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3,491,217

IGNITION DISTRIBUTOR WITH IMPROVED BREAKER POINT ARRANGEMENT

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Fig. 3

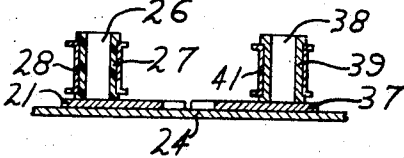


Fig. 1

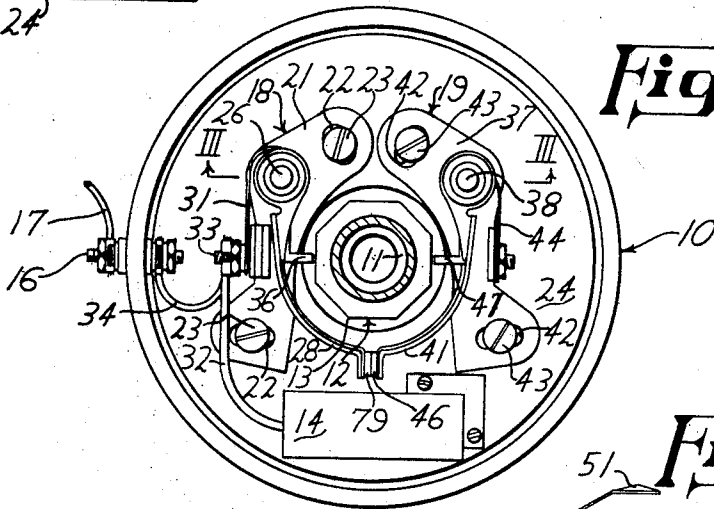


Fig. 5

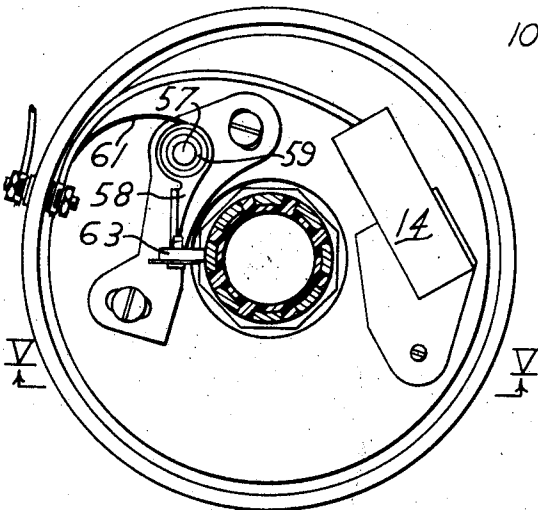
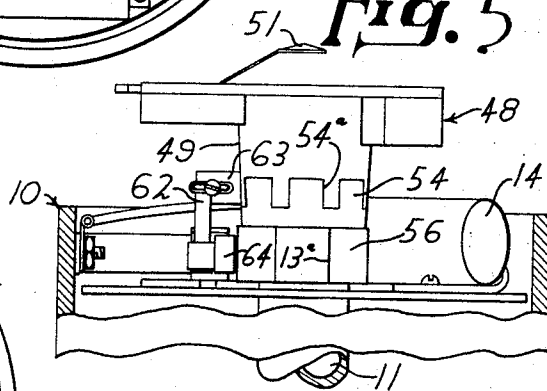


Fig. 4

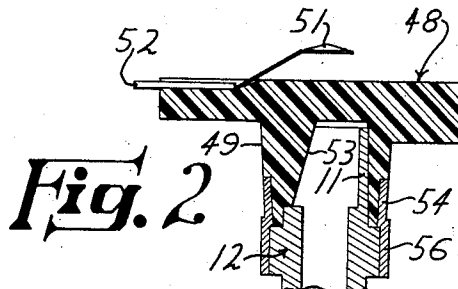


Fig. 2

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IGNITION DISTRIBUTOR WITH IMPROVED BREAKER POINT ARRANGEMENT

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5 Claims

ABSTRACT OF THE DISCLOSURE

A distributor for automobile ignition systems in which the grounded and "hot" breaker points both are pivotally mounted and both move apart in response to rotation of the cam, the advantage being that accurate opening and closing of the points is obtained even though the circuit breaker cam shaft runs eccentrically in its bearings or the cam itself is worn. A distributor rotor carrying a self contained resurfacer for the cam is also disclosed.

This invention relates to automotive ignition systems and has for its principal object a provision of means which shall be effective more accurately to open the breaker points.

A specific object of my invention is to provide a system of the character indicated in which both of the points, namely, the one in the "hot" side of the circuit and the one which is grounded, move apart in response to rotation of the cam, that is, in which opposite lobes of the cam contact followers associated with each of the contact point carrying arms, thus to move them apart and break the points at the proper time and in the proper amount.

