Oct. 9, 1928. 1,687,040

W. D. SCHROPE

IGNITION DEVICE

Filed Aug. 2, 1926

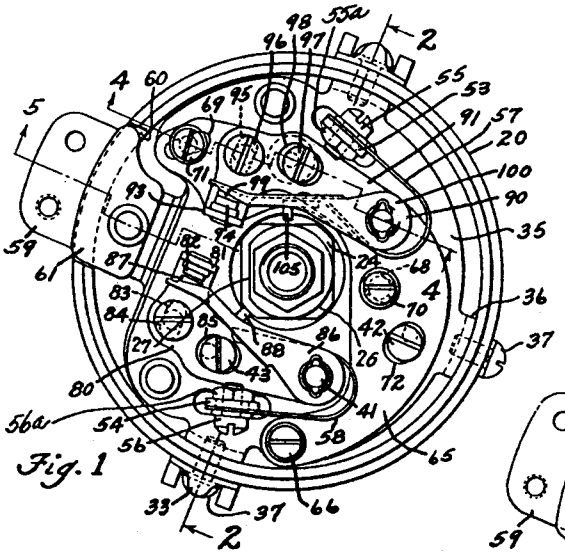


Fig. 1

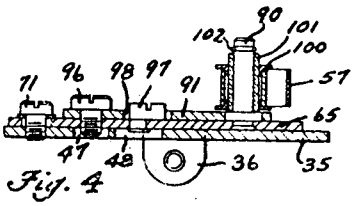


Fig. 4

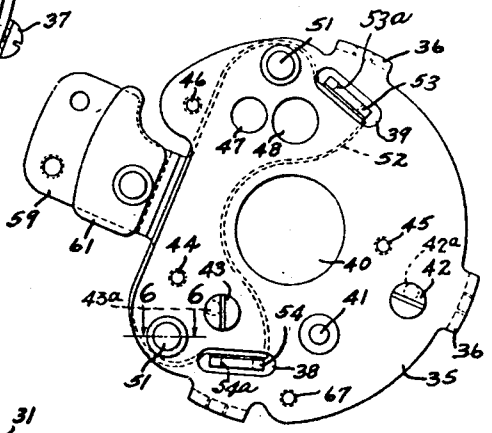


Fig. 3

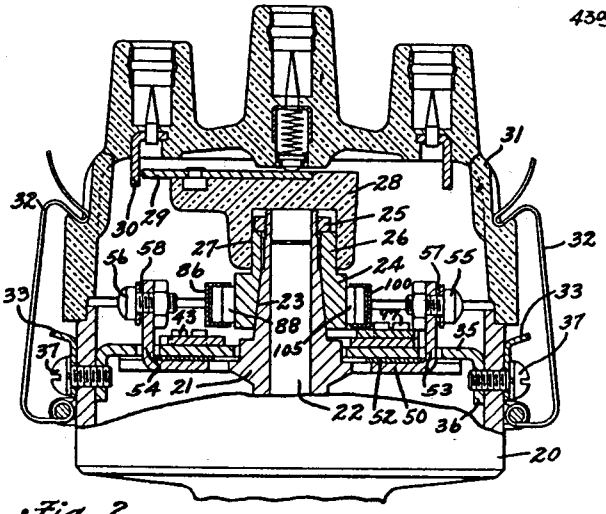


Fig. 2

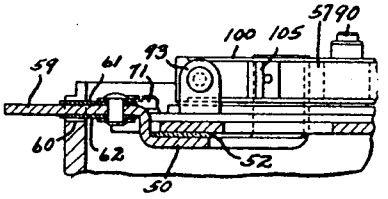


Fig. 5

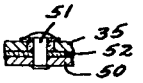


Fig. 6

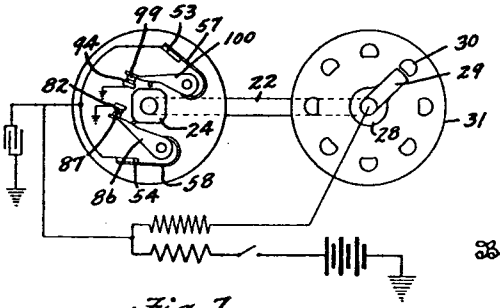


Fig. 7

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UNITED STATES PATENT OFFICE.

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IGNITION DEVICE.

Application filed August 2, 1926 Serial No. 126,413.

This invention relates to ignition timers for internal-combustion engines.

