O. E. BARTHEL.

EXPLOSIVE ENGINE.

APPLICATION FILED MAR. 30, 1904.

908,641.

Patented Jan. 5, 1909.

3 SHEETS—SHEET 1.

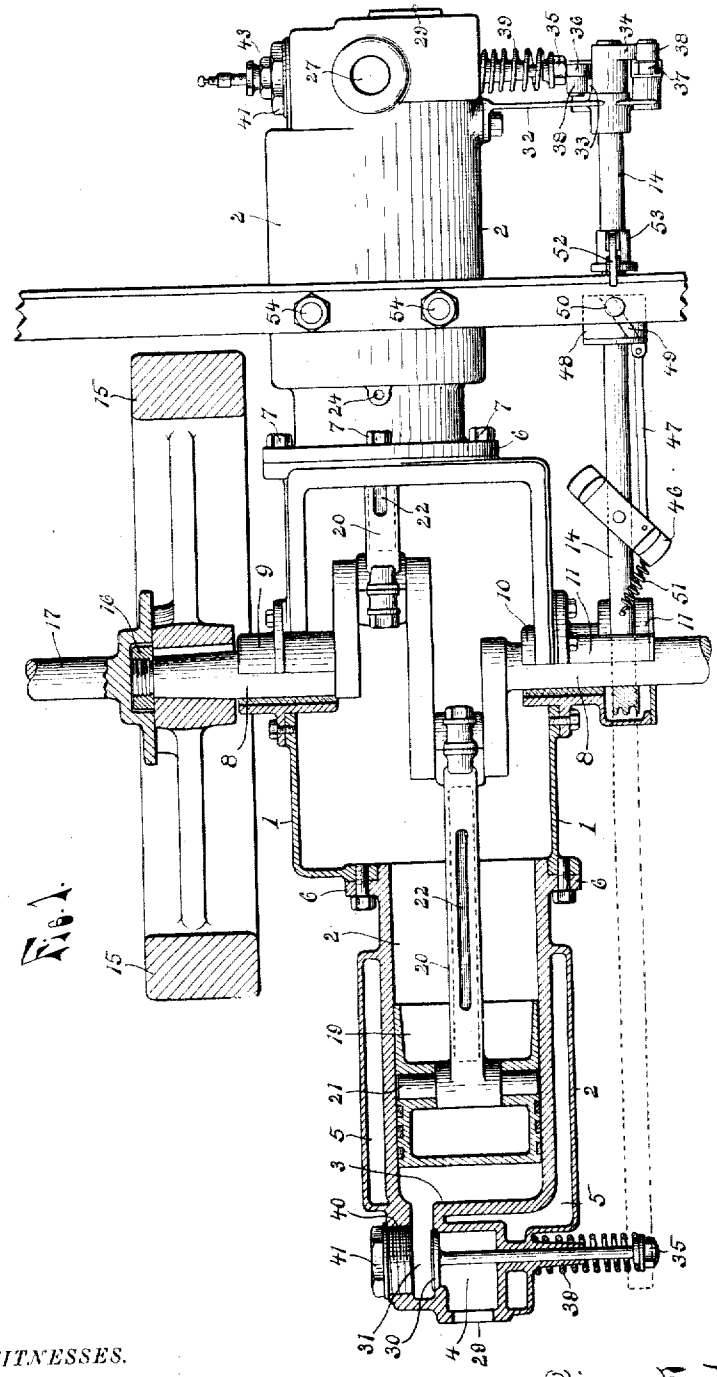


Fig. 1.

WITNESSES.

