L. L. RUSSELL.

VALVE.

APPLICATION FILED MAY 16, 1916.

1,232,849.

Patented July 10, 1917.

2 SHEETS—SHEET 1.

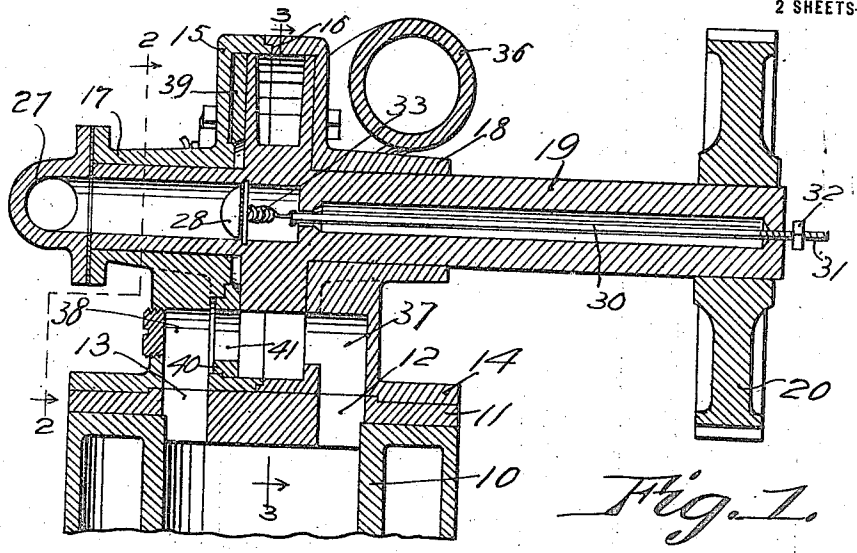


Fig. 1.

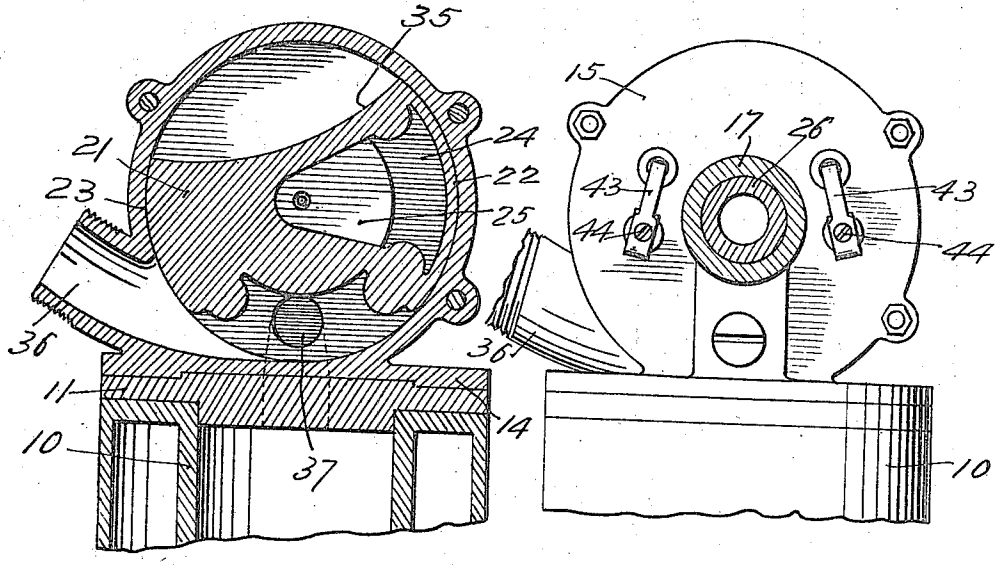


Fig. 3.

Fig. 2.

Witness

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2 SHEETS—SHEET 2.

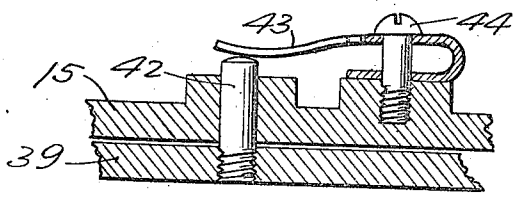


Fig. 4.

