March 14, 1939. H. S. KEATING 2,150,376

ELECTRICAL DEVICE

Filed Sept. 5, 1936

FIG. 1

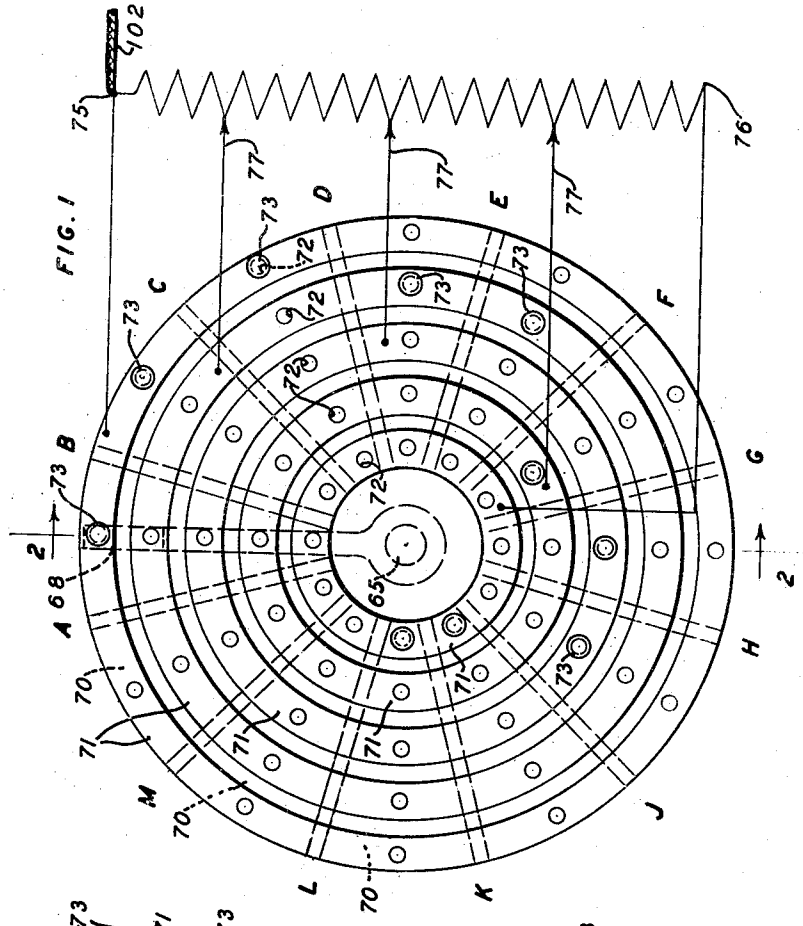
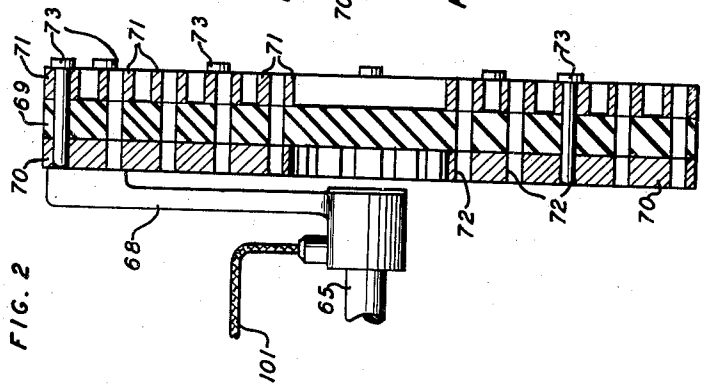


FIG. 2



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Patented Mar. 14, 1939 2,150,376

UNITED STATES PATENT OFFICE

2,150,376

ELECTRICAL DEVICE

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Application September 5, 1936, Serial No. 99,586

7 Claims. (Cl. 200—26)

This invention relates to electrical devices and in particular to a device for variably connecting an electrical conductor to any of a plurality of other conductors in any desired predetermined pattern or sequence of successive patterns.

In co-pending application Serial No. 89,814, filed July 9, 1936, by the present inventor, there is disclosed an apparatus for combining stands by intertwisting them with a cyclically repeated, more or less complex sequence of portions of differing pitches of lay. In this apparatus there is a motor for advancing the strands longitudinally and a multi-tap resistance to be connected in cyclically varying amounts in the field circuit of the motor to correspondingly vary the speed of the motor.

