H. HOPKES.

ROTARY VALVE FOR ENGINES.

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1,098,574. Patented June 2, 1914.

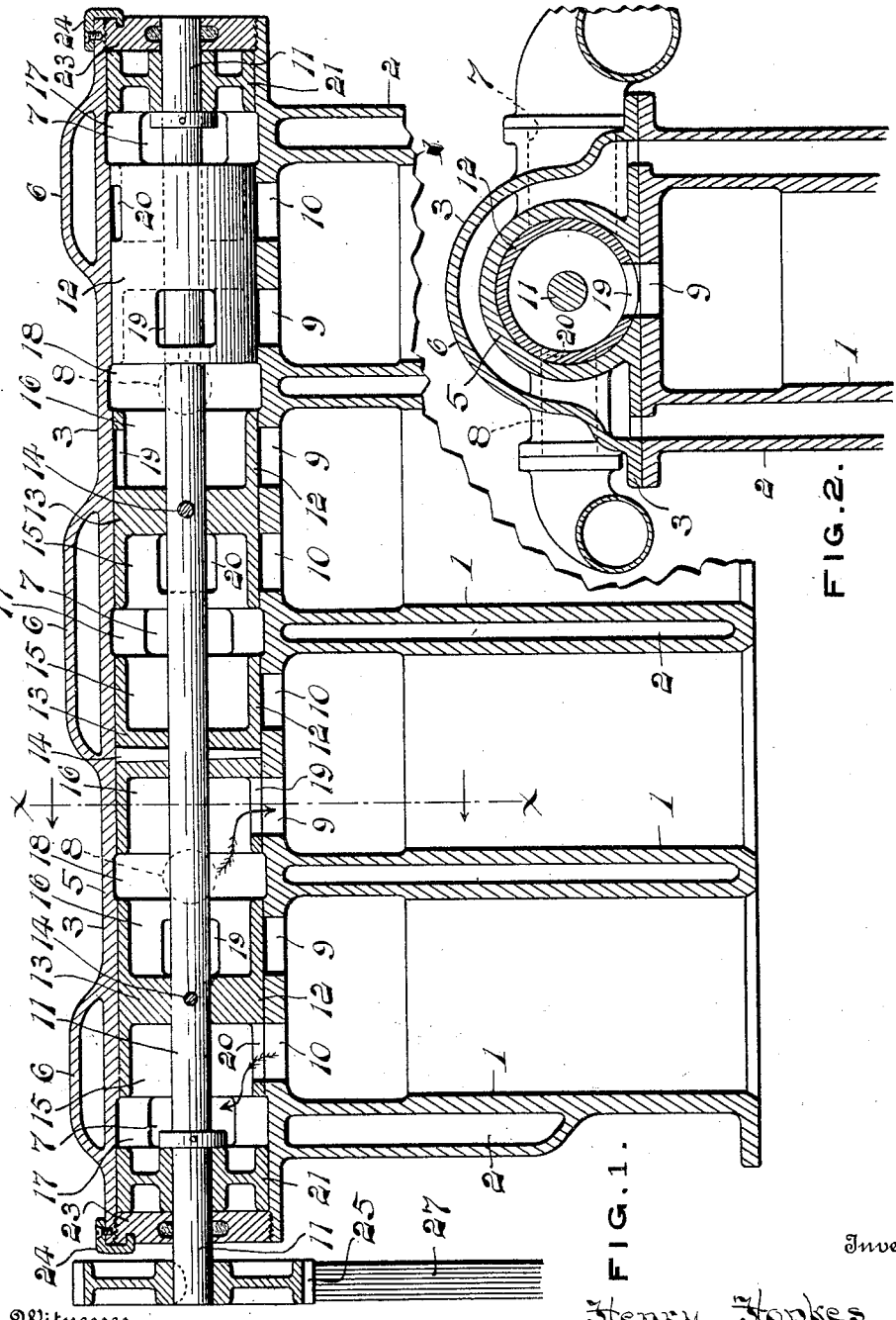


FIG. 1.

FIG. 2.

Witnesses

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ROTARY VALVE FOR ENGINES.

1,098,574. Specification of Letters Patent. Patented June 2, 1914.

Application filed March 2, 1912. Serial No. 681,216.

To all whom it may concern:

Be it known that I, HENRY HOPKES, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Rotary Valves for Engines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in internal combustion engines and more particularly to a rotary valve construction for such engines.

The object of the invention is to provide a simple, cheap, compact and efficient valve construction which is so made that it may be readily assembled and adjusted to give the proper timing of the opening of the ports and the invention consists in the matters hereinafter set forth and more particularly pointed out in the claims reference being had to the accompanying drawing, in which—

Figure 1 is a vertical longitudinal section through the upper portion of the cylinders of an engine and a valve construction embodying the invention applied thereto: and Fig. 2 is a transverse section of the same upon line *x—x* of Fig. 1.

