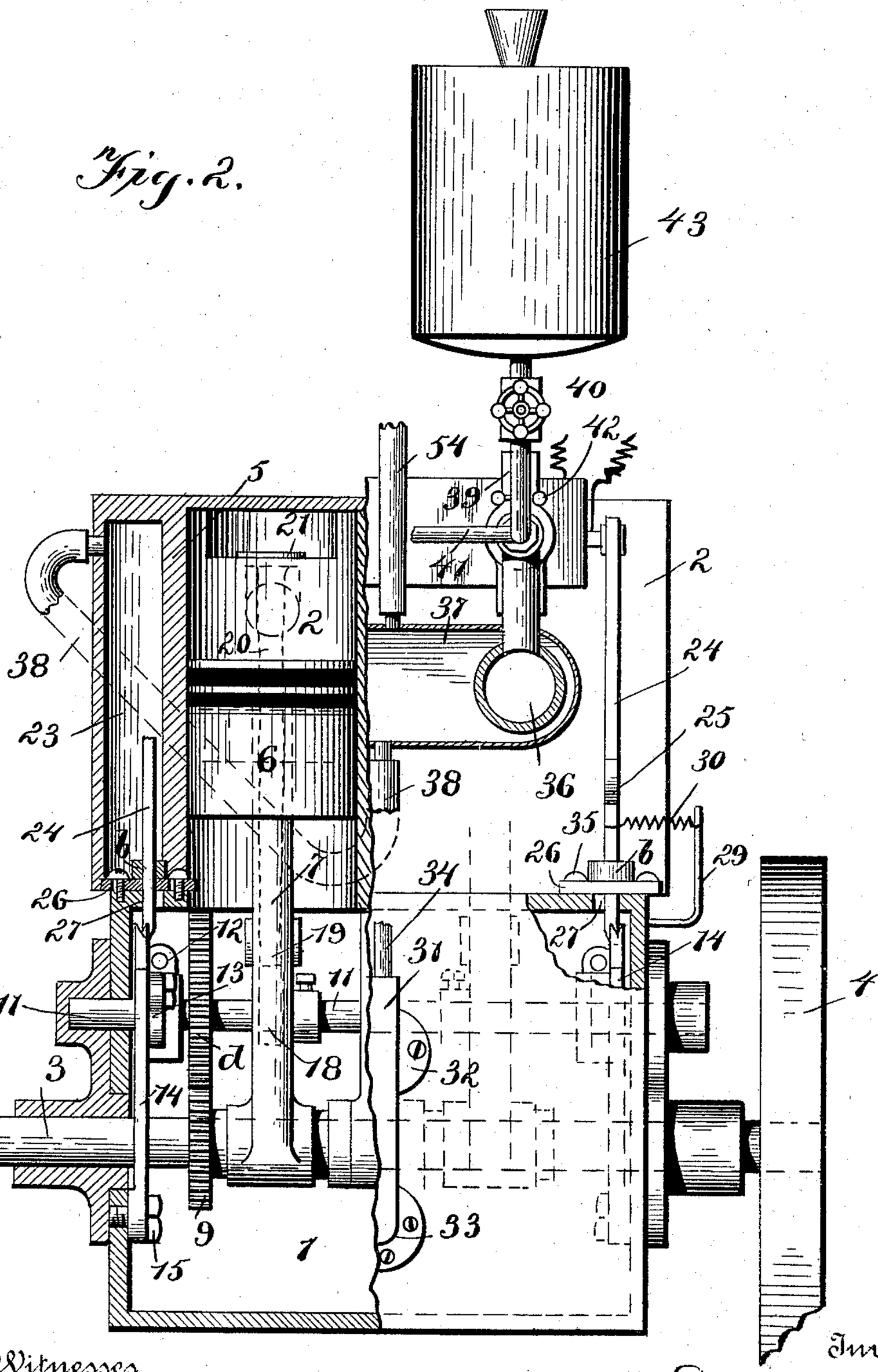
Fig. 2.



