O. F. CONKLIN.

IGNITION APPARATUS.

APPLICATION FILED APR. 19, 1916.

1,354,888. Patented Oct. 5, 1920.

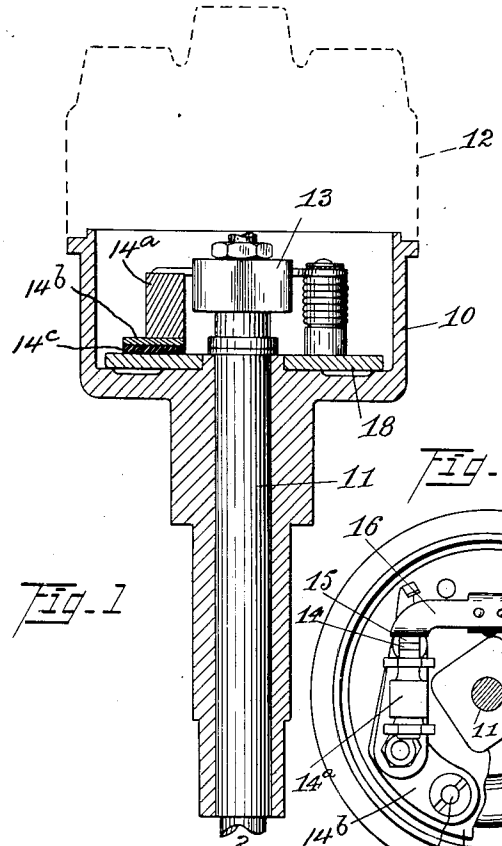


Fig. 1

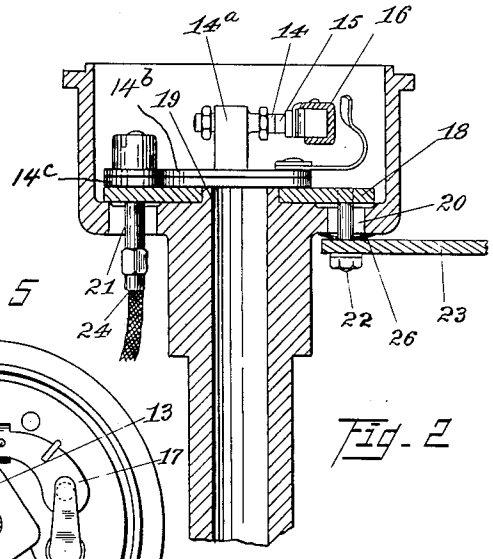


Fig. 2

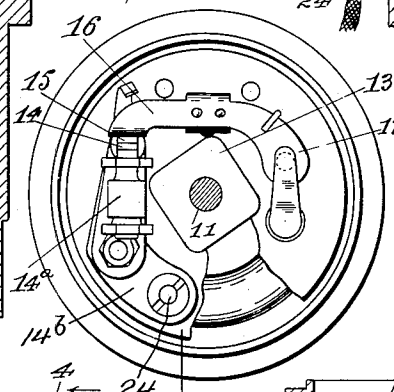


Fig. 5

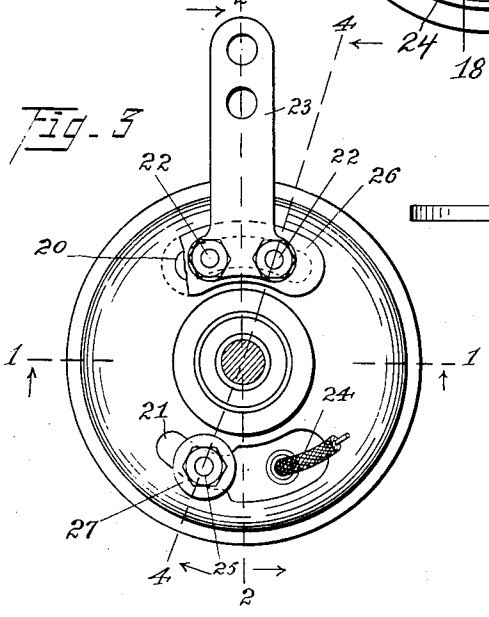


Fig. 3

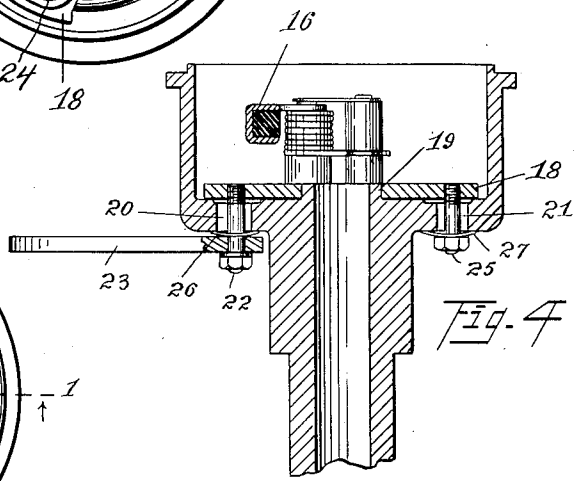


Fig. 4

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IGNITION APPARATUS.