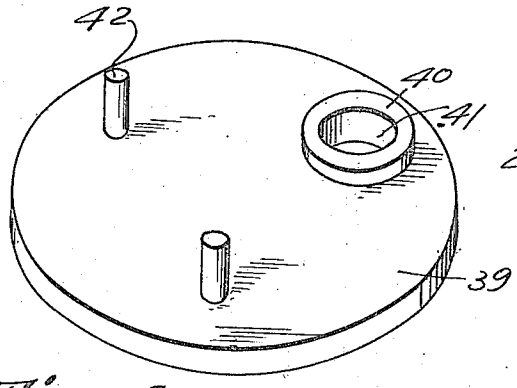


Fig. 5.

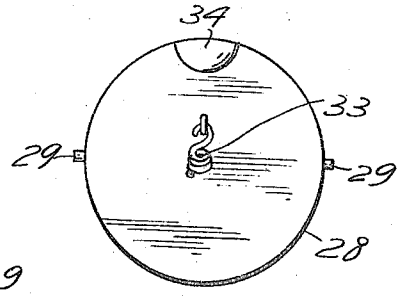


Fig. 6.

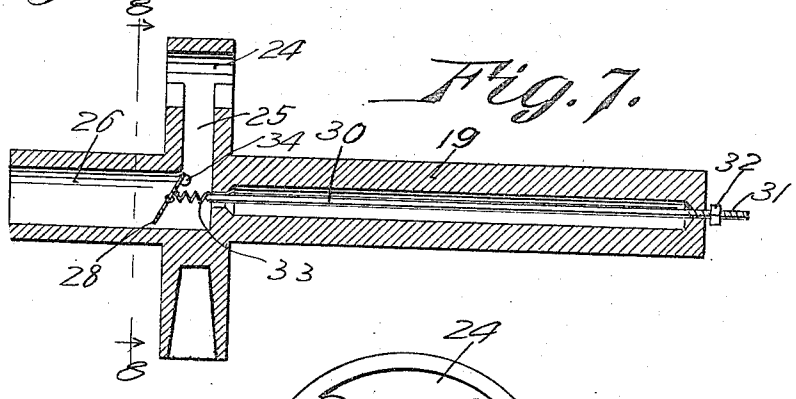


Fig. 7.

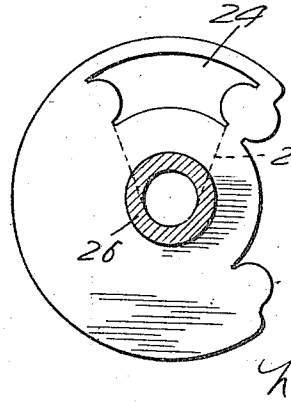


Fig. 8.

Witness

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UNITED STATES PATENT OFFICE.

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VALVE.

1,232,849. Specification of Letters Patent. Patented July 10, 1917.

Application filed May 16, 1916. Serial No. 97,909.

To all whom it may concern:

Be it known that I, LEON L. RUSSELL, a citizen of the United States of America, and resident of New Rockford, in the county of Eddy and State of North Dakota, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to valves and particularly to rotary valves which are of utility in connection with explosive motors, steam engines, pumps or other machinery in which valves are employed; the said invention involving subject matter constituting an improvement on the valve forming the subject matter of an application filed by me on Nov. 2, 1915, Serial Number 59,252.

An object of this invention is to produce a rotary valve having walls of irregular contour, the curves of the walls of which are in such relation to the axis as to insure satisfactory results when said valve walls operate in conjunction with the ports of the valve casing by which the charge is admitted and the spent gases are exhausted from the cylinders.

A further object of this invention is to provide a valve of the character indicated having means of adjustment by which the valve is held in effective relation to the valve casing, yet permitting free rotation of the valve in the casing.