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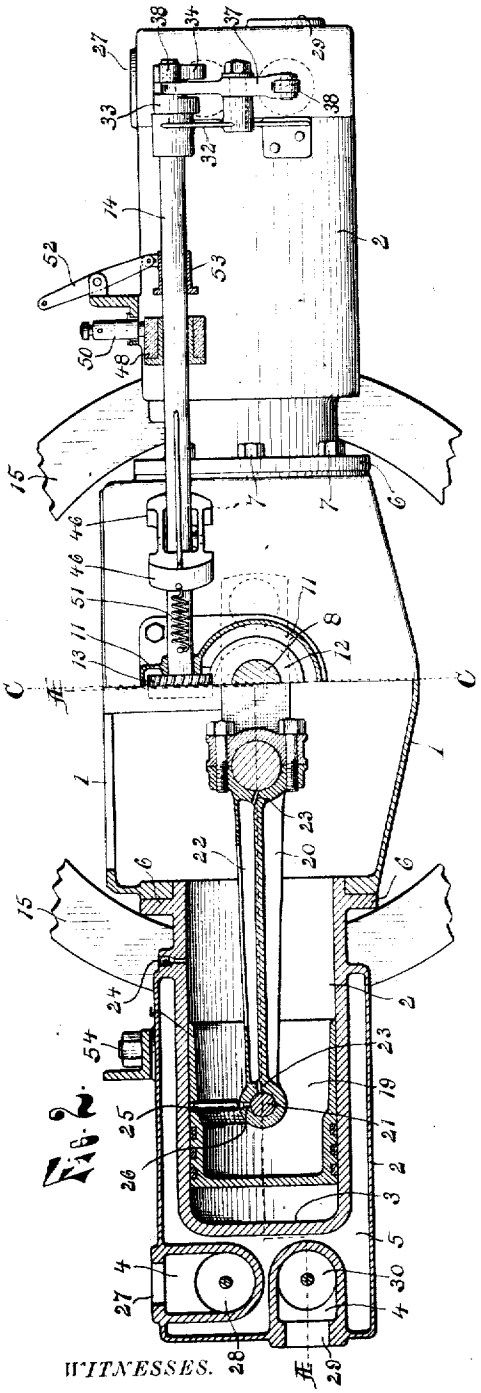


Fig. 2.

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3 SHEETS—SHEET 3.

