No. 663,653. Patented Dec. 11, 1900.

W. H. COTTON.

ELECTRIC IGNITER FOR GAS ENGINES.

(Application filed Nov. 23, 1898.)

(No Model.)

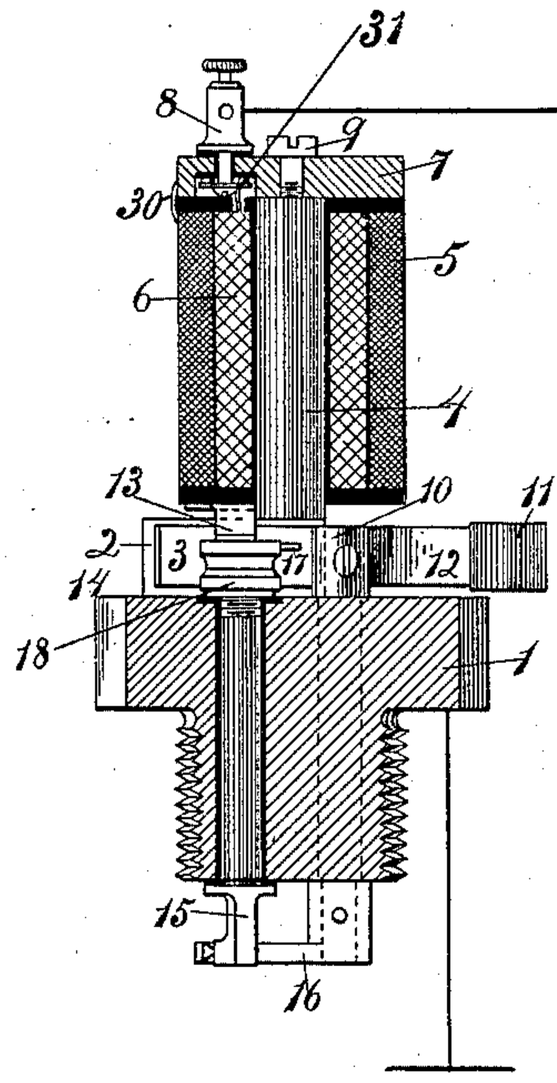
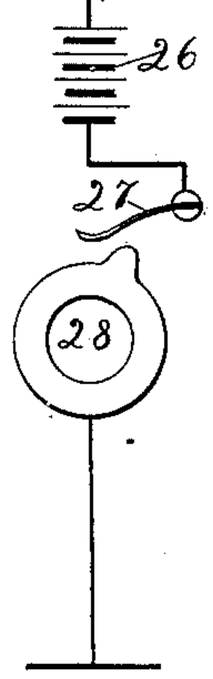


Fig. 1.



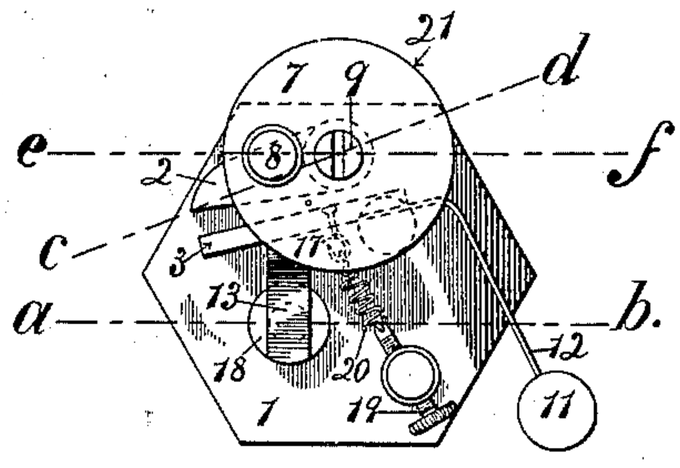


Fig. 2.

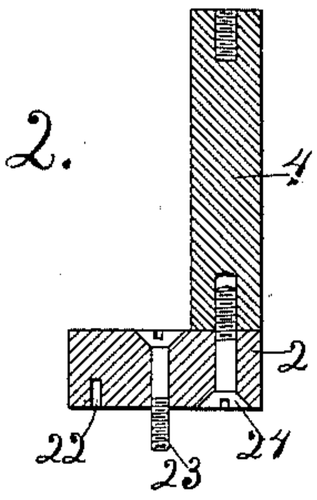


Fig 4.

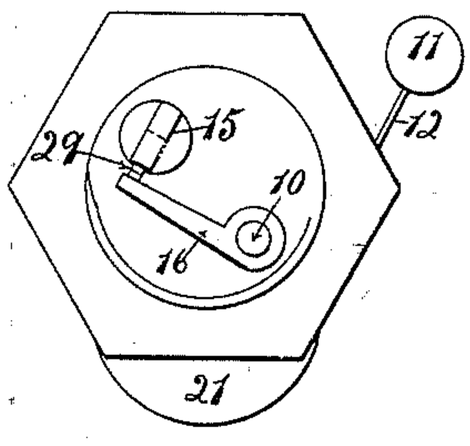


Fig. 3.

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UNITED STATES PATENT OFFICE.

WALTER H. COTTON, OF CHICAGO, ILLINOIS.

ELECTRIC IGNITER FOR GAS-ENGINES.

SPECIFICATION forming part of Letters Patent No. 663,653, dated December 11, 1900.

Application filed November 23, 1898. Serial No. 697,285. (No model.)

To all whom it may concern:

Be it known that I, WALTER H. COTTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Electric Igniters for Gas-Engines, of which the following is a specification.

