

March 23 , 1926.

1,577,468

W. KAISLING

DISTRIBUTOR

Filed April 12, 1920

2 Sheets-Sheet 1

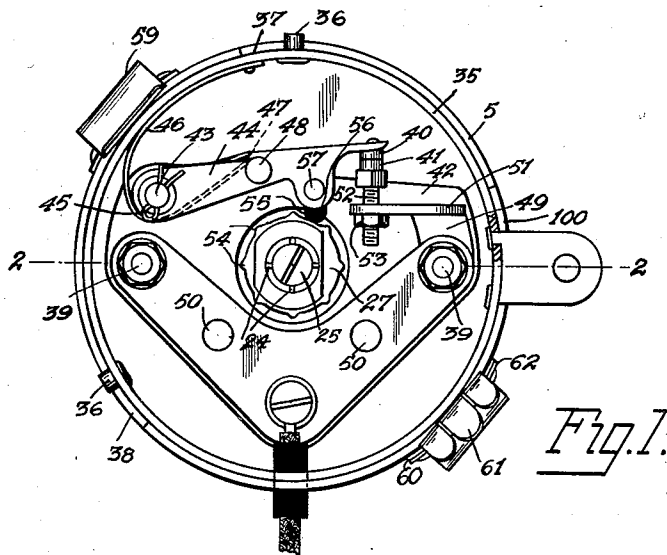


Fig. 1.

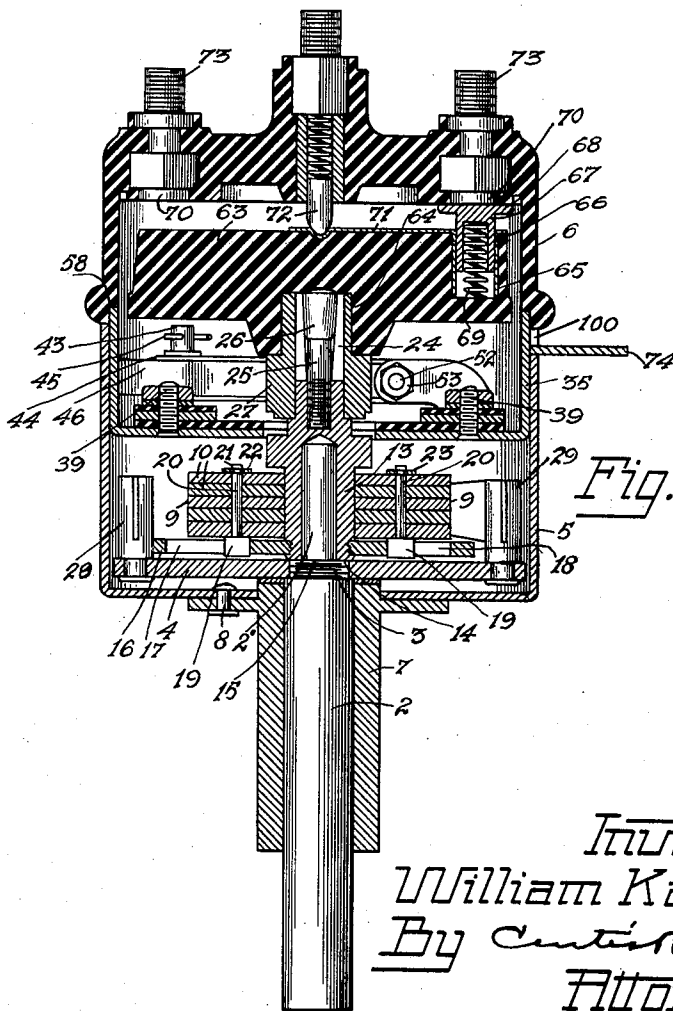


Fig. 2.

