W. D. TIPTON.

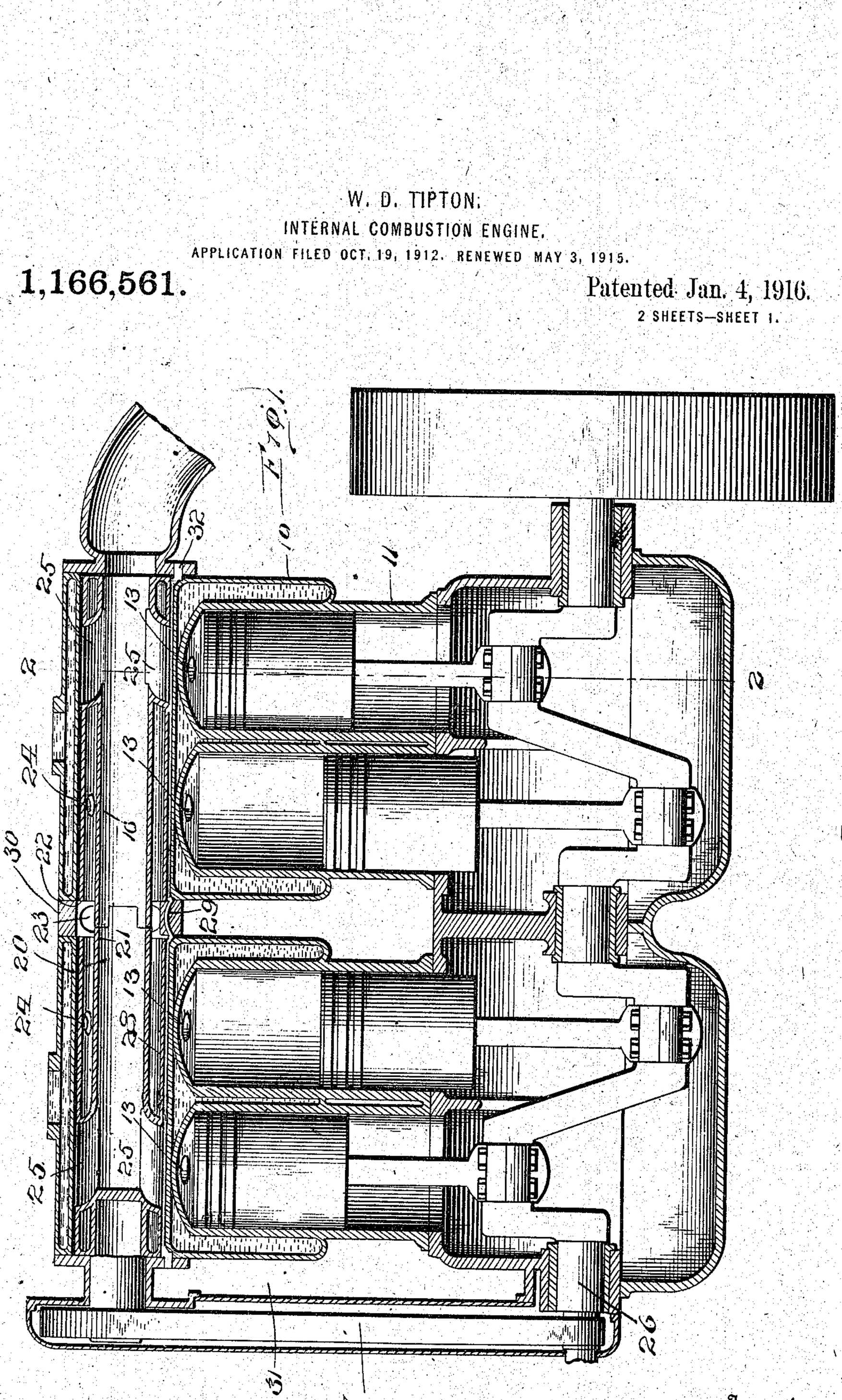
INTERNAL COMBUSTION ENGINE.

APPLICATION FILED OCT. 19, 1912. RENEWED MAY 3, 1915.

1,166,561.

Patented Jan. 4, 1916.

