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J. L. ARTHUR

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CIRCUIT INTERRUPTER

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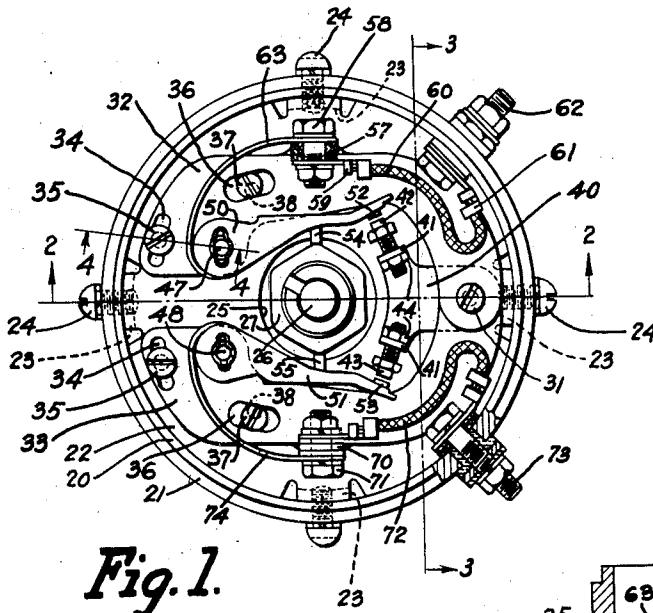


Fig. 1.

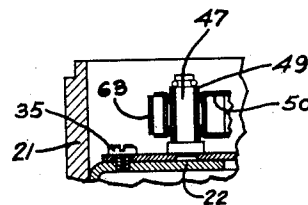


Fig. 4.

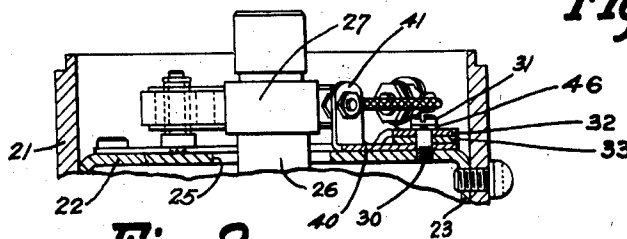


Fig. 2.

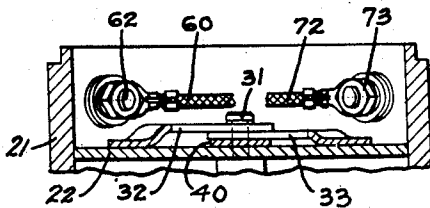


Fig. 3.

Inventor

JAMES L. ARTHUR

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Spencer, Hardman & Felt

Attorneys

UNITED STATES PATENT OFFICE

JAMES L. ARTHUR, OF ANDERSON, INDIANA, ASSIGNOR TO DELCO-REMY CORPORATION,
OF ANDERSON, INDIANA, A CORPORATION OF DELAWARE

CIRCUIT INTERRUPTER

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This invention relates to a circuit interrupting device particularly adapted for use in an ignition system for a multi-cylinder internal combustion engine.

5 It is among the objects of the present invention to provide a device adapted simultaneously to interrupt two primary circuits of a dual type ignition system for a multi-cylinder internal combustion engine.

10 Another object of the present invention is to provide a double circuit interrupter with an automatic adjusting means adapted to adjust the interrupter substantially to assure simultaneous interruption of the two circuits.

15 A still further object of the present invention is to provide a synchronizing device in a double circuit interrupter, of simple structure and design, easily accessible and substantially positive in operation.

20 Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of a circuit interrupter.

30 Fig. 2 is a fragmentary sectional view of the interrupter taken along the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view of the interrupter taken across the line 3—3 of Fig. 1.

35 Fig. 4 is a detail sectional view taken along the line 4—4 of Fig. 1.

Referring to the drawings, the circuit interrupter is shown comprising a housing 40 having an annular wall 21. Within the housing a mounting platform 22 is provided, said platform having angular ears 23 provided with screw-threaded apertures for receiving the screws 24 which extend through the annular wall 21 of the housing. The mounting platform 22 has a central opening 25 through which the shaft 26 which supports the interrupter operating cam 27 extends. As shown in Fig. 1, the operating cam in the present instance is provided with six lobes. Shaft 26
50 extends from the housing, and is adapted to

be connected with any suitable rotating part of the engine not shown, but by which the circuit interrupter is adapted to be operated.

