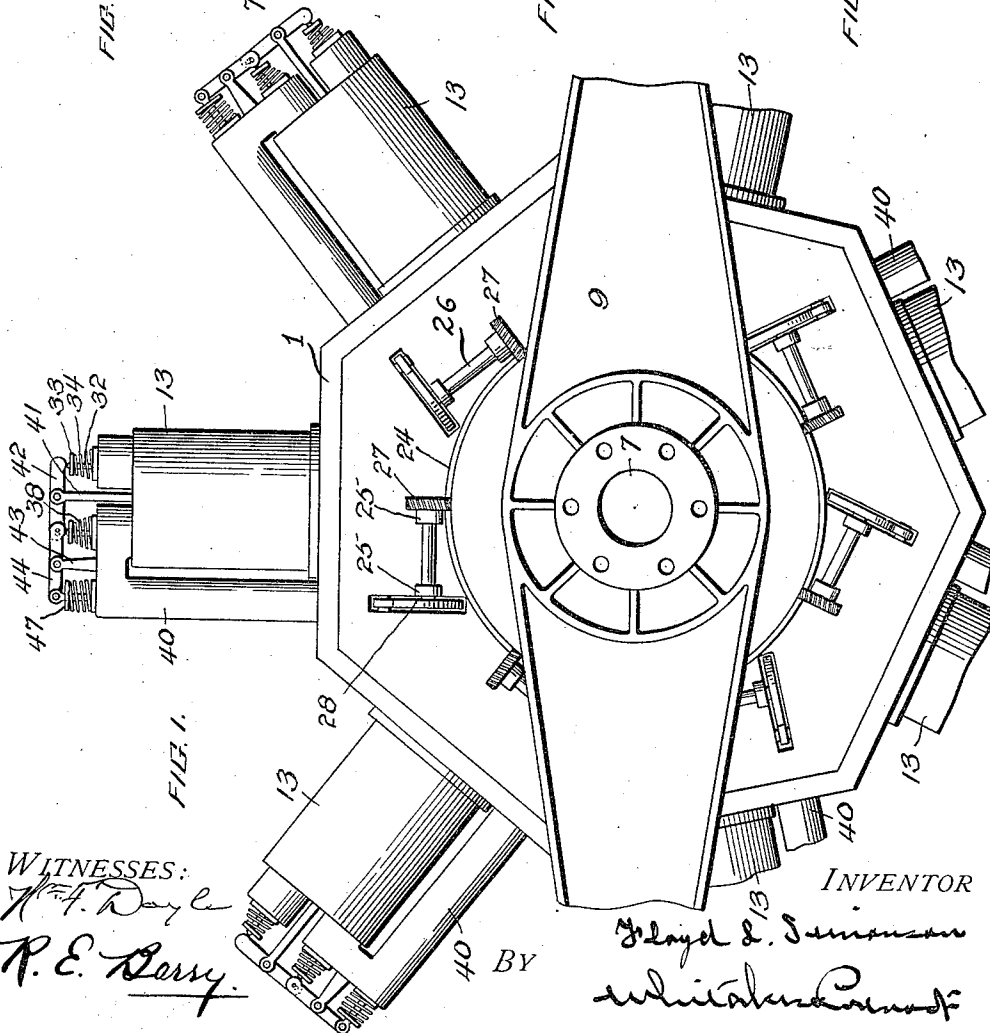
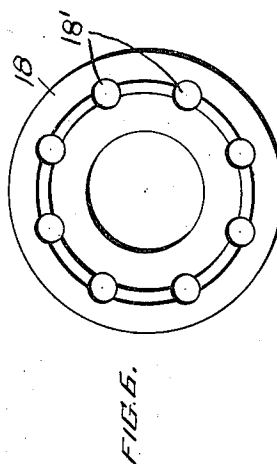
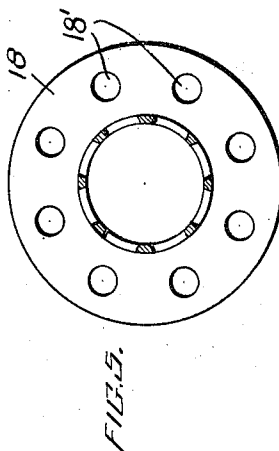
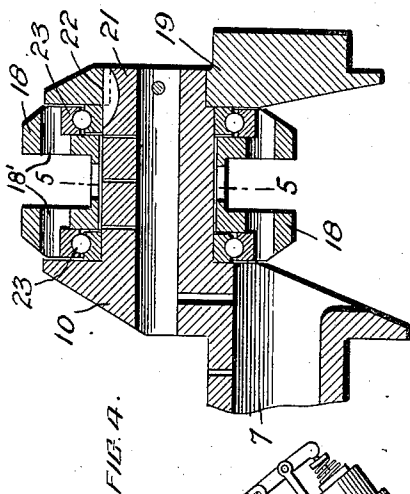