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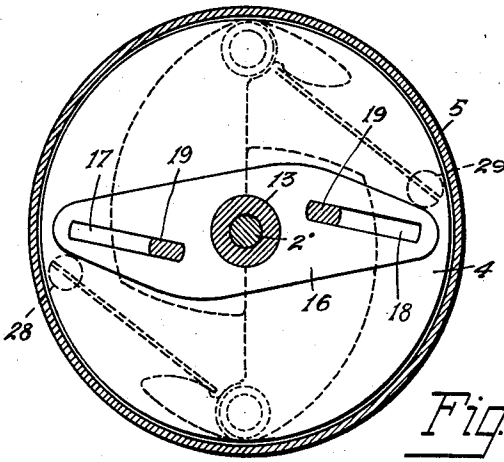


Fig. 5.

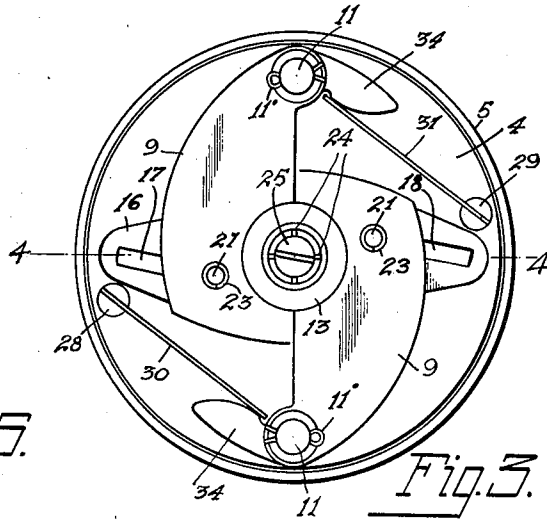


Fig. 3.

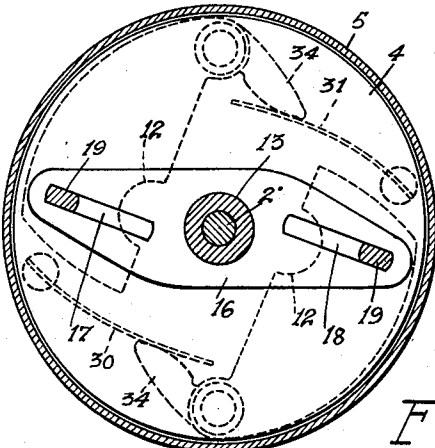


Fig. 6.

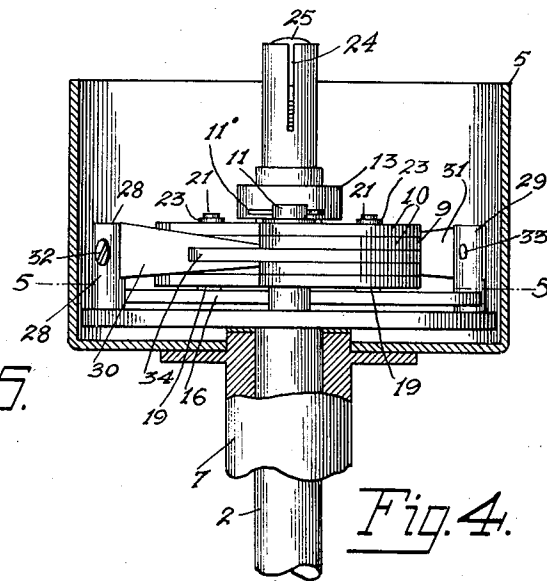


Fig. 4.

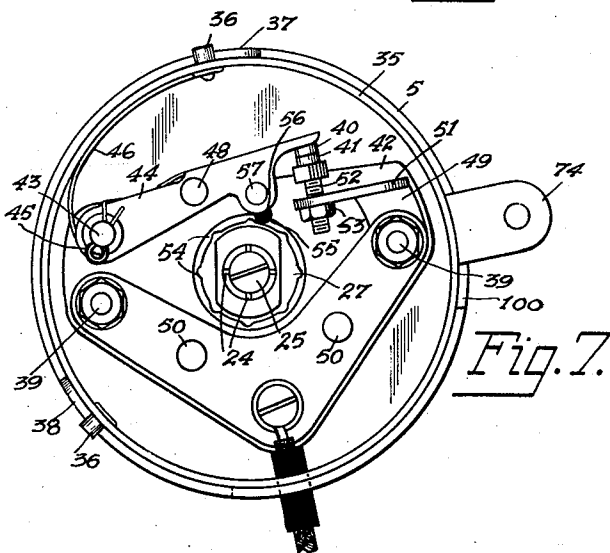


Fig. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DISTRIBUTOR.

