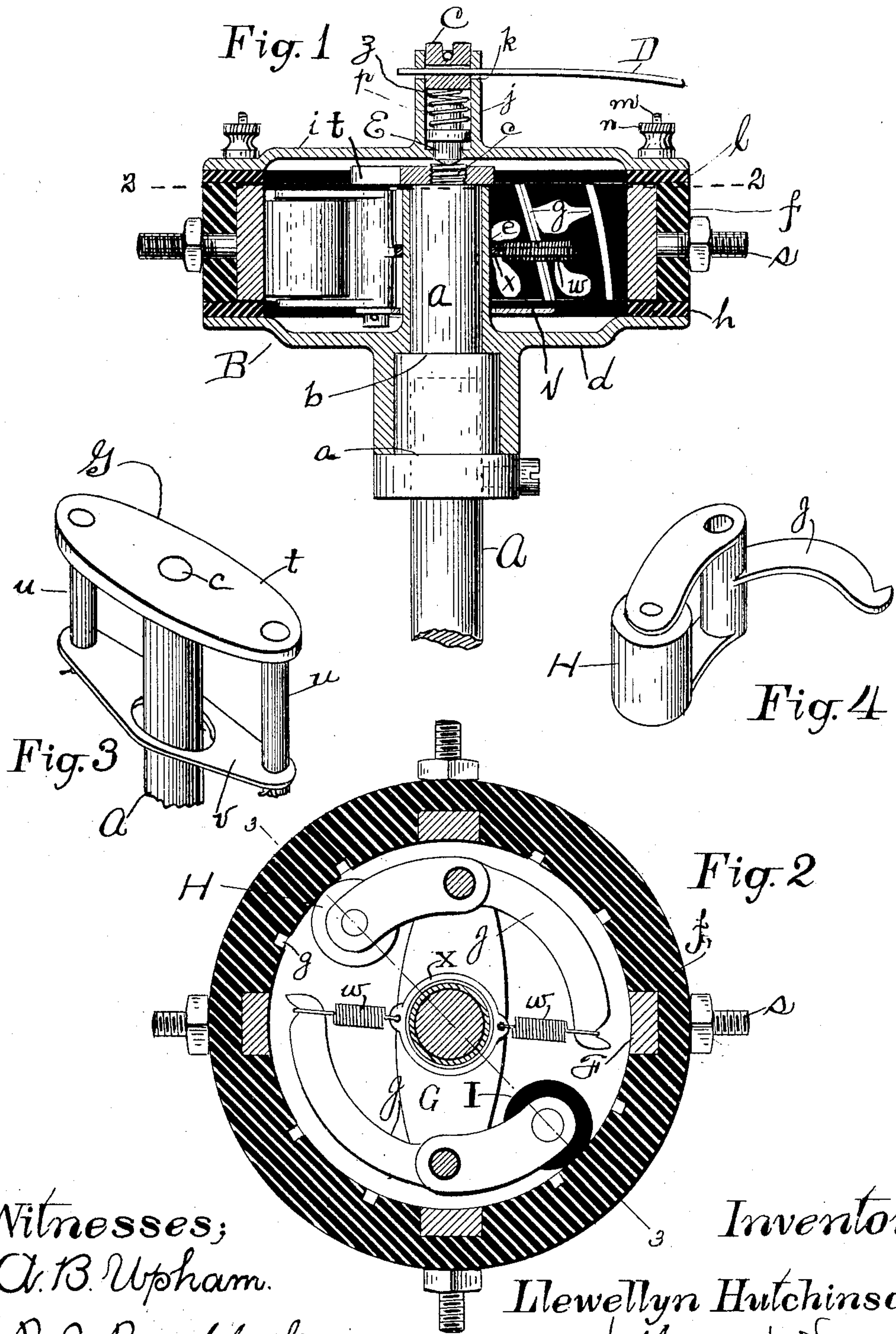


No. 860,383.

PATENTED JULY 16, 1907.

L. HUTCHINSON.
 ROTARY CIRCUIT CLOSER.
 APPLICATION FILED DEC. 10, 1906.



Witnesses;
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UNITED STATES PATENT OFFICE.

LLEWELLYN HUTCHINSON, OF BOSTON, MASSACHUSETTS.

ROTARY CIRCUIT-CLOSER.

No. 860,383.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed December 10, 1906, Serial No. 347,208.