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APPLICATION FILED AUG. 17, 1911. RENEWED SEPT. 9, 1912.

1,059,576.

Patented Apr. 22, 1913.

2 SHEETS—SHEET 1.



WITNESSES:

W. F. Doyle
R. E. Barry

INVENTOR

Frederic L. Simonson
Whitaker & Treadwell

Attorneys

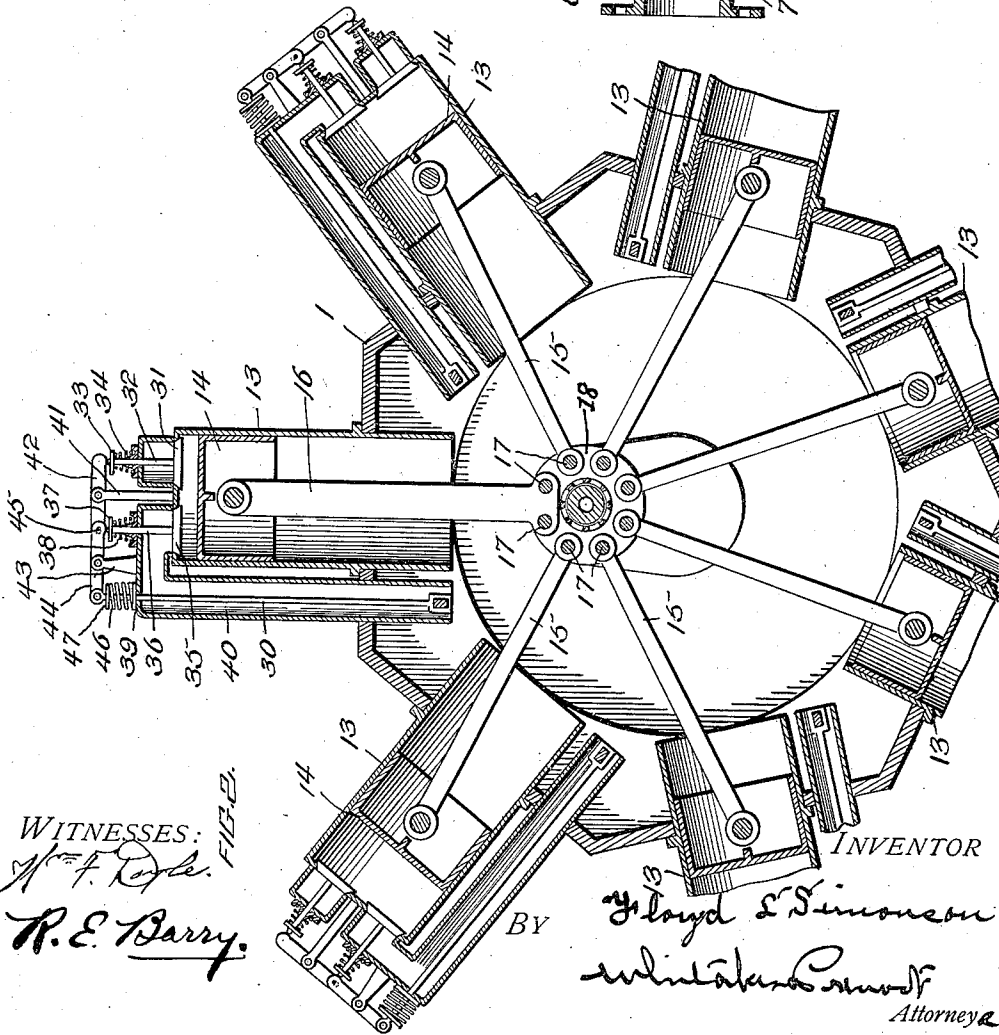
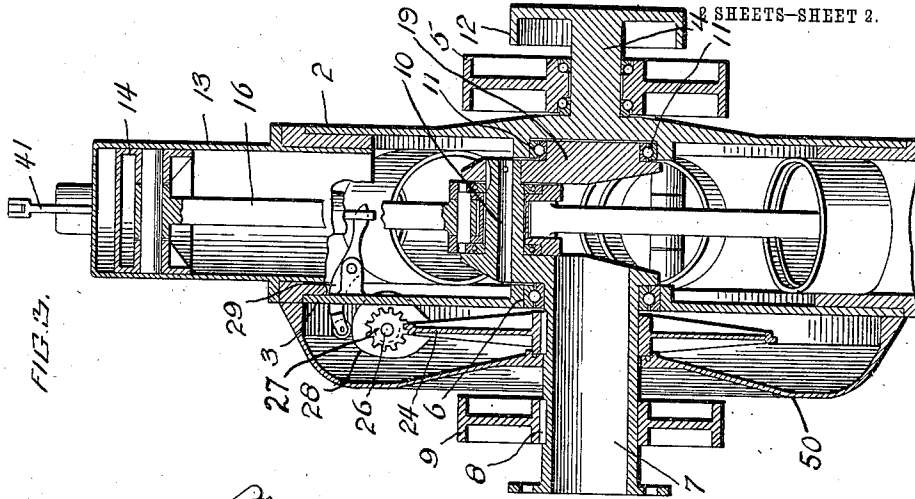
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WITNESSES:
M. F. Doyle
R. E. Barry

