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2,793,259

SWITCH MECHANISM

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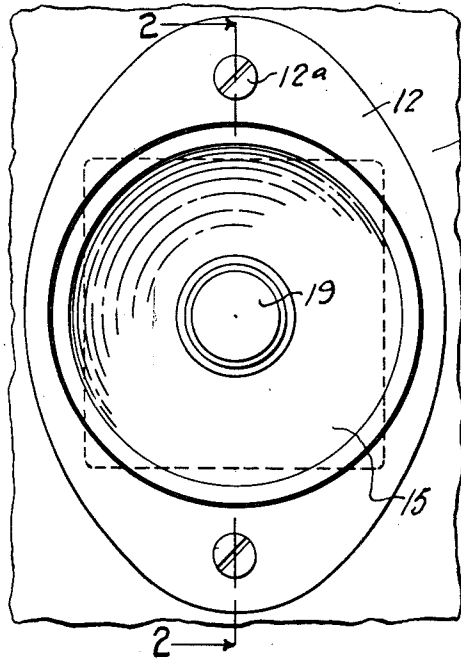


FIG. 1.

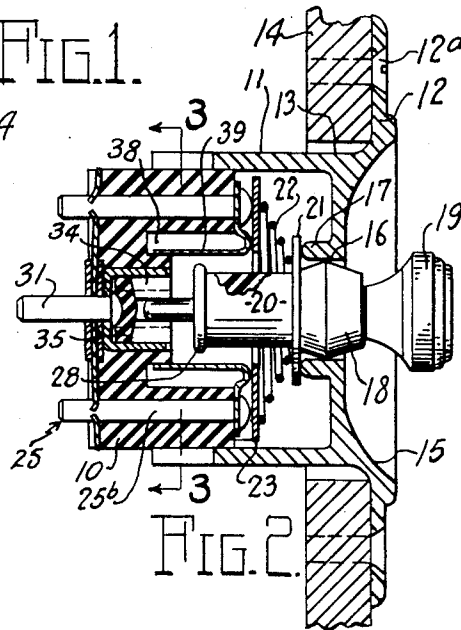


FIG. 2.

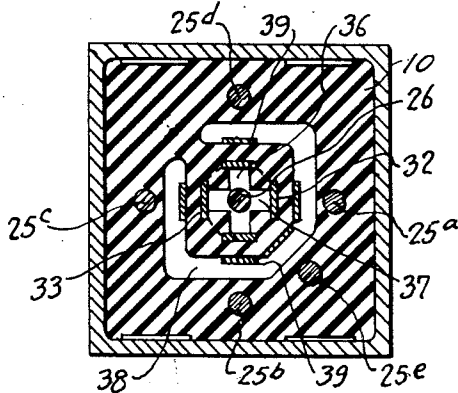


FIG. 3.

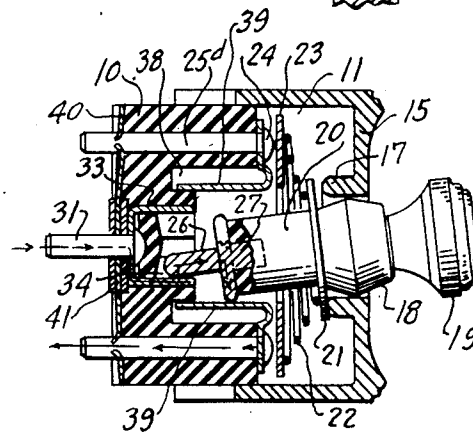


FIG. 4.

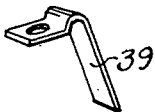


FIG. 5.

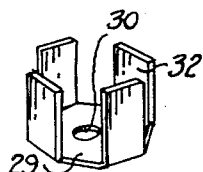


FIG. 6.

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SWITCH MECHANISM

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9 Claims. (Cl. 200—6)

This invention relates to switch mechanism particularly of the type for selectively carrying current to several outlets, and an object is to produce a new and improved switch mechanism of this character which operates satisfactorily; can be manufactured economically on a quantity basis; is rigid and sturdy and reliable in construction; and has the unique features of construction, assembly and operation hereinafter described.

For purposes of illustration, but not of limitation, an embodiment of the invention is shown on the accompanying drawings in which

Figure 1 is a face view of the switch mechanism mounted on a supporting panel;

Figure 2 is a vertical sectional elevation substantially on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view substantially on the line 3—3 of Figure 2;

Figure 4 is a view somewhat similar to Figure 2 but showing the switch shifted to one position for making the desired contact;

Figure 5 is a perspective view of one of the contact spring elements; and

Figure 6 is a perspective view of the cup-like conductor unit.

