Aug. 26, 1941. H. L. MEKELBURG 2,254,121

CIRCUIT CONTROLLING DEVICE

Filed Feb. 20, 1939 2 Sheets-Sheet 1

Fig. 1

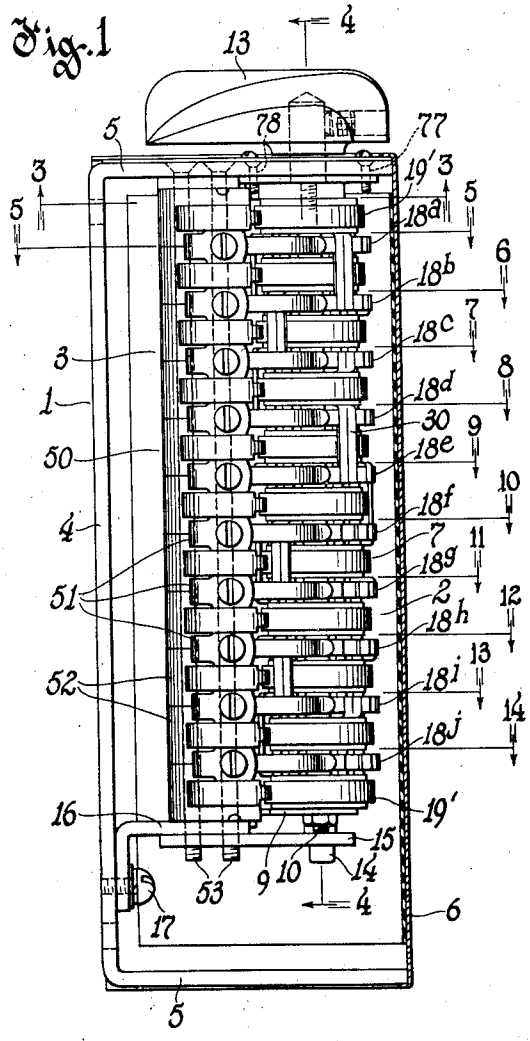


Fig. 2

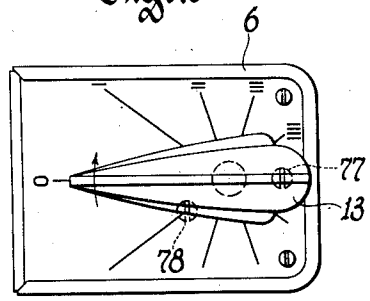


Fig. 3

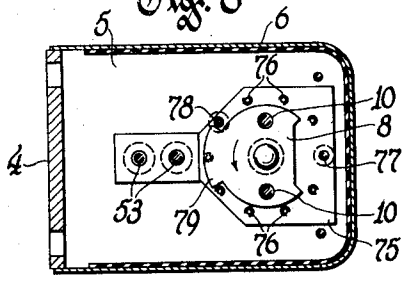


Fig. 4

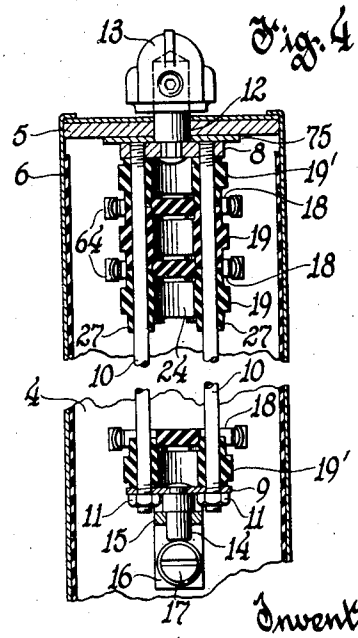
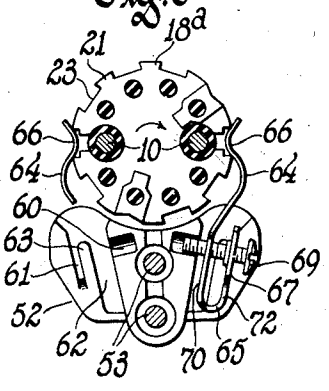


