T. M. McKELVY.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED MAR. 24, 1916.

1,224,557.

Patented May 1, 1917.

2 SHEETS—SHEET 1.

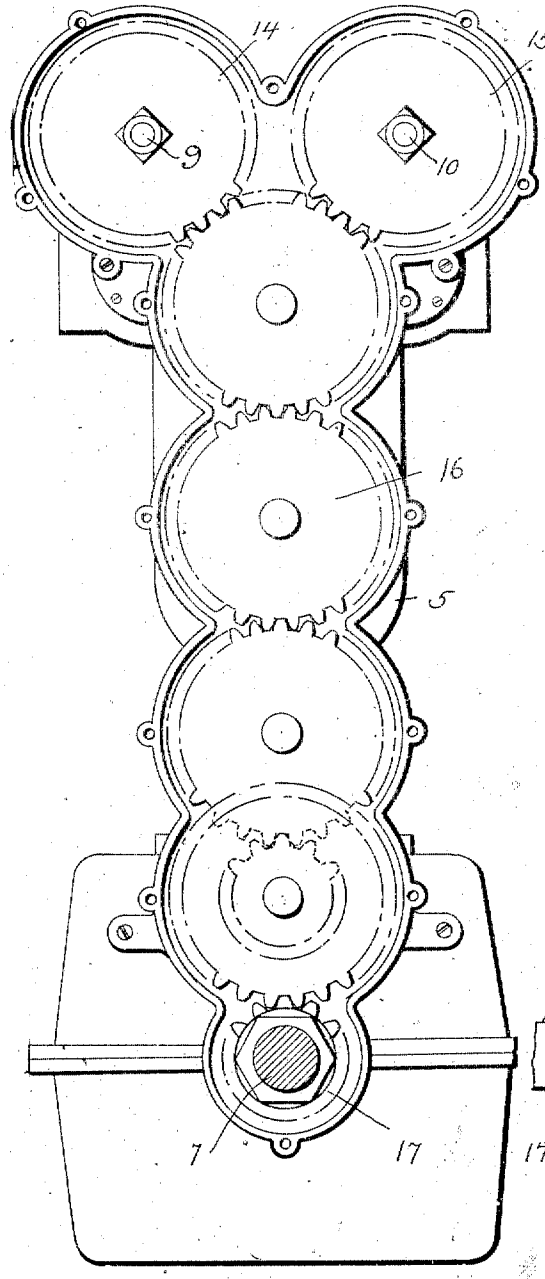


Fig. 1.

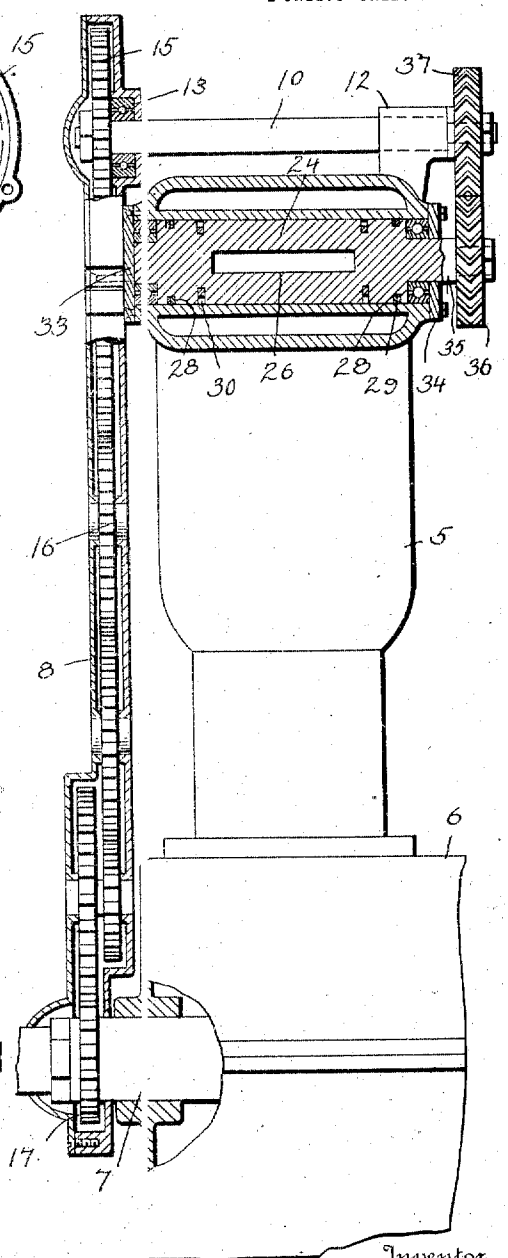


Fig. 2.

