

Sept. 21, 1937.

B. H. A. WALLENTA

2,093,700

IGNITION APPARATUS

Filed Dec. 29, 1934

Fig. 1.

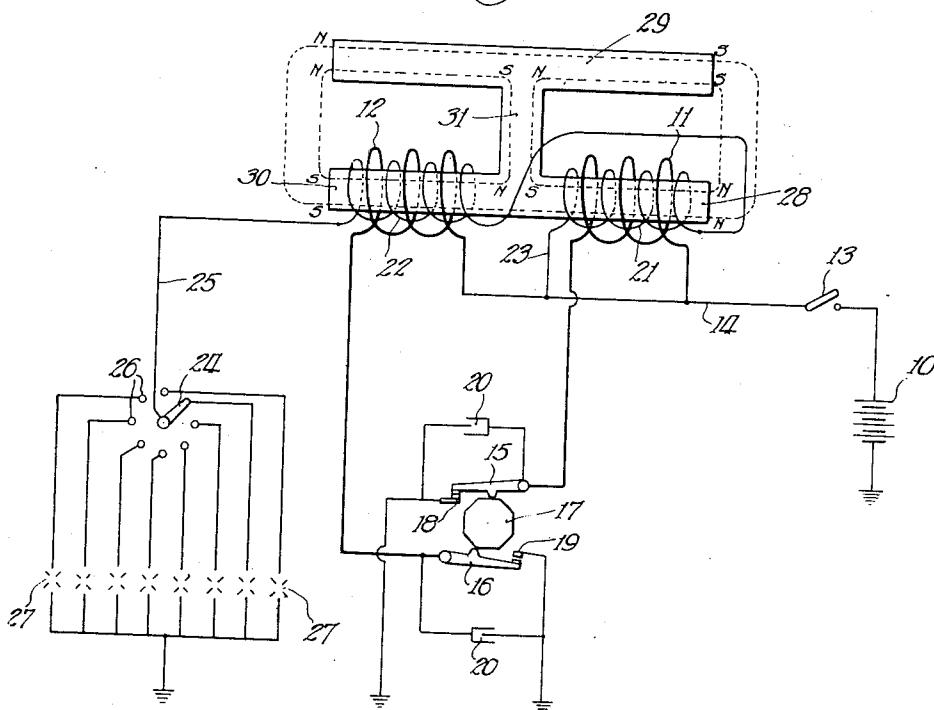
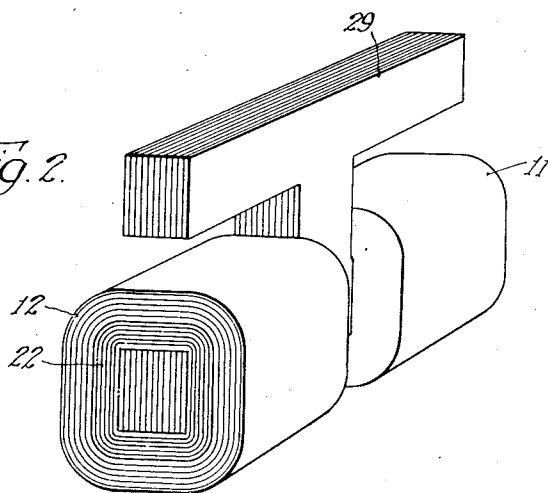


Fig. 2.



Inventor
Bernard H. A. Wallenta
By: *C. P. Soper* Att'y.

UNITED STATES PATENT OFFICE

2,093,700

IGNITION APPARATUS

Bernard H. A. Wallenta, Western Springs, Ill.,
 assignor to Kellogg Switchboard and Supply
 Company, Chicago, Ill., a corporation of Il-
 linois

Application December 29, 1934, Serial No. 759,750

13 Claims. (Cl. 123—148)

This invention relates to an improvement in ignition apparatus such as employed with automobiles and other multi-cylinder motor devices.

The object of the invention is the provision of an ignition coil and appurtenant apparatus which will be compact and cheap to manufacture and yet will give satisfactory ignition for motors employing several cylinders, such as eight or twelve.

One of the features of the invention is a unitary coil structure comprising a generally H-shaped core on the legs of which are two independent primary coils and a compound secondary coil, the parts of which are associated with the primary coils, respectively.

Another feature of the invention closely related to the coil structure is the provision of an interrupter having two pairs of contacts, one pair being associated with each of the primary coils. The common cam is arranged to open the interrupter contact pairs alternately, a sparking impulse being created in the secondary coil each time one or the other of the interrupter contact pairs is opened.