To all whom it may concern:

Be it known that I, LLEWELLYN HUTCHINSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Rotary Circuit-Closers, of which the following is a specification.

My invention relates to rotary circuit closers such as are used in connection with internal combustion engines for the purpose of forming sparks between electrodes and thereby firing charges of explosive mixture at proper intervals.

One of the objects of my invention is the provision in a rotary circuit closer, of a roller for counterbalancing the rotary contact device, this with a view of rendering the movement of the contact device smooth and even and equalizing the strain incident to such movement so as to prolong the usefulness of the device and assure proper operation thereof for an indefinite period.

Another object of the invention is the provision of a rotary circuit closer embodying such a construction that a chamber is afforded therein for holding oil and keeping the rotary contact device and the counterbalance roller thoroughly lubricated.

Another object is the provision of a rotary circuit closer having means for preventing any particles of dirt or other foreign substance that may find their way into the device from interfering with the rotary contact piece properly engaging the stationary contact pieces.

To the attainment of the foregoing objects, the invention consists in the peculiar construction, novel combination and adaptation of parts hereinafter described and particularly defined in the claims appended.

In the accompanying drawings, which are made a part hereof: Figure 1 is a view, partly in vertical section (taken on line 3—3 of Fig. 2) and partly in elevation, of the rotary circuit closer constituting the best embodiment of my invention known to me. Fig. 2 is a horizontal section taken in the plane indicated by the line 2—2 of Fig. 1, looking downward. Fig. 3 is a detail perspective view illustrating the relative arrangement of the shaft and the frame for carrying the contact device and the counterbalancing roller. Fig. 4 is a detail perspective view of the contact device and the lever in which the same is mounted.

Similar letters designate corresponding parts in all of the views of the drawings, referring to which:

A is the driving shaft of the rotary circuit closer, which is connected by gearing or otherwise to the engine to be fired so as to assure rotation of the rotary contact device at a speed commensurate with that of the engine. The said shaft A is shouldered at *a* and *b* and is provided at its upper end with a reduced and threaded portion *c*.

B is the casing of the circuit closer. This casing com-

prises a metallic base section *d* shaped to rest on the shoulders *a* and *b* of shaft A and having an upwardly-extending, central tubular portion *e* which snugly receives the portion of the shaft above the upper shoulder *b*, an annulus *f* of insulating material having oblique grooves *g* in its inner side, a horizontally-disposed ring *h*, of insulating material, interposed between the base section *d* and the annulus *f*; a metallic cap or cover section *i* having an upwardly extending tubular portion *j* in which are diametrically-opposite apertures *k*, a horizontally disposed ring *l*, of insulating material, interposed between the annulus *f* and the cap section *i*, and connecting bolts *m*, equipped above the cap section *i* with suitable nuts *n*. In the tubular portion *j* of the casing B is loosely arranged a plug C having a diametrical bore *p* to receive a wire D which also extends through the apertures *k* in said tubular portion, and between said plug C and a pin E which bears on the upper end of the shaft A, is arranged a coiled spring *z*. Arranged in the inner side of the annulus *f* of casing A at equi-distant points are four stationary contact pieces F, equipped with binding posts *s* for the connection of wires (not shown) leading to electrodes in the explosion chambers of a four-cylinder engine. From this it follows that when the opposed electrodes in the explosion chambers of the engine are electrically connected with the wire D, a spark will be formed between the electrodes in each cylinder as the contact device electrically connected with the shaft A passes over the stationary contact piece F complementary to said cylinder. At this point I desire it understood that when my device is employed in connection with a single cylinder internal combustion engine but one contact device F will be provided in the casing B, while when the device is used in connection with a two cylinder engine two contact pieces F arranged diametrically opposite each other will be employed, and so on; the number of the contact pieces F always corresponding to the number of cylinders in the engine with which the circuit closer coöperates.

G is the frame for carrying the contact device and the counterbalance roller of my novel device. The said frame comprises a plate *t* screwed on the upper end *c* of shaft A and in that manner fixed to the shaft, pins *u* depending from the ends of said plate, and a lower plate *v* surrounding but not contacting with the tubular portion *e* of casing B and secured on the lower ends of the pins *u* by cotter pins as shown or other suitable means.

H is the rotary contact device of the circuit closer which is preferably, though not essentially, a roller, as illustrated, and I is the counterbalancing roller which is of non-conducting material as illustrated. The said rollers are mounted in the rear arms of levers J which are fulcrumed on the pins *u* of frame G and have their forward arms connected through springs *w* with a ring *x* loosely surrounding the tubular portion *e* of cas-

ing B, this in order to assure the rollers being yieldingly pressed against the inner side of the annulus *f* as they move about the shaft A.