Fig. 5



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CIRCUIT CONTROLLING DEVICE

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Fig. 6

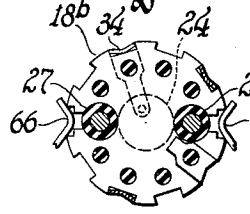


Fig. 7

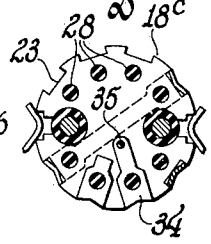


Fig. 8

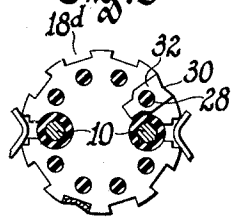


Fig. 9

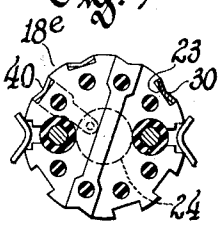


Fig. 10

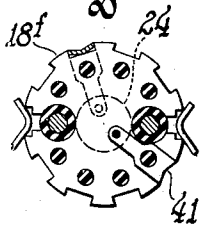


Fig. 11

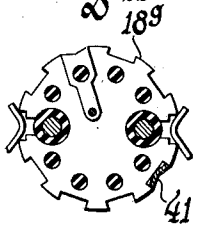


Fig. 12

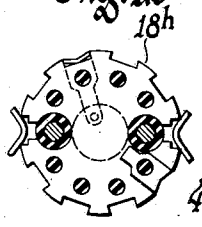


Fig. 13

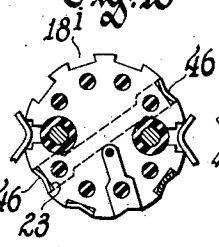


Fig. 14

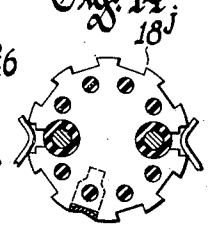


Fig. 15

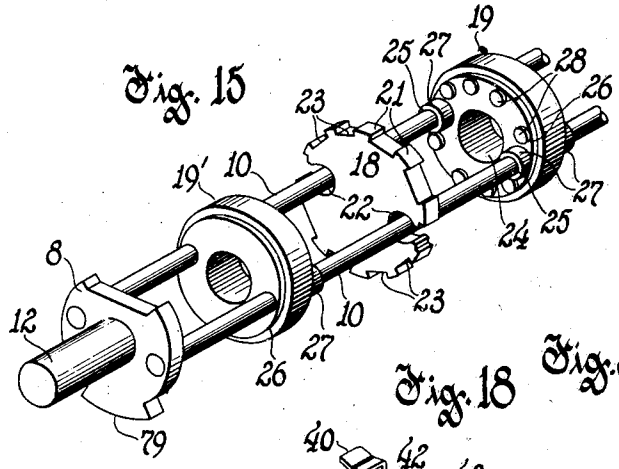


Fig. 20

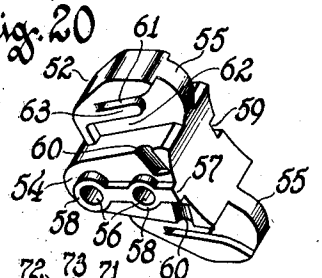


Fig. 22

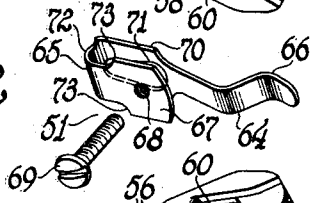


Fig. 18

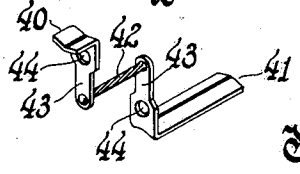


Fig. 16

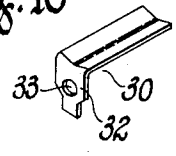


Fig. 21

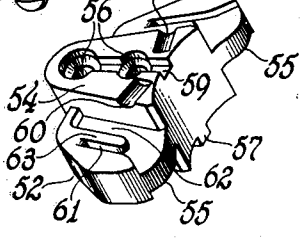


Fig. 19

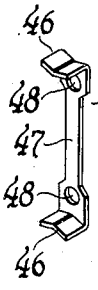
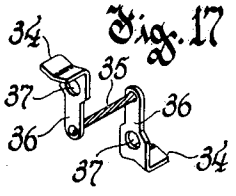


Fig. 17



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Patented Aug. 26, 1941 2,254,121

UNITED STATES PATENT OFFICE

2,254,121

CIRCUIT CONTROLLING DEVICE

Harold L. Mekelburg, Milwaukee, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis., a corporation of Delaware

Application February 20, 1939, Serial No. 257,283

15 Claims. (Cl. 200—8)

This invention relates to circuit controlling devices, and is particularly applicable to controllers of the drum type.

