Dec. 5, 1961 F. W. BOHN 3,012,111

POSITIVE CONTACT IGNITION DISTRIBUTOR

Filed May 20, 1960

Fig. 1.

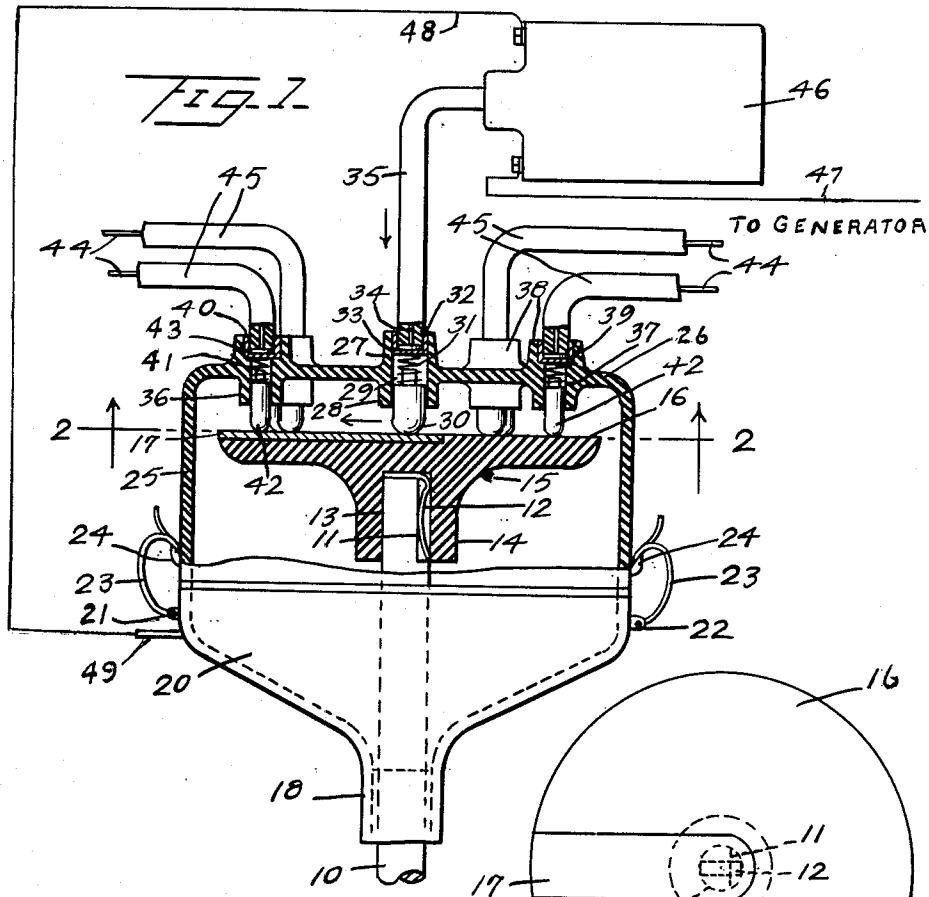
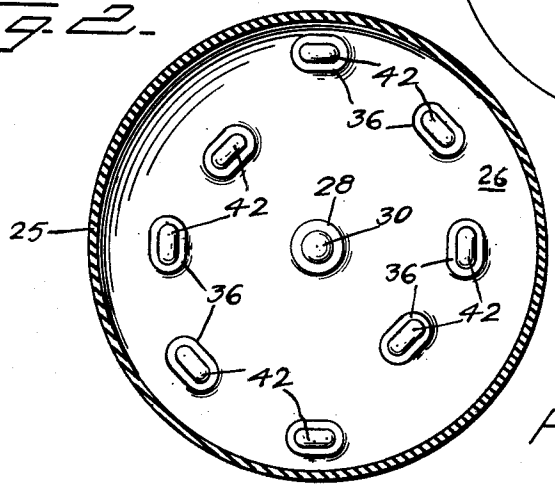


Fig. 3.

Fig. 2.



FRANK . W. BOHN
INVENTOR

BY C. A. Snow & Co.
ATTORNEYS.

United States Patent Office 3,012,111 Patented Dec. 5, 1961

3,012,111

POSITIVE CONTACT IGNITION DISTRIBUTOR

Frank W. Bohn, 1825 Ross Ave., Scranton 9, Pa.

Filed May 20, 1960, Ser. No. 30,557
8 Claims. (Cl. 200—24)

This invention relates to a positive contact ignition timer or distributor.

The object of the invention is to provide an ignition timer or distributor which will develop a hotter spark across the points of the spark plugs than the ignition timers or distributors at present known.

Another object of the present invention is to provide an ignition timer or distributor which will develop a longer spark across the points of the spark plugs than the ignition timers or distributors in use at the present time.

A further object of the present invention is to provide an ignition timer or distributor which will facilitate easier starting of the engine in the winter and, of course, in the summer through the production of hotter and longer sparks at the points of the spark plugs.

An additional object of the present invention is to provide an ignition timer or distributor in which corrosion of the stationary and rotatable contacts is substantially eliminated.

