(No Model.) 2 Sheets—Sheet 1.

L. G. WOOLLEY.

MAGNETO ELECTRIC IGNITOR FOR COMBUSTIBLE VAPOR ENGINES.

No. 464,347. Patented Dec. 1, 1891.

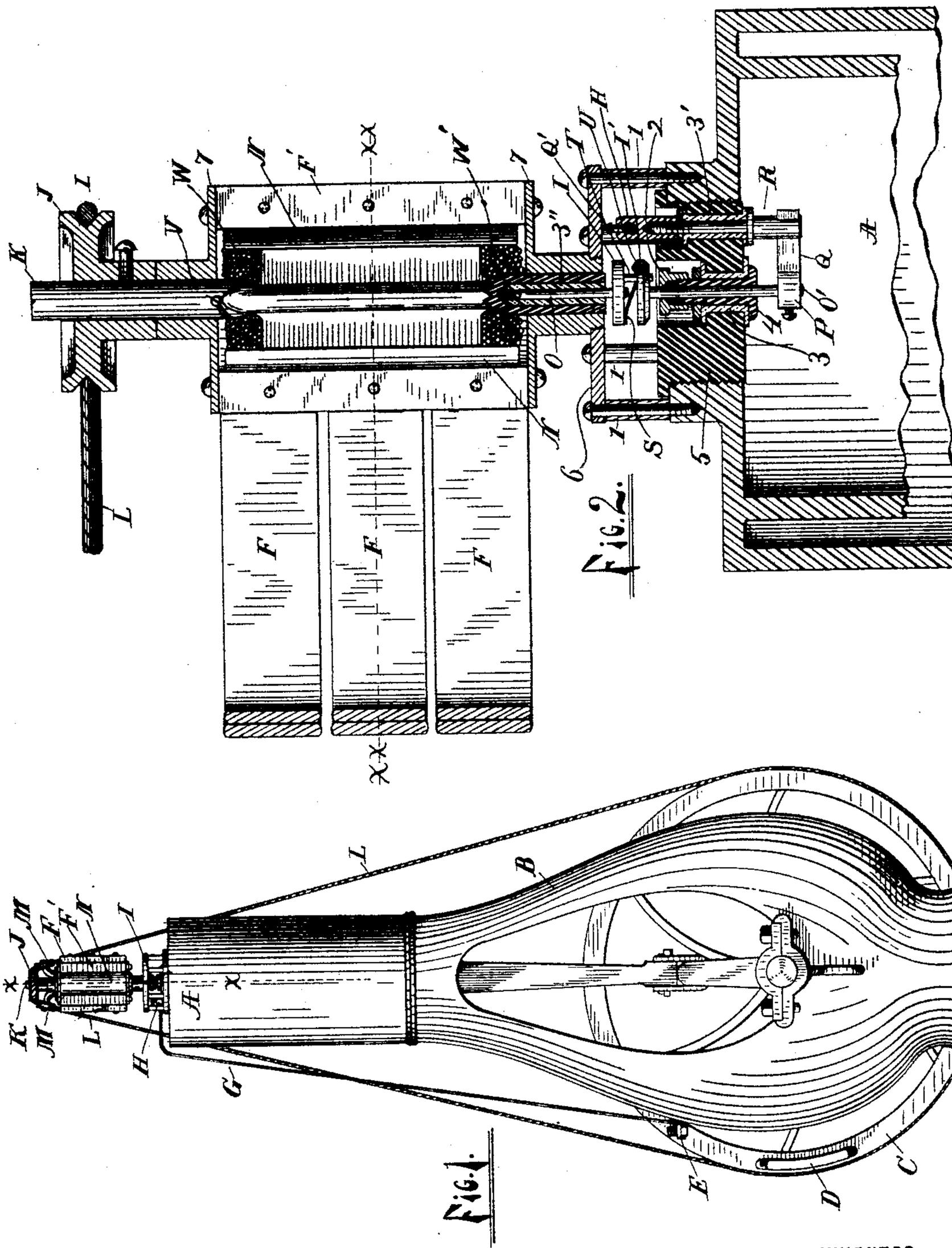

FIG. 2.

