G. L. LANG.

ELECTRIC CONTACT DEVICE

APPLICATION FILED SEPT. 29, 1914.

1,200,627.

Patented Oct. 10, 1916.

2 SHEETS—SHEET 1.

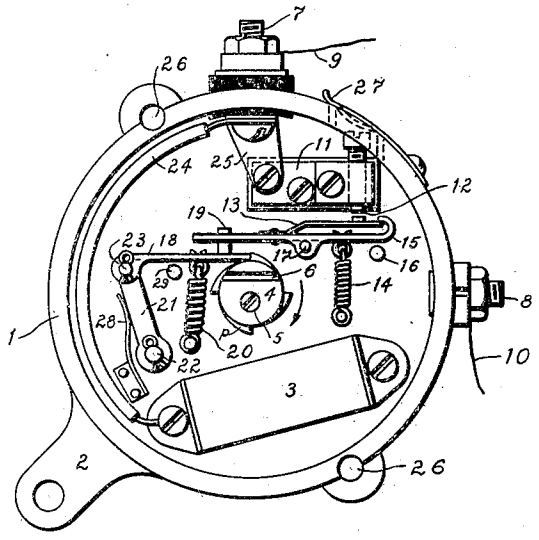


Fig. 1.

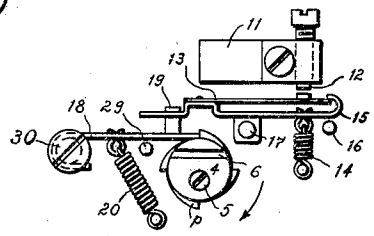


Fig. 4.



Fig. 3.

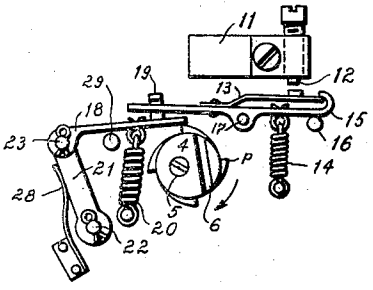


Fig. 2.



Fig. 7.

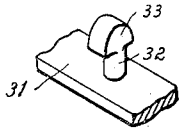


Fig. 8.

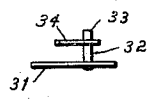


Fig. 5.

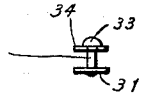


Fig. 6.

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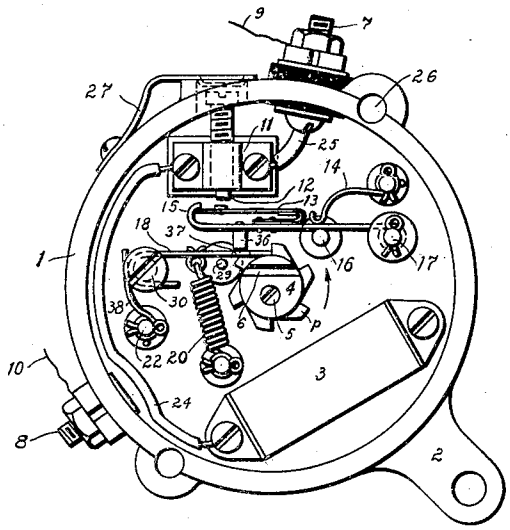


Fig. 9.

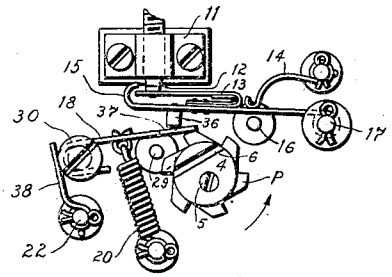


Fig. 10.

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ELECTRIC CONTACT DEVICE.

1,200,627. Specification of Letters Patent. Patented Oct. 10, 1916.

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To all whom it may concern:

Be it known that I, GEORGE L. LANG, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Electric Contact Devices, of which the following is a specification.

My invention relates to means for making and breaking an electric circuit for the purpose of producing current impulses that follow each other in rapid succession. Such circuits are used in great quantity on internal combustion engines and when so used, the operations of the means for producing these current impulses must be regular and uniform in order to obtain the maximum result.

A further object of my invention is to provide a means for making and breaking an electric circuit in such a manner that the time of contact is practically the same for all speeds of the engine.

A further object of my invention is to provide a means for overcoming "back fires" on a reverse motion of the engine.

I am aware that many attempts have heretofore been made to accomplish these results but I have found by experience that such devices as I have seen in operation have contained a number of faults. By my invention I seek to overcome these difficulties and have constructed a device which is simple and easy to manufacture.

My invention consists of other novel features which will be apparent to anyone skilled in the art.

