

April 30, 1946.

G. B. CARSON

2,399,165

DISTRIBUTOR

Filed May 22, 1943

2 Sheets-Sheet 1

Fig. 1

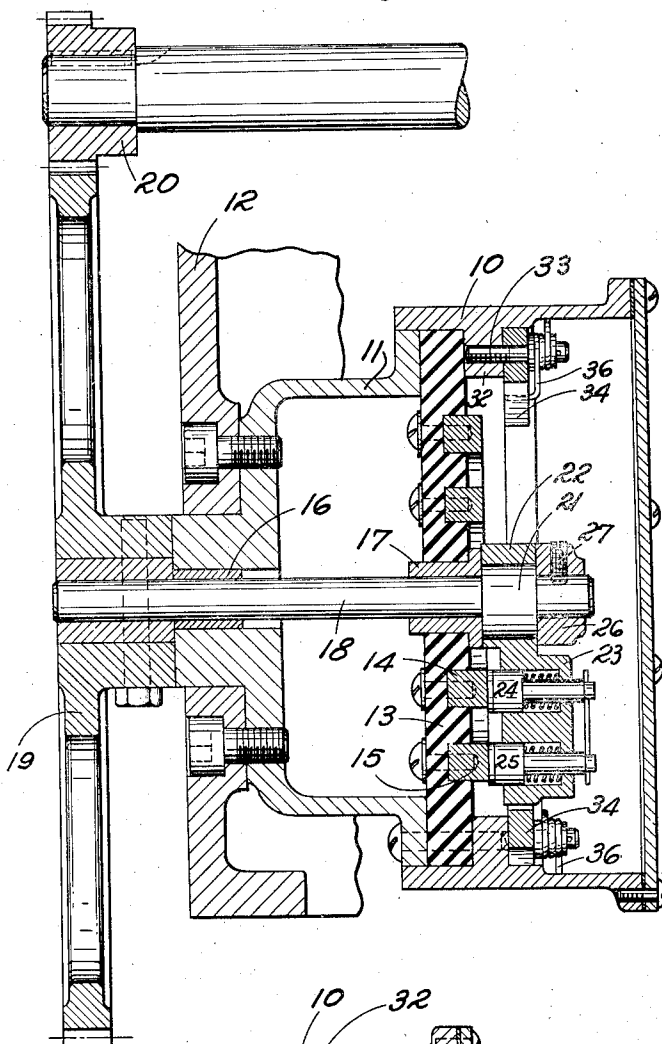
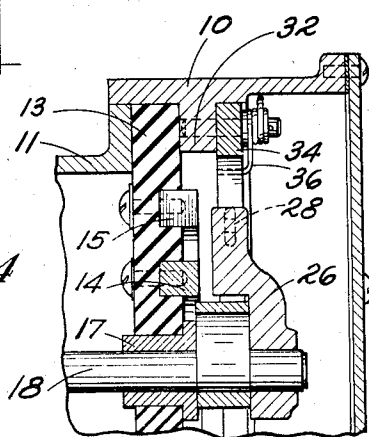


Fig. 4



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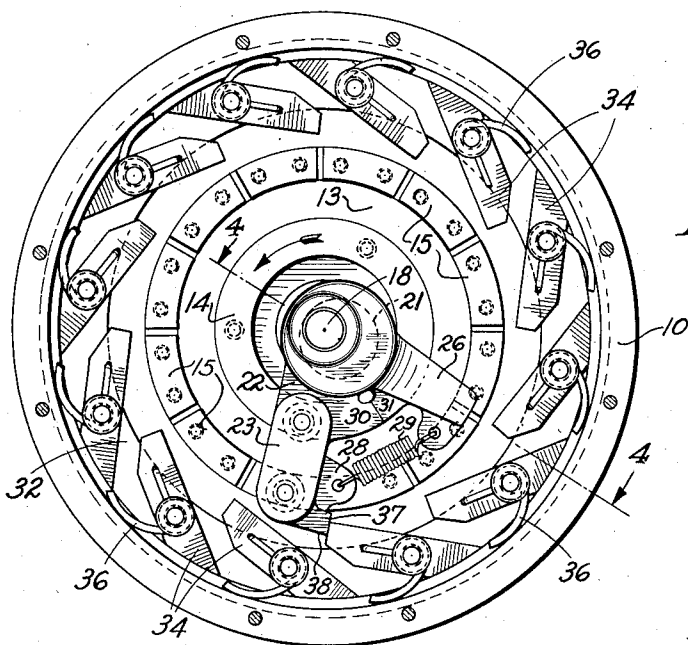


