C. R. HELD.

DYNAMIC MOTOR.

APPLICATION FILED OCT. 27, 1908. RENEWED MAR. 25, 1911.

995,348. Patented June 13, 1911.

Fig. 1.

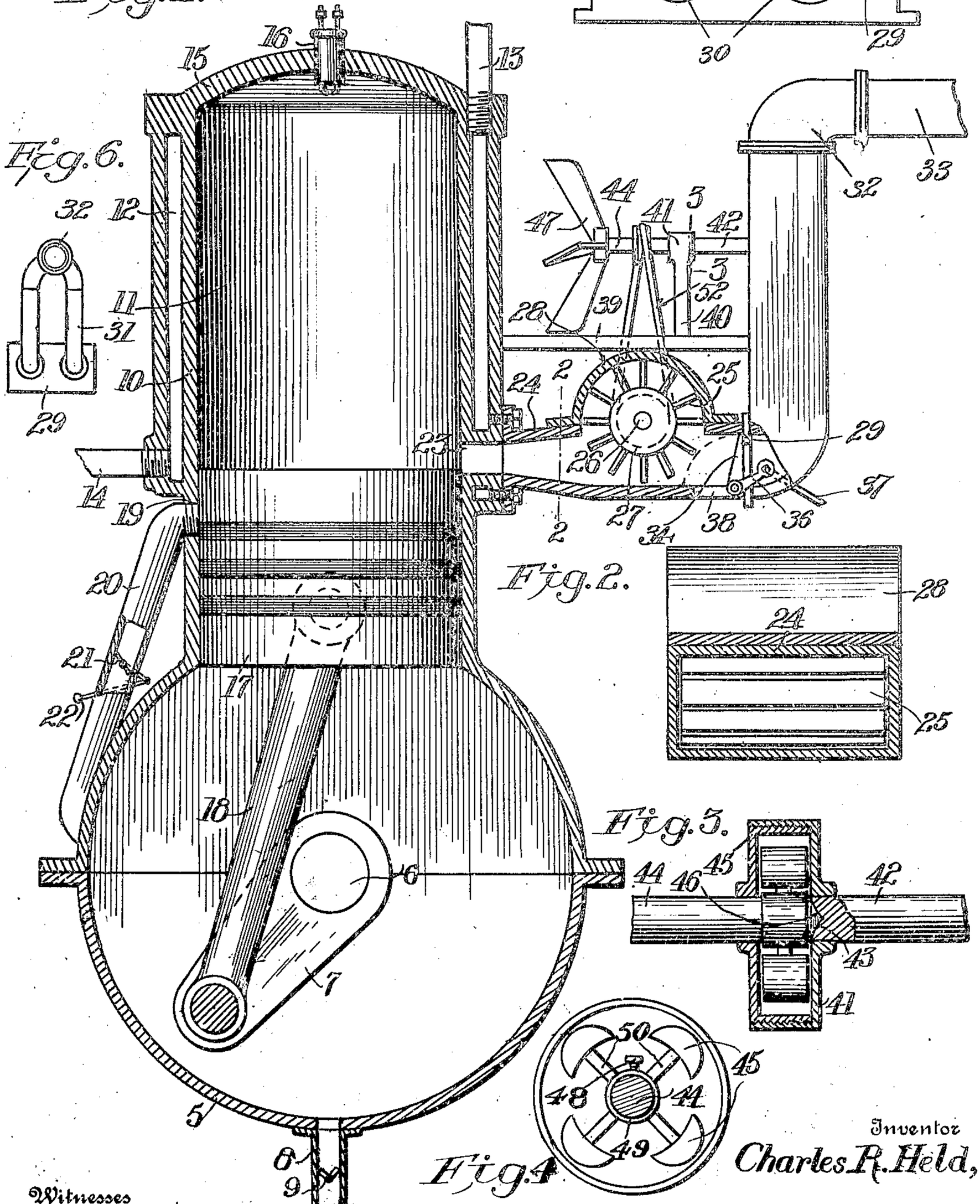

Fig. 5.