FIG. 1.

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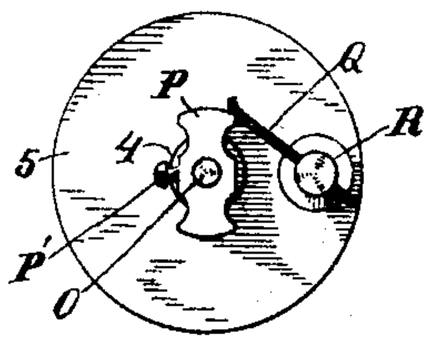

Fig. 4.

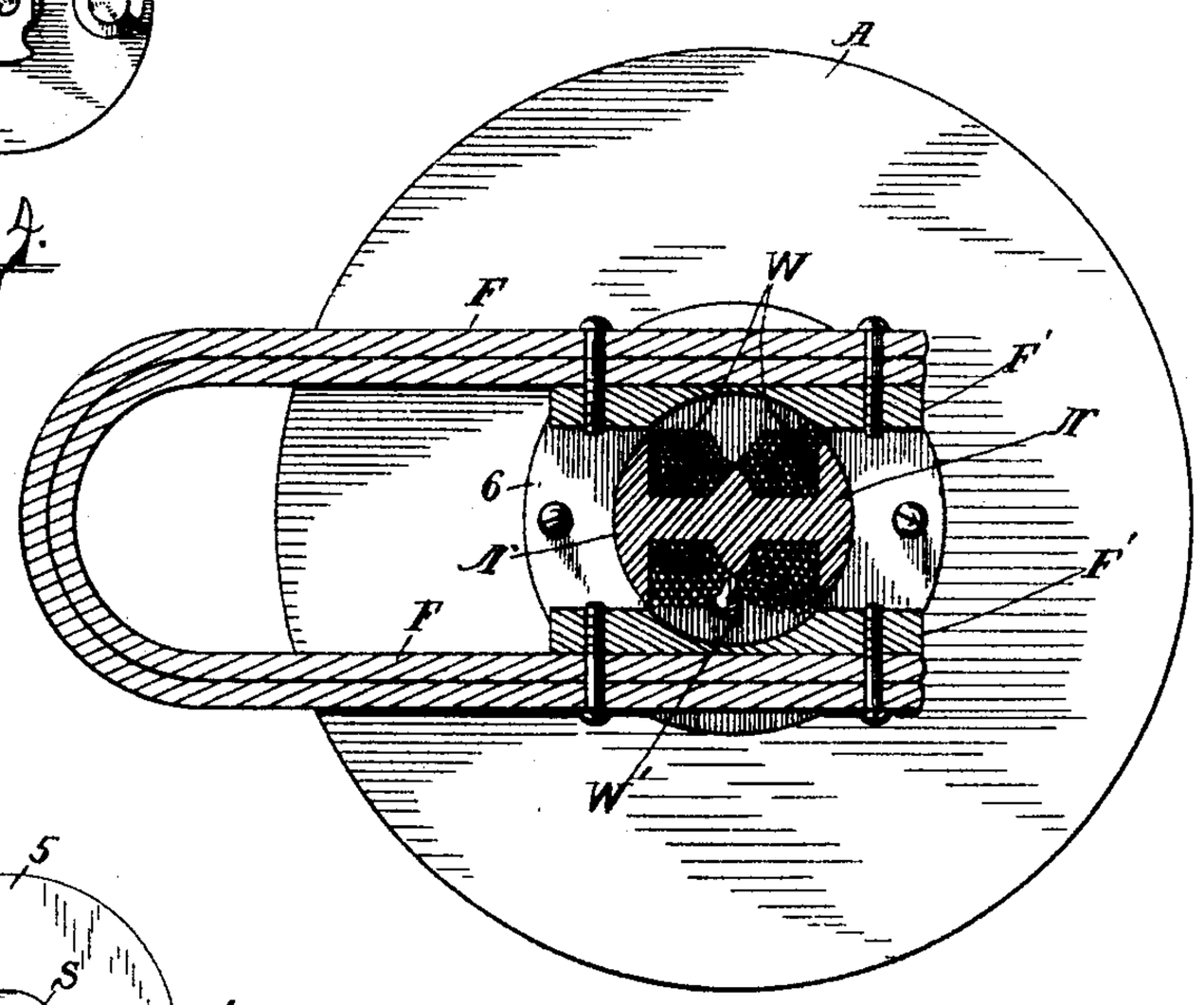

Fig. 3.

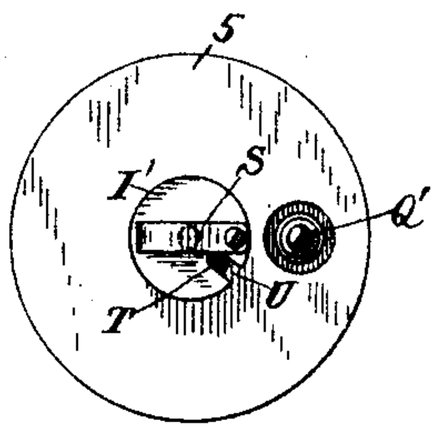

Fig. 5.

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UNITED STATES PATENT OFFICE.

LEONIDAS G. WOOLLEY, OF GRAND RAPIDS, MICHIGAN.

MAGNETO-ELECTRIC IGNITOR FOR COMBUSTIBLE-VAPOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 464,347, dated December 1, 1891.

Application filed September 26, 1890. Serial No. 366,273. (No model.)

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Magneto-Electric Ignitors for Combustible-Vapor Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a magneto-electric ignitor for combustible-vapor engines.

My object is to produce an improved device of this class; and it consists in the construction, combination, and arrangement of the various parts hereinafter described, and pointed out in the claims, reference being had to the accompanying drawings, wherein—

Figure 1 is an elevation of a vapor-engine with my device attached; Fig. 2, a partial vertical section of my apparatus on the line X X of Fig. 1; Fig. 3, a horizontal section on the line *xx xx* of Fig. 2; Fig. 4, a plan of the under side of the plug 5, shown in Fig. 2; Fig. 5, a plan of the top of the same.

Like letters and figures indicate corresponding parts throughout the drawings.

A represents the cylinder, B the frame, and C the fly-wheel, of the engine, having an electrode-plate D secured to its rim, engaging at each revolution of the wheel with the insulated brush E attached to but insulated from the frame B and provided with conductor G in the circuit.

