Dec. 2, 1924. 1,517,653

L. T. RHOADES

COMBINED TIMER AND DISTRIBUTOR

Filed Dec. 7, 1920 3 Sheets-Sheet 1

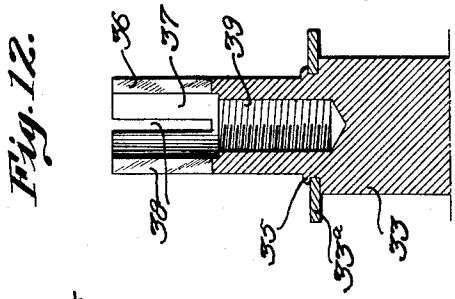


Fig. 12.

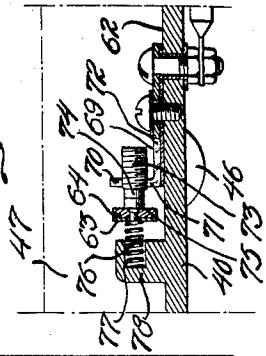


Fig. 6

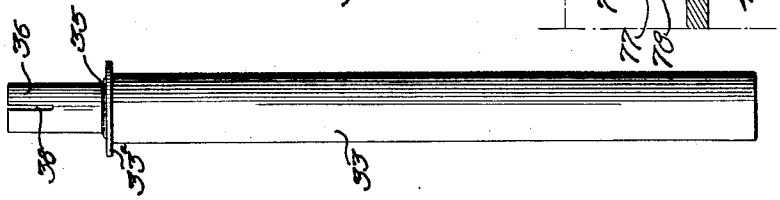


Fig. 11.

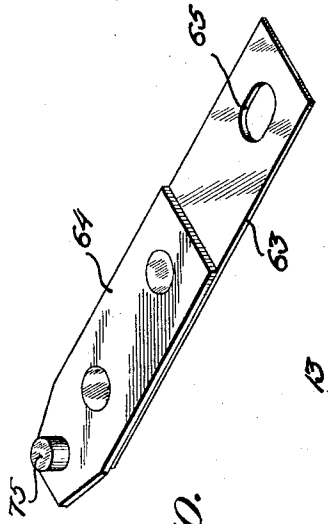


Fig. 10.

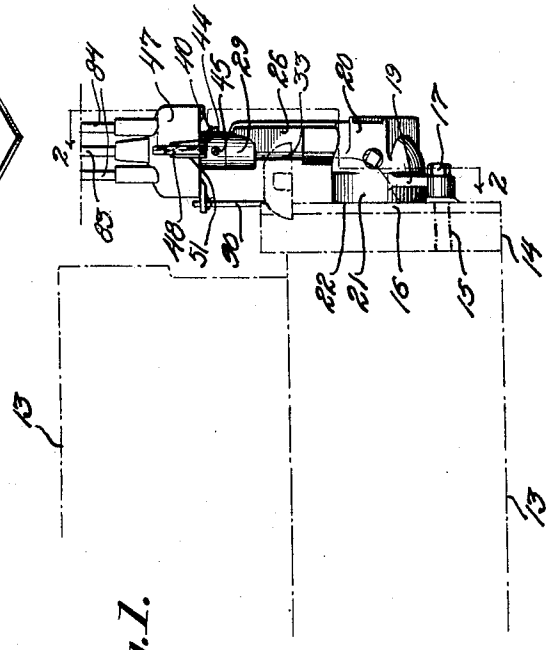


Fig. 1.

Witnesses
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Augustus B. Coppes

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Filed Dec. 7, 1920 3 Sheets-Sheet 2

Fig. 3.

