

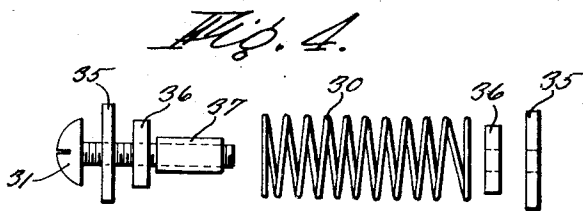
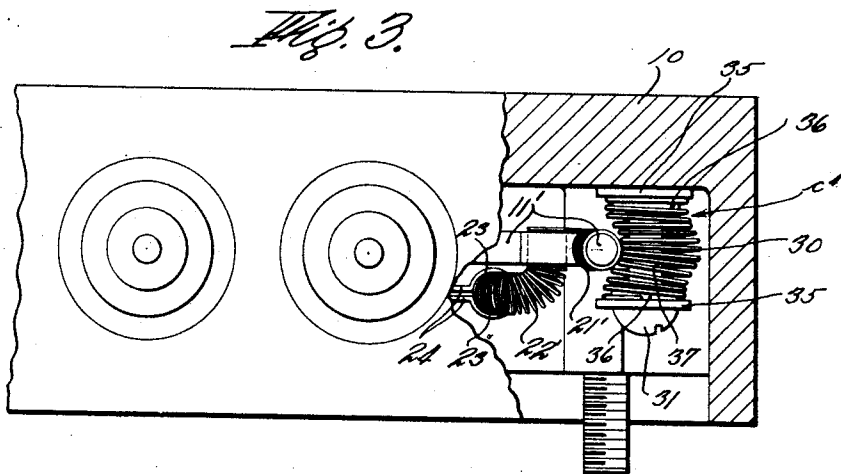
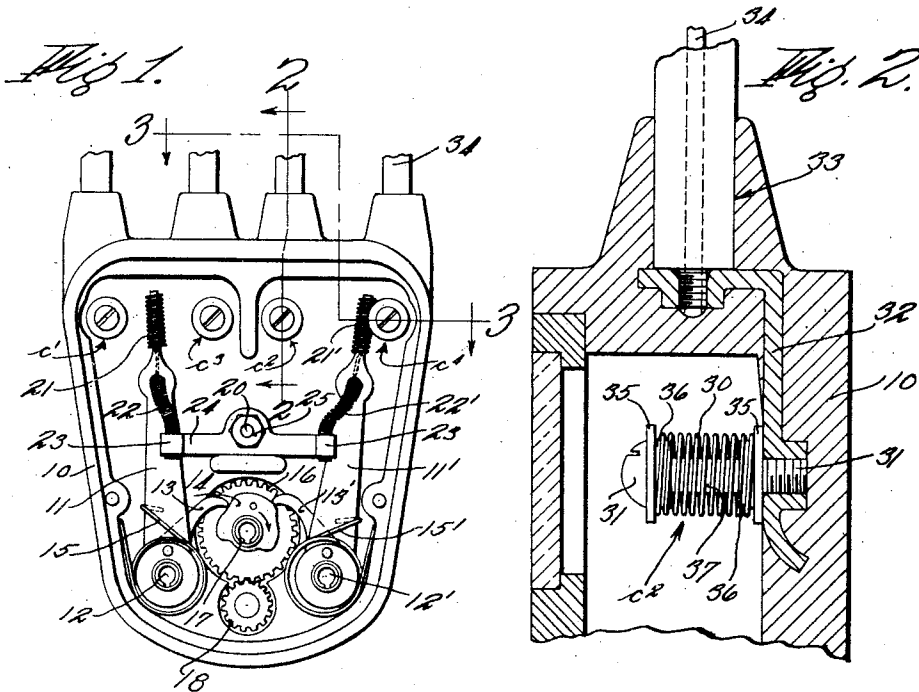
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T. G. LOUIS

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DISTRIBUTOR

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UNITED STATES PATENT OFFICE.

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DISTRIBUTOR.

Application filed June 7, 1926. Serial No. 114,178.

This invention relates to improvements in electrical make and break mechanism, such as distributors or the like, and more particularly, to improvements in contacts therefor.

5 The invention, while capable of other applications, is especially suitable for use in distributors and especially in distributors of the type, in which the distributor arm moves back and forth between a pair of contacts. The
10 invention will be disclosed for illustrative purposes in connection with a distributor of this particular type.

The invention has for one object to provide a contact, which is not only simple in construction and inexpensive to manufacture but
15 which is calculated to give reliable service without requiring attention or adjustment and to have a long useful life in service because it is adapted to be engaged by the distributor arm or other equivalent element in
20 such a manner that wear between the contacting parts is reduced to a minimum.