The invention has among its objects to provide a rugged, compact and efficient drum type controller which is of simplified and generally improved construction.

Another object is to provide a drum type controller consisting of parts which can be readily manufactured and assembled.

Another object is to provide a drum type controller which is of a sectional construction and includes interchangeable parts capable of assembly in numerous ways to meet various control requirements.

Another object is to provide a novel drum assembly including circular insulating sections which interlock with each other and with the drum contacts to provide a rugged and compact unit.

Another object is to provide a novel stationary contact assembly including a sectional insulating support and stationary contacts which are removably held within recesses formed in such support.

Various other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate an embodiment of the invention which will now be described, it being understood that various modifications may be made in the embodiment illustrated without departing from the spirit and scope of the appended claims.

In the drawings,

Figure 1 is a side elevational view of a drum controller embodying the invention, a cover for the controller being shown in section.

Fig. 2 is a top view of the controller shown in Fig. 1;

Fig. 3 is a horizontal sectional view on line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view on line 4—4 of Fig. 1;

Fig. 5 is a sectional view of the drum assembly and stationary contact assembly shown in Fig. 1, such view being taken on line 5—5;

Figs. 6 to 14, inclusive, are sectional views of the drum assembly on lines 6 to 14, inclusive, of Fig. 1;

Fig. 15 is an exploded perspective view of certain of the drum parts shown in Fig. 1;

Figs. 16 to 19, inclusive, are perspective views illustrating drum contacts of various forms which are employed in the controller shown in Fig. 1;

Figs. 20 and 21 are perspective views of one of the insulating sections employed in the stationary contact assembly shown in Fig. 1, and

Fig. 22 is a perspective view of one of the stationary contacts shown in Fig. 1.

Referring to Fig. 1, the same illustrates a drum controller including a supporting frame 1 which carries a rotatable drum assembly 2 and a cooperating stationary contact assembly 3. Frame 1 has a rear wall 4 and top and bottom walls 5—5, and the same is provided with a removable U-shaped cover 6 which embraces said walls to completely enclose the controller.

Drum assembly 2 includes an insulating cylinder 7 comprising a plurality of axially aligned circular insulating sections which are clamped between end plates 8 and 9 (Fig. 4) by a pair of tie rods 10—10. The tie rods 10—10 are arranged in parallel relation on opposite sides of the axis of cylinder 7 and the upper ends thereof are fixed within openings in end plate 8 while the lower ends thereof pass through openings in end plate 9 and are provided with clamping nuts 11. Plate 8 has a spindle 12 fixed thereto which is journaled within an opening in top wall 5 of frame 1 and an operating lever 13 is fixed to the upper end of said spindle. Plate 9 has a spindle 14 fixed thereto which is journaled within an opening in a plate 15 mounted upon a bracket 16 which is secured to the rear wall 4 of frame 1 by a screw 17.

More specifically, the insulating sections of cylinder 7 comprise a plurality of like contact carrying disks 18, a plurality of like intermediate spacers 19 located between said disks, and a pair of like spacers 19^1 located at opposite ends of said cylinder. One of the disks 18 is illustrated in Fig. 15 and as shown the same comprises a fibre stamping of circular form having ten equally spaced projections 21 formed on the periphery thereof which are arranged in diametrically opposed groups of five each on opposite sides of a pair of opposed C-shaped openings 22—22 formed on opposite sides of the disk. The radial projections 21 provide eight equally spaced contact receiving notches 23 on the periphery of the disk.

