Dec. 19, 1933. E. FIBISH 1,939,807

ADJUSTABLE IGNITION DISTRIBUTOR

Filed Sept. 8, 1931 2 Sheets-Sheet 1

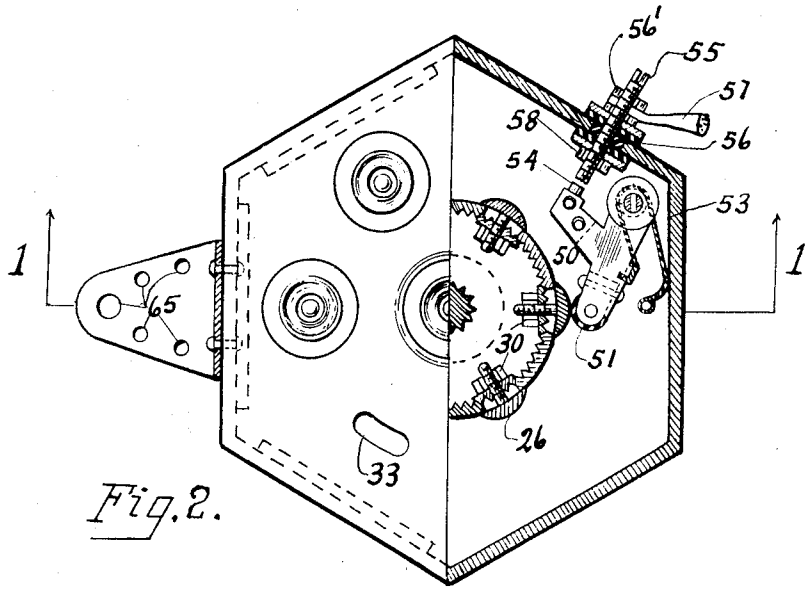

Fig. 2.

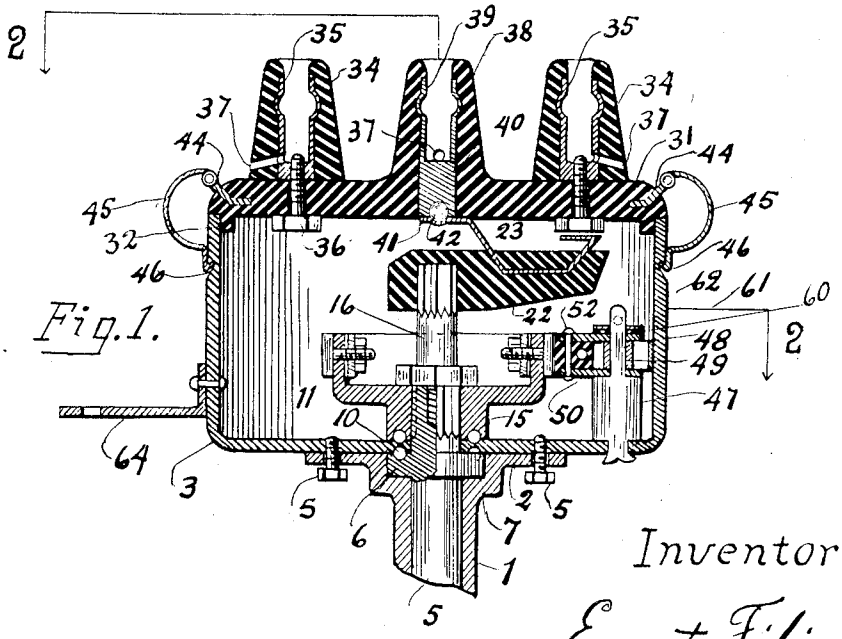

Fig. 1.

Inventor

Ernest Fibish

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Fig. 9.

Fig. 8.

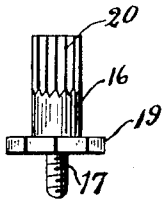
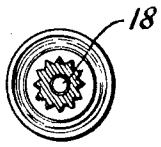


Fig. 5.