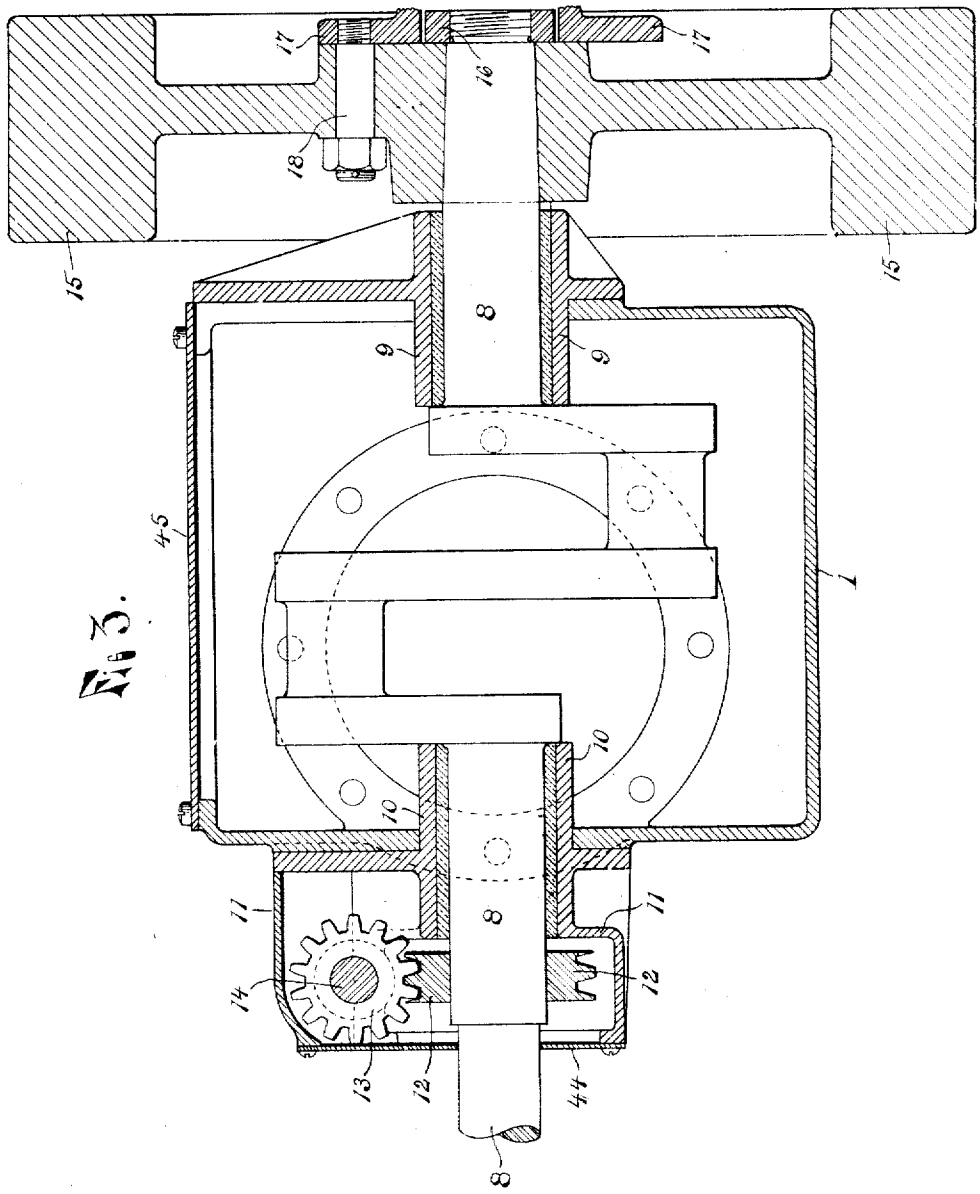


Fig. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

OLIVER E. BARTHEL, OF DETROIT, MICHIGAN.

EXPLOSIVE-ENGINE.

No. 908,641. Specification of Letters Patent. Patented Jan. 5, 1909.

Application filed March 30, 1904. Serial No. 200,667.

To all whom it may concern:

Be it known that I, OLIVER E. BARTHEL, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Explosive-Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in explosive engines and refers more particularly to that type known as the multiple cylinder opposed type of gasolene engine.

To this end the invention consists in certain new and useful improvements in explosive engines and in the peculiar construction, arrangement and combination of parts all as more fully hereinafter described and pointed out in the claims, reference being had to the accompanying drawings, in which:—

Figure 1, is a plan view of my improved engine, one-half being shown in horizontal section on the line A—A Fig. 2; Fig. 2, is a side elevation thereof, one-half being shown in vertical section; Fig. 3, a vertical section through the crank case and adjacent parts on the line C—C, Fig. 2.

As shown in the drawings, 1 is the crank case preferably cast in one piece, 2 the cylinders integrally formed with the cylinder head 3, valve chamber 4 and surrounding water jacket 5 so as to do away with all ground and leaky joints.

6 is a flange extending around the inner end of the cylinder and 7 are tap bolts passing through apertures in said flange into the wall of the crank case to secure the cylinders in place at the opposite ends thereof; although if desired the method of splitting the crank case in half and casting one-half with each cylinder might be used.

8 is the crank shaft mounted in bearings 9—10 removably secured to the opposite sides of the crank case by tap bolts, one or both sides of the crank case being vertically slitted at this point so that the crank shaft may be readily lifted out for the purpose of repair. Integrally formed with the bearing 10 is a housing 11 for the two to one gears 12, 13 mounted upon the crank shaft 8 and cam shaft 14 respectively.

15 is the fly wheel secured upon the tapered portion of the crank shaft by the nut 16 and 17 is an extension of said shaft forming a cap for said nut and removably secured in position by the studs 18 so that either section of the shaft may be dismounted without disturbing the other.

19 are the pistons, 20 the rods connecting the crank pins with their respective pistons through the medium of the transverse piston pins 21.

22 are channels or oil receptacles in the upper sides of the connecting rods 20 formed with overhanging ledges and having an aperture 23 at each end through which lubricant may be fed to the crank and piston pins respectively, the channels 22 being preferably filled with wicking to prevent the oil from being lost or spilled in the operation of the parts as it drops from the opening 24 in the cylinder casting connected with the lubricator, not shown.

