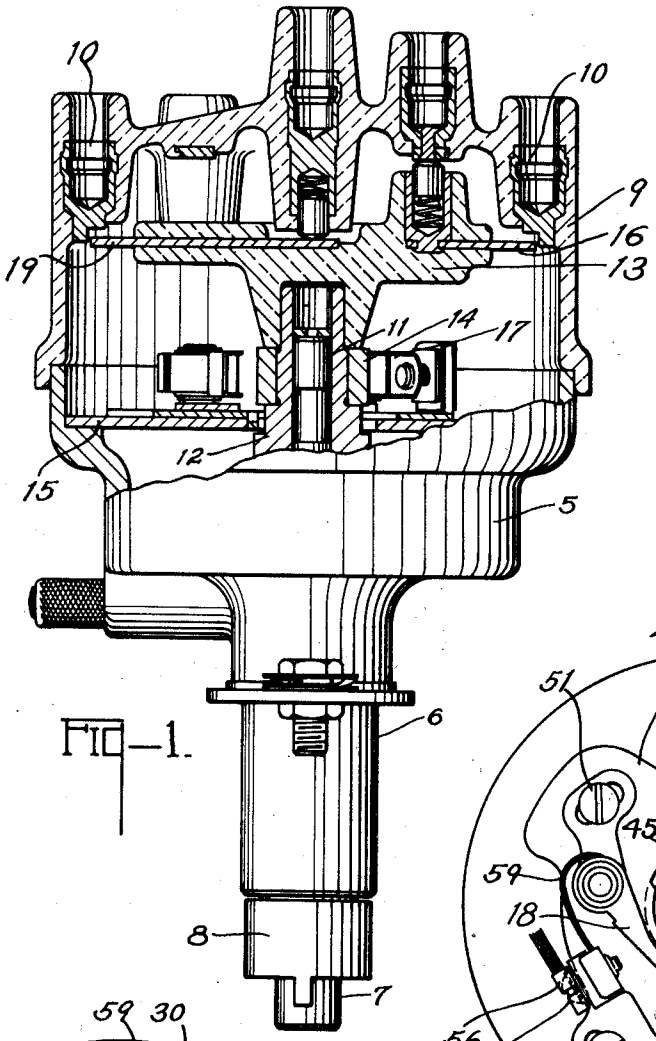
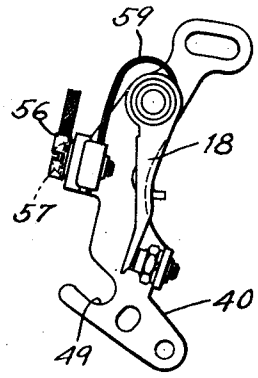
Dec. 29, 1936. L. B. EHRLICH 2,066,069

IGNITION TIMING DEVICE

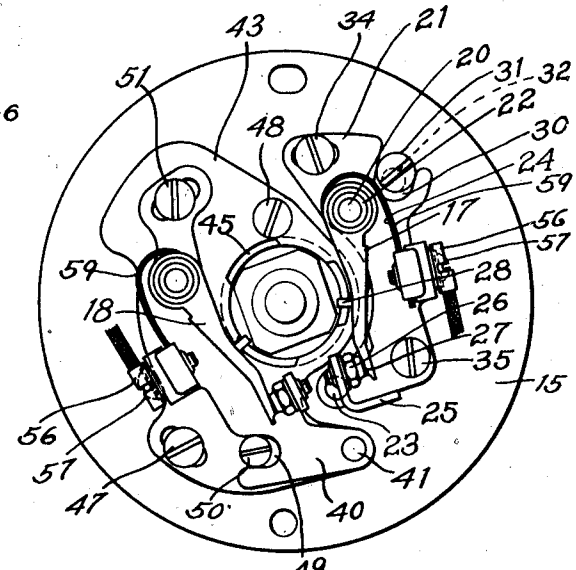
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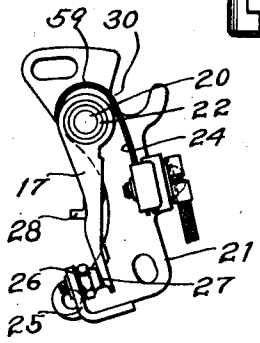

FIG—1.




FIG—3.




FIG—2.




FIG—4.