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(No Model.) 4 Sheets—Sheet 3.

A. WINTON.

EXPLOSIVE ENGINE.

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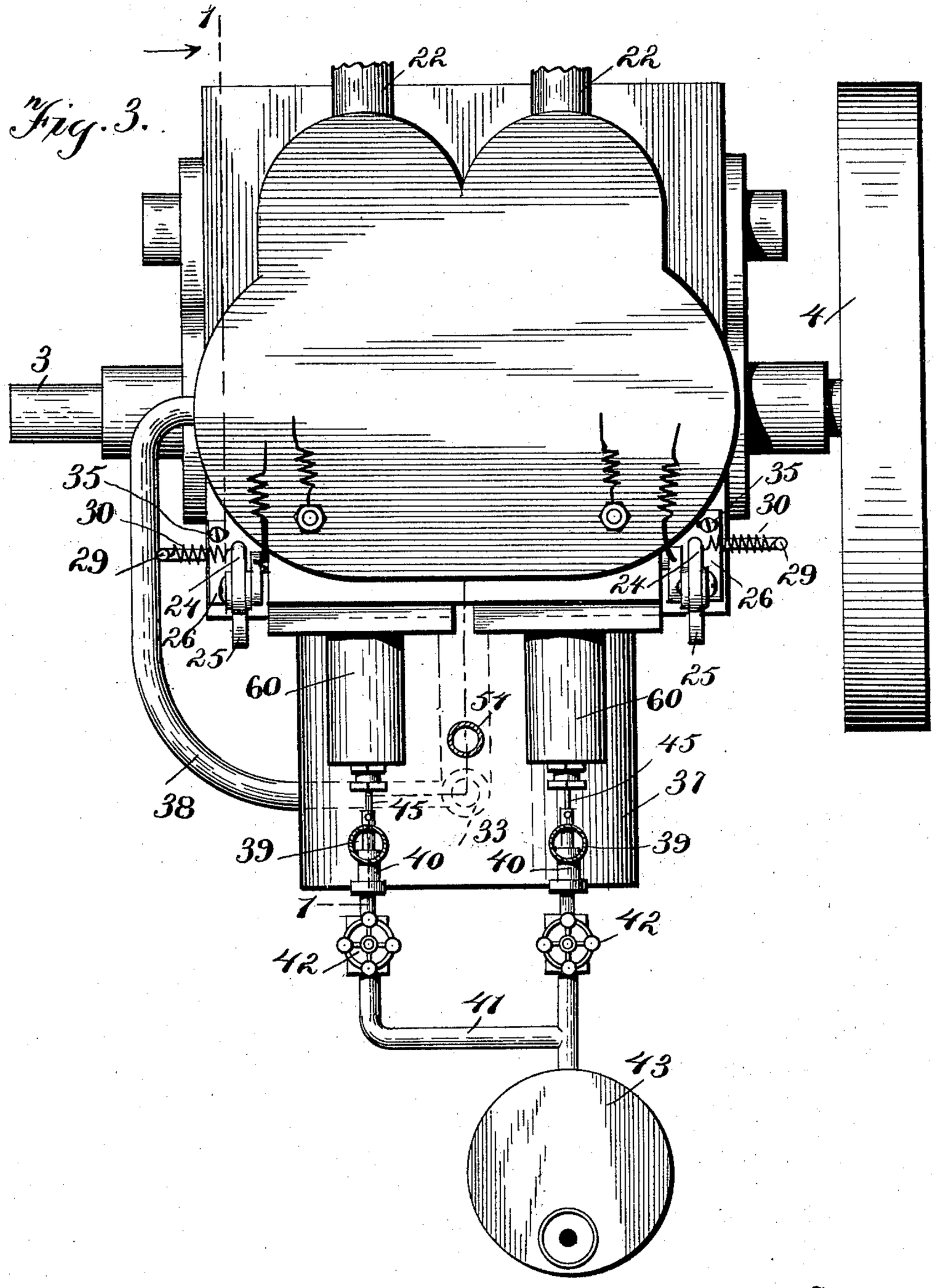
Fig. 3.



