

W. Z. FLOWER.
VALVE FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JAN. 12, 1912.

1,066,593.

Patented July 8, 1913.

2 SHEETS-SHEET 1.

Fig. 1.

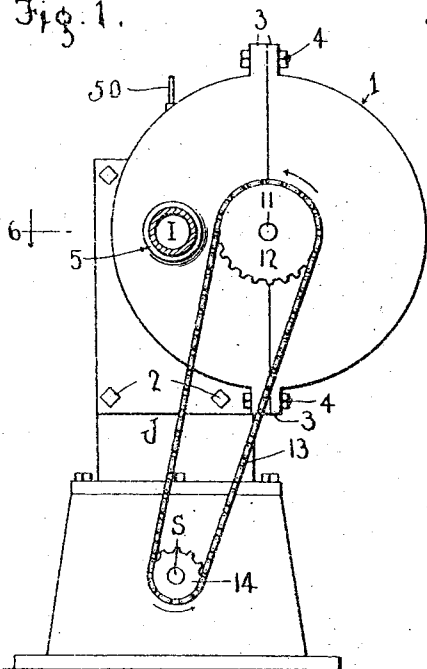


Fig. 2.

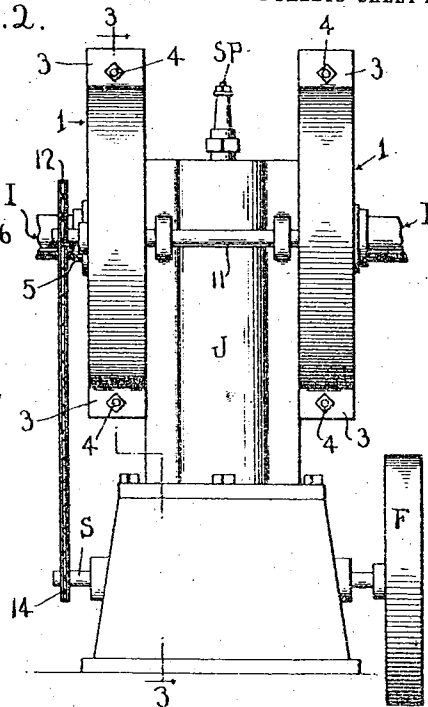


Fig. 5.

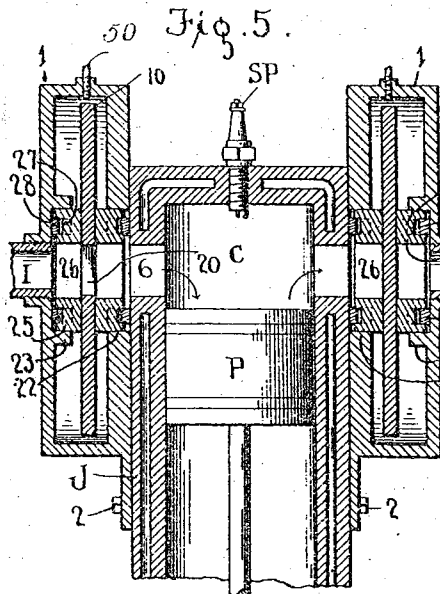
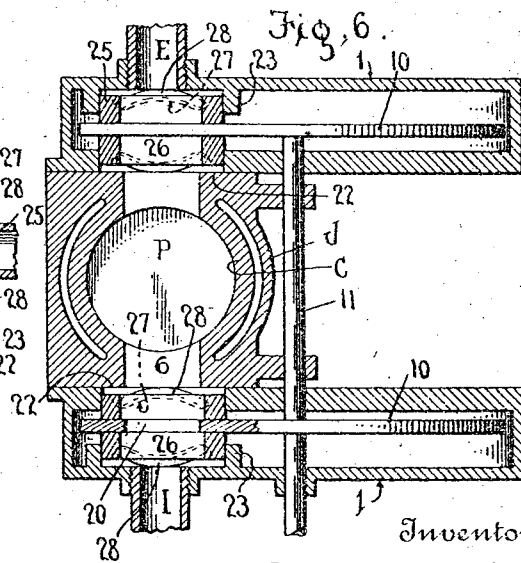


Fig. 6.



