L. L. McLARTY.

ENGINE STARTER.

APPLICATION FILED DEC. 12, 1910.

1,015,817. **Patented Jan. 30, 1912.**

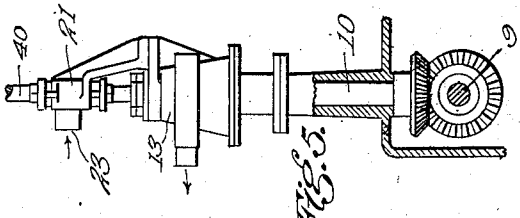

Fig. 5.

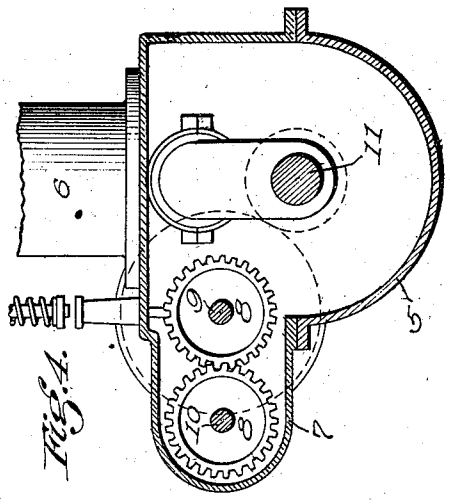

Fig. 4.

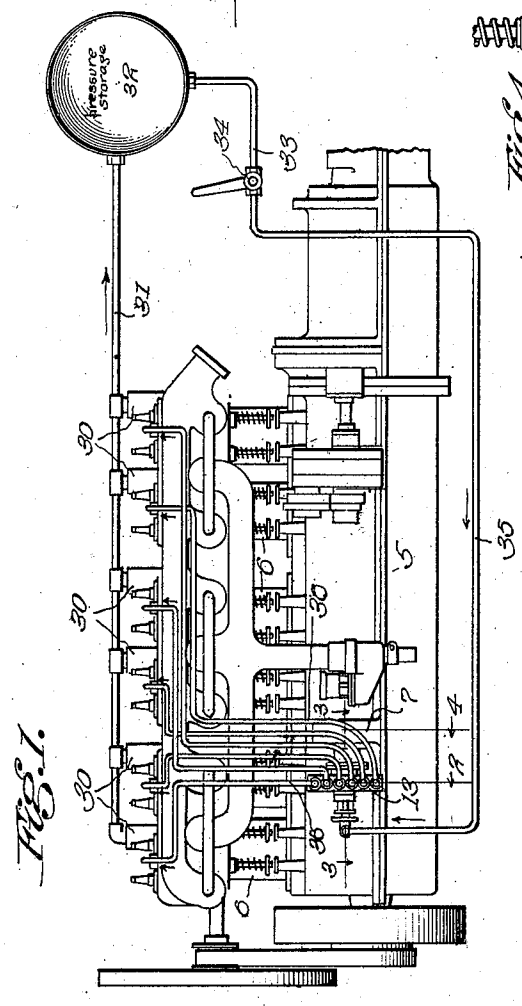

Fig. 1.

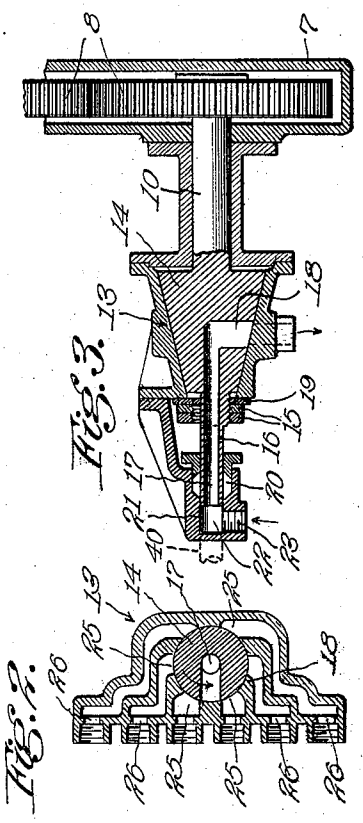

Fig. 3.

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

LEONARD L. McLARTY, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO L. A. HAUSER, OF LOS ANGELES, CALIFORNIA.

ENGINE-STARTER.

1,015,817. Specification of Letters Patent. Patented Jan. 30, 1912.

Application filed December 12, 1910. Serial No. 596,771.

To all whom it may concern:

Be it known that I, LEONARD L. McLARTY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Engine-Starters, of which the following is a specification.

This invention relates to a starting mechanism for internal combustion engines, especially for engines of the type in general use on automobiles, and the invention consists in certain novel combinations for starting the engine by use of compressed non-explosive fluid.

The invention relates particularly to that class of starters which consist of a source of compressed fluid supply in combination with a distributing or timing valve operated in conjunction with the engine to admit fluid under pressure to appropriate cylinders where the pressure on the piston will cause the rotation of the engine in the correct direction. Preferably, the compressed fluid is a portion of the burned gases of the cylinders, means being employed to keep the pressure in a storage chamber at a certain predetermined point; but other means of supplying non-combustible fluid under pressure may be used. A hand or equivalently operated valve controls the supply of pressure from the storage chamber to the distributing valve.

In the accompanying drawings I have shown a preferred form of my invention as applied to a six cylinder engine; but it will be understood that it is applicable to any number of cylinders.