An object of the present invention is to provide a device whereby one conductor may be connected to other conductors in any desired and predetermined temporal pattern of sequence, and whereby the pattern may be changed as desired in a simple, rapid and dependable fashion and the device itself be simple to make and rugged in construction.

One embodiment of the invention may present two pluralities of mutually insulated conductive members so formed and so disposed in space that each member of one plurality is spatially aligned in some part thereof with some part of each member of the other plurality, in combination with a plurality of means to interconnect any member of one plurality at will with any member of the other plurality of conductive members in any desired spatial pattern of interconnection, together with movable means to connect the members of one plurality in sequence to a conductor, each of the other plurality of members being individually connectible to other conductors.

Other objects and features of the invention will appear from the following detailed description of one embodiment thereof taken in connection with the accompanying drawing in which the same reference numerals are applied to identical parts in the several figures and in which

Fig. 1 is a partly diagrammatic view in front elevation of a current distributing device constructed in accordance with the invention, and

Fig. 2 is a view partly in section on the line 2—2 of Fig. 1.

The embodiment of the invention herein disclosed comprises a main supporting member 69 of electrically insulating material such as molded artificial resin, hard rubber, wax impregnated wood, or the like, in the shape of a plate or preferably a disk having a circular periphery. This disk 69 may be thought of as supported stationarily by any suitable means not shown in a vertical position, though of course it may have any orientation desired or convenient.

To the rear face of the disk 69 (rear as seen in Fig. 1, left as seen in Fig. 2) is secured by any suitable means a plurality (here twelve) of segmental members 70 of conductive material, e. g. bronze. On the opposite face of the disk 69 is secured a plurality (here five) of rings 71 also of conductive material. The segments 70 are insulated from each other by radial interspaces and by the disk 69, the rings 71 are insulated from each other by annular interspaces and by the disk 69, and the rings are insulated from the segments by the disk.

Along the central radial line of each segment 70 a series of cylindrical holes 72 is formed through the segments, disk and rings, and a plurality of removable metal pins 73 is provided, adapted to fit snugly into the holes 72 and to extend through both segments and rings. Thus by inserting pins 73 into the appropriate holes 72, any segment may be interconnected with any ring or any number and distribution of rings, or any ring may be connected to any segment or any number and distribution of segments. In the drawing segments A—B, B—C and C—D are thus connected to the outermost ring, segments D—E and E—F to the next ring, segment F—G to the fourth ring, segments G—H and H—J to the third ring, and segments J—K and K—L to the fifth or innermost ring, while segments L—M and M—A are not connected to any ring.

The outermost and innermost rings are connected respectively to the end terminals 75 and 76 of a resistance coil and the three intermediate rings are connected respectively to three taps or sliding contacts 77, 77, 77 on the coil between its ends, thus electrically interposing the four parts of the coil between the successive rings.

At the rear of the disk 69 and its appurtenances is mounted a metal shaft 65 coaxial with the disk and carrying a contact arm 68 whose outer end is formed and positioned to wipe over the segments 70 in succession as the shaft rotates.

One side 101 of a circuit into which various predetermined fractions of the resistance 75, 76 are to be connected for various and predetermined time intervals, is connected to a brush wiping on the shaft 65 as shown, and the other side 102 of the circuit is connected to the terminal 75 of the resistance.

The shaft 65 may be thought of, in one adaptation to use of the device, as being driven with constant speed of rotation by any suitable means not shown, such as a gearing, chain and sprockets, belt and pulleys or the like from a constantly rotating member. The contact arm 67 then sweeps over the segments 70 in turn. In the position of the parts shown in Figs. 1 and 2, current from the circuit line 101 passes through the shaft 65, arm 68, and into segment A—B. Since this segment is connected by a pin 73 with the outer ring 71 and the latter is directly connected via the terminal 75 with the other circuit line 102, the current passes on from segment A—B via the outer ring 71 and directly to the other line 102 without traversing any part of the resistance 75, 76. Also since segments B—C and C—D are likewise connected by pins 73, 73 to the outer ring 71 only the same state of affairs will continue while the contact arm sweeps from A to D.

Segments DE and EF are connected by pins 73, 73 to the second or next to the outer ring 71 only. Current entering the segments as before will leave segments DE and EF via the second ring, the uppermost contact 77 and will therefore have to pass through the uppermost portion of the resistance 75, 76 to enter the circuit line 102. Hence while the contact arm 68 is sweeping over the distance from D to F, the top portion of the resistance is interposed between the lines 101 and 102.

