Oct. 9, 1923. 1,470,462

L. L. MAIDEN

ENGINE

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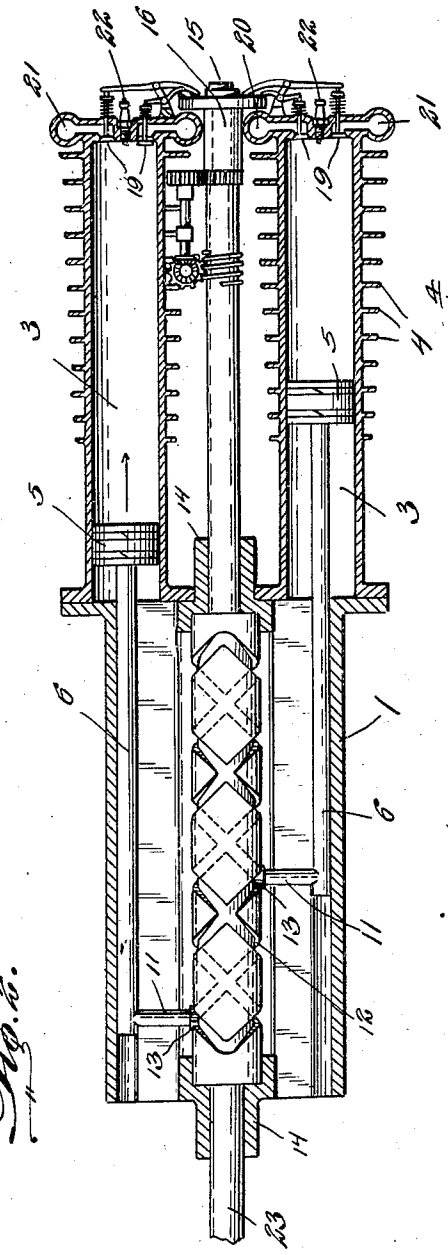


Fig. 2.

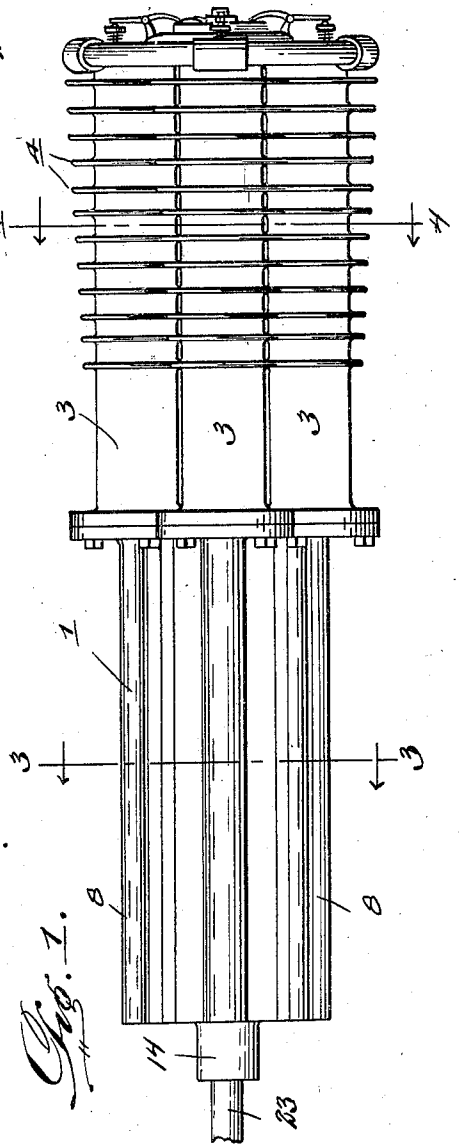


Fig. 1.

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INVENTOR

BY Victor J. Evans.

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WITNESSES

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Fig. 4.

