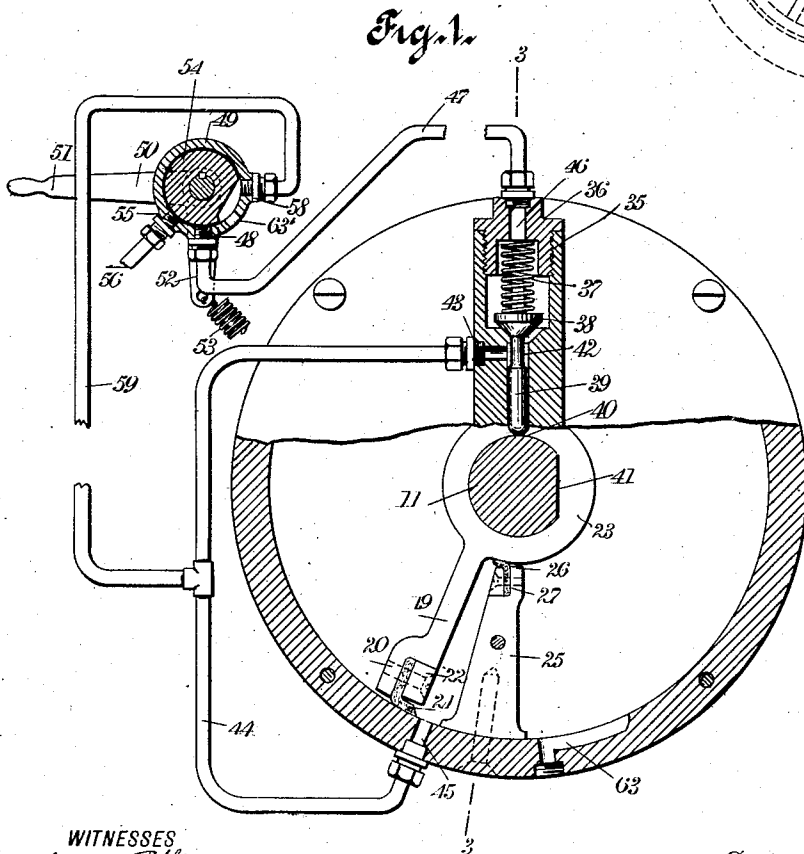
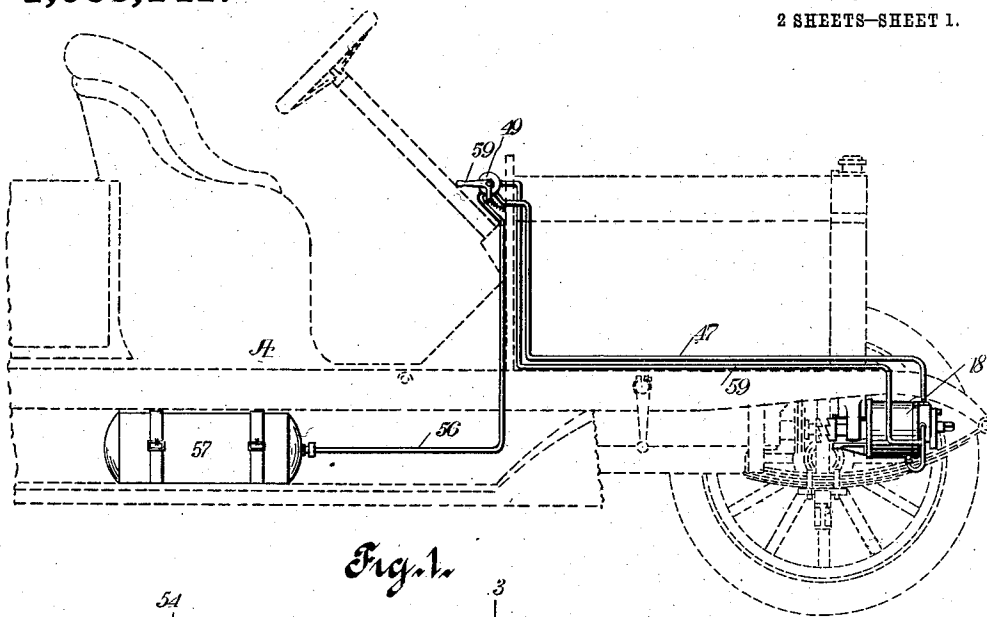


G. J. SPOHRER.
ENGINE STARTER.
APPLICATION FILED MAY 17, 1911.

1,063,141.

Patented May 27, 1913.

2 SHEETS—SHEET 1.



WITNESSES
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W. S. Orton

Fig. 2.