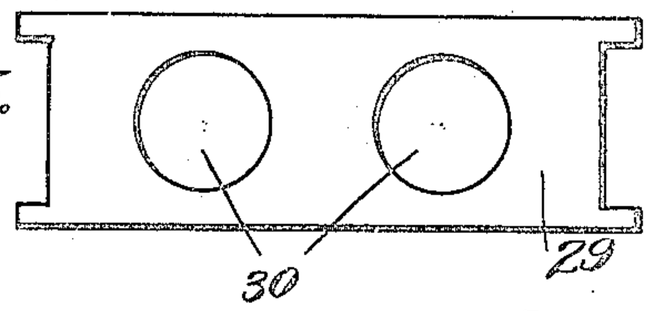

Fig. 6.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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DYNAMIC MOTOR.

995,348. Specification of Letters Patent. Patented June 13, 1911.

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To all whom it may concern:

Be it known that I, CHARLES R. HELD, a citizen of the United States, residing at Stanford, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Dynamic Motors, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to a thermo-dynamic motor of the two-cycle type adapted for use in a motor vehicle, boat or the like in either a vertical or horizontal position.

The primary object of the invention is to provide a motor of the class specified with a rapid exhaust means to avoid back pressure into the explosion cylinder or chamber and prevent modification or interference with the regular stroke of the piston and also thoroughly liberate the burned gas from the explosion cylinder with advantages in the successive explosion of incoming fresh charges of gas into the said cylinder.

A further object of the invention is to provide a muffler in connection with the exhaust means of a motor of the class specified and to utilize the exhaust as a motive means for a cooling fan for the explosion cylinder and also to cut out the exhaust from the muffler.

With these and other objects and advantages in view the invention consists in the construction and arrangement of the several parts which will be more fully hereinafter specified in preferred form.

In said drawings:—Figure I is a section through a motor embodying the features of the invention. Fig. II is a transverse section on the line 2—2 of Fig. I. Fig. III is a section on the line 3—3 of Fig. I. Fig. IV is a detail elevation of a part of the mechanism. Fig. V is a detail side elevation of the muffler conduit connection plate, and Fig. VI is an end elevation of the auxiliary U-shaped ports secured to said plate.

The numeral 5 designates a crank casing, preferably of cylindrical form and of suitable dimensions. Through the center of this casing extends a shaft (6) having a crank arm (7) and constituting a crank shaft. The crank casing forms a chamber for the reception of the motive agent such as a suitable mixture of a hydrocarbon product and air, the motive agent in properly usable form being fed to the crank casing by a pipe (8) connecting with a suitable source of supply and having a butterfly or other suitable controlling valve (9) therein opening in the direction of the casing but resisting opening movement in the opposite direction. Continuing from the crank casing (5) is a piston cylinder (10) of elongated form to provide an explosion chamber (11) surrounded by a water jacket (12) with opposed pipes (13) and (14) controlling the supply and exhaust of the cooling liquid to the said jacket. The motor, as shown, may be disposed either vertically or horizontally, or the cylinder (10) may be above the crank casing or at one extremity of the same, and in the end or head (15) opposite the said crank casing a sparking plug (16) is centrally arranged as shown. A piston (17) is mounted in the cylinder (10) and has a piston rod (18) movably connected to one end thereof and also movably attached to the end of the crank arm (7). A feed port (19) is formed in the cylinder (10) in suitable position and connecting therewith and the chamber formed by the crank casing (5) is a by pass or feed pipe (20) having a feed regulating or butterfly valve (21) provided with an exteriorly located operating lever (22). In a portion of the cylinder (10), opposite the port (19) is an elongated or oblong exhaust port (23) which is so situated that it is opened before the piston completes its receding stroke, and at such time that the explosion chamber (11) will have been fully relieved of the exploded charge prior to the admission thereto of a fresh charge of the motive agent.

It has been found that the most effective operation as to the exhaust ensues when the piston has reached a six-eighths limit of its receding stroke and thus give ample time for the explosion chamber to become entirely clear of each exploded charge or exhaust,

particularly in view of the use of the enlarged oblong exhaust port (23). The exhaust is also so controlled when liberated from the explosion chamber that backing up of the same, or the institution of back pressure in the said chamber is avoided, and in accordance with the features of the invention, the pressure of the exhaust is utilized as a motive means for driving a cylinder cooling organization. Further, the exhaust is controllable as to its outlet particularly with respect to a muffler connection or conduit.