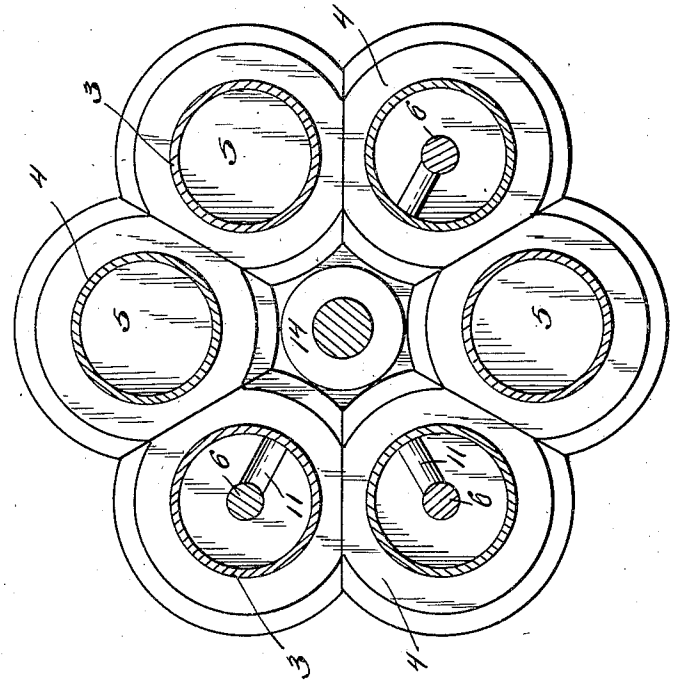
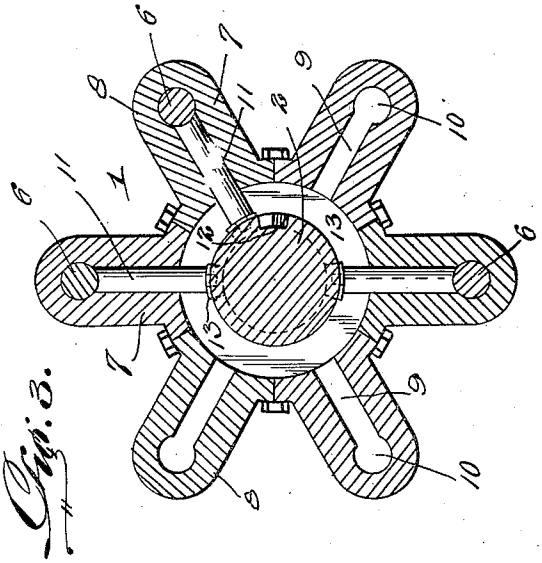


Fig. 3.



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Fig. 6.

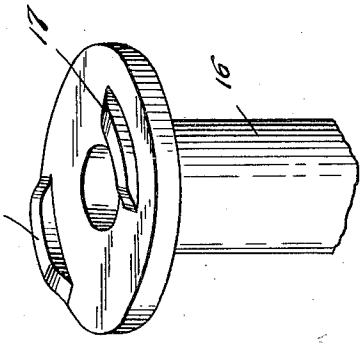
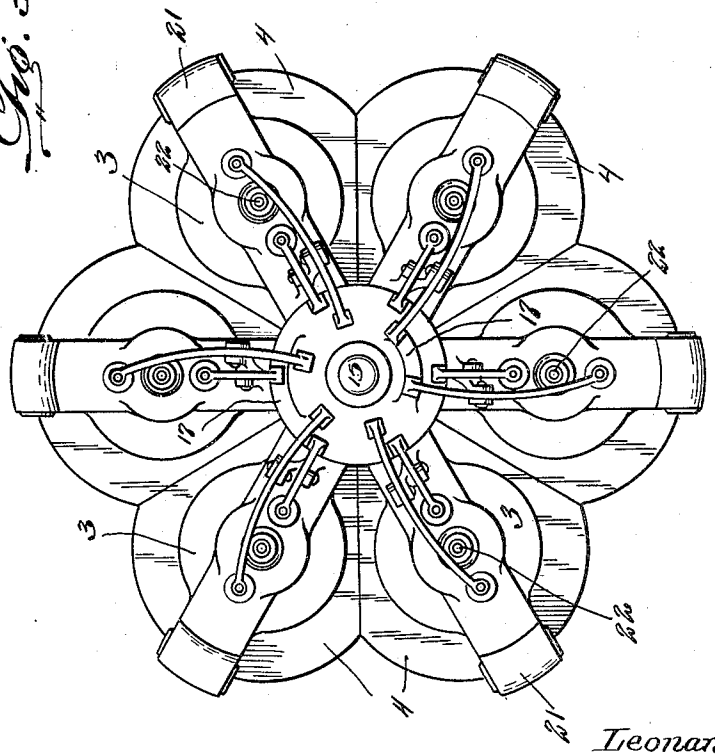


Fig. 5.



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Patented Oct. 9, 1923. 1,470,462

UNITED STATES PATENT OFFICE.

LEONARD LEE MAIDEN, OF DETROIT, MICHIGAN.

ENGINE.

Application filed May 17, 1920. Serial No. 381,882.

To all whom it may concern:

Be it known that LEONARD LEE MAIDEN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, has invented new and useful Improvements in Engines, of which the following is a specification.