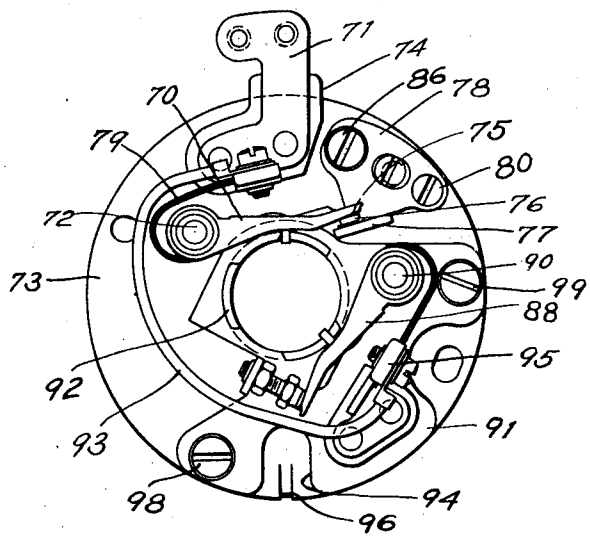
Inventor
Louis B. Ehrlich

By Braselton, Whitcomb & Davies
Attorneys.

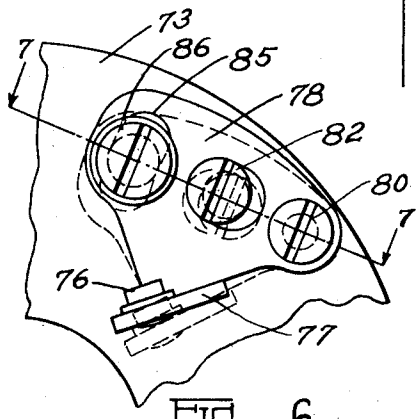
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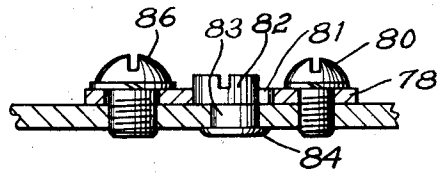
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FIG—5.




FIG—6.




FIG—7.

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2,066,069

# UNITED STATES PATENT OFFICE

2,066,069

## IGNITION TIMING DEVICE

Louis B. Ehrlich, Toledo, Ohio, assignor to The Electric Auto-Lite Company, Toledo, Ohio, a corporation of Ohio

Application March 20, 1930, Serial No. 437,373

7 Claims. (Cl. 200—21)

This invention relates to ignition timing devices for internal combustion engines and more particularly to a timing and distributing mechanism for use in such ignition systems for controlling and distributing the current for producing ignition charges within the cylinders of such engine.

The invention contemplates a novel and unique arrangement of parts in a device of this character and particularly the means for adjusting the current interrupter mechanism.

The invention embraces a simplified means for regulating the amount of clearance opening of the interrupter contacts and includes the provision of an arrangement wherein such adjustments may be made without the use of special tools.

A further object of the invention is the provision of a novel arrangement of interrupting mechanism for use with a multi-cylinder engine wherein the periodic movements of the interrupter mechanism are substantially decreased.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which

Figure 1 is a side elevational view partially in section showing the general arrangement of combined current interrupter and distributor mechanism of my invention;

Figure 2 is a detail plan view of the support and interrupting mechanism;

Figure 3 is a detail view of certain parts of the interrupting element;

Figure 4 is a detail view of other parts of the assembly;

Figure 5 is a view of a modified form of the arrangement similar to Figure 2;

Figure 6 is an enlarged fragmentary detail view showing a form of adjustment;

Figure 7 is an enlarged detail sectional view taken substantially on the line 7—7 of Figure 6.

I have illustrated my invention as incorporated in the so-called combined timer and distributor for use with internal combustion engines, but it is to be understood that I contemplate the use of my invention wherever the same may be found applicable. Referring to the drawings in detail a substantially circular cup-like housing 5 is provided with a depending portion 6 which forms a suitable bearing for a shaft 7, the latter carrying at its lower end a collar 8 formed with suitable means adapted to interlock and form a driving connection with a part of the internal combustion engine (not shown) with which the device may be used.