Still other objects, advantages and improvements according to the present invention will become apparent from the following specification, taken in connection with the accompanying drawing, in which:

FIGURE 1 is a side elevational view, partly in section, of an ignition timer and distributor, according to the present invention, also showing the connections to the induction coil and the spark plugs.

FIG. 2 is an under plan view partly in section, taken on the line 2—2 of FIG. 1 and looking in the direction of the arrows, and showing the arrangement of the stationary contacts.

FIG. 3 is a top plan view of the rotor of the ignition timer or distributor.

Referring now to the drawing in detail, and to FIG. 1 in particular, the reference numeral **10** designates a rotatable shaft, which is generally driven from the cam shaft (not shown) of an internal combustion engine. The rotor **15** of the ignition timer or distributor is made of some hard insulating material such as phenolic condensation product, "Bakelite," etc. and has a flat top **16** and a central boss **14**. The boss **14** has a bore **13** therethrough, which receives the upper end of the rotatable shaft **10**. The latter is cut away along an arcuate sector **11** and a bowed leaf spring **12** is positioned between the wall of the bore **13** and the bottom of the sector. The rotatable contact element **17** is comprised by a strip of conducting metal, which is inlaid in a suitable groove in the top **16** of the rotor **15** and extends from the center to the circumference of the latter.

A casing **20** is of generally cylindrical shape and is preferably made of metal. This casing has a central boss **18** at its bottom, in which the shaft **10** is journalled in any suitable manner. A fluid seal (not shown) is preferably provided between the shaft **10** and the wall of the bore through the central boss **18**.

A cap **25** is also of generally cylindrical shape and is preferably made of some suitable insulating material, similarly a phenolic condensation product, such as "Bakelite," etc. This cap is of the proper diameter so that its side wall registers with the side wall of the casing **20**.

The cap **25** is held onto the casing **20** by at least two catches **23—23**, which are mounted by pins **22** on ears **21** on the casing **20** and engage with lugs **24** on the cap.

The top **26** of the cap has an axial boss **27** and a plurality of rotatably and arcuately spaced bosses **38** thereon, eight (8) of the latter being shown. A boss **28** is formed on the under side of the top **26**, in general alignment with the boss **27** on the upper surface and a bore **29** extends through the two bosses. Within this bore **29** a central contact element **30** is slidably mounted. The upper end of the bore **29** is closed by a metal cup **32**, which is force fitted therein. A coil spring **31** is positioned between the bottom of the cup **32** and the central contact element **30**, biasing the latter into engagement with the rotatable contact element **17**. A cable **35** has an outer fabric sheath and a central conductor **34**, the latter being connected at its inner end to a metal disc **33**, which is force fitted into the cup **32**.

The arrangement of the contacts for the cables leading to the spark plugs (not shown) is illustrated in FIG. 2. While the arrangement here illustrated is that for an eight (8) cylinder engine, it will be understood that the ignition timer and distributor according to the present invention, would be equally adaptable to four (4), six (6), or eight (8) cylinder engines. It will be noted that the contacts **42** are arranged in four (4) pairs, the first pair being positioned along the horizontal axis of the distributor cap **25**; the second pair is spaced radially outwardly from the first pair and positioned along the 45° line through the second and fourth quadrants; the third pair is spaced radially outwardly from the second pair and positioned along the 45° line through the first and third quadrants; and the fourth pair is spaced radially outwardly from the third pair and positioned along the vertical axis of the distributor cap.

The bosses **36** on the under side of the top **26** of the distributor cap are here shown as of flattened elliptical shape, as are the bores **37** through same, and the slidable contacts **42** within the latter. The generally aligned upper bosses **38** on the top **26** of the distributor cap are as before, cylindrical, as are the bores **39** through same. Cups **40** are force fitted in the bores **39** and coil springs **41** are positioned intermediate the bottoms of the cups **40** and the slidable contacts **42**, biasing the latter into engagement with the rotatable contact element **17** and the top of the rotor **16**. The slidable contacts **42** are of flattened elliptical cross section to conform to the shape of the bores **37** through the bosses **36** on the under side of the top **26** of the cap.

The cables which lead to the spark plugs (not shown) have outer fabric sheaths **45** and a control conductor **44**, the latter being connected at their ends to metal discs **43**, which are force fitted in the cups **40**.

The primary circuit of the ignition system is from the positive terminal of a generator (not shown) over the conductor **47** to the low voltage winding of the ignition coil **46**; the negative terminal of the generator is grounded. The other side of this circuit is over the conductor **48** to a lug **49** in the wall of the timer casing **20**. Inside of the casing **20** there are the contacts of the interrupter (not shown), one of which is connected to the lug **49** and the other is grounded. The primary circuit of the ignition coil **46** is alternately closed and opened by the interrupter. This induces a high voltage in the secondary circuit of the ignition coil. This secondary circuit is comprised by a ground connection (not shown), the high voltage winding of the ignition coil and the cable **35**.

