E. T. SHAW & G. E. WOOD.

COMBINED COIL, TIMER, AND DISTRIBUTER DEVICE.

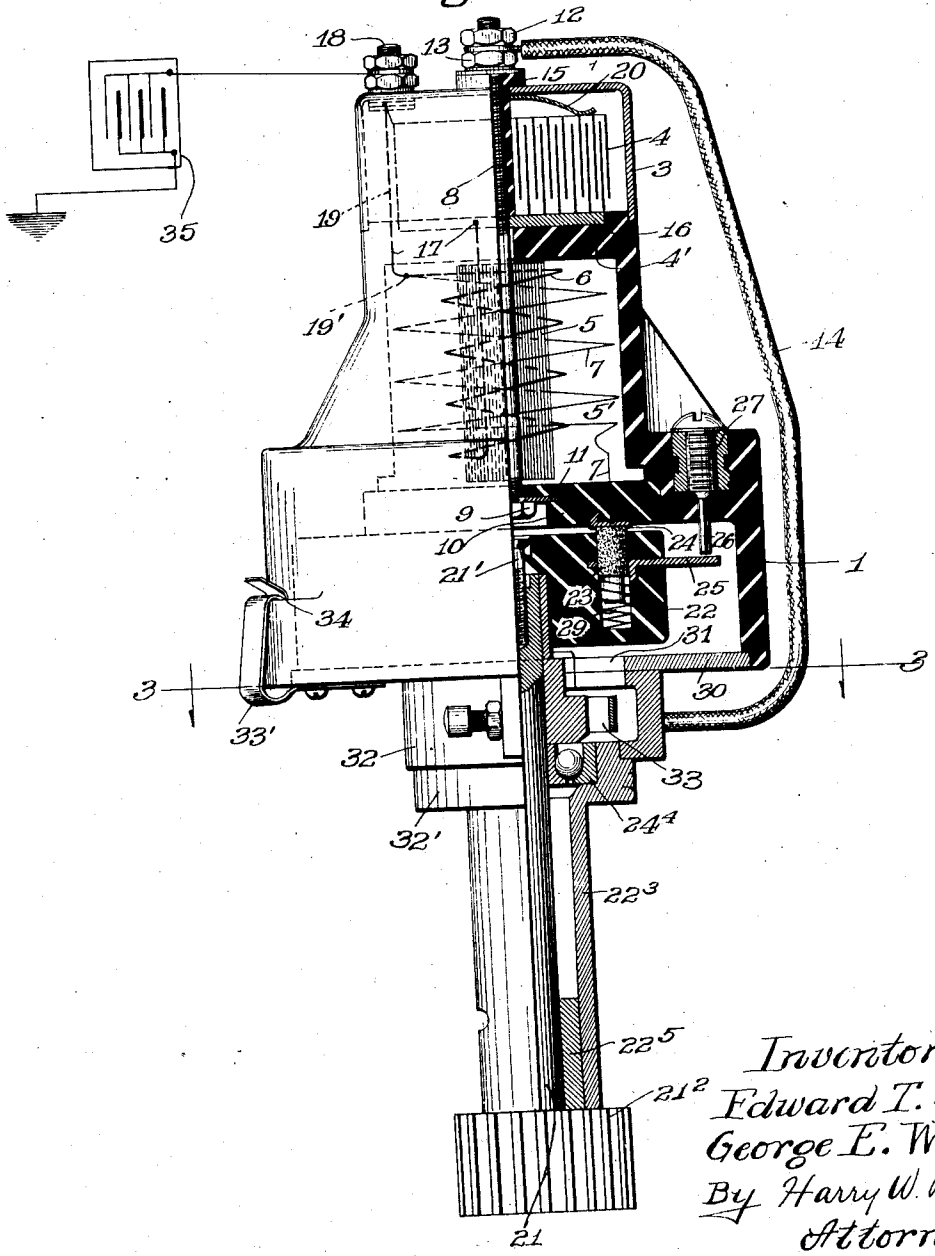
APPLICATION FILED JUNE 15, 1916.

1,246,822.

Patented Nov. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1




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2 SHEETS—SHEET 2.

Fig. 2.