Figure 1 is a plan view, showing one form of my contact mechanism mounted on a suitable plate, for the purpose of applying to automobiles. Fig. 2 shows the operating mechanism of Fig. 1 but with the operative parts in a slightly different position. Fig. 3 is an end view of the movable member operated directly by the cam of Fig. 2. Fig. 4 is a modified form of a movable mechanism similar to that shown in Figs. 1 and 2. Fig. 5 is a modified form of an element of the movable member operated by the cam. Fig. 6 is an end view of Fig. 5. Fig. 7 is a plan view of the end of the top movable member of Fig. 5, while Fig. 8 is an enlarged view of the bottom movable member of Fig. 5. Fig. 9 is a modified construction of a contact device, arranged for firing a six cylinder engine. Fig. 10 is a view of the movable members of Fig. 9 but in a position such that the contact is closed.

These parts will be particularly described in the specification and drawings which follow, in which similar numerals of reference, indicate corresponding parts in the various figures of the drawings.

Referring now to the drawings, 1 is the timer-case. This case has a lever 2, to which the usual timing rod running to the steering wheel is attached.

3 is a condenser connected by an insulated wire 24, to an insulated contact 7. The other end of the condenser 3 is grounded to the timer-case 1.

8 is a stud connected directly to the case 1. Mounted on the interior of the case is an insulated contact block 11, connected to the insulated stud 7 by connecting member 25. Mounted on the block 11 is an adjustable contact 12, the screw carrying this adjustable contact is in line with a hole in the side of the case and this hole being covered by a cover 27. In case it is necessary to adjust the contact, cover 27 is pushed aside, adjustment made and cover returned to its normal position. Mounted on suitable bearings within the case, is a rotatable cam 4, which is held to the driving shaft by some suitable means such as a screw 5. The end of the cam has a slot 6 for the purpose of receiving a member used as a distributer finger, which finger serves to distribute the high tension current carried to the various plugs. As this device forms no part of my invention and is well understood, it is not shown nor further described herein. The cam 4 as shown, has four cam surfaces *p* which are adapted to engage a movable member 18, which member is connected by a pivoted stud 23 to the arm 21. The arm 21 is pivoted at 22 and has a restoring tension member 28. Attached to the member 18 is a tension member 20. Attached to the member 18, is a projection 19, which is more clearly shown in Fig. 3, the same being an end view thereof. The projection 19 over-hangs the end of the second movable member 15 but is not attached thereto. The movable member 15 is pivoted at 17 and carries thereon a resilient element 13 which carries a contact adapted to co-act with contact 12.

16 is a stop pin for member 15, which is partially controlled by the tension member 14.

In Fig. 4 the movable member 18 is pivoted on a stud 30 and a tension member 20 serves to return the movable member 18 to its normal position when raised upward by the cams or pushed sidewise by the cam 4 when it is turned in a reverse direction to that shown by the arrow. It will be noted that the stud 30 also acts as a stop for the movable member 18 when this member is pushed sidewise by the cam 4. In the operation of my invention, as the cam 4 rotates in the direction of the arrow, member 18 is displaced upward, as shown in Fig. 2. At the same time, the member 15 rotates on its pivot 17 and comes against its stop 16. When the member 18 drops off the point of the cam surface *p*, the projection 19 strikes a blow on the end of the movable member 15, causing it to rotate suddenly on its pivot and thereby causing the resilient element 13, carrying a contact to engage the stationary contact 12. Immediately thereafter owing to the action of the tension member 14, the member 15 snaps the resilient element 13 away from the contact 12, thereby opening the electrical circuit which is readily traced as coming from the wire 9 to the stationary contact 12 and through the element 13 and member 15 to the case and away by the wire 10, connected to the post 8. It will be noted that the member 18 strikes against the surface of the cam 4 as a stop and as soon as the cam is rotated, a rotatable stop is produced, which reduces the amount of wear on the movable member 18. By providing a rotatable stop of this character, the wear is much less than it would be if pin 29 were used as a stop. It will be noted that directly after the projection 19 strikes the end of the member 15 and knocks it away, it engages the end of this member again, which action pulls the member 15 off its stop 16. I find that by arranging the members this way, I am sure of getting a very rapid action at the electrical contact. One of the common faults in devices of this character is that "back-fires" are produced in the engines when the engine rocks back, as it is apt to do in cranking or when the engine stops. It will be noted that my invention overcomes this difficulty, as will now be described.

When cam 4, Figs. 1, 2 and 4 is rotated in a reverse direction, one of the surfaces *p* engages the member 18 and pushes the same horizontally to the left, pin 29 being used to guide the member 18 during this action. As soon as the member 18 is thus moved horizontally, the projection 19 does not pull the end of the member 15 downward sufficiently to close the contact 12, and when the member 18 is lifted up over the nose of the cam surface *p*, it snaps back to its original position in practically the same path as it was moved out of position. In other words, the member 18 moves back and forth on the reverse rotation of the cam without transmitting any motion to the member 15. It will also be noted at this point that by my improved construction, it is impossible to stop the cam in any position whereby the contact 12 will be closed, hence, there will be no consumption of current, through the timer contact when the cam is stationary.