2 SHEETS—SHEET 1.



Witnesses

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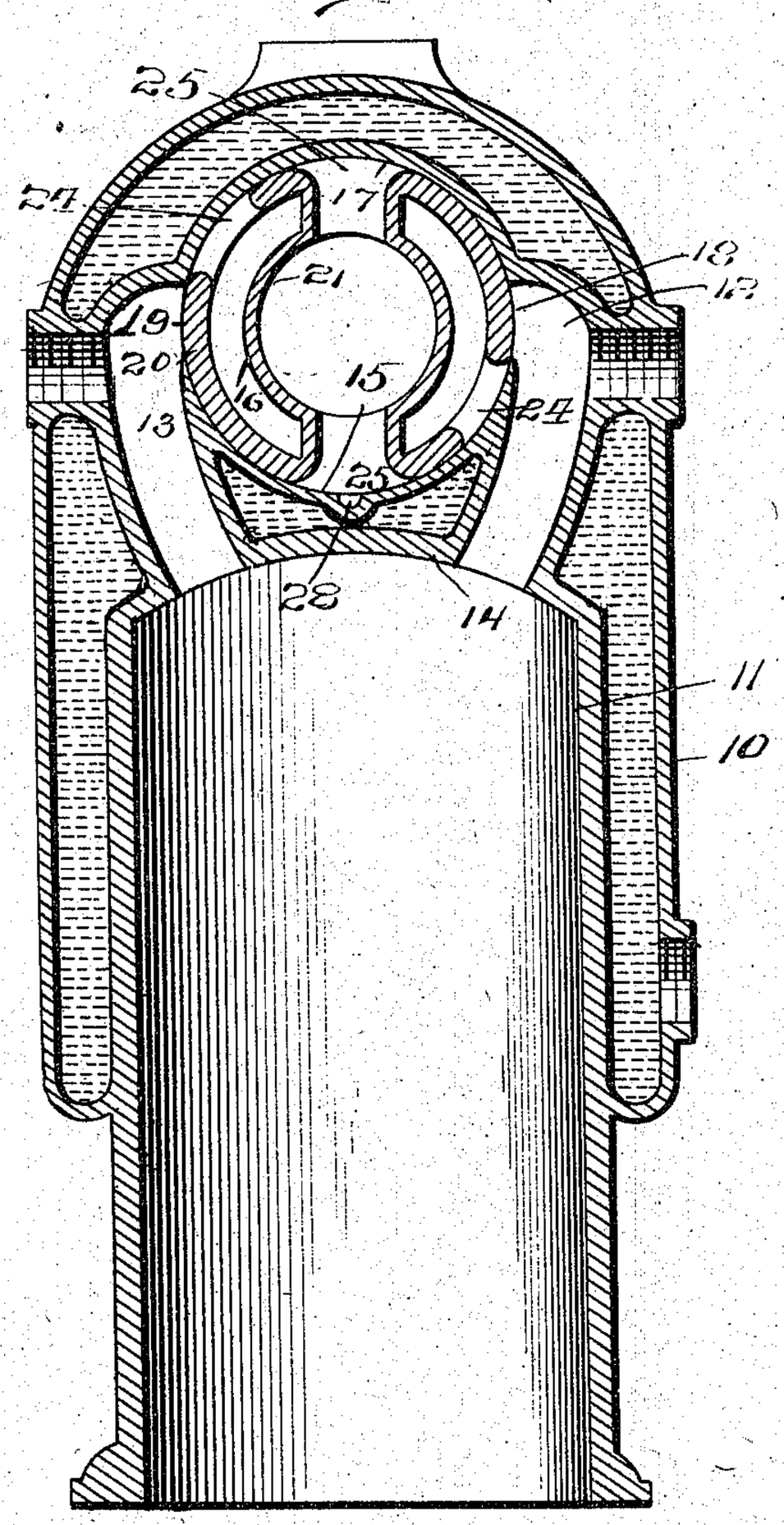
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

1,166,561. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed October 19, 1912, Serial No. 726,836. Renewed May 3, 1915. Serial No. 25,632.

To all whom it may concern:

Be it known that I, WILLIAM D. TIPTON, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Internal-Combustion Engines; and I do hereby 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 has for an object to provide a balanced valve serving both as an inlet and exhaust valve with means for actuating the said valve in timed relation to the reciprocation of the pistons.

A further object of the invention is to provide a piston having two ports serving alternately as exhaust and inlet ports with a valve located and rotating between the ports, said valve being provided with passages proportioned and positioned to communicate with the ports at proper timed intervals to serve as exhaust and inlet ports upon opposite sides of the valve respectively.

With these and other objects in view the invention consists in the construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

In the drawings: Figure 1 is a vertical longitudinal sectional view through one of the valves shown in conjunction with a four cylinder engine. Fig. 2 is a vertical sectional view at right angles to Fig. 1 and taken on the line 2—2 of Fig. 1 with the piston removed from the cylinder.

Like reference characters indicate corresponding parts throughout the several views in the drawings.

The improved valve which forms the subject matter of this application is adapted to be used with any ordinary form of internal combustion engine, represented at 10 and shown in the drawing as a four cylinder engine, although it is to be understood that the number of cylinders is wholly immaterial to the present invention.

Each of the cylinders 11 is provided with two ports 12 and 13 extending from adjacent sides of the cylinder and separated by a partition 14 preferably water-jacketed as indicated at Fig. 2.

The partition 14 is provided upon its upper side with a bearing surface 15 for the valve shown as a whole at 16 to rotate in, the housing being also provided upon its upper surface with a complementary bearing surface 17, with openings 18 and 19 formed between the said partition and the upper part of the cylinder.

