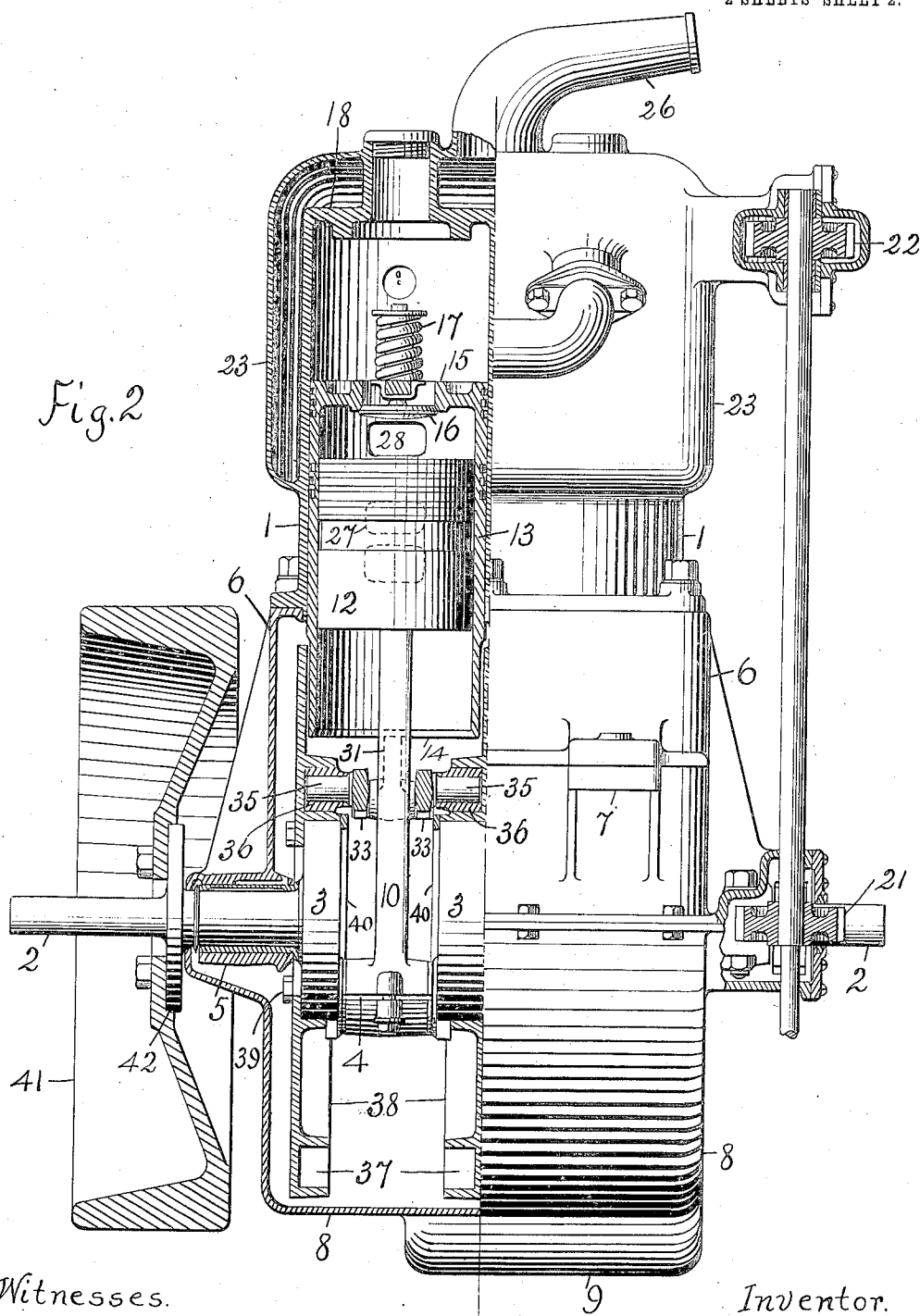


C. D. MILLER.
SLEEVE TYPE TWO-CYCLE ENGINE.
APPLICATION FILED FEB. 7, 1911.

1,057,442.

Patented Apr. 1, 1913.

2 SHEETS—SHEET 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

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TO HARRY F. HAVILAND AND ONE-THIRD TO WARREN J. MILLER, BOTH OF PHIL-
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SLEEVE-TYPE TWO-CYCLE ENGINE.

1,057,442.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed February 7, 1911. Serial No. 607,137.

To all whom it may concern:

Be it known that I, CLARENCE D. MILLER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Sleeve-Type Two-Cycle Engines, of which the following is a specification.

