March 24, 1959 M. M. MASON 2,879,346

IGNITION DISTRIBUTOR

Filed April 19, 1957 2 Sheets-Sheet 1

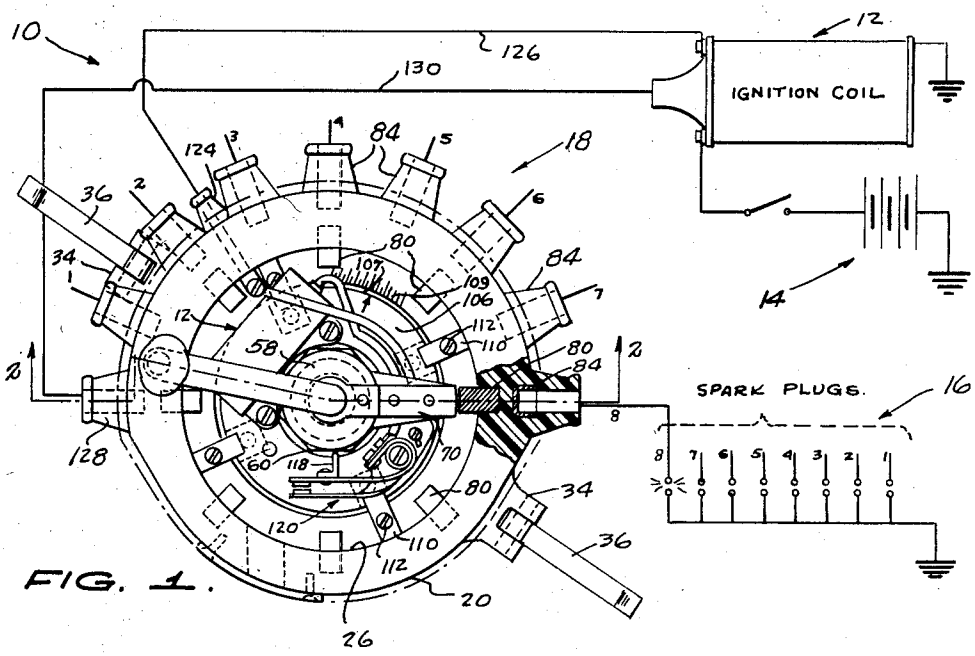


FIG. 1.

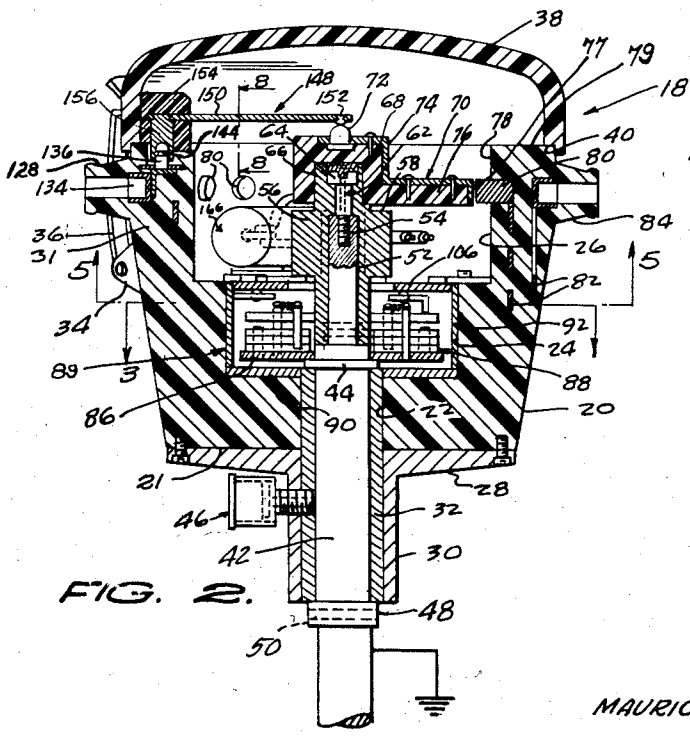
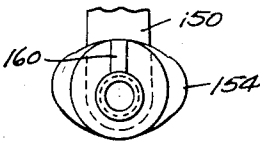


FIG. 2.

