Jan. 2, 1962 W. B. DULL 3,015,705

DUAL ROTARY SWITCH ASSEMBLY

Filed Oct. 6, 1958 2 Sheets-Sheet 1

Fig 1

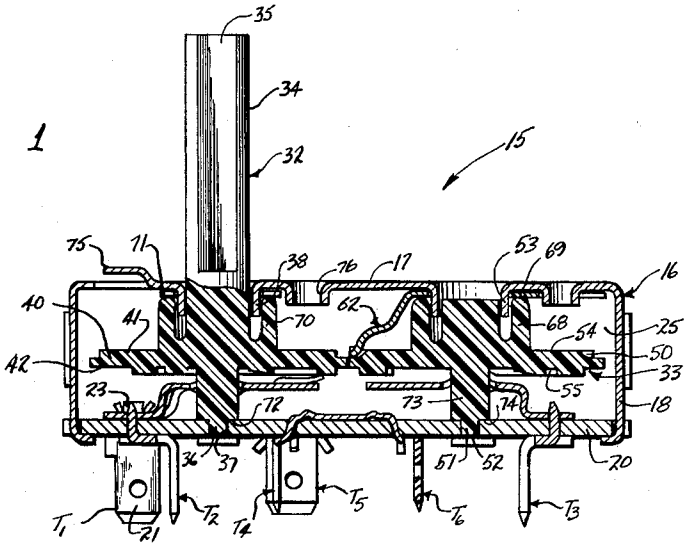


Fig 2

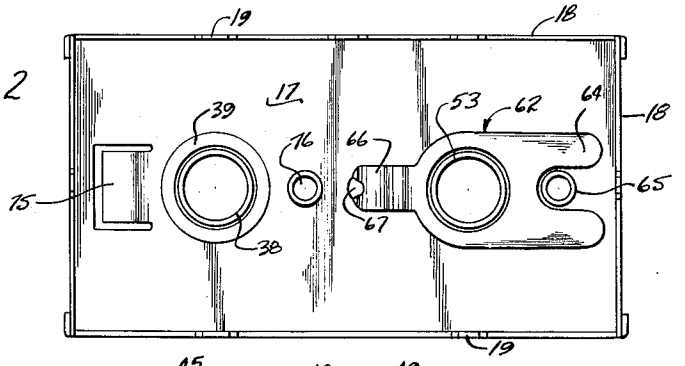
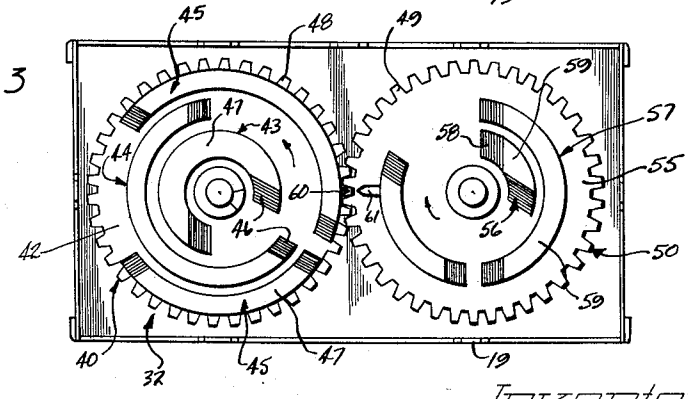