Mounted upon the cylinder A, upon a stand 6, supported upon a series of posts 1 1 1, is a frame 7, to which is attached a series of permanent magnets F F F, having concave pole-pieces F′ opposite to each other, between which is journaled a revolving armature N, having a shaft K and an induction-coil W attached to the armature-shaft K at V at one end and to an insulated post W′, attached to the shaft O, which is in effect a continuation of the shaft K at the other end. The head of the cylinder is provided with a plug 5, through which are two apertures, in one of which is secured the insulated post R, to which is attached the brush Q, and having a head H, having a socket in which is placed the end of the conductor G, secured by binding-screw Q′. In the other aperture is the shaft O′, upon the lower end of which is the T-head P, with segmental faces engaging the brush Q and secured by set-screw P′. Upon the upper end of the shaft O′ and upon the lower end of shaft O are wheels I I′, with their faces opposite each other. The wheel I has projecting from its face the pin T, which engages with a slot U in the wheel I′, and the opposite faces are still further connected by a spring S, secured to wheel I′ and having its opposite end in contact with the wheel I. The purpose of this arrangement is to form a flexible electrical connection between the shafts O O′. If preferred, the armature may be placed horizontally and a miter-gear substituted, as will be readily comprehended.

4 is a sleeve in which the shaft O′ rotates.