FIG. 7.



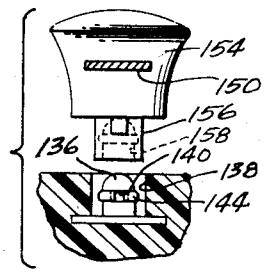


FIG. 8.

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FIG. 3.

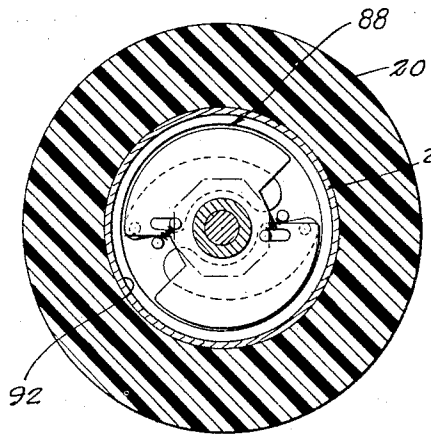
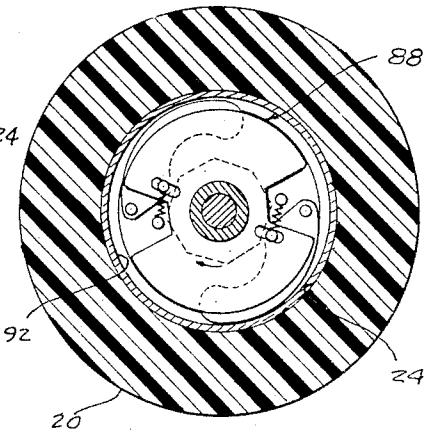


FIG. 4.



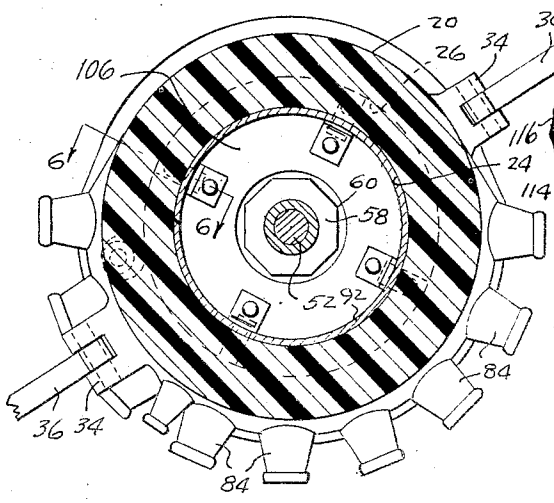


FIG. 5.

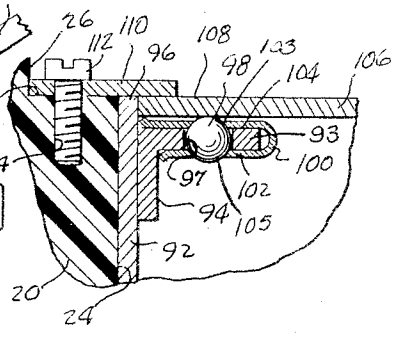


FIG. 6.

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2,879,346

IGNITION DISTRIBUTOR

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Application April 19, 1957, Serial No. 653,954

3 Claims. (Cl. 200—21)

This invention relates to an improved distributor for automotive engine ignition systems.

A primary object of the invention is to provide a practical and more efficient distributor of this kind which can be operated without a closure cap so as to enable a mechanic to adjust the breaker arm and breaker point and the dwell while the engine is running, so that greater accuracy in adjusting the timing of the engine is obtained as well as freedom of visual examination for malfunctioning of the working parts of the distributor.

Another object of the invention is to provide a distributor of the character indicated wherein the spark plug wire terminals of the distributor are all located on one side of the distributor cup, whereby installation and servicing of the distributor are facilitated.

A further object of the invention is to provide a distributor of the character indicated which can be made in rugged and serviceable forms at relatively low cost, is easily adjusted, and is highly satisfactory for the purpose intended.

