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Feb. 5, 1929. 1,700,862

R. J. THOMPSON

INTERNAL COMBUSTION ENGINE VALVE

Filed Oct. 6, 1925 2 Sheets-Sheet 1

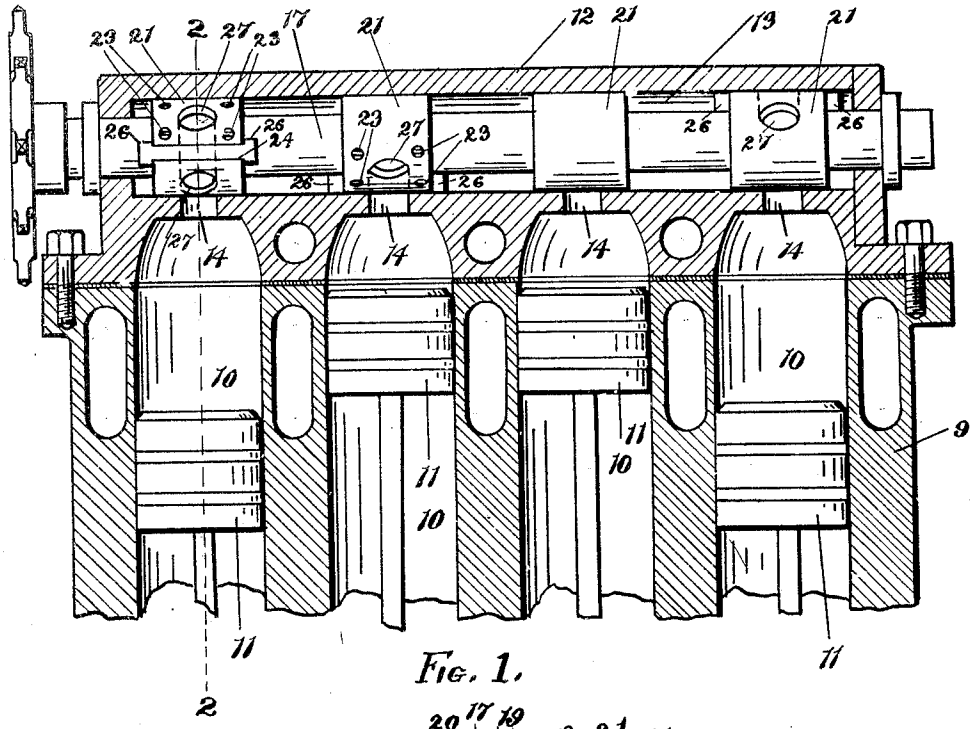



Fig. 1.

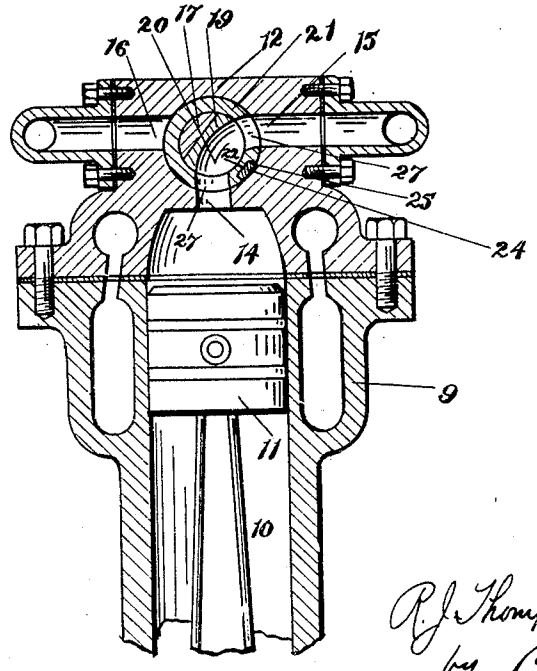



Fig. 2.

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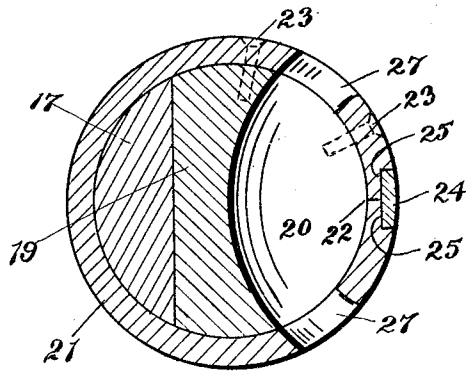



Fig. 3.

