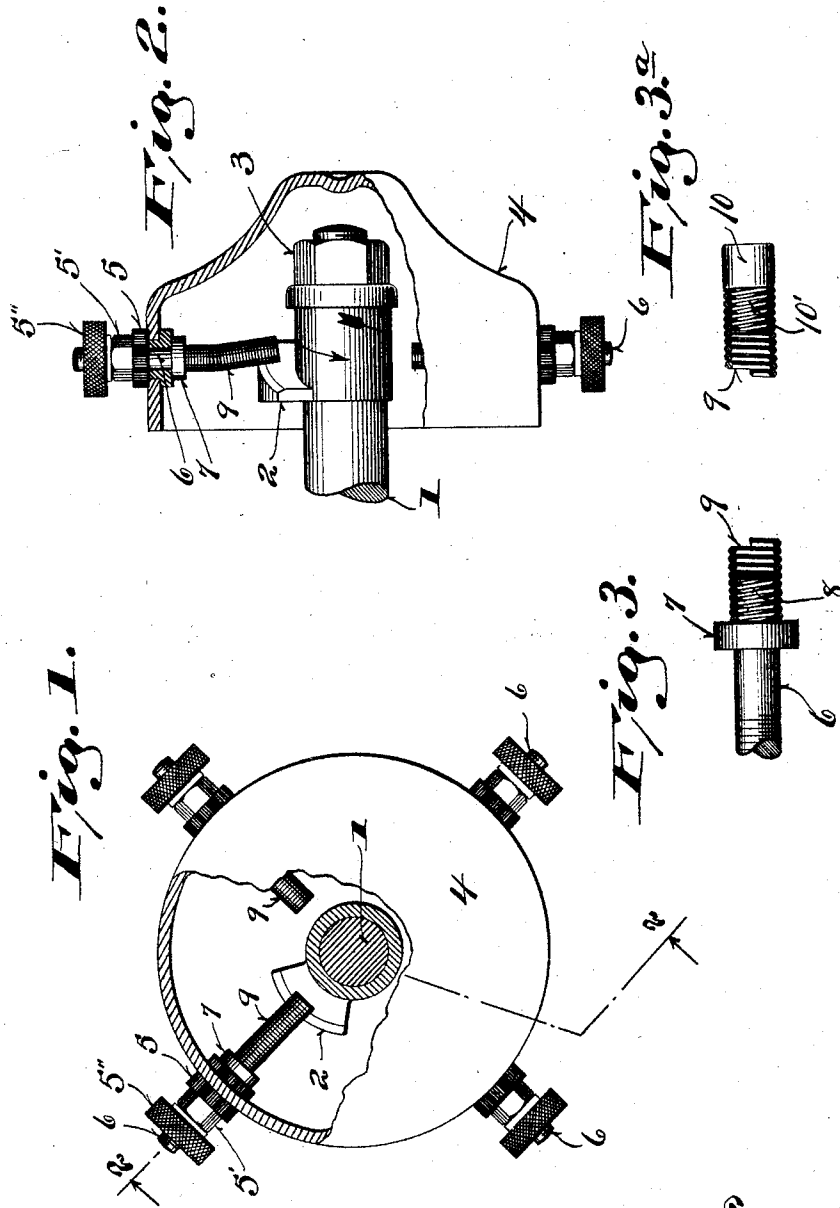


A. W. KAUFMAN.
 TIMER.
 APPLICATION FILED APR. 15, 1921.

1,411,787.

Patented Apr. 4, 1922.
 2 SHEETS—SHEET 1.



Witness:
 Robert E. Weber

Inventor:
 Adam W. Kaufman:
 By: Young & Young
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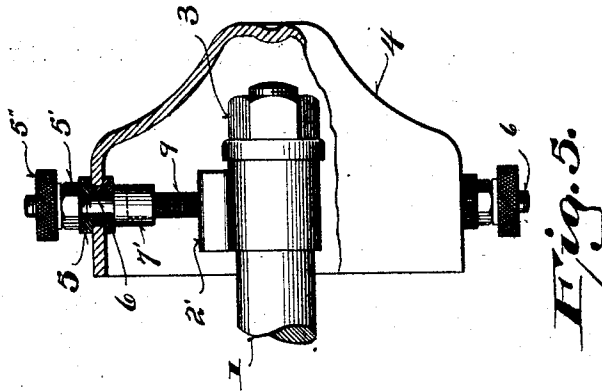


Fig. 5.