The mounting platform 22 carries a pivot member 30, shown in the present instance in the form of a screw having a head 31. Two mounting plates 32 and 33 are provided within the housing 20, each mounting plate having a curved end which is pivotally attached to the pivot screw 30 as shown in the Figs. 1 and 2 respectively. These plates are on opposite sides of the cam 27 as shown in the Fig. 1 of the drawings. At the free end of each plate there is provided an arcuate slot 34, substantially concentric with the opening in the plate fitting over the pivot pin 30, these slots being adapted to receive the shank portion of a headed screw 35, which shank portion screw threadedly engages threaded openings in the mounting platform 22. Tightening of these screws clamps the mounting plates 32 and 33 to the mounting platform 22 and on the other hand when said screws 35 are loosed, these plates 32 and 33 may be moved about the pivot screw 30 toward or away from the cam 27. In each plate there is provided an elongated slot 36, the longer sides of which lie substantially parallel with a line passing through the center of the cam and the center of the pivot screw 30. Each slot 36 receives the head 37 of an adjusting member, having a shank portion 38 eccentric to the head, which shank portion is rotatably attached to the mounting platform 22. The heads 37 are provided with screw driver slots so that rotation of said heads when screws 35 of the plates 32 and 33 are released, will move said plates about their pivot screw 30 toward or away from the cam 27, dependent upon the rotation of said heads 37. Tightening of the screws 35, as has been mentioned, will secure the plates in properly adjusted position. A bracket 40, substantially Y-shaped, has an opening in the end of its main body portion adapted to fit over the pivot screw 30 whereby bracket 40 is pivotally supported by the pivot screw 30. The diverging branch portions of the Y-shaped bracket each have an angular ear 41 provided with a threaded opening. One

of these angular ears 41 supports the contact stud 42, the other angular ear supports the contact stud 43. As shown in the Fig. 1, these contact studs extend outwardly from the bracket 40 in opposite directions. Each stud has a clamping nut 44 whereby the stud may be securely fastened in properly adjusted position upon its respective bracket ear 41. As seen in Fig. 2, bracket 40, plate 33 and plate 32 are in superposed position on the pivot screw 30. Bracket 40 engages the platform 22, then the plate 33 rests upon the bracket, and plate 32 upon plate 33, the screw 30 extending through aligned openings of these members. Between the screw head 31 and the plate 34 a spring washer 46 is interposed which, when the screw is operated to maintain the mounting plates and bracket in proper position, will exert a pressure upon the mounting plate 32, which pressure is exerted upon mounting plate 33 and bracket 40 whereby pivotal movement of the bracket 40 relative to the pivot pin 30 is yieldably resisted.

The mounting plates 32 and 33 carry pivot posts 47 and 48 respectively. These pivot posts each have an insulating sleeve 49 fitting rotatably upon them. The insulating sleeve on pivot post 47 supports a lever 50, while the insulating sleeve on pivot pin 48 supports lever 51. Adjacent the free end of lever 50 a contact 52 is carried, while a similar contact 53 is supported adjacent the free end of lever 51. Between the respective contacts and pivot posts of the levers, rubbing blocks are carried by said levers, the rubbing block of lever 50 being designated by the numeral 54, while the rubbing block of lever 51 is designated by the numeral 55.

The mounting bracket 32 has an angular ear 57 extending therefrom. This angular ear supports a stud 58 insulatingly, to which a connector clip 59 is attached, said connector clip being in electrical connection with the lead 60, carrying a clip 61 at its opposite end which is in electrical connection with the terminal screw 62 insulatingly supported in the annular wall 21 of the housing 20. One end of a conductor spring 63 is also electrically connected to the stud 58, the opposite end of said spring conductor 63 being secured to the lever arm 50. This spring yieldably urges the lever arm clockwise as regards Fig. 1 or so that the rubbing block 54 thereof is urged into the path of movement of the lobes of cam 27. When the rubbing block 54 does not ride upon the lobe of the cam, contact 52 on the lever 50 will engage with contact 42 supported on the bracket 40.