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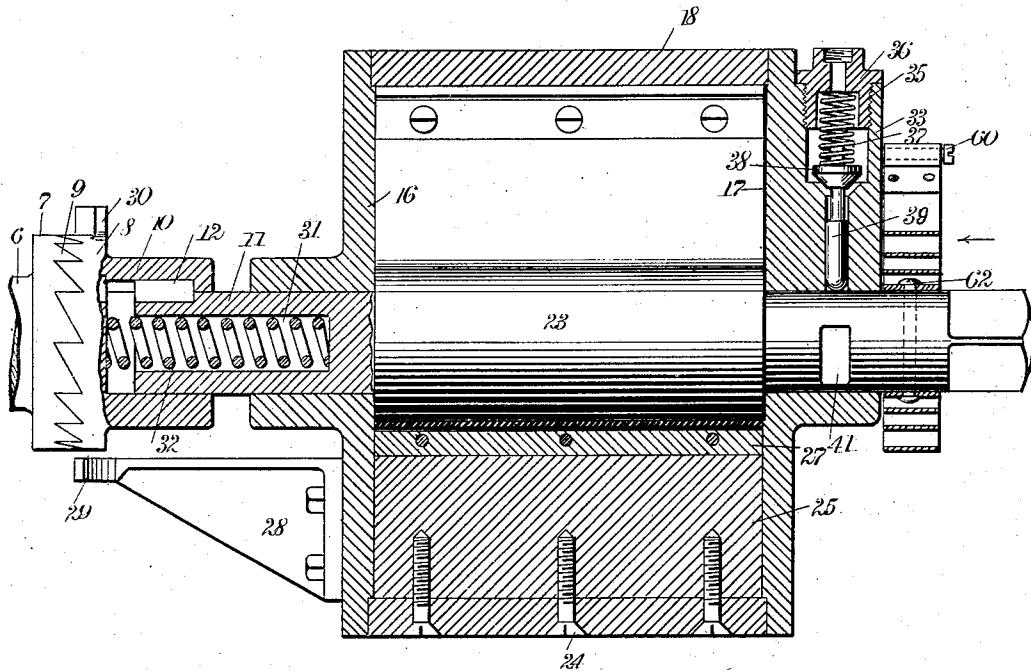


Fig. 3.

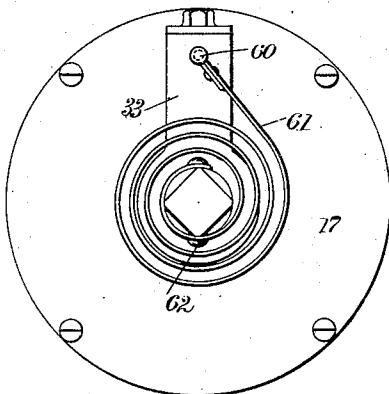


Fig. 4.

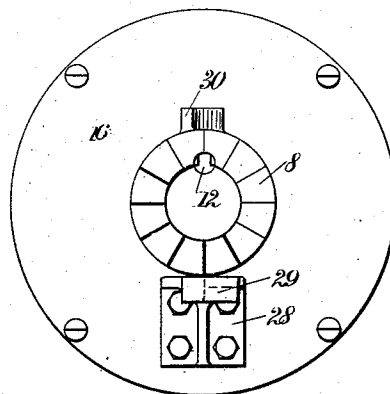


Fig. 5.

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UNITED STATES PATENT OFFICE.

GREGORY JOHN SPOHRER, OF FRANKLIN, PENNSYLVANIA, ASSIGNOR TO WILSON
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ENGINE-STARTER.

1,063,141.

Specification of Letters Patent.

Patented May 27, 1913.

Application filed May 17, 1911. Serial No. 627,653.

To all whom it may concern:

Be it known that I, GREGORY J. SPOHRER, a citizen of the United States, and a resident of Franklin, in the county of Venango and State of Pennsylvania, have invented a new and Improved Engine-Starter, of which the following is a full, clear, and exact description.

My invention relates to a new and improved form of engine starter, and more particularly relates to means for "turning over" the internal combustion engine of an automobile.

An object of my invention is to provide a device which will eliminate the objectionable features of the old cranking means for "turning over" the engine by the use of a compressed fluid.

A further object of my invention is to provide a means for starting the engine by merely actuating a lever placed within convenient reach of the driver.

A further object of my invention is to provide an engine starter, which will be positive and automatic in its action, and which is made of relatively few parts, simple in construction and operation.

I attain the above outlined objects by providing a clutch to engage the engine shaft, which clutch is mounted on a shaft having a blade movable in a cylinder. The blade is actuated by compressed fluid admitted to the cylinder through suitable ports, to rotate the engine shaft through one revolution or sufficient to start the sparking in the explosion chamber common to engines of this character.