1,354,888. Specification of Letters Patent. **Patented Oct. 5, 1920.**

Application filed April 19, 1916. Serial No. 92,112.

To all whom it may concern:

Be it known that I, OLIVER F. CONKLIN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Ignition Apparatus, of which the following is a full, clear and exact description.

This invention relates to ignition apparatus for internal combustion engines, and particularly to certain features of construction of the circuit breaker or timer.

This invention relates particularly to the manner of mounting or supporting the breaker contacts, which, in accordance with the present invention, are carried by an adjustable breaker plate which is mounted in the base of the circuit breaker casing and has attached thereto the adjusting lever for advancing or retarding the spark.

One of the objects of the invention is to provide a construction which is simple and durable and admits of easy adjustment of the breaker plate to advance or retard the spark without twisting the distributer conductors or turning the entire breaker casing. Still further, the invention aims to support and mount the breaker plate carrying the breaker contacts so that it is held yieldingly against the base of the circuit breaker casing in such a manner that dust and dirt is excluded from the casing by the plate itself, while at the same time a sufficient freedom of movement is permitted to enable the plate to be readily adjusted when desired. A still further object is to bring the primary conductor or conductors into the casing and to attach the shifting lever to the plate in such a way that the openings thus formed in the casing are closed by the plate itself.

The invention may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the accompanying sheet of drawings, Figure 1 is a sectional view through the circuit breaker constructed in accordance with my invention, the distributer cap being shown by dotted lines; Fig. 2 is a sectional view through the circuit breaker, certain parts being removed and the section being taken substantially along the line 2—2 of Fig. 3; Fig. 3 is a view looking toward the bottom of the circuit breaker casing; Fig. 4 is a vertical sectional view similar to Figs. 1 and 2, the section being taken substantially along the line 4—4 of Fig. 3; and Fig. 5 is an inside view, or view looking into and toward the base of the circuit breaker, a portion of the breaker plate being broken away.

In the drawings, 10 represents a cup-shaped circuit breaker casing into which extends a shaft 11 adapted to operate the circuit breaker and also, if desired, the distributer segment, the distributer cap being shown by dotted lines at 12. As the distributer forms no part of the present invention, it is not shown in detail. This shaft is provided with a cam 13 which in this case is designed to positively open the circuit breaker or contact device, which includes a stationary contact 14 carried by a post or stud 14^a and a movable contact 15 carried by a breaker lever 16 which is pivoted at 17. The invention does not reside in the details of the contact mechanism and the latter will, therefore, not be described in further detail. The breaker lever 16 is mounted directly upon breaker plate or disk 18, which grounds contact 15 upon casing 10. The post 14^a projects from a base 14^b which is mounted upon plate 18 but is insulated therefrom by strip 14^c of non-conducting material. It will be observed that this plate is located in the bottom of the casing 10 and is mounted to turn on an annular bearing flange or shoulder 19 projecting upwardly from the base of the casing at the center thereof, the plate having a central opening which has a close but free working fit on the flange or shoulder 19.

In the base of the casing are two arc-shaped slots or openings 20, 21, which are substantially diametrically opposite each other, one of these openings being adapted to accommodate connecting means such as screws or studs 22 by which the plate 18 is connected to an adjusting lever 23 adapted to turn the plate and the contacts carried by it to advance or retard the spark, and the other opening 21 being adapted to accommodate one or more primary leads or conductors 24, and also a holding screw or stud 25. The conductor 24 shown in the drawing is electrically connected to the base 14^b of post 14^a, but is insulated from plate 18. By reason of its attachment to the base 14^b,

the conductor 24 is mechanically fastened to plate 18, so as to be moved when plate 18 is moved. The plate is held yieldingly against the base of the casing by two dished springs 26, 27, the former of which is elongated or arc-shaped and entirely covers the opening 20, the spring 26 being between the inner end of the adjusting lever 23 and the bottom wall of the casing. The other spring 27 is circular and engages the under side of the casing over a narrow portion of the slot 21 through which passes the holding screw or stud 25, and the primary conductor or conductors. The upper or inner ends of the studs 22 and 25 are preferably fastened to the plate 18, while the lower ends are provided with nuts by which the parts are held in assembled relation and the position of which determines the pressure with which the plate 18 is held against the inner side of the base of the casing. Preferably the inner side of the base of the casing is grooved, forming within and around the outside of the elongated slots 20 and 21 two annular bearing surfaces which are engaged by the under surface of the breaker plate.