A further object is to provide apparatus of the character designated which in large measure shall eliminate the misopening or the undesirable degree of opening of the breaker points when the bearings for the shaft or the cam thereon become worn.

A further object is to provide an improved distributor rotor which carries a thin walled lower section having an outer configuration corresponding to the proper, original shape of the cam, whereby the cam may be resurfaced simply by inserting my improved rotor button in place of the old one.

Apparatus illustrating features of my invention is shown in the accompanying drawings forming a part of this application in which:

FIG. 1 is a plan view of a distributor embodying my improved point operating mechanism, with certain parts broken away and in section;

FIG. 2 is a vertical view through my improved form of distributor rotor and showing the same installed on the upper part of the cam shaft;

FIG. 3 is a detail sectional view taken generally along the line III—III of FIG. 1;

FIG. 4 is a plan view of a modified form of my invention in which the distributor rotor shown in FIG. 2 may be employed; and

FIG. 5 is a fragmental detail sectional view taken generally along line V—V of FIG. 4.

Referring now to the drawings, particularly to FIGS. 1, 2 and 3, I illustrate in FIG. 1 the usual circular housing 10 forming the supporting means for the distributor. As will be understood, the housing 10 is adapted to receive a distributor cap and that this cap has a plurality of wires leading to the individual spark plugs of the internal combustion engine.

Also, the distributor has a cam shaft 11 which is driven in timed relation to the engine as is well understood. On the shaft is the cam indicated generally by the numeral 12 and which has a plurality of lobes or high points 13

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thereon, one for each cylinder to be fired. The usual condenser 14 may be provided. At 16 I illustrate an insulated connection which leads through a wire 17 to the low tension connection to the usual high tension coil, not shown, all of which parts function in the normal manner.

My invention comprises providing the system with separate sets of distributor contact means which are illustrated generally in the drawings by the numerals 18 and 19. Thus, the unit 18 may contain a base plate 21 having slots 22 therein through which screws 23 may pass into the base plate 24 of the distributor 19.

Mounted on a vertically upstanding pin or shaft 26, and insulated therefrom by a bushing 27 is a breaker point arm 28. It will be noted that this arm 28 is curved, and at the end opposite the pivoted end carries one of the breaker points 29. Further, a spring 31 biases the arm counterclockwise as viewed in FIG. 1. As is customary, the lead 32 from the condenser 14 is connected to a post 33 which is insulated from the plate 21, but electrically connected to the arm 28 and hence the point 29. The post 16 is connected by a lead 34 to the post 33. The arm 28 is provided with a follower 36, of insulating material, which is adapted to be engaged by the lobes of the cam 12 as the shaft 11 rotates, thus to move the point 29 to the left as viewed in FIG. 1.

In somewhat similar manner the other set of contact point mechanisms comprises the base plate 37. Mounted on a pin 38 and on a bushing 39 of conducting material is another arm 41. The base plate 37 is provided with slotted openings 42 so that it may be adjustably secured to the base plate 24 by screws 43. Also, a spring 44, anchored about the end of the arm 41 pivoted on pin 38 biases the arm 41 clockwise, thus to bias the second contact point 46 on the end thereof toward contact point 29. Also, a follower 47 is provided on the arm 41 and is disposed to be engaged by the rotating cam.

From what has been described it will be seen that when opposed ones of the lobes 13 of the cam 12 become aligned with the followers 36 and 47, both of the points 29 and 46 are opened, that is, move away from each other. Therefore, even if the cam itself is worn or even if the shaft 11 is operating eccentrically in its bearings, the points are open. Further, since I can more closely adjust the followers 36 and 47 to the cam 12, any error due to wear of the cam itself or to eccentricity of shaft 11 is materially reduced. That is to say, instead of depending on the adjustment of one of the contact arms, as heretofore has been the case, to obtain the desired amount of opening of the points, since both of my points move apart in response to rotation of the cam, the adjustment of the followers 36 and 47 cuts down the opening error by half. For instance, if the shaft 11 were operating, say, five-thousandths inch off center toward follower 47, then instead of the points opening five-thousandths less than they were supposed to open, this would increase the opening by five-thousandths on the side of follower 47 and decrease it five-thousandths on the side of follower 36. Therefore, one would have the same opening as originally set. Still further, if the shaft were rotating for instance five-thousandths of an inch out of concentricity in a plane normal to one passing through the followers 36 and 47, this would have little effect on the total opening of the points 29 and 46 because the wipers are opposed, that is, diametrically opposite the center of the shaft 11. Therefore, it will be apparent that the points can be set to open almost precisely to that required. Further, the adverse opening effect on the points 29 and 46 due to wear of the cam lobes and the followers 36 and 47 is reduced substantially in half and thus, misopening or improper opening from this cause is reduced. Further, if desired instead of grounding the arms 41 through the

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pin 38, I can use a flexible conductor fastened to the arm 41 and to the housing 10.