The illustrated embodiment of the invention comprises a plastic block or base 10 of any suitable electrical insulating material. Slidable over the base 10 which is substantially square in cross section is a metallic cover member 11, the skirt of which is adapted to telescope over a portion of the base 10. Integral with the outer portion of the cover 11 is an escutcheon 12 which is flat and generally oval in appearance as shown in Figure 1 to fit flatly against a supporting panel 14 to which the escutcheon is secured by screws 12a. The front end of the cover 11 is closed by an integral wall 15 which as shown is inwardly dished on the outer side, the inner side being flat. The cover 15 has a central opening 16 which is surrounded by an inwardly extending cylindrical tube-like flange 17 integral with the cover. Mounted for universal rocking movement within the tube-like flange 17 is a rocker 18 which is generally in the form of a double truncated cone, the structure being such that the central portion of the rocker provides a peripheral ridge from which taper in opposite directions the cone portions substantially as shown on Figure 1. This enables the rocker to rock in any direction desired within a single plane and still maintain its proper position relative to the inner working parts of the switch mechanism. The rocker 18 may be of metal such as a die casting, chromium plated for example to enhance its appearance, and secured to the outer end thereof is an operating knob 19 which extends outwardly beyond the dished cover 15 in position to be readily and conveniently grasped for operation. The knob 19 may likewise be of metal plated to enhance its appearance and of any desired esthetic design.

On the inner end of the rocker 18 is a post-like extension 20 secured in any suitable manner to the rocker 18. Intermediate the post extension 20 and the rocker 18 is a

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washer 21 which as indicated in Figure 2 is adapted normally to seat against the inner end of the tube-like flange 17. Bearing against the inner face of the washer 21 is a conical spring 22, the small end of the spring engaging the washer 21 and the large end of the spring seating against a washer 23 which abuts and bears against the heads 24 of an annular row of prongs or pins 25 which extend through the insulating base 10 with the opposite ends projecting outwardly therebeyond to be plugged into a suitable receptacle as will be readily understood.

The post extension 20 is of electrical insulating material and mounted on the inner end thereof in any suitable manner is a contact nose 26 of electrical conductive material. The unit including the nose 26 has an attaching portion 27 which is socketed in and suitably secured to the post extension 20. Intermediate the nose and attaching portion 27 is an integral disk-like head 28, the rim of which projects outwardly beyond the side walls of the post extension 20.

As will more fully appear hereinafter the contact nose 26 is adapted to engage one of the arms of a cup-like conductor. As shown the conductor is a one piece metallic structure having a base 29 formed with a central aperture 30 through which the pin or prong 31 extends, the same being connected to a battery or other source of electrical current. Integral with the base 29 and extending at substantially right angles thereto and spaced from each other are four legs 32. The legs 32 extend into slots formed in the base 10, slots being indicated generally at 34. Thus the legs 32 are in position to be engaged by the contact nose 26 upon rocking of the armature member. It will be apparent that the face 29 of the contact member abuts against the outside of a base member 35 integral with the base 10 as indicated particularly in Figures 1 and 4, the same being socketed in its under side to accommodate the head of the pin or prong 31. It will also be apparent that the upper surface of the base or partition member 35 is free of contact with the adjacent end of the contact nose 26, enabling the contact nose to be rocked in the desired manner without contacting the portion 35.

Surrounding the recessed portion into which the contact nose 26 projects is a recessed portion 38 which as shown in Figure 3 is not complete nor is it of any definite configuration. It is formed by a recess to receive the free end of each of the contact springs 39. It will be understood that there is one contact spring for each of the prongs 25.

The contact springs 39 are generally L-shaped as indicated on Figure 5 having a flat upper portion which abuts against the flat end portion of the plastic base 10 and being apertured to receive the prongs 25. The long arm of the spring 39 inclines outwardly normally as indicated in Figure 5 so that when it is applied in position of use, it is under spring tension to engage against the inner wall of the recess 38. Thus in position of use the long arm of the spring 39 is substantially parallel to the normal axis of the switch mechanism. The springs 39 are in position to be contacted by the disc-like head 28 of the contact piece which shifts with the knob as above indicated and as best shown on Figure 4.

