

G. B. BOWEN.
 ROTARY VALVE FOR MULTIPLE CYLINDER ENGINES.
 APPLICATION FILED MAY 2, 1912.

1,041,957.

Patented Oct. 22, 1912.

2 SHEETS—SHEET 1.

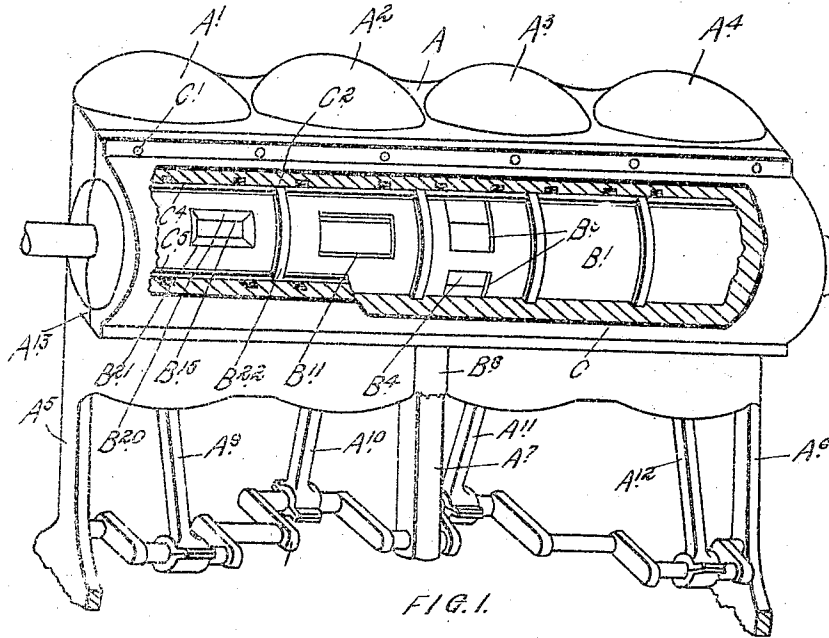


FIG. 1.

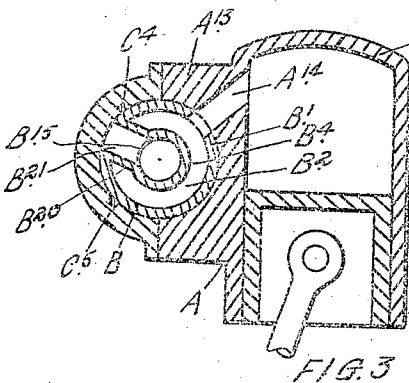


FIG. 3.

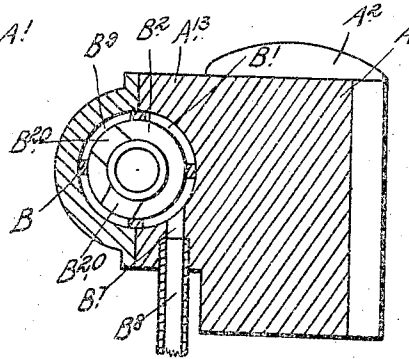


FIG. 4.

WITNESSES
A. Long.