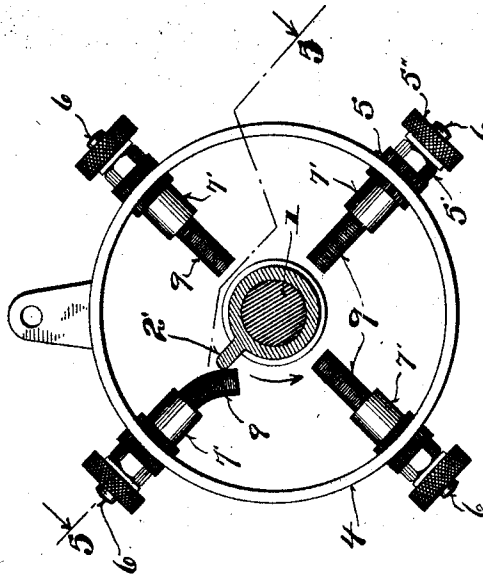


Fig. 4.

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UNITED STATES PATENT OFFICE.

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TIMER.

1,411,787.

Specification of Letters Patent.

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Application filed April 15, 1921. Serial No. 461,629.

To all whom it may concern:

Be it known that I, ADAM W. KAUFMAN, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Timers, and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention refers to commutators known to the trade as timers, for controlling the ignition spark of the internal combustion engines, and it has for its object to provide a simple, economical, effective and durable timer, wherein oiling is dispensed with and all wearing parts can be quickly replaced at nominal cost to thus render the life of the timer indefinite.

Specific objects of my invention are:

To provide a full floating contact tip embodying essentially a tight coiled spring section that will sensitively respond to a make-and-break wiper, the coil section being capable of absorbing the yield, when coming in contact with its companion member, throughout its entire area whereby tendency to crystallize at a common point of yield is avoided, the coils having the longitudinal and radial compensating resiliency. To provide relatively rotative make-and-break members, one of which is in the form of the closely coiled spring adapted to engage a wiper, whereby the associated contact surfaces will insure a "fat-spark," the said contacting surfaces being thus uniformly polished and cleaned and the wear reduced to a minimum without the use of lubricants.

To provide means for quickly renewing the coil spring brush tips in connection with a rigid holder, whereby the timer is maintained in perfect working condition at the replacement cost of a tip or tips.

With the above and other minor objects in view, the invention consists in certain peculiarities of construction and combination of parts, as are hereinafter set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings:

Figure 1 represents a face view of a timer embodying the features of my invention, parts being broken away and in section to more clearly illustrate details of construction.

Figure 2 is a side elevation of the same, partly in section, as indicated by line 2—2 of Figure 1.

Figure 3 is a fragmentary enlarged detail view of a holder and brush tip mechanism made in accordance with my invention. Figure 3^A is a detailed view of another form of brush tip.

Figure 4 represents a face view of a timer illustrating a modified form of attaching the yieldable brush tip to the holder, and a rotary wiper of the lip or lug type, and

Figure 5 represents a side elevation of the same, partly in section, as indicated by line 5—5 of Figure 4.

Referring by characters to the drawings, 1 represents a rotary timer shaft having secured thereto a wiper lug 2 of the radial cam type, it being understood that the device is shown particularly applicable to forward construction, and that the wiper lug or cam can readily be adjusted to the timer shaft and locked in such adjustment by the standard Ford clamping nut 3, which is in threaded union with the end of said shaft.

A housing 4 is arranged concentrically about the shaft and adapted to be oscillated upon its bearing (not shown) whereby the spark may be advanced or retarded. The housing is provided, in this instance, with four radial openings, suitably fitted with washers 5 of insulating material through which extends the shank portion 6 of a series of holders. Each holder shank is provided with an inner collar 7 adapted to engage the inner surface of the washer 5 and the shank is firmly held in place by a nut 5' in threaded union with its corresponding threaded outer end, there being a binding nut 5'' run upon the end of the holder shank for connecting the conductor wire. Extending from the collar 7 of the holder is a threaded coupling nipple 8, which nipple is adapted to receive the outer end of a closely coiled section of spring 9, the same constituting a brush tip. The coils of the spring are approximately of the same pitch as the thread upon the coupling nipple, and hence, the brush tip can be readily screwed to position and held firmly by the coupling nipple, it being understood that the free end of each coil spring is extended in the path of travel of

the wiper lug, whereby make-and-break contact between the relatively rotative parts is effected.

As shown in Figures 1 and 2, the wiper cam is of the radial type, being a section of a spiral. Hence, when the shaft 1 is rotated in the direction of the arrow, the narrow end of the spiral shaft enters the field of the coil spring brush tip and as the cam travels past the tip, it will gradually contact therewith and deflect it in a direction longitudinal to the axis of the shaft. The coil spring will thus exert a yielding pressure upon the cam as it travels past the end coil of the tip to form a positive sliding contact, and insure a perfect electrical connection, whereby an intensified spark will result. When the heel of the cam passes the deflected brush tip, it will snap back to its normal rigid radial alignment. It will be observed that owing to this contact, the engaged parts will be wiped at each revolution of the shaft and fouling of the contacting point is thus avoided. Furthermore, owing to the fact that the yielding coil spring engages the cam, at practically one point throughout its travel, and that this contact is compensating in its nature, the liability to wear upon the rubbing parts is reduced to a minimum and said parts, as has been practically demonstrated, do not require oiling.