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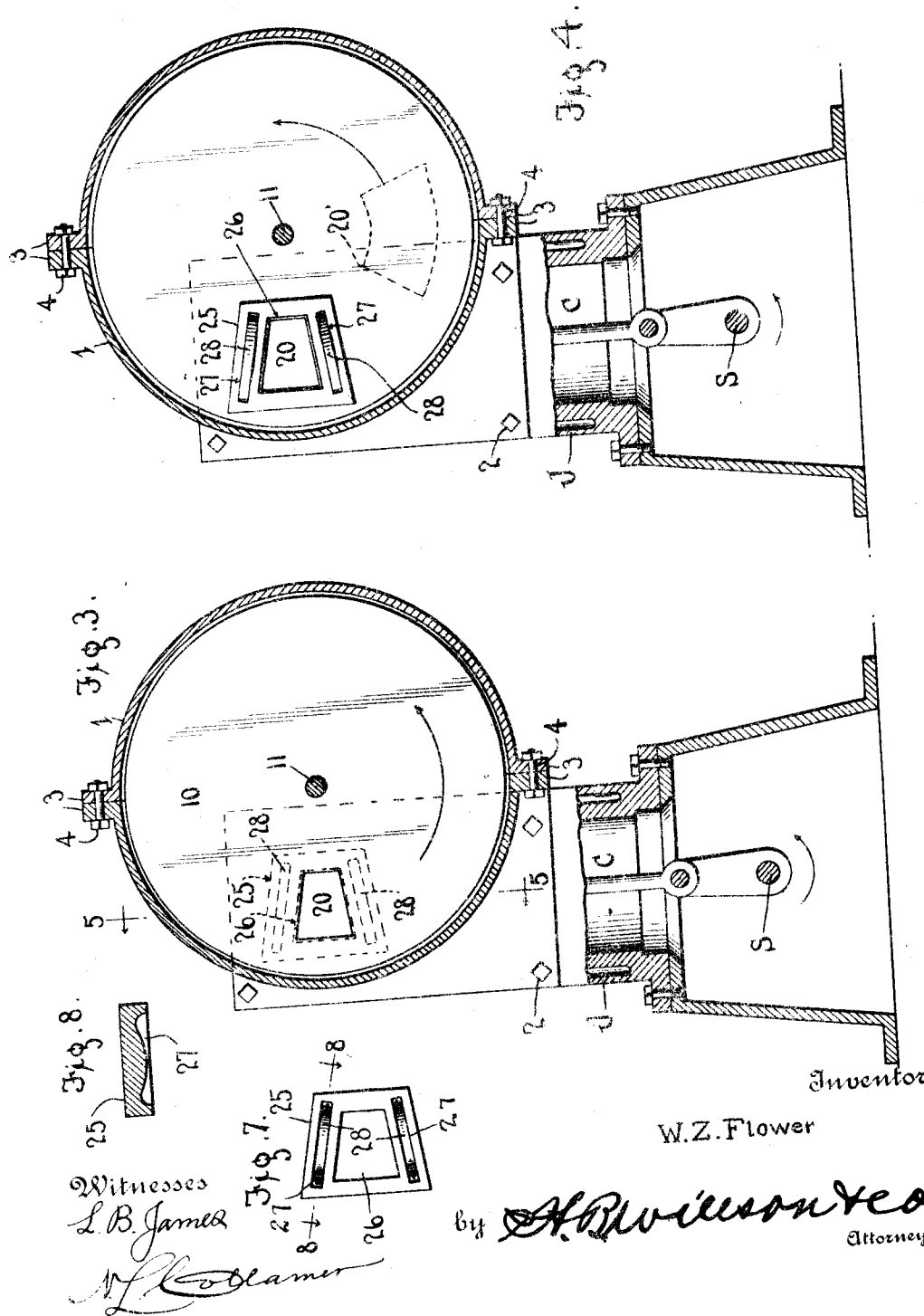
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Attorneys

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UNITED STATES PATENT OFFICE.

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VALVE FOR INTERNAL-COMBUSTION ENGINES.

1,066,593.

Specification of Letters Patent.

Patented July 8, 1913.

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To all whom it may concern:

Be it known that I, WARD Z. FLOWER, a citizen of the United States, residing at Gibbon, in the county of Sibley and State of Minnesota, have invented certain new and useful Improvements in Valves for Internal-Combustion Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to internal combustion engines, and more especially to the valves thereof; and the object of the same is to produce an improved form of valve which is easily accessible when it needs attention and an improved form of packing therefor also easily accessible, and a valve in which all noise is eliminated. These and other objects are accomplished by the construction hereinafter more fully described and claimed, and as shown in the drawings wherein—

Figure 1 is a side elevation of this engine, complete, and Fig. 2 is an end view thereof taken at right angles to the position shown in Fig. 1. Fig. 3 is a vertical section on the line 3—3 of Fig. 2. Fig. 4 is a vertical section similar to Fig. 3, excepting that the nearer face plate only of the valve casing is omitted. Fig. 5 is a vertical section through this entire engine on the line 5—5 of Fig. 3, and Fig. 6 is a horizontal section on the line 6—6 of Fig. 1. Fig. 7 is an enlarged detailed view of one of the valve-packing plates, and Fig. 8 is a sectional detailed view on the line 8—8 of Fig. 7.

In the drawings is conventionally shown a four-cycle gasoline engine which may be briefly described as including a piston P reciprocating vertically within a cylinder C surrounded by a water jacket J, the piston being connected with the crank shaft S whereon is mounted the fly wheel F and the charge above the piston being ignited by a spark plug SP, the intake being designated at I and the exhaust at E.