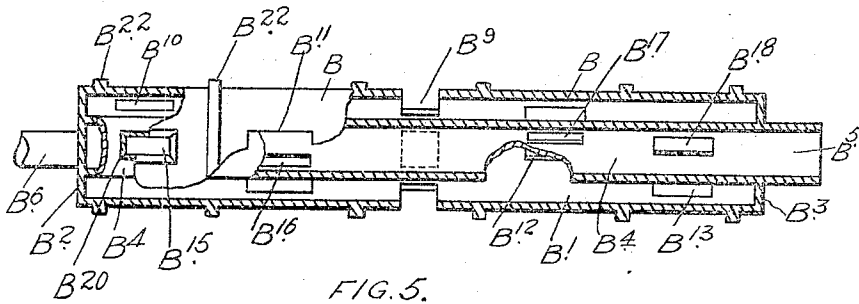
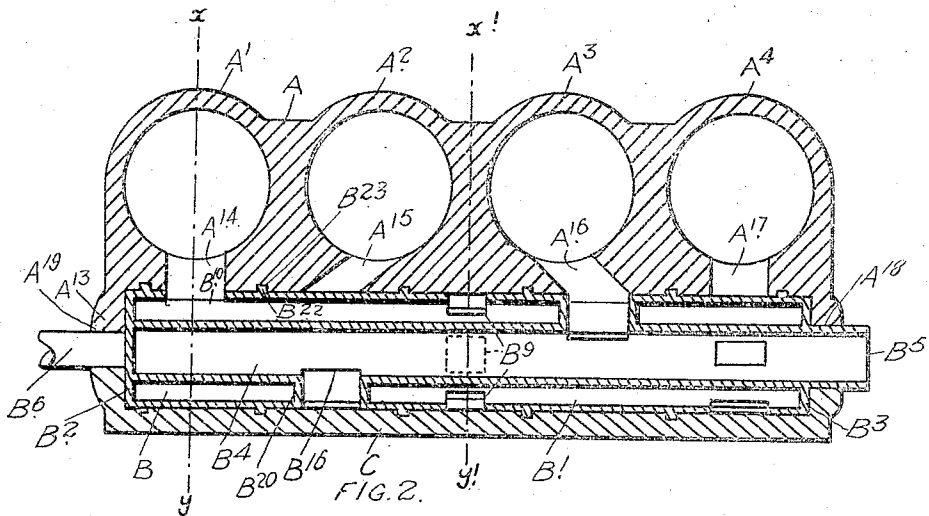
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GEORGE BRADFORD BOWEN, OF WARKWORTH, ONTARIO, CANADA.

ROTARY VALVE FOR MULTIPLE-CYLINDER ENGINES.

1,041,957.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE BRADFORD BOWEN, of the village of Warkworth, in the county of Northumberland, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Rotary Valves for Multiple-Cylinder Engines, of which the following is the specification.

My invention relates to improvements in rotary valves for multiple cylinder engines and the object of the invention is to devise a valve which will be noiseless, positive in action, not liable to get out of order and in which the ports leading to each cylinder may be packed so as to be isolated one from the other and it consists of a main cylinder casting having a port leading to each cylinder, a valve bed forming part of the main casting of the engine and into which the aforesaid ports lead, a cylinder valve journaled at each end and fitting within the bed and comprising an outer cylinder and an inner cylinder extending longitudinally through the center of the outer cylinder and open at one end to form an exhaust, a fluid inlet pipe leading into the outer valve cylinder, ports leading from the outer cylinder and registering with the ports leading to each engine cylinder and ports leading from the inner cylinder through the outer cylinder and also registering with the ports leading to the engine cylinder and a covering cap extending over the valve cylinder and secured to the valve bed the parts being arranged and described in detail as hereinafter more particularly explained by the following specification.

Figure 1, is a general perspective view of a multiple cylinder engine showing my valve applied thereto; the valve covering thereof being partially broken away and in section. Fig. 2, is a sectional view. Fig. 3, is a cross sectional view on line *x-y* Fig. 2. Fig. 4, is a cross sectional view on line *x'-y'* Fig. 2. Fig. 5, is a side elevation mostly in section of my valve cylinder.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is an engine provided with four cylinders A^1 , A^2 , A^3 and A^4 provided with depending bearings A^5 and A^6 and A^7 in which is journaled the usual form of crank shaft A^8 to which are connected the piston rods A^9 , A^{10} , A^{11} and A^{12} connected to the pistons of the cylinder.

A^{13} is my valve bed which is preferably

formed integral with the cylinder casting A. A^{14} , and A^{15} , A^{16} and A^{17} are ports leading from each of the cylinders A^1 , A^2 , A^3 and A^4 to the interior of the valve bed A^{13} .

B is my valve cylinder comprising the outer cylindrical portion B^1 having closed heads B^2 and B^3 .

