

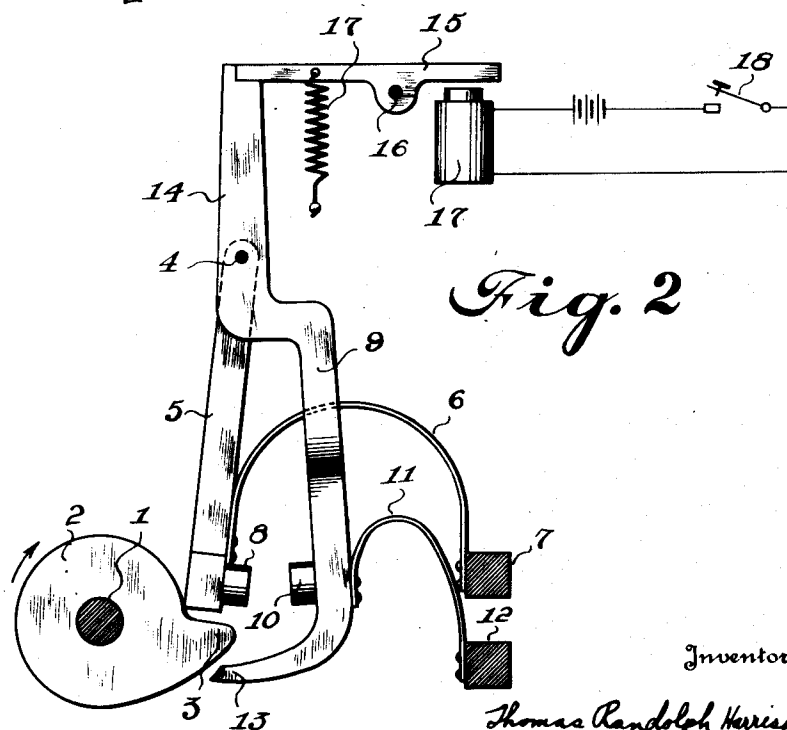
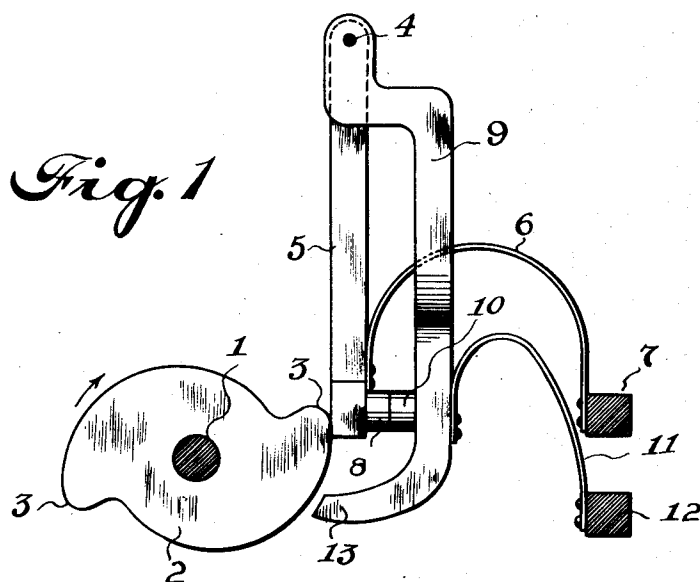
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CIRCUIT CONTROLLING MEANS

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CIRCUIT-CONTROLLING MEANS.

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The present invention relates to improvements in control arrangements for electrical circuits.

More particularly the invention relates to arrangements for periodically making and interrupting electrical circuits, and for timing the circuits in definite manner. Devices of this character are useful in timing the ignition circuits of gas or other explosive type of engines, in automatic control or flashing of signal or display lights, and in many other control relations.

The preferred forms of the invention are especially adapted for the control of periodically interrupted inductive circuits in which relatively high currents may be handled. An object of the invention is to provide control arrangements in which relatively large contacts may be utilized, in which engagement is effected by a blow, and in which a quick interruption occurs in a manner to limit arcing, burning and sticking of the contacts and to prolong the useful life thereof.

A further object of the invention is the provision of a fixed periodic control of a set of contacts together with an auxiliary control for the same set of contacts.

Other objects of the invention are such as may be attained by the utilization of the combinations and subcombinations hereinafter set forth in the description of the preferred embodiments of the invention of which—

Fig. 1 shows in more or less diagrammatic manner a simple periodically operated form, and

Fig. 2 shows a form under a combined periodic, and remote auxiliary control.