Fig 3



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DUAL ROTARY SWITCH ASSEMBLY

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Fig 4

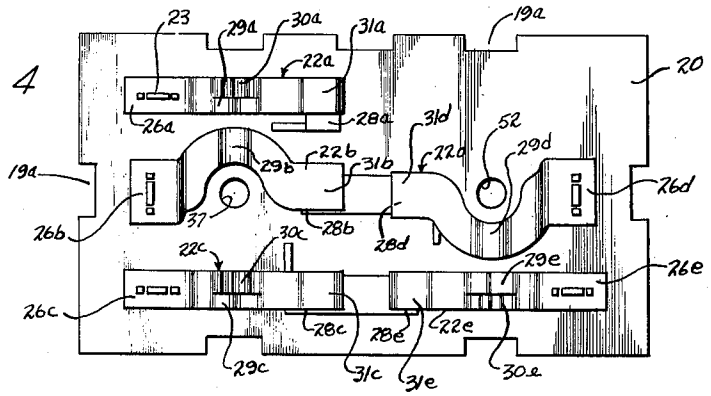


Fig 5

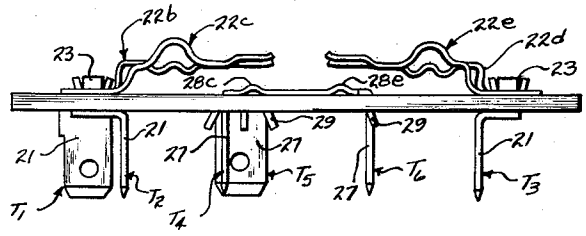
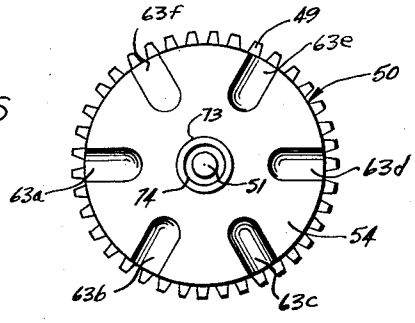


Fig 6



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3,015,705

DUAL ROTARY SWITCH ASSEMBLY

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Filed Oct. 6, 1958, Ser. No. 765,603
7 Claims. (Cl. 200—6)

The present invention relates broadly to electrical switch constructions, and is more particularly concerned with a dual rotary switch provided with a pair of cooperating angularly adjustable actuator members having camming flanges cooperating with resilient contact arms and resilient positioning means to thereby effect selective actuation of the contact arms and self-indexing of the switch through the positioning means.

According to the general principles of the present invention, a pair of one-piece actuators made of molded nylon or the like and each provided with a stem having a flange formed thereon are used to actuate resilient contact arms into selective bridging engagement with contact terminals carried on a base plate. The contact arms and the actuating flange on each stem are enclosed in a switch housing. Each flange is provided with teeth around its outer circumference for meshing engagement with the other flange whereby rotation of one actuator member drives the other actuator member. One side of the flange on both the driving and driven actuator member has camming surfaces formed thereon selectively engaging the contact arms, while in the exemplary embodiment of the invention disclosed herein, the other side of the flange of the driven actuator member has camming surfaces selectively engaging resilient positioning means preferably supported by an adjoining wall of the housing. Any desired number of positions may be provided in the switch of this invention, and in particular applications stop means may be utilized to limit the angular adjustability of the actuator members. However, normally the novel switch herein disclosed is selectively adjustable through a complete revolution of 360° so that stop means are not required.

By provision of camming surfaces on one side of both flanges, and camming surfaces on the opposite side also of one of the flanges, the resilient contact arms are actuated to perform electrical functions and the resilient positioning means engaged to perform the mechanical functions of indexing and angular movement control. Further, by provision of the gearing arrangement whereby one actuator member is driven by the other, a greater number of switch positions are obtained without substantially increasing the dimensions of the switch housing. In addition, by reason of the inherent resilience of the contact arms and positioning means, all parts are preloaded and unnecessary looseness therebetween, rattling and other undesirable actions are effectively avoided. Also, the preloading gives a good positioning feel in the operation of the switch.

A primary aim of the present invention accordingly lies in the provision of a new and improved dual rotary switch assembly.

Another object of the invention is to provide a rotary switch comprising a minimum number of relatively simple components.

A further object of this invention is to provide one-piece actuator mechanisms for a rotary switch which do not require lubrication and which may be readily fabricated utilizing high speed production techniques.

A still further object of the invention is to provide a dual rotary switch incorporating novel actuator members in meshing engagement one with the other and effective

to induce the performance of both electrical and mechanical functions.

Other objects and advantages of the invention will become more apparent during the course of the following description, particularly when taken in connection with the accompanying drawings.