A still further object of this invention is to provide a governor associated with the intake port or duct of the valve so that the area thereof may be controlled to regulate the charge to be admitted to the valve.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a sectional view through a fragment of a cylinder and through the valve mechanism applied thereto;

Fig. 2 illustrates a sectional view on a line corresponding with the line 2—2 of Fig. 1;

Fig. 3 illustrates a sectional view on a line corresponding with the line 3—3 of Fig. 1;

Fig. 4 illustrates an enlarged detail sectional view showing the packing and the means for holding the same against the valve;

Fig. 5 illustrates a perspective view of the said packing;

Fig. 6 illustrates a view in elevation of a valve or governor;

Fig. 7 illustrates a sectional view of the valve and its hollow shaft;

Fig. 8 illustrates a sectional view on a line corresponding with the line 8—8 of Fig. 7.

In these drawings 10 denotes a cylinder having a water jacket and this cylinder may be of ordinary construction the said cylinder having a removable cylinder head 11 with ports 12 and 13 through which the charge and the exhaust may pass and 14 denotes the base flange of the valve case 15 which is shown as being made in sections with a joint 16 between said sections.

The valve casing has bearings 17 and 18 in which a hollow shaft 19 is rotatable, the said shaft in the present embodiment of the invention having a gear wheel 20 which may be geared to the valve timing and driving mechanism of any ordinary construction.

The valve 21 is, in the present embodiment of the invention, shown as integral with the shaft 19 and it has a segmental rim 22 at one end and a segmental edge 23 at the other end which rotates in intimate contact with the inner wall of the valve casing. The valve has a slot 24 concentric with the rim 22 and an inwardly tapered duct or recess 25 which is formed between the sides of the said valve, the said recess leading to and merging with the channel 26 formed in the hollow shaft, so that the said channel 26 constitutes the intake duct or port for the explosive charge and the end of the hollow shaft is in communication with a manifold 27, which manifold may connect to a carbureter or other source of fuel supply whereby the explosive charge finds its way to the valve casing.

As a means for controlling the supply of fuel, a shutter or valve 28 has trunnion pins 29 pivoted in the hollow shaft and said valve 28 is connected to a rod 30, the said rod extending through an end of the shaft and having threads 31 engaged by a nut 32 so that the said rod may move longitu-

dinally. The nut acts against the tension of a spring 33 by which the inner end of the rod is connected to the valve. The valve has a weight 34 which will overcome the tension of the spring when the said shaft is rapidly rotated and centrifugal force will tend to close the channel 26 in the hollow shaft, thus cutting off the supply of fuel, and automatically reducing the speed thereby. This governor or controlling mechanism will be of particular utility on stationary engines, although it is not, of course, to be limited to that use.

The edges of the valve are of irregular contour and of such construction that they clear the ports or pass over the ports during the rotation of the valve so that the opening and closing of the said ports is accomplished with the greatest efficiency. It is of course known that the ports should be closed or opened by minimum movement of the valve and they should be left open for the exhaust as long as possible so that there will be no doubt of the proper clearance of the cylinders for the receipt of the succeeding charge and to that end, the valve has one of its edges concaved as shown at 35 so that there is a relatively large space between the said edge and the wall of the valve casing. The channel or space created between the said edge and the wall of the valve casing receives the exhaust and it is discharged therefrom to the exhaust pipe or manifold 36.

The valve casing has ports 37 and 38 in the base which aline with the ports 12 and 13 respectively of the cylinder head and within the valve casing there is a packing plate 39 with a hollow boss 40 and an aperture 41 which communicate with the ports in the base of the valve casing and form a means of communication between the valve casing and the ports on one side of the valve. The packing plate 39 has guide pins 42 which project through apertures 43 in the valve casing and the said guide pins have their outer ends engaged by springs 43 which yieldingly press the packing plate into engagement with the rotary valve. The tension of the springs is adjusted by means of the screws 44, the configuration and construction of which is well shown in Fig. 4 of the drawing. It is the purpose of the inventor to have the packing plate bear against the side of the valve in order that a proper joint may be maintained between the valve and the wall of the casing on one side and with the packing plate on the other, it being understood that the tension of the springs is such as to force the packing plate against the valve and that this tension will hold the valve against the opposite side wall of the valve casing.