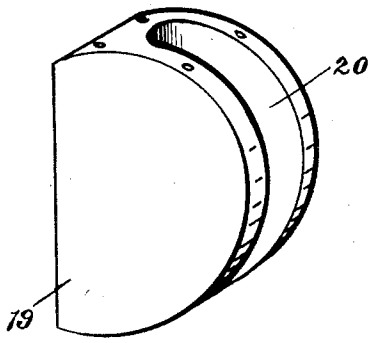



Fig. 4.

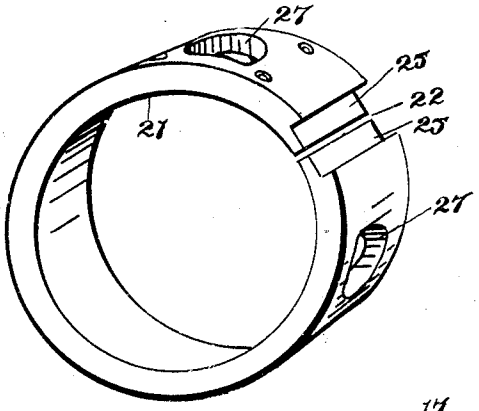



Fig. 5.

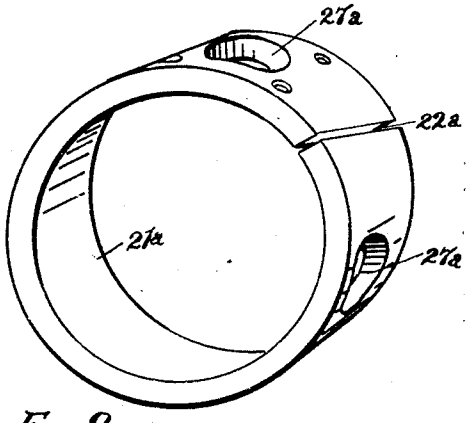



Fig. 8.

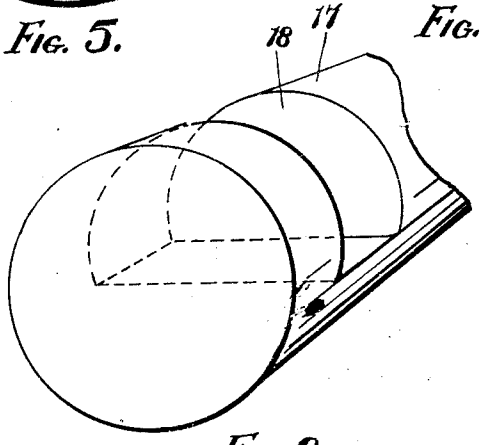



Fig. 6.

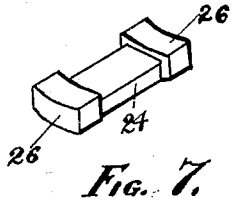



Fig. 7.

Inventor

R. J. Thompson

by R. J. Foster

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Patented Feb. 5, 1929. 1,700,862

# UNITED STATES PATENT OFFICE.

ROBERT J. THOMPSON, OF HARRISBURG, PENNSYLVANIA.

## INTERNAL-COMBUSTION-ENGINE VALVE.

Application filed October 6, 1925. Serial No. 60,902.

The present invention relates to rotary valve mechanisms for internal combustion engines, the object being to provide a structure that is practical and has relatively little friction surface, and is one that is easily constructed and readily repaired.

In the accompanying drawings:

Figure 1 is a vertical sectional view through an engine illustrating the valve mechanism in elevation,

Figure 2 is a cross sectional view taken on the line 2—2 of Figure 1,

Figure 3 is a detail cross sectional view on an enlarged scale through the valve,

Figure 4 is a detail perspective view of one of the filling blocks,

Figure 5 is a similar view of one of the packing rings,

Figure 6 is a detail perspective view of the shaft,

Figure 7 is a detail perspective view of one of the packing keys,

Figure 8 is a perspective view of a modified form of ring.

In the embodiment disclosed, an engine block is shown, comprising a cylinder member 9 containing a plurality of piston chambers 10. Mounted to reciprocate in these chambers are pistons 11. It will be understood that this structure may be of any well known or desired type.