These together with other objects and advantages which will become apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout the several views, and in which:

Figure 1 is a top plan view of a distributor of the invention, the cap thereof having been removed, and portions being broken away and in section, and showing diagrammatically connection of the distributor in a typical automotive engine ignition system;

Figure 2 is a central vertical transverse section taken substantially on the plane of line 2—2 of Figure 1, with the cap in place;

Figure 3 is a horizontal section taken substantially on the plane of line 3—3 of Figure 2, showing a retarded condition of the auotmatic spark control;

Figure 4 is a view similar to Figure 3, showing an advanced position of the automatic spark control;

Figure 5 is a horizontal section taken substantially on the plane of line 5—5 of Figure 2;

Figure 6 is an enlarged fragmentary vertical transverse section taken substantially on the plane of line 6—6 of Figure 5;

Figure 7 is an enlarged fragmentary bottom plan view of the contactor arm;

Figure 8 is an enlarged fragmentary exploded vertical transverse sectional view taken substantially on the plane of line 8—8 of Figure 2.

Referring to the drawings in detail, there is shown a conventional automotive engine ignition system, indicated generally at 10, comprising an ignition coil 12, a battery 14, a plurality of spark plugs 16, said system being conventionally defined as a "single line" system wherein the chassis of the vehicle constitutes a common ground for all of the components of the ignition system, and

having connected therein a distributor 18 of the present invention.

The illustrated distributor 18 comprises a dielectric cup 20 of any suitable material having the necessary insulative characteristics. The cup 20 includes an axial bore 22 extending through the lower end 21 of the cup and communicating at its upper end with an annular concentrically disposed lower recess 24 which opens into a larger diameter annular main recess 26 in the top of the cup 20. Secured on the lower end 21 of the cup 20 is a support plate 28 which has a depending central sleeve 30 aligned with the bore 22. A shaft bearing sleeve 32 of brass or any other suitable material extends through the bore 22 and the sleeve 30. The side wall 31 of the cup 20 has extending laterally outwardly from diametrically opposed sides thereof lugs 34, see Figures 1 and 2, on which are hinged resilient cap-retaining clips 36.

A convex-concave cap 38 has an annular groove 40 in its lower edge which seats on the upper edge of the side wall 31 of the cups 20. The cap 38 has diametrically opposed laterally extending abutments with which the resilient clips 36 are engageable.

The cap 38 involves no operating components of the distributor, so that the distributor can function with the cap removed, so that the distributor can be adjusted while functioning, and the operation of the operating components can be observed while in operation.

Journaled through the bearing sleeve 32 is an intermediate portion of a distributor shaft 42 having thereon an intermediate annular collar 44 resting on the upper end of the sleeve 32. Traversing the sleeve 30 and the sleeve 32 for lubricating the shaft 42 is a conventional grease cup assembly, indicated generally at 46. In order to prevent longitudinal movement of the shaft 42 within the sleeve 32, the shaft has an annular abutment collar 48 in engagement with the lower end of the sleeve 32, suitably keyed thereon by means of a transverse retaining pin 50. The shaft 42 is grounded and projects upwardly through the recess 24 into the main recess 26, where the shaft 42 has a reduced diameter portion 52 and has a threaded bore 54 in its upper end. Circumposed on the reduced portion 52 of the shaft 42 is a polygonal cam 56 having flat faces 58 defining therebetween spaced cam lobes 60. The cam 56 has a reduced diameter eccentric upstanding portion 61 having thereon a bore 62 which is axial to the cam, and receives therein a retaining screw 64 which is threaded in the bore 54 in the shaft 42 for maintaining the cam 56 on the shaft 42. The eccentric upper end portion 66 of the shaft 42 has engaged thereon a hub 68 on a radial arm 76, together constituting a rotor, indicated generally at 70, which rotates with the shaft 42. The rotor 70 includes a contact 72 having an upper rounded end, which is retained on the top of the hub 68 by a connector strip 74. The strip 74 extends along the arm 76 and on the outer end 77 of the arm 76, and terminates in spaced relationship to the side wall 78 of the main recess 26 of the cup 20.