The spacers 19 and 19^1 are formed of molded insulating material and one of each is illustrated in Fig. 15. As shown in Fig. 15 spacer 19 is cylindrical in form and of slightly smaller diameter than the contact carrying disk 18. The same is provided with a centrally located opening 24, a pair of diametrically opposed openings 25—25 for receiving the tie rods 10—10 and shouldered end portions 26. The opposite faces

of spacer 19 are each formed as shown in Fig. 15 to provide a pair of diametrically opposed circular projections 27—27 which are aligned with the tie rod openings 25—25 and eight circular button projections of small diameter designated by numeral 28. The projections 27—27 are arranged to align with the C-shaped openings 22—22 in disk 18 and are of a diameter to fit snugly within such openings. The button projections 28 are located to align radially with the contact receiving notches 23 in disk 18. End spacer 19¹ shown in Fig. 15 is similar to the intermediate spacer 19 except that the projections 25 and 28 are omitted on one face thereof.

As is apparent from the foregoing, upon assembly of a disk 18 between a pair of spacers 19, the projections 27 on opposing faces of the spacers fit within the openings 22 to provide a rigid coupling between the disk and its associated spacers. It should be noted from Fig. 4 that the projections 27 on opposing faces of the spacers 19 meet within the openings 22 in disks 18 and that the disk 18 is spaced with respect to said faces by the button projections 28. As is apparent, when the various contact carrying disks 18 and spacers 19 are assembled upon the tie rods 10—10 said rods are completely enclosed within said spacers and corresponding contact receiving notches 23 on the various disks are axially aligned.

Figs. 16, 17, 18 and 19 illustrate drum contacts of various forms comprising sheet metal stampings which are adapted for mounting upon the disks 18 during assembly thereof upon the spacers 19. The several forms of drum contacts shown in these figures are all embodied in the controller shown in Fig. 1, the same being mounted upon the various contact carrying disks 18 as shown in Figs. 5 to 14, inclusive. The drum contacts on the controller shown in Fig. 1 are grouped to provide for control of a non-reversing alternating current multi-speed motor of the type having separate windings for each speed. However, the present invention is not concerned with the function of the controller and the contact arrangement is shown merely to illustrate the manner in which the various forms of contacts may be mounted upon the disks 18.

Referring to Fig. 16, the same illustrates an elongated bridging contact 30 for association with a pair of disks 18 which are located on opposite sides of a spacer 19. Contact 30 has a laterally projecting shank 32 formed on one end thereof which is provided with an opening 33. The controller shown in Fig. 1 is provided with a plurality of contacts 30, one being associated with disks 18ᵈ and 18ᵉ. As shown in Figs 8 and 9, contact 30 seats within axially aligned contact receiving notches 23 in disks 18ᵈ and 18ᵉ and the shank 32 thereof is anchored between the upper face of contact 18ᵈ and the opposing face of the adjacent spacer 19 by one of the button projections 28 on the opposing face of said spacer which engages within the opening 33 in said shank.

Fig. 17 illustrates a bridging contact assembly including a pair of short contacts 34 which are connected by a flexible lead 35. The contacts 34 are of like construction, each of the same having a laterally projecting shank 36 formed on one end thereof which is provided with an opening 37. The contacts 34 are arranged in opposed relation and are soldered to the flexible lead 35. The controller shown in Fig. 1 is provided with a plurality of contact assemblies such as shown in Fig. 17, one of the same being associated with the disks 18ᵇ and 18ᶜ. As shown in Figs. 6 and 7, lead 35 passes through the opening 24 in the spacer 19 located between the disks 18ᵇ and 18ᶜ and the contacts 34 are seated in diametrically opposed contact receiving notches 23 in said disks. The shanks 36 of contacts 34 are anchored in the spaces between disks 18ᵇ and 18ᶜ and the spacer 19 intermediate said disks by button projections 28 on opposite faces of said spacer which extend into the openings 37 in said shanks.

