

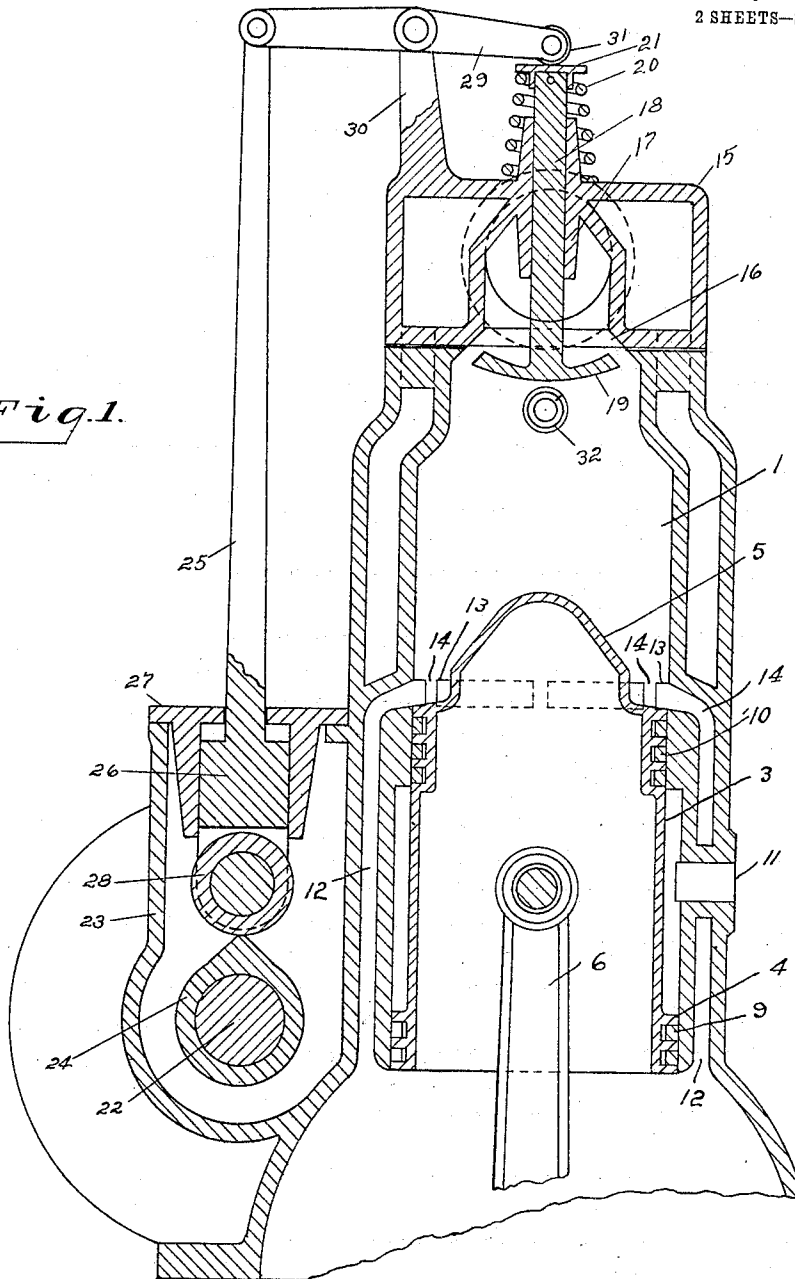
I. G. NEUBER.
EXPLOSIVE ENGINE.
APPLICATION FILED SEPT. 23, 1907.

929,622.