Application filed April 12, 1920. Serial No. 373,117.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Distributors, of which the following is a specification.

My invention relates to current controllers or ignition distributors for use in connection with internal combustion engines that are subject to various and sudden changes of speed, such as automobile engines, and my invention relates most particularly to the type of distributor which is provided with manual means, in connection with automatic means or by itself, for advancing or retarding the spark furnished the engine of the distributor.

An object of my invention is to provide an improved device of the character described provided with an improved manual control mechanism in combination with automatic control mechanism, which will overcome the undesirable features found in the present devices in use.

One of the features of my invention is the provision of manual means for advancing or retarding the spark without rotating the terminal head of the distributor, to which are connected the wires or cables leading to the ignition apparatus.

The distributor of my invention embodies desirable features and advantages, all in a simple, efficient and economical manner, and consists of novel details of construction, parts and combination of parts hereinafter described and particularly pointed out in the appended claims.

For a more complete understanding of my invention, reference may be had to the accompanying drawings, in which like reference characters in the several views denote like parts, and in which

Fig. 1 shows a top view, with the cover cap, removed, of the distributor of my invention;

Fig. 2 is a sectional view along the line 2—2 of Fig. 1 with the cap in place;

Fig. 3 is a top view of the device with

the cup containing the timer contacts removed;

Fig. 4 is a sectional view along the line 4—4 of Fig. 3;

Fig. 5 is a sectional view along the line 5—5 of Fig. 4, but showing the weighted members and their spring controlling means, which appear in dotted lines, in their normal position;

Fig. 6 is a view similar to Fig. 5, but showing the weighted members in their actuated position; and

Fig. 7 is a view similar to Fig. 1, but showing the manual spark advance in its advanced position.

Referring now more in detail to my invention as illustrated, it comprises a driving shaft 2 suitably connected to the engine shaft and geared to the proper ratio of movement to operate the timer and distributor in proper cycle. The upper end of the driving shaft 2 is reduced and this reduced portion 3 is threaded to receive a circular mounting plate 4, the said plate being provided with a suitable tapped orifice which permits screw-threaded engagement with the threaded portion of the shaft 2. The plate 4 carries the mechanism that operates to automatically advance the spark as the speed of the driving shaft is increased. The circular plate 4, as well as the rest of the mechanism that forms the combined timer and distributor, is carried in a cup-shaped containing member 5 which is provided with an inverted cup-shaped cap 6, which is moulded of suitable insulating material such as bakelite. The cup 5 is provided with a sleeve member 7 secured thereto by means of the rivets 8 and serves as a bearing for the shaft 2.

The weighted members 9 consist of laminations 10 of sheet metal, and are suitably riveted together and pivotally secured, diametrically opposite each other, to the circular plate 4 by means of the pins 11 that are staked to the plate 4. The weighted members 9 are retained in place by means of cotter pins 11' which pass through suitable openings in the pins 11. The free

ends of the weighted members 9 extend inwardly and are each provided with a semi-circular recess 12 to permit the sleeve 13, which surrounds the shaft 2 to extend there-through. Fitting loosely over the extended end 2' of the shaft 2 is a surrounding sleeve 13 that has a bearing surface 14 adapted to engage the shoulder 15 of the shaft 2, and the lower end of the sleeve 13 is threaded to receive an irregularly shaped plate 16, the said plate 16 being provided with a tapped orifice of a size to receive the threaded portion of the said sleeve 13. Cut in the plate member 16 is a pair of slots 17 and 18 that are adapted to receive the extended ends 19 of the pins 20 to limit the movements of the weighted members 9. The pins 20 pass through suitable orifices in the weighted members 9 of a size to receive the pins 20, and the protruding ends 21 are provided with grooves 22 which are adapted to receive the split collars 23, which collars 23 secure the pins 20 in the weighted members 9 but permit the turning of the pins 20, as will be more fully hereinafter described.