On the cylinder member is fixed a head 12, in which is formed a valve chamber 13 extending over and common to all the piston chambers 10. This valve chamber 13 is in communication with the various piston chambers 10 by means of ports 14, and in the same planes with said ports, but in opposite sides of the head block, are formed intake or supply ports 15 and exhaust ports 16.

A rotary shaft 17 extends through the valve chamber 13 and is driven by any suitable means. This shaft is provided with a series of transversely disposed recesses 18 that are located in the same planes with the ports 14, 15 and 16. In the recesses 18 are fitted detachable filler blocks 19 that fill the recesses and have their outer surfaces curved to conform to the curvature of the shaft. Each of the blocks is provided with a pocket or passageway 20. Surrounding the shaft and covering the blocks 19 are packing rings 21, preferably of spring material and split, as shown at 22. These rings are each secured at one end, and as indicated at 23, to its block, the other end being free. The cut or split portion is bridged by a packing key 24, preferably fitted into recesses 25 formed in the ends of the ring, the key having enlarged heads 26 projecting beyond the ring. The rings furthermore have in their end portions ports 27 that are in communication with the pockets 20 of the blocks, and these ports 27 are so disposed that they move into and out of register with the ports 14, 15 and 16 of the piston chambers, so as to alternately afford communication through the pockets 20 between the ports 14, and 15, and between the ports 14 and 16 as the shaft rotates.

With this construction therefore, it will be evident that as the shaft 17 is rotated in synchronism with the movements of the pistons, the supply ports 15 will be brought into communication with the ports 14 and supplies of fuel thus enter the piston chambers 10. After the explosions take place, the ports 14 will be brought into communication with the exhaust ports 16 and allow the escape of the exhaust gases.

In this construction, a practical rotary valve is provided, in which a relatively small amount of friction surface is necessary, and this is divided up so that it is at the points where proper resistance is secured to the force of the exploding charges. The parts are easily manufactured, they are duplicated and may be rearranged and adjusted or replaced as desired.

Moreover the rings will fit the valve chamber walls even though the shaft is not entirely true and accurate and the block 19 will accommodate itself to any reasonable change in the ring. It furthermore acts as an anchor for the ring, and being tightly fitted thereto, provides an oil-proof joint. Moreover in addition to the fact that any block can readily be replaced, these blocks can be individually more easily shaped than would be the drilling and milling of the shaft itself.

In Figure 8 a slightly modified form of construction is illustrated, in which the ring $21^a$ is substantially the same as the ring 21, already described, except that no packing key, as 24, is employed, but the ring is split diagonally, as shown at $22^a$; otherwise its structure and operation is the same as that already described.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be ap-

parent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

What I claim, is:

1. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, and a block fitted into said seat and having a fluid passageway.

2. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat and having a fluid passageway, and a ring surrounding the block and shaft.

3. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat and having a fluid passageway, and a ring surrounding the block and shaft and having ports communicating with the passageway to permit the passage of fluid therethrough.

4. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat and having a fluid passageway, and a split spring ring surrounding the block and shaft and having ports in its ends communicating with the passageway to permit the passage of fluid therethrough.

5. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat and having a fluid passageway, and a split spring ring surrounding the block and shaft and having its cut or split over the block, and a packing bridge key between said end, said ends having ports in its ends communicating with the passageway to permit the passage of fluid therethrough.

6. A rotary valve for internal combustion engines, including a rotary shaft, a split spring ring surrounding the shaft and rotatable therewith, said ring having ports in its ends on opposite sides of the split for the passage of fluid, a passageway within the ring connecting the ports and a packing key fitted between the ends of the ring and between the ports.

7. In an internal combustion engine, the combination with a cylinder member having a plurality of piston chambers and pistons therein, of a valve chamber common to the piston chambers and having ports in communication therewith, a rotary shaft in the valve chamber having pockets alined with the ports, blocks in said pockets having passageways, and a plurality of split rings surrounding the shaft and blocks and having ports that move into and out of communication with the piston chamber ports, said valve chamber also having intake and exhaust ports with which the ring ports communicate.

8. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat, and a split ring surrounding the shaft and block and secured to said block.

9. A rotary valve for internal combustion engines, including a rotary carrier shaft having a recessed seat, a block fitted into said seat and a split ring surrounding the shaft and block and secured to said block, said block having a passageway and said ring having ports in communication with the passageway.

In testimony whereof, I affix my signature.

ROBERT J. THOMPSON.