With the above and other objects in view, as will more fully hereinafter appear, the present invention consists in certain novel details of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and more particularly pointed out in the appended claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, and in which—

Figure 1 is a side elevation of a preferred embodiment of my invention in position on an automobile shown in outline; Fig. 2 is an enlarged front elevation of the device shown in Fig. 1, parts being broken away to show

the internal details; Fig. 3 is a longitudinal section taken in a plane indicated by the line 3—3 of Fig. 2; Fig. 4 is a front elevation of the cylinder head and attached spring, looking in the direction indicated by the arrow in Fig. 3; and Fig. 5 is a view similar to Fig. 4 but shown at the rear of the cylinder in a direction opposite to that shown in Fig. 4.

Described more in detail, I have shown an automobile of the general construction, applied to which is a preferred embodiment of my new and improved engine starter.

In the front end of the engine shaft 6 is attached a crown head 7 coacting with a crown head 8, to form a one-way clutch 9. The crown head 8 constitutes one end of a sleeve 10, fastened to a shaft 11 by means of a key 12. Forming a bearing for the shaft 11, are the heads 16 and 17 of the cylinder 18. Rigidly mounted on the shaft 11 and turning therewith, is an arm 19 extending from head to head of the cylinder and radially disposed therewith, the outer end of which arm is offset, as shown at 20. Disposed with this offset portion is a packing 21 fastened to said offset portion 20 by means of a plate 22. By this construction, it will be seen that a fluid tight packing is placed between the arm 19 and the side of the cylinder 18. The inner end of the arm 19 is formed into an enlarged extension or hub 23, the ends of which extension abut the heads of the cylinder, to form a shoulder at each end, to prevent end play of the shaft.

Rigidly mounted within the cylinder and fastened to the side thereof by means of screws 24, is a radially extending fixed abutment 25, the inner end 26 of which has extending therefrom, a packing 27, an extended part of which packing engages the hub 23, to form a fluid-tight packing between said abutment and said hub in a manner similar to the packing construction at the outer end of the arm 19 described in detail.

Extending from the lower portion of the rear cylinder head 16 and rigidly affixed thereto and extending parallel with the shaft 11, is a bracket 28 having a horizontally-disposed incline 29 at its outer end, said incline being disposed in vertical alignment with the crown head 8 and adapted to engage a lug 30 extending from said crown head, and so disposed with reference to said

crown head that the lug positioned on the incline will disengage the head 7 from the head 8 and accordingly disengage the shaft 11 from the engine shaft 6, and this is the position in which these parts are normally disposed. The inner end of the shaft 11 is recessed at 31, in which recess is disposed a compression spring 32, one end of which bears upon the head 8, tending to force the two parts of the clutch 9 into engagement, but this engagement is of course prevented as long as the lug 30 is held on the incline 29. The rotation of the arm 19 will cause the lug 30 to ride up the incline 29, permitting the spring 30 to force the two parts of the clamp 9 into engagement with each other, to revolve the engine shaft 6.

The front head 17 has extending radially upward from the shaft 11, a hollow boss 33 constituting a valve casing, the upper outer end of which is screw-threaded, as shown at 35, which screw-thread engages a hollow nipple 36 and constitutes the bearing for the upper end of a valve compression spring 37, the lower end of which bears on the head 38 of a valve stem 39. The lower end 40 of the valve stem 39 rides on the shaft 11 and is adapted to be forced by the spring 37 into a flattened recess 41 disposed in the periphery of the shaft 11 in vertical alinement with said valve stem. The valve stem 39 is reduced, as shown at 42, in line with which reduced portion is an outlet 43, which outlet is connected by a pipe 44 to an inlet 45 extending through the side of the cylinder 18 between the moving arm 19 and the abutment 25.

Extending from the aperture 46 in the nipple 36, is a pipe connection 47 leading to an outlet 48 of a three-way cylindrical valve 49, which valve is actuated by a bell crank lever 50, one arm of which constitutes a hand lever 51. The other arm 52 of the bell crank has connected to its outer end a tension spring 53, which spring is carried by the framework of the automobile, so as to retain the stem 54 of the valve 49 in the position shown in Fig. 2. A second opening 55 of the valve 49 leads by means of tubing 56 to a compressed air or other fluid reservoir 57 disposed at any convenient point on the machine. A fluid outlet 58 in the valve 49 leads by means of a pipe 59 to the pipe 44 hereinafter described.

Attached to the front of the boss 33, is a pin 60 fastened to which is one end of a spiral spring 61, the inner end of which spring is attached to the front end of the shaft 11 by means of a rivet 62. This spring is normally in uncoiled condition and as said spring is stronger than the spring 32, it will revolve the shaft 11 disengaging the heads 7 and 8 of the clutch 9 by causing the lug 30 to ride down the incline 29, thereby compressing the spring 32.