Patented July 27, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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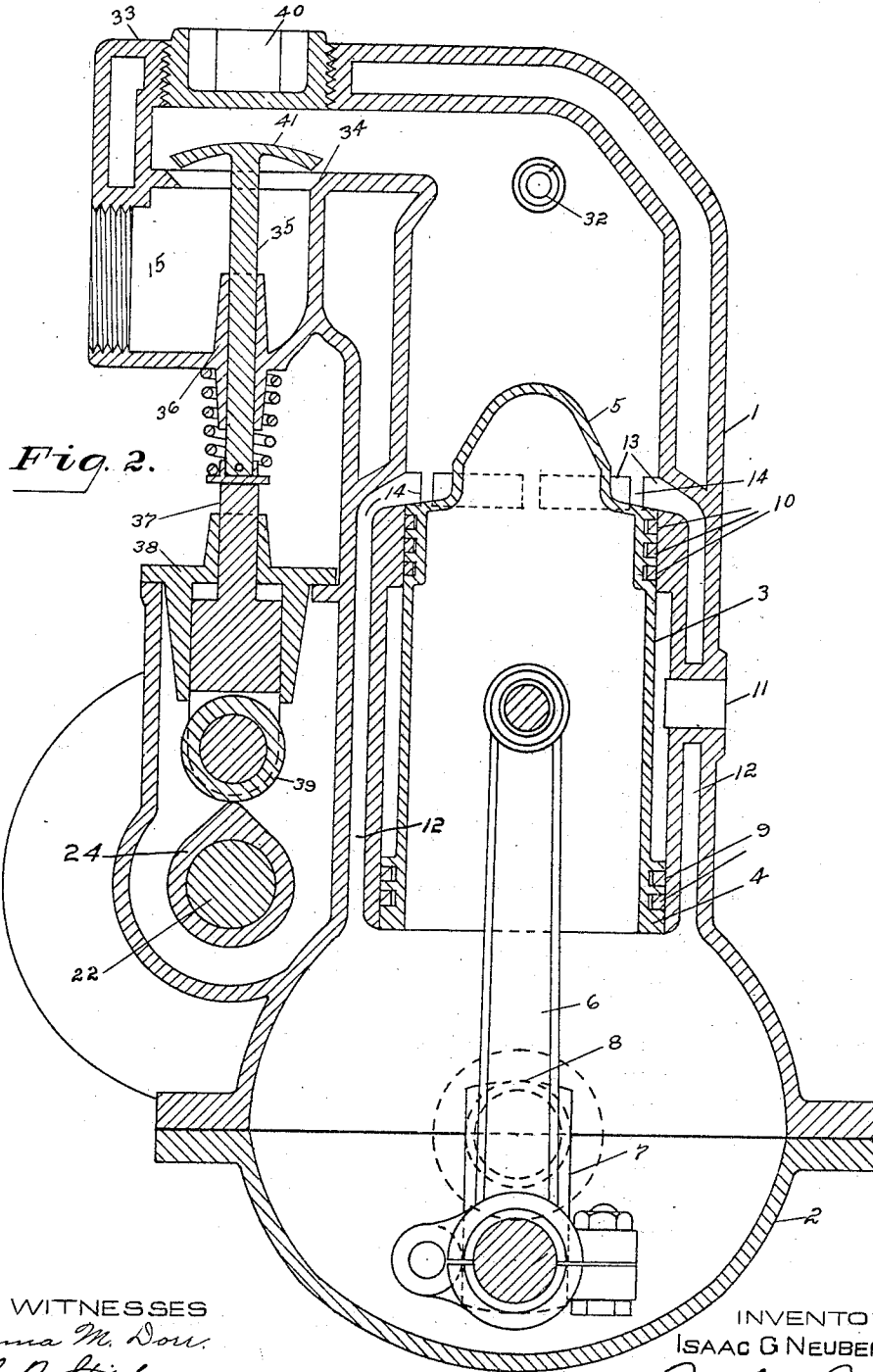


Fig. 2.

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EXPLOSIVE-ENGINE.

No. 929,622.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed September 23, 1907. Serial No. 394,099.

To all whom it may concern:

Be it known that I, ISAAC G. NEUBER, a subject of the King of England, 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.

10 In two-cycle rear compression explosive engines wherein the inlet ports are controlled by the piston, the efficiency of the engine depends to a large extent upon the rapidity with which the ports are opened and closed, and upon the thoroughness of the scavenging of the cylinder by the incoming charge.

20 This invention relates to a two-cycle, rear compression motor and especially to certain improvements in the distribution and proportion of the ports and in the design of the piston adapted to increase the rapidity of the intake of the charge and the even distribution thereof through the cylinder and in the exhaust port control whereby it may be accurately adjusted to best advantage.

25 The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

30 Referring to the drawings, Figure 1 is a view in longitudinal section of a preferred form of an engine embodying features of the invention. Fig. 2 is a similar view of a modified form of the device.

35 In the drawings 1 represents an engine cylinder, with water jacket or other preferred cooling device, extended at its lower end to rest on a base 2 with which it forms a crank case and compression chamber. The upper portion of the cylinder is contracted and its lower portion is counterbored, and a piston 3 with a flange 4 engaging the counterbore and projecting conical head 5 corresponding in general contour to the contracted portion of the cylinder is reciprocable therein, being 40 connected by a conventional piston rod 6 and cranks 7 to a main shaft 8. Sets of packing rings 9 and 10 are provided at each end of the piston.

50 A supply port 11 is so situated in the cylinder wall as to be uncovered by the piston when the latter is approaching the upper end of it, and when a partial vacuum exists in the compression chamber owing to the withdrawal of the piston therefrom. A by-pass 12 in the cylinder wall connects the compression chamber with a substantially annu-

lar inlet port 13 or a series of ports, bridges 14 connecting the margins at regular intervals to permit the piston rings to pass readily.