The present structure provides a very compact and cheap core and coil arrangement which necessitates but a single interrupter cam having two breaker arms associated therewith and a single distributor which is associated with the compound secondary coil.

It is believed the further disclosure of the invention will be best understood from a detailed description thereof taken in connection with the accompanying drawing in which,

Fig. 1 is a diagrammatic layout showing the core structure with the coils thereon and the breaker contacts and distributor arm associated therewith; and

Fig. 2 is an enlarged view of the coil structure showing it more nearly in its actual proportions.

Referring now to the drawing, in which like reference characters indicate the same parts in the several views, 10 indicates the storage battery which is adapted to be connected to the primary coils 11 and 12 by means of the ordinary switch 13. It will be noted that the coils 11 and 12 are connected at their right ends in parallel to the same battery lead 14 and the left ends of the coils 11 and 12 are connected to the breaker arms 15 and 16, respectively. Intermediate the arms 15 and 16 is an operating cam 17 of any preferred construction which is adapted to alternately operate the arms 15 and 16. Cooperating with the contact arms 15 and 16 are the stationary contacts 18 and 19, respectively, which

are connected to ground or the frame of the machine. Each of the pairs of contacts 15—18 and 16—19 is bridged by a condenser 20.

The secondary comprises the coils 21 and 22 which are in series, the coil 21 being associated with the primary coil 11 while the coil 22 is associated with the primary coil 12. It will be noted that one end of the secondary coil 11 is joined to the battery lead 14 by the conductor 23 while the remote end of the coil 22 is joined to the distributor arm 24 by means of the lead 25. The distributor arm 24 is adapted to contact or pass immediately adjacent to the several contacts 26 which are connected respectively to the spark plugs 27 of the motor.

Reference to the drawing will show that the primary coil 11 and associated secondary coil 21 are mounted on one leg 28 of the substantially H-shaped core element 29 while the primary coil 12 and secondary coil section 22 are mounted on the core leg 30.

The core 29 will preferably be formed of laminated sheets in accordance with the usual practice.

As above stated, the breaker arms 15 and 16 will be operated alternately to interrupt the circuits of the primary coils 11 and 12, respectively. Just prior to the opening operation of one or the other of the breaker arms, both the pairs of breaker contacts will be closed and battery will then be flowing through both primary coils. During this period the coils 11 and 12 will cooperate to cause the right end of the core section 28 to become positive and the left end of the core section 30 to become negative. At this time obviously the lines of magnetic force will travel in a complete or continuous loop through the core legs 28 and 30 on one side and the opposite corresponding legs of the H-shaped core piece on the other. Practically no magnetic lines will flow through the cross member 31 of the core structure while both pairs of breaker contacts are closed. The general path of the magnetic lines during this period is indicated in Fig. 1 of the drawing by the outer dotted rectangle.

If, now, the contacts 15 and 18 are separated current will cease flowing through the coil 11 and the magnetic field will assume the structure indicated by the inner dotted rectangle at the left of Fig. 1. The magnetic lines will now pass through the core cross member 31 and the right end of the magnetic structure will be entirely shunted out causing a sparking impulse to be produced in the secondary coil 21. Due to the fact that the primary coils are of relatively few

turns and the circuit of the coil 12 is closed at this time practically no impedance will be produced in the secondary or high tension circuit due to the secondary coil section 22. The contacts 15-18 are immediately closed and there is a period during which both sets of contacts are closed before the contacts 16-19 are separated at which time the magnetic field structure is such as indicated by the small dotted rectangle at the right in Fig. 1. The magnetic lines produced by the active coil 11 will now pass through the cross member 31 of the core and the left end of the magnetic structure will be shunted out to produce a spark as above described.

It will thus be seen that applicant has produced an ignition structure which is very compact and relatively cheap to manufacture, yet will provide as satisfactory ignition as an ignition device comprising two separate coils and two separate distributors.

While in the drawing and in the above description but one form or embodiment of the invention has been disclosed, it is appreciated that various modifications may be made in the arrangement without departing from the spirit of the invention. The invention, therefore, should be limited only by the scope of the appended claims.

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

1. In a distributing apparatus, an H-shaped core, a pair of primary coils on said core, circuits for said primary coils respectively, each of said circuits including a source of current and a pair of interrupter contacts, said current flowing in the same direction in both of said primary coils, a cam for actuating said interrupter contacts, a secondary coil located on one side of said core associated with the said primary coils, and a distributor arm electrically connected to the said secondary coil.

