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1,504,283

H. B. TAYLOR

SEQUENCE SWITCH

Filed May 17, 1921

Fig. 1.

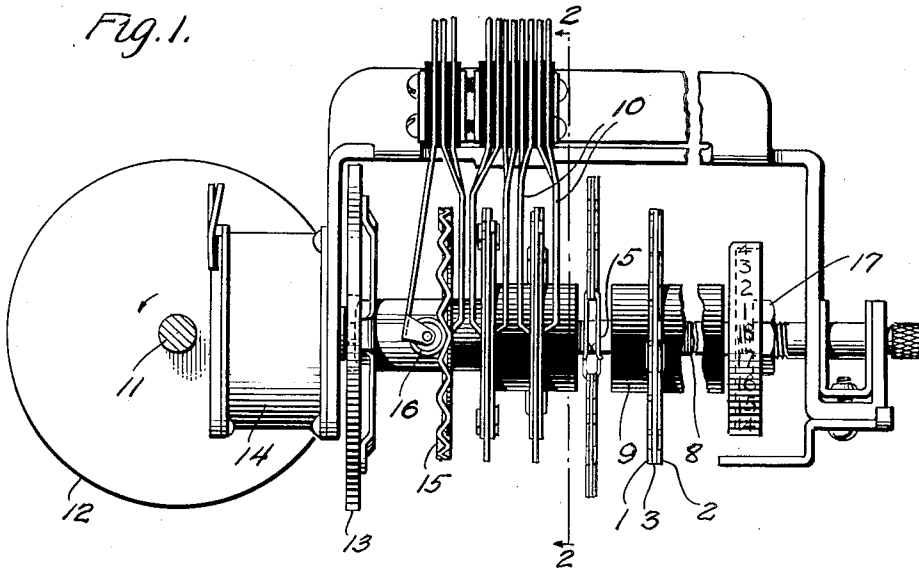


Fig. 2.

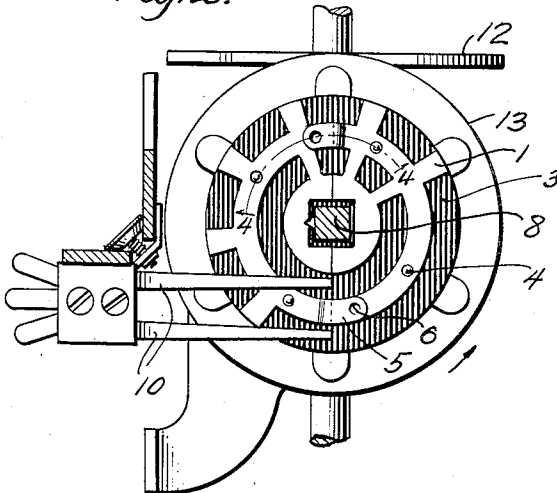


Fig. 3.

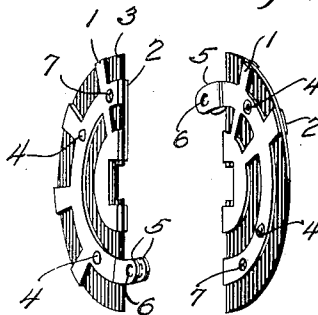
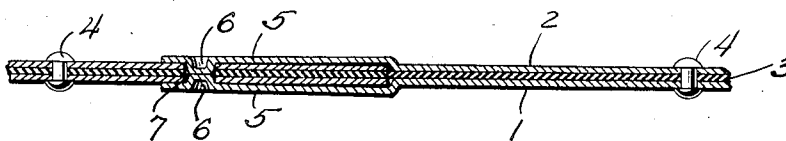


Fig. 4.



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## UNITED STATES PATENT OFFICE.

HERBERT B. TAYLOR, OF WESTFIELD, NEW JERSEY, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

## SEQUENCE SWITCH.

Application filed May 17, 1921. Serial No. 470,304.

*To all whom it may concern:*

Be it known that I, HERBERT B. TAYLOR, a citizen of the United States, residing at Westfield, in the county of Union, State of New Jersey, have invented certain new and useful Improvements in Sequence Switches, of which the following is a full, clear, concise, and exact description.

This invention relates to electrical switches of the rotary type and more particularly to so-called sequence switches such as are employed in automatic telephone systems for controlling the operation of the various circuits in their proper order.

A sequence switch of the type referred to herein is shown and described in detail in U. S. Patent No. 1,127,808 issued to J. N. Reynolds and C. F. Baldwin, February 9, 1915.

The object of this invention is the provision of a sequence switch with circuit-controlling disks which may be readily put on and taken off without dismantling the switch or removing it from its mounting.

Heretofore when it was necessary to remove one or more of the circuit-controlling disks of a sequence switch for replacement or repair the rotary shaft on which the disks are mounted had to be withdrawn from its bearings and if the disk to be removed happened to be near the driven end of the shaft it was usually necessary to remove a large number of other disks and insulators, involving considerable expense and loss of time.

This invention consists in providing a circuit-controlling disk for a rotary switch divided into two or more parts whereby the disk may be removed laterally from the driving shaft and further consists in providing a novel arrangement for holding the parts of the disk together which arrangement permits the disk being easily taken apart.

For a more complete description of this invention reference is now made to the accompanying drawings wherein Fig. 1 is a side elevation of a sequence switch, Fig. 2 is a cross-sectional view taken along the line 2-2 of Fig. 1, Fig. 3 is a perspective view of a circuit-controlling disk and Fig. 4 is an enlarged cross-sectional view taken along the line 4-4 of Fig. 2.