This invention relates to improvements in electric igniters in which the energy is provided by means of electromagnets mounted on the cylinder-head or other part of the engine having convenient means of communication with the firing-chamber. In my device one or more magnets can be used in combination with an armature; but I prefer to use but one, thus simplifying and reducing the cost and at the same time increasing its efficiency, and by mounting the device upon the head of the screw-cap I am enabled to tap any cylinder, thread the aperture, and insert the screw-cap carrying the device, thus adapting it for use upon any gas-engine with but little expense or delay.

My device is illustrated in the accompanying drawings, in which—

Figure 1 is a vertical cross-section in the lower portion on line *a b* and on the upper part through the magnet on line *e f*, Fig. 2. Fig. 2 is a plan view of the top of the device. Fig. 3 is a plan view of the bottom of the device. Fig. 4 is a cross-section of the core of the magnet on line *c d*, Fig. 2.

Similar numerals refer to similar parts throughout the several views.

In the construction of my device I make use of a compound-wound magnet 21, composed of a spool or magnet core 4 and two coils of wire. For the first winding or coil a coarser wire is used than in the second. The first is designated by 6 and the second by 5. The first or coil 6 provides a primary current and the other or coil 5 the secondary current. The upper terminal 31 of the primary coil 6 is connected with the post 8, which is erected on the plate 7 on the head of the magnet. A perforation in the plate 7 provides a seat for the post 8, and the under side of the plate at this point is countersunk to provide for the connection of the terminal 31 with the post 8. The upper terminal 30 of the secondary coil is grounded in the plate 7. The lower terminals 13 of the two coils are connected with the lower post 18, which passes through the screw-cap 1, is insulated from it, and projects through the lower extremity of the screw-cap, providing a point of contact 15 for the lever 16. The armature 3 is flat and attached to a post 10, which is also set in the screw-cap 1, passing through it and adapted to turn slightly when acted upon by the armature. The post 10 carries rigidly on its lower end and internally of the cylinder the contact-lever 16, which reaches to the contact-point 29, which is its normal position. The armature is provided at one end with an extension 12, which carries a button or weight 11 to give it momentum. The armature thus swings with the post 10 as a pivotal connection and support.

The armature 3 engages a spring 20, which is also engaged by a set-screw 19, mounted in a post set on the surface of the head of screw-cap 1, by means of which the tension or force of the spring may be adjusted. The spring breaks the force of contact of the armature with the magnet and keeps the points of lever 16 in its normal position. The head of the core 4 of the magnet is attached to the head-plate 7 by the screw-bolt 9 and at its lower end is set on the plate 2 and fastened by the screw-bolt 24, and this plate 2 is attached to the head of the screw-cap 1 by the screw-bolt 23 and dowel 22. The post 8 is connected with the battery 26 by the wire 25 and the battery with the brush 27, stationary on and insulated from the engine. A cam 28 is placed in a position to engage with the brush, and as the cam trips on the brush 27, which is insulated from the engine, the circuit is closed by the ground connection.

In the operation of the igniter the tripping of the cam upon the brush closes the circuit and excites the electric magnet, which, exerting its energy upon the armature, causes it to swing upon its pivotal post, which, slightly turning with it, causes the contact-lever to break away from the point of contact 29 in the cylinder, causing the spark to be emitted. The current passing first through the primary coil of the magnet to the contact-lever, the breaking of the circuit causes the energy to be transmitted to the secondary coil, which intensifies or enlarges the spark,

obviating the use of a spark-coil in the circuit.

The advantages in the adoption of magnetic energy for operating the contact-points of electric igniters will be clearly seen, as the igniter is not dependent upon the mechanical parts of the engine, and on starting after the charge is pumped into the combustion-cylinder it can be ignited by a push-button or switch electrically connected to the circuit, so as to switch the current around the cam and brush. This advantage is more noticeable in its use on gas-engines used for the propulsion of carriages, as said push-button can be placed any convenient distance from the motor.

Another important feature of my invention is that the duration of the spark can be regulated by increasing or diminishing the length of contact of the cam and brush, as a continuous spark is produced as long as the circuit is closed, and inferior mixtures and low grades of gases may be used, and therefore cost of power diminished.

Having thus described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In an electric igniter for gas-engines, a cap adapted to be inserted in the cylinder of the engine, a compound-wound electromagnet erected on the cap and having a primary and secondary coil, a head-plate on said electromagnet, a post erected on said head-plate, the upper terminal of the primary coil connected with said post, the upper terminal of the secondary coil grounded, the lower terminals of the two coils connected with a post inserted in said cap, fixed and movable electrodes, and means for making and breaking electric connection with said electrodes, as set forth.

2. In an igniter for gas-engines, a cap adapted to be secured in the engine-cylinder, an electromagnet mounted on the cap and having primary and secondary coils, means for connecting the upper terminal of the primary coil of the magnet with an electric battery, an armature mounted on a post pivoted in the cap and positioned within the field of the electromagnet, a movable electrode secured to said post and adapted to turn with the armature, a fixed electrode secured to said cap and insulated therefrom, and means for electrically connecting the said post and the lower terminals of both coils, substantially as set forth.

3. In an igniter for gas-engines, a cap adapted to be secured in the engine-cylinder, an electromagnet mounted on the cap and having primary and secondary coils, means for connecting the upper terminal of the primary coil of the magnet with an electric battery, means for breaking such connection, an armature mounted on a post pivoted in the cap and positioned within the field of the electromagnet and having a weighted extension, a movable electrode secured to said post and adapted to turn with the armature, a fixed electrode secured in said cap and insulated therefrom, and means for electrically connecting said post and the lower terminals of both coils, substantially as set forth.

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Witnesses:
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