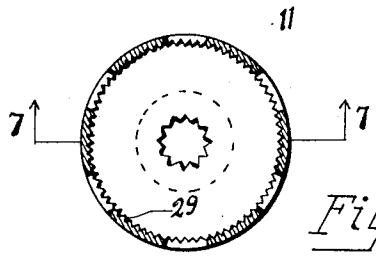


Fig. 6.

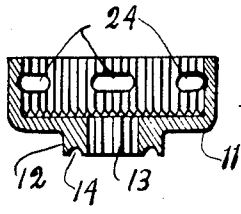


Fig. 7.

Fig. 13.

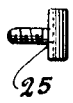


Fig. 14.

Fig. 4.

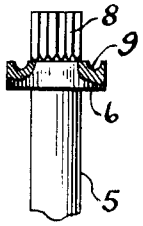


Fig. 12.

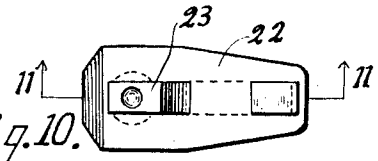


Fig. 10.

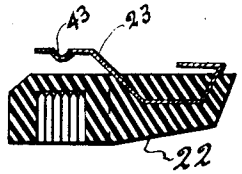


Fig. 11.

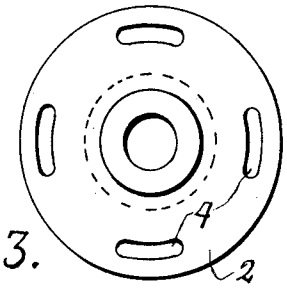


Fig. 3.

Inventor

Ernest Fibish

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UNITED STATES PATENT OFFICE

1,939,807

ADJUSTABLE IGNITION DISTRIBUTOR

Ernest Fibish, Chicago, Ill.

Application September 8, 1931. Serial No. 561,707

4 Claims. (Cl. 200—19)

This invention relates to ignition distributors, such as are employed to distribute the sparks to the cylinders of an internal combustion engine of an automobile, and is particularly adapted for adjusting the timing of said sparks.

An object of this invention is to produce a device of the character described, in which the spark to each cylinder may be adjusted independently of all of the other cylinders, whereby the same may be advanced or retarded, this being accomplished through adjustable interrupting parts provided on the timer cam in a distributor.

A further object of this invention is to provide an improved construction of cover cap or distributor head in which the terminal connecting sockets are mounted, the latter being secured in elongated slots, whereby the position thereof may be readily adjusted.

A still further object of this invention is to provide in a device of the character described a novel and improved construction of housing for containing the timing elements and novel and improved means for mounting said housing in position.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention consists in certain novel features of construction, arrangement and combination of parts hereinafter more fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of construction may be made without departing from the spirit or sacrificing any of the advantages of the invention.

For the purpose of facilitating an understanding of my invention, I have illustrated in the accompanying drawings a preferred embodiment thereof from an inspection of which, when considered in connection with the following description, my invention, its mode of construction, operation and many of its advantages should be readily understood and appreciated.

Referring to the drawings in which similar characters of reference are employed to indicate corresponding or similar parts throughout the several figures of the drawings:—

Figure 1, is a sectional view through a distributor constructed in accordance with the principals of my invention, said view being taken on line 1—1 of Figure 2;

Figure 2, is a top plan view of the distributor shown in Figure 1, parts thereof being broken away to show the inside construction thereof and taken on line 2—2 of Figure 1;

Figure 3, is a top plan view of a sleeve upon which my distributor housing is mounted;

Figure 4, is an elevational view of the upper portion of a shaft mounted in said sleeve;

Figure 5, is a top plan view of the shaft shown in Figure 4;

Figure 6, is a top plan view of the timer cam carrier;

Figure 7, is a sectional view through the same taken on line 7—7 of Figure 6;

Figure 8, is an elevational view of an extension shaft;

Figure 9, is a top plan view of same.