Witnesses

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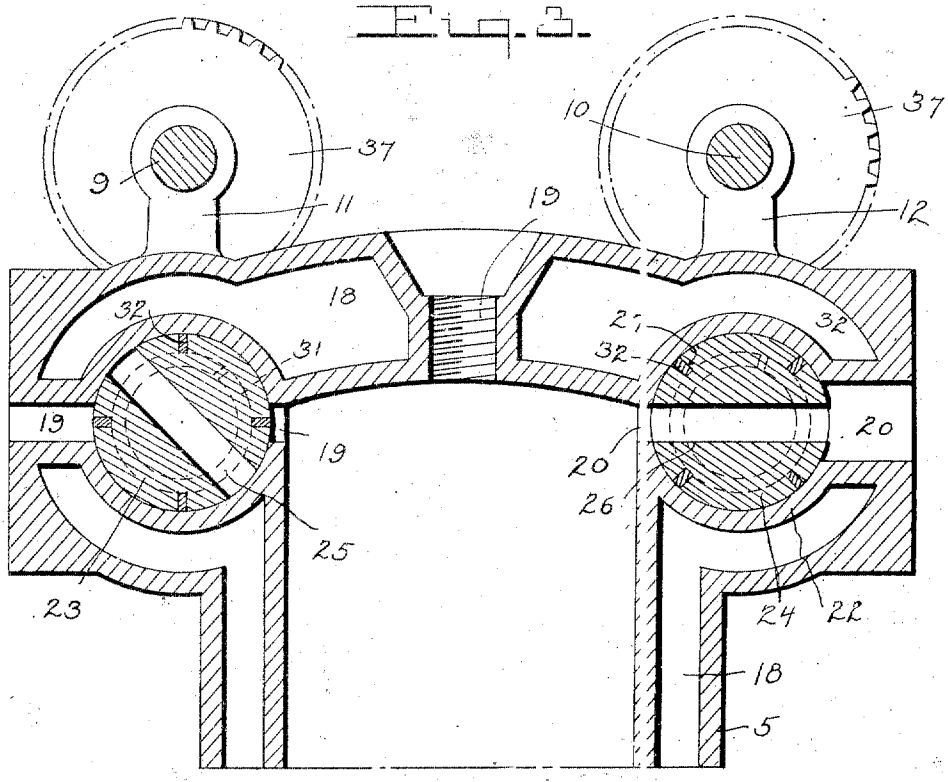
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2 SHEETS—SHEET 2.

Fig. 3.



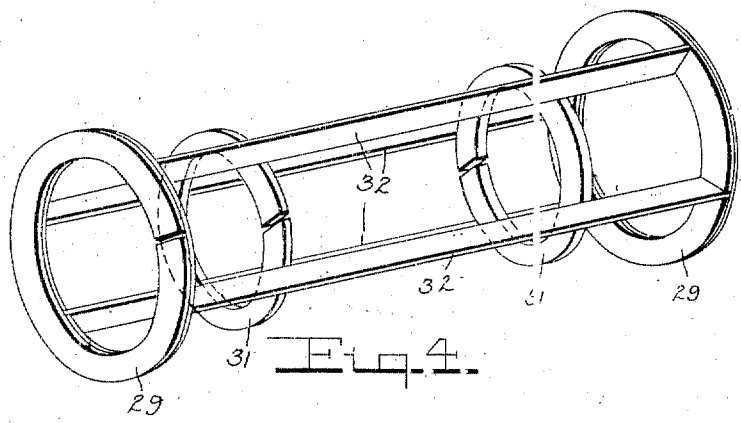


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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INTERNAL-COMBUSTION ENGINE.

1,224,557. Specification of Letters Patent. Patented May 1, 1917.

Application filed March 24, 1916. Serial No. 86,417.

To all whom it may concern:

Be it known that I, THOMAS M. McKELVY, a citizen of the United States, residing at Fresno, in the county of Fresno and State of California, 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 its primary object to provide an improved type of rotary valve and operating mechanism therefor.

Another object is the provision of means for insuring against leakage of fluid between the wall of the valve casing and the valve.