In the drawings: Figure 1 is a side elevation of a typical six cylinder automobile engine equipped with my invention. Fig. 2 is an enlarged cross section taken on line 2 of Fig. 1. Fig. 3 is a section taken on line 3—3 of Fig. 1. Fig. 4 is a section taken on line 4 of Fig. 1. Fig. 5 is a section showing a modified connection of the timing valve to the rotating parts of the engine.

Referring now to the drawings 5 designates the casing of a typical six cylinder engine and 6 the respective cylinders. At some point on the casing I provide a special gear housing 7 in which are incased gears 8 rotatively connecting half time cam shaft 9 with shaft 10 of my timing valve. The timing valve is rotated at the same speed as the half time shaft, it being designed to feed the compressed gas to each of the six cylinders during every two revolutions of crank shaft 11. This method connection is merely typical of other forms.

In Fig. 5 I have shown the connection of the distributing valve to the electric timer or distributer shaft. In this case the construction of the valve is modified to allow the passage of the shaft completely therethrough. This method of connection will suggest others applicable to machines of various designs.

The timing valve consists of a casing 13 inclosing a cone shaped valve 14 which is fitted with a ground joint in the casing and held in place by nuts 15. Valve stem 16 is hollow, a longitudinal duct 17 leading from its outer end to a point central within valve 14, whence a radial passageway 18 leads to the periphery of the valve. Nuts 15 engage with the valve stem and press a washer 19 against the end of casing 13, pulling the valve into tight seating engagement with the casing but allowing it to revolve freely. The other end of valve stem 16 passes into a stuffing box 20 in a casting 21. Passage 22 in casting 21 connects with the longitudinal duct in valve stem 16, means being provided at 23 for the connection of a pipe for the supply of gas under pressure. Casing 13 is provided with a plurality of ports 25, in this case being six in number, arranged around valve 14 and adapted to be registered by passageway 18 at different times during the rotation of the valve. Ports 25 are connected to passages 26 which are adapted for connection with pipes or tubes leading to the various cylinders of the engine. In the arrangement shown it will be noted that, with the valve rotating in the direction indicated, gas under pressure will be fed to passages 26 in direct order beginning with the uppermost and ending with the lowermost in Fig. 2. But the cylinders on an automobile engine are usually exploded in a sequence different from their arrangement on the crank case. For the present purpose I have assumed that, counting the cylinders from the front or left hand end in Fig. 1, the cylinders are exploded in the following manner; one, four, two, six, three, five. The pipes leading from passages 26 are consequently arranged to feed gas under pressure to the cylinders in the above named sequence. Gas under pressure is taken from

the cylinders in any well known manner, mechanisms 30 allowing a certain amount of exploded gases to pass through pipe 31 to storage tank 32. From the storage tank 32 a pipe 33 leads to hand valve 34. This valve may be operated in any desired manner by the driver of the car. From valve 34 a pipe 35 leads to the timing valve and connects at 23. From each of passages 26 a tube or pipe 36 leads to an appropriate cylinder. The relative arrangement of the valve, connections and cycles of the pistons is such that the gas is fed to each cylinder during what is normally its explosion and expansion cycle.

The valve may be mounted on the timer shaft, as is shown in Fig. 5. In this case the end of stem 16 is prolonged through casting 21, as indicated in dotted lines in Fig. 3, and the timer shaft 40 continued up from the stem. This connection of the valve is preferable on many engines on account of economy of installation, and especially where my starting system is applied to the engine after building. When applied at the time of engine construction, the valve may be placed in the most convenient position and the structure of the engine altered to suit.

Having described my invention, I claim:

1. In a device of the character described, a distributing valve comprising a casing, a rotary valve within the casing and having a duct therein leading to its periphery, the casing having a plurality of ports with which the valve duct is adapted to register, a valve stem extending from the valve and having a longitudinal duct therein connecting with the valve duct, a stuffing box surrounding the outer end of the valve stem, and a chamber inclosing the end of the valve stem duct and adapted to receive fluid under pressure.

2. In a device of the character described, a distributing valve comprising a casing having a conical valve seat therein, a conical valve adapted to seat upon the valve seat and rotatively engage therewith and provided with a duct leading to its conical face, the casing being provided with a plurality of ports arranged around the conical valve and adapted for registry with the valve duct at different times during the rotation of the valve, a valve stem projecting from the small end of the valve and having a longitudinal duct leading from its outer end and connecting with the valve duct, means on the valve stem engaging with the valve casing to prevent the movement of the conical valve off its conical seat, a member surrounding the outer end of the valve stem and provided with a chamber in communication with the longitudinal duct therein, and a stuffing box on the member and surrounding the valve stem.

3. In a device of the class described, a distributing valve comprising a casing having a conical seat therein, a conical valve adapted to seat upon the valve seat and rotatively engage therewith and provided with a duct leading to its conical face, the casing being provided with a plurality of ports arranged around the conical valve and adapted for registry with the valve duct at different times during the rotation of the valve, a valve shaft projecting from the large end of the valve and through the medium of which the valve may be rotated, a valve stem projecting from the small end of the valve and having a longitudinal duct leading from its outer end and connecting with the valve duct, adjustable means on the valve stem engaging with the valve casing to prevent the movement of the conical valve off its conical seat, a member surrounding the outer end of the valve stem and provided with a chamber in communication with the longitudinal duct therein, and a stuffing box on the member and surrounding the valve stem.

In witness that I claim the foregoing I have hereunto subscribed my name this 6th day of December 1910.

LEONARD L. McLARTY.

Witnesses:
JAMES T. BARKELEW,
L. A. HAUSER.