In the drawings, wherein like numerals are employed to designate like parts throughout the same:

FIGURE 1 is a cross-sectional view, with parts shown in elevation, of a rotary switch provided in accordance with the principles of the present invention;

FIGURE 2 is a plan view of the interior of the switch housing, with certain parts removed, to show particularly the resilient positioning means as located therein;

FIGURE 3 is a plan view of the interior of the switch housing, and showing the cooperating actuator members after proper positioning therein;

FIGURE 4 is a plan view of the base plate illustrating a particular arrangement of contact switch means;

FIGURE 5 is a side elevational view of the base plate and showing the contact switch means and terminal members connected thereto; and

FIGURE 6 is a plan view of one side of an actuator member to illustrate camming surfaces provided for engagement with the resilient positioning means shown in FIGURE 2.

The switch of the present invention is indicated generally by the reference numeral **15**, and comprises an enclosure or housing **16** which can conveniently be made as a cup-shaped stamping of generally rectangular configuration including a wall **17** and upstanding side walls **18**. At the edges of the side walls **18** there is provided a plurality of tangs or lugs **19** which can be struck over to retain in firm assembly across the open side of the enclosure **16** a base member or plate **20** made of an electrically non-conductive material.

The base member **20** is a rectangularly shaped insulator sheet and has its edges notched as at **19***a* in FIGURE 4 to receive the tangs or lugs **19**. Attached in firm assembly to the base member is a plurality of contact terminals. For clarity in description, the designations T_1, T_2, and T_3 are applied to the contact terminals which secure the switch contacts to the base member **20**, while the legends T_4, T_5, and T_6 are applied to the contact terminals against which the switch contacts are selectively depressed during operation of the switch assembly **15**. The switch assembly now to be further described is a six-position switch, however, it will be appreciated that the principles of this invention apply to switches having a greater or lesser number of positions, and that accordingly the number of contact terminals may be widely varied. Modifications may further be practiced in the arrangement of camming surfaces later to be described. The number of switch positions to be provided is limited principally by availability of space on the actuator members for the camming surfaces as well as the limitations of space on the base member for the contact terminals, and the six-position switch herein disclosed should therefore be considered as exemplary only.

It is to be noted particularly from FIGURES 4 and 5 that each contact terminal T_1, T_2 and T_3 comprises a connecting contact portion **21** on the outside of the switch **15** and a switch contact portion **22** inside of the enclosure **16**. A single connecting portion **21** serves to secure the switch portions **22***b* and **22***c* to the base member **20**, and a single connecting portion **21** attaches the switch portions **22***d* and **22***e* to said base **20**. The switch portion **22***a* is mounted by the connecting portion **21** of the terminal T_1 only. Various means may be employed to effect the attachment of the switch portions and connecting portions to the base member **20**, and a preferred mode is

to slot the switch portions for reception of the connecting portions and to flare one end of each of the latter portions against each switch portion, as indicated in FIGURES 1 and 5 by the numeral **23**. It may be noted at this point that the enclosure **16**, being closed by the base member **20**, has a hollow space **25** bounded on opposite sides by walls formed by the base member **20** and the wall portions **17** of the enclosure **16**.

Each of the contact arms includes a body portion **26***a–e* connected to the base member **20** by means of the connecting portions **21** of the terminals T_1–T_3 as noted, and each of the contact arms is disposed inside of the space **25** of the housing **16**. It is to be seen that the contact arms **22***a*, **22***c* and **22***e* are essentially identical in configuration, and that the contact arms **22***b* and **22***d* are also similarly shaped. Each contact arm **22** is made of a strip material which is electrically conductive, and preferably has an inherent resiliency or springiness in order to develop the novel functions of the present invention.