In FIGURE 2 I show a form of distributor rotor, or rotor button, 48 which has advantage in my improved system. The rotor 48 comprises the body portion 49 of insulating material. It carries a central, spring mounted contactor 51 which contacts the high tension connection to the coil through the distributor cap, not shown, which in turn is connected to the rotary contactor 52 which transmits the energy to the individual spark plugs. As understood, the rotor 48 fits on the upper end of the shaft 11 and is provided with a keyed portion 53 which holds it non-rotatably to the shaft by engaging in a slot in the upper end of the shaft 11.

Carried integrally with the body 49 of the rotor is a metallic lower portion 54. This portion 54 is relatively thin walled material and has a portion 56 which is adapted to fit about the cam section 12 formed on the shaft 11. Thus, I can resurface or reconfigure the outer surface of the original cam 12, including the lobes 13, simply by installing one of my improved rotor buttons.

In FIGURES 4 and 5 I show a modified form of my invention in which my improved rotor button 48 may be used, in combination with a single movable device to perform the contact point function. Thus, the metal portion 54 of the rotor button may be interrupted as shown at 54a. That is to say, the material in the area 54a is the insulating material of the body 49 of the rotor button. Pivotaly mounted on a pintle 57 is an arm 58, this arm being insulated from the pintle by a bushing 59 of insulating material. A spring 61 urges the outer end or free end of the arm 58 to the right as viewed in FIGURE 4.

Mounted on the upper end of an extension plate 62, carried on the end of the arm 58 is a wiper member 63 of conducting material. This member is disposed to engage the side of the rotor button so as to run onto the insulating portions 54a, and onto the metallic portions 54, alternately.

The lower end of the extension 62 carries a member of insulating material 64 which is adapted, when the cam lobes 13a pass by the same, to pivot the arm 58 to the left as viewed in FIGURE 1, thus to move the member 63 out of contact with the rotor button. However, it will be seen that in this modification that if the wiper 64 wears, nevertheless the circuit will be broken whenever the member 63 rides into the areas 54a. Thus, this system affords a double or fail-safe means for "breaking" the points, namely, interrupting the circuit thus to fire the spark plugs. The electrical details of the modification being described are somewhat standard and are apparent from the drawings.

From the foregoing it will be apparent that I have invented an improved ignition system and particularly including a set of contact points, both of which move, and an improved rotor button which may be used in such system to resurface a worn cam. Further, my improved rotor button is adapted for use in a single contact system as shown in FIGURES 4 and 5.

While I have shown my invention in but two forms,

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it will be obvious to those skilled in the art that it is not so limited, but is susceptible to various other changes and modifications without departing from the spirit thereof.

What I claim is:

1. In an ignition distributor having a rotary breaker cam with lobes thereon,

(a) a pair of pivotaly mounted arms partially encircling the cam and carrying cooperating breaker points adjacent the free ends thereof and disposed to be opened by the cam, there being means biasing the free ends of the arms toward breaker point contacting position,

(b) one of said arms being connected to one side of the ignition circuit and the other thereof being connected to the other side of said ignition circuit, whereby upon rotation of the cam opposed lobes thereof pivot the free ends of the arms away from each other, thus opening the breaker points.

2. Apparatus as defined in claim 1 in which the arms are pivotaly mounted on a base plate forming a part of the distributor mechanism, and in which one of said arms is insulated from the base plate and connected to the "hot" side of the ignition circuit, and the other arm being grounded to the base plate.

3. Apparatus as defined in claim 2 in which said arms are curved as viewed in plan, the breaker points being located on one end of said arms and the arms being pivoted adjacent the opposite ends thereof, and followers on each arm intermediate their ends positioned to be simultaneously engaged by opposed lobes of the cam as it rotates, thereby to open said breaker points.

4. Apparatus as defined in claim 3 in which each arm is provided with means selectively to adjust the clearance between its follower and the cam thereby to determine the amount said breaker points open when the cam lobes engage the followers.

5. Apparatus as defined in claim 1 in which a distributor is provided with a distributor rotor, said rotor carrying a depending thin walled lower section disposed to fit about the cam and having an outer surface corresponding to the original configuration of the cam, whereby the breaker point operating surfaces of a worn cam may be renewed by simply replacing the distributor rotor.

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