The upper end of the sleeve member 13 is reduced and provided with transverse slots 24 so that when the screw 25, which is provided with a tapered head 26, is tightened, the timer cam 27 is securely held in its place upon the sleeve 13 due to the forcing out of the split portions of sleeve 13. A pair of studs 28 and 29 are staked to the plate 4 and are provided with transverse slots to receive the ends of a pair of leaf springs 30 and 31 and screws 32 and 33 are provided to secure the leaf springs 30 and 31 to the staked studs 28 and 29. The free ends of the springs 30 and 31 engage ears 34 formed integrally with the middle ones of the laminations of the weighted members 9 and operated to hold the said members 9 in their normal position. The inner surface of the ears 34 are so formed that as the weighted members move outwardly, the spring tension of the leaf springs 30 and 31 is increased at a desired ratio until the extended ends 19 of pins 20 prevent further movement of the weighted members 9.

A circular cup-shaped member 35 for carrying the interrupter contacts, fits within the outer enclosing cup 5 and is provided with pins 36 which rest in notches 37 and 38 in the outer cup 5 to permit movement of the said cup 35 in the cup 5, as will be more fully hereinafter described. Insulatingly secured to the inner surface of the cup 35 are the interrupter contacts 40 and 41 which are suitably mounted on a triangularly shaped mounting plate 42, which in turn is secured to the cup 35 by means of bolts 39. The triangularly shaped mounting plate 42 which carries the contacts 40 and 41 is

preferably made of insulating material, such as bakelite; and secured to this plate 42 is a post 43 on which is pivotally mounted the contact arm 44 that carries contact 40. A cotter pin 45 is passed through a transverse opening in the post 43 to pivotally support the contact arm 44 upon the same. A leaf spring 46 is provided with a hooked end 47 that engages a pin 48 in the arm 44 and is then bent around the pivot post 43 and contacts the inner cylindrical surface of the cup 35 to provide tensioning means for yieldingly holding contact arm 44 in its normal position. A plate member 49 is securely held in place upon the plate 42 by means of bolts 39 and rivets 50 and is provided with an upturned end portion 51 for holding contact 41. The upturned portion is tapped to receive a screw member 52 that carries the contact 41, and a lock nut 53 is provided to hold the screw member 52 in its adjusted position. The timer cam 27 is provided with a number of ribs 54, equal in number to the number of cylinders of the internal combustion engine. The ribs 54 are adapted to contact with the nose 55 of fiber member 56, which is securely fastened to the contact arm 44 by means of a rivet 57 to open and close the contacts 40 and 41 as the distributor shaft is rotated. The cover 6, which is made of suitable insulation material, is provided with an inner annular recess 58 which is adapted to fit over the upper edge of the cup member 35 and abut against the upper edge of the cup 5. A pair of springs 59 and 60 are adapted to yieldingly hold the cup 6 in its position upon the cup 35 while an upwardly extending arm 61 of a spring 62 is provided to prevent rotation of the cup 6 in relation to the casing 35 when it is placed in its locked position.

A distributor arm 63 is provided with a recess 64 for securing it to the timer cam 27, so that when the timer cam 27 is rotated, the arm 63 is rotated therewith. A cylindrical recess 65 is cut in the upper surface of the arm 63 into which is fitted a cylindrical member 66. A contact button 67 provided with a disk portion 68 is adapted to fit within the member 66, and a spring 69 is provided which exerts tension upon the button 67 in an upward direction to keep it in contact with the terminals 70 imbedded in the cap 6. A metallic strip 71 is secured to the upper surface of the arm 63 and forms electrical connecting means from the button 67 to a contact point 72 which is carried by the cap 6. A plurality of contact terminal studs 70 extend through the surface of the distributor head 6 into a position to be engaged by the contact button 67 as the arm 63 is rotated, the contact studs 70 corresponding in number to the number of cylinders of the internal combustion en-