With this construction the breaker plate is held yieldingly against the bottom of the casing and is yieldingly connected therewith, but in such a manner that it can be readily adjusted to advance or retard the spark without turning the entire casing or twisting the secondary conductors. At the same time the plate covers the openings through which pass the primary conductor or conductors as well as the holding studs or screws 22 and 25, so that dirt and dust are effectively excluded from the casing. The feature of construction wherein the breaker plate covers the openings through which the connection is made with the adjusting lever and through which the primary conductors extend is a very important feature of the invention.

In practice, the circuit breaker is generally arranged vertically, and for that reason the end wall of the casing is, for convenience, described as the bottom of the casing. However, as is obvious, the breaker may be supported in other than a vertical position.

While I have shown only the preferred construction, I do not desire to be confined to the exact details shown, as certain changes can be made without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim, is:—

1. In a circuit breaker, a casing, an engine driven shaft in said casing, a cam on said shaft, a pair of circuit-breaker contacts, one of said contacts being movable relative to the other when actuated by said cam, a breaker plate in the base of said casing and carrying said contacts, a spark-adjusting member connected by an operating connection with the plate, the bottom of said casing having an opening between the center and the periphery through which the operating connection to the adjusting member extends, said operating connection holding the breaker plate against the base of said casing, and supporting the spark-adjusting member.

2. In a circuit breaker, a casing, an engine driven shaft in said casing, a cam on said shaft, a pair of circuit breaker contacts, one of said contacts being movable relatively to the other when actuated by said cam, a breaker plate journaled in stationary portions of the casing and carrying the said contacts, a spark-adjusting member with connecting means for operatively connecting it to the plate to oscillate the same, the bottom of said casing having an opening at a point between the center and the periphery of the casing through which the operating connection to the adjusting member extends, and said breaker plate being adapted to close the said opening, and held against said body by said connecting means, and supporting the spark-adjusting member.

3. In a circuit breaker, a casing having an opening therein, a contact device in said casing, shifting means for shifting said contact device relative to said casing to vary the ignition timing, means for supporting a conductor independent of said shifting means, and a flexible conductor directly connected at one end with said supporting means and contact device through said opening.

4. In a circuit breaker, a casing having openings in the end wall thereof, engine operable circuit breaking means including an engine driven member and a movable mounted plate carrying contact provisions, an adjusting lever operatively connected to the plate through one of said openings, and one or more conductors extending through another of said openings and mechanically connected with said plate, said conductors being constructed so as to permit movement of the movable plate.

5. In a circuit breaker, a casing, breaker contacts, a breaker plate mounted on the interior of the casing at the end thereof, a spark adjusting lever connected to said plate by yieldable connecting means which also assist in holding the plate against the casing end wall, and one or more primary conductors mechanically fastened to the plate, said conductor or conductors and the connecting means between the plate and lever passing through the end wall of the casing, and yieldable means for holding the breaker plate against the end wall of the casing.

6. In a circuit breaker, a casing, a breaker plate mounted on the interior thereof at the bottom or end of the casing, a spark adjusting lever and one or more primary leads

or conductors mechanically fastened to said plate, said conductor or conductors and the fastening means between the plate and the lever passing through the end wall of the casing, and dished or spring members for causing the breaker plate to be held yieldingly against the end wall of the casing, one of said spring members forming part of the fastening means between the plate and the spark-adjusting lever.

7. In a circuit breaker, a casing, a breaker plate mounted on the interior thereof at the bottom or end of the casing, a spark adjusting lever and one or more primary leads or conductors mechanically fastened to the plate, said conductor or conductors and the fastening means between the plate and lever passing through the end wall of the casing, and dished or spring members located exteriorly of and engaging the end wall of the casing for holding the breaker plate yieldingly against the end wall of the casing, one of said spring members forming part of the fastening means between the plate and the spark-adjusting lever.

8. In a circuit breaker, a casing having on the end wall thereof an inwardly projecting annular shoulder, a breaker plate mounted on said shoulder, circuit breaker contacts carried by said plate, means comprising screws or studs and spring members for holding the plate yieldingly against the bottom wall of the casing, a spark adjusting lever connected to the plate by studs and spring members, the bottom wall of the casing having openings which are closed or covered by said plate, said openings accommodating the screws or studs and primary conductors adapted to be connected to one or more of the contacts.