Raising the lever 51 will cause compressed fluid to flow from the reservoir 57 through the pipe 56, valve 49, pipe connection 47, aperture 46 and nipple 36, about the head 38, through the outlet 43 and pipe 44 and into the cylinder 18 through the inlet 45. As this inlet is disposed between the arm 19 and the abutment 25, it will, of course, rotate the arm 19 in a clockwise direction as viewed in Fig. 2. The rotation of the shaft 11 will cause the lug 30, to ride up the incline 29, and the shaft 11 will be connected to the engine shaft 6 by means of a clutch 9, thereby starting the engine by the revolution of the engine shaft, as is now commonly done by a hand crank. Just before the arm 19 has made a complete revolution, the recess 41 will come beneath the end 40 of the valve stem 39, permitting the spring 37 to force the head 38 into engagement with the valve seat thereby shutting off the passage of compressed fluid through the pipe 44 and through the inlet 45, and the momentum of the arm 19 even after the supply of compressed air has been shut off, will carry the arm 19 beyond the outlet 63 disposed in the cylinder 18 on the side of the abutment 25 opposite the side containing the inlet 45. By this means, the air in the cylinder is exhausted to the normal outside pressure. This movement of the shaft 11 winds up the spring 61, but as soon as the pressure of fluid in the cylinder has been reduced, the spring 61 acts to return the arm 19 to the position shown in Fig. 2, again causing the lug 30 to ride down the incline and thereby disengaging the members of the clutch 9. At the same time, the spring 53 acts on the lever 50, returning the stem 54 to the position shown in Fig. 2, permitting the air between the abutment and the arm 19 to escape through the pipes 44 and 59 and the outlet 63' in the valve 49, and placing the entire device in position ready to repeat the above described cycle of operation.

Many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof. It is intended that all matters contained herein in the above description or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is merely intended to cover all the generic and specific features of the invention herein described, and to cover the full scope of the invention, which, as a matter of language, might be said to fall therebetween, and that materials, sizes and relationships of parts are non-essential, except as called for in the claims.

Having thus described my invention, I

claim as new and desire to secure by Letters Patent:

1. In an engine starter, an engine shaft, a cylinder having a revoluble shaft mounted therein, said last-mentioned shaft being in alinement with said engine shaft and adapted to engage the same, an arm rigidly attached to said revoluble shaft within said cylinder, a compressed fluid reservoir, fluid-conducting means extending from said reservoir to said cylinder, and a controlling valve disposed in said fluid-conducting means and actuated by said revoluble shaft, to admit compressed fluid to said cylinder, to rotate said arm and engine shaft.

2. In an engine starter, a cylinder, a shaft extending through said cylinder, an arm revolubly mounted on said shaft in said cylinder, said arm having a limited movement, a compressed fluid-conducting means leading to said cylinder, and a valve controlling the admission of said compressed fluid to said cylinder, the valve stem riding on said shaft, said shaft having a recess therein to receive said stem, and thereby to automatically shut off the admission of said fluid to said cylinder when said arm approaches the limit of its movement.

3. In an engine starter, an engine shaft, a revolving shaft in line with said engine shaft and normally disconnected therefrom, a one-way clutch adapted to connect said shafts, resilient means carried by said revolving shaft tending to bring the parts of said clutch into engagement, means to rotate said revolving shaft to permit said resilient means to act, resilient means put under tension by rotation of the revolving shaft when driven by said rotating means but stronger

than the first-mentioned resilient means, and serving to return said shaft to its normal position, and means acting under the influence of said shaft returning means to disconnect said clutch against the tension of the first-mentioned resilient means.

4. In combination, a cylinder, a shaft passing through the heads of said cylinder, one head being enlarged to form a valve casing, a valve controlling the admission of fluid to said cylinder mounted in said casing, said valve having a valve stem riding on said shaft, to normally maintain said valve in open position, said shaft having a flattened portion in alinement with said valve stem, and means forcing said stem into said flattened portion, to bring said valve to the closed position.

5. In an engine starter, in combination, a fluid-actuating mechanism adapted to turn the engine shaft, a valve carried by said mechanism, a three-way valve disposed adjacent the operator, a fluid connection between one outlet of said three-way valve and the valve on the mechanism, a connection from a compressed fluid reservoir leading to an inlet in said three-way valve, and a fluid connection with the third opening of said valve, said last-mentioned fluid connection bifurcated, forming a fluid connection with the mechanism and forming a connection with the valve on the mechanism.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GREGORY JOHN SPOHRER.

Witnesses:

WINTFRED JOHNSON,
H. F. OSMER.