3 3′ 3″ are insulating-bushings to insulate the parts that are in the circuit.

2 is a gland around shaft O′ to keep the gas from escaping.

The armature-shaft is provided with a pulley J, connected to the fly-wheel by a band L, which passes around idlers M. It will now be seen that the parts P and Q constitute a circuit-breaking device or sparker, and that the parts D and E form a circuit-closing device which closes the circuit periodically at each revolution of the fly-wheel and holds it closed while the plate is passing the brush. In the meantime the shaft O′, revolving rapidly, causes the head P and the brush Q to engage and disengage a number of times while the plate D and the brush E are in contact, and a spark is produced at each disengagement of the parts P and Q, whereby, as is evident, a series of sparks is produced in the combustion-chamber of the engine sufficient to fire the charge with absolute certainty.

The device generates sufficient electrical energy to make a spark only at certain points during the revolution of the armature—viz., at the instant the poles of the armature leave the poles of the permanent magnet. At this instant the potential rises to its highest point, and at this instant the parts are so adjusted that the circuit is broken by the sparker. Hence there is no continuous current in this machine, whereby, as is evident, the electrical energy is greatly economized, and I am enabled to construct the device with a less num-

ber of parts than are necessary in ordinary dynamo-electrical machines as heretofore used for this purpose.

I am aware that it is not new to use a dynamo or magneto electric machine to generate a practically-constant or rapidly-pulsating current, to conduct said current through the combustion-chamber of the engine, and there break the same to form a spark without regard in point of time between such break and the maximum tension of the current. I do not claim such, broadly.

What I claim, and desire to secure by Letters Patent, is—

1. In a device of the class described, in combination with an armature rotating between the poles of a permanent magnet and periodically producing electrical tension in a coil around said armature, a rotating shaft journaled in the head of the combustion-chamber, a T-head on the end of the shaft adapted to engage a brush in the circuit arranged within the combustion-chamber, and a flexible connection between said shaft and the armature-shaft, arranged substantially as and for the purposes set forth.

2. In a device of the class described, in combination with an armature rotating between the poles of a permanent magnet and a sparker arranged within the combustion-chamber, adapted to break the circuit the instant the tension is on, as set forth, a brush in the circuit attached to the stationary parts, and a circuit-closing device attached to the moving parts of the engine, substantially as set forth.

3. In a device of the class described, in combination with an armature rotating between the poles of the permanent magnet and periodically producing electrical tension in a coil around said armature, a sparker consisting of a rotating head engaging with a brush in the circuit insulated from the rest of the machine, arranged within the combustion-chamber, a brush insulated from but attached to the stationary parts and connected to the brush inside the chamber, and a plate attached to the moving parts of the engine, adapted to periodically engage the brush for closing the circuit and holding it closed for producing a succession of sparks, substantially as set forth.

4. In combination with a combustible-vapor engine, an electric machine adapted to produce a pulsating current and a current-breaker located within the combustion-chamber of said engine, rotating synchronously with the armature of said electric machine and adjusted to break the circuit only at the point of highest tension of said current, substantially as described.

5. In combination with a combustible-vapor engine, an armature rotating between the poles of a magnet and periodically inducing electrical tension in a coil and an electric circuit permanently connected to said coil and to a sparker within the combustion-chamber of said engine, said sparker adjusted to break said circuit at the time of highest electric tension in said coil and at no other time, substantially as described.

6. In combination with a combustible-vapor engine, an armature revolving between the poles of a magnet and periodically inducing electrical tension in a coil, an electric circuit permanently connected to said coil and to a sparker located in the combustion-chamber of said engine, adapted to break the circuit at the time of highest tension in said coil and at no other time, and a closer in said circuit attached to the moving parts of said engine, adapted to close said circuit at the proper time to fire the charge of combustible vapor, substantially as described.

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

LEONIDAS G. WOOLLEY.

Witnesses:

DENNIS L. ROGERS,

LUTHER V. MOULTON.