The terminals T_4, T_5 and T_6 are each provided with a connecting portion **27** disposed outside of the space **25** and a contact portion **28** interiorly of the enclosure **16**. Securement of the noted terminals to the base member **20** may be effected by flaring one end of each contact portion outwardly as at **29** to form a pressed contact with the outer surface of the base member. It is to be seen from FIGURES 4 and 5 that the contact terminal T_4 serves by its contact portion **28** both of the switch portions **22***c* and **22***e*, that the terminal T_6 provides the contact for the switch portions **22***b* and **22***d*, and that the contact portion **28** of the terminal T_5 serves in the exemplary form shown only the switch portion **22***a*. For ease of understanding in the later to be described operation of the present switch assembly, the suffixes *a–e* have been applied to the contact portions of the terminals T_4, T_5 and T_6 acted upon by the switch portions **22***a–e*, respectively.

The body portion **26** of each contact arm extends toward the respective contact terminals T and includes an angularly bent detent portion indicated at **29***a–e*, the legs of the detent portion being shaped to protrude inwardly into the space **25** of the enclosure **16**. In the case of the contact arms **22***a*, **22***c* and **22***e*, the respective detent portions may be struck out of the contact arms in generally midway of their lengths to provide on each an oppositely bent portion **30***a*, **30***c* and **30***e*. With respect to the contact arms **22***b* and **22***d*, it may be noted that their respective detent portions comprise the entire width of the arms. Each contact arm **22***a–e* further comprises a switch contact portion **31***a–e*, respectively, in registry with the contact portions **28***a–e* of the terminals T_4, T_5 and T_6.

According to the principles of the present invention, there is provided a pair of cooperating one-piece actuator members which are conveniently fabricated as integral molded articles made of a suitable electrically non-conductive material such as nylon or the like. A commercially available material which has proven suited in actual practice is identified as Du Pont's Zytel No. 101. In this connection, it may be noted that the material selected may include such a representative plastic material as nylon which has the characteristic of being self-lubricating when fitted into bearing engagement with a metallic surface.

Referring now particularly to FIGURES 1 and 3, the actuating members of the present invention are indicated generally at **32** and **33**, the member **32** being herein referred to as the driving member and the member **33** as the driven member. The driving member **32** will first be described in detail.

The member **32** comprises a generally cylindrical stem **34** flattened as at **35** to receive a finger manipulable knob (not shown) to facilitate manual actuation of the switch **15**. At the opposite end of the stem **34** there is provided a reduced diameter pin **36** which is received in and seated in an aperture **37** located in the base member **20** to thereby provide a bearing and journal support for the end of the actuator **32**.

The wall portion **17** of the enclosure **16** is also provided with an apertured embossment **38** surrounded by a relatively thin washer **39** and sized to provide a bearing and journaling engagement for the stem **34** of the actuator **32**.

At an intermediate portion of the stem **34**, the driving member **32** is provided with a flange **40** which extends radially outwardly from the stem inside the space **25** of the enclosure or casing **16**. The flange **40** has front and rear faces **41** and **42**, respectively, spaced from the wall **17** and base member **20**.

The front face **41** of the flange **40** is essentially flat as shown, while the opposite face **42** is constructed to include three arc-like camming surfaces **43**, **44** and **45** shaped and disposed to engage the detent portions **29***b*, **29***a*, and **29***c*, respectively, of the contact arms **22***b*, **22***a* and **22***c*. Each camming surface **43**, **44** and **45** is provided at opposite ends with a sloped or inclined portion **46** and a generally flat portion **47** therebetween, and the camming surface **45** is interrupted about its circumference to provide a pair of spaced camming segments. As mentioned earlier, other arrangements of camming surfaces are well within the purview of this invention should it be desired to provide a switch having a greater or lesser number of electrical positions than those shown in the drawings and described herein.

The peripheral portion of the flange **40** is provided with a plurality of circumferentially spaced teeth **48** for meshing driving engagement with teeth **49** similarly spaced and located upon a flange **50** of the driven actuator member **33**. It is to be seen from FIGURE 1 that the actuator members **32** and **33** are generally similarly shaped, an essential departure therefrom being the absence of a stem portion on the member **33** extending outwardly from the casing or housing **16**. The actuator member **33** is provided at one end with a reduced diameter pin **51** which is received and seated in an aperture **52** located in the base member **20** to thereby provide a bearing and journal support for the end of the driven member **33**. The wall portion **17** of the enclosure **16** is also provided with an apertured embossment **53** sized to provide a bearing and journaling engagement for the end of the actuator opposite to the reduced diameter pin **51**.

