H. R. VAN DEVENTER.

IGNITER MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JAN. 15, 1915.

1,153,767.

Patented Sept. 14, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

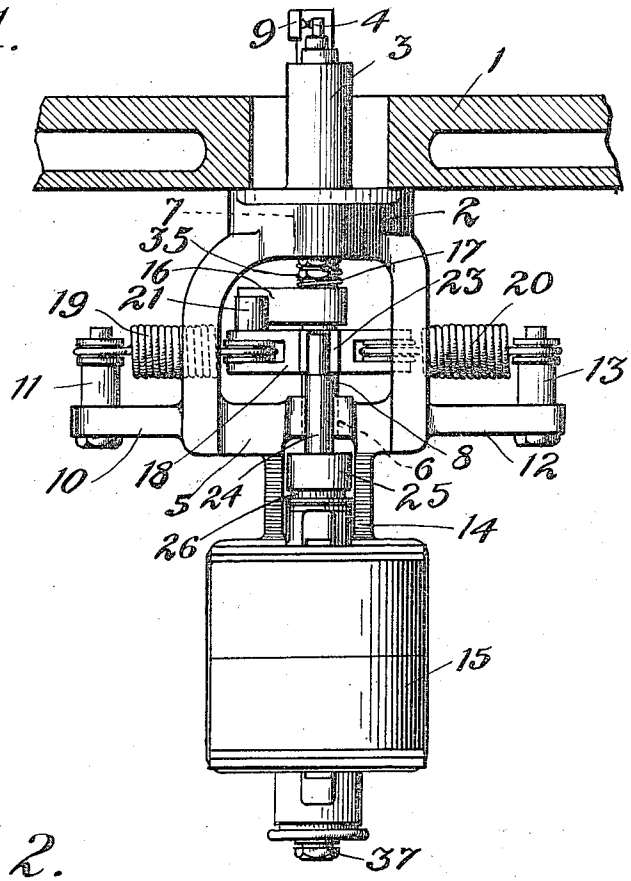
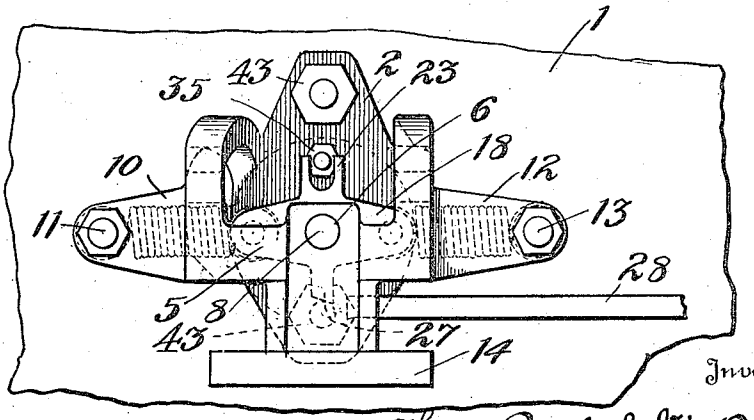


Fig. 2.



Witnesses

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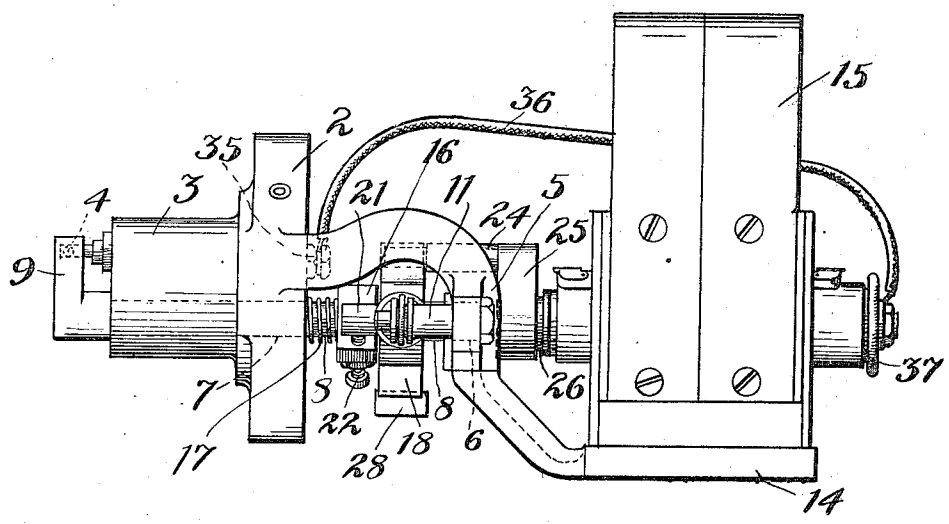


Fig. 3.