gine. The threaded ends 73 of the terminals 70 constitute the secondary terminals that connect to the cylinders that contain the explosive mixture ready for firing. At the same time that the contact button 67 is rotated over the contact ends 70 of the terminals 73, the timer cam 27 is, of course, operating the make and break device or contacts 40 and 41 to cause the impulses to be sent through the primary winding of the induction coil. A manual controlling means is provided whereby the cup 35 may be rotatably advanced or retarded through a manual connecting link from the spark lever to an arm 74, which is suitably secured to the cup 35 and rests in a slot 100, which slot 100 serves as a guiding means when the cup 35 is moved to manually advance the spark. The slots 37 and 38 in association with the pins 20 36 also serve as guiding means and also limit the advance movement of the cup 35. The arm 74 associated with its connecting link form manual means to rotate the cup 35, which in turn moves the contact arm 44 therewith in relation to the timer cam 27 to advance or retard the spark that the distributor furnishes to the engine.

Referring now to the operation of the device when the shaft 2 is rotated, due to its connection to the shaft of the engine, the circular mounting plate 4, which is attached thereto, is rotated and the free ends of the weighted members 9, due to their centrifugal force, are forced outwardly against the tension of the leaf springs 30 and 31. The rotation of the weighted members 9 rotates the surrounding sleeve 13 which carries the timer cam 27 (through the medium of the extended ends 19 of the pins 20 and the plate member 16). The rotation of the timer cam 27 operates to interrupt the timer contacts 40 and 41 to make and break the circuit through the primary of the induction coil. The rotation of the cam member 27 also causes the arm 63 to be rotated, thereby causing the contact button 67 to make contact with the contact studs 70, thereby distributing the secondary currents to the different cylinders of the combustion engine. As the speed of the distributor shaft 2 is increased, the weighted members 9 are forced further from their normal position, causing the pins 20 to move outwardly in their grooves 17 and 18, thereby causing the plate member 16 to advance the sleeve 13, which in turn advances the timer contacts, thereby causing the timer contacts to be operated to transmit an impulse to the primary of the induction in advance of the impulses that would have been transmitted had the timer cam not been advanced. Conversely, as the speed of the distributor shaft 2 is decreased, the weighted members 9 are forced inwardly by the leaf springs 30 and

31, thus causing the timer cam 27 to be moved backwardly in relation to its position with the distributor shaft 2, thereby retarding the spark. The pins 20 are rotatably held in the weighted members 9 by means of the split collars 23 so that as the weights 9 are forced outward the ends 19 travel in the slots 17 and 18 and rotate permitting the construction of straight slots, but it is to be understood that the slots may be varying in shape so as to vary the advance of the spark, as is well understood.

Assuming that the operator desires to manually advance the spark fed to the combustion chambers of the engine by the distributor, he operates the spark advance lever to cause the connecting mechanism to move the arm 74 secured to the cup 35, which cup 35 in turn is rotated, and as the contacts 40 and 41 are also secured thereto, they are rotated, thus advancing the spark supplied to the cylinder of the combustion engine. If the engine speed is now varied at any time, the weighted members will operate to either advance or retard the spark from its advanced position.

Should the operator now wish to retard the spark, he operates the spark lever in the opposite direction to cause the connecting mechanism to move the arm 74 secured to the cup 35, which cup 35 is in turn rotated, and as the contacts 40 and 41 are also secured thereto, they are also rotated in the direction opposite that of advance, thus retarding the spark.

While I have described one form of mechanism which is adapted to accomplish the objects sought, it is to be understood that various other forms may be utilized to accomplish the desired results. Therefore, I do not wish to be limited to the exact structure as shown, as many changes and modifications may readily suggest themselves, but I aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A device of the character described including a stationary casing, a driving shaft extending into said casing, a governor member secured to said driving shaft, a cam supporting member rotatable with said drive shaft but movable angularly with respect thereto, a governor weight pivotally supported by said governor member, a second governor member secured to said cam supporting member and having a straight slot therein, and a pin pivotally secured to said governor weight adapted to fit into said straight slot and slidable therein and rotatable in said governor weight when said governor rotates about its pivot for moving

said cam supporting member angularly with respect to said driving shaft and for rotating said cam supporting member.