B^4 is an inner cylinder extending longitudinally through the center of the outer cylinder from the head B^2 to and through the head B^3 terminating in an open end B^5 . The projecting open end B^5 is journaled in bearings A^{18} . The opposite end of the cylinder B^1 is provided with a shaft B^6 preferably formed integral therewith. The shaft B^6 is journaled in bearings A^{19} formed in a cylinder bed A^{13} . The shaft B^6 is also provided with suitable gears (not shown) connecting the main crank shaft A^8 with the shaft B^6 and from which the shaft B^6 is driven. B^7 is a port (see Fig. 4) leading into the valve bed A^{13} into which is connected the gas or fluid inlet pipe B^8 .

B^9 are a series of ports arranged circumferentially around the cylinder B^1 whereby gas is admitted through the inlet pipe B^8 through the port B^7 , and ports B^9 into the interior of the cylinder B between the inner wall of the cylindrical portion B^1 and the exterior wall of the inner cylinder B^4 .

B^{10} , B^{11} , B^{12} and B^{13} are ports (see Figs. 2 and 5) leading from the interior of the cylinder B^1 and registering with the ports A^{14} , A^{15} , A^{16} and A^{17} leading to the cylinders A^1 , A^2 , A^3 and A^4 . By this means gas or other fluid is admitted from the valve cylindrical portion B^1 to the cylinders of the engine.

B^{15} , B^{16} , B^{17} and B^{18} are ports leading from the inner cylinder B^4 . The ports B^{15} , B^{16} , B^{17} and B^{18} are provided with surrounding walls B^{19} connecting the inner cylinder B^4 with the outer cylinder B^1 . The outer cylinder B^1 is provided with corresponding ports B^{20} corresponding to each of the ports B^{15} , B^{16} , B^{17} and B^{18} . It will, of course, be understood that there is a port B^{15} in the other cylinder to correspond and register with each of the ports A^{14} , A^{15} , A^{16} and A^{17} leading to the engine cylinder. By this means after the working stroke of the engine is completed the ports B^{15} , B^{16} , B^{17} and B^{18} are brought into alignment with the ports A^{14} , A^{15} , A^{16} and A^{17} so that the burnt gases are carried into the inner cylinder B^4 and passed through the open end thereof

into a suitable exhaust pipe (not shown). To each side of each set of valve cylinder ports an annular rib B^{22} is located. The annular rib B^{22} is formed integral with the valve cylinder B' and fits into the correspondingly formed grooves B^{23} and in the valve bed.

C is the covering cap which extends over the valve cylinder B and is secured by suitable bolts C' to the valve bed A^{13} of the engine. The cap C is also provided with interior grooves C^2 into which the ribs B^{22} fit. By this means the gas is prevented from passing between the bed and the valve cylinder B' to the next adjacent set of inlet and exhaust ports. C^4 and C^5 are spring packing strips extending between each of the annular ribs B^{22} to each side of the exhaust and inlet ports of the valve cylinder B. These packing strips prevent gas from passing between the cylinder and valve bed from the inlet to the exhaust port.

From this description it will be seen that I have devised a very simple form of valve which will be noiseless in its operation, which will be positive in action and not liable to get out of order, and in which the ports may be readily packed so as to be isolated one from the other.

What I claim as my invention is.

1. In a device of the class described, the combination with the cylindrical valve bed having ports leading therefrom, of a cylindrical valve journaled therein and comprising an outer cylindrical member having closed heads, an inner cylindrical member

extending longitudinally through the outer cylindrical member and extending at one end through one of the closed heads of the outer cylinder, ports leading from the outer cylinder and arranged in circumferential alinement with the ports of the valve bed, ports leading from the inner cylindrical member through the outer cylindrical member and also arranged in circumferential alinement with the ports of the valve bed, annular ribs extending from the outer cylindrical member of the valve between each set of inlet and exhaust ports into corresponding grooves in the valve bed and cap and backing strips extending between each pair of annular ribs to each side of each port, as and for the purpose specified.

2. In an engine, the combination with a plurality of cylinders, a cylindrical valve bed and ports connecting the interior of the bed and the cylinders together, a rotary valve journaled in the bed, said valve comprising an outer and inner cylindrical member, a series of ports in the outer member, a series of ports in the inner member, and means for preventing the gas leaking from one of the ports to the other, said means comprising an annular rib between each of the ports, said annular ribs extending into annular grooves in the interior of the valve bed.

GEORGE BRADFORD BOWEN.

Witnesses:

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