Figure 10, is a top plan view of the rotor arm;

Figure 11, is a sectional view through the same taken on line 11—11 of Figure 10;

Figure 12, is a sectional view through the cam element;

Figure 13, is a side elevational view through the same; and

Figure 14, is a bottom and cross sectional view of a lock washer used in connection with the cam element.

Referring to the drawings more specifically by characters of reference, the numeral 1 designates a sleeve at the upper end of which is provided the horizontally disposed flange 2, upon which is adapted to be supported the hexagonal housing 3. The flange 2 is provided with the elongated slots 4, through which are adapted to extend the bolts 5, by means of which the housing 3 is secured upon the sleeve 1. Supported within the sleeve 1, is a shaft 5, provided with an enlargement 6, which is adapted to be received within a depression 7, provided in the sleeve 1. The upper portion of the shaft 5 is provided with a serrated head 8, for a purpose to be presently more fully described. The shaft 5 is adapted to extend through an opening in the bottom wall of the housing 3, there being provided a raceway 9, between the upper face of the enlarged portion 6 of the shaft 5, and the bottom wall of the housing 3, for receiving the ball bearings 10 to facilitate in the rotation of the shaft relative to the housing.

To the upper serrated portion 8 of the shaft 5 is secured the timer cam 11, said timer cam being provided with the reduced hub portion 12, the inner surface of which is serrated as shown at 13, for making a locking fit with the serrated portion 8 of the shaft 5. The bottom edge of the hub 12 is provided with the raceway 14, which cooperates with the smaller race-

way provided on the inner face of the bottom wall of the housing 3 for receiving the ball bearings 15 to facilitate the rotation of the timer cam with reference to the housing.

To complete the assembly of the timer cam 11 with the shaft 5 there is provided an extension shaft 16, from the lower end of which projects a threaded screw 17, which is adapted to be received in threaded engagement with the threaded opening 18 provided in the upper end of the shaft 5. The extension shaft 16 is provided with an enlarged portion 19 which may be of any suitable form for facilitating the threading of said extension shaft into the main shaft 5.

By reason of the construction so far described it will be readily apparent that the timer cam 11 will rotate with the shaft 5 relative to the fixed housing 3. The upper portion of the extension shaft 16 is provided with serrations on the outer surface thereof as shown at 20, by means of which the rotor arm 21 may be mounted on the extension shaft for rotation therewith. The rotor arm 22 is formed from any suitable insulating material and has molded therein the conducting spring 23, in the manner illustrated in Figure 11.

As shown in Figures 2 and 7 of the drawings, the timer cam 11 is provided along the circumference thereof with a plurality of elongated slots 24, in which are adapted to be received the cam elements 25, which are provided with the rounded heads 26. The said cam elements are adapted to be disposed within said elongated slots 24 and may be adjusted in any desired position within said slots. To fixedly secure the said cam elements within the slots 24, I provide the washer 27, one face of which is serrated as shown at 28 in Figure 14, which is adapted to cooperate with the serrations shown at 29 on the inner face of the timer cam 11, and the nuts 30 which are threaded on the threaded shanks of said cam elements for securely locking said cam elements in the desired adjusted position. By reason of the elongated slots it will be readily apparent that the said cam elements may be moved within the limits of said slots and rigidly secured in any desired adjusted position within said slots.

The housing 3 is open at its upper end and is adapted to be closed by a suitable insulated cover or head designated generally by the reference character 31, said cover being provided with a depending flange 32, which is adapted to snugly fit within the housing 3.