For convenience of illustration the invention is shown as applied to a four-cycle engine, the cylinders of which are cast *en bloc* but it will be understood that it may be applied to engines having any number of cylinders cast as desired. The several cylinders 1 are cast with a water jacket 2 and formed at their upper ends with a seat for a detachable head 3 which extends across the entire number of cylinders. This head is secured to the upper end of the cylinders by bolts (not shown) in the usual manner and is formed with a cylindrical casing 5 extending throughout its length and partially surrounded by a water jacket 6 which is in communication with the water jacket 2 of the cylinders. Near each end of the casing 5 is a laterally extending exhaust passage 7 and a similar passage is provided intermediate its ends substantially opposite the space between the two middle cylinders. Two intake passages 8 extend laterally from the casing in a direction opposite to that of the exhaust passages and these intake passages are located substantially in the planes of the spaces between the two adjacent cylinders at each end of the motor to supply combustible charges thereto. The casing 5 is bored longitudinally to form a seat for a valve and an inlet port 9 and an exhaust port 10 is formed in the bottom of the casing to open directly into the upper end or explosion chamber of each cylinder.

The valve consists of a shaft 11 upon which is strung a series of cylindrical sleeves or valve members 12, one sleeve opposite the upper end of each cylinder and these sleeves are each secured upon the shaft in spaced relation so that the spaces between the ends of the sleeves will come opposite the several intake and exhaust ports and passages in the casing. Each valve member is formed with a web or hub portion 13 intermediate its ends having an axial opening to receive the shaft 11 and supporting the member in place thereon. A pin 14 passing through a suitable opening in this hub portion and through an opening in the shaft firmly secures each member in place upon the shaft. Each cylindrical member or sleeve is thus made hollow or provided with a chamber 16 in one end and a like chamber 15 in the opposite end, said chambers opening through the ends of the member and forming parts of the adjacent inlet and exhaust passages 18 and 17 respectively, in the casing at the ends of said member. Each valve member is also formed with an inlet opening 19 through which its chamber 16 communicates with the interior of the engine cylinder when the valve is turned to bring said port into register with the port 9 in the head of the cylinder, and a like port or opening 20 is provided near the opposite end of each valve member to register with the ports 10 in the head of the cylinder and permit the products of combustion to pass into its chamber 15 and out through the adjacent exhaust passage 18 in the casing.

The several valve members fit closely within the valve casing and the shaft 11 upon which they are secured is supported at each end by bearings 21 fitting within the outer ends of the casing and secured in place by any suitable packing disks 23 which are screwed into the ends of the casing and are prevented from turning by means of locking members 24.

The shaft 11 and several valve members secured thereto are turned by means of a suitable wheel 25 secured upon one end of

the shaft and to actuate the valve in proper timed relation to the movement of the several engine pistons, a chain belt 27 engages the sprocket wheel and is driven in any suitable manner (not shown) as by a wheel on the crank shaft of the engine. Obviously the valve shaft may be turned by other means and changes may be made in the construction and arrangement of the valve and its parts without departing from the spirit of my invention. I therefore do not wish to limit myself to the particular form, construction or arrangement shown.

Having thus fully described my invention what I claim is:—

1. The combination with a plurality of engine cylinders, of a head secured upon said cylinders and formed with a cylindrical valve casing extending across the several cylinders, said casing being provided with a common inlet and a common exhaust passage for adjacent cylinders and with two ports opening into the upper end of each cylinder, a shaft in the axis of the casing, a cylindrical valve member for each cylinder fitting within the casing and each formed with a transverse wall intermediate its ends providing a chamber at each end of the member communicating with the inlet and exhaust passages and forming a bearing for said shaft, said members being secured in spaced relation upon said shaft and provided with ports to register with the ports in the casing, and means for actuating the shaft.

2. The combination with a plurality of engine cylinders, of a head secured upon the upper ends of said cylinders formed with a cylindrical valve casing extending across the several cylinders and forming a valve seat having ports opening into the upper ends of the several cylinders said head being also formed with intake and exhaust passages extending laterally from the valve casing and communicating with the interior thereof, a shaft in the longitudinal axis of said valve casing, bearings for said shaft in the ends of said valve casing, a cylindrical valve member fitting within the valve casing opposite the upper end of each cylinder, said valve members being secured upon said shaft in spaced relation to form passages between their adjacent ends communicating with the inlet and exhaust passages in the head, and each valve member being formed with a transverse wall through which the shaft extends and in which it is secured, said wall forming a chamber in each end of the member opening through said end, and each member being formed with a port in the side of each of said chambers adapted to register with the ports in the casing, and means for turning the shaft to turn the several valve members.

3. The combination with a plurality of engine cylinders having water jackets, of a head secured upon the upper ends of said cylinders and formed with a cylindrical valve casing extending horizontally through the head from end to end thereof with a water jacket surrounding the casing in communication with the water jacket of the cylinders, said head being also formed with intake and exhaust passages extending laterally from and opening into said casing and said casing being provided with ports at its lower side opening into the upper end of each cylinder, bearings in the ends of said casing, a shaft mounted in said bearings, a plurality of cylindrical valve members fitting within the casing and each formed with a transverse wall through which the shaft extends and in which said shaft is secured to hold said members spaced apart with passages between their adjacent ends communicating with the intake and exhaust passages, said wall forming a chamber in each end of each member opening through said ends into the spaces between the members, and each member being provided with ports in its side opening into said chambers and adapted to register with the ports in the casing opening into the cylinders, and means secured to the outer end of said shaft outside of one of its end bearings to turn the valve members within the casing.

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

HENRY HOPKES.

Witnesses:
LEWIS E. FLANDERS,
ANNA M. DORR.