Fig. 2

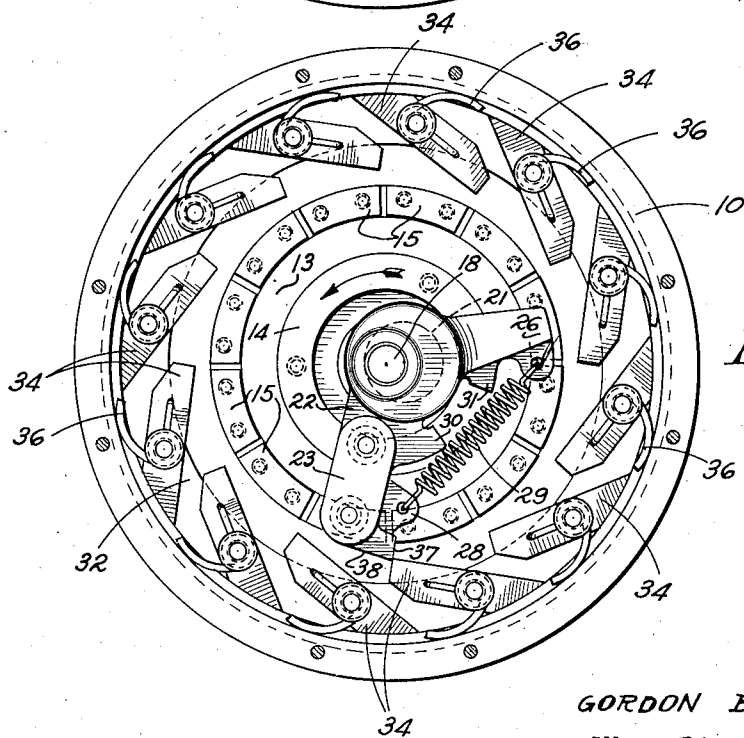


Fig. 3

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8 Claims. (Cl. 200—24)

This invention relates broadly to mechanism for the control of electric circuits and more specifically to a distributor having snap action circuit making and breaking switches therein.

In machines of the type in which a series of independent movements are electrically controlled within fractional portions of each cycle of operation it is essential that the selector switch employed therewith be formed to effect the requisite order of operation of the machine elements, the timed relation thereof and the rapid actuation of the brush in order to avoid arcing between the contacts as the brush passes from one terminal to another.

To this end the invention contemplates a distributor for automatically closing a circuit and holding such circuit closed for a given period of time and mechanism associated therewith for suddenly and violently interrupting the circuit and closing another.

One of the objects of the invention is to provide mechanism for successively opening and closing a number of electric circuits, the mechanism being designed to close each circuit for a predetermined period of time then quickly break the contact and close the succeeding circuit in the series.

Another object of the invention is to provide a snap action rotary switch having mechanism associated therewith to facilitate the reversal of movement of the rotor therein.

Another object of the invention is to provide a distributor which will perform its operative function irrespective of the driven rate of speed thereof or variations in speed occurring within an operative cycle.

Further objects reside in the provision of a combined switch and distributor which is compact, sturdy of structure, reliable of performance and economic of manufacture.

Other objects and advantages more or less ancillary to the foregoing and the manner in which all the various objects are realized will appear in the following description, which considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

Referring to the drawings:

Fig. 1 is a vertical section through the improved distributor including a fragmentary portion of the supporting frame and drive gearing thereof.

Fig. 2 is a plan view of the interior of the distributor;

Fig. 3 is a similar view of the distributor, the rotor and follower arm being illustrated in their actuated position; and

Fig. 4 is a vertical sectional view through a fragmentary portion of the distributor, the section being taken on a plane indicated by the line 4—4 in Fig. 2.

Referring first to Fig. 1, the distributor comprises a housing 10 mounted upon a base 11 bolted

or otherwise secured to the machine element 12 with which the distributor is associated. The housing 10 is formed for the reception of a plate 13 formed of a suitable electrical insulating material and constructed with a contact ring 14 preferably embedded therein and a series of arcuate segments 15 disposed in spaced relation with each other and concentric relation with the ring. The ring and each of the segments are provided with binding screws of conventional form for the retention of the wires uniting the contacts with the respective circuits. The base 11 and central portion of the plate 13 are apertured for the reception of bushings 16 and 17 constituting journal bearings for a rotatively driven shaft 18. As illustrated, the outer end of the shaft is provided with a gear 19 intermeshed with a pinion 20, the ratio thereof being selected in each environ to effect the proper timing of the distributor relative to the mechanisms controlled thereby. The inner end of the shaft 18 is formed with a cam or eccentric journal 21 having a follower arm 22 journaled thereon. The outer end of the arm is formed with a boss 23 machined for the reception of a brush or contact plunger 24 supported in spring pressed engagement with the ring 14 and a second plunger 25 arranged for spring pressed engagement with the contact segments 15. The outer end of the shaft 18 is provided with a second arm or rotor 26 secured against rotative movement thereon by the set screw 27. The rotor 26 and arm 22 are formed with ears 28 apertured for the support of a contractile spring 29 constituting the medium of power transmission for the arm 22. The rotor and arm are further provided with bosses 30 and 31 normally held in abutting relation with each other by the spring 29. The inner wall of the housing 10 is formed with a ledge 32 drilled and tapped for the reception of studs 33 having stops or pawls 34 mounted thereon. The pawls are disposed in radial alignment with the segments 14, the outer ends thereof being retained in abutting engagement with the inner wall of the housing 10 by springs 36 compressively engaged between the outer ends of the pawls and the inner wall of the housing 10.