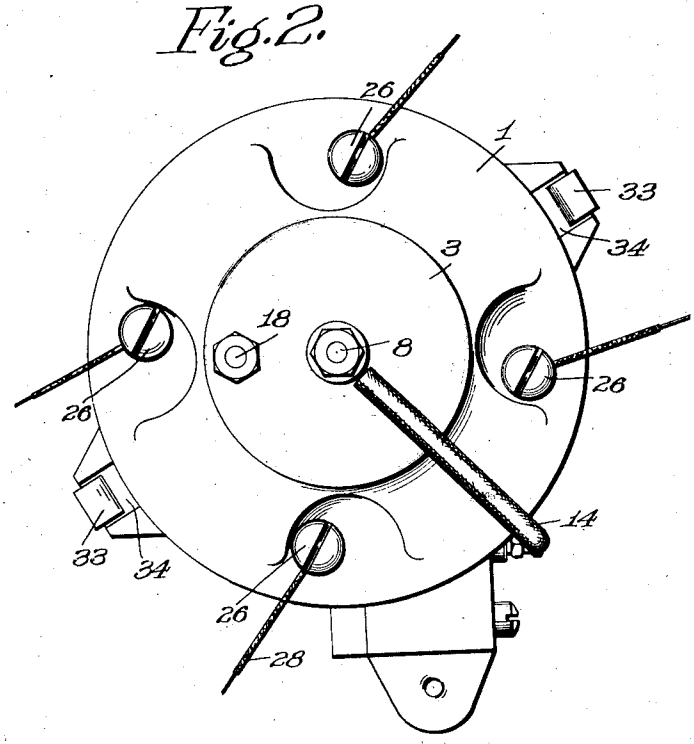
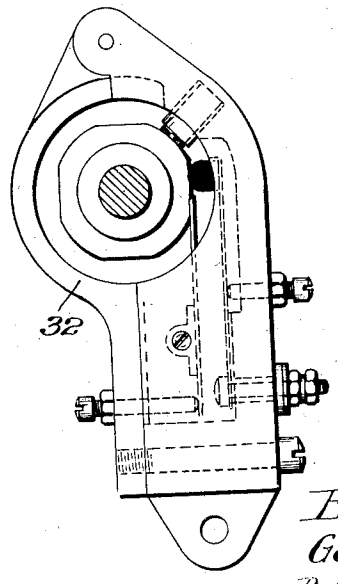



Fig. 3.




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# UNITED STATES PATENT OFFICE.

EDWARD T. SHAW AND GEORGE E. WOOD, OF PITTSFIELD, MASSACHUSETTS, ASSIGNORS TO PITTSFIELD SPARK COIL COMPANY, OF PITTSFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

## COMBINED COIL, TIMER, AND DISTRIBUTER DEVICE.

1,246,822. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed June 15, 1916. Serial No. 103,793.

*To all whom it may concern:*

Be it known that we, EDWARD T. SHAW and GEORGE E. WOOD, citizens of the United States of America, residing in the city of Pittsfield, county of Berkshire, and State of Massachusetts, have invented certain new and useful Improvements in a Combined Coil, Timer, and Distributer Device, of which the following is a specification.

This invention relates to improvements in a combnied coil, timer and distributer device. An object of the invention is to include in as small a compass as possible an induction coil, a condenser and distributer device for the spark current, also means for securely holding the condenser and coil together in the same axial alinement. A further object of the invention is to provide a rotating or distributer part for conveying the secondary or spark current of the coil to the leads of the various spark plugs of an internal combustion engine. An adjustable make-and-break device is also combined with the coil and condenser said device being located within the inclosing casing and in axial alinement with the core of the condenser and coil, as will more fully appear.

Referring to the drawings:

Figure 1 is a side elevational view of the assembled device, one half of which, for clearness, is shown in section for illustrating the arrangement and location of the coil, condenser and distributer and timer mechanism;

Fig. 2 is a top plan view of Fig. 1 showing the terminals to which the lead wires are connected and which serve to convey the spark current to the various spark plugs, also showing one end of the electric connection between the timer make-and-break device and one terminal of the condenser and primary coil; and

Fig. 3 is a sectional detail view on the line 3—3 of Fig. 1, looking in the direction of the arrows; of the make-and-break device which device forms the subject matter of a co-pending application of the joint applicant Edward T. Shaw, of this application, filed Mar. 30, 1916, Ser. No. 87,706.