The flange **50** of the actuator **33** has front and rear faces **54** and **55**, respectively, spaced from the wall **17** and base member **20**. The face **55** of the flange **50** is constructed to include a pair of arc-like camming surfaces **56** and **57** shaped and disposed to engage the detent portions **29***d* and **29***e*, respectively, of the contact arms **22***d* and **22***e* during rotation of the actuator **33** in meshing relation with the actuator **32**. As was described in connection with the camming surfaces on the flange **40** of the actuator **32**, the camming surfaces **56** and **57** on the flange **50** are each provided with a sloped or inclined portion **58** at opposite ends thereof and a generally flat portion **59** therebetween. The camming surface **57** is discontinuous to provide a pair of interrupted camming segments, in the manner of the camming surface **45** on the base flange **40**. With respect also to the camming arrangement on the flange **50**, variations may be effected should it be desired to provide a switch having a greater or lesser number of electrical positions than those shown in the drawings and described herein.

To assure that the camming surfaces on the flanges **40** and **50** will be located properly with respect to the contact switches **22***a–e*, alignment indicia **60** and **61** are provided on the faces **42** and **55** of the flanges **40** and **50**, respectively. Such indicia may be in the form of a raised portion integral with each face, may be a recess in one of the teeth **48** of the flange **40** and a recess on the face **55** of the flange **50**, or may be painted on said faces or otherwise applied thereto.

Referring in particular to FIGURES 1 and 2, the apertured embossment **53** in the wall **17** of the housing

16 is surrounded by and has seated thereupon resilient positioning means 62. The positioning means functions in cooperation with camming means located on the face 54 of the flange 50, said means comprising as shown in FIGURE 6 a plurality of rounded bottom notches 63 circumferentially spaced with respect to one another in the manner shown. Six of said notches or camming surfaces are formed to provide the desired indexing functions during rotation of the actuators 32 and 33, although it is of course appreciated that the number and positioning of the camming surfaces 63 may be varied when a greater or lesser number of positions are desired in the switch 15.

To function properly in cooperation with the camming surfaces 63 to provide the desired indexing, the positioning means 62 is shaped to include at one end a yoke portion 64 surrounding an apertured embossment 65 in the wall 17 of the enclosure 16 to restrain the positioning means against movement within the housing. The opposite end of the positioning or indexing means is formed to include a raised or tongue portion 66 having a detent 67 thereon. As appears in FIGURE 1, the major portion of the length of the resilient positioning means 62 lies flush with the inner surface of the wall 17, with the exception of the raised or tongue portion 66 of said positioning means. It is to be seen that the tongue portion is generally rounded for proper reception in the closed rounded end of each camming notch or groove 63.

In addition to being restrained against movement within the housing by location on the embossments 53 and 65, the positioning means 62 is held closely against the inner surface of the wall 17 by an annular bearing ring 68 which projects axially from the face 54 of the flange 50 and is spaced concentrically outwardly of the central portion of the actuator 33. The bearing ring 68 is sized to surround the apertured embossment 53 and has an annular bearing edge 69 slidably abutting the resilient positioning means 62 and preventing inward movement of said means within the housing 16.

Similarly, the actuator member 32 is shaped to include an annular bearing ring 70 having an annular bearing edge 71 slidably abutting the washer means 39 surrounding the apertured embossment 38. The annular bearing ring 70 is spaced concentrically outwardly of the stem 34 of the actuator 32, and functions to maintain the washer means 39 in firm contact with the inner surface of the wall 17. It has been found desirable to incorporate the bearing means 39 in the assembly to provide a better bearing relation with the annular edge 71 on the actuator 32.

