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TIMING DEVICE

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Fig. 1.

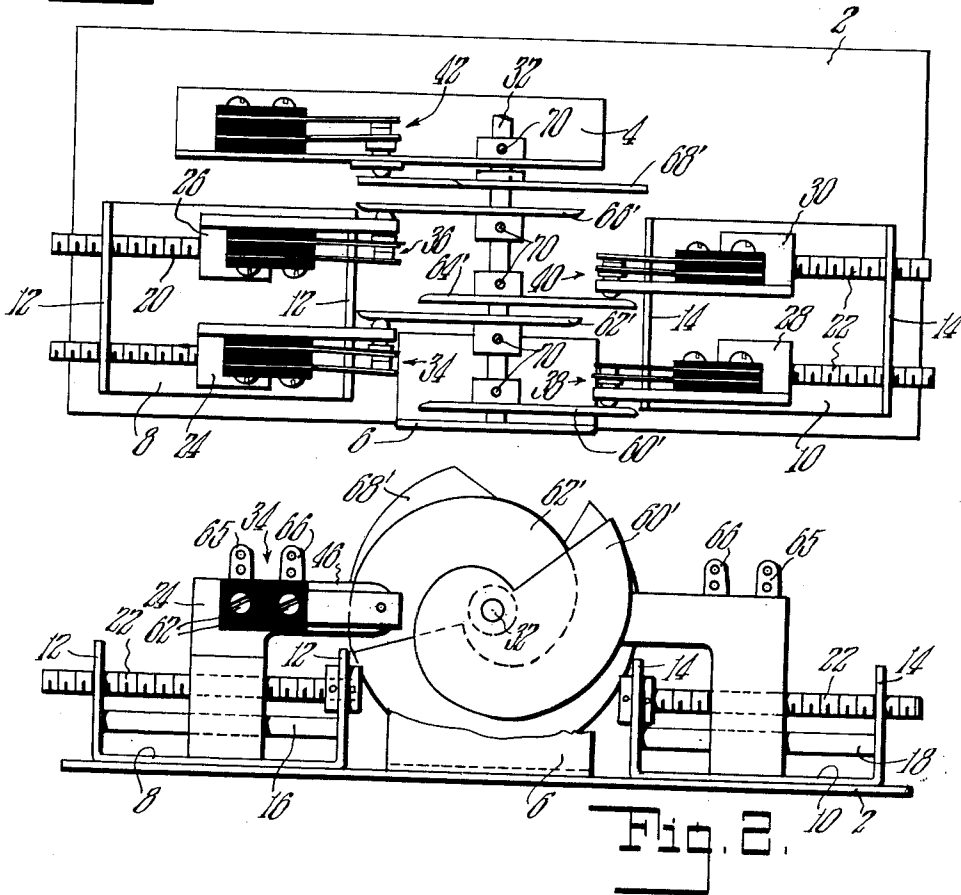


Fig. 2.

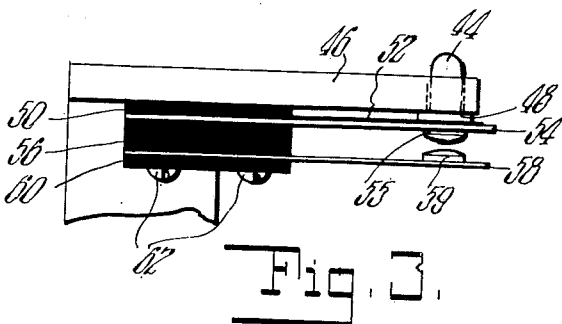


Fig. 3.

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TIMING DEVICE

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8 Claims. (Cl. 200-27)

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This invention relates to improvements in timing devices and is directed more particularly to improvements in devices for operating electric circuit opening and closing means.

The principal objects of the invention are directed to mechanism for opening and closing a plurality of circuits which may be related for the operation of a plurality of related devices.

According to special features of the invention a plurality of switch devices and operating means therefor are provided with said switch devices and operating means being relatively and independently adjustable so that a plurality of circuits may be opened and closed in various timed relations.

All of the above objects I accomplish by means of such structure and relative arrangement of parts thereof, as will fully appear by a perusal of the description below and by various specific features which will be hereinafter set forth.

To the above cited and other ends and with the foregoing and various other novel features and advantages and other objects of my invention as will become more readily apparent as the description proceeds, my invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claims hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Fig. 1 is a plan view of timing mechanism embodying the novel features of the invention;

Fig. 2 is a side elevational view of the mechanism shown in Fig. 1; and

Fig. 3 is an enlarged plan view of one of the switch devices of the mechanism shown in Figs. 1 and 2.

Referring now to the drawings more in detail, the invention will be fully described.

A support is represented by 2 which may be formed from sheet metal or any desired material and has bearing members 4 and 6 secured thereto in some suitable manner.

Guide members 8 and 10 are secured to the support and have upstanding portions 12 and 14. Guide rods 16 and 18 extend between the members 12 and 12 and 14 and 14 and adjusting screws 20 and 22 thereabove are rotatable in the parts 12 and 14.

Switch carriers 24, 26, 28 and 30 are slidable on rods 16 and 18 and lower portions thereof may slide on the members 8 and 10. The adjusting screws 20 and 22 are in threaded engagement with the switch carriers and as said screws are

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rotated in one direction or the other the switch carriers move towards and away from a shaft 32 journaled for rotation in members 4 and 6.