Referring now to the drawings in detail: The main inclosing and distributer casing, which is of insulating material, is indicated at 1 and is formed with an upwardly extending portion 2 of slightly smaller diameter than the lower part indicated at 1. The upper end of the casing is provided with the metal cap 3 preferably of spun metal, for inclosing the spirally wound condenser which is indicated at 4 above the upper end 4′ of the casing. The laminated core of the induction coil is shown at 5 with the primary winding at 6 and the secondary winding at 7. The laminations preferably consist of a large number of soft iron wires suitably secured together. The core of the coil and the condenser are rigidly secured in place and to the casing by means of the threaded metallic rod 8 which is threaded at its ends and passes through and is located in the axis of the core 5 and the center of the spirally wound condenser 4. The threaded lower end of the rod 8 is threaded into and secured to a nut 9 that is embedded in the disk of insulation 10 which is secured to the casing 1 in any suitable manner and which serves as a partition piece between the space 5′ in which the coil is located and the space 1′ in which the distributer is located. Also embedded in this piece of insulation is a washer 11 to prevent the nut from being pulled out by the rod 8. The upper end of the threaded rod 8 passes through an insulating bushing in the metal cover 3 and is provided with two nuts 12 and 13, the nut 13 serving to secure the cover 3, the condenser 4, and the coil in place, while the nut 12 serves to secure one terminal of the primary lead wire 14 which connects from the make-and-break device to the condenser and coil. 15 designates a bushing for insulating the rod 8 from the metal cover 3.

The condenser 4 has one terminal electrically connected to the primary winding of the coil by means of the threaded metal washer 16 to which washer one terminal of primary winding of the coil is also connected, as indicated at the point 17. It should be stated that the rod, or stud 8, is in electrical connection with the metal washer 16, but is insulated from the metal condenser covering 3 as stated. Secured to the metal condenser covering 3 is a terminal securing stud 18 for making connections to the battery and the primary winding of the coil as indicated by the wire 19 which is connected at 19′ to the other terminal of the primary winding. A spring washer 20 serves to make electrical connection from the other

terminal of the condenser 4 to the metallic covering 3. 21 designates a rotating shaft to the upper end of which is secured by means of the screw 21′ the distributer head 22 formed from insulating material. At the lower end of the shaft is attached a driving gear $21^2$, a sleeve $22^3$, a ball bearing $24^4$ and bearing $22^5$ serves to support the shaft. Carried by this head is the carbon brush 23 which has a sliding contact with the fixed current collecting ring 24 to which the secondary wire 7 is connected. The rotating head 22 carries the distributer plate or finger 25 which passes in close proximity to the lower end of the lead wire stems 26 which are rigidly secured to the casing 1 by being threaded in the metallic sockets 27. The lead wires 28 are connected to the various spark plugs of the engine in the usual manner. The brush 23, as will be noticed, is normally forced upward by means of the compression spring 29, into contact with the current collecting ring 24.

The casing 1 is supported upon a plate 30 which is provided with openings 31 therethrough for the purpose of giving access to the interior of the adjustable interrupter casing 32 for inspection and adjustment of the platinum points and springs when the distributer casing 1 is removed, it being understood that the plate 30 is attached to the stationary sleeve $22^3$. The make-and-break device or interrupter is indicated at 33 which is of the same construction as shown in Fig. 3 and properly does not form any part of the present invention. The casing 1 is secured to the plate 30 by means of the springs 33′ the upper ends of which are bent so as to snap over and engage shoulders 34 of the casing 1, whereby when the springs are withdrawn the entire casing 1 may be removed giving access to working parts for adjustment.

The operation of the device is as follows: Considering a source of electric energy, as a battery 35, one terminal of which is connected to the binding post or terminal stud 18, the other terminal being considered as connected to the ground or framework of the machine. Current may be considered as passing from the battery to the binding post 18, through the wire 19 which constitutes one end of the primary winding 6 to the metal washer 16, the metallic rod 8, to the binding post 12 and the connection 14 to the make-and-break device in the interrupter casing which is indicated as a whole by the numeral 32 and then to the ground or frame work of the machine. The condenser, it will be observed, has its terminals connected across the terminals of the primary winding of the coil by means of the washer 16 at the point 17 and the spring washer 20 between the other terminal of the condenser and the casing 3. When the make-and-break or interrupter device is opened, the secondary current in the winding 7, which is connected to the primary at 19′ at one end and to the distributer ring at its other end, passes to the distributer ring 24 where it is conveyed by means of the rotating brush 23 to the stud or stems 26 by means of rotating the metallic plate 25. From the stud or stems 26 the spark current is conveyed to the various spark plugs by means of the lead wires 28. The metallic rod 8 serves the double purpose as a binding or securing element for the coil, condenser and covering 3, and also as an electric conductor for the primary current.