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4 Sheets—Sheet 4.

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EXPLOSIVE ENGINE.

No. 598,832. Patented Feb. 8, 1898.

Fig. 4.

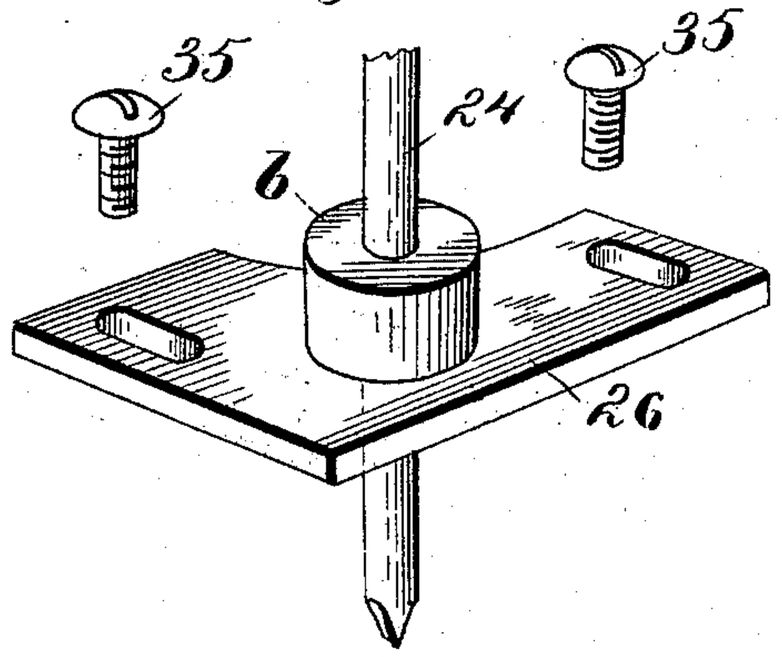


Fig. 5.

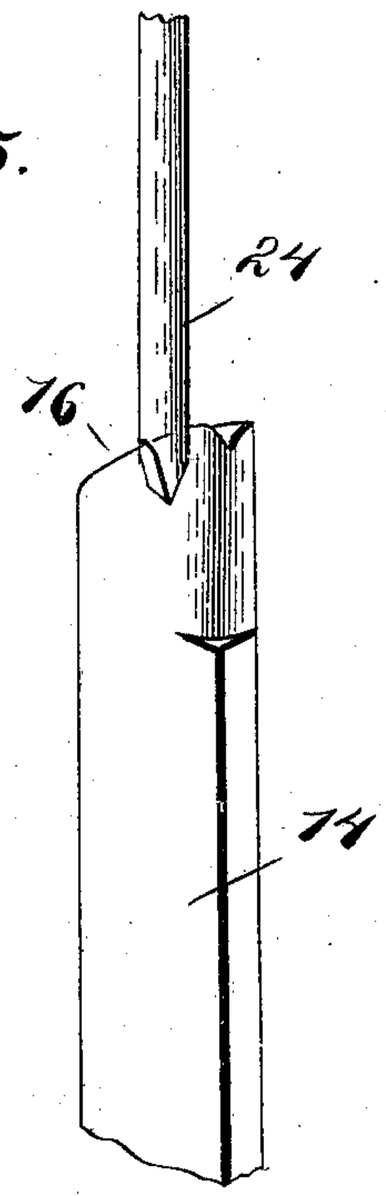
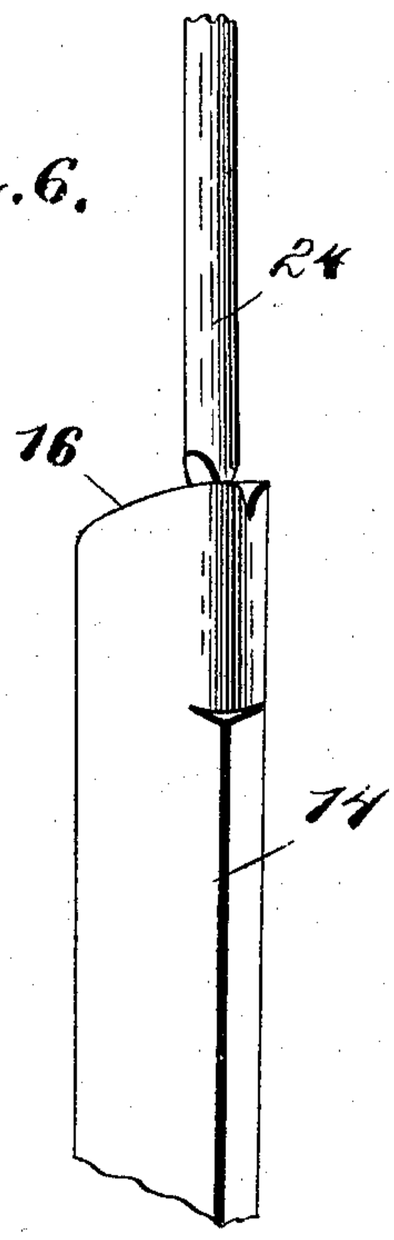