Instead of using the L shaped projection 19, attached to the member 18, as shown in Fig. 3, I may use a round pin, such as 32, shown in Figs. 5 and 6, which passes through the slot 35 in the movable member 34, shown in Fig. 7. In order to assemble the two movable members, the pin 32 may have its head flatted as indicated by 33, in Fig. 8. The slot 35 may be carried clear to the end of the member 34, and a round head used on the pin 32, instead of having the shape as shown by 33.

In the modified form, shown in Figs. 9 and 10, the movable member 18 has a hole 37 in it and the movable contact 15 has a pin 36 attached to it and in alinement with the hole 37. In the operation of this modified form as the cam 4 is turned in the direction of the arrow, one of the cam's noses *p* being in engagement with the movable member 18, pushes the same to the left, the pin 29 acting as a guide. As soon as the cam 4 has rotated sufficiently, the movable member 18 slides over the nose of the cam *p* suddenly under the action of the tension members 20 and 38 and the member 18 engages the pin or projection 36, which is associated with the contact member 15, as indicated in Fig. 10. This action is in the nature of a sudden blow against the movable contact member 15 and closes the contact 12. Further rotation of the cam causes the movable member 18 to return to its original position and likewise the member 15 to return against its stop 16. Should the cam 4 be rotated in a reverse direction the member 18 will be displaced upward and the pin 36 will pass through the hole 37 and no movement will be transmitted to the member 15, consequently a "back-fire" is impossible with this modified form of my invention.

Other changes and modifications will be apparent to anyone skilled in the art, therefore, I do not wish to be limited to the exact construction shown and described.

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

1. In a contact device of the character described, the combination of two movable members, tension devices therefor, a cam adapted to displace one of said members, means for effecting its release, a hook on said member, said second member having

one end thereof in the path of said hook during the return movement of said first member, whereby the end of said second member is struck a sharp blow by said hook, thereby suddenly closing and opening the contact.

2. In a contact device of the character described, the combination of a movable member, a tension device and a rotatable stop therefor, a second movable member, a tension device and a stop therefor, and means to hold said second member off its stop when said first member is against its stop, as described.

3. In a contact device, the combination of a movable member, a tension device therefor, a rotatable stop for limiting the movement of said member in one direction, means for displacing said member, said means also serving to effect the release and return of said member in the same path that it was advanced and a spring contact element carried on a movable member independent and disconnected from said first movable member and out of engagement with said movable member when said movable member is in its fully displaced position but co-acting with said member on its return movement and not intermediate the points between which it is moved to both make and break the circuit.

4. In a contact device, a movable member, a tension device therefor, a movable cam for displacing said member, said cam also effecting the release of said member from its displaced position, an auxiliary stop for said member, an adjustable stationary contact and a movable contact carrying member out of engagement with said movable member when said movable member is in its fully displaced position but co-acting therewith to make and break the circuit on the return movement of said first movable member, said movable cam, when moved in a reverse direction co-acting with said first movable member and said auxiliary stop to prevent a contact being made.

5. In a contact device, a contact means, a movable member, a tension device therefor, a rotatable stop for limiting the movement of said member in one direction, means for advancing said member to increase the tension thereon, said advancing means also serving as a releasing means and means out of engagement with said movable member when said movable member is in its fully displaced position for preventing said movable member engaging with said contact member when the advancing means for said member travels in a reverse direction.

6. In a contact device, a contact member, a movable member and a tension device therefor, a stop for limiting the movement of said member in one direction, means for advancing said member to increase the tension thereon, said advancing means also serving as a releasing means, a projection on said movable member extending around and above said contact member but out of fixed engagement therewith, whereby said projection does not engage said contact member when the advancing means for the movable member travels in a reverse direction.

7. In a contact device, a contact member, a movable member and a tension device therefor, a stop for limiting the movement of said member in one direction, means for advancing said member to increase the tension thereon, said advancing means also serving as releasing means, a hooked projection on one of said members in line with the other of said members whereby said projection does not transmit motion from one member to the other when the advancing means for the movable member travels in a reverse direction.

8. In a contact devce, the combination of two movable members, tension devices therefor, a cam adapted to displace one of said members and to effect its release and return, a hook on said member extending upward beyond and laterally across one end of the other of said members whereby the return movement of said member having the hook causes said hook to suddenly engage the other of said members to close a circuit.

In testimony whereof, I have affixed my signature in the presence of two witnesses.

GEORGE L. LANG.

Witnesses:
A. D. T. LIBBY,
M. W. BARTLETT.