The invention makes use of a coil spring as the essential element of the contact and
25 I am aware that coil springs have been used for this purpose before, as shown in U. S. patent to Kaufman, No. 1,411,787, dated April 4, 1922. This invention is distinguished from that of said patent in that the
30 coil spring is firmly held at both ends and is adapted to be engaged by the distributor arm, or equivalent member, at a location on its periphery between the ends of the spring. The distributor arm, moving in a plane at
35 substantially right angles to the axis of the coil spring, engages the latter between its ends and, while said ends are firmly held, the portion intermediate the ends is free to be flexed by the distributor arm, whereby the
40 latter can flex the spring and form a seat for itself in the yielding coil spring. This arrangement is characterized in that the spring does not vibrate when flexed, as in said patent where the free end of a spring is struck by
45 a wiper which necessarily results in the spring vibrating many times before it finally comes to rest. In the present case, as the distributor arm moves away from the spring, the latter merely resumes the position occupied
50 prior to its flexure without vibration.

The invention has for another object the provision of improved means for connecting the flexible conductor of the distributor arm to a magneto terminal or the like.

Other objects and advantages will appear 55 in the following description and will be pointed out in the appended claims.

The invention will be disclosed for illustrative purposes with reference to the accompanying drawings, in which:—

Fig. 1 is a front elevational view of a distributor embodying the improved contact of this invention;

Fig. 2 is an enlarged cross sectional view taken on the line 2—2 of Fig. 1 and showing 65 the construction of the contact;

Fig. 3 is an enlarged sectional plan view taken on the line 3—3 of Fig. 1 and showing the contact when flexed by engagement with the distributor arm; and

Fig. 4 is a view showing the several parts of the contact in dissociated relation.

Referring to these drawings; there has been shown, as a background or setting for this invention, a distributor of the type disclosed 75 in the copending application for U. S. Letters Patent of Phelps Brown, Serial No. 114,212, filed June 7, 1926. This distributor includes a case 10 of insulating material having four contacts c^1 , c^3 , c^2 , and c^4 , 80 arranged in spaced relation and in the order named, in a row across the upper part of the case. A distributor arm 11 is pivoted at 12 near the lower end of case 10 and is movable in a plane at right angles 85 to the axes of, and between, the contacts c^1 and c^3 . A similar arm 11' is provided to cooperate with the contacts c^2 and c^4 . The arm 11 has fixed thereto a cam follower 13 adapted to be held against a cam 14 by a 90 spring 15. The cam 14 is fixed to a gear 16 which is mounted on a stud 17 and driven by a pinion 18 which is adapted to be driven by the drive shaft of a magneto.

The cam 14 is constructed to move arm 11 95 from the position shown to the right and into engagement with contact c^3 and at the same time to move arm 11' to the left disengaging it from contact c^4 prior to the engagement of arm 11 with contact c^3 . The cam later moves 100 arm 11 to the left and arm 11' still further to the left so that arm 11 is disengaged from contact c^3 and arm 11' is engaged with contact c^2 . Subsequently, cam 14 moves arm 11 still further to the left into engagement with contact 105 c^1 and moves arm 11' to the right out of engagement with contact c^2 . As cam 14 continues to turn arm 11 is moved to the right out

of engagement with contact c^1 and arm 11' is moved still further to the right into engagement with contact c^4 . The cam 14 is constructed to cause the arms 11 and 11' to dwell for an interval when engaged with each of its contacts and to cause one arm to dwell in a position intermediate its contacts while the other arm dwells in engagement with one of its contacts. The arms 11 and 11' may be otherwise operated and the present invention is independent of the plan of operation described.

The magneto terminal is shown at 20. Arm 11 has a conducting tip comprising a section of a coil spring 21 which is slipped over and embraces the upper end of its arm. Integrally connected with spring section 21 is a second similar but longer spring section 22 which passes through an opening in arm 11 and has its other end held between the semi-circular embracing ends 23 of a pair of conducting cross bars 24 which are fixed by a nut 25 to the magneto terminal 20. The section 22 forms a flexible connection between the conducting tip 21 and the magneto terminal 20 and has slack enough to permit free movement of arm 11 throughout the desired range.

The arm 11' is similar to arm 11 and the parts associated therewith and corresponding to those above described have corresponding reference numerals primed.

The several contacts c^1 , c^2 , c^3 and c^4 are similar in construction and a description of one will suffice for all. The contact c^2 , for example, comprises a coil spring 30 and a suitable support therefor which will hold the ends of the spring and yet permit flexure thereof in a direction at right angles to its axis at points intermediate such ends. As shown, a spool like support is provided which is connected by a screw 31 to a terminal plate 32, embedded in case 10 and leading to a socket 33 in the latter for connection to a distributor wire, such as 34. This spool like supporting structure may be made in various ways to accomplish the stated purpose.