In the preferred form of construction, a 60 cylinder head 15 secured by suitable means on the cylinder has a central apertured valve seat 16, and an elongated boss 17 aligned therewith in which the stem 18 of an upwardly acting closure 19 is reciprocable. A 65 spiral spring 20 encircling the stem in compression between the cylinder head and a cap or stop 21 on the stem holds the closure normally on the seat. A cam shaft 22 preferably journaled at the side of the cylinder 70 casing in a suitable housing 23 and operated in timed relation to the main shaft by any conventional gearing periodically depresses the closure 19 in proper relation to the piston stroke through a cam 24 secured on the 75 shaft, a vertically reciprocable cam rod 25 whose lower forked end 26 slides in a guide cap 27 suitably secured in the housing and carries a roll 28 riding on the cam, and a walking beam 29 pivoted on a lug 30 of the 80 cylinder head and articulated at one end to the cam rod, and a friction roller 31 on the free end of the beam bearing against the upper end of the valve stem 18 or the stop 21. A spark plug 32 is secured in the cylinder wall 85 below the exhaust valve.

One advantage gained is the greater piston displacement and consequent increase in vacuum and compression in the compression chamber obtained by the enlargement of the 90 piston without increasing the stroke. Another advantage however is the great area obtained by the annular inlet port which may be very narrow, so that it is very rapidly uncovered and closed by the piston. A 95 further advantage is gained by the conical form of the piston head and contracted upper port of the cylinder. The former deflects the gas incoming from the annular port centrally upward, completely ousting the 100 exhausted product of the previous charge and driving it readily through the contracted part and well past the spark plug. As the piston follows up, the conoidal head effects rapid compression toward the end of the 105 stroke, and ignition takes place without fail, as the spark terminals are always in unvitiated gas.

In the modification shown in Fig. 2 the head of the cylinder, preferably integrally 110 formed thereon, is provided with a lateral hollow extension 33, in which there is a con-

ical apertured valve seat 34 in vertical alignment with the cam shaft 22. A vertically lifting closure 41 thereon has a depending stem 35 which passes through an apertured guide lug or boss 36 and is connected to a forked cam-rod 37 sliding in a guide cap 38 over the cam shaft, and having a roll 39 riding on the cam 24. A circular plug 40 screw-threaded into an aperture in the extension in axial alinement over the closure permits its inspection and repair. Other changes may be made without departing from the spirit of the invention, and I do not care to limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

1. In a two-cycle, rear compression engine, a cylinder having a central portion provided with an annular inlet port, a counterbored enlarged lower portion having a supply port, and an upper portion with convergent walls, a crank case forming with the counter-bored portion of the cylinder a compression chamber connected with the annular port by an annular by-pass, a piston controlling said ports having a flanged lower end filling the cylinder counterbore, a body corresponding to the central portion of the cylinder and a head having a projecting middle portion corresponding substantially in contour to the contracted portion of the cylinder, a main shaft and cam shaft operated by the piston, a lug on the cylinder head, a lever fulcrumed thereon, an exhaust port valve in the cylinder beyond the contracted portion operated by said lever, a cam rod oscillating the lever reciprocated by said cam shaft.

2. In a two-cycle, rear compression engine, a cylinder having a central portion provided with an annular inlet port, a counterbored

enlarged lower portion having a supply port and an upper portion with convergent walls, a crank case forming with the counter-bored portion of the cylinder a compression chamber connected with the annular port by a by-pass, a piston controlling said ports having a flanged lower end filling the cylinder counterbore, a body corresponding to the central portion of the cylinder and a head having a projecting middle portion corresponding in general contour to the contracted upper portion of the cylinder, a main shaft and cam shaft operated by the piston, a housing for the cam shaft on the cylinder casing, a cam on the shaft, a cam rod having a forked squared lower end reciprocable longitudinally in a guide cap secured in the housing above the cam, and a cam roll journaled therein riding on the cam, a cylinder head having an apertured valve seat on its inner face and an exhaust duct leading therefrom, a boss on the head having a guide aperture axially alined with the seat, an inwardly opening closure for the seat having a stem extending through and reciprocable in the boss, an outer lug on the head, a walking beam pivoted to the lug and articulated at one end to the upper end of the cam rod, a friction roll journaled on the other end of the walking beam bearing against the end of the closure stem, a stop on the outer end of the stem and a spring encircling the stem in compression between the stop and cylinder head.

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

ISAAC G. NEUBER.

Witnesses:

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