The cup 20 has embedded in its side wall 78 a plurality of circumferentially spaced fixed contacts 80, see Figure 2, equal in number to the number of cylinders or spark plugs of the engine with which the ignition system is associated, eight for example, as shown diagrammatically in Figure 1. The contacts 80 are electrically connected by conductor strips 82 embedded in the side wall 31 of the cup 20 to spark plug wire sockets 84 on the outer side of the cup side wall 31, and arranged in a continuous arc around one side of the cup 20.

Suitably secured on the shaft 42 within the lower recess 24 above and near the collar 44 is a plate 86

having thereon a conventional centrifugal speed-responsive automatic spark advance control, indicated generally at **88**, for advancing the shaft **42** to the position shown in Figure 4, from the retarded position shown in Figure 3, so as to orientate the outer end **77** of the rotor arm relative to the contacts **80** to procure proper firing of the spark plugs in response to increased speeds of rotation of the shaft **42**.

Seated on the bottom of the recess **24** is a metal cup **89** whose bottom wall **90** is traversed by the sleeve **32**, which has an upstanding side wall **92** engaged with the side wall of the recess **24**. The side wall **92** has secured on the inner periphery thereof, see Figures 5 and 6, L-shaped brackets **94**, spaced around the side wall **92**, and having legs **93** projecting radially inwardly and spaced below the upper edge **96** of the side wall **92**. The legs **93** have therein openings **97** containing ball bearings **98**, which are held in place by U-shaped clips **100** which have legs **102** and **104** engaged with opposite sides of the legs **93**, which have therein openings **103** and **105**, respectively, smaller than and retainably receiving opposite sides of the ball bearings **98**. Rotatably supported on the upper sides of the ball bearings **98** in an advance-and-retard plate **106**, whose upper surface **108** is in substantial alignment with the upper edge **96** of the side wall **92**. The plate **106** is held down in place by means of tabs **110** which are traversed by screws **112** which are threaded, as indicated at **114**, into the bottom **116** of the main recess **26** of the cup **20**. As most clearly shown in Figure 1, the upper surface of the advance-and-retard plate **106** has thereon a pointer **107** which confronts a scale **109** on the recess bottom **116**, enabling calibrated adjustment of the cam follower **118** of a breaker point assembly, indicated generally at **120**, in relation to the cam lobes **60** of the cam **56**. The plates **106** has suitably supported thereon a condenser **122** which is operatively connected to the breaker point assembly **120**. The cup **20** has an external coil wire connecting socket **124** for connecting a conductor **126** leading from the primary of an ignition coil **12**. Integral with and extending laterally from one side of the cup **20** is another socket **128** for receiving therein the terminal end of the high tension wire **130** of the ignition coil **12**.

As most clearly seen in Figure 2, the high tension socket **128** includes a conductive cup **134** electrically connected to a vertical mounting pin **136** rising above the upper edge **79** of the cup **20**. The mounting pin **136** has thereon an intermediate annular groove **140** in which is engaged a split lock ring **144**. A high tension contactor arm **148** which comprises a resilient conducting bar **150** having on its free inner end a contactor **152** engaged upon the contact **72** of the rotor **70**. The outer end of the resilient bar **150** is embedded in an enlarged dielectric knob **154** having therein a conductive socket **156** having a downwardly opening bore **158** conforming to the upper end of the mounting pin **136**, as clearly shown in Figure 8. The knob **154** has a radially extending rib **160** engageable within the groove **146** so as to orientate the contactor arm **148** relative to the rotor **70**.

Although not shown in the drawings, the described distributor may have operatively connected to its advance-and-retard plate **106** a conventional "vacuum control" for automatically advancing and retarding the distributor.

The foregoing is considered as illustrative only of the principles of the invention. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, as fall within the scope of the appended claims.