With these and other objects in view, the invention consists in the novel construction, combination and arrangement of parts as will be hereinafter specifically described, claimed and illustrated in the accompanying drawing, in which:

Figure 1 represents a side elevation of the improved engine, one side of the gear case being removed,

Fig. 2 represents a front elevation of the engine, partly in section,

Fig. 3 represents a detail sectional view through the upper portion of one of the cylinders of the engine, and

Fig. 4 represents a perspective view of the leak-proof rings and packing strips removed.

Referring to the drawings in detail, wherein similar reference numerals designate corresponding parts throughout the several views, the numeral 5 indicates an engine cylinder supported upon the usual crank case 6, in which is supported the crank shaft 7. The lower portion of a two-part gear case 8 is supported adjacent one end of the crank case 6 and is secured at its upper end to the head of the cylinder 5.

A pair of spaced parallel shafts 9 and 10 is supported at one end in bearings 11 and 12, respectively, secured to the head of the cylinder 5 and the opposite ends of the shafts are supported in bearings 13 provided in the upper portion of the gear case 8. The shafts 9 and 10 are provided with gear wheels or pinions 14 and 15, respectively, which mesh with the uppermost gear wheels of a train of gears, designated generally by the numeral 16. The lowermost gear wheel 16 meshes with a drive pinion 17 non-rotatably secured to the crank shaft 7, whereby rotary movement is transmitted from the latter to the two valve operating shafts 10.

The side wall and head of the cylinder 5 are formed with the usual water chambers 18, the head being provided with the usual spark plug-receiving opening 19. Inlet and exhaust ports 19 and 20, respectively, are formed in diametrically opposed relation in the upper portion of the cylinder 5 adjacent the head and intersect the axes of horizontally disposed cylindrical valve casings 21 and 22, which are arranged directly below and in parallel relation to the shafts 9 and 10, respectively.

Rotary cylindrical valves 23 and 24 are rotatably mounted in the casings 21 and 22, the valve 23 being provided with a diametrical port 25, adapted, during rotation of the valve, to be moved into registration with the inlet port 19 to admit an explosive mixture to the cylinder 5 and the exhaust valve 24 being formed with a diametrical port 26, adapted, during rotation thereof, to be moved into axial alinement with the exhaust port 20 to permit of the exhaust of the products of combustion from the explosion chamber of the cylinder. The ports 25 and 26 in the valves 23 and 24 are so arranged as to alternately open and close the inlet and exhaust ports 19 and 20, during operation of the engine.

Each of the rotary valves 23 and 24 is formed with a plurality of longitudinal grooves 27, which extend between and communicate with the circumferential grooves 28 formed adjacent the ends of the valve. Double or compound packing rings 29 are fitted in the annular grooves 28 and are adapted to prevent the escape of fluid between the valve and the casing. Intermediate the annular grooves 28, the valve is formed with a pair of spaced annular grooves 30, of greater depth than the grooves 28 and 27 and receiving the split expansion rings 31, which engage the packing strips 32 fitted within the longitudinal grooves 27 and force said strips outwardly into frictional engagement with the bore of the valve casing, so as to prevent the fluid from leaking circumferentially of the valve between the latter and the wall of the casing.

The ends of the casings 21 and 22 are closed by plates 33 and 34 bolted or otherwise secured to the cylinder. The plates at

the ends of the casings opposite the gear case 8 are formed with apertures receiving the axially projecting stems 35 of the valves 23 and 24 on which are non-rotatably secured pinions 36, which mesh with pinions 37 carried by the shafts 9 and 10 whereby rotary movement is transmitted to the valves during operation of the engine.

What I claim is:

1. In an internal combustion engine, a cylindrical valve casing, a rotary valve mounted in said casing having a plurality of longitudinal grooves, and annular grooves of greater depth than the longitudinal grooves intersecting the latter intermediate their ends, packing strips arranged in the longitudinal grooves, and split expanding rings arranged in the annular grooves normally retaining the packing strips in outwardly extended position.

2. In an internal combustion engine, a cylindrical valve casing, a rotary valve mounted in said casing having a plurality of longitudinal grooves, annular grooves at the ends of the longitudinal grooves, and annular grooves of greater depth than the longitudinal grooves intersecting the latter intermediate their ends, packing rings arranged in the first-mentioned annular grooves, packing strips arranged in the longitudinal grooves, and slit expanding rings arranged in the second-mentioned annular groove normally retaining the packing strips in outwardly extended position against the wall of the bore of said casing.

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

THOS. M. McKIBBY.

Witnesses:
ETHEL BALDEN,
J. D. HELVEY.