J. V. THORNDIKE.

COMBINED SPARK COIL AND INDICATOR.

APPLICATION FILED OCT. 23, 1908.

953,498. Patented Mar. 29, 1910.

Fig. 1.

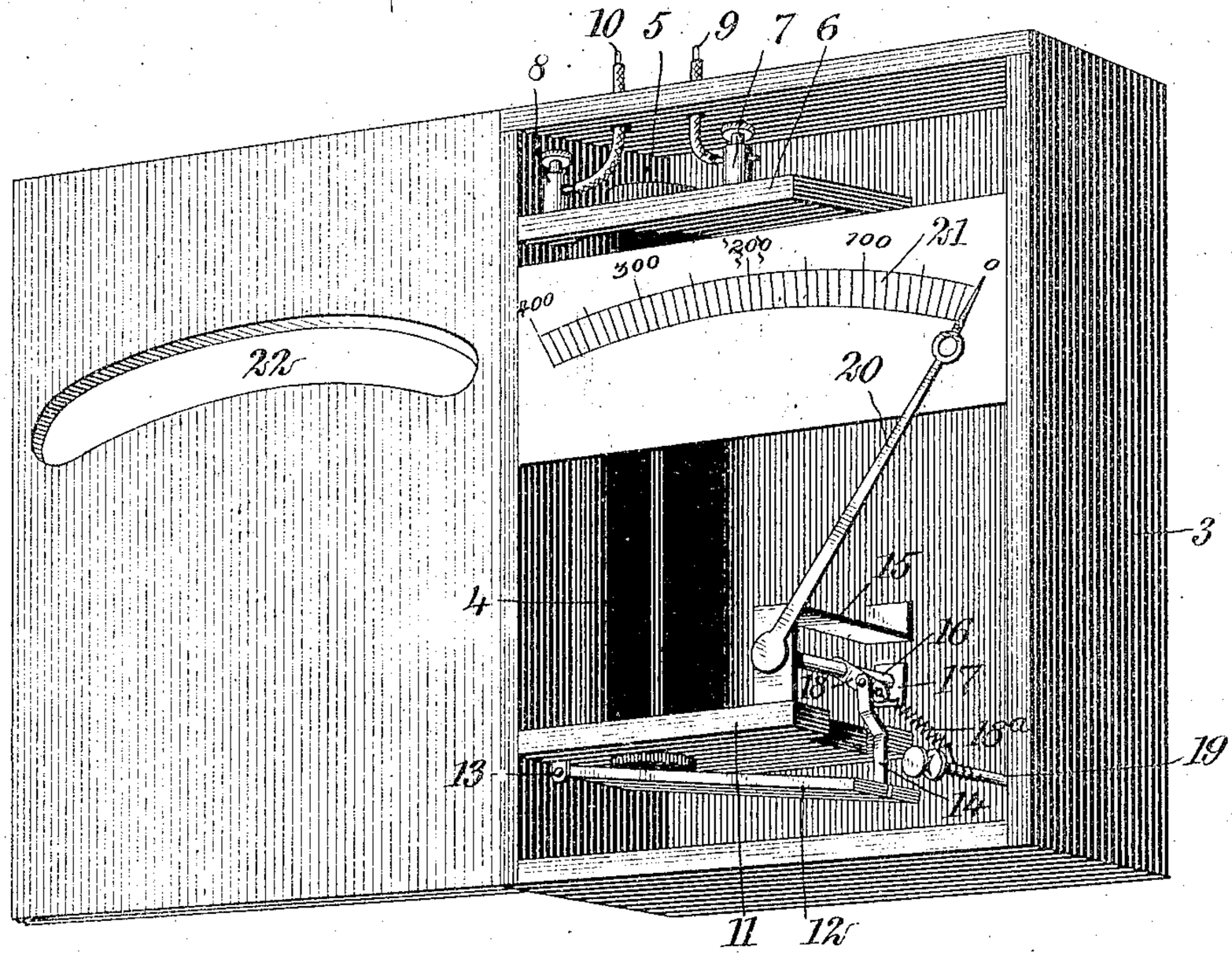
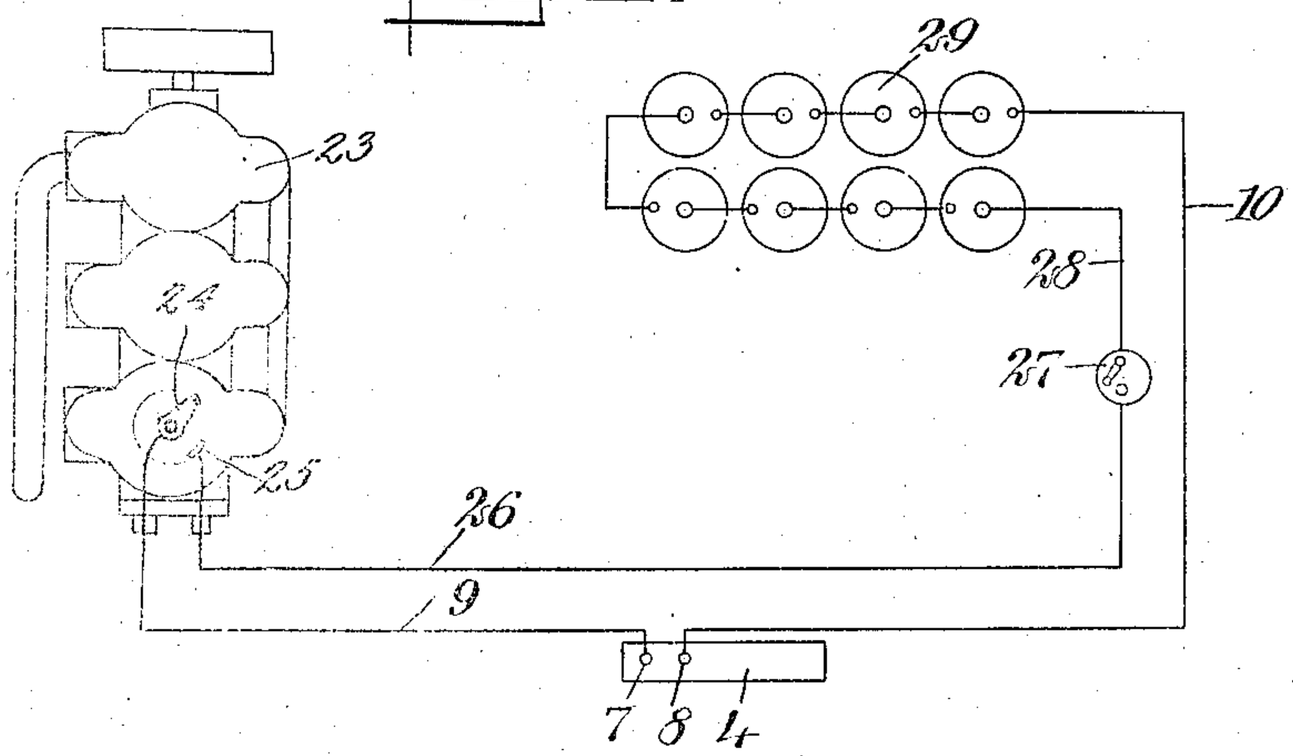