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER WINTON, OF CLEVELAND, OHIO.

EXPLOSIVE-ENGINE.

SPECIFICATION forming part of Letters Patent No. 598,832, dated February 8, 1898.

Application filed November 27, 1896. Serial No. 613,617. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WINTON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Explosive-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in explosive-engines, and pertains more particularly to that class of explosive-engines in which gasolene is used from which to generate the explosive compound.

My present improvement pertains to an improved form of electric sparker and controller for the hydrocarbon fluid and in the general assemblage and construction of the several elements which combine to produce a complete engine.

In the accompanying drawings, Figure 1 is a vertical sectional view taken on the dotted line 1 1 of Fig. 3. Fig. 2 is an elevation, partly in section, looking in the direction indicated by arrow in Fig. 3. Fig. 3 is a top plan view of the engine. Fig. 4 is a detail perspective view showing the vibrating plate or gland carried by the sparker-rod. Fig. 5 is a detail perspective view of the operating end of the lever for actuating the sparker. Fig. 6 is a similar view looking at the lever from the opposite side.

I here show a double or two cylinder engine, though the several parts and elements hereinafter described are equally applicable to a single engine, as will fully appear hereinafter, and I also here show and prefer to have all working parts of the engine inclosed within an oil-tight casing.

Referring now to the drawings, 1 indicates a chamber which is oil-tight, having a reduced extension 5, which is formed into two cylinders, in which the piston-heads 6 work in the usual manner. The drive-shaft 3 extends transversely through the oil-tight chamber 1 approximately at its center and directly below the center of the cylinders formed by the extension 5. The drive-shaft 3 is provided with two cranks connected with the pistons, respectively, through the medium of the pitman 7. The outer ends of the cylinders are provided with exhaust-ports controlled by the valves 21, said valves having elongated stems 20 extending down into the oil-tight chamber through the offset or shoulder formed by the reduced extension 5. The inner or lower ends of the stems 20 are provided with rollers 19, and above the rollers are situated springs *a*, which serve to normally hold the valves to their seats, as represented in Fig. 1. Each cylinder is provided with a sparker consisting of the stationary contact 53 and the movable contact 52, electrically connected to a battery in the usual manner. An endwise-moving rod 24 is connected at its upper end with the outer end of the contact which is intermediately pivoted at the point 51, as shown, the opposite and lower end of the rod 24 passing through an elongated opening 27 made in the upper wall of the oil-tight chamber 1. A plate or gland 26 closes this opening 27 and is held in position by means of screws 35, the said screws passing through slots in the plate, which permit the plate to move or slide in the direction of the length of the elongated slot 27. The lower end of the rod 24 passes through this plate 26 and moves up and down independent thereof. A stop *b* is arranged on the rod 24 to limit the downward movement of the rod under the tension of the spring 28. The spring 30 has its inner end connected with the rod 24 and its outer end connected to a bracket 29, the tension of the spring being to hold the lower end of the rod normally to the outer end of the elongated slot 27, as will be readily understood.