25 is a feed tube carried by the piston adapted to register with the opening 24 in the cylinder on the return stroke of the piston, and conduct the lubricant to the oil hole 26 in the sleeve of the connecting rod and to the piston pin to thoroughly lubricate the same, so that with but the one opening in the cylinder I am enabled to maintain a constant lubrication of the piston, crank and piston pins which is a decided advantage.

27 is the inlet passage controlled by the inlet valve 28, and 29 is the exhaust passage controlled by the exhaust valve 30 both passages communicating with the cylinder through the common port or ignition chamber 31 forming a part of the compression space of the cylinder.

32 are brackets secured to the cylinders adjacent to the valve stems, in which brackets the opposite ends of the cam shaft 14 are journaled carrying the inlet and exhaust cams 33, 34 coöperating with the heads 35 on the valve stems through the medium of the inlet and exhaust levers 36, 37 pivotally mounted on the brackets and carrying the anti-friction rollers 38.

39 are coil springs sleeved on the stems of the inlet and exhaust valves to hold them normally to their seats and 40 are openings in the cylinder casting opposite the inlet and exhaust valves for the purpose of the removal of the valves should it be necessary to replace the valves or regrind the seats, at the same time forming a convenient means for coring the passages. 41 are screw plugs or bushes closing said openings, one of said bushes having an internally screw-thread

aperture which forms a convenient means for supporting the spark plug 43.

44 and 45 are removable covers for the gear and crank case respectively.

46 is a governor weight pivoted on the cam shaft 14 and connected by a link 47 with the commutator 48 splined on the shaft and carrying the inclined contact strip 49 adapted to make and break contact with the brush 50 carried by the frame but insulated therefrom and to which brush one terminal of the primary circuit is connected, the other being grounded on the frame.

51 is a spring to normally hold the governor weight in the position shown but as the speed of the engine increases the weight will tend to straighten out at right angles to the cam shaft due to the centrifugal force and automatically advance the lead of the spark by sliding the commutator on the shaft so that a more advanced portion of the contact strip 49 will make and break contact with the brush, earlier. Where it is desired however to check the engine down considerably, as in going through crowded thoroughfares, I have pivoted a lever 52 on the frame member, the upper end being conveniently connected for the operator and the lower end to the sleeve 53 on the cam shaft.

In the drawings the motor is shown as suspended from the frame of an automobile by the tap bolts 54 screw threaded into bosses on the cylinder castings by which method of suspension I am enabled to use standard forms of bars as ordinarily carried in stock without the necessity of bending into special forms.

Having thus fully described my invention, what I claim is:—

1. In an explosive engine of the opposed type, the combination with the cylinders, the pistons in said cylinders, the crank, and the connecting rods; of a crank case formed in one piece with an opening in each side for the reception of the crank-shaft and with a slot leading to one of said openings through which slot the crank may be inserted, and a plate to close the slot when the crank is in place.

2. In an explosive engine of the opposed type, the combination with the cylinders, the pistons in said cylinders, the crank, and the connecting rods; of a crank case formed in one piece with an open top and an opening in each side for the reception of the crank-shaft and having a vertical slot in one side leading from the upper edge thereof to the opening therein through which the crank may be inserted, a cover to close the top of the case and a plate to close the slot.

3. In an explosive engine of the opposed type, the combination with the cylinders, the pistons in said cylinders, the crank, and the connecting rods; of a crank case formed in one piece to which the cylinders are secured and provided with an open top and an opening in each side and a slot leading from the upper edge of the side to the opening therein, detachable bearings for the crank-shaft adapted to be secured within the openings, a cover to close the top and a plate to close the slot.

4. In an explosive engine of the opposed type, the combination with the cylinders and operating parts, of a crank case integrally formed in one piece having openings in its ends to which the cylinders are secured and having an opening in each side and a slot leading to one of said openings and bearings in said openings.

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

OLIVER E. BARTHEL.

Witnesses:
LEWIS E. FLANDERS,
THOMAS G. LONGSTAFF.