Fig. 2.



WITNESSES

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JAMES VERN THORNDIKE, OF RANDOLPH, NEBRASKA.

COMBINED SPARK-COIL AND INDICATOR.

953,498. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed October 23, 1908. Serial No. 459,125.

To all whom it may concern:

Be it known that I, JAMES VERN THORNDIKE, a citizen of the United States, and a resident of Randolph, in the county of Cedar and State of Nebraska, have invented a new and Improved Combined Spark-Coil and Indicator, of which the following is a full, clear, and exact description.

My invention relates to electric spark devices, my more particular purpose being to combine a spark coil with an appropriate indicator for disclosing the condition of the coil, in order that the operator may readily ascertain if the spark is being made properly.

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 both the figures.

Figure 1 is a perspective showing the combined coil and indicator; and Fig. 2 is a diagram of the wiring and shows how the instrument appearing in Fig. 1 may be connected with an engine and with a source of electricity.

Mounted within a box 3 is a spark coil 4. This coil has a laminated core 5, and at the upper end of the coil is a board 6 having binding posts 7, 8 upon it for convenience in attaching wires 9, 10. At the bottom of the coil 4 is another board 11 and below this is an armature 12 which is secured upon the board 11 by aid of journals 13. Pivotally connected with the outer or free end of the armature 12 is a link 14. A brace 15 is connected with the board 11 for the purpose of supporting the same, and is also connected with the back of the box. A rocking shaft 16 is journaled partly within this brace 15 and partly within a bearing plate 17.