Like plate 32, plate 33 carries an angular ear 70 insulatingly supporting the terminal stud 71 to which one end of the lead 72 is connected, the other end of said lead being secured to the terminal screw 73, insulatingly

supported on the annular wall 21 of the housing 20. Lever 51 also has one end of a spring conductor 74 secured thereto, the other end of said spring conductor being electrically connected with and attached to the stud 71, spring conductor 74 yieldably urging the lever arm 51 counter-clockwise so that its rubbing block 55 may be engaged by the cam lobes 27. When the rubbing block 55 does not ride upon one of the lobes of the cam, contact 53 is moved into engagement with the contact 43 supported on the bracket 40. The plates 32 and 33 should be so positioned that the rubbing blocks of their respective levers 50 and 51 will be simultaneously engaged by the cam lobes thus moving said levers 50 and 51 counter-clockwise and clockwise respectively, or outwardly from the cam into contact disengaging position as shown in the Fig. 1.

If for any reason the bracket 40 should become displaced or out of proper alignment with the center of the cam shaft, or if for any reason one of the contacts 42 or 43 should burn away faster than the other, striking of the contacts 52 and 53 against the bracket contacts would properly move said bracket about its pivot screw 30 into proper alignment. For instance, if contact 42 were engaged by its cooperating contact 52 before the contact 43 would be engaged by its cooperating contact 53, then the pressure of spring conductor 63 upon lever arm 50 would cause said lever to pound upon the contact 42 to move the bracket 40 counter-clockwise as regards Fig. 1 until the contact 43 would be properly engaged by the contact 53, or more specifically until contact 43 would be engaged substantially with an equal force by the contact 53 and at substantially the same instant contact 42 would be engaged by the contact 52. This adjustment would therefore assure simultaneous breaking of the contacts 52—42 and 53—43.

The adjustability of plates 32 and 33 relative to the mounting platform 22 provides for the moving of the levers 50 or 51 respectively, toward the cam 27 to compensate for wear of the wearpieces 54 or 55 respectively. If wearpiece 54 would become too short for proper interrupter operation, then screw 35 would be loosed and the head 38 rotated counter-clockwise to move the arm assembly toward the cam, into the proper position in which the rubbing block 54 would again properly be engaged by the cam 27 to break the contact engagement between contacts 52 and 42. The same adjustment could be made in connection with lever 51 by the loosening of screw 35 and the operation of the head 37.

In the present instance applicant has provided an improved ignition circuit interrupter automatically adjustable to facilitate or assure simultaneous interruption of two distinct circuits. Sufficient yieldable re-

istance has been put upon the bracket 40 to insure against inadvertent movement of said bracket out of proper adjustment, however, said resistance not being of such a degree that hammering of the levers 50 and 51 against contacts 42 and 43 can not move the bracket properly to position its contacts relative to the respective armatures 50 and 51.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A circuit interrupter comprising in combination, a pivoted bracket; two pivoted levers insulated from said bracket; cooperating contacts carried respectively by the bracket and levers; a spring engaging each lever and urging it toward the bracket so that its contact engages a contact on the bracket; and a rotatable member adapted to engage the levers to operate them, simultaneously to disengage their contacts from the bracket contacts.

2. A circuit interrupter comprising, in combination, a Y-shaped bracket having a main body portion and two diverging branch portions; means pivotally supporting the bracket at its main body portion; angular ears provided on each diverging branch portion; a contact carrying stud adjustably secured to each of said angular ears; two pivoted levers insulated from the bracket; a contact on each lever adapted to engage a contact carrying stud on the bracket; a spring engaging each lever, urging the lever toward the bracket so that its contact stud is engaged by the respective lever contact; and a rotatable cam adapted to engage the levers simultaneously to disengage their contacts from the contact studs on the bracket.

3. A circuit interrupter comprising, in combination, a housing; a contact carrying member pivotally supported within said housing and in electrical connection therewith; two contacts pivotally supported, separately within said housing and insulated therefrom, said contacts being adapted to engage the first mentioned contact carried by said member; means yieldably urging the said two contacts into engagement with the cooperating contact on said member; and operating means adapted to move said two contacts simultaneously to effect contact disengagement.