2. In a distributing apparatus, an H-shaped core, a pair of primary coils on said core, circuits for said primary coils respectively, each of said circuits including a source of current and a pair of interrupter contacts, said current flowing in the same direction in both of said primary coils, a cam for alternately actuating said interrupter contacts, a secondary coil wound on opposite legs of said core and associated with the said primary coils and a distributor arm electrically connected to the said secondary coil.

3. In a distributing apparatus, an H-shaped core, a pair of primary coils located on opposite legs of said core, circuits for said primary coils respectively, each of said circuits including a source of current and a pair of interrupter contacts, a cam for alternately actuating said interrupter contacts, a secondary coil having portions inductively associated with the said primary coils, the current flow in said portions of said secondary coil being in opposite directions, and a distributor arm electrically connected to the said secondary coil.

4. In a distributing apparatus, an H-shaped core, a pair of primary coils on opposite legs of said core, circuits for said primary coils, respectively, each of said circuits including a source of current and a pair of interrupter contacts, said current flowing in the same direction in both of said primary coils, a cam for alternately actuating said interrupter contacts, a compound secondary coil the parts of which are inductively associated with the said primary coils respectively,

and a distributor arm electrically connected to the said secondary coil.

5. In a distributing apparatus, a generally H-shaped core, a pair of primary coils on opposite legs of said core, circuits for said primary coils respectively, each of said circuits including a source of current and a pair of interrupter contacts, a cam for alternately actuating said interrupter contacts, a compound secondary coil the parts of which are wound upon opposite legs of said core and associated with the said primary coils respectively, the current in the respective parts of said secondary flowing in opposite directions, and a distributor arm electrically connected to the said secondary coil.

6. In a distributing apparatus, a generally H-shaped core, a pair of primary coils mounted in substantial alignment on opposite legs of said core, circuits for said primary coils respectively, each of said circuits including a source of energy and a pair of interrupter contacts, a cam for actuating said interrupter contacts, a compound secondary coil the parts of which are inductively associated with the said primary coils respectively, and a distributor arm electrically connected to the said secondary coil.

7. An ignition apparatus comprising a core, a pair of primary coils wound on said core so as to cause similar magnetic effects on said core when said coils are traversed by electrical current, electrical circuits for said primary coils respectively, interrupter means for alternately opening and closing said primary coil circuits, a secondary coil of two parts wound in series on said core, said parts being in inductive relation to said primary coils respectively, one of said secondary coils being wound about said core in the same direction as its associated primary coil and the other secondary coil being wound about said core in a direction opposite to that of its associated primary coil.

8. An ignition apparatus comprising a core, a pair of primary coils wound on said core at the opposite ends thereof so as to cause similar magnetic effects on said core when said coils are traversed by electrical current, electrical circuits for said primary coils respectively, interrupter means for alternately opening and closing said primary coil circuits, a secondary coil having portions wound in series, said portions being positioned on said core in inductive relation to the said primary coils respectively, one of said secondary coils being wound about said core in the same direction as its associated primary coil and the other secondary coil being wound about said core in a direction opposite to its associated primary coil, and an electrical circuit for said secondary coil.

9. An ignition apparatus comprising a core, a pair of primary coils located on said core and wound so as to cause similar magnetic effects on said core when said coils are traversed by electrical current, the inner ends of said coils being separated a substantial distance, electrical circuits for said primary coils respectively, a secondary coil comprising two portions wound in series on said core in inductive relation to said primary coils respectively, one of said secondary coils being wound about said core in the same direction as its associated primary coil and the other secondary coil being wound about said core in a direction opposite to its associated primary coil, and an electrical circuit for said secondary coil.

10. An ignition device comprising an H-shaped

5 core, a pair of primary coils wound in the same direction and located on one leg of said core, electrical circuits for said primary coils respectively, a secondary coil of two parts wound in series in opposite directions and located on one leg of said core, and an electrical circuit for said secondary coil.

10 11. An ignition apparatus comprising an H-shaped core, a pair of primary coils wound in the same direction and located at opposite ends of one leg of said core, a secondary coil having portions wound in series in opposite directions, said portions each being positioned on said core in inductive relation to the respective primary coils, and electrical circuits for said coils.

15 12. An ignition apparatus comprising an H-

shaped core, a pair of primary coils wound in the same direction and located on one leg of said core, the inner ends of said coils being separated by the crossbar of said core, a secondary coil having two portions wound in series in opposite directions and positioned on said core in inductive relation to said respective primary coils, and electrical circuits for said coils. 5

13. An ignition apparatus comprising an H-shaped core, a pair of primary coils located on one leg of said core, the inner ends being separated by the crossbar of said core, and a secondary winding positioned on said core in inductive relation to said primary coils. 10

BERNARD H. A. WALLENTA. 15