The purpose of the present invention is to control the inlet of the charge from the intake to the cylinder and the outlet of the burnt gases from the cylinder to the exhaust, and yet avoid the use of the valves so commonly employed at present in engines of

this character and which are closed by springs and opened by cams on a cam shaft.

Coming now more particularly to the present invention, the numeral 1 designates a valve casing secured as at 2 to each side of the cylinder C and itself by preference made in two halves as best seen in Fig. 1, having ears 3 which are bolted together as at 4 so that the halves can be separated when desired. The general shape of the casing is cylindrical, its axis being horizontal, and the intake pipe I opens off center through the casing at the point 5, while a port 6 leads through the opposite wall of the casing and into the cylinder C as seen in Fig. 5. Disposed within said casing is a disk-valve 10 fixed upon a shaft 11 journaled through the heads of the casing and carrying a wheel 12 on one extremity which in the present instance is shown as a sprocket connected by chain 13 with a smaller sprocket 14 on the main shaft S so that two revolutions of the latter are necessary to impart one revolution to the valve-shaft and its valve, as is usual in four-cycle gasoline engines. However, this construction and arrangement is only typical of any means that may be employed for rotating the valve shaft from the crank shaft. I am describing but one of the valves of which two are shown in Fig. 5, but the shaft 11 extends across, past the cylinder C as seen in Fig. 2, and is attached to both disk-valves 10, so that the same are rotated simultaneously by means of the connection with the main shaft S just described, or any other that may be used. These disks have by preference considerable size, and may possibly be of the proportion illustrated in the drawings; and although they also have some considerable thickness, it is not so great but what there is space left within each casing 1 for the packing which is specially constructed as will be seen below.

Referring now more particularly to Figs. 5 and 6, the inlet 5 at the inner end of the intake pipe I, the port 6 directly opposite thereto, and the port 20 through the valve-disk 10 are disposed as shown in these views, although the intake port 20 through one disk and the exhaust port 20' through the opposite disk will be out of register as well understood in four-cycle engines and as shown in dotted lines in Fig. 4. Within

each valve casing 1 at the inner side of the disk therein an aperture 22 is formed in the inner wall of the casing and ribs 23 in the outer wall thereof, defining a recess corresponding in shape with the ports but larger; and within each recess is located the valve packing which is a washer 25 (preferably of cast iron) having a port 26 through it of a size and shape to register with the other ports referred to. Above and below said port 26 (see Figs. 7 and 8) the washer is provided in what will be its outer face with recesses 27 in which are disposed leaf springs 28 pressing toward the side of the casing and therefore forcing the washer inward toward the disk and into close contact with it, as will be clear.

The parts being constructed about as described, and as set up as shown in the drawings, when the engine is running the shaft 11 is rotating and the two disks are revolving within their casings. At a proper moment the inlet port 20 comes in register with the intake ports 5 and 6 and a charge is admitted to the cylinder; later it is compressed and fired as usual, and then the outlet port 20' in the other disk comes into register with the outlet ports leading from the cylinder and into the exhaust E, and the spent gases are ejected as usual. The force of the compression and the force of the explosion are borne by those packing washers which are outside of the two disks, and when said washers become worn they may be easily replaced by taking off either one half of the casing or simply the outer face plate thereof.

At 50 is shown an oil cup by means of which a proper lubricant can be admitted to the interior of the valve casing, so that the disk in rotating therein will not unduly wear the inner faces of the washers which are borne against it with considerable force.

I reserve the right to make changes in details as come within the spirit of this in-

vention, and the exact sizes, shapes and proportions of parts are immaterial.

What is claimed as new is:

1. The herein described valve comprising a cylindrical casing having alined ports through its heads and off center thereof, a disk-shaped valve rotating within said casing and pierced with a port which registers with the ports in the casing at each revolution of the valve, the inner faces of the casing heads having recesses around said ports, a washer fitting loosely in each recess with its inner face against the disk valve and its outer face having recesses adjacent its port, and in each of the recesses an expansive spring pressing the washer into contact with the disk valve.

2. In an internal combustion engine, the combination with an upright cylinder having inlet and exhaust ports in its opposite sides, and independent cylindrical valve casings secured against said sides of the cylinder and having alined ports through their heads in alinement with the ports in the cylinder; of the intake pipe communicating with the inlet port of one casing, the exhaust pipe communicating with the outlet port of the opposite casing, a shaft journaled through the axes of both casings, means for rotating this shaft, two disk-shaped valves fast on said shaft and each within one of said casings and having an off center port adapted to register with the alined ports through its casing, the ports in the two valves being set in timed relation to each other, and packing within each casing on both sides of the disk valve.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WARD Z. FLOWER.

Witnesses:

WILLIAM H. GUGISBERG,
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