As shown in Figure 2 of the drawings, the said cover is provided with a plurality of elongated slots 33, within which are adapted to be mounted the terminal connecting sockets 34. The said terminal connecting sockets are made of suitable insulated material, and have mounted therein the brass sleeve 35, the lower part of said sleeve being provided with a threaded opening within which is adapted to be received the bolts 36, by means of which bolts the said sockets may be rigidly secured to the cover 31. By reason of the elongated slots 33 it will be readily apparent that the said sockets may be adjustably mounted within the limits of said slots upon the cover 31 for the housing.

Each of the terminal connecting sockets are provided with the openings 37 adjacent the lower end thereof, as shown in Figure 1 of the drawings. The center terminal connecting socket 38, it will be noted, is formed integral with the cover 31 and is also provided with the brass internal sleeve 39, the lower end of which is solid as shown at 40, and is provided at its bottom edge with a raceway 41, within which is mounted the ball bearing 42, said ball bearing being received within the raceway 41 and a depression 43 provided in the spring 23. It will thus be noted that the spring is in electrical contact at all times with the sleeve 39 of the center terminal connecting socket 38, the ball bearing 42 permitting free rotation of the said spring relative to the fixed cover 31.

Suitable staples 44 are molded in the cover 31, said staples having pivotally secured to their free ends suitable springs 45, which are adapted to cooperate with the notches 46, provided in the side wall of the housing 3 for securing the cover 31 to the housing.

A standard or post 47 is rigidly secured to the bottom wall of the housing 3, said standard having a reduced portion 48, upon which is mounted a sleeve of insulating material 49, said sleeve having mounted thereon the interrupter arm 50, which is adapted for pivotal movement on said sleeve. The assembly of the interrupter arm to the standard 47 is completed by means of an insulated washer 60, a metal washer 61 and a cotter pin 62 extending through an opening provided in the reduced portion of the post 34. The free end of the interrupter arm 50 has rigidly secured thereon a block 51 of insulating material, which may be rigidly secured thereto by means of the rivet 52, or in some other suitable and well known manner, said block being adapted for engaging the outer circumference of the timer cam 11, upon which it is adapted to ride, and as shown in Figure 1 of the drawings the said interrupter arm is so disposed as to engage the heads 26 of the cam elements 25 as the latter rotate with the shaft 5. A suitable leaf spring 53 is provided for urging said interrupter arm towards the timer cam 11. The interrupter arm 50 is provided with a contact point 54, which is disposed in position to engage the contact point 55, which extends through an insulated threaded bushing 56, provided in the wall of the housing. The contact 55 has threaded thereon a terminal 56', to which the lead 57 is connected. A nut 58 is provided on the inside of the housing, threaded on the contact 55 for securely locking the same in the desired adjusted position. The contacts 55 and 54 are so disposed relative to each other as to be in contacting engagement with each other when the block 51 engages the outer circumference of the timer cam 11, and to be out of contacting engagement with each other when said block is in engagement with the heads of any of the cam elements 25. Thus it will be apparent that by adjusting the position of the cam elements circumferentially on the timer cam, the time at which the contact between 54 and 55 will be made or broken may be varied.

A suitable handle 64 is rigidly secured to the housing 3, said handle being provided with a plurality of openings 65, whereby the housing as a whole may be secured in an advanced or retarded position.

The operation of the device may be described as follows:

The interrupter arm 50 projects into the path of the cam elements 25, the spring 53 normally holding said interrupter arm in that position. The timer cam 11 is adapted to rotate with the

shaft 5, which may be connected to the engine, and as said timer cam rotates the cam elements 25 will be successively brought into engagement with the free end of the interrupter arm 50 for causing the same to move against the action of the spring 53 to break the contact between the points 54 and 55. It will be understood that the circuit is closed as long as the contact points 54 and 55 are together, but as the timer cam 11 travels around with the shaft 5 the cam elements 25 will be brought against the block 51 of the interrupter arm to force the latter about its pivot so as to draw the point 54 away from the point 55 and consequently break and interrupt the circuit. As the ignition circuit is controlled by the circuit through the points 54 and 55, it will be seen that the time of the ignition or the interval between successive explosions may be easily and accurately controlled by adjusting the cam elements in their respective slots, as hereinbefore more fully described.