2. A distributor comprising a casing, a driving shaft extending into said casing, a governor member secured thereto, a cam supporting member supported on said driving shaft and adapted to rotate therewith and to move angularly with respect thereto, a governor weight secured to said governor member, a second governor member secured to said cam supporting member and having a slot therein, a pin rotatably secured to said governor weight and adapted to fit into said slot whereby when said drive shaft is rotated said cam member is rotated therewith and said pin moves along said slot rotating in said governor weight to change the angular relation of said cam supporting member with respect to said drive shaft.

3. A device of the character described including a casing, a drive shaft extending into said casing, a cam supporting member rotatable with said drive shaft and adapted to have its angular position changed with respect to said drive shaft, a pair of governor members secured respectively to said drive shaft and to said cam supporting member, a governor weight secured to one of said governor members, the other said governor member being provided with a straight slot therein, and a pin rotatably secured to said governor weight and having an enlarged end portion adapted to fit into said slot so that when said governor weight is rotated about its axis, said pin slides along in said slot and rotates in its bearing in said governor weight to change the angular position of said cam supporting member relative to said drive shaft.

4. A device of the character described including a casing, a driving shaft extending into said casing, a cam supporting member rotatable with said driving shaft but angularly movable thereto, a pair of governor members secured respectively to said drive shaft and said cam supporting member, a governor weight secured to one of said governor members, the other of said governor members being provided with a slot, a pin rotatably secured in said governor weight and having an enlarged end portion fitting into said slot so that the pin rotates in said governor weight as said governor weight has its free end moved outwardly as the speed of the drive shaft increases, thereby causing the angular position of said cam-supporting member to be changed relative to said drive shaft.

5. A device of the character described including a casing, a rotary shaft extending into said casing, an interrupter rotatable with said shaft, a cup shaped member adapted to fit into said casing and supported thereby so that it may be moved rel-

ative to said casing, said cup shaped member supporting interrupter contacts operable by said interrupter, automatic means located within said casing below said cup shaped member comprising a pair of governor members, a pin adapted to slide in a slot in one of said governor members and rotate in its bearing in the other of said governor members when the said governor members rotate to change the angular position of said interrupter with respect to said rotary shaft, and a manual link for rotating said cup shaped member for changing the position of said interrupter contacts relative to said casing.

6. An ignition distributor for internal combustion engines, including a cup shaped housing, a movable plate supported by said housing and within said housing, a driving shaft extending into said casing, a contact operator rotatable with said drive shaft but movable angularly with respect thereto, interrupter contacts carried by said movable plate, automatic means positioned within said housing and below said movable plate comprising a pair of governor members, a pin adapted to slide in a slot in one of said governor members and rotate in its bearing in the other of said governor members when the said governor members rotate to change the angular position of said contact operator with respect to said driving shaft, and a manual link for moving said movable plate to change the angular position of said interrupter contacts with respect to said housing.

7. A device of the character described including a casing, a rotatable shaft extending into said casing, an interrupter rotatable with said shaft but movable angularly with respect thereto, a movable plate member having pins extending into slots in said casing, so that said plate may be moved with respect to the casing interrupter contacts carried by said movable plate and adapted to be operated by said interrupter, automatic means comprising a pair of governor members, a pin adapted to slide in a slot in one of said governor members and rotate in its bearing in the other of said governor members when the governor revolves to change the angular position of said interrupter with respect to said rotary shaft, and manual means for moving said plate member for changing the position of said interrupter contacts relative to said casing.

8. A device of the character described including a casing, a rotary shaft extending into said casing, a contact interrupter rotatable with said shaft but movable angularly with respect thereto, a movable plate supported by said casing, interrupter contacts supported on said plate, a distributor head attached to said casing and provided with distributor contacts, a distributor

member secured to said contact interrupter, automatic means comprising a pair of governor members, a pin adapted to slide in a slot in one of said governor members and
5 rotate in its bearing in the other of said governor members when the governor revolves to change the position of said contact interrupter relative to said drive shaft and for changing the position of said distributor member relative to said distributor 10 contacts, and manual means for rotating said plate to change the position of said interrupter contacts relative to said casing and distributor head.

Signed by me at Chicago, Illinois, this 15
ninth day of April, 1920.

WILLIAM KAISLING.