It is among the objects of the present invention to simplify the construction of ignition timing devices for engines so that the various adjustments necessary in a device may be made precisely and with simple tools and minimum labor.

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 form of embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of the ignition timer having the distributor head removed therefrom.

Fig. 2 is a fragmentary sectional view taken along the lines 2—2 of Fig. 1.

Fig. 3 is a detail plan view of the apertured mounting plate with the bridging conductor mounted thereon. Other parts carried by the said plate have been omitted for the sake of clearness.

Fig. 4 is a sectional view taken along the lines 4—4 of Fig. 1.

Fig. 5 is a similar view taken along the line 5 of Fig. 1.

Fig. 6 is a detailed section taken along the lines 6—6 of Fig. 3.

Fig. 7 is a diagrammatic view showing the electrical connections of the ignition timer when included in an ignition system.

Referring to the drawings the ignition device is shown as comprising a housing 20 which is adapted to be secured to the engine in any suitable manner. In this housing there is provided a hollow sleeve 21 having a shaft 22 extending thereinto which shaft is included in the driving connections between the engine and the hollow sleeve 21. The method of journaling the sleeve 21 in the distributor and the method of connecting the shaft 22 with the engine being well known in the art no illustration of these structures has been included in the drawings. The end of the sleeve 21 is tapered as at 23 and has a cam 24 fitting about it. This cam is held in position on the sleeve 21 by a nut 25 which engages the upper threaded end of the sleeve. The cam 24 has a cylindrical extension 26 having a flat surface 27 which is received by a similarly shaped recess in a rotor block 28. The rotor block 28 carries a conducting strip 29 which is adapted to rotate in close proximity to the plurality of terminals 30 carried by the distributor head 31 for the purpose of distributing spark impulses to the engine. The distributor head 31 fits on the peripheral edge of housing 20 and is held on said housing by clips 32 which are hingedly secured to the outer wall of the housing.

Within the housing there is provided a mounting plate 35, a detailed plan of which is shown in Fig. 3. This mounting plate has downwardly turned ears 36 formed in spaced relation on its periphery, said ears having screw-threaded apertures for receiving screws 37 which secure the mounting plate in the housing. These screws also secure hinge brackets 33 to the housing 20 which brackets hingedly support the clips 32. The mounting plate 35 is provided with elongated apertures 38 and 39 oppositely disposed from the central opening 40 in said plate. A pivot post 41 is carried on the plate 35 adjacent the aperture 38. Plate 35 supports two members having screw driver-slotted heads 42 and 43 and eccentric stems 42^a and 43^a respectively by which these members are pivotally connected with the plate. A plurality of screw threaded holes 44, 45, 46 and 67 and plain holes 47 and 48 are provided in this plate.

A bridging conductor 50 is secured to the underside of plate 35 by rivets 51. A strip of insulation 52 is interposed between said bridging conductor and the plate 35 so that these two elements are not in electrical connection. The bridging conductor has angular portions 53 and 54 so constructed and arranged that the portion 53 will extend up through the aperture 39 of plate 35 without engaging said plate while the angular portion 54 extends up through the aperture 38 without engaging any portion of plate 35. The angular portions 53 and 54 have elongated apertures 53^a and 54^a respectively for receiving screws 55 and 56 respectively which cooperate with nuts 55^a and 56^a respectively to secure leaf spring conductors 57 and 58 to the angular portions 53 and 54, respectively. An arm 59 of the bridging conductor 50 extends through an aperture 60 formed in the timer housing. The arm is insulated from the housing by

two plates 61 and 62 secured on opposite sides of the arm 59 adjacent the opening 60 in the housing.

An adjustable plate 65 is pivotally secured to the mounting plate 35 by means of a screw 66 which passes through an aperture of plate 65 and screws into the screw-threaded opening 67 of plate 35. Thus the plate 65 is in electrical connection with the mounting plate 35. Plate 65 has arcuate slots 68 and 69 for receiving screws 70 and 71 respectively screw-threaded into the tapped holes 45 and 46 respectively in the plate 35. These screws 70 and 71 when tightened hold the plate 65 in any desired position on plate 35. Intermediate the screws 70 and 66 the plate 65 is provided with an elongated slot 72 into which extends the screw-driver-slotted head 42 carried by plate 35. Loosening of screws 66, 70 and 71 will permit adjustment of plate 65 by rotation of the head 42 which, as has been mentioned before, is rotatably connected with the plate 35 by means of a stem eccentric to said screw head.