A lever 14 is provided at each side of the oil-tight casing 1, whereby a lever is provided for each cylinder for operating its respective sparker, as will presently appear. The levers are pivoted at the point 15 upon opposite walls of the casing 1, and the upper ends of these levers are directly under the inwardly-projecting ends of the rod 24. These rods 24 form operating members for the sparkers, and the lower ends of the rods are preferably rounding in cross-section and slightly tapered to engage the grooves *c*, made in the upper faces of the cam-shaped ends 16 of the levers 14. Secured to a shaft 11, extending transverse the oil-tight chamber, are the gears *d*,

which are operatively connected and driven by the drive-shaft through the medium of the gears 9 and 10. Upon the shaft 11 adjacent the gear-wheels are the eccentrics 12, one end of the pitman 13 surrounding the said eccentric, its opposite end being pivotally connected to the levers 14 intermediate their ends, as clearly shown in Fig. 1. From this description it will be seen that the shaft in its rotation rotates the gears *d*, and the levers 14 are correspondingly reciprocated for the purpose of operating the sparker-actuating members 24. The inner edges of the upper ends of the levers 14 are tapered, as shown at *e*, so that after the levers have been forced outward and the actuating members 24 moved upward by the cam-shaped upper ends 16 of the levers 14 to cause a contact of the contact-points 52 and 53 the rod will then drop downward behind the inner edge of the lever 14, as shown in dotted lines, Fig. 1. The lever 14 cannot move inward except that the end of the rod 24 is moved laterally, and this lateral movement is caused through the medium of the tapered edge *e* of the upper end of the lever 14. The springs 30 and 28, respectively, cause a downward and lateral pressure upon the lower end of the rod for the purpose of causing it to assume its normal position after being operated either upward or laterally by the end of the lever 14, thus assuming the proper position to again engage the groove in the upper cam-shaped end of the lever 14. The sparker-actuating member or rod 24 is reduced intermediate its ends and bent laterally into essentially a U-shaped spring portion 25. The object of this spring portion is that before the end of the rod 24 has traveled the entire length of the cam 16 of the lever 14 the contacts or electrodes will be in contact, and the further upward movement of the rod 24 in traversing the remainder of the cam 16 is taken up by the spring 25. This always insures an absolute and positive contact of the sparker and also takes up any wear which may occur in the sparker, always assuring a reliable contact of the electrodes, as will be readily understood.

The cylinders are provided with the usual water-jackets 23, and these water-jackets are connected through the medium of a pipe or pipes 38 with the water-jacket 37, surrounding the carbureting-chamber 36. Water is fed through these jackets and out an outlet-pipe 54, this arrangement serving to keep the carbureting-chamber 36 warm and preventing condensation of the hydrocarbon vapor which would otherwise occur from the cooling of the chamber 36. The inner ends of the carbureting-chamber 36 (of which there is one for each cylinder) are connected with the inlet-ports of the explosion-chambers and the outer ends of the carbureting-chambers are provided with air-inlet pipes 39. A gasolene or other fluid chamber 43 is connected through the medium of pipes 41 with the nozzles 40, forming gasolene-exits within the air-pipes 39. The communication of the fluid from the tank to the nozzles 40 is preferably interrupted through the medium of the valves 42 and 44 for the purpose of regulating the fluid or of cutting it off entirely.