While the specification refers to the valve as associated with a cylinder of an internal combustion motor, it is to be understood that when the valve is to be applied to other machinery for controlling inlets and outlets, such as for the admission and exhaust of steam in steam engines or the admission and escape of water in pump cylinders, the ports and ducts described herein as being intended for the entrance of the explosive charge would be utilized for admitting the live steam or the water to cylinders in steam engines and pumps respectively, and where reference is made herein to ports and ducts for the exhaust or spent gases, these ducts and ports would be utilized for exhausting steam or the outflowing water in steam engines and pumps respectively and its use in connection with other machinery would be obvious from what has been said, since it has been set forth that it is not the intention of the inventor to limit this invention to explosive motors but for the purpose of showing one embodiment of the invention, a cylinder of an explosive motor was utilized as a part of the illustration to better explain and illustrate the utility of the said invention.

I claim:

1. In a valve, a valve casing having bearings and ports opening in the sides of the said casing, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel, a valve having a radial opening leading from the said channel, said valve having a concentric slot with which the radial opening of the valve communicates, and a centrifugally controlled governor in the channel.

2. In a valve, a valve casing having bearings and ports opening in the sides of the said casing, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel, a valve having a radial opening leading from the said channel, said valve having a concentric slot with which the radial opening of the valve communicates, a centrifugally controlled governor in the channel, and adjustable means for holding the governor in normal position.

3. In a valve, a casing having bearings at the sides, a hollow shaft rotatable in the bearings, said casing having an exhaust opening, said valve casing having ports in its sides with ducts leading therefrom, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel for the passage of fuel or liquid, said valve having a radial opening communicating with the said channel, and a concentric slot with which the said radial opening communicates, said valve having its periphery rotating in intimate contact with the wall of the valve casing, and recessed sides forming ducts establishing communication between the exhaust and the side ports of the said casing.

4. In a valve, a casing having bearings at the sides, a hollow shaft rotatable in the bearings, said casing having an exhaust opening, said valve casing having ports in its sides with ducts leading therefrom, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel for the passage of fuel or liquid, said valve having a radial opening communicating with the said channel, and a concentric slot with which the said radial opening communicates, said valve having convexed ends rotating in intimate contact with the wall of the valve casing, recessed sides forming ducts establishing communication between the exhaust and the side ports of the said casing, and a packing plate interposed between the valve and one wall of the valve casing.

5. In a valve, a casing having bearings at the sides, a hollow shaft rotatable in the bearings, said casing having an exhaust opening, said valve casing having ports in its sides with ducts leading therefrom, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel for the passage of fuel or liquid, said valve having a radial opening communicating with the said channel, and a concentric slot with which the said radial opening communicates, said valve having convexed ends rotating in intimate contact with the wall of the valve casing, recessed sides forming ducts establishing communication between the exhaust and the side ports of the said casing, a packing plate having a hollow boss fitting in one of the side ports of the casing, and means for exerting pressure on the said packing to hold it in contact with the valve.

6. In a valve, a casing having bearings at the sides, a hollow shaft rotatable in the bearings, said casing having an exhaust opening, said valve casing having ports in its sides with ducts leading therefrom, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel for the passage of fuel or liquid, said valve having a radial opening communicating with the said channel and a concentric slot with which the said radial opening communicates, said valve having convexed ends rotating in intimate contact with the wall of the valve casing, recessed sides forming ducts establishing communication between the exhaust and the side ports of the said casing, a packing plate having a hollow boss fitting in one of the side ports of the casing, pins on the said packing plate, said valve casing having apertures through which the pins project, and means for exerting tension on the pins for pressing the valve plate against the valve.

7. In a valve, a casing having bearings at the sides, a hollow shaft rotatable in the bearings, said casing having an exhaust opening, said valve casing having ports in its sides with ducts leading therefrom, a hollow shaft rotatable in the bearings, said hollow shaft constituting a channel for the passage of fuel or liquid, said valve having a radial opening communicating with the said channel and a concentric slot with which the said radial opening communicates, said valve having convexed ends rotating in intimate contact with the wall of the valve casing, recessed sides forming ducts establishing communication between the exhaust and the side ports of the said casing, a packing plate having a hollow boss fitting in one of the side ports of the casing, pins on the said packing plate, said valve casing having apertures through which the pins project, springs, and means for yieldingly holding the springs against the pins for pressing the packing plate against the valve.

LEON L. RUSSELL.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."