Between the pin 36 and the stem 34 of the actuator 32 there is a radial shoulder 72 which engages against the base 20. Similarly, between the pin 51 and inner stem portion 73 of the actuator 33 there is a radial shoulder 74 which also engages against the base 20. Accordingly, the portion of the stem 34 lying between the flange 40 and the pin 36, as well as the stem portion 73 of the actuator 33, operate as spacers in positioning the respective flanges 40 and 50 relative to the base member 20. Likewise, in addition to cooperating in maintaining the positioning spring 62 against the inner surface of the housing wall 17, the bearing ring 68 operates as a spacer positioning the flange 50 relative to the wall 17. In like manner, the bearing ring 70 on the actuator 32 spaces the flange 40 relative to the wall 17.

It is to be further noted that the axial dimension between the radial shoulder 72 and the annular bearing surface 71, as well as the axial dimension between the radial shoulder 74 and the annular bearing surface 69, is such that when the actuators 32 and 33 are positioned with their respective flanges 40 and 50 interiorly of the space 25, the resilient contact arms 22 resiliently engage the camming faces 42 and 55 of the flanges 40 and 50 and develop a spring bias detent function upon cooperatively engaging the camming surfaces 45, 46 and 47 on the face 42 and the camming surfaces 56 and 57 on the camming face 55.

When the switch 15 is assembled as shown in FIGURE 1 with the indicia 60 and 61 aligned in the manner of FIGURE 3, the detent portion 67 of the resilient positioning means 62 is in the camming notch 63*a* on the front face 54 of the actuator member 33. Further, the detent portion 29*a* of the switch contact 22*a* is acted upon by the flat portion 47 of the camming surface 44 on the actuator 32, and the detent portion 29*c* of the switch contact 22*c* is upon the flat portion of the camming surface 45. In this first position of the switch 15, a circuit is completed from the terminal T_1 to the terminal T_5, and a circuit completed from the terminal T_2 to the terminal T_4. Rotation of the actuator member 32 in a clockwise direction when viewed looking toward the wall 17 of the switch 15, causes the detent portion 29*a* to travel upon the flat portion of the cam 44 to continue the circuit from terminal T_1 to terminal T_5 and further causes the detent 29*b* to ride upon the camming surface 43 to depress the switch contact portion 31*b* of the switch 22*b* against the contact 28*b* of the terminal T_6. Simultaneously, the detent 29*c* remains in contact with the camming surface 45 to continue the circuit from the terminal T_2 to the terminal T_4. Rotation of the flange 40 in meshing engagement with the flange 50 of the actuator 33 causes counterclockwise rotation of the flange 50 to engage the detent 29*d* of the switch contact 22*d* and complete a circuit from the terminal T_6 to the terminal T_2. Upon completion of this rotation, the switch 15 is in its second position and the camming surface 63*b* on the front face of the flange 50 receives the detent 67 of the resilient positioning means 62 to properly index the switch.

Continued rotation of the actuator 32 moves the actuator 33 so that the resilient positioning means indexes the switch to a third position, at which time the positioning means is contacted by the camming surface 63*c* on the face 54 of the radial flange 50. It will be found that in this third position the detent portions of each switch contact 22*a–e* is in engagement with the relatively flat portion of each camming surface 43, 44, 45, 56, and 57. Accordingly, the switch contact portions 31*a–e* are depressed against the contacts adjacent thereto. In this third position a circuit is completed from terminal T_1 to terminal T_5, a circuit completed from terminal T_3 to terminal T_4, and a circuit effected from terminal T_6 to terminal T_2.

Continued clockwise rotation of the actuator 32, and consequent counter-clockwise rotation of the actuator 33, moves the detent 29*a* off the camming surface 44, releases the detent 29*b* from the camming surface 43 and causes the detent 29*e* to move off the camming surface 57. In this fourth position, the switch contact 31*d* is depressed against the terminal contact 28*d* and the contact portion 31*c* bears against the terminal contact 28*c*. Accordingly, a circuit is completed from the terminal T_4 to the terminal T_2 and from the terminal T_6 to the terminal T_2.