The arm 22 is formed with a lip or shoulder 37 disposed for abutting engagement with the free ends of the pawls 34, the surface of engagement of the parts being proportioned relative to the throw of the cam 21 so that the arm will drop off the face of the respective pawls during each cycle of operation of the cam.

In operation when the movement of the arm is restrained by the pawl with which it is engaged (Fig. 2), the rotor 26 will effect the extension of the spring 29 until the cam 21 retracts the arm from the end of the pawl (Fig. 3), whereupon the pre-loaded spring will draw the arm into engage-

ment with the rotor, the shoulders 30 and 31 locating the arm for contact engagement of the brush 25 with the contiguous segment 15. Obviously, as the spring regains its unstressed form the arm will be moved with a snap action over the insulation between the segments, moreover, as the cam completes its operative cycle the brush 25 will dwell upon the segment with which it is then engaged until the cam again retracts the arm from the apertured stop or pawl.

In certain environs, for example, a machine designed for hand operated adjustments necessitating reverse rotative movement, the arm 22 may be pushed by the rotor in the opposite direction to that indicated by the arrow in Fig. 2, the arm overcoming the springs 36 and effecting the oscillation or ratchet action of the pawls 34.

As illustrated herein the distributor is designed to control twelve separate electric circuits, each having the same period of operative control. It will be understood, however, that the invention contemplates the control of any number of circuits and the use of segments of various length and/or spacing to accommodate irregular periods of operation of certain of the circuits within the series.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. A combined distributor and switch comprising a contact ring, a plurality of spaced segments disposed in concentric relation therewith, a power actuated rotor, a follower actuated thereby and mounted for eccentric movement relative thereto, contacts on said follower engaged respectively with said ring and said segments, stops adjacent said segments engageable with said follower during a portion of the rotative cycle thereof, and stops on said rotor and follower engageable with each other to delimit the movement of said follower.

2. A distributor and switch for opening and closing a plurality of electric circuits comprising a contact ring, a plurality of contact segments arranged in concentric relation therewith and insulated therefrom and from each other, said ring and said segments being connected respectively with the electric circuits, a power driven rotor, a contractile spring thereon, a pivotally mounted arm coupled with said spring, a contact on said arm engaged with said ring, a second contact on said arm engageable with said segments, pawls adjacent each segment arranged to arrest the movement of said arm and thereby tension said spring and a rotatively driven cam for successively retracting said arm from engagement with said pawls.

3. A distributor comprising a plurality of spaced contact segments, an arm mounted for rotation thereover, a contact in said arm, means for holding the arm against movement relative to each segment for a predetermined period of time, means for jumping said arm progressively from one segment to another, and means independent the first named means to delimit the

movement of the arm as it jumps from one segment to another.

4. A distributor comprising a plurality of spaced segments, a rotor movable thereover, an arm mounted for pivotal movement relative thereto, a brush on said arm engageable with said segments, stops for restraining the movement of said arm, a cam for retracting said arm from said stops, pivots in said stops, and an abutment engaged with said stops to delimit the movement thereof in one direction.

5. A distributor comprising a plurality of spaced segments, a brush engageable therewith and movable relative thereto, means associated with said segments for snapping said brush over the space between said segments, and means in said brush for arresting the movement thereof adjacent the forward edge of the contiguous segment.

6. A combined distributor and snap switch comprising a contact ring, a plurality of contact segments insulated therefrom and from each other, a rotatable shaft, a rotor thereon driven thereby, a shoulder on said rotor, an arm on said shaft, a contact thereon engageable with said segments, a shoulder on said arm engageable with the shoulder on said rotor, a second shoulder on the free end of said arm, pawls mounted for pivotal movement circumambient said segments and disposed in radial alignment therewith, means associated with said pawls to delimit the pivotal movement thereof, springs associated with said pawls for the retention thereof in abutting relation with the second named shoulder on said arm, an eccentric on said shaft associated with said arm for the retraction thereof from said pawls, a spring intermediate said arm and said rotor urging the arm towards the rotor as the arm is successively retracted from the pawls, the shoulder on said rotor and the first named shoulder on said arm being disposed to position the contact on the arm into engagement with a segment when said shoulders are brought into abutting engagement with each other.

7. A combined distributor and switch comprising a plurality of contact segments disposed in spaced relation with each other, a driven rotor, a follower arm mounted for eccentric movement relative thereto, a spring connecting said rotor with said follower, a contact in said follower engageable with said segments, pawls pivotally supported adjacent said segments for abutting engagement with said follower during one direction of rotation thereof and for sliding contact with said follower during the opposite direction of rotation.

8. A distributor comprising a plurality of spaced segments arranged in a circular path, a rotatable shaft in the center thereof, a rotor keyed to said shaft, a cam on said shaft, an arm loosely mounted on said cam, a yieldable connection between said rotor and said arm, a contact in said arm engageable with said segments, pawls circumjacent said segments disposed for abutting engagement with said arm under the influence of said cam and means on said rotor to arrest the movement of the arm intermediate two successive pawls when the arm is released from one of the pawls by the action of the cam.

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