9. In a circuit breaker, a casing having in the bottom or end wall thereof an inwardly projecting annular shoulder, a breaker plate mounted on said shoulder, circuit breaker contacts carried by said plate, means comprising screws or studs and spring members for holding the plate yieldingly against the bottom wall of the casing, a spark adjusting lever connected to the plate by studs and spring members, the bottom wall of the casing having openings which are closed or covered by said plate, said openings accommodating the screws or studs and one or more primary conductors adapted to be connected to the contacts, said spring members comprising dished spring plates on the exterior of and engaging the end wall of the casing.

10. In a circuit breaker, a casing having an opening therein, timing means including an ignition contact member, means for adjusting said member, connecting means extending through said opening, and a resilient member extending over said opening and serving as a dust-excluding means while permitting movement of said connecting means in said opening.

11. In a circuit breaker, a casing having an apertured end wall, a breaker plate mounted in the interior of the casing and adjacent the end wall thereof, said plate being adapted to cover the apertured portion of the casing and prevent the ingress of dirt thereinto, one or more flexible conductors and a breaker plate rocking device mechanically connected with said plate through separate apertures in the apertured end wall of the casing.

12. In a circuit breaker, a casing having an opening therein, a contact member in said casing, a contact support, means for shifting said contact support relative to said casing, a flexible conductor electrically connected with said contact member through said opening, and a resilient member holding said contact support against the casing and located over said opening.

13. In a circuit breaker, a casing, a revolubly mounted breaker plate at one end of said casing, contacts supported by the breaker plate, a stud fixed to the plate and extending through a slot at one end of the casing on one side of the central axis thereof, a spark control lever supported by said stud for adjusting the position of the breaker plate, and a cable for electrically connecting the circuit breaker with other electrical devices, said cable extending through another slot in the same end of the casing and mechanically secured to the plate.

14. In a circuit breaker, a casing, a breaker plate and adjusting means mounted at one end thereof, breaker contacts supported by the plate, and a flexible cable for electrically connecting the circuit breaker with other electrical devices, said cable extending through an opening in said casing and being attached mechanically to the breaker plate, said cable by its free flexing permitting movement of said plate.

15. In a circuit breaker, a cup-shaped casing having integral side and bottom walls, the bottom wall formed with a shaft bearing, an engine driven shaft extending through said bearing into the cup-shaped part of the casing, a second bearing formed upon the bottom wall of said casing, a breaker plate journaled in said second bearing, a cam on said shaft, a pair of circuit-breaker contacts on said plate, one movable relative to the other when actuated by said cam, plate shifting means connected with said plate through the bottom wall of the casing, and a conductor passing through the bottom wall of the casing and mechanically connected with the plate and serving electrically to connect directly the circuit breaker with other electrical devices, said conductor permitting the shifting of the plate.

16. A circuit breaker having a casing

formed with two arcuate slots at opposite portions of the bottom thereof, a breaker plate in said casing covering both said slots, studs extending through said slots and connected at the one end with said plate and carrying at their other ends dished springs which bear against the outer face of the bottom of the casing, and hold the breaker plate yieldingly against the inner face of the bottom of the casing.

17. In a circuit breaker, a casing including a bottom wall having a bearing for a cam shaft and a second bearing concentric with the cam shaft bearing; a breaker plate supporting contact elements journaled on the second bearing, and means disposed oppositely with respect to the bearings for yieldingly holding the breaker plate in position within the casing.

18. In a circuit breaker, a casing having openings in the end wall thereof, a breaker plate mounted in the casing and covering said openings, a contact carried by said breaker plate, an engine driven cam operating said contact, an adjusting lever operatively connected with the plate through one of said openings and a flexible conductor mechanically connected with said plate through the other of said openings, said conductor by its free flexing permitting the movement of said breaker plate.

19. In a circuit breaker, a casing having openings in the end wall thereof, a breaker plate mounted in the casing and covering said openings, a stud projecting from the breaker plate and extending through one of said openings, breaker contacts mounted on said plate, an engine driven cam for actuating one of said contacts, an adjusting lever engaging with said stud and a flexible conductor mechanically connected with said plate and electrically connected with the other contact, said conductor by its free flexing permitting the movement of said breaker plate.

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

OLIVER F. CONKLIN.

Witnesses:
ALBERT E. BERDON,
FRANKLIN P. MCDERMOTT, Jr.