What is claimed is:

1. In an ignition distributor, a dielectric cup having an upper end and a closed lower end, a main annular recess opening through the upper end of the cup and defining a bottom and a cup side wall having an upper edge, said bottom being spaced from the lower end of the cup, a smaller diameter concentric recess in the cup below and opening into said main recess, said smaller recess having a bottom spaced upwardly from the lower end of the cup, an axial bore in the lower end of the cup and opening through the bottom of the smaller recess, a bearing sleeve secured in said bore, a rotary distributor shaft having a lower portion journaled in said bearing sleeve, means precluding vertical endwise movement of the shaft in the bearing sleeve, said shaft having an intermediate reduced diameter portion located in said smaller recess and a further reduced diameter upper end portion located in said main recess, said reduced diameter portions defining an upwardly facing shoulder therebetween, a polygonal cam secured on the upper end portion of the shaft in the main recess, the side wall of the main recess having thereon a row of circumferentially spaced fixed contacts projecting radially inwardly therefrom, a rotor comprising a hub secured non-rotatably on the upper end of the shaft and engaging said shoulder and having a radial arm having a free end, said rotor hub having an upper end having an upstanding contact thereon, and a conductive strip extending along said arm to the free end thereof, said conductive strip having an outer end facing and spaced from said radial fixed contacts, a high tension ignition coil wire socket mounted on the upper edge of the main recess side wall, said socket including a conductive mounting pin on and rising above the upper edge of the side wall, a high tension contactor comprising a knob having a conductive socket having a downwardly opening bore securably engaged on said mounting pin and a radial spring conductor bar in contact with said socket and having a free inner end engaged with the upstanding contact on the rotor hub.

2. In an ignition distributor, a dielectric cup having an upper end and a closed lower end, a main annular recess opening through the upper end of the cup and defining a bottom and a cup side wall having an upper edge, said bottom being spaced from the lower end of the cup, a smaller diameter concentric recess in the cup below and opening into said main recess, said smaller recess having a bottom spaced upwardly from the lower end of the cup, an axial bore in the lower end of the cup and opening through the bottom of the smaller recess, a bearing sleeve secured in said bore, a rotary distributor shaft having a lower portion journaled in said bearing sleeve, means precluding vertical endwise movement of the shaft in the bearing sleeve, said shaft having an intermediate reduced diameter portion located in said smaller recess and a further reduced diameter upper end portion located in said main recess, said reduced diameter portions defining an upwardly facing shoulder therebetween, a polygonal cam secured on the upper end portion of the shaft in the main recess, the side wall of the main recess having thereon a row of circumferentially spaced fixed contacts projecting radially inwardly therefrom, a rotor comprising a hub secured non-rotatably on the upper end of the shaft and engaging said shoulder and having a radial arm having a free end, said rotor hub having an upper end having an upstanding contact thereon, and a conductive strip extending along said arm to the free end thereof, said conductive strip having an outer end facing and spaced from said radial fixed contacts, a high tension ignition coil wire socket mounted on the upper edge of the main recess side wall, said socket including a conductive mounting pin on and rising above the upper edge of the side wall, a high tension contactor comprising a knob having a conductive socket having a downwardly opening bore securably engaged on said mounting pin and a radial spring conductor bar in contact with said

socket and having a free inner end engaged with the upstanding contact on the rotor hub, a convex-concave cap having a side wall engaged around the cup side wall and a lower edge seated on the upper edge of the main recess side wall, and means releasably securing the cap in place, the cap being devoid of electrical components of the distributor.

3. An ignition distributor comprising a dielectric cup having a side wall having an upper edge, a rotary distributor shaft axially journaled through said cup, a polygonal cam secured on said shaft within the cup and spaced below the upper edge of the cup side wall, a dielectric rotor mounted upon and positioned above said cam and having a radially outwardly projecting arm having an outer end, a center contact on and rising from said rotor, a conductor extending along said arm from said contact to the outer end of the arm to the region of spark plug contacts on said side wall, a high tension socket comprising an upstanding inductive pin on the upper edge of the cup side wall and a high

tension contactor comprising a conductive socket engaged over said pin, a dielectric knob enclosing said socket, and a radial spring contact bar fixed at one end on said knob in contact with the socket and having a free end bearing upon the center contact of the rotor.

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