FIG. 22.

BY

INVENTOR
Floyd L. Simonson
Wintona C. Smith
Attorneys

UNITED STATES PATENT OFFICE.

FLOYD L. SIMONSON, OF KANSAS CITY, MISSOURI.

INTERNAL-COMBUSTION ENGINE.

1,059,576.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed August 17, 1911, Serial No. 644,632. Renewed September 9, 1912. Serial No. 719,443.

To all whom it may concern:

Be it known that I, FLOYD L. SIMONSON, citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, 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.

My invention relates to internal combustion engines of the rotary type and consists of certain new and useful improvements in the same which are clearly shown in the accompanying drawings, and described in the following specification and more particularly pointed out in the claims.

One object of my invention is to provide a rod ring to which may be removably secured the rods of the pistons of the different cylinders, and especially the master rod, by which construction an injured rod may be taken out and replaced without taking the entire engine down, and without rendering useless, other parts not affected.

Another object is to provide means for positively operating the valves with which the cylinders are provided.

The drawings show an engine having seven cylinders, with my improvements attached.

In said drawings, Figure 1 is a side elevation of an engine of the class referred to, provided with my invention. Fig. 2 is a vertical section of the same taken at right angles to the crank shaft. Fig. 3 is a vertical section taken in line with the crank shaft. Fig. 4 is an enlarged detail section through part of the crank shaft and the rod ring. Fig. 5 is a section on line 5—5 of Fig. 4. Fig. 6 is a detail elevation of the rod ring.