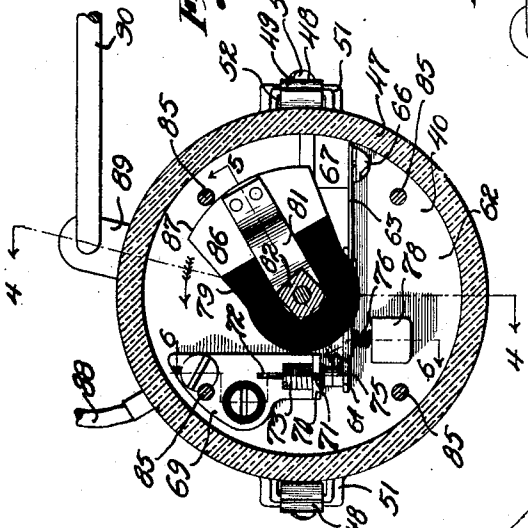
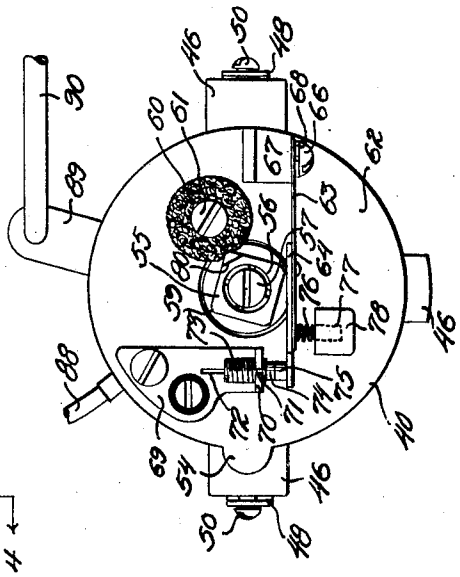


Fig. 7.



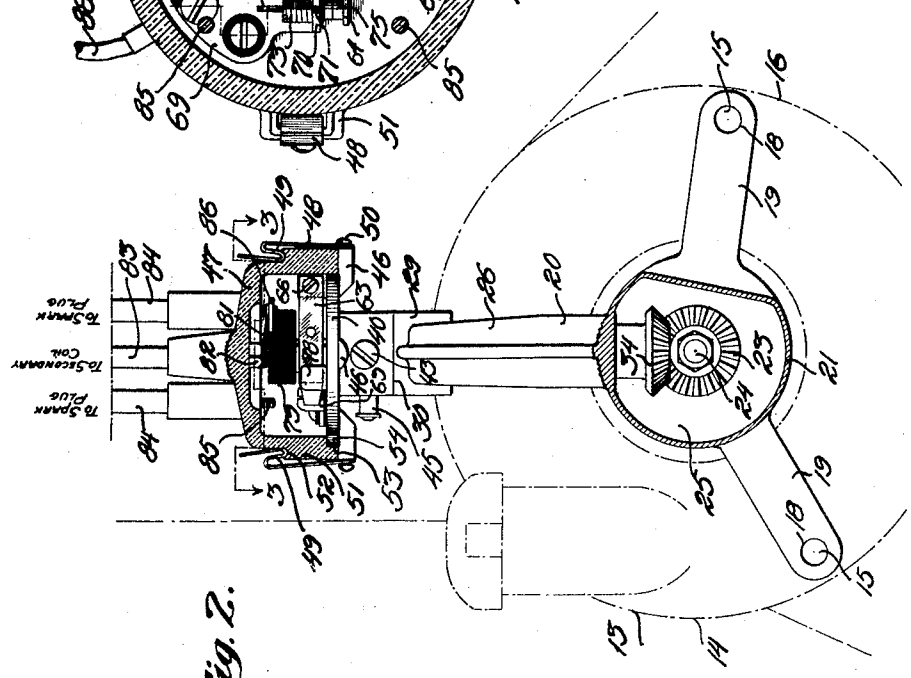


Fig. 2.

Witnesses
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COMBINED TIMER AND DISTRIBUTOR

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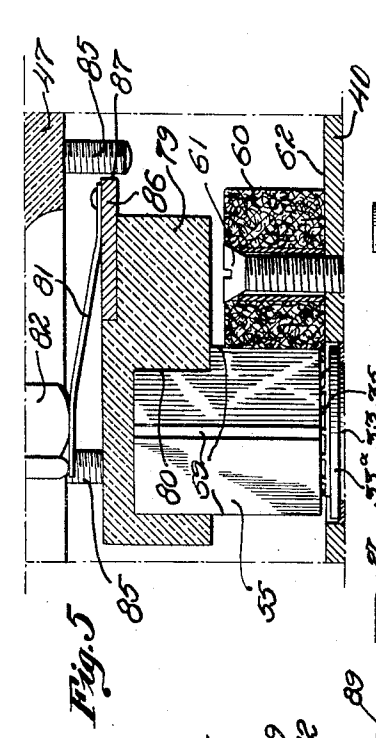