It is believed that my invention, its mode of construction and operation and many of its advantages should be readily understood from the foregoing without further description, and should also be manifest that while a preferred embodiment of the invention has been shown and described for illustrative purposes, the structural details are, nevertheless, capable of wide variation within the purview of my invention as defined in the appended claims.

I claim,

1. A device of the character described, comprising a hexagonal housing, a rotatable shaft extending through the bottom of said housing, a cylindrical timer cam mounted on said shaft for rotation therewith, a plurality of spaced cam blocks in the form of screws having rounded heads mounted on the circumference of said timer cam, said cam blocks being mounted in elongated slots for adjustment relative to each other, serrations provided on the inner surface of the timer cam for aiding in securely locking the cam blocks in adjusted position, means for locking said cam blocks in adjusted position, said means including washers having one surface serrated for cooperation with the serrations provided on the timer cam, a swinging interrupter lever mounted in said housing, means for urging the forward end of said lever into the path of travel of said cam blocks, whereby the latter will successively engage the said lever for tripping the same, and a rotor arm carried by the shaft for rotation therewith.

2. A device of the character described, comprising a housing adjustably mounted on a stationary sleeve, a shaft extending through said sleeve and bottom wall of said housing for rotation therein, the upper portion of said shaft being provided with a serrated outer surface, a cylindrical timer cam having a depending sleeve the inner surface of which is serrated for cooperation with the upper portion of said shaft for securing the cam to the shaft for rotation therewith, a plurality of spaced cam blocks mounted in elongated slots provided on the circumference of said timer, an interrupter arm swingingly mounted within said housing, the free end of said arm being disposed in the path of travel of said cam blocks, to be successively engaged thereby to be tripped, and a cover for said housing carrying terminal connecting sockets, and means whereby the position of said sockets on the cover may be adjusted.

3. In a timing mechanism of the character described, the combination of a housing adjustably mounted on a stationary sleeve, a shaft extending through said sleeve and bottom wall of said housing for rotation therein, that portion of the shaft extending into said housing being provided with a serrated periphery, a cylindrical timer cam having a reduced portion for attachment to the serrated portion of the shaft, a plurality of spaced cam blocks mounted in elongated slots provided on the circumference of the said timer, means for securely locking said cam blocks in any desired adjusted position, said means including serrations on the inner surface of the said timer cam and serrated washers for cooperation with said serrated inner surface, an extension shaft mounted on the upper end of the first shaft, the free upper end of said extension shaft being provided with serrations, a rotor arm of insulating material carrying a spring contact secured to the serrated portion of the extension shaft, said rotor arm being disposed in position to successively engage the terminal connecting sockets, an interrupter arm swingingly mounted within said housing, the free end of said arm being disposed in the path of travel of said cam blocks, to be successively engaged thereby to be tripped, and a cover for said housing carrying the said terminal connecting sockets, and means whereby the position of said sockets on the cover may be adjusted.

4. In a timing mechanism of the character described, the combination of a housing adjustably mounted on a stationary sleeve, a shaft extending through said housing and sleeve for rotation therein, a hollow cylindrical timer cam carried by said shaft for rotation therewith, a plurality of cam blocks mounted in elongated slots provided on the circumference of said timer, an interrupter arm swingingly mounted within said housing, a contact carried by said interrupter arm, a second contact mounted in the wall of the housing for engagement with the contact on the interrupter arm, said second contact being in the form of a screw threaded through the wall of the housing and securely locked in the desired position by a plurality of washers and lock nuts, means for adjusting said second contact, spring means for urging said interrupter arm into contacting engagement with said second contact, the free end of said interrupter arm being disposed in the path of travel of said cam blocks, to be successively engaged thereby to be tripped.

ERNEST FIBISH.