The valve 50 controls the inlet-port for the explosive compound to the explosion-chamber and is provided with an extended stem 47, the outer end of which is provided with a guide or piston head 49, moving in a short cylinder 60, and situated between this head 49 and the inner wall of the cylinder 60 is a spring 48, serving to normally hold the valve seated, as will be readily understood. A valve or controller 45 passes through one wall of the air-pipe 39 and is seated at the exit of the nozzle 40. This controller 45 is connected with the extended end of the valve-stem through the medium of a connection 46, which is here shown as being essentially U-shaped in form, and thus constituting it a spring. The action of this spring is to cause the controller 45 to seat itself before the valve 50 is entirely closed, so that the further movement of the valve is taken up by the spring 46, and this insures always a perfect seating of the valve or controller 45 at the gosolene-entrance, and also serves as a means for taking up any wear of the seat or the controller, as will be readily understood.

From the above description it will be noted that when the valve 50 is opened by the suction of the piston-head 6 the controller 45 is withdrawn from the gasolene-exit, thus admitting a spray of gasolene into the air-pipe, and at the same time the piston 6 causes a suction through the air-pipe and through the carbureter 36, which carries the mixed gas and air to the explosion-chamber of the cylinder ready to be exploded, as will be readily understood. It will also be noted that the gear-wheel *d*, which is driven by the drive-shaft, effects the operation of the sparkers and the exhaust-valves through positive connections, which produces absolute timing and reliable operation of these elements, which are so necessary to the proper operation of an explosive-engine. The chamber 1 is filled with oil to about its center, and the oil being churned by the operating mechanism situated within this chamber, and there being some escape of gases from the productions of combustion in the explosion-chamber, it is necessary to furnish an escape for the gases which accumulate in this chamber. I provide this escape in a simple manner by essentially a U-shaped connection consisting of the two elbows or arms 32 and 33 in the form of pipes, the one, 33, having communication with the chamber 1 below the level of the oil and the communication 32 at a point practically above the oil-level. The main stem or leg 31 of this communication, which is essentially U-shaped in form, has an air-escape 34. The air or gas which accumulates in this chamber 1 escapes and passes upward through the

communication 34, as shown by arrow, while any oil which may splash through or otherwise enter the communication 32 will pass downward into the chamber 1 again. The exhaust passes out through the pipe 22, and the exhaust-port is regulated by the valve 21, the stem of said valve passing downward through the extension 5, with its lower extremity within the chamber 1. A wheel 19 is carried on the lower end of the valve-stem, and the shaft 11 carries a cam or projection 18, which strikes the wheel of the valve-stem at each revolution thereof, thus serving to force the stem upward and unseat the valve to permit an escape of the exhaust. The projection or cam 18 is carried by the shaft 11, as before stated, and this same shaft carries an eccentric 12 for reciprocating the lever 14, that actuates the sparker, as previously described. It will be noticed that the projection 18 is at the opposite side of the shaft 11 from the eccentric 12, or, in other words, operates the valve in opposition to the operation of the sparker to permit the escape of the products of combustion or exhaust at the proper time. The actuating members for the exhaust-valve and the sparker being made fast to the same shaft they are more reliable than when actuated by different parts or elements of the engine, making the timing of them simple and easy, being regulated by the relative position of the cam or projection and the eccentric upon the shaft, as will be readily understood.

The above engine is adapted for many purposes, and is particularly adapted for use upon a motor-vehicle, and instead of being a double engine the parts are equally adapted to a single engine, as will be readily understood, without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. An explosive-engine having an oil-tight box, actuating mechanism situated therein, and an escape for the gases comprising a plurality of communications with said chamber, one practically above and the other practically below the oil-level of the chamber, the upper communication opening to the atmosphere, substantially as described.

2. An explosive-engine having an oil-tight chamber containing oil, actuating mechanism situated within said chamber, and an escape for said chamber comprising an essentially U-shaped pipe having one end in communication with the chamber practically above and the other below the oil-level of said chamber, and an escape for said communication above the oil-level, substantially as described.