Fig. 5

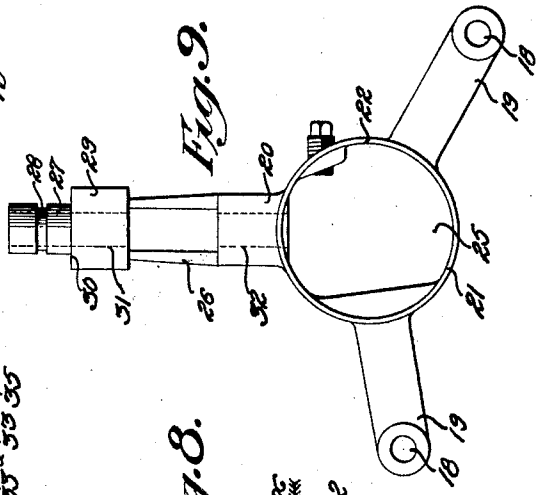


Fig. 9.

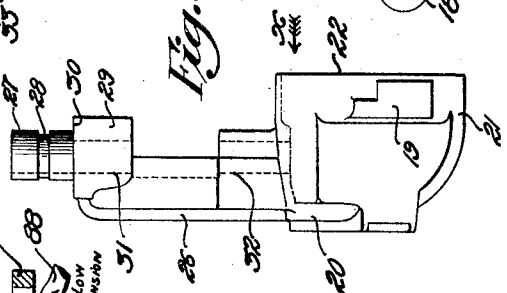


Fig. 8.

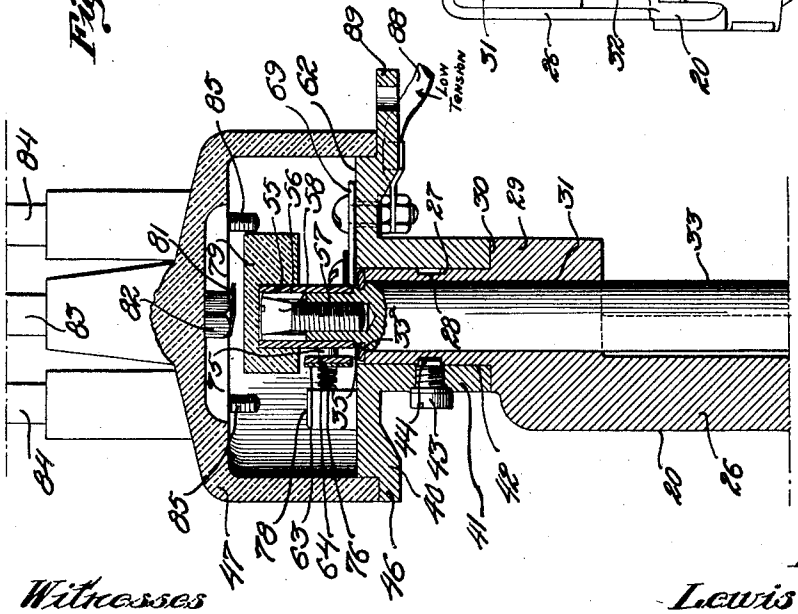


Fig. 4.

Witnesses
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Inventor
Lewis T. Rhoades
By Joshua R. H. Potts
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Patented Dec. 2, 1924. 1,517,653

UNITED STATES PATENT OFFICE.

LEWIS T. RHOADES, OF MONT CLARE, PENNSYLVANIA, ASSIGNOR TO NEW YORK COIL COMPANY, OF NEW YORK, N. Y.

COMBINED TIMER AND DISTRIBUTOR.

Application filed December 7, 1920. Serial No. 428,863.

To all whom it may concern:

Be it known that I, LEWIS T. RHOADES, a citizen of the United States, residing at Mont Clare, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Combined Timers and Distributors, of which the following is a specification.

One object of my present invention is to provide an improved combined timer and distributor for automobiles which are not equipped with a distributor type system of ignition. For example the device of my present invention is particularly well adapted as a substitute device for a car using four separate vibrating coils and a conventional timer in the primary or low tension circuit such as the well known "Ford" automobile and when so used it will take the place of said conventional timer and three of said four coils can be discarded and the high tension for the one coil can be distributed to the cylinders so as to insure perfect and regular occurrence of the spark which was not possible where four of such coils were used since it was practically impossible to make all of the coils produce positive and similar ignition.