Fig. 18 illustrates a bridging contact assembly including a short contact 40 and an elongated contact 41 which are connected by a flexible lead 42. Contacts 40 and 41 each have a laterally projecting shank 43 formed on one end thereof which is provided with an opening 44. Contacts 40 and 41 are arranged in opposed relation and the shanks 43 thereof are soldered to the lead 42. One of the contact assemblies shown in Fig. 18 is associated with the contact carrying disks 18ᵉ, 18ᶠ and 18ᵍ of the controller shown in Fig. 1. As shown in Figs. 9, 10 and 11, contacts 40 and 41 are arranged in opposed relation, contact 41 being seated within axially aligned contact receiving notches 23 in disks 18ᶠ and 18ᵍ and contact 40 being seated within a contact receiving notch 23 in disk 18ᵉ. The lead 42 passes through the opening 24 in the spacer 19 located between disks 18ᵉ and 18ᶠ and the shanks 43 of the contacts 40 and 41 are anchored in the spaces between said spacer and said disks by button projections 28 on opposite faces of said spacer which extend into the openings 43 in said shanks.

Fig. 19 illustrates a bridging contact 45 having oppositely disposed short contact portions 46 which are formed on opposite ends of a shank 47 having openings 48—48 located adjacent said contact portions. The controller shown in Fig. 1 is provided with a plurality of contacts of the form shown in Fig. 19, one of the same being associated with the contact carrying disk 18¹. As shown in Fig. 13 the contact portions 46 are seated within diametrically opposed contact receiving notches 23 in the disk 18¹ and the shank 47 is held between the bottom face of said disk and the adjacent spacer 19, the openings 48—48 in said shank being aligned with diametrically opposed button projections 28 on said spacer to receive the latter.

From the foregoing it is apparent that the contacts shown in Figs. 16, 17, 18 and 19 may be mounted upon the several contact carrying disks 18 in various angular positions and may be grouped in various ways to meet various control requirements.

The stationary contact assembly 3 includes a sectional insulating support 50 having a plurality of combined contact and wiring terminal units 51 removably mounted thereon which are arranged in pairs on opposite sides of each of the contact carrying disks 18. Insulating support 50 is located to the rear of drum assembly 2 and is made up of a plurality of like insulating sections 52 corresponding in number to the spacers employed in said drum assembly. The several insulating sections 52 are mounted upon a pair of tie rods 53 which serve to clamp said insulating sections between bracket 16 and the top wall 5 of frame 1. As shown in dotted lines in Fig. 1, the upper ends of the tie rods 53 are provided with headed portions which are located

within openings in the top wall of frame 1, and the lower ends of said tie rods pass through bracket 16 and are threaded into tapped openings in the plate 15 associated with said bracket.

The insulating sections 52 are of like form, and one of the same is shown in detail in Figs. 20 and 21. Said insulating section is formed of molded insulating material and is provided with a wedge shaped body 54 having similarly shaped narrow ear projections 55—55 formed on opposite sides thereof. Body 54 is provided with a pair of tie rod openings 56—56 which are located on a line intermediate the side faces thereof and the ears 55—55 are located midway between the top and bottom faces of said body. The lower face of body 54 is provided with a tongue projection 57 which is aligned with the tie rod openings 56—56 and is provided with enlarged circular portions 58—58 through which said openings extend. The upper face of body portion 54 is provided with a recess 59 which is aligned with the tie rod openings 56 and is shaped similarly to the tongue projection 57. The upper and lower faces of body portion 54 are also similarly formed to provide inwardly extending recesses 60 on opposite sides of the ear projections 55. The opposite faces of ear projections 55—55 are similarly recessed to provide slots 61 and 62 which are arranged in parallel relation on opposite sides of a narrow rib 63 and extend inwardly from the front ends of said ears.

As is apparent when the several insulating sections 52 are placed upon the tie rods 53—53 the tongue projection 57 on each section projects into the recess 59 in the adjacent section to provide a rigid assembly. As shown in Fig. 1 insulating support 50 is located so that the ears 55 on the various insulating sections 52 are positioned intermediate the various contact carrying disks 18 and the combined contact and terminal units 51 are mounted between the opposing faces of said ears.

The combined contact and terminal units 51 are of like form, each comprising a sheet metal stamping formed of bronze or a similar highly resilient material. One of the units 51 is illustrated in Fig. 22, and as shown the same comprises a narrow finger 64 having a reflexed shank 65 of increased width formed on the rear end thereof. The front end of finger 63 is bent to provide a curved face 66 for engagement with disks 18 and the contacts mounted thereon, and said finger is angularly disposed with respect to its shank as shown in Fig. 5 to clear the drum assembly 2. The reflexed shank 65 provides an outer forwardly extending terminal portion 67 which is provided with a tapped opening 68 for receiving a terminal screw 69. The inner leg 70 of shank 65 is provided with an opening 71 to provide clearance for the inner end of terminal screw 69 and to increase the flexibility of the contact finger 64. Also the rear end of shank 65 is cut away on opposite sides as shown at 72 to provide shouldered portions 73 on opposite sides of the terminal portion 67.