Upon further rotation of the actuators 32 and 33, the resilient positioning means 62 indexes the switch into the fifth position by reception in the camming notch 63*e* on the radial flange 50. The detents 29*a* and 29*e* remain out of engagement with their adjacent camming surfaces, the detent 29*c* is off the camming surface 45, the detent 29*d* is upon the flat portion 59 of the detent 56, and the detent 29*b* is upon the flat portion 47 of the camming surface 43. A circuit is thereupon completed from terminal T_6 to terminal T_2 and from terminal T_4 to terminal T_3.

The final position of the illustrative switch 15 shown finds the detent 67 of the resilient positioning means in the camming notch 63*f* of the radial flange 50 of the actuator 33. At this time the detent 29*d* remains upon the flat surface 59 of the camming surface 56 and the

detent 29*e* is upon the camming surface 57. All other detents are released from their respective camming surfaces. With the detents 29*d* and 29*e* thus contacted, a circuit is completed from terminal T_6 and from terminal T_4 to terminal T_3. Again, as noted, a greater or lesser number of switch positions may be provided without departure from the novel concepts of the present invention.

A switch of the character described finds many applications in the appliance and related industries, and the switch may be conveniently mounted on an appliance cabinet or related structure in a number of different ways. The wall 17 of the enclosure or housing 16 may have an outwardly turned portion 75 (FIGURES 1 and 2) receivable in a suitable opening in the supporting structure, and the casing 16 may be rigidly secured thereto by passing a metal screw or bolt or similar means through a threaded apertured embossment 76 in the wall 17 of the enclosure 16 and into said supporting structure. Other forms of mounting means may of course be employed.

Because of the inherent resiliency of the spring contact arms 22*a–e* and the positioning spring means 62, the actuators 32 and 33 are in effect preloaded, thereby tending to maintain selected positions of adjustment obtained by rotating the actuators relative to the detent portions 29*a–e* of the contact arms and relative to the detent 67 of the positioning spring 62. When the actuator 32 is manually operated, good positioning feel is afforded because the detent 67 tends to definitely snap in place when said detent seats in a cam recess 63*a–f* on the flange face 54. The actuator is also securely locked in place, and is not moved out of selected positions of adjustment because of vibration or inadvertent turning of the stem 34 of the actuator 32.

Various modifications may be effected in the structure herein disclosed without departing from the novel concepts of the present invention.

I claim as my invention:

1. A rotary switch comprising a substantially rectangular cup-shaped housing open along one wall, a terminal member closing said wall and attached to said housing, resilient contact arms secured to the terminal member and having detent portions extending into the housing interior, a first one-piece actuator member comprising a stem journaled in the terminal member and one wall of said housing and a flange extending radially from said stem inwardly of opposite ends thereof, one side of said flange having cam surfaces formed thereon receiving the detent portions of the resilient contact arms during rotation of the actuator member, a second one-piece actuator member journaled at opposite ends in the terminal member and one wall of the housing and having between said ends a radially extending flange engageable with the flange of the first actuator member for rotation therewith, one side of the flange of the second actuator having cam surfaces formed thereon receiving the detent portions of other resilient contact arms during rotation of the actuator members, the other side of the last-named flange being provided with cam surfaces arranged adjacent the periphery thereof, and resilient positioning means clampingly held between the housing and the second actuator member and having a detent portion engageable with the camming surfaces on the other side of the last-named flange to index the actuator members.

2. A rotary switch comprising a substantially rectangular cup-shaped housing open along one wall, a terminal member closing said wall and attached to said housing, resilient contact arms secured to the terminal member and having detent portions extending into the housing interior, a first one-piece actuator member comprising a stem journaled in the terminal member and one wall of said housing and extending outwardly therefrom for hand manipulation and a peripherally toothed flange extending radially from said stem inwardly of opposite ends thereof, one side of said flange having cam surfaces formed thereon receiving the detent portions of the resilient contact arms during rotation of the actuator member, a second one-piece actuator member journaled at opposite ends in the terminal member and one wall of the housing and essentially entirely contained within said housing, said second actuator member being provided with a peripherally toothed radial flange engageable with the flange of the first actuator to be rotatably driven thereby, one side of the flange of the second actuator having cam surfaces formed thereon receiving the detent portions of other resilient contact arms during rotation of the second actuator by the first actuator, the other side of the last-named flange being provided with cam surfaces arranged adjacent the periphery thereof, and resilient positioning means clampingly held between the housing and the second actuator member and having an end portion engageable with the cam surface on the other side of the last-named flange to index the actuator members.