A plurality of circuit interrupters are provided in the housing 20, one of said circuit interrupters being carried by the mounting plate 35 while the other circuit interrupter is carried by the adjustable plate 65. The circuit interrupter mounted on plate 35 includes an adjustable bracket 80 pivoted to the post 41 and in electrical connection therewith. This bracket has an angular portion 81 upon which is carried a contact member 82 termed the "stationary contact." Adjacent this end of the bracket there is provided an arcuate slot 83 through which extends the stem of screw 84 which is screw-threadedly connected with the aperture 44 of plate 35. Between the arcuate slot 83 and the pivot pin 41 the bracket 80 is provided with an elongated slot 85 into which extends the screw-driver-slotted head 43 eccentrically connected with the plate 35, so that when the screw 84 is loosened and the screw head 43 is rotated the bracket 80 will be rotated relative to its pivot pin 41.

The pivot pin 41 also pivotally carries a movable arm 86 which is provided with a contact member 87 at its free end, adapted to co-operate with the stationary contact 82. A cam follower 88 is carried by the arm 86, said cam follower engaging with the cam 24.

The pivot pin 90 for the second interrupter is carried by the adjustable plate 65. A contact bracket 91 is pivoted upon this pin 90 and in electrical connection therewith and, like the other interrupter bracket 80, is provided with an angular portion 93 carrying a stationary contact 94. Adjacent this contact 94 the bracket 91 is provided with an arcuate slot 95 through which extends the stem of screw 96 which is screw-threaded into the plate 65. The plate 65 carries an eccentrically mounted screw-driver-slotted head 97 which extends into an elongated slot 98 provided in bracket 91. When the screw 95 is loosened and the head 97 is turned the bracket 91 is rotated relative to its pivot pin 90 carried on the plate 65.

Contact 94 is adapted to be engaged by a contact 99 which is carried at the free end of a contact arm 100, supporting a cam follower 105. Like in the other interrupter, contact bracket and contact arm are mounted coaxially, the arm of the former interrupter being in electrical connection with the pivot pin and the arm of the latter insulated therefrom. In Fig. 4 the contact arm 100 is shown mounted on the insulating sleeve 101 which in turn fits over the pivot pin 90 carried by the adjustable plate 65. The sleeve 101 is held on the pin 90 by a lock spring washer 102.

As shown in Fig. 1, the movable contact arm 86 of the interrupter carried on the mounting plate 35 is electrically connected with the angular portion 54 of the bridging member 50 by a flat spring conductor 58 while the movable contact arm 100 is electrically connected with the other angular portion 53 of the bridging member 50 by the flat spring conductor 57. This spring conductor 57 is so constructed and arranged as to permit adjustment of the plate 65 without interference by the spring. The spring pressure between contacts 99 and 94 can be adjusted by loosening the nut 55^a which holds screw 55 and moving the screw 55 sidewise in the slot 53^a in the angular portion 53 in order to move the stationary end of spring 57 relative to the contact arm 100. The screw 55 and said end of spring 57 are clamped in adjusted position by the nut 55^a. In a similar manner, the fixed end of the spring 58 can be adjusted,—the screw 56 passing through a slot 54^a in the angular portion 54.

Referring to Fig. 7 it may be seen that the contacts of the two interrupters operate in a predetermined sequence. First the contacts 82 and 87 will be separated to provide a sparking impulse then the contacts 94 and 99 will be separated to provide another impulse, these operations being recurrent in proper sequence. If one of the cam followers should wear more than the other, or if one lobe of the cam wear away faster than another, causing the intervals between sparking impulses to vary, or if for any other reason the timing of the sparking impulses be effected, the plate 65 may be loosened and adjusted relative to the plate 35 thereby shifting the positions of the cam followers relative to the cam and thus varying the angular relation between the two cam followers of the two circuit interrupters relative to the cam for purposes of again establishing proper sequential sparking im-