In the same way, while the arm 68 passes from F to G, the three upper parts of the resistance are connected between 101 and 102, and while the arm passes from G to J, the two upper parts of the resistance are included, and from J to L the entire resistance 75, 76 is in the circuit. But since there are no pins in the segments from L to A, lines 101 and 102 are disconnected from each other entirely while the contact arm swings over these segments.

Thus while the arm makes one revolution 101 is connected to 102 directly for 3 units of time, through one quarter (about) of 75, 76 for 2 units, through three quarters of the resistance for one time unit, through half of 75, 76 for 2 units, and through the whole resistance for 2 units, and is then completely disconnected for 2 units, after which the same cycle is repeated at each revolution of the arm. The device thus serves to connect the line 101 to the terminal 75 to the several contacts 77, 77 or to the terminal 76 in a predetermined temporal pattern of time intervals, cyclically repeated as long as the shaft revolves. The units of the pattern depend on the distribution of the pins 73 and may be interchanged in relative position in the pattern or altered in relative length by shifting, adding or omitting pins.

If only the totality of the units in the pattern is important and not their actual or relative lengths or sequence relation, the shaft may be turned by hand to bring into effect any unit of the particular pattern set up at any moment chosen at will.

The embodiment of the invention herein disclosed is illustrative only and may be modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited solely by the appended claims.

What is claimed is:

1. An electrical device for connecting one conductor to any one, two or more of a group of conductors one at a time in any desired order, the said device comprising two mutually insulated pluralities of mutually insulated conductive members, removable means to connect at will any number of members of one plurality each to any member of the other plurality in any desired spatial pattern of interconnection, and means to connect the members of one plurality in sequence to the first electrical conductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

2. An electrical device for connecting one conductor to any one, two or more of a group of conductors one at a time in any desired order, the said device comprising two mutually insulated pluralities of mutually insulated conductive members so formed and disposed in space that some part of each member of one plurality is spatially aligned with some part of each member of the other plurality, removable means to connect each member of one plurality to any number of members of the other plurality at the aligned parts thereof, and means to connect the members of one plurality in sequence to the first electrical conductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

3. An electrical device for connecting one conductor to any one of a group of conductors, the said device comprising a first plurality of mutually insulated elongated conductive members, a second plurality of mutually insulated elongated conductive members insulated from the first plurality and having each member extending across all the members of the first plurality, removable means to connect each member of one plurality to each member of the other plurality at the crossings thereof, and means to connect the members of one plurality in sequence to the first electrical conductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

4. An electrical device for connecting one conductor to any one of a group of conductors, the said device comprising a body of insulating material, a first plurality of mutually insulated elongated conductive members mounted on the body, a second plurality of mutually insulated elongated conductive members mounted on the body and insulated from the first plurality and having each member extending across all the members of the first plurality, removable means to connect each member of one plurality to each member of the other plurality at the crossings thereof, and means to connect the members of one plurality in sequence to the first electrical conductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

5. An electrical device for connecting one conductor to any one of a group of conductors, the said device comprising a disk of insulating material, a first plurality of mutually insulated elongated conductive members mounted radially on one face of the disk, a second plurality of mutually insulated annular conductive members mounted on concentrically on the other face of disk and insulated by the disk from the first plurality, the disk and each member of each plurality being formed with a hole passing therethrough at each crossing of each member of one plurality over each member of the other plurality, a plurality of interchangeable metal pins each insertable into any of the holes to thereby connect a radial member with an annular member, and means to connect the members of one plurality in sequence to the first electrical con-

ductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

6. An electrical device for connecting one conductor to any one, two or more of a group of conductors one at a time in any desired order, the said device comprising two mutually insulated pluralities of mutually insulated conductors, means to connect any member of one plurality to any number of members of the other plurality, and means to connect the members of one plurality in sequence to the first electrical conductor, the members of the other sequence being individually connectible to the electrical conductors of the group.

7. An electrical device for connecting one conductor to any one of a group of conductors, the said device comprising a disk of insulating material, a first plurality of mutually insulated elongated conductive members mounted radially on one face of the disk, a second plurality of mutually insulated annular conductive members mounted on concentrically on the other face of disk and insulated by the disk from the first plurality, the disk and each member of each plurality being formed with a hole passing therethrough at each crossing of each member of one plurality over each member of the other plurality, and a plurality of interchangeable metal pins each insertable into any of the holes to thereby connect a radial member with an annular member.

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