1 represents the crank case, in which any desired number of cylinders are mounted, in any preferred manner, the cylinders being all alike. The crank case is provided with cheek plates 2, 3, the cheek plate 2 being provided with a stub shaft 4 mounted in the frame bearing 5. The cheek plate 3 revolves upon the stationary hollow crank shaft 7, keyed at 8, in the frame support 9, after the manner of other engines of like character. The shaft 7 is provided at its inner end with a rigid crank pin 10. Secured to the end 21 of the crank pin 10 by

the key 22, is a securing member 19, which is provided with bearings 11 on which is mounted the cheek plate 2. This construction facilitates the rigid mounting of the crank shaft, and the mounting of the crank case with its cheek plates so as to revolve around a common center.

Rigidly connected with the stub shaft 4 of the cheek plate 2 is a belt wheel 12, from which power may be taken.

The cylinders 13 are mounted in any preferred manner in the crank case, and are provided with pistons 14, and piston rods 15, one of said piston rods being made the master rod 16. This master rod 16, as shown in the drawings, is preferably somewhat heavier than the other piston rods and is secured to a rod ring 18 by two pins 17, while the remaining rods 15 are each pivoted to said ring. The rod ring 18 is provided with a centrally located circumferential groove to accommodate the inner ends of the piston rods 15 and 16 and is also provided on its outer sides with recesses in which the bearings 23 are adapted to be placed. The pins 17, as clearly shown in Fig. 4, are located in equi-distantly spaced apertures 18' in the ring 18. The recesses for the bearings 23 extend partially across the apertures 18' and the pins or pivots are held in place by means of the bearings 23, upon which the rod ring is mounted. The rod ring and bearings are held in position by the securing member 19. The master rod 16, as stated, is provided at its inner end with two openings adapted to receive two of the pins 17 and the openings are so spaced as to register with any two adjacent apertures 18' in the rod ring 18. By this construction, in assembling the parts or in repairing them, the position of the master rod in relation to the rod ring may be changed and secured by suitable means through any two of the said adjacent apertures to compensate for unequal wear. The changing of the securing of the master rod 16 and the pivoting of the rods 15, may be accomplished by removing the cheek plate 2, which will permit the pins or pivot 17 to be forced outward at that side of the machine thus freeing the master rod and the piston rods from the rod ring. By this construction, it is obvious that by removing the securing member 19 of the crank shaft, one of the ball bearings 23 which forms the mounting of the rod ring on the crank shaft,

may be withdrawn, thereby facilitating the withdrawal of the pins 17 and the removal of either of the rods 15 or the master rod 16.

As will appear in Figs. 1 and 3 of the drawings, a worm 24 is provided, mounted rigidly on the hollow crank shaft 7. Mounted in lugs 25 on the cheek plate 3 is a series of short shafts 26 each carrying at one end a worm wheel 27 meshing with the worm and at the other end, a cam 28, said cam being provided for the operation of a bell crank lever 29, pivotally mounted on said cheek plate 3, the inner end of the bell crank lever being connected to the lower end of the rod 30.

The cylinders 13 are each provided with exhaust valves 31, having a stem 32, extending beyond the valve seat and provided with a washer 33. Between said washer and the top of the valve casing is a spring 34 which normally holds said exhaust valve closed. Each of said cylinders, is further provided with the inlet valves 35, having a stem 36, a washer 37 and a spring 38, similar to the exhaust valves.

Communicating with the valve casing 39 of the inlet valve, is an inlet tube 40 which communicates with the crank case, said inlet tube 40 being provided within the crank case and forms a guide for the lower end of the rod 30.

Mounted between the inlet valve 35 and the exhaust valve 31 is a support 41, upon which is pivotally mounted a rock lever 42, and upon the standard 43, is pivotally mounted a rock lever 44, said rock levers being pivotally connected at 45. The other end of the lever 44 is connected to the upper end of the rod 30, a spring 46 being interposed between a washer 47 mounted on the rod 30 and the tube 40.

