

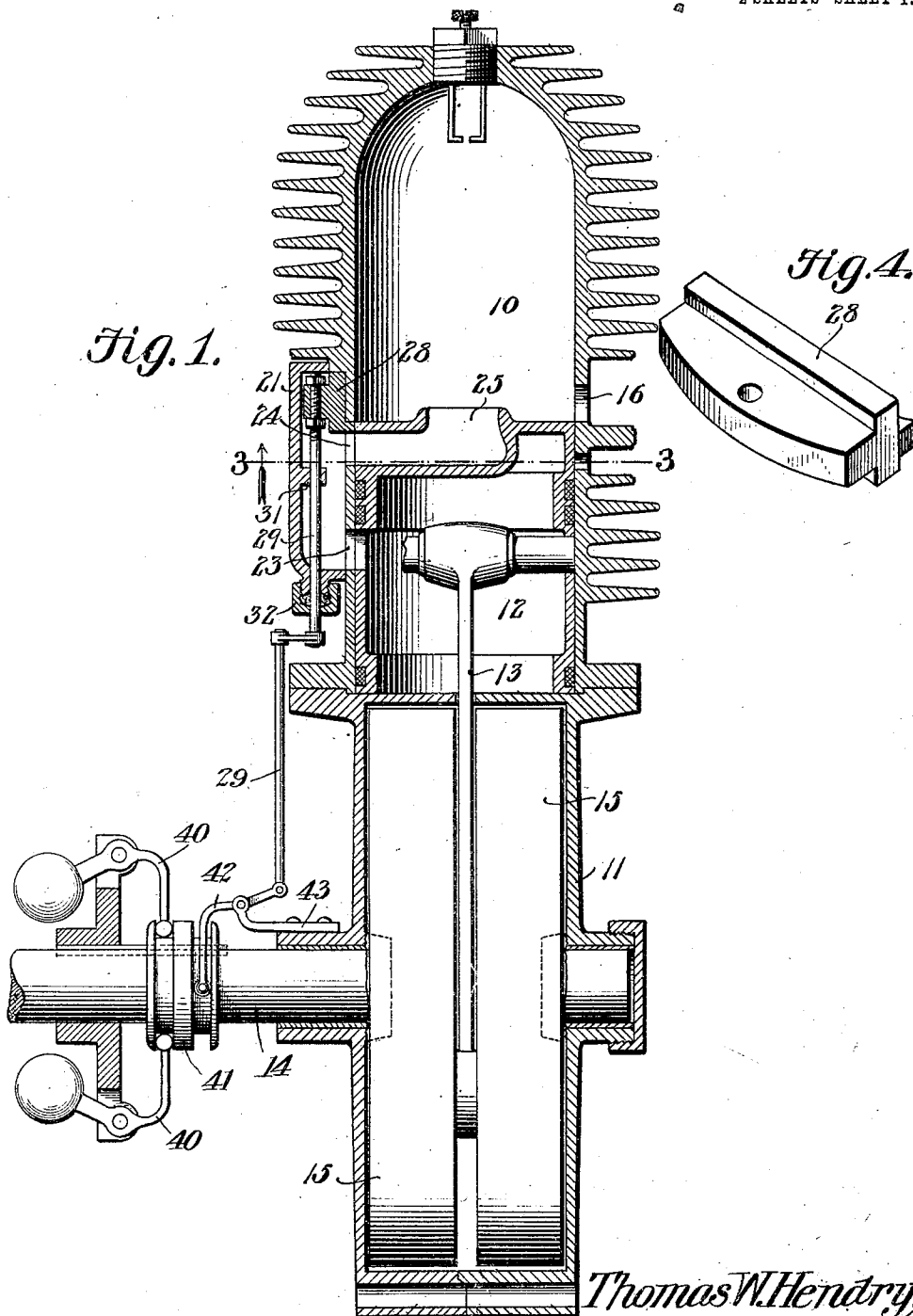
No. 859,383.

PATENTED JULY 9, 1907.