A rectangular or oblong casing (24) is bolted or otherwise fastened against the outer side of the cylinder (10) over the port (23) and therein a bladed wheel (25) is rotatably mounted and held by a shaft (26) extending transversely through the casing and carrying a pulley (27). Over the wheel (25) on the top of the casing, which forms an enlarged duct or passage, is a hood or housing (28) and secured against the hood is a plate (29) having two openings (30) therein to which are fitted the ends of auxiliary U-shaped ports (31) having a suitable connection or union (32) at the elbow for a muffler conduit (33). Against the plate (29) a cut-out means for the exhaust is provided and consists of a valve (34) fulcrumed, as at 35, and having an exterior arm (36) secured thereto and provided with an operating rod or analogous device (37). The valve performs a dual function and is operative to open or close a bottom outlet opening (38) or the auxiliary ports (31). When the valve is in the position shown by Fig. I, the outlet (38) is open and the ports (31) closed, and the exhaust is then liberated without passing on to the muffler or has a freer escape to render the motor more efficient as a power means when used in driving a motor vehicle upgrade. When exhausting during level travel, the valve is turned down to close the outlet (38) and open the auxiliary ports (31).

Above the hood or housing (28) a support (39) is mounted and has an upright (40) terminating in an interiorly screw threaded casing (41) centrally intersected by a bearing arm (42) formed with a center recess (43) in the end, on which casing (41) is mounted, as shown by Fig. III. A fan shaft (44) carrying a companion casing (45) exteriorly screw threaded to fit in and become secured to and form a part of the casing (41), is provided with an outer conical end (46) to engage the recess (43) and reduce friction and avoid end thrust of the shaft (44), the latter rotating in the center of the casing (45) and having on its inner end a suitable fan (47) in proximity to the cylinder (10) and of such dimensions as to be effective as a cooling medium with relation to said cylinder at the point of greatest heat generation. Fixed on the shaft (44) within the housing formed by the interfitting companion casings (45) and (41) by a set screw (48) is the hub (49) of a plurality of weight arms (50) acting centrifugally as a momentum wheel to constantly maintain a uniform rotation of the fan (47) and materially accelerate the speed of said fan, and thereby form an effective speed auxiliary to the wheel (25) constituting the prime actuating means for the shaft (44). This shaft (44) has a band pulley (51) fixed thereon, and trained thereover, and over the pulley (27) is a belt (52) which is turned after leaving the pulley (27) to engage the pulley (51) in view of the fact that the pulleys (27) and (51) are disposed at angles to each other.

Assuming the crank casing to be fully charged with the motive agent and the piston (17) at the limit of its receding stroke, the port (19) will be cleared and the motive agent will be permitted to pass through feed pipe (20) into the explosion chamber ahead of the piston (17) and will be instantly compressed by the latter and at a proper time the sparking plug will become electrically active and ignite the compressed charge and drive the piston back, clearing the exhaust port (23) to liberate or exhaust the exploded charge and at the same time compress the motive agent in the crank casing to a certain extent with advantage in charging the explosion chamber. The impetus given the crank arm (7) will overturn shaft (6) and the successive forward and backward strokes of the piston (17) will become regular and the explosions or ignition of successive charges uniform. The crank casing will be recharged at regular intervals with the motive agent from a source of supply or suitable mixing means and the piston will be cushioned thereby and the disadvantages of "dead center" overcome. The exhaust passing from the explosion chamber actuates the wheel (25) and the latter in turn rotates the shaft (44) through the means heretofore explained and the fan (47) is set in motion to cool the cylinder. The exhaust after passing the wheel (25) is freed in either one of the two ways as heretofore specified.

It will be understood that when the motor is installed in a motor vehicle, the operating means for the valves (21) and (34) will be located adjacent to or render operation from the driver's seat, and further the dimensions of the several parts may be changed at will to vary the horse-power of the motor.

What is claimed is:—

In a motor of the class described, the combination with an explosion chamber having an exhaust port, a duct communicating with said port, of driving means positioned therein operated by the exhaust pressure, a supporting bracket positioned above said duct

and comprising an arm having an end recess of conical form, a shaft having a conical end engaging said recess, a casing carried by said arm, said casing comprising a plurality of sections, one of said sections threaded into the other section, and momentum means secured to said shaft within said casing.

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

CHARLES R. HELD.

Witnesses:
F. H. LIGHTHART,
J. F. HAMMOND.