The principal objects of this invention are first, to provide a gasoline engine having an explosion in the cylinder to each revolution of the crank shaft; and to provide for an initial exhaust and a final exhaust to scavenge all burnt gas in a sleeve previous to the incoming of gas for the following explosion; second, the provision of a rotary timing valve with protecting means against discharge of gas tending to carbon, deface, or in any way injure it; third, the provision of a sleeve with large wearing surfaces, and operated by mechanism designed with large wearing surfaces, to thereby insure durability and efficiency, and fourth, certain other features of the engine as will be hereinafter more fully described and then claimed.

The invention is illustrated in the accompanying drawings, whereof similar parts bear similar reference characters.

Figure 1 is mostly a central vertical section of the engine at a right angle to the crank shaft thereof. Fig. 2 is a view of one cylinder mostly in central vertical section parallel with the crank shaft, and an exterior view of the adjoining cylinder. Fig. 3 is a section showing the locking rim for the cams to the crank disks.

As many cylinders as desired may be joined, as shown in Fig. 2. The engine is of the two cycle, piston sleeve, vertical type with the cylinder 1 located above the shaft 2 which has a crank formed with disks 3 integral with the bearing ends 2, and connected by the crank pin 4, all being supported by bearings 5 formed on the inclosing case 6 having supports 7, and a removable bottom part 8 upon which is formed an oil chamber 9. A connecting rod 10 connects crank pin 4 and the pin 11 of piston 12. Intermediate cylinder 1 and piston 12 there is an interposed piston sleeve 13, having an open bottom 14 and an upper head 15. In head 15 there is an inlet valve 16 carried by a spring 17.

At a point about level with cylinder head 18, at one side, and in communication with the top of cylinder 1, there is a rotary valve 19 connected to the carbureter 20 (which may be of any approved type) said valve operated by the timing gears 21, 22 from shaft 2. The cylinder 1 is provided with a water jacket 23, a spark plug 24, an exhaust manifold 25 and a water outlet 26. Sleeve 13 has an initial exhaust port 27 and a final or scavenge exhaust port 28 which also admits the firing spark. At the lower end of sleeve 13 there are lugs 29 connected by a pin 30 to a link 31 which in turn is connected by a pin 32 to a bifurcated arm 33 pivotally attached to case 6 by a pin 34. At a point intermediate pins 32, 34 and on the central line of the engine, arms 33 are provided with outwardly projecting journals 35 on which are rollers 36 running in grooves 37 of cams 38. The cams are secured to the outer disk 3 by bolts 39 and to the outer and inner disks by retaining rings 40. A balance wheel 41 is secured to flange 42 of shaft 2.

In operation the crank pin 4 and cams 38 rotate in the direction shown by the arrow, and as seen in Fig. 1 the crank pin 4 is half way on its down stroke while cams 38 and piston sleeve 13 are at their highest point. As crank pin 4 revolves, the rollers 36 will follow the grooves 37, causing piston sleeve 13 to descend, and as the lower port 27 of the sleeve comes in alinement with the manifold 25 a portion of the burned charge will be discharged. As the piston sleeve 13 and the piston 12 reach the downward limit, which is the lower center of the crank pin 4, the upper port 28 will register with manifold 25 and the entire charge of burnt gas will be discharged. While the piston sleeve 13, is descending the rotary valve 19, will be controlled by the gears 21 and 22, to cause the said valve 19, to open so as to admit a fresh charge of the gas and on the upstroke of the piston of the engine and of this gas to be forced automatically through the valve 16, when the piston sleeve 13, has reached the head of the cylinder 1, when this gas will be compressed by means of the piston 12, and so as to be ignited by the spark-plug 24, of the engine, for another operation of the said engine.

Having thus described the nature and ob-

jects of my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In an internal combustion engine, a cylinder having in its walls an exhaust port, a sleeve within said cylinder, said sleeve provided with a pair of ports located in different horizontal planes, whereby upon the reciprocation of the sleeve in the direction of its axis, the said sleeve-ports will register successively with the cylinder port, to provide initial and final discharges of exhaust gases.

2. In an internal combustion engine, a cylinder having in its walls an exhaust port, a spark-plug port located in the cylinder wall above the exhaust port, a sleeve within said cylinder, said sleeve provided with a pair of ports located in different horizontal planes, whereby upon the reciprocation of the sleeve in the direction of its axis, the said sleeve ports will register successively with the cylinder exhaust port, to provide

initial and final discharges of exhaust gases and the uppermost sleeve port adapted to register with said spark-plug port, at the moment of explosion.

3. In an internal combustion engine, a cylinder having in its wall an exhaust port, a sleeve within said cylinder, a check-valve located in the crown of said sleeve and controlling the inlet of gases to the interior of said sleeve, said sleeve provided with a pair of ports located in different horizontal planes, whereby upon movement of said sleeve in the direction of its axis, the said sleeve ports successively register with the said cylinder port, to provide initial and final discharges of exhaust gases.

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

CLARENCE D. MILLER.

Witnesses:

CHARLES E. WILLIAMS,
R. C. WRIGHT.