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IGNITER MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

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To all whom it may concern:

Be it known that I, HARRY RANDOLPH VAN DEVENTER, a citizen of the United States, residing at Sumter, in the county of Sumter and State of South Carolina, have invented certain new and useful Improvements in Igniter Mechanism for Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to ignition mechanisms for internal combustion engines and has for its object the production of a compact ignition unit containing in itself all the necessary parts except the driving or operating means, which operating means must of necessity be connected with some moving part of the engine. In apparatus of this type the strains during operation are sudden, with wide variations in a single cycle of operation, and when such strains are exerted in varying directions the resultant wear is productive of defects practically irreparable.

It is one of the objects of this invention to overcome the above mentioned difficulties by causing the different strains to be applied either substantially in a common plane or so distributed as to produce a resultant of uniform and constant direction.

Various other advantages of my invention will be apparent from a perusal of the accompanying specification and drawings.

My invention is illustrated in the accompanying drawings in which:—

Figure 1 is a top plan view of the ignition unit mounted on an engine, a portion of the engine cylinder being shown in section and the fastening means omitted for the sake of clarity. Fig. 2 is a front elevation, with the magneto removed from the bracket for the sake of clarity, and a fragmentary portion of the engine cylinder shown. Fig. 3 is a side elevation of the complete ignition unit free of all engine parts except the push rod shown in end view.

Referring to the drawings, 1 is the engine cylinder on which is mounted the main frame body 2 of the ignition unit by means of the mounting bolts 43 (Fig. 2). The main frame body carries the igniter body 3 which extends into the ignition chamber of the engine and carries mounted on its end the fixed electrode 4 of the igniter which electrode is insulated from the igniter in any well known manner but is electrically connected with the binding post 35 carried on the outer face of the main frame body 2. An outward extension 5 of the frame carries a bearing 6 positioned in alinement with a bearing 7 in the main frame body 2. These two bearings support the igniter operating shaft 8 which extends from the bearing 6 inwardly through the igniter body into the ignition chamber where it carries the movable electrode 9 of the igniter. The outer extension 5 carries a pair of spring holding arms consisting of the extension 10 and post 11 on one side, and extension 12 and post 13 on the other side. These arms instead of being built up of extensions and posts as shown may be simply angular extensions of the frame and integral therewith. A bracket 14, preferably integral with the frame, extends outwardly from, and below the extended portion 5 for the purpose of mounting the magneto 15 in proper position relative to the other parts. Circuit connection is made with the magneto winding through the conductor 36 (see Fig. 3) extending from the magneto binding post 37 to the igniter binding post 35, the return circuit being by way of ground or frame.

The igniter operating shaft 8 carries an operating lever 16 fixed thereto and both held normally in a given position relative to the frame by means of a torsion spring 17 connected between the lever 16 and the main frame body 2. The trip lever 18 is journaled on the igniter operating shaft and held under tension in a given position relative to the frame by means of the pull springs 19 and 20 each connected at one end to the trip lever through a pulley or roller bearing, and at the other end to one of the posts 11 and 13 through a roller bearing, as is clearly shown in Fig. 1. Motion is transmitted from the trip lever to the igniter operating arm 16 by means of a stud 21 projecting from the trip lever across the igniter operating lever and acting on it through an adjustable tappet in the form of a screw and lock nut 22, see Fig. 3.

The magneto 15 is mounted on the bracket 14 with its operating shaft substantially in alinement with the igniter operating shaft and motion is transmitted from the trip lever to the magneto shaft by means of the upwardly extending bifurcated finger 23 on the trip lever, and the crank pin 24 strad-

dled at one end by the bifurcated finger and connected at the other end to the crank 25 carried by the magneto shaft 26.

For operating the trip lever 18 a trip finger 27 is provided extending downwardly from the trip lever into the path of a reciprocating trip rod 28 and clear of the various other parts of the ignition unit. The trip rod 28 is adapted to be operated to first engage the trip finger 27 and rotate the trip lever in a clockwise direction (Fig. 2) and then move out of the arc scribed by the trip finger and so permit the trip lever to trip or spring back under tension of the pull springs, all in synchronism with the movement of the engine and in a manner familiar to those skilled in the art.

The various parts of the ignition unit are so adjusted that each time the trip lever snaps back into the normal position shown, after being tripped, it delivers a hammer blow through the stud 21 and tappet 22 to the igniter shaft operating lever 16 causing a sudden counterclockwise rotation of the ignition shaft resulting in a sudden parting of the igniter contacts, and also through means of the bifurcated finger 23 and crank connection 24—25, transmits its entire rotary motion to the magneto operating shaft, which shaft is so fixed in relation to the rotor of the magneto that the E. M. F. generated reaches its maximum at the instant of separation of the igniter contacts.