In practice the combined contact and terminal unit 51 is assembled upon support 50 by threading the shank of terminal screw 69 only a slight distance into the opening 68 in terminal portion 67, and then inserting said unit rearwardly into position between the opposing faces of ears 55 on a pair of adjacent insulating sections 52. The shouldered portion 73 on terminal portion 67 fits snugly within the slots 61 in the opposing faces of said ears and the inner leg 70 of shank 65 is located within slots 62 in said ears. When the combined contact and terminal units 51 are inserted into their respective spaces between the various ears 55 on insulating sections 52 the terminal screws 69 may be driven in a greater distance than that aforementioned and the inner ends of said screws then engage within the openings formed by the recesses 60 in the various insulating sections 52 to anchor said units upon insulating support 50.

Upon mounting of the combined contact and terminal units 51 upon insulating support 50 the contact faces 66 of the several units are yieldingly held in engagement with their associated contact carrying disks 18 and as shown in Fig. 5 said contact faces 66 are diametrically disposed with respect to their associated disks 18.

As shown in Figs. 3 and 4, a stop plate 75 is mounted upon the under face of top wall 5 of frame 4, said plate being provided with ten equally spaced tapped openings 76. The top wall 5 of frame 4 is also provided with openings which are aligned with the tapped openings in stop plate 75 and are adapted to receive stop screws 77 and 78 which extend through said stop plate and project beyond the lower face thereof. The upper clamping plate 8 is provided with a tail piece 79 which cooperates with the stop screws 77 and 78 to limit movement of drum assembly 2 between extreme positions determined by the location of said screws within the openings in stop plate 75. In the embodiment illustrated the stop screws 77 and 78 are arranged to limit movement of drum assembly 2 between extreme positions marked "0" and "IIII" in Fig. 2.

What I claim as new and desire to secure by Letters Patent is:

1. In a rotatable drum assembly for electric switches, in combination, a supporting frame including tie rods arranged in parallel relation, a sectional insulating cylinder mounted upon said rods comprising like cylindrical spacing members and like circular contact carrying disks arranged alternately and in axial alinement, said contact carrying disks having openings therein in alinement with said tie rods and said spacers having axially extending openings therein for receiving said tie rods and also having projections on the opposing faces thereof which fit within the openings in said contact carrying disks, and a plurality of contact members anchored between the opposing faces of said disks and spacers, and having contact portions located on the outer surfaces of said disks.

2. In a rotatable drum assembly for electric switches, in combination, a supporting frame including a pair of tie rods arranged in parallel relation, a sectional insulating cylinder mounted upon said rods comprising like cylindrical spacing members and like circular contact carrying disks arranged alternately and in axial alinement, said contact carrying disks having a plurality of equally spaced contact receiving notches formed on the periphery thereof and also having diametrically disposed openings therein in alinement with said tie rods and said spacers having diametrically disposed openings therein for receiving said tie rods and also having projections on the opposing faces thereof which fit within the diametrically disposed openings in said contact carrying disks, and a plurality of contacts each associated with one of said disks, each of said contacts having a contact portion seated within a selected contact receiving notch of its associated disk and a shank portion anchored

between its associated disk and the adjacent spacing member.

3. In a rotatable drum assembly for electric switches, in combination, a supporting frame including a pair of tie rods arranged in parallel relation, a sectional insulating cylinder mounted upon said rods comprising like cylindrical spacing members and like circular contact carrying disks arranged alternately and in axial alinement, said spacing members having diametrically disposed openings therein for receiving said tie rods and also having axially extending projections on the opposing faces thereof which surround said tie rods and abut within openings in said disks, and a plurality of contact members each associated with one of said disks, each of said contact members having a shank portion anchored between its associated disk and the adjacent spacing member, and a contact portion overlapping the outer surface of its associated disk.