The valve 16 comprises an outer shell 20 proportioned to rotate in the bearing surfaces 15 and 17 and with a concentric inner tube 21 extending substantially the entire length of such valve. At its middle the outer shell 20 is interrupted as indicated at 22 and communicates with a passage 23 supplying explosive mixture to the engine. This interrupted space 22 extends entirely around the valve and is at all times in communication with the passage 23, so that the space between the outer shell 20 and the inner tube 21 is continuously filled with the explosive mixture.

Through the outer shell 21 ports 24 are formed positioned to register at times with the passages 12 and 13 so that as the valve rotates the chamber between the outer shell 20 and the inner tube 21 is put in communication with the cylinder 11 to receive a charge of the explosive mixture from such chamber. The outer shell 20 is provided with two of the ports 24 for each of the cylinders located at diametrical points, so that two of the ports 24 are simultaneously in registry with the ports 18 and 19 by which arrangement the discharge of explosive mixture from the chamber into the pistons 12 and 13 is accurately balanced.

The inner tube 21 serves as an exhaust passage and ports 25 are formed extending through the chamber intervening between the outer shell 20 and the inner tube 21 and positioned to register at times with the ports 18 and 19 and to receive exhaust from the cylinder 11 through the passages 12 and 13. The ports 25 are like the ports 24 located at diametrical points upon the valve so that both the ports 25 register simultaneously with the ports 18 and 19, so that the discharge of the vitiated gases from the cylinder 11 impinges equally upon both sides of the valve 16, whereby the valve is also accurately balanced as regards the exhaust.

The valve 16 is rotated in timed relation

with the driving shaft 26 through any usual and ordinary transmission mechanism illustrated diagrammatically as the belt 27.

For the purpose of lubricating the valve 16 a furrow 28 is formed throughout the entire length of the bearing surface 15 and at the middle where the bearing surface is interrupted is continued by a passage 29 through the filler block 30, which accommodates the inlet passage 23. Oil is supplied in the compartment 31 by any usual and ordinary forcing mechanism, such as a pump or the like, and rising in such compartment 31 passes through the entire length of the furrow 28 with its intervening passage 29, and is discharged through the orifice 32 preferably into some sight arrangement, although such arrangement is wholly immaterial to the present invention, the essence being that the furrow should remain filled with oil from the compartment 31 at all times to provide adequate lubrication to the valve 16. It will be apparent therefore that as the valve 16 rotates it will be lubricated from said furrow 28 and will alternately discharge explosive mixture from the inlet passage into the passages 12 and 13 and into the cylinder 11 upon opposite sides of the valve 16 to accurately balance such valve and that the exhaust ports as the valve rotates will also simultaneously register with the passages 12 and 13 to likewise balance the valve.

I claim:

1. The combination with an internal combustion cylinder, of a valve rotating adjacent the cylinder and provided with an inner and an outer chamber, a valve casing inclosing the valve and comprising two sections spaced apart, means including an independent annular member having an inner annular channel disposed between said sections to supply explosive mixture to the outer chamber, said outer chamber being provided with diametrically disposed ports adapted to communicate at times with the cylinder and the inner chamber being provided with other ports disposed diametrically and positioned to register at other times with the cylinder.

2. The combination with an internal combustion cylinder, having passages leading therefrom and terminating in spaced ports, of a valve rotating between the ports and comprising inner and outer chambers, a valve casing inclosing the valve and comprising two sections spaced apart, means including an independent annular member having an inner annular channel disposed between said sections to supply explosive mixture to the outer chamber, said outer chamber having ports positioned to at times register with the passages of the cylinder and the inner chamber having ports positioned to at other times register with the passages of the cylinder.

3. The combination with an internal combustion cylinder, having passages leading therefrom terminating in spaced ports, of a cylindrical valve mounted to rotate between the ports and embodying an inner exhaust chamber and an outer inlet chamber, a valve casing inclosing the valve and comprising two sections spaced apart, means including an independent annular member having an inner annular channel disposed between said sections to supply an explosive mixture to the inlet chamber, said chamber having diametrically spaced ports positioned to at times register with the passages of the cylinder and an exhaust conduit having diametrically disposed ports positioned to at other times register with the passages of the cylinder, the casing for the valve including a partition wall between the spaced ports, one port of each chamber being simultaneously cut off by said partition wall.

4. The combination with a plurality of internal combustion chambers and pistons reciprocating therein, of a cylindrical valve mounted to rotate across and in communication with the several cylinders, a casing for the valve formed in sections spaced apart, a filler member located between said sections and formed with a channel admitting gas to the valve, a furrow formed in the casing along the under side of the valve, and means to pass a lubricant through the furrow, the filler member having a passageway for the lubricant.

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

WILLIAM DOLLY TIPTON.

Witnesses:

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HUGH R. SPENCER.