On the drawing there are shown five pins or prongs 25 and these have been given designation as 25a, 25b, and 25c, these being substantially equally spaced from each other. Then between the pins 25a and 25b is another pin 25e. As above mentioned it will be understood that along with each of these pins or prongs is a contact spring 39.

The contact nose 26, although it is mounted for more or less universal movement, can only move within defined paths. For this purpose a pair of intersecting cross channels 36 and 37 formed in the insulated base 10 de-

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termine the movement of the contact nose. As shown in Figure 3 these channels or grooves cross each other at right angles and at the end of each of these channels is disposed one of the legs 32 above mentioned, these legs carrying current from the battery or other source. Thus when the contact nose 26 is brought into engagement with one or another of the current-carrying legs 32, current then passes from the legs 32 to the contact nose 26 and thence to the disk-like head 28 and thence to the contact spring 39. The arrangement is such that the contact spring 39 is first engaged and before the contact nose 26 engages the respective current carrying leg 32. Thus the nose 26 does not at any time engage a leg 32 which carries the current from the battery or other source until after one of the contact arms 39 is first engaged. As a matter of fact the respective contact arm 39 is engaged and then flexed slightly before the nose 26 is brought into engagement with a current carrying arm 32. In view of the cross channel arrangement 36 and 37, manifestly the contact nose 26 can move only in a defined path. In one direction the tilting action results in the supplying of current to the pin or prong 25a or rocking motion in the opposite direction supplies current to the prong 25c. Similarly a rocking motion in one direction will bring the contact nose 26 into the channel 36 to bring current either to the contact prong 25b or 25d.

It should be noted that the prong 25e is positioned between the prongs 25a and 25b. Associated with the prong 25e is the spring finger 39 similar to that above described. This arrangement is such that when the contact nose 26 is brought in such direction as to bring current to the prong 25a, the disk-like head 28 will also and simultaneously engage the two spring contact arms 39 which are associated with the prongs 25a and 25e respectively. Therefore current is simultaneously brought to both these prongs upon the rocking of the contact nose toward the prong 25a. This same action obtains in connection with the movement of the contact nose 26 in a direction to bring current to the prong 25b because similarly the circular head 28 will at the same time be brought into engagement with the contact spring 39 associated with both the contact prong 25b and the prong 25e.

The mounting of the assembly is done in a conventional manner, a simple spring clip operating both to hold the cover 11 and base 10 in the desired assembled position and at the same time secure these parts securely together. Such spring clips are old in the art and since they form no part of the present invention, description and illustration thereof are not considered necessary. As shown in Figures 1 and 4, a plate 40 having spring arms to engage the adjacent prongs is provided and such plate may serve as a bus bar in some instances to connect certain of the prongs together electrically. It will also be observed that insulating washers 41 are provided for insulating the plate 40 from adjacent portions such as the base 29 of the cup-like conductor.

From the above description it will be manifest that I have produced an exceedingly simple and inexpensive switch mechanism, the parts of which can be readily and conveniently assembled. The entire structure has been designed from the standpoint of a long period of service without attention, the parts being ruggedly constructed and none is of such delicate structure as to break readily or otherwise render the mechanism inoperative. The structure can be produced economically on a large quantity production basis and has been worked out with that as an important feature.

Numerous changes in details of construction, arrangement and choice of materials may be effected without departing from the spirit of the invention especially as defined in the appended claims.

What I claim is:

1. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said

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body and arranged to be flexed toward the respective pin, means on said body adapted to connect with a source of current and having a plurality of arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, and a rockable switch actuating member having a spring element contacting part for passing current from any one of said arms to the adjacent of said spring elements, said contacting parts being constructed and arranged so that said spring element is first engaged and then said adjacent current carrying arm is engaged.

2. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, means on said body adapted to connect with a source of current and having a plurality of arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a rockable switch actuating member having a spring element contacting part and an arm contacting part for passing current from any of said arms to the adjacent of said spring elements, said contacting parts being constructed and arranged so that said spring element is first engaged and then said adjacent current carrying arm is engaged, and means to cause said arm contacting part of the rockable member to move in defined paths.

3. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, a cup-like member fitted to a central portion of said body adapted to connect with a source of current and having a plurality of integral arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a rockable switch actuating member having a spring element contacting part and any one of said arms contacting part for passing current from an arm to the adjacent of said springs element, said contacting parts being constructed and arranged so that said spring element is first engaged and then said adjacent current carrying arm is engaged, and means to cause said arm contacting part of the rockable member to move in defined paths.

4. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, a cup-like member fitted to a central portion of said body adapted to connect with a source of current and having a plurality of integral arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a rockable switch actuating member having a spring element contacting part and any one of said arms contacting part for passing current from an arm to the adjacent of said spring elements, said contacting parts being constructed and arranged so that said spring element is first engaged and then said adjacent current carrying arm is engaged, said contacting parts comprising a one-piece member in which an elongate nose constitutes the spring element contacting part, and means to cause said arm contacting part of the rockable member to move in defined paths.

5. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, means on said body adapted to connect with a source of current and having a plurality of arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a housing part fitting one end of said body and having a central cylindrical flanged aperture, a switch actuating member having a substantially line contact with the wall of said aperture, a manual element on said actuating member exteriorly of said hous-

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ing part, a post rigid with said actuating member and of non-conducting material, spring means for mounting said actuating member and normally positioning same centrally, a nose of conducting material on the inner end of said post for engagement with a selected current carrying arm, and a cylindrical disc intermediate the nose and said post and also of conductive material, said disc being engageable with any of said spring elements before the nose engages the adjacent of said current carrying arms.

6. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, means on said body adapted to connect with a source of current and having a plurality of arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a housing part fitting one end of said body and having a central cylindrical flanged aperture, a switch actuating member having a substantially line contact with the wall of said aperture, a manual element on said actuating member exteriorly of said housing part, a post rigid with said actuating member and of non-conducting material, spring means for mounting said actuating member and normally positioning same centrally, a nose of conducting material on the inner end of said post for engagement with a selected current carrying arm, a cylindrical disc intermediate the nose and said post and also of conductive material, said disc being engageable with any of said spring elements before the nose engages the adjacent of said current carrying arms, and means providing channels in said body into which the nose extends and is movable, a current carrying arm being disposed at the end portions of said channels.

7. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through said body, a leaf spring element for each pin mounted on said body and arranged to be flexed toward the respective pin, means on said body adapted to connect with a source of current and having a plurality of arms disposed parallel to and spaced from said spring elements, one arm being adjacent each spring element, a housing part fitting one end of said body and having a central cylindrical flanged aperture, a switch actuating member in the form of a double reversely positioned truncated cone, having a substantially line contact with the wall of said aperture, a manual element on said actuating member exteriorly of said housing part, a post rigid with said actuating member of non-conducting material, spring means for mounting said actuating member and normally positioning same centrally, said spring means including a washer on said cone, a washer abutting the ends of said conductive pins, and a cone-shaped spring between said washers, a nose of conducting material on the inner end of said post for engagement with a selected current carrying arm, a

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cylindrical disc intermediate the nose and said post and also of conductive material, said disc being engageable with any of said spring elements before the nose engages the adjacent of said current carrying arms, and means providing channels in said body into which the nose extends and is movable, a current carrying arm being disposed at the end portions of said channels.

8. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through and spaced about the outer portion of said body, said body having a central inwardly disposed cavity having a plurality of slots corresponding in arrangement to said pins, a substantially cup-shaped metallic member having integral vertically disposed arms extending through said slits respectively, means for conveying current to said cup-shaped member, an inwardly extending recess in said body between said pins and said central recess, a conductive spring for each pin and comprising a portion anchored by the pin and an arm portion resiliently engaging an inner wall of said inwardly extending recess, and a manually rockable actuator having a nose portion projecting into said central recess for selectively engaging one of said vertically disposed current carrying arms, said actuator also having a conductive member engaging said nose and projecting laterally so that upon rocking of the actuator said last member engages one of said springs before the nose engages one of said current carrying arms.

9. Switch mechanism comprising an insulating body, a plurality of conductive pins extending through and spaced about the outer portion of said body, said body having a central inwardly disposed cavity having a plurality of slots corresponding in arrangement to said pins, a substantially cup-shaped metallic member having integral vertically disposed arms extending through said slits respectively, means for conveying current to said cup-shaped member, an inwardly extending recess in said body between said pins and said central recess, a conductive spring for each pin and comprising a portion anchored by the pin and an arm portion resiliently engaging an inner wall of said inwardly extending recess, and a manually rockable actuator having a nose portion projecting into said central recess for selectively engaging one of said vertically disposed current carrying arms, said actuator also having a conductive member engaging said nose and projecting laterally so that upon rocking of the actuator said last member engages one of said springs before the nose engages one of said current carrying arms, said central recess having channels into which said nose projects for causing the latter to move through predetermined paths.

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