pulses. If on the other hand the co-operating contacts of either interrupter do not separate sufficiently to properly break the circuit, that is, if the movable contact is not moved a sufficient distance from its co-operating stationary contact by the operation of the cam, the proper stationary contact bracket can be adjusted by means of its eccentric adjusting screw thereby to adjust the gap between the said cooperating contacts. To make such an adjustment, for instance, between contacts 94 and 99, the operator first unscrews the screw 96 to release the contact bracket 91 from the plate 65, then the screw-driver-slotted head 97 is rotated to move the contact bracket 91 about its pivoted pin 90 toward the cam 24. The cam is then rotated so that the cam follower 105 of the contact carrying arm 100 rides upon one of the cam lobes. Following this, a shim of proper thickness is placed between the contacts 94 and 99 and then the screw-driver-slotted head 97 is rotated to move the contact carrying bracket 91 so that the shim may easily be withdrawn from between the contacts. After this screw 96 is again tightened to clamp the contact carrying bracket 91 upon the plate 65. The interrupter including bracket 80 and arm 86 may be adjusted in a similar manner. From this it will be noted that all of these adjustments may be made with a single screw driver. No special tools are necessary and neither need be held in adjusted position while it is being secured in the adjusted position. Thus the present device provides an ignition timer of simple structure and design which may be easily adjusted.

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. An iginition device comprising in combination, a housing; a cam in the housing; pivot pins in said housing; an adjustable, stationary contact bracket pivoted on each of said pivot pins and in electrical connection therewith; and a cam operated, contact carrying arm pivoted on each of said pivot pins so that the contact of each arm is adapted to engage the contact of its respective stationary contact bracket.

2. An ignition device comprising in combination, a housing; a cam in said housing; a pivot pin in the housing; a contact carrying bracket pivoted to said pin and in electrical connection therewith; a cam operated contact carrying arm also pivoted on said pin, but insulated from the bracket and pin; a flat spring conductor anchored to said arm, and adapted to hold the contact of the arm in engagement with the contact of the bracket; and means for moving the bracket on the pivot pin to adjust said bracket relative to the contact arm.

3. An ignition device comprising in combination a housing; a cam in said housing; an apertured mounting plate secured in the housing; a conducting bridging member insulatingly secured to the one side of the said mounting plate, said member having angular portions extending through the apertures in said plate; circuit interrupters in said housing on the side of the mounting plate opposite the bridging member, said interrupters each including a stationary contact bracket and a movable arm carrying a contact adapted to engage with the contact of the stationary bracket; and a leaf spring conductor interposed between each contact arm and an angular portion of the bridging member extending through the mounting plate, and being in electrical connection with both.

4. An ignition device comprising in combination, a housing; a cam in said housing; an apertured mounting plate secured in said housing; a plurality of circuit interrupters in said housing, on one side of the mounting plate; a conducting bridging member insulatingly secured to the other side of the mounting plate, the said member having angular portions extending through the apertures of the mounting plate; a terminal arm extending from the bridging member through the housing but insulated therefrom; and leaf spring conductors interposed between the interrupters and the several angular portions of the said member.

5. An ignition device comprising in combination, a housing; a cam in said housing; a mounting plate secured in the housing; an adjustable plate pivotally carried by mounting plate and in electrical connection therewith; circuit interrupters supported on each of said plates, said interrupters each including an adjustable bracket carrying a contact and a co-operating contact carrying arm coaxially pivoted on the respective plates; and conducting means normally holding the movable contact on the arm in engagement with the contact on the bracket.

6. An ignition device comprising in combination, a housing; a cam in said housing; a mounting plate secured in the housing; a pivot pin on said plate; an adjustable plate pivotally carried by the mounting plate and in electrical connection therewith, said adjustable plate also having a pivot pin; circuit interrupters in said housing, one of which is carried by the mounting plate, the other by the adjustable plate each interrupter including a contact carrying adjustable bracket pivoted on and electrically connected with the pivot pin of its respective plate, and also including a cam controlled, contact carrying arm also

pivoted on but insulated from the pivot pin of its respective contact bracket; and spring conductors connected to each contact carrying arm and adapted normally to hold the contact of the arm in engagement with the respective bracket contact and to conduct electric current to each of said arms.

7. An ignition device comprising in combination, a housing; a cam in said housing; an apertured mounting plate secured in the housing; a pivot pin on said plate; an adjustable plate pivotally carried by the mounting plate and in electrical connection therewith, said adjustable plate also having a pivot pin; circuit interrupters in said housing, one of which is carried by the mounting plate, the other by the adjustable plate, each interrupter including a contact carrying adjustable bracket pivoted on and electrically connected with the pivot pin of its respective plate, and also including a cam controlled, contact carrying arm also pivoted on but insulated from the pivot pin of its respective contact bracket; a bridging, conducting member insulatingly secured to the side of the mounting plate opposite the adjustable plate, said member including angular portions extending through the apertures in the mounting plate; and spring conductors interposed between said angular portions and the several cam controlled contact arms.

In testimony whereof I hereto affix my signature.

WM. D. SCHROPE.