T. W. HENDRY.
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED OCT. 31, 1905.

2 SHEETS—SHEET 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

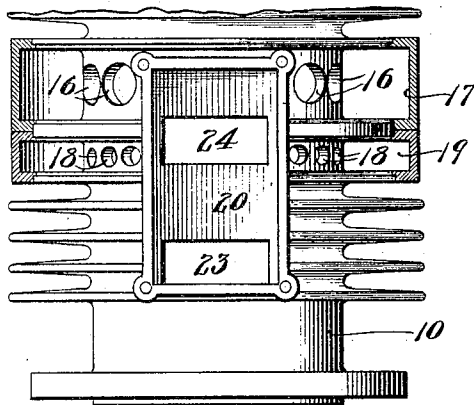


Fig. 3.

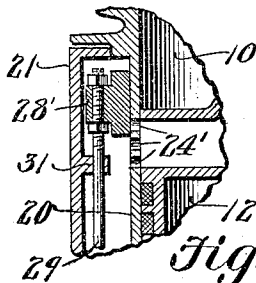
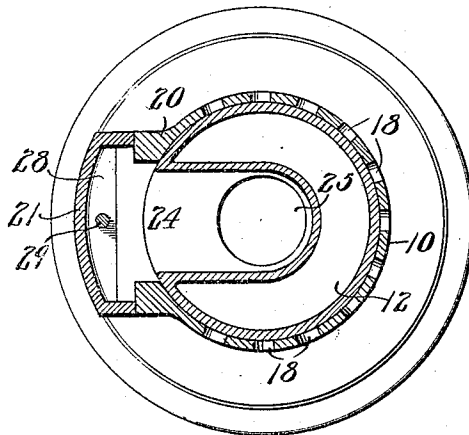


Fig. 5.

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UNITED STATES PATENT OFFICE.

THOMAS W. HENDRY, OF SAN FRANCISCO, CALIFORNIA.

INTERNAL-COMBUSTION ENGINE.

No. 859,383.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed October 31, 1905. Serial No. 285,290.

To all whom it may concern:

Be it known that I, THOMAS W. HENDRY, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Internal-Combustion Engine, of which the following is a specification.

This invention relates to internal combustion engines, and has for its principal object to provide means for accurately controlling the speed and power of the engine by varying the effective area of the inlet port through which the explosive mixture passes to the cylinder or explosion chamber.

A further object of the invention is to provide an improved form of engine in which the inlet port is formed in the piston, and in this connection, a further object is to provide a two cycle engine in which the stream of fresh gas or explosive compound is directed into the central portion of the cylinder to more effectively sweep out the exploded charge through ports formed at the periphery of the cylinder.

A still further object of the invention is to provide a novel form of cylinder and a valve for controlling the quantity of explosive mixture passing into said cylinder.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a sectional elevation of an internal combustion engine constructed in accordance with the invention. Fig. 2 is an elevation of a portion of the cylinder, parts being broken away in order to more clearly illustrate the construction. Fig. 3 is a transverse sectional view of the piston and cylinder on the line 3—3 of Fig. 1 looking in the direction indicated by the arrow. Fig. 4 is a detail perspective view of the controlling valve. Fig. 5 is a detail sectional view, illustrating a modified construction of valve and inlet port.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The engine forming the subject of the present invention is of the two cycle type, and the cylinder 10 and crank casing 11 are firmly bolted together, and suit-

able packings employed for the purpose of preventing the escape of any of the gases from the crank casing during the in stroke of the piston.

In the cylinder is arranged a trunk piston 12 that is connected by a rod 13 to a crank on the main shaft 14, the latter being provided with suitable balance wheels 15 of any ordinary construction.

The wall of the cylinder is provided with numerous openings 16 through which the products of combustion escape as the piston nears the limit of its inward movement on the working stroke, the exploded gases passing into a suitable chamber 17 which may be connected to a muffler or similar device if desired. These ports are controlled by the piston and are not opened until said piston has nearly completed the working stroke. Immediately below the exhaust port 16 are inlet ports 18 leading from a chamber 19 that is in communication with a carbureter or any other source from which an explosive mixture may be drawn. These ports are, also, under the control of the piston and are opened when the latter reaches the limit of its out stroke. The out stroke of the piston creates a partial vacuum in the lower portion of the cylinder and crank casing, and as soon as the ports 18 are uncovered, a quantity of explosive mixture will rush into the lower portion of the cylinder to fill the vacuum. On the down stroke of the piston this charge will be compressed, and at about the time the piston is opening the exhaust ports, communication is established between the upper and lower ends of the cylinder and the explosive mixture now compressed forces its way into the upper portion of the cylinder and drives out the exploded charge.