3. An explosive-engine comprising an oil-tight chamber, a driving mechanism situated therein, an igniter, an elongated opening in the wall of said chamber, an igniter-actuating member passing through said opening and having an up-and-down horizontal reciprocating movement in said opening, a plate covering said opening and through which said actuating member reciprocates vertically, and means for holding the plate against vertical movement but permitting a horizontal movement thereof, substantially as described.

4. A sparker comprising the electrodes one movable in relation to the other, an endwise-moving rod connected with said sparker and having an intermediate spring portion, an actuating member for moving the said rod longitudinally in one direction and a spring for moving the rod in the opposite direction the parts combined for the purpose described.

5. A sparker comprising relatively-movable electrodes, an actuating member movable at one end in two directions, and an operating member therefor having vertical and horizontal cam-surfaces which move the actuating member in its two directions, substantially as described.

6. A sparker having an actuating member movable in two directions, and an operating-lever therefor moving across the actuating member, the lever having a curved end for moving the member in one direction, and an inclined edge for moving the member in the other direction, substantially as described.

7. A sparker having an actuating member movable longitudinally and transversely at its free end, a reciprocating lever reciprocating transverse the free end of the member, the lever having its end formed into a cam for moving the member longitudinally, and its edge inclined for engaging and moving the free ends of the member transversely, substantially as described.

8. A sparker having an actuating member movable transversely and longitudinally, and an operating-lever therefor situated at and reciprocating transverse the ends of the member, said lever having its end provided with a grooved cam for receiving the end of the member and moving it longitudinally, and its edge inclined for moving it transversely, substantially as described.

9. In an explosive-engine, the combination of a sparker, an operating-lever for said member pivoted at one end and having its free end engaging the said member, a drive-shaft, and a connection having one end operatively connected with the drive-shaft and its opposite end connected with the first-mentioned lever intermediate its ends, substantially as described.

10. In an explosive-engine the combination of a drive-shaft, a sparker and an exhaust-valve, a rotating member driven by the drive-shaft, a valve-cam and a sparker-cam carried by and arranged in operative position upon said rotating member, for the purpose described.

11. In an explosive-engine, the combination of a drive-shaft, a sparker, an exhaust-valve, a gear operatively connected with the drive-

shaft, a lever pivoted at one end and having its free end operating the said sparker, a pitman having one end driven by the said gear and its opposite end connected with the lever, and a cam or arm operated by said gear for actuating the exhaust-valve, substantially as described.

12. A gasolene-engine comprising an explosive-chamber, a gasolene-inlet port, a valve therefor, an actuating member for said valve having a movement greater than the movement of the valve, and a yielding connection between the actuating member and the valve, for the purpose described.

13. A gasolene-engine comprising an explosive-chamber, a gasolene or vapor exit, a valve therefor, an explosive-inlet port, a valve therefor, a yielding connection between said valves positively opening and closing the gasolene-valve by the movement of the explosive-inlet-port valve, substantially as described.

14. A gasolene-engine comprising an explosion-chamber, having an inlet-port, a valve for controlling said port, a gasolene-exit opening in the same direction as the said inlet-port, and a controller for said exit carried by the valve, whereby the opening and closing of the valve opens and closes the gasolene-exit, substantially as described.

15. A gasolene-engine comprising an explosion-chamber having an inlet-port, a valve controlling the same and having a projecting stem, a gasolene-exit, a controller for said exit, and a U-shaped spring connection between the stem and the exit-controller, substantially as described.

16. A gasolene-engine comprising an explosive-chamber having an inlet-port, a valve controlling said port, a carbureter situated adjacent said port and having at one end an outlet communication with said port at a point outside said valve, and the opposite end an inlet in communication with the atmosphere and extending across the line of travel of said valve, a gasolene-exit within said inlet communication, a controller for said exit, and a connection between the controller and the valve, the parts operating as described.

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

ALEXANDER WINTON.

Witnesses:
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P. H. LONERGAN.