In Fig. 1, a shaft 1, driven in any suitable manner in the direction indicated by the arrow, has mounted thereon a cam 2 provided with one or more projections 3. Pivotaly mounted on a fixed spindle 4 is a contact carrying arm 5, the lower end of which is pressed into engagement with cam 2 by means of a flat spring 6, one end of which is secured to arm 5, and the other end is secured to a fixed support 7. A contact 8 is mounted on the lower end of arm 5. Pivotaly supported from spindle 4 is an offset arm 9 upon which a contact 10 is mounted. Arm 9 is urged to the left in Fig. 1 under influence of spring 11 secured at

one end thereto. At its other end spring 11 is secured to a fixed support 12. Formed integrally with the lower end of arm 9 is an extension 13 adapted to engage cam 2 when the end of arm 5 drops off a projection 3 of the cam.

In operation, contacts 8 and 10 are connected in the circuit to be controlled. As cam 2 rotates springs 6 and 11 will hold contacts 8 and 10 in engagement until the end of arm 5 drops off a shoulder formed by one of the projections 3. Arms 5 and 9 will then move together about spindle 4 under influence of the springs until the end of extension 13 engages cam 2. Movement of arm 9 will then be arrested, but the movement of arm 5 will continue until the low point of the cam is reached. In this manner when 13 engages cam 2, the contacts 8 and 10 will suddenly separate. The contacts will remain separated until the end of extension 13 drops off the projection 3 of the cam when spring 11 will force arm 9 to the left and will cause contact 10 to engage contact 8 with a blow causing a firm engagement.

It will be noted that the separation of the contacts and corresponding interruption of the circuit controlled thereby occurs each time a projection 3 passes the end of member 5, and re-engagement occurs when the same projection passes the end of extension 13. The interval between interruption and re-establishing of the contact engagement is therefore governed by the point at which the end of extension 13 will engage the cam surface, and this interval may accordingly be predetermined within definite limits.

In the form shown in Fig. 2 an extension 14 is formed integrally with member 9 and at its upper end is shouldered to seat against the end of a latch member 15 which is pivotaly mounted on a suitable spindle 16, and held in downward position by a spring 17. Latch 15 may be actuated mechanically by any suitable control arrangement, or may be operated by an electromagnet controlled through a remote contact make 18. Contact maker 18 may be operated manually or through a suitable automatic control device. The arrangement of parts is such that with contact 10 latched outward in the position shown, contact 8 will not be brought into engagement therewith by the rotation of cam 2. The high point of

projection 3 is such that it will force extension 13 to the right and extension 14 of member 9 to the left a sufficient distance to permit the end of latch 15 to drop behind the latching shoulder of extension 14, restoring the parts to latched position after the end of arm 5 has dropped off shoulder 3.

As long as latch 15 is unactuated, contacts 8 and 10 will not come into engagement. When latch 15 is actuated to release extension 14 for movement under the influence of spring 11, and projection 3 passes the end of extension 13, member 9 will move under the influence of spring 11 until contact 10 engages contact 8. The contacts will then remain in engagement until the end of member 5 drops off the shoulder formed by 3. The contacts will then move together until extension 13 engages cam 2 and is arrested. The movement of arm 5 will continue until the low point of the cam is reached, causing separation of the contacts. Immediately after extension 13 engages the cam 2, it is forced outwardly by projection 3 until latch 15 drops back of the shoulder on extension 14. Until latch 15 is again actuated to free member 9 for movement under influence of spring 11, no engagement of contacts 8 and 10 can occur.

It will be seen that the operation of contacts 8 and 10 in Fig. 2 is under the combined control of magnet 17 and of the cam 2. When controlling a light circuit, the regular flashing of lights may be controlled from a remote point in any desired manner.

Having described preferred embodiments of the invention what is desired to be secured by Letters Patent and claimed as new is:

1. In combination, a lever, carrying a contact, a second lever carrying a contact, a rotating cam member, spring means for

urging said levers into cooperation with said cam member, said cam member having a single steep sloping side cooperating with said spring means to move said contacts to engagement and disengage each other with a snap action.

2. In combination, a first contact, a second contact, a cam member, said cam member being shaped to permit movement of said contacts simultaneously while in engagement and provided with a steep sloping side to suddenly release one of said contacts during said movement whereby said contacts disengage, the release contact moving with a snap action, and to later suddenly release the second contact whereby said contact re-engages said first contact with a snap action.

3. In combination, a first lever, a second lever, a contact carried by each of said levers, a rotating cam member, spring means for urging said levers into engagement with said cam members, said cam members cooperating with said spring means to operate said contacts into and out of engagement with each other with a snap action and means for locking one of said lever members from operation.

4. In combination, a first lever, a second lever, a contact carried by each of said levers, a rotating cam member, spring means for urging said levers into engagement with said cam members, said cam members cooperating with said spring means to operate said contacts into engagement and out of engagement with each other with a snap action and electromagnetically operated means for locking one of said levers from operation.

In testimony whereof, I affix my signature.

THOMAS RANDOLPH HARRISON.