The switch carriers have switch devices 34, 36, 38 and 40 secured thereto and a similar switch 42 is secured to member 4.

These switch devices are similar and will be described in connection with Fig. 3.

A button 44 is slidable in a member such as 46 and has a head 48. An insulation block 50, a flexible strip of insulation 52, a switch contact 54, an insulation block 56, a switch contact 58 disposed on block 56 and an insulation block 60 are secured to member 46 by screws 62.

The flexible member 52 of insulating material has an outer end between the head 48 of button 44 and the switch contacts 54 and 58 have lugs 64 and 66 for connecting in circuits.

Switch contacts 54 and 58 are flexible and resilient and 55 and 59 carry engageable contact members 55 and 59 and as a button 44 is moved inwardly, the head 48 thereof through the flexible member 52 acts on the adjacent contact 54 to flex it and engage members 55 and 59 for closing a circuit in which they are included. The contacts 54 resist inward movements and when the buttons are released they are moved outwardly by said contacts 54 and members 55 and 59 are disengaged to break or open a circuit.

Cams 60' to 68' inclusive are provided which are secured in adjusted positions on shaft 32 by means of set screws 70 or the like. The peripheries of the cams are arranged in the form of spirals and the transverse sides of the cams engage the buttons 44 of the switch devices.

The shaft 32 is rotated by suitable means such as a motor or of course it may be rotated by hand crank. The mechanism may be used in connection with a vending machine or the like which may be coin controlled. As an example, the shaft 32 may be rotated through a cycle of rotation on the deposit of a coin or coins.

While a cam face engages the button of a switch device the contacts thereof will be in engagement to close a circuit in which the contacts are included.

The switch carrying members may be moved in and out relative to their respective actuating cams. With said switch carrying members moved inwardly relative to their cams the switch will be closed through a longer period of time or through a greater angle of the cycle of rotation than when the carriers are moved outwardly of the cams. With the carriers in outermost positions the contacts are in engagement for a short period. The

switch carriers are independently adjustable so that the switches may be closed for various related intervals.

The cams are independently adjustable on the shaft therefor, whereby the operation of the switches may be arranged in the desired timed relation.

The mechanism by reason of its adjustability is adapted for various and numerous uses where it is desired to open and close circuits for various time intervals in timed relationship.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claims are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

1. In a timing mechanism comprising, a support, a driven shaft member rotatable in said support, a switch operating spiral cam fixed to said shaft and rotatable therewith in a plane, a switch device carried on said support and having a pair of contacts flexible in planes at an angle to the plane of said cam and into and out of engagement with each other for opening and closing a circuit, said cam having a transverse side face and an effective width spirally decreasing outwardly from the center and having an effective width at a plurality of points outwardly from the center sufficient to insure engagement between the transverse side face and one of the contacts of said switch for displacing the said one contact in a direction normal to the plane thereof and away from said cam to the other contact for closing the circuit.

2. A device according to claim 1 wherein said switch device is independently adjustable on said support toward and away from said shaft.

3. A device according to claim 1 wherein said switch device is independently adjustable on said support towards and away from said shaft angularly relative to the longitudinal axis thereof.

4. A device according to claim 1 with means permitting the independent adjustment of said cam on said shaft.

5. In a timing mechanism comprising, a support member, a driven shaft member rotatable in said support member, a switch operating spiral cam fixed to said shaft and rotatable in a plane, and a switch device having a pair of contacts flexible in parallel planes at an angle to the plane of said cam into and out of contact with each other for opening and closing a circuit, said cam having transverse side faces and having an out-

wardly decreasing arcuate extent sufficient to assure engagement between one of the transverse side faces of said cam with one of the contacts of said switch device for a length of time to cause the said one contact to contact the other contact of said switch for periodically closing the circuit.

6. A device according to claim 5 wherein said cam has a switch engaging side face having a plane of travel extending across the said one contact, the side face serving to displace the said one contact in a direction away from the plane of said cam when said cam engages the said one contact.

7. In a timing mechanism comprising, a support member, a driven shaft member rotatable in said support member, a switch operating spiral cam adjustably securable to said shaft and rotatable therewith in a plane, a switch device for cooperation with said cam and having a pair of switch contacts flexible in parallel planes perpendicular to the plane of said cam towards and away from each other for closing and opening a circuit, said cam having a contact engaging portion in a plane of travel extending in front of one of the contacts of said switch device, said cam serving to displace the said one contact in a direction towards the other contact of said switch device for a time sufficient to insure engagement of the contacts for closing the circuit.

8. A timing mechanism for opening and closing a pair of related electric circuits at predetermined times relative to each other comprising in combination, a support member, a driven shaft member rotatable in said support, a pair of switch operating spiral cams fixed to said shaft and rotatable therewith in parallel planes, a pair of switch devices carried on said support and each being related to one of the cams of said pair of cams and each having a pair of contacts flexible in parallel planes at an angle to the planes of said cams, the contacts of each of said pairs being movable into and out of engagement with each other for opening and closing one of the electric circuits, each of said cams having a transverse side face and an outwardly decreasing arcuate extent sufficient to insure engagement between the transverse side face and one of the contacts of the related switch device of said pair for displacing the said one contact to engage the other contact of said pair for closing the circuit, the cams of said pair being adjusted on said shaft whereby one of the electrical circuits is opened and closed in a timed relation to the opening and closing of the other of the electrical circuits.

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