In the practical use of my circuit closer, it will be apparent that the roller I will render the movement of the contact device H smooth and even and by equalizing the strain on the parts through which said contact device is moved in a circle about the shaft A, will assure the circuit closer working properly at all times, and will also prolong the usefulness of the circuit closer as a whole. It will also be seen that the upwardly extending central tubular portion *e* of the casing serves in conjunction with the remainder thereof to form a chamber calculated to hold oil with a view of keeping both of the rollers H and I thoroughly lubricated.

The office of the grooves *g* in the roller-track of the casing B is to receive any particles of dust or other foreign substance that may be pushed before the rollers, this in order to assure said track being at all times smooth and avoiding interference with proper engagement between the contact device H and the stationary contact pieces F. By virtue of the said grooves *g* being disposed obliquely the jar is avoided to which the rollers would be subjected were the grooves disposed at right angles to the orbit of the rollers.

As before stated the construction herein shown and described is the best embodiment of my invention of which I am aware, but I desire it understood that in practice such changes or modifications in the form, construction and relative arrangement of parts may be made as fairly fall within the scope of my invention as defined in the appended claims.

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

1. The combination in a rotary circuit closer, of a stationary contact piece, a rotary contact device for cooperating with said contact piece, means for rotating the contact device, and means for counterbalancing said contact device during rotation thereof.

2. The combination in a rotary circuit closer, of a shaft, a casing surrounding the shaft and having a circular track, a contact piece countersunk in said track, a contact device connected with the shaft and movable in a circle against the track of the casing, and means for counterbalancing the contact device also connected with the shaft and movable in a circle against the track of the casing.

3. The combination in a rotary circuit closer, of a shaft, a casing surrounding the shaft and having a circular track, a contact piece countersunk in said track, a contact device connected with the shaft and movable in a circle against the track of the casing, and a roller for counterbal-

ancing the contact device also connected with the shaft and movable in a circle against the track of the casing.

4. The combination in a rotary circuit closer, of a shaft, a casing surrounding the shaft and having a circular track, a contact piece countersunk in said track, a contact-device connected with the shaft and movable in a circle on the track of the casing, means for counterbalancing the contact device also connected with the shaft and movable in a circle on the track of the casing, and means for holding the contact device and the counterbalancing means under yielding pressure against the track of the casing.

5. The combination in a rotary circuit closer, of a shaft, a casing surrounding the shaft and having a circular track, a contact piece countersunk in said track, a frame fixed on the shaft and disposed in the casing, levers fulcrumed intermediate their ends on said frame, a contact device carried by one arm of one lever, a counterbalance roller carried by one arm of the other lever, and means connected with the other arms of the levers for holding the contact device and the counterbalance roller under yielding pressure against the circular track of the casing.

6. The combination in a rotary circuit closer, of a circular track having at intervals grooves, a contact piece countersunk in said track, a rotary contact device movable against the circular track and over the grooves at an angle to said grooves, whereby said contact device is enabled to push foreign substance into the grooves, and means for rotating said contact device.

7. The combination in a rotary circuit closer, of a casing having a circular track in which there are one or a plurality of oblique grooves, a contact piece countersunk in said track, a rotary contact piece movable over the circular track in a path to intersect the oblique groove or grooves, a counterbalancing device similarly movable over the circular track, and means for rotating the contact and counterbalancing devices.

8. The combination in a rotary circuit closer, of a casing having a circular track in which there are one or a plurality of oblique grooves, a contact piece countersunk in said track, a rotary contact piece movable over the circular track in a path to intersect the oblique groove or grooves, a counterbalancing device similarly movable over the circular track, means for rotating the contact and counterbalancing devices, and means for holding said devices under yielding pressure against the track.

9. The combination in a rotary circuit closer, of a shaft, a casing surrounding the shaft and having a central, upwardly extending tubular portion receiving the shaft and forming an oil chamber in the casing and also having a circular track, a contact piece countersunk in said track, and a rotary contact device connected with the shaft and movable about the shaft on the track of the casing.

In testimony whereof I affix my signature in presence of two witnesses.

LEWELLYN HUTCHINSON.

Witnesses:

VAN COURTLANDT LAWRENCE.

MARY E. BOWDEN.