An example of one simple way of making up the spool is shown in the drawings. A thin washer 35, slightly larger than the outside diameter of spring 30 is first slipped on screw 31, followed by a somewhat thicker washer 36 of a diameter such as to fit within the convolutions of spring 30. A spacing sleeve 37, of a diameter considerably less than the internal diameter of spring 30, is next slipped upon screw 31. Then spring 30 is slipped over the sleeve 37 and washer 36 until one end engages the washer 35. The spring is then compressed enough to allow a second washer 36, followed by a second washer 35, to be slipped over the end of the screw 31. With the parts thus assembled on the screw, the free end of the latter is threaded into the terminal plate 32 and tightened up until each pair of washers is brought into contiguous

relation and the smaller washers 36 are brought into contiguous relation with the ends of sleeve 37. The spring 30 is thus placed under the requisite degree of tension. The assembled supporting structure and contact then appears as shown in Fig. 2.

In operation, the distributor arm, or other equivalent element, is moved back and forth between the contacts in the described, or any other suitable manner, to alternately engage the springs of each pair of contacts, which is associated therewith. This arm, however, is preferably not moved merely into engagement with a contact spring 30 but is moved sufficiently beyond the point of bare engagement so as to flex spring 30 in the manner shown in Fig. 3. As there shown, the cylindrical conducting tip 21' forms for itself a seat in the spring 30. The latter yields readily to the arm and yet at the same time the tendency of spring 30 to resume its normal position causes it to hug a substantial part of the periphery of tip 21'. A bare engagement of these two cylindrical parts would result in point contact while by causing the arm to flex spring 30, a substantial area of contact between the engaging parts results.

An important feature of the contact construction is that it allows, by its yieldability, a certain amount of overtravel of arm 11' and this is important for reasons other than that just pointed out above. The arm and its actuating cam would have to be nicely constructed to insure proper engagement with the contacts if the latter were rigid. Moreover, proper engagement could not be maintained after the parts became worn. Yielding of some sort between the engaging parts is thus a practical necessity and the present means for securing the yield is a most attractive solution of the problem. The yielding is secured without vibration of the spring following its disengagement from the arm. There is no shock of engagement nor any extensive rubbing between the engaging parts and no impacts or impingements, all of which cause rapid wear. The parts come into engagement very quietly and adjust themselves to the engagement so that contacting surfaces properly fit together over an adequate area without any particular attention being required to secure the result. In addition, and as pointed out in said copending application, the arms may be so operated (with dwell intervals in the manner above described) as to entirely avoid sparking between the arms and contacts. With this destructive agency eliminated, the contact is adapted for a long useful life because the engaging parts are never under heavy strains and because shocks and impacts are eliminated from the engagement.

The features of the distributor relating to the manner of operating the distributor arms and the construction of the conducting tip

for said arms and the flexible conductor therefor were invented by Phelps Brown, of Springfield, Massachusetts, prior to the filing of this application and said features form the subject matter of the above identified copending application.

The invention has been disclosed herein, in an embodiment at present preferred, for illustrative purposes, but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is:

1. In a distributor, an oscillating distributor arm, a pair of contacts between which said arm is movable, a conducting tip for said arm consisting of a coil spring section encompassing the free end of said arm and a second coil spring section connected to said first named section, a fixed electrical terminal, and a pair of conductors having opposed and substantially semi-circular ends between which the free end of said second coil spring section is clamped, said conductors being stationarily supported and electrically connected to said terminal.

2. In combination, a pair of contacts, each comprising a coil spring and means for supporting the same at opposite ends with free-

dom for flexure intermediate said ends in directions at substantially right angles to the axis of the spring, said springs being supported with their axes in parallel relation, and an arm mounted for swinging movement in a plane at right angles to said axes and movable to alternately engage said springs, said arm adapted to engage the periphery of each spring intermediate its ends and to flex the spring sufficiently so that the arm becomes partially embedded in the spring.

3. In a circuit controller, a contact comprising a coil spring and means for supporting the same at longitudinally spaced points with freedom for flexure intermediate said points in directions at substantially right angles to the axis of the spring, and a cooperating contact arm, said arm and contact being relatively movable and the arm being disposed at substantially right angles to the axis of said spring so as to engage the latter on relative movement at a point intermediate its points of support and flex the spring laterally so that the arm becomes partially embedded therein.

In testimony whereof I have affixed my signature.

TERRENCE G. LOUIS.