This invention relates to an improved construction of engine and the principal object of the invention is to provide a spirally grooved cylinder, the grooves of which are engaged by pins on the piston rods of the engine so as to convert the reciprocatory motions of the pistons to a rotary motion of the cylinder. In this way the grooved cylinder will be rotated at high speed by long and slow strokes of the pistons in the engine cylinders.

Another object of the invention is to provide simple and effective means for controlling the valves of the engine by the revolutions of the grooved cylinder.

Still another object of the invention relates to the peculiar construction of the casing in which the grooved cylinder is located and is provided with guiding means for the piston rods.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing my invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:—

Figure 1 is an elevation of the invention.

Figure 2 is a longitudinal section thereof.

Figure 3 is a section on line 3—3 of Figure 1.

Figure 4 is a section on line 4—4 of Figure 1.

Figures 5 and 6 are enlarged detail views of the valve operating means.

In these views 1 indicates a casing for the spirally grooved cylinder 2 and 3 indicates a plurality of engine cylinders which are connected with one end of the cylinder and which are arranged in a circle around the center of said cylinder. The drawing shows six of these engine cylinders. The cylinders are shown as being provided with the fins 4 so that the cylinder may be cooled by air but it will of course be understood that they may be controlled by means of a water jacket. Each cylinder contains a piston 5 to which is attached a piston rod 6. The casing is formed of a plurality of longitudinally extending sections 7, each section having a wing 8 extending outwardly therefrom. Each wing is provided with an interior passage 9 communicating with the interior of the casing and ending in a circular enlargement 10, said enlargement forming a guideway for the piston rod. A pin 11 extends at right angles from each piston rod and this pin is adapted to work in the passage 9. Each pin is made long enough to extend into the casing and engage the spiral grooves 12 of the cylinder 2. As shown the cylinder is provided with a pair of these grooves which pass around the cylinder in opposite directions and have their ends connected together by rounded and enlarged portions so that the pin reaching the end of one groove will pass into the other groove on its return stroke. I place shoes 13 on the pins for keeping the pin in engagement with the proper groove.

It will thus be seen that the reciprocation of the pistons in their cylinders will cause the grooved cylinder to rotate and the parts are so arranged that as one of the pistons are being forced outwardly by the explosive charge the other pistons will be moving inwardly as the pins of these pistons will be engaging the return groove in the cylinder.

As will be seen the cylinder 2 has its ends reduced and these reduced ends pass through the bearings 14 at the ends of the casing 1. The forward reduced end extends between the annular row of engine cylinders and has a reduced extremity 15 on which is mounted a revolving sleeve 16. This sleeve is geared to said part 15 so that it will rotate at slower speed than the cylinder. This sleeve 16 carries the cams 17 for operating the rocker arms 18 for the inlet and exhaust valves 19 of the engine cylinders. Each cylinder is provided with an inlet 20 and an outlet 21 and each cylinder is also provided with the usual spark plug 22 which is connected with the ignition system. The other reduced end of the cylinder is connected with the usual drive shaft 23.

I prefer to arrange the pitch of the grooves in the cylinder 2 so as to cause said cylinder to make six revolutions to each double stroke of the piston and it will of

course be understood that the sleeve is so geared to the end of the cylinder as to cause the proper operation of the valves to secure the operation of the apparatus.

It is thought from the foregoing description that the advantages and novel features of my invention will be readily apparent.

I desire it to be understood that I may make changes in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:—

1. An engine of the class described comprising a casing, a plurality of engine cylinders connected with one end of the casing and arranged in a circle around the center of the same, a spirally grooved cylinder in said casing, said casing having outwardly extending wings, each wing having a passage and a guideway therein, a piston in each engine cylinder, a piston rod connected with each piston and extending into the guideway, a pin on each rod extending through the passage and engaging the groove in the cylinder and means for controlling the valves in the engine cylinders by the rotation of said grooved cylinder.

2. An apparatus of the class described comprising a casing having outwardly extending wings thereon, each wing having a guideway and a passage therein, a spirally grooved cylinder in said casing, a plurality of engine cylinders connected with one end of the casing and arranged in a circle about the center thereof, a piston in each engine cylinder, a piston rod connected with each piston, said rods extending into the guideways in the wings of the casing, a pin on each rod extending through the passage and engaging the groove in the cylinder, an extension on the cylinder located in the center of the space formed by the engine cylinders, a rotatable sleeve on said extension, gears for connecting the same with said extension, cams on said sleeve, inlet and outlet valves, for each engine cylinder and rocker arms for said valves operated by said cams.

In testimony whereof I affix my signature.

LEONARD LEE MAIDEN.