

UNITED STATES PATENT OFFICE.

GEORGE E. CONWAY, OF TENAFLY, NEW JERSEY.

VALVE FOR MOTORS.

Application filed September 7, 1920. Serial No. 408,411.

To all whom it may concern:

Be it known that I, GEORGE E. CONWAY, a citizen of the United States, residing at Tenafly, in the county of Bergen and State of New Jersey, have invented a certain new and useful Improvement in Valves for Motors, of which the following is a specification.

The invention relates to motors or engines in which two pistons in axial alignment reciprocate oppositely, the space between the pistons serving as a chamber in which gases or other mediums are allowed to expand or explode for the purpose of developing power, and the object of the invention is to provide a free annular port or opening of large area to permit easy and regular flow of incoming or exhaust gases in a motor of this character, and to provide a valve for such port, of such form and construction as to permit uniform heating and cooling and the avoidance of distortion due to unequal expansion.

The invention consists in certain novel features of construction and arrangement by which the above and other objects are attained, to be hereinafter described and claimed.

The accompanying drawing forms a part of this specification and is a vertical section, partly in elevation, showing an internal combustion engine having a pair of pistons arranged tandem and the hollow cylindrical valves controlling the inlet and exhaust passages and serving also as cylinders for the pistons.

Referring to the drawing, 1 is a casing bored at each end to form cylindrical guides 2 and 3, provided with a water-jacket 4 and an annular inlet chamber or passage 5 for incoming gas from a carburetor 6, and an annular outlet or exhaust chamber or passage 7 in communication with an exhaust pipe or manifold 8.

The inlet passage has an annular opening or port 9 on the interior of the guide 3 and the exhaust passage is in communication with a similar port 10. Between the ports is a partition 11 extending annularly into the bore of each guide and having its opposite faces beveled or ground angularly to form conical valve-seats, as at 12 and 13.

The valves, which also serve as the cylinders for the motor, are marked 14 and 15. They are true cylinders finished exteriorly to match to the guides 2 and 3 in which they

are inclosed and each provided with suitable packing 16 to insure a gas tight fit therein. The hollow interior of each is smoothly finished to receive the pistons, marked 17 for the valve 14 and 18 for the valve 15, and the adjacent annular ends of the valves are coned to match to the valve-seats 12 and 13 and make gas tight contact therewith.

The pistons reciprocate in opposite directions in the hollow cylindrical valves, thus increasing and diminishing the space between them as required for the cycle of intake, compression, explosion, and exhaust, and are correspondingly connected by the rods 19 and 20 to the cranks 21 and 22 which revolve in opposite directions as shown by the arrows.

At diametrically opposite points on the projecting outer end of each valve are studs or trunnions 23, 24 which receive the legs 25, 26 of the bifurcated rocking levers 27, 28 fulcrumed at 29 and 30 respectively on the outer ends of the guides 2 and 3.

The rocking levers 27 and 28 carry each a roller 31 in contact on the outer face with a cam, marked respectively 32 and 33, and on the inner face each roller is acted upon by a strong helical spring 34 abutting against a bracket 35 fixed on the casing 1 and adjustable as to tension by the screws 36 in the arms of the bracket.

The cams, through the levers 27 and 28 and in opposition to the springs 34, move the cylindrical valves outwardly and permit the springs to force the valves yieldingly inwardly to their seats, and are so timed relatively to each other and to the positions of the pistons 17 and 18 as to operate the valve properly in making the cycle.

In the position shown, the exhaust port 10 is open to permit the spent gases to escape and the pistons are approaching each other to force out such gases. At the completion of the inward movement of the pistons the cam 32 will permit the spring to move the cylindrical valve 14 to its seat, and the cam 33 will move the valve 15 from its seat to initiate the intake or suction through the port 9. Both valves will remain closed during compression and during the effective outward stroke of the pistons following ignition by the spark plug 37.

The cam-shafts 40 and 41 may be understood to be driven by any suitable gearing from the power shafts 38 and 39.

It will be noted that the cylindrical valves expose large unobstructed annular ports through which the exhaust gases and incoming vapor-laden air may flow freely.

5 I claim:—

1. A casing having a continuous bore therethrough, with a partition and annular inlet and exhaust passages and annular inlet and exhaust ports communicating there-
10 with, the opposite faces of said partition serving as valve seats, reciprocatory valves one upon each side of said partition and controlling said ports respectively and fitted
15 to said bore, a reciprocatory piston in each of said valves, and means for actuating said valves independently for controlling the inlet and exhaust through said ports for both
pistons.

2. A casing having a continuous bore
20 therethrough, with a partition and annular inlet and exhaust passages and annular inlet and exhaust ports communicating there-
with, the opposite faces of said partition serving as valve seats, reciprocatory valves

one upon each side of said partition and
25 controlling said ports respectively and fitted to said bore, a reciprocatory piston in each of said valves, means for actuating said
30 valves independently for controlling the inlet and exhaust through said ports for both pistons, and means for yieldingly and independently seating said valves.

3. A casing bored cylindrically, having
inlet and exhaust passages and annular in-
35 ternal ports communicating with such passages, a partition between such ports having
annular valve-seats on its opposite faces, a cylindrical valve in each end of said casing,
40 each of said valves matching to one of said valve-seats, a reciprocating piston in each of said valves, a connection from each
of said pistons to a crank, cams for moving
said valves axially from said seats, and
yielding means for seating said valves.

In testimony that I claim the invention
45 above set forth I affix my signature.

GEORGE E. CONWAY.