The lower side of the plate 30 is provided with openings 31 to allow access for adjusting the platinum contacts and springs when the distributer casing 1 is removed, the springs 33′ permitting the removal of the casing 1. Normally, however, the opening 31 is closed when the distributer casing 1 is in place. For the purpose of advancing or retarding the spark it should be stated that the casing 32 is adjustable between the plate 30 and a shoulder 32′ on the supporting sleeve $22^3$.

What we claim is:

1. A combined coil, distributer and timer device, with an inclosing casing, a partition serving to divide the casing into two compartments, the coil being located in one compartment and a rotatable spark distributing device being located in the other compartment, a condenser, the axis of which coincides with the axis of the core of the coil, a rod passing through the condenser and coil and having one end secured to said partition and its opposite end extending through a covering which serves to inclose the condenser, said rod serving as one terminal of the primary winding and condenser and said inclosing covering serving as the other terminal of the condenser and primary winding, and a make-and-break device for interrupting the primary circuit of the coil, and means for conveying the spark current to terminals which are connected to spark plugs.

2. A device of the kind described, comprising in combination with an inclosing casing, an induction coil and a distributer located in said casing, a casing arranged with its axis coinciding with the axis of the coil, means extending through the condenser and coil for securing the same together and a metallic covering for the condenser which serves as one terminal of the primary circuit, the other terminal of the primary circuit being connected to said securing means, one terminal of the condenser being in electrical connection with said securing means and the other terminal with the metallic casing, whereby the condenser is connected across the terminals of the primary wind-

ing, a rotatable member in electrical connection with the secondary winding of the coil, and means connected to said rotating member for interrupting the primary circuit in which is included a source of electrical energy.

3. A device of the kind described, comprising a casing, a coil and spark current distributer therein, a condenser, the axis of the condenser and coil being in axial alinement, a cover for inclosing the condenser, and a rod passing through the axis of the coil, condenser and cover for securing the same to the casing.

4. A device of the kind described comprising a distributer casing, a coil having primary and secondary windings, a condenser having its axis coinciding with the axis of the coil, a covering for the condenser, a rod for securing the coil, condenser, and covering in place, a distributer ring, means engaging said ring for conveying the spark current to the lead wires, a source of electrical energy, and means for interrupting the primary circuit.

5. In a device of the kind described, comprising a casing, an induction coil therein, a condenser, a rod molded into the core of the coil and passing through the axis of the condenser and coil, a cover for the condenser, a partition in the casing one end of the rod being attached to the partition and its other end to the cover, whereby the coil, condenser, and cover are secured to the casing, said rod serving as one terminal of the condenser and primary winding, as and for the purpose described, and the covering for the other terminal of the condenser and primary winding, a distributer for the secondary current and an interrupter for the primary current.

6. A device of the kind described having the axis of the induction coil, condenser, distributer and interrupter arranged in the same axial line and a securing rod passing through the axis of the condenser and the core of the coil for attaching the same to the inclosing casing.

7. In a device of the kind described, the combination with an inclosing casing having a partition therein, a distributer located in one compartment and an induction coil in the other compartment, a shaft for rotating the distributer, a rod secured to the partition and passing through the axis of the coil, a cap for closing the upper end of the casing, and having a condenser mounted therein, said condenser and cap being secured in place by the rod, means for closing the lower end of the distributer compartment, said means comprising a plate having spring clips secured thereto that are adapted to engage shoulders formed on the casing, and said plate having an opening to permit inspection of the distributer, a source of energy one terminal of which is connected to the cover, connections leading from the cover to the primary windings and connections leading from the other terminal of the primary windings to one terminal of the condenser, and electrical connections between the other terminal of the condenser and the cover, a make-and-break device, and connections extending from the cover to the make-and-break device, as described.

8. In an electrical timer and distributer, the combination, of an inclosing casing having a partition therein dividing the casing into two compartments, a distributer device in one compartment, an induction coil in the other compartment, the partition having a contact plate which is engaged by the distributer, one terminal of the secondary coil being connected to the contact plate, the other terminal of the secondary coil being connected to one terminal of the primary, a condenser, a cover for the condenser, and means extending from the partition to the cap for securing the coil, condenser and cap in place.

9. A combined timer and distributer, comprising an inclosing casing, the lower portion of which is larger than the upper portion forming an annular ledge between the two portions, a partition in the casing, secondary terminals mounted in the ledge, a distributer plate disposed adjacent the terminals, an induction coil having a terminal connected to said plate, said coil being mounted in the smaller compartment, a condenser arranged at the upper end of the casing, a covering for the condenser, and means passing through the axis of the coil and cap for securing the same to the casing.

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