The upper end of the shaft 7 is provided with a reduced portion 11 which acts as guiding means for the cam element adapted to rotate with the shaft 7 as herein illustrated comprising the support 12 carrying a cam 14. The cup member 5 supports a guiding plate 15 having a central opening to accommodate the cam support 12, the plate supporting the current interrupting mechanism. The upper portion of the cup like housing 5 is suitably closed by means of a cap 9 which is provided with a plurality of high tension terminals 10 which are suitably connected to the spark plugs of the engine (not shown). The upper extremity of the member 12 carries a current distributing arm 13 of insulating material which is provided with suitable current conducting elements 16 and 19 for distributing the current to the terminals 10 in consecutive order of their arrangement, the elements 19 and 16 being insulated from each other and adapted to be connected to two independent sources of high tension current. In the embodiment illustrated the device is equipped with a pair of movable contact carrying or breaker arms 17 and 18, but it is to be understood that the device of my invention may be used with only one breaker arm. The breaker arm 17 is pivotally supported upon a pin 20 and insulated therefrom by means of the insulating bushing 22 which is carried by an adjustable member or bracket 21 as particularly shown in Figures 2 and 4. The bracket 21 is in turn pivotally mounted upon a pin 23 carried by the plate 15.

The bracket 21 is formed adjacent the pin 23 with an upwardly projecting L-shaped portion 25 which is adapted to support a relatively stationary contact member 26 riveted or otherwise secured to the member 25. The breaker arm 17 is provided at its outer extremity with a contact 27 adapted for normal engagement with the fixed contact 26; being urged into engagement by a spring 24. It should be noted that during the operation of the engine, the lobes of the cam 14 alternately engage the projection 28 on the breaker arm for the purpose of periodically separating the interrupter contacts 26 and 27 to break the circuit.

One of the features of the invention is the

means of adjusting the distance of separation of the contacts 26 and 27 by the action of the cam which structure will now be described. The bracket 21 is provided with an open slot 30 which accommodates the head of a screw 31, the head of the screw being eccentric with respect to the threaded portion 32 thereof. The bracket is also provided with elongated slots adapted to accommodate the screws 34 and 35 acting as locking means for the bracket 21. In the operation of adjusting the separation of the contacts, the screws 34 and 35 are backed away to release the bracket 21, the screw 31 then being rotated moving the bracket 21 clockwise or counter-clockwise about the pivot pin 23 as an axis. This adjustment obviously moves the projection 28 of the breaker arm 17 nearer to or farther away from the axis of the cam 14 in this manner regulating the opening of the contacts 26 and 27. After the proper adjustment has been obtained by means of the eccentric screw 31, the screws 34 and 35 may be locked to hold the bracket and breaker arm in adjusted position. It should be noted that struck up projections cooperating with the open slot may be used in lieu of the eccentric screw above mentioned as illustrated in Figure 5, a screw driver or other suitable tool being used to adjust the bracket 21.

When the additional breaker arm 18 is employed as shown in Figure 2, a bracket 40 similar to bracket 21 is pivotally supported by means of a pin 41 upon an irregular plate 43 which in turn is adjustably carried by the plate 15. The plate 43 is provided with struck up portions 45 which snugly fit the edges of the central opening in the plate 15, thus rendering the plate 43 adjustable about the axis of the cam 12. The plate 43 may be locked in its adjusted position by means of screws 47 and 48 to the plate 15, the purpose of adjustment of the plate 43 being to properly regulate the relative position of the breaker arm 18 with respect to the breaker arm 17 for purposes of synchronizing interruptions of the two breaker arms by means of the cam 14.

The bracket 40 carrying the breaker arm 18 is provided with a slot 49 which accommodates an eccentric screw 50, the latter being capable of rotation to change the position of the bracket 40 with respect to its supporting plate 43. The bracket 40 may be locked in position by manipulation of the screw 51. The brackets 21 and 40 are provided with means which insulatingly support the terminals 56, the latter being held in place by means of screws 57. The terminals 56 are respectively connected to the movable breaker arms by means of flexible current conductors 59 in a manner not illustrated in detail.

In the embodiment of my invention illustrated in Figures 5 to 7 inclusive, the breaker mechanism is substantially the same as that hereinbefore described. The breaker 70 illustrated in Figure 5 is insulatingly supported upon a pin 72 which is mounted directly upon the supporting plate 73. The extremity of the breaker arm is provided with a contact 75 which is urged into engagement by means of spring 74 with a relatively stationary contact 76 fixedly secured in an upwardly projecting finger 77 forming an integral part of a bracket 78, the bracket 78 being adjustable for the purpose of regulating the separation of the contacts 75 and 76. To this end, as more particularly shown in Figure 6, the bracket is suitably pivoted to the supporting plate 73 by means of a screw 80, and is formed with an opening 81 adapted to engage an enlarged head of an adjusting cam or eccentric member 82, the latter being provided with a tenon 83 projecting through an opening in the plate 73 and being swaged as shown at 84 to hold the same to the plate 73. The bracket 78 is also provided with an elongated slot 85 adapted to accommodate a screw 86 which serves as a locking means to hold the bracket 78 in position on plate 73 after the bracket has been properly adjusted by means of the cam 83. The adjustment is particularly illustrated in dotted lines in Figure 6. It will be apparent from the foregoing description that a very minute adjustment of the contact separation may be made by unskilled laymen without the use of special tools.