It will be seen that by journaling the trip lever on the igniter shaft intermediate the two bearings, the strains due to the force of the pull springs and push rod are distributed uniformly and the resultant force maintained substantially in a given direction. Thus the igniter shaft is not subjected to any side strain or wear due to the presence of the trip lever upon it. This elimination of side strain and its resulting wear makes possible the maintenance of a gas tight fit between the igniter operating shaft and its inner bearing. It will be noted that the igniter shaft is at rest during the greater portion of the cycle of operation of the mechanism and is moved only at the end of the tripping stroke of the trip lever so that during rotation it is free of any lateral strain due to the force exerted by the push rod. It will be further observed that there is no tendency of the push rod to push the magneto off the bracket and that there is practically no strain on any part of the magneto. The number of parts are reduced to a minimum and in fact with the exception of the springs 19 and 20 and the crank 25, there are no parts used which are not already found in standard make-and-break igniters as used for battery. As the parts are all close together and assembled with the operating shafts in line, any difference in timing between the magneto and igniter due to wear is reduced to a minimum which is not the case where the shafts operate on different centers and where the parts are interconnected by projecting fingers having considerable leverage.

It will be observed that the magneto may be readily removed from the engine without interfering in any way with the operation of the igniter mechanism proper, and that the construction enables the operating parts to be underslung, that is, so that the push rod 28 may operate on the bottom of the trip lever without the necessity of fitting arms to carry the magneto around underneath the trip lever, which makes a very cumbersome arrangement.

While I have herein described and illustrated in detail a preferred embodiment of my invention it is to be understood that various other modifications may be made without departing from the spirit of the invention, which modifications are contemplated by me.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. An ignition mechanism for internal combustion engines comprising a frame adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, inner and outer bearings carried by the frame, an operating shaft for the igniter journaled in said bearings, a magneto carried on the frame, a trip lever journaled on the igniter shaft between said inner and outer bearings and means for transmitting motion from the trip lever to both said igniter shaft and said magneto shaft.

2. An ignition mechanism for internal combustion engines comprising a frame adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, inner and outer bearings carried by the frame, an operating shaft for the igniter journaled in said bearings, a magneto carried on the frame, a trip lever journaled on the igniter shaft between said inner and outer bearings, tension means connected to said trip lever tending to hold it in a given position, means for moving said trip lever against the force of the tension means and tripping the same and means for transmitting motion from said trip lever to both said igniter and magneto shafts.

3. An ignition mechanism for internal combustion engines comprising a frame adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, inner and outer bearings carried by the frame, an operating shaft for the igniter journaled in said bearings, a magneto carried on the frame, a trip lever journaled

on the igniter shaft between said inner and outer bearings, tension means connecting said trip lever with the frame so as to normally hold the lever in a given position relative to the frame, an operating lever carried by said igniter shaft between said inner and outer bearings, tension means connecting the igniter shaft with the frame so as to normally hold the igniter shaft in a given position relative to the frame, means for operating said trip lever and means for transmitting motion from the trip lever to said igniter shaft operating lever and said magneto operating shaft.

4. An ignition mechanism for internal combustion engines comprising a frame adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, inner and outer bearings carried by the frame, an operating shaft for the igniter journaled in said bearings, a magneto carried on the frame, a trip lever journaled on the igniter shaft between said inner and outer bearings, tension means tending to hold the trip lever in a given position relative to the frame, means for operating the trip lever engaging it below the igniter shaft and means carried by the trip lever situated above said trip lever operating means for transmitting motion from the trip lever to both said igniter and magneto operating shafts.

5. An ignition mechanism for internal combustion engines comprising a main frame body adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, an outward extension on said main frame body, an operating shaft for the igniter, an inner bearing for the igniter shaft situated in the main frame body, an outer bearing for the igniter shaft situated in the said extension, a bracket extending outward from said outward extension, a magneto mounted on the bracket, a trip lever on the igniter shaft intermediate said inner and outer bearings, means for operating the trip lever and means for transmitting motion from said trip lever to both of said operating shafts.

6. An ignition mechanism for internal combustion engines comprising a main frame body adapted to be mounted on the engine, an igniter carried by the frame so as to extend into the ignition chamber of the engine, an outward extension on said main frame body, an operating shaft for the igniter, an inner bearing for the igniter shaft situated in the main frame body, an outer bearing for the igniter shaft situated in the said extension, a bracket extending outward from said outward extension, arms extending laterally from the said outward extension and extending inwardly at their ends to a line transverse of the igniter shaft and intermediate said inner and outer bearings, a trip lever journaled on the igniter shaft, pull springs connected from each of the opposite ends of said lever to the end of one of said arms, a magneto mounted on the bracket, means for rotating the trip lever against the tension of said pull springs and tripping or releasing the same in synchronism with the movements of the engine and means for transmitting motion from the trip lever to both of said shafts.

7. An ignition mechanism for internal combustion engines comprising a frame, an igniter carried by said frame, inner and outer bearings in said frame, an operating shaft for the igniter journaled in said bearings, a trip lever journaled on the operating shaft intermediate the said bearings, a magneto carried by the frame and means for transmitting motion from the trip lever to both of said shafts.

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

HARRY RANDOLPH VAN DEVENTER.

Witnesses:
EDNA ISLER,
E. H. RHAME.

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