Another object is to so construct the apparatus of my present invention that it can be quickly and easily substituted for the timing and ignition apparatus of cars of the above described type without requiring any changing of the parts of the engine proper. For example the device of my invention is so constructed that it includes a main supporting bracket which, when used in connection with a Ford car, has two legs having bolt holes so arranged that they register respectively with two holes in the front of the engine so that by means of two bolts, the bracket may be clamped to the engine without drilling or machine work of any character.

A further object is to make the device of my invention of a durable and simple construction which can be readily manufactured, easily adjusted and so that it cannot easily get out of proper working order.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which—

Figure 1 is a side elevation illustrating in dot-and-dash lines, the outline of an engine such for example as a Ford engine and showing in full lines the position which my improved device assumes when secured to said engine as above described,

Figure 2 is an enlarged section taken on the line 2—2 of Figure 1,

Figure 3 is a sectional plan view taken on the line 3—3 of Figure 2 and shown on an enlarged scale,

Figure 4 is a fragmentary section taken on the line 4—4 of Figure 3,

Figure 5 is a fragmentary sectional elevation taken on the line 5—5 of Figure 3,

Figure 6 is a fragmentary section taken on the line 6—6 of Figure 3,

Figure 7 is a top plan view of my improved device with the cap removed,

Figure 8 is a side view of the main supporting bracket which forms an important part of my present invention,

Figure 9 is a view of said bracket looking in the direction of the arrow x in Figure 8,

Figure 10 is a perspective view of the contact operating arm which forms a part of my present invention,

Figure 11 is an elevation of a shaft which forms a part of my invention, and

Figure 12 is an enlarged fragmentary section of a portion of said shaft which is constructed to permit advantageous functions hereinafter described.

Referring to the drawings, 13 represents an engine of the Ford type which on its end 14 has two holes 15, which are usually employed for the purpose of holding the cover plate 16 in place, and in attaching my improved device, I employ these two holes through which I extend bolts 17; said bolts passing through holes 18 in legs 19 of a main supporting bracket 20. The bracket 20 includes a cup-shape body portion 21 which is open at its end 22 which is adapted to be placed adjacent the end of the engine 13 in a manner clearly shown in Figure 1.

To secure the bracket to the engine as above described and to substitute the same for the conventional timer, the latter is removed and a bevel gear 23 is slipped on the end of the time shaft 24 and is secured thereto by the same fastening formerly employed for the rotating element of the conventional or usual timer. The space 25 within the cup-shape body portion 21 provides room for the bevel gear 23 and the bracket 20 has an arm 26 which projects upwardly and its upper

end has an integral collar 27 formed thereon as shown in Figures 8 and 9; said collar having an annular groove 28 for a purpose hereinafter described. The arm 26 includes an enlarged boss 29 which at the bottom of the collar 27 forms a ledge or shoulder 30. The boss 29, collar 27 and body portion 21 have aligned bores 31 and 32 which provide bearings for a vertical shaft 33; said vertical shaft having a bevel gear 34 at its bottom which meshes with the bevel gear 23 and is also located within the space 25 of the body portion 21. The shaft 33, as clearly shown in Figure 12, adjacent its upper end has an annular flange 33^a which is adapted to bear upon the top edge of the collar 27 as shown in Figure 4. This flange 33^a, which is of greater diameter than the diameter of the major portion of the shaft 33, is preferably made in the form of a ring in order to produce the same in a quick and cheap manner; the ring being secured to the shaft by calking or upsetting the metal of the shaft so as to produce an annular projection 35 which holds the flange 33^a in position. Said flange can thus be made of a ring and secured in place without requiring that the major portion of the length of the shaft be turned from an exceptionally large piece of metal and in this manner I am enabled to cheaply and quickly manufacture this part of the device. The extreme upper end portion 36 of the shaft 33 is made hollow so as to provide a cavity 37 and the hollow portion is split as shown at 38 so that it may be slightly expanded under certain conditions hereinafter described. The shaft 33 immediately below the hollow portion 36 has a tapped bore 39.

A distributer head and timer includes a base 40 which may be made of metal which has a hub portion 41 which is provided with a bore 42 in which the collar 27 is adapted to rotatably fit; said hub portion having its lower end in engagement with the shoulder 30 of the bracket boss 29. A set screw 43 fits a tapped hole in the hub portion 41 of the base and has a smooth end 44 adapted to project within the groove 28 of the collar 27. Thus the base 40 is permitted to freely rotate with respect thereto. I also preferably insert an oil cup 45 within the hub portion 41; the latter having a tapped hole to receive the cane so that the oil can pass into the groove 28 of the collar 27 and also will serve to lubricate the bearing between the collar and the hub as well as to lubricate the bearing of the shaft 33.