It will now be apparent that an ignition timer or distributor constructed as herein described and illustrated has several advantages over the similar devices at present in use. The flat top **16** of the rotor **15** and spring biased input contact **30** and adjacent contacts **42** bearing on the contact element **17** carried by the rotor, provide for firm engagement of the contacts with the contact element.

This is important in two aspects. If there should be a gap between either the central contact **30** and the rotatable contact element **17**, or between the latter and any one of the contact elements **42**, an arc would be developed across the gap. The latter would result in pitting of either the central contact **30**, the rotatable contact element **17** or the contact element **42**. Such pitting would result in corrosion through copper oxide being formed over the pitted surface areas, and hence an appreciable increase in the resistance of the secondary ignition circuit. It is also the case that voltage would be required to force the current across the arc, or arcs, developed, thereby diminishing the voltage available across the points of the spark plug. Another advantage of an ignition timer or distributor according to the construction herein described and illustrated, is that, with the contacts **42** in the shape of a flattened ellipse in cross section and the major axis of the ellipse positioned tangent to the underlying circles of rotation of the rotor **15**, the contacts are in engagement with the rotatable contact element **17** for a greater length of time, than would be the case with a contact of cylindrical formation and having the same cross-sectional area. A further improvement of an ignition timer or distributor according to the present invention is that, through the radial staggering of the contacts **42**, wear on the rotatable contact element **17** is distributed at spaced arcuate lines of travel over its length, instead of being concentrated in a single arcuate line of travel.

Having now fully described my invention, what I claim as new and useful and desire to secure by Letters Patent of the United States is:

1. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element positioned radially of said disc, a contact bearing on said disc and contact element along the axis of rotation of the disc, and a plurality of contacts bearing on said disc symmetrically disposed on the opposite sides of the axis of the disc and ranged in progressively decreasing radial distances from the axis of the disc in the direction of rotation of the latter.

2. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element positioned radially of said disc, a contact bearing on said disc and contact element along the axis of rotation of same, and a plurality of contacts of flattened elliptical shape bearing on said disc concentrically positioned with respect to the axis of rotation of the latter and having their major axes positioned tangent to the underlying circles of rotation of the disc.

3. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element carried by said disc and positioned radially of same, a contact bearing on said disc and contact element along the axis of rotation of the disc, and a plurality of contacts bearing on said disc positioned progressively radially inwardly toward the axis of rotation of the disc in the direction of rotation of the latter.

4. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element carried by said disc and positioned radially of same, a contact bearing on said disc and contact element along the axis of rotation of the disc, and a plurality of contacts bearing on said disc spaced on reference axes at right angles in the plane of the flat top of the disc, and a plurality of other contacts bearing on said disc spaced on axes at equal angles to the reference axes.

5. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element carried by said disc and positioned radially of same, a contact bearing on said disc and contact element along the axis of rotation of the disc, and a plurality of contacts bearing on said disc at varying distances from the axis of rotation of same comprised by a first pair on a first reference axis of the disc, a second pair on a second reference axis at right angles to the first reference axis, a third pair on an axis at equal angles to the reference axes, and a fourth pair on another axis at equal angles to the reference axes.

6. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element carried by said disc and positioned radially of same, a contact bearing on said disc and contact element along the axis of rotation of the disc, a first pair of contacts bearing on said disc positioned on a first axis in the plane of the flat top of the disc and equally spaced on the opposite sides of the axis of rotation of the latter, a second pair of contacts bearing on said disc positioned on a second axis in the plane of the flat top of the disc at right angles to the first axis and equally spaced on opposite sides of the axis of rotation of the disc and radially inwardly of the first pair of contacts, a third pair of contacts bearing on said disc positioned on a third axis in the plane of the flat top of the disc at 45° with respect to the first and second axes and equally spaced in opposite sides of the axis of rotation of the disc and radially inwardly of the first and second pair of contacts, and a fourth pair of contacts positioned on a fourth axis in the plane of the flat top of the disc at 45° with respect to the first and second axes and equally spaced in opposite sides of the axis of rotation of the disc and radially inwardly of the second pair of contacts and outwardly of the third pair of contacts.

7. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element positioned radially of said disc, a contact bearing on said disc and contact element along the axis of rotation of same, and a plurality of contacts of flattened elliptical shape bearing on said disc radially positioned with respect to the top and angularly spaced with respect to the axis of rotation of the latter, and having their major axes positioned tangent to the underlying circles of rotation of the disc.

8. An ignition distributor including a rotatable shaft, a disc carried by said shaft and having a flat top, a contact element positioned radially of said disc, a contact bearing on said disc and contact element along the axis of rotation of same, and a plurality of contacts of flattened elliptical shapes bearing on said disc along concentric circles of progressively decreasing diameters in the direction of rotation of the disc.

References Cited in the file of this patent

UNITED STATES PATENTS

1,525,119	De Lorme	Feb. 3, 1925
1,953,913	Walther	Apr. 3, 1934
2,008,546	Findley	July 16, 1935
2,886,661	Skelton et al.	May 12, 1959

FOREIGN PATENTS

371,214	France	Jan. 16, 1907