50 represents a supplemental casing for protecting the gears and making the apparatus gastight.

As is obvious the worm 24 being stationary, and the worm wheels being mounted on the cheek plate of the crank case which is made to revolve by the impulses of the several cylinders, a rotary movement is imparted to the shaft 26, thereby providing means through the cam 28, the bell crank 29, the rod 30 and spring 46, for opening and closing the inlet and exhaust valves. The spring 46 is somewhat stronger than the spring 38, thereby causing the outer end of the bell crank 29 to follow the cam 28 and open the inlet valve when desired.

What I claim and desire to secure by Letters Patent is:—

1. In an internal combustion engine of the class described, the combination with a stationary shaft, of a crank pin integral with the same, a plurality of bearings on said crank pin, a ring mounted on said bearings and provided with a centrally located

circumferential groove, a plurality of equidistantly spaced apertures directly opposite one another in either side of said ring, a securing member fastened to one end of said crank pin, a revoluble casing mounted on said shaft and securing member, cylinders in said casing, pistons and piston rods in said cylinders, and a plurality of pins adapted to secure the inner ends of said piston rods to said rod ring through said apertures and be held in position by means of said bearings.

2. In an internal combustion engine of the class described, the combination with a stationary shaft, of a crank pin rigid therewith, a plurality of bearings on said crank pin, a ring provided with recesses to receive said bearings, said bearings being adapted to rest in said recesses and support said ring, said ring being also provided with a centrally located circumferential groove, a securing member fastened to one end of said crank pin, a casing mounted to revolve around said shaft, cylinders in said casing, pistons in said cylinders, a master rod and piston rods, said master rod being secured to said ring by pins passing through two of the apertures in either side of the rod ring and the piston rods being secured to said rod ring by a single pivot and means for holding said pins and pivots in position.

3. In an internal combustion engine of the class described, the combination with a stationary shaft, of a crank pin rigid therewith, a plurality of bearings on said crank pin, a ring mounted on said bearings and provided with a centrally located circumferential groove, a plurality of equidistantly spaced apertures directly opposite one another in either side of said ring, a securing member fastened to said crank pin, a casing mounted to revolve around said shaft, cylinders in said casing, pistons in said cylinders, a master rod and piston rods secured to said cylinders, and a plurality of pins adapted to secure the inner ends of said master rod and piston rods to said rod ring, said master rod being secured to said rod ring by more than one pin.

4. In an internal combustion engine of the class described, the combination with a stationary shaft, of a crank pin rigid with the same, a plurality of bearings on said crank pin, a rod ring mounted on said crank pin and provided with a plurality of equidistantly spaced apertures directly opposite one another in either side of said ring, a securing member fastened to one end of said crank pin, a revoluble casing mounted on said shaft and said securing member, cylinders in said casing, pistons and piston rods in said cylinders, one of said piston rods being provided on its inner end with two apertures so spaced as to register with any two adjacent apertures in either side of said rod

ring, and a plurality of pins adapted to secure the inner ends of said piston rods to said rod ring through said apertures.

5 5. In an internal combustion engine of the class described, the combination with a rod ring revolubly mounted upon the crank pin, with a plurality of piston rods and a master rod, said piston rods and master rod being interchangeable and said master rod being
10 secured to said rod ring at more than one point.

6. In an internal combustion engine of the class described, the combination with a rod ring provided with equi-distantly spaced

apertures, of a plurality of piston rods and a master rod, said piston rods and master rod being interchangeable on said rod ring, and said master rod being provided with a plurality of perforations which will aline with any two adjacent apertures in said rod
20 ring.

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

FLOYD L. SIMONSON.

Witnesses:

WM. F. DOYLE,
J. K. MOORE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."