This is an important feature of my invention primarily, due to the fact that standard timers of this general type require constant care and oil from time to time; otherwise they will quickly deteriorate. Furthermore, in such structures, it has been found by actual test that the parts will wear, even though oiled from time to time. The relatively rotative parts of such standard structures are generally of the cam shoe and roller type. Under ordinary usage, the cam shoe of this type of make-and-break mechanism will wear or roughen, and hence, when the roller travels over the surface it will strike only upon high points, and thus develop an imperfect spark. This imperfection of spark is also developed in instances where the roller has flattened, due to constant engagement of the elements mentioned.

My device, as described, fully overcomes such objectionable features and the problem, as I have solved it, relies primarily upon the use of a coiled spring brush tip having the full floating functions, whereby shock in initial contact is absorbed and whereby the tendency to crystallize at a given point is overcome, due to the fact that the spring yields uniformly throughout its free length and also transversely to a certain extent, owing to the spring tension of the coils. This transverse yield is particularly developed in that form of my invention, as shown in Figures 1 and 2, which is the preferred form under certain conditions.

Obviously, the tips can readily be renewed or replaced by removal of the old and replacement, the operation being simply the insertion of a section about the nipple 8 and turn the same until it is firmly seated upon the holder. Due to its screw threaded union, the detachable part will not loosen under vibration, particularly as the coils of the spring tip are slightly expanded when run upon the threaded coupling nipple. It is obvious that the cost of renewal is nominal, under such conditions, and it can be effected by those not skilled in the art. Hence, the life of the timer may be extended indefinitely by this simple, adjustable arrangement of coil spring tips.

Referring now more particularly to Figures 4 and 5, the wiper cam 2' in this instance is of the radial or fin type, and as best shown in Figure 4, when the rounded end of the fin comes in contact with the free loading end of the coil spring brush tip, said brush tip will be deflected tangentially, and as the fin travels past the tip, it will produce a rolling contact, the length of which depends upon the lap contact space between the relatively movable parts. In this exemplification of my invention, the outer end of the coil spring tip is fitted and secured into a cupped end of the holder shank, which cupped end forms an extension of the collar portion of said shank. Obviously, the coupling between the shank and coil spring can be effected by a threaded union of the internal type, or this union may be effected by solder or other convenient means, in which case for renewal purposes the entire holder would have to be replaced.

While I have shown and described two forms of my invention, various suggestions as to details of construction might be used for carrying out the primary object, which is to provide the coil spring brush tips that may be renewed, if desired, and obviously, a timer may be arranged in some cases with a single rotatory brush tip, which tip would be adapted to engage a plurality of contact shoes carried by the timer housing, this suggestion being merely a reversal of parts.

Figure 3^A illustrates a fragment of a brush tip having a solid contact head associated therewith, the head being secured by a shank which is in threaded union with the end of the spiral coil. This contact shoe, in some instances, is used and materially increases the wear of the structure.

I claim:

1. As a new article of manufacture, a full floating brush tip for rotatory timers comprising a closely coiled section of spring wire, and a holder therefor including a threaded section engageable with the ends of the coil spring tip.

2. As a new article of manufacture, a full floating brush tip for rotatory timers com-

prising a closely coiled section of spring wire, and a holder therefor including a threaded stem engageable with the ends of the coil spring tip, the coils of the spring being of approximately the same pitch as the threaded stem.

3. As a new article of manufacture, a make-and-break mechanism for electric circuits comprising relatively rotative members, one of which includes a coil spring section, the free end of which is adapted to engage the opposite member.

4. A timer comprising relatively rotative make-and-break members, one of said members having a yieldable coil spring tip section, the other member being in the form of a radial cam arranged to side-swipe the yieldable tip.

5. In a timer comprising a rotatory shaft, a cam lug carried thereby, a housing adjustable about the shaft holders carried by the housing, and coil spring tips extending from

the holders adapted to have yielding wiping engagement with the cam lug.

6. In a timer comprising a rotatory shaft, a cam lug carried thereby, a housing disposed concentrically with relation to the shaft and having a plurality of apertures therein, holders fitted through the apertures, means for insulating the holders from the housing, radially disposed threaded nipples extending from the holders and closely coiled spring tips having their outer ends in threaded union with the nipples, the free ends of the springs being arranged in the path of travel of the cam lug, whereby successive wiping contacts are effected between these parts to successively make and break a series of circuits.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

ADAM W. KAUFMAN.