4. In a rotatable drum assembly for electric switches, the combination with a sectional insulating cylinder comprising a plurality of axially aligned cylindrical spacing members of like form and a plurality of contact supporting disks of like form axially aligned with said spacers and held between the opposing faces thereof, of a plurality of contacts each associated with one of said contact supporting disks, each of said contacts having a contact portion overlapping the periphery of its associated disk, and a shank portion anchored between one face of its associated disk and the opposing face of the adjacent spacing member, the shank portions of said contacts being disposed radially with respect to said disks and each of said spacing members having a center opening therein constituting a wiring passage for electrical connection of the shank portions of contacts disposed on opposite sides thereof.

5. In a rotatable drum assembly for electric switches, in combination, a sectional insulating cylinder comprising a plurality of axially aligned cylindrical spacing members of like form and a plurality of thin contact supporting disks of like form axially aligned with said spacers and held between the opposing faces thereof, said disks each having a plurality of equally spaced contact receiving notches formed on the periphery thereof, and a plurality of contacts each associated with one of said contact supporting disks, each of said contacts having a contact portion seated within a selected contact receiving notch on the periphery of its associated disk and a shank portion anchored between one face of its associated disk and the opposing face of the adjacent spacing member, the shank portions of said contacts being disposed radially with respect to their associated disks and each of said spacing members having projections on opposite faces thereof which engage within openings in the shank portions of said contacts to hold said contacts in assembled position upon said disks and also having a center opening therein constituting a wiring passage for electrical connection of the shank portions of contacts disposed on opposite sides thereof.

6. In a rotatable drum assembly for electric switches, in combination, a sectional insulating cylinder comprising a plurality of axially alined cylindrical spacing members of like form and a plurality of thin contact carrying disks of like form arranged between the opposing faces of said spacing members, said spacing members having axially extending projections on the opposing faces thereof fitting within openings in said disks to prevent relative rotation of said disks and spacing members, and said disks having a plurality of equally spaced contact receiving notches formed on the peripheries thereof and a plurality of contact members carried by said insulating cylinder, each of said contact members being associated with one of said disks and having a contact portion seated within a selected contact receiving notch of its associated disk, and a shank portion clamped between one face of its associated disk and the adjacent spacing member.

7. In an electric switch, in combination, a rotatable contact drum, a plurality of elongated resilient contact fingers of like form engaging said drum, each of said contact fingers having a contact portion on one end thereof and a reflexed terminal portion formed on the opposite end thereof, a stationary support for said contact fingers located to the rear of said drum and extending parallel thereto, said support comprising molded insulation having notches formed therein for receiving the terminal portions of said contacts to hold the latter against lateral displacement and also against endwise movement rearwardly with respect to said support, said terminal portions being freely insertable by endwise movement into said notches from the front of said support, and terminal screws threaded into the respective terminal portions of said contacts, said support having recesses formed therein for receiving the shanks of said terminal screws to hold said contact fingers in assembled position upon said support.

8. In a rotatable drum assembly for electric switches, in combination, a sectional insulating cylinder comprising a plurality of axially alined spacers of annular form and a plurality of thin contact carrying disks arranged between the opposing faces of said spacers, said disks and spacers having interlocking parts for preventing relative rotation thereof and a plurality of contact members mounted upon said cylinder, each of said contact members being associated with one of said disks and having a contact portion overlapping the outer surface of its associated disk and a shank portion clamped between its associated disk and the adjacent spacer, certain of said contacts being disposed on opposite sides of one of said spacers and being electrically connected by a connection located within the center opening in said spacer.

9. In an electric switch, in combination, a stationary frame, a contact drum rotatably mounted upon said frame, a plurality of elongated resilient contact fingers engaging said drum, each of said contact fingers having a contact portion on one end thereof and an enlarged reflexed terminal portion formed on the opposite end thereof, a stationary support for said contact fingers carried by said frame and located to the rear of said contact cylinder, said support comprising molded insulation having notches formed therein for receiving the terminal portions of said contacts to hold said contacts against lateral displacement and also against endwise movement rearwardly with respect to said support, the terminal portions of said contacts being freely insertable into said notches from the front of said support, and means associated with said contacts for releasably holding the same against forward movement with respect to said support.