Mounted upon the shaft 16 is an arm 18 to which the link 14 is pivoted. A spring 18^a is connected with the link 14 and also with a windlass 19. By turning this windlass by hand, tension of the spring 18^a may be regulated at will. A needle 20 is mounted upon the shaft 16 and is adapted to play over a graduated scale 21, so that any movement of the shaft 16 is apparent from a glance at the graduated scale 21 and the needle 20. The box 3 is provided with a slot 22 through which readings of the scale 21 may be made at a glance.

At 23 is an internal combustion engine and associated with it is a revoluble contact arm 24 which periodically engages a stationary sector or contact member 25. A wire 26 is connected with the sector 25 and with a hand switch 27. A wire 28 is connected with the hand switch 27 and with a battery 29. From the battery the wire 10 leads to the coil 4 shown in Fig. 1. The wire 9 connects the coil with the contact arm 24.

The graduations 21 may be numbered as desired. In the particular instance shown in Fig. 1, they run from zero to 400, inclusive.

The operation of my device is as follows: The parts being connected up as indicated in Fig. 2, the switch 27 being closed by hand, and the revoluble contact arm 24 being in motion, contact is repeatedly made and broken between this contact arm and the sector or stationary contact member 25. Each time contact is thus made, the following circuit is completed: battery 29, wire 10, binding post 8, coil 4, binding post 7, wire 9, contact arm 24, contact sector 25, wire 26, switch 27, and wire 28, back to battery 29. This circuit being broken, every time the contact arm 24 leaves the sector 25, a spark is made in the manner well known in this art. The completion of the circuit, in energizing the coil 4, excites the core 5 and causes it to attract the armature 12. The armature thereupon swings upward, causing the link 14 to rock the arm 18, and consequently the shaft 16 and needle 20. The operator, by looking through the slot 22 at the needle 20 and scale 21 can see from movements of the needle relatively to the scale whether the circuit is in working condition; or in other words, whether the spark is being made.

I have made the discovery that with the apparatus arranged as above described, each time the coil is energized and deënergized, if the spark is a good one—a "fat spark" as it is often called—the movement of the needle is farther than would otherwise be the case. The operator therefore, by watching the character of the movement made by the needle, can ascertain, with some degree of precision, whether the spark is being made properly or not. The reason why the needle moves differently when the spark is being made properly, is doubtless due to the inductance of the coil 4, this inductance being greater whenever the spark is made properly

than when it is not made at all or is made imperfectly. When the rotation of the contact arm 24 is comparatively slow, the action of the armature 12 is to move the needle 20 by a series of jerks, the needle being restored to its normal position, zero, after each time it is energized. When, however, the contact arm 24 rotates with unusual rapidity, the needle 20 does not have time, after each impulse, to resume its normal position and therefore takes up a tolerably steady position upon the scale. In any event, however, the operator, by watching the needle and scale, can ascertain the condition of the electric circuit and the manner of performance of the spark.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination of an electric circuit, a spark coil connected therewith for increasing the voltage of currents flowing through said circuit, a movable armature for said spark coil, and indicating mechanism connected with said movable armature and actuated thereby for disclosing when said spark coil is energized.

2. The combination of an electric circuit, a source of electricity for energizing said circuit, a spark coil connected with said circuit for the purpose of intensifying currents traversing the same, said spark coil being provided with a core, a movable armature disposed adjacent to said core, and indicating mechanism connected with said armature and controllable by movements thereof for indicating changes in the condition of the current traversing said circuit.

3. The combination of an electric circuit, a spark coil connected with said electric circuit for energizing the same, an armature movable relatively to said spark coil and actuated thereby, and mechanism connected with said armature and operated by the same for the purpose of indicating the condition of said circuit.

4. The combination of a circuit including contact members for the purpose of opening said circuit and thereby producing a spark, a spark coil connected with said circuit for increasing the voltage of currents traversing the latter, and mechanism actuated magnetically by said spark coil for indicating when currents flow through said circuit.

5. The combination of an electric circuit including contact members for producing a spark, an indicating mechanism, a spark coil connected electrically with said circuit for the purpose of increasing the voltage of currents flowing therethrough, and a movable armature controllable by said spark coil and connected mechanically with said indicating mechanism for the purpose of actuating the latter.

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

JAMES VERN THORNDIKE.

Witnesses:
J. L. Dolin,
M. E. Buol.