The movable contact 75 carried by breaker arm 70 is suitably connected to a terminal 71 supported upon plate 73 and separated therefrom by means of a block of insulating material 74. The terminal 71 is adapted to be connected to a source of current supply by means not shown, and is also connected by a current conducting member 79 to the breaker arm 70. Terminal 71 is also connected to another terminal 95 by means of a flexible connector 93, terminal 95 being connected to the breaker arm 88. The terminal 95 is suitably insulated from the plate 9. When two breaker arms are used for simultaneously interrupting the ignition circuit as shown in Figure 5, it is important that the time of occurrence of the opening of the contacts of the respective breaker systems should be in unison. It is essential that one of the breaker arms be mounted upon an adjustable support. To this end breaker arm 88 is pivotally mounted upon a pivot pin 90 carried by plate 91. Plate 91 is provided with struck up portions 92 which fit the edges of the central opening of the plate 73, thus rendering the plate adjustable about the axis of the cam. The plate 91 is provided with an open slot 94 circumventing a projection 96 formed in the plate 93. Obviously insertion of the tool as, for example, a screw driver, on either side of the projection 96 and one wall of the open slot 94 will serve to rotate the plate about the axis of the cam and thereby shift the relative angular relationship of breaker arm 88 with respect to breaker arm 70. The plate may be locked by means of screws 98 and 99.

It is apparent that, within the scope of the invention modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What I claim is:

1. In a device of the character disclosed, the combination of a housing; a supporting plate in said housing; a cam in said housing; a bracket pivotally carried by said plate; a relatively stationary contact fixedly carried by said bracket; a breaker arm carrying a movable contact pivotally supported on said bracket and operated by said cam, said movable contact and bracket having independent pivotal axes; and means to adjust the effective opening of said contacts by moving said bracket relative to said cam.

2. In a device of the character disclosed, the combination of a housing; a supporting plate in said housing; a cam in said housing; a bracket pivotally carried by said plate; a relatively stationary contact secured to said bracket; a breaker arm carrying a movable contact; a pin for pivotally supporting said breaker arm carried by said bracket, said breaker arm and bracket having separate pivotal axes out of alignment with each other; and means to move said bracket with

the cooperating contacts relative to said cam for changing the effective opening of said contacts including an open ended slot formed on said bracket and a projection carried by said supporting plate and cooperating with said slot.

3. In a device of the character described, the combination of two cooperating members, one pivotally mounted on the other, and each carrying a contact for conjoint action one on the other, means for moving said pivotally mounted member to open and close said contacts, said one member, carrying the other pivoted thereto, being adjustable primarily for varying the amount of separation of the contacts.

4. In a device of the character described, the combination of a mounting member, a circuit breaker member carrying a contact and being adjustably mounted on said mounting member, an arm pivotally mounted on said breaker member and having a contact cooperating with said first-mentioned contact, the adjustable mounting of said circuit breaker member being primarily for varying the amount of separation of the contacts.

5. In a device of the character described, the combination of a mounting member, a circuit breaker member carrying a contact and being adjustably mounted on said mounting member, a post carried on said breaker member, an arm pivotally mounted on the post, said arm having a contact for cooperation with said first-mentioned contact, the adjustable mounting of said circuit breaker member being primarily for varying the amount of separation of the contacts.

6. In a device of the character described, the combination of a mounting member, a circuit breaker member carrying a contact and being shiftably mounted on said mounting member, a movable member carried on said breaker member and having a contact cooperating with said first-mentioned contact, the shiftable mounting of said circuit breaker member being primarily for varying the amount of separation of the contacts.

7. In a circuit breaker having cooperative contacts, means for opening and closing said contacts, means for retaining the contacts in parallelism while varying the amount of opening of the contacts which comprises a shiftable member carrying one of the contacts and a member movably carried on said shiftable member and carrying the other contact, said breaker member being adjustable primarily for varying the amount of separation of the contacts.

LOUIS B. EHRLICH.