4. A circuit interrupter comprising, in combination, a pivoted bracket; oppositely disposed contacts carried by said bracket; two pivotally supported levers, insulated from said bracket; a contact carried at the free end of each lever; a rubbing block carried by each lever intermediate its contact and pivoted support; a conductor spring en-

gaging each lever and urging it toward the bracket so that its contact engages a respective contact on said bracket; and a rotatable cam adapted to engage the rubbing blocks of the levers to operate said levers simultaneously to move the respective lever contact out of engagement with the bracket contacts.

5. A circuit interrupter comprising, in combination, a housing; three pivotally supported members within said housing two of which are insulated from each other and from the third member; contacts carried by said third member; a contact carried on each of the other two members; a spring engaging each one of said other two members, urging them toward the third member so that its contacts are engaged respectively by the contacts of the other two members; and a rotatable cam adapted simultaneously to effect separation of the engaging contacts.

6. A circuit interrupter comprising, in combination, a housing; three pivot posts supported within said housing; a bracket pivotally supported by one of said pivot posts; an insulating sleeve on each of the other two pivot posts; a lever secured to each of said insulating sleeves; contacts carried by the bracket; a contact on each lever; a spring engaging each lever and urging it toward the bracket so that its contact will engage with a respective bracket contact; and a rotatable cam adapted to operate said levers simultaneously to move the contacts thereon out of engagement with the contacts on the bracket.

7. A circuit interrupter comprising, in combination, a housing; a pivot member carried by a wall of the housing; two supporting plates pivotally secured to said pivot member; means adjustably securing the said plates to said wall of the housing; a bracket pivotally secured to said pivot member; contacts carried by said bracket; a pivot post on each of said supporting plates; an insulating collar on each pivot post; a lever secured to each of said insulating collars; a contact on each lever; a conductor spring engaging each lever and urging it toward the bracket so that its contact engages a respective contact on said bracket; and a cam adapted to engage the levers and operate them intermittently, to effect simultaneous disengagement of the lever contacts from the bracket contacts.

8. A circuit interrupter comprising, in combination, a housing having an end wall; a pivot member carried by said end wall; a bracket having one end pivotally attached to the pivot member; contacts on said bracket; a mounting plate pivotally attached at one end to the pivot member; another mounting plate pivotally attached at one end to said pivot member; resilient means carried on said pivot member for exerting pressure upon the one mounting plate yieldably to resist

the pivotal movement of the two mounting plates and the bracket about the pivot member; means adjustably securing the mounting plates to the end wall of the housing; a lever, insulatingly, pivotally supported upon each mounting plate; a contact on each lever; springs urging said levers toward the bracket so that their contacts engage the respective bracket contacts; and a cam adapted to operate both levers simultaneously to effect separation of the lever and bracket contacts.

9. A circuit interrupter comprising in combination, a pivoted bracket; contacts on said bracket; yieldable means adapted to resist pivotal movement of the bracket; two pivoted levers insulated from said bracket; a contact on each lever adapted to engage with a respective contact on the bracket; springs urging the levers toward the bracket; and a cam for operating said levers to effect simultaneous separation of the lever and bracket contacts respectively.

10. A circuit interrupter comprising in combination, a rotatable cam; two levers insulatingly, pivotally supported, and adapted to be operated by said cam; a contact on each lever; springs urging the levers toward the cam; and a member having contacts adapted to be engaged by the contacts on the levers, said member being pivotally mounted so that said member is adjustable by said levers to effect simultaneous disengagement of the two lever contacts from the contacts on said member.

11. A circuit interrupter comprising in combination, a rotatable cam; two levers insulatingly, pivotally supported and adapted to be operated by said cam; a contact on each lever; springs urging the levers toward the cam; a pivotally mounted member having contacts adapted to be engaged by the contacts on the levers, said member being adjustable pivotally, to position its contacts in proper relation with the lever contacts to assure simultaneous separation by the cam of both lever contacts from the contacts on the member; and a drag on said member, yieldably resisting its pivotal movement.

In testimony whereof I hereto affix my signature.

JAMES L. ARTHUR.