The base 40 includes lugs 46 adapted to form a mounting for the bottom edge of a cap 47; said cap 47 being preferably made of electric non-conducting material such as compressed fiber or the like. This cap is secured to the base by means of clips 48 which are made of strips of resilient metal having a double convoluted fold 49 adjacent their free ends; the opposite ends having slots or enlarged holes through which securing screws 50 pass; said securing screws entering the lugs 46 which form a part of the base 40 and which directly support the bottom edge of the cap 47. The cap 47 has opposed lobes 51 which have recesses 52 in their upper ends in which the downwardly projecting folds of the clips 48 are adapted to spring by forcing the clips toward the lobes 51 in order to secure the cap to the base. Furthermore the inner surface of the cap 47 is recessed as shown at 53 to provide an entrance for a lip 54 so that the cap 47 is held against rotation relatively to the base 40.

A cam 55 has a hole 56 so that, when the hollow portion 36 of the shaft 33 is in its normal position, it will fit said hole 56 so that the cam 55 can be placed on the top of the shaft and can normally be freely rotated. However, in order to secure the cam 55 to the shaft, I provide a screw 57 which fits the tapped bore 39 in the shaft 33 and has an upwardly flaring head 58; the extreme upper end of which is of larger diameter than the cavity 37 so that by turning down upon the screw 57, the head 58 thereof will expand the hollow portion 36 of the shaft 33 and thereby lock the cam 55 to the shaft 33. The cam 55 has four projections 59 which during rotation of the shaft 33 are adapted to wipe against a cylindrical pad 60 of fibrous material; said pad being secured to the base 40 by means of a screw 61; the pad extending entirely to the top surface 62 of the base and partway over the bore 42 of the base hub 41. This pad 60, during the rotation of the shaft 33 and cam 55, serves to absorb any oil which works its way upwardly through the bore 42 and reapply the oil to the projections 59 of the cam 55; said projections being operative in a manner hereinafter described. Furthermore the pad 60 prevents the oil from covering the entire upper surface 62 of the base 40 and the device is therefore kept free of oil other than the places which must be lubricated.

A spring plate 63, which is preferably made of a strip of flat steel, has a hardened and comparatively rigid plate 64 rigidly secured thereto adjacent one end. The opposite end of the spring plate 63 has a slot 65 as clearly shown in Figure 10; said slot 65 being elongated in the direction of the length of the spring plate 63. This spring plate is positioned as clearly shown in Figuses 2, 3 and 7 and is secured at one end by a screw 66 which passes through the slot 65 and engages within a lug 67; there preferably being a split ring spring washer 68 interposed between the plate and the head of the screw so that said end is firmly se-

cured to the lug 67. The hardened plate 64 is adapted to be engaged by the projections 59 of the cam 55 during the rotation of the shaft 33. A support 69 which is insulated from the base 40 has an up-turned lip 70 which is split as shown at 71; said split also extending into the bottom portion 72 of the support 69. The lip 70 has a tapped hole with which the split 71 communicates and an adjusting screw 73 extends through said tapped hole and has a contact 74 on its end opposed to a contact 75 on the hardened plate 64. A coiled spring 76 has one end bearing on the spring plate 63 in back of the hardened plate 64; the opposite end of the coiled spring 76 being positioned within a cavity 77 in a lug 78 which projects upwardly from the base 40. Under normal conditions and when no one of the projections 59 of the cam 55 is in engagement with the hardened plates 64, the spring 76 will hold the contact 75 in direct and positive engagement with the contact 74 and with this arrangement I avoid all pivotal hinge connections since the spring plate 64 is rigidly connected to the lug 67 and only flexes when the projections 59 of the cam 55 engage and push outwardly the hardened plate 64 so as to separate the contacts 74 and 75. Thus the spring plate 63 and hardened plate 64 provide a contact operating arm which has no pivotal hinge connection whatever but depends upon the flexible character of the plate 63 and the positive acting spring 76 in order to move the contact 75 into engagement with the contact 74 when permitted to do so by the cam 55.