Arranged at one side of the cylinder is a valve casing 20, having a suitable head or cover 21, and this casing communicates with the cylinder through two ports 23 and 24, the port 24 being placed in communication with a port 25 formed in the piston, when the latter reaches the end of the working stroke. This port 25 extends in a radial line to the center of the cylinder, and its discharge end is at the exact center of the piston, the walls of the port being arranged on slightly convergent lines, so that the stream of explosive mixture passing through the port will be somewhat contracted and will be directed in a straight line toward the outer end of the cylinder, affording an opportunity for the escape of the exploded charge through the numerous ports 16 formed in the periphery of the cylinder. The stream of fresh gas strikes against the center of the outer end of the cylinder, and then is deflected downward under the cylinder wall, sweeping the exploded charge before it.

In order to control the speed and power of the engine, provision is made for adjusting the available area of the port 24. The walls of the port 24 serve as guides for a valve 28, the inner face of the valve being arranged on an arcuate line corresponding to the curvature of the bore of the cylinder and forming a part thereof, while the remaining portion of the valve seats within the casing 20. To this valve is secured one end of a valve stem 29, guided by an opening formed in the lug 31 of the cover 21, the end of the valve stem extending out through a suitable stuffing box 32, and being so arranged as to permit any desired adjustment of the position of the valve; and by thus increasing or decreasing the area of the inlet port, the speed and power of the engine may be altered in accordance with circumstances. The stem 29 may be manually controlled or it may be connected to a suitable governing mechanism operated by the engine in order to permit automatic adjustment of the position of the valve in accordance with the speed of the engine.

In the modified construction illustrated in Fig. 5, the wall of the cylinder is provided with numerous ports 24', all of which serve as inlet ports, and these ports open at a seat on which slides a valve 28', the valve being adjustable in order to close or open any desired number of ports, and thus control the quantity of explosive mixture passing into the cylinder.

Mounted on the main shaft 14 is a governor 40 having a movable sleeve 41, provided with an annular groove for the reception of one arm of a bell crank lever 42 that is pivoted on a bracket 43 secured to the crank casing. The opposite arm of the lever is connected to the valve stem 29 so that the position of the valve may be adjusted in accordance with the speed of the engine.

It will be seen that by adjusting the position of the valve, the quantity of explosive mixture passing to

the cylinder may be increased or diminished, and the engine is thus placed under perfect control.

Having thus described the invention, what is claimed 40 is:—

1. The combination with a cylinder having a port in its wall, of a valve mounted in the port and having its inner face conforming to the curvature of the cylinder bore, and means for gradually moving the valve to alter the effective area of the port. 45

2. The combination with a cylinder having an inlet port in its wall, of a valve guided by the walls of the port, the inner face of said valve being arranged on a curved line following the contour of the cylinder bore. 50

3. The combination with a cylinder having an inlet port formed in its wall, of a valve casing surrounding the port and through which the charge passes to said port, a valve arranged within the casing and a valve stem extending outside the casing, the inner face of the valve being in alignment with the bore of the cylinder and curved to conform thereto, said valve being guided by the walls of the port. 55

4. The combination with a cylinder having an inlet port in its wall, of a valve casing surrounding the port, and through which the charge passes to the port, a valve arranged within said casing and extending through the port, the inner face of the valve being curved to follow the contour of the bore of the cylinder, the valve extending inward to a point in alignment with the cylinder bore, and a stem secured to said valve and projecting through the casing. 60

5. The combination with a cylinder having an inlet port in its wall, of a valve casing surrounding the port, a removable cover or head for the valve casing, said head having an inwardly extending guiding lug, a valve arranged within the casing and fitting partly in the port, and a valve stem extending through the guiding lug, and a stuffing box carried by the removable head and through which said stem also extends. 65

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses. 70

THOS. W. HENDRY.

Two witnesses:

GEO. H. WOODWARD,
HARRY E. ANTHONY.