There are shown in Fig. 1 four circuit-controlling disks each comprising two skel-

etonized metal members, 1 and 2, and a flat insulator 3 which is interposed between the skeletonized metal members. The circuit-controlling disks are made preferably in two parts as is most clearly shown in Fig. 3. They may, however, be made in more than two parts when it is necessary to so construct them.

A square aperture is provided at the center of each disk whereby it is mounted on the square shaft 8 with which it rotates. The projecting fingers 5 provided on each portion of the disk are each provided with a boss 6 which is adapted to engage a corresponding aperture 7 in the adjoining portion of the disk. It is obvious that when the portions of the disk are pressed together the bosses 6 will snap into the apertures 7. This is most clearly shown in the enlarged cross-sectional view of Fig. 4. By virtue of this arrangement it will be seen that the disks can be readily put together and separated and that they can be removed laterally from the shaft 8 without dismantling the switch.

Referring again to the Fig. 1, the circuit-controlling disks are shown to be separated by insulating bushings 9 which are also mounted on shaft 8.

The corrugated disk 15 is a centering device which registers with the spring pressed roller 16 to step the switch in definite positions. The several disks and bushings 9 are held securely together by the nut 17 which engages a thread on one end of the shaft 8.

The disk 13 is flexibly mounted on the shaft 8 and rotatably secured thereto. It is made of magnetic material and is disposed in the magnetic circuit of electromagnet 14. Shaft 11 and the driving disk 12 which is securely attached thereto are rotated continuously in the direction indicated by the arrow in Fig. 1. When electromagnet 14 is energized disk 13 is forced by magnetic attraction into engagement with disk 11 and is rotated thereby together with shaft 8 and the circuit-controlling disks.

Skeletonized metal members 1 and 2 of each disk are electrically connected by means of rivets 4 which extend through and hold the members together.

As is shown in Figs. 1 and 2 there is associated with each circuit-controlling disk a set of contact brushes 10 and, as will be clear from an examination of the drawing,

whenever a pair of oppositely disposed brushes engage a metallic sector on their associated disk a circuit will be established between the brushes. The two brushes 10 shown in Fig. 2 are in contact with insulating portions of the disk. During one revolution of the disk shown, the lower pair of brushes (Fig. 2) will close their circuit six times and the upper pair will close their circuit three times. This is evident from the fact that the members 1 and 2 are provided with six contacting portions with which the lower brushes engage in sequence and three contacting portions with which the upper 15 brushes engage in sequence.

In Fig. 1 the second disk from the right is shown partially removed from the shaft. The nut 17 having been loosened the pressure of the bushing 9 against the disks is relieved and the latter may be readily removed laterally from the shaft. The spring fingers 5 and bosses 6 engage apertures 7 with sufficient firmness to prevent the disks accidentally coming apart under ordinary 20 circumstances but they may be easily enough forced apart when it is desirable to remove them from the shaft.

There are many possible modification of this invention which will suggest themselves to those skilled in the art and it is intended that the scope of the invention shall be limited only by the appended claims.

What is claimed is:

1. In a switch, a rotatable shaft, a circuit-controlling disk mounted on and encircling said shaft, said disk being made in a plurality of separable parts so that it may be removed laterally from said shaft and snap interlocking means carried by each of said 40 parts for securing them collectively on said shaft.

2. A circuit-controlling member for a rotary switch comprising a metal disk and a non-conducting disk fastened together, said member being divided into a plurality of separable parts and having an aperture at its center whereby it may be mounted on a shaft and a plurality of snap fastenings for holding said parts together on said shaft, said controlling member being removable laterally from the shaft. 50

3. In a switch, a rotatable shaft, a circuit-controlling disk encircling said shaft and secured thereto, said circuit-controlling disk comprising two parallel metal members and a non-conducting member interposed be-

tween said metal members, said disk being divided into a plurality of parts whereby it may be removed laterally from said shaft and snap fastening devices for locking said parts together on said shaft. 60

4. In a switch, a rotatable shaft, a circuit-controlling disk encircling said shaft and secured thereto, said circuit-controlling member comprising two parallel metal members and a non-conducting member interposed between said metal members, said disk being divided into a plurality of parts whereby it may be removed laterally from said shaft and a spring interlocking means carried by each of said parts for fastening them together. 65

5. In a switch, a rotatable shaft, a circuit-controlling disk encircling said shaft and secured thereto, said circuit-controlling disk comprising two parallel metal members and a non-conducting member interposed between said metal members said disk being divided into a plurality of parts whereby it may be removed laterally from said shaft, each of said parts being provided with a pair of opposed spring fingers and an aperture, the spring fingers of one part being adapted to engage with the aperture of another part, thereby holding the disk together. 75

6. A circuit controlling disk comprising a plurality of semi-circular separable parts and spring latching means on each part for engaging an adjacent part whereby the disk is held together. 80

7. In a switch, a rotatable shaft, a circuit controlling disk secured to said shaft comprising conducting and non-conducting members, said disc being formed of a plurality of parts whereby it may be removed laterally from said shaft, each of said parts being provided with mutually cooperating interlocking means for holding said disc together. 85

8. In a switch, a rotatable shaft, a circuit controlling disc secured to said shaft comprising conducting and non-conducting members, said disc being formed of a plurality of parts whereby it may be removed laterally from said shaft, the end portions of the conducting members of each of said parts being formed into mutually cooperating interlocking means for holding said disc together. 100

In witness whereof, I hereunto subscribe my name this 13th day of May, A. D. 1921.

HERBERT B. TAYLOR. 110