A rotor block or head 79 includes a part made of non-conducting material having a cavity in which fits the upper end of the cam 55. The cam 55 being substantially angular and the cavity in the head 79 being of substantially the same shape, the head 79 will be rotatably secured to the cam and in order to insure that the head is placed in its proper relative position with respect to the cam, I preferably cut a portion of the top of the cam away as shown at 80 and make the cavity of the head 79 of similar section so that the head must always be placed on the cam in the same relative position thereto. The head 79 carries a spring 81 which has a free end adapted to engage always upon a contact member 82 which depends axially into the cap and is in electric connection with a wire 83. Other wires 84 lead into the space within the cap and are in connection with metallic projecting members 85 which in the present instance are illustrated in the form of screw threaded stems which may be a part of the means which secure the wires to the cap. The spring 81 is in direct contact with a plate 86 supported on the head 79; said plate having an arcuate edge 87 adapted during the rotation of the shaft to pass successively into close proximity to the members 85 which as previously stated are in electric connection with the wires 84 which lead to the spark plugs. The support 69 is in electric connection with a wire 88 adapted to conduct low tension current from the coil and it will be noted from the above description that the contact operating arm is grounded in view of the fact that there is a direct metallic connection between the several parts leading to and supported by the engine. The wire 83 is connected to the secondary of the coil and since the wire 83 carries low tension current from the primary of the coil, the high tension current which will be set up in the secondary will be conducted through the wire 83, spring 81, plate 86 and during the rotation of the head 79, this high tension current will successively pass through the gap between the edge 87 of the plate 86 and the members 85. This current will then be conducted to the spark plugs which constitute the other current of the circuit. The spark may be advanced or retarded at will by rotating the base and cap relatively to the head 79 and I have illustrated for this purpose, an extension 89 which may be connected with any suitable device such as the rod 90 which may be controlled by the operator of the automobile in the usual manner.

It will be noted that in order to insure the proper positioning of the parts before the screw 57 is tightened, the distributor head 79 can be moved carrying the cam with it until the contacts 74 and 75 are together. This at once simplifies the setting or timing of the spark to occur at the exact and proper instant of the piston's travel in the engine. Furthermore this setting is accomplished without any attention whatever being paid to the meshing of the bevel gears 23 and 24.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

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

1. Apparatus of the character described including an operative cam; an electric contact member; a supporting structure; a contact operating arm including a contact portion and a flexible spring plate having a portion rigidly secured to the supporting structure; and a spring independently operative to flex said plate to move and hold said contact portion of the arm in engage-

ment with said contact member, said cam being operative to flex said plate in an opposite direction against the action of said spring to separate the contact portion of the arm from said contact member, said arm including a hardened plate secured to the flexible plate and carrying said contact portion, said hardened plate being positioned to be engaged by said cam; substantially as described.

2. Apparatus of the character described including an operative cam; an electric contact member; a supporting structure; a contact operating arm including a contact portion and a flexible spring plate having a portion rigidly secured to the supporting structure; and a spring independently operative to flex said plate to move and hold said contact portion of the arm in engagement with said contact member, said cam being operative to flex said plate in an opposite direction against the action of said spring to separate the contact portion of the arm from said contact member, the connection between said spring plate and the supporting structure including a slot in the plate and a screw extending through said slot into the supporting structure: substantially as described.

3. Apparatus of the character described including an operative cam; an electric contact member; a supporting structure; a contact operating arm including a contact portion and a flexible spring plate having a portion rigidly secured to the supporting structure; and a spring independently operative to flex said plate to move and hold said contact portion of the arm in engagement with said contact member, said cam being operative to flex said plate in an opposite direction against the action of said spring to separate the contact portion of the arm from said contact member, said arm including a hardened plate secured to the flexible plate and carrying said contact portion, said hardened plate being positioned to be engaged by said cam, said cam engaging said hardened plate at a position between said spring and the connection of said spring plate with the supporting structure; substantially as described.

4. Apparatus of the character described including an operative cam: an electric contact member; a supporting structure: a contact operating arm including a contact portion and a flexible spring plate having a portion rigidly secured to the supporting structure; and a coiled spring independently operative to flex said plate to move and hold said contact portion of the arm in engagement with said contact member, said cam being operative to flex said plate in an opposite direction against the action of said spring to separate the contact portion of the arm from said contact member, said supporting structure including a lug having a cavity in which said coiled spring is mounted: substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEWIS T. RHOADES.

Witnesses:
JOS. ZIKMUND,
MAE FITZGERALD.