10. In a rotatable drum assembly for electric switches, in combination, an insulating cylinder

including like cylindrical spacers, and like circular contact carrying disks arranged alternately and in axial alinement, said spacers and said contact carrying disks having interlocking parts for preventing relative rotation thereof and said spacers having a plurality of equally spaced contact anchoring projections formed on the opposing faces thereof and a plurality of contact members mounted upon said cylinder, each of said contact members having a shank portion anchored between one of said contact carrying disks and the adjacent spacing member by one of the anchoring projections on the latter and also having a contact portion overlapping the outer surface of its associated disks.

11. In a drum controller, in combination, an insulating contact carrying drum comprising axially alined cylindrical spacers of like form and thin circular contact carrying disks of like form carried between said spacers, a plurality of forwardly extending contact fingers engaging said contact disks, each of said fingers having an enlarged terminal portion on the rear end thereof, and a sectional insulating support for said fingers arranged to the rear of said drum and extending parallel thereto and having spaced ear projections thereon coplanar with said cylindrical spacers, the opposing faces of said ear projections having recesses formed therein for receiving the terminal portions of said contact fingers and said contact fingers being freely insertable into said recesses from the front of said support.

12. In a drum controller, in combination, a sectional insulating contact carrying drum comprising axially alined cylindrical spacers of like form and thin circular contact carrying disks of like form carried between said spacers, a plurality of forwardly extending contact fingers engaging said contact carrying disks on opposite sides thereof, each of said contact fingers having a reflexed terminal portion on the rear end thereof, a sectional insulating support for said fingers arranged to the rear of said drum, and having spaced ear projections on opposite sides thereof coplanar with said spacers, the opposing faces of said ear projections having forwardly extending recesses therein for receiving the terminal portions of said contact fingers.

13. In a drum controller, in combination, an insulating contact carrying drum of sectional construction comprising axially alined cylindrical spacers of like form and thin circular contact carrying disks of like form carried between said spacers, a plurality of forwardly extending contact fingers engaging said contact carrying disks on opposite sides thereof, each of said contact fingers having a reflexed terminal portion on the rear end thereof, a sectional insulating support for said fingers located to the rear of said drum and including like molded insulating members stacked one upon the other, said insulating members having spaced ear projections on opposite sides thereof coplanar with said spacers and the opposing faces of said ear projections having forwardly extending recesses formed therein for receiving the reflexed terminal portions of said contact fingers, the terminal portions of said contact fingers being freely insertable into said recesses from the front of said support, and terminal screws associated with the respective terminal portions, which engage within recesses formed in said molded insulating members to hold said contact fingers in assembled position upon said support.

14. In an electric switch, in combination, a rotatable contact drum, a plurality of elongated resilient contact fingers of like form engaging said drum, said contact fingers being arranged in parallel rows on opposite sides of said drum and each having a contact portion on one end thereof and a reflexed terminal portion formed on the opposite end thereof, a stationary support for said contact fingers located to the rear of said drum and extending parallel thereto, said support comprising molded insulation having notches formed on opposite sides thereof for receiving the terminal portions of said contacts to hold the latter against lateral displacement and also against endwise movement rearwardly with respect to said support, the terminal portions of said contacts being freely insertable into said notches from the front of said support, and means associated with said contacts for releasably holding the same against forward movement with respect to said support.

15. In an electric switch, in combination, a rotatable contact drum, a plurality of elongated resilient contact fingers of like form engaging said drum, said fingers being arranged in two parallel rows on opposite sides of said drum and each having a contact portion on one end thereof and a reflexed terminal portion formed on the opposite end thereof, a sectional insulating support for said fingers located to the rear of said drum and including like molded insulating members stacked one upon the other and each having a pair of ear projections formed on opposite sides thereof, the opposing faces of said ear projections having grooves formed therein which open to the front of said support and the reflexed terminal portions of said contacts being adapted to seat downwardly into said grooves from the front of said support to restrain said contact members against lateral displacement and also against endwise movement rearwardly with respect to said support, wiring terminal screws associated with the respective terminal portions, said insulating sections being formed to accommodate the shanks of said screws to hold said contact fingers in assembled position upon said support.

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