3. A rotary switch comprising a substantially rectangular cup-shaped housing open along one wall, a terminal member closing said wall and attached to said housing, resilient contact arms secured to the terminal member and having detent portions extending into the housing interior, a first one-piece actuator member comprising a stem journaled in the terminal member and one wall of said housing and a peripherally serrated flange extending radially from said stem inwardly of opposite ends thereof, one side of said flange having arc-shaped radially and circumferentially spaced cam surfaces formed thereon receiving in pressing contact the detent portions of the resilient contact arms during rotation of the actuator member, a second one-piece actuator member journaled at opposite ends in the terminal member and one wall of the housing and provided with a peripherally serrated radial flange in meshing engagement with the flange of the first actuator for rotation therewith, one side of the flange of the second actuator having arc-shaped radially and circumferentially spaced cam surfaces formed thereon receiving the detent portions of other resilient contact arms during rotation of the actuator members, the other side of the last-named flange also being provided with cam surfaces arranged adjacent the periphery thereof, and resilient positioning means clampingly held between the housing and the second actuator member and having a detent portion engageable with the cam surfaces on the other side of the last-named flange to index the actuator members.

4. A rotary switch comprising a substantially rectangular cup-shaped housing open along one wall, a terminal member closing said wall and attached to said housing, a pair of spaced groups of resilient contact arms secured to the terminal member and having detent portions extending into the housing interior, a pair of one-piece actuator members each comprising a stem journaled in the terminal member and one wall of said housing and each having a flange extending radially from said stem inwardly of opposite ends thereof, the flanges being notched along their outer circumferences for meshing engagement one with the other, one side of each flange having cam surfaces formed thereon receiving the detent portions of each group of the resilient contact arms during rotation of the actuator members, the other side of one of the flanges being provided with cam surfaces arranged adjacent the periphery thereof and the other side of the second flange being essentially flat, and resilient positioning means clampingly held between the housing and the other actuator member and having a raised end portion provided with a detent thereon, said detent engaging the cam surfaces on the other flange side to index the actuator members.

5. A rotary switch comprising a substantially rectangular cup-shaped housing open along one wall, a terminal member closing said wall and attached to said housing, resilient contact arms secured to the terminal member

and having detent portions extending into the housing interior, a first one-piece actuator member comprising a stem journaled in the terminal member and one wall of said housing and a peripherally notched flange extending radially from said stem inwardly of opposite ends thereof, one side of said flange having a plurality of arc-shaped cam surfaces spaced radially and circumferentially from one another and provided with inclined and relatively flat portions receiving the resilient contact arms during rotation of the actuator member, a second one-piece actuator member journaled at opposite ends in the terminal member and one wall of the housing and provided between said ends with a peripherally notched radial flange in meshing engagement with the flange of the first actuator for rotation therewith, one side of the flange of the second actuator having a plurality of arc-shaped cam surfaces spaced radially and circumferentially from one another and provided with inclined and relatively flat portions receiving other resilient contact arms during rotation of the actuator member, the other side of the last-named flange being provided with a plurality of circumferentially spaced notches arranged adjacent the periphery thereof, and resilient positioning means clampingly held between the housing and the second actuator member and having a raised end portion provided with a detent thereon, the detent of said raised end portion being received in the notches on the other side of the last-named flange to index the actuator members.

6. A rotary switch comprising a substantially rectangular housing having a pair of spaced walls, one of which comprises a terminal member removably secured to said housing, the other of said walls having a plurality of apertured embossments thereon, a plurality of groups of resilient contact arms attached to the terminal member and having detent portions spaced from said walls, a first one-piece actuator member comprising a stem portion journaled in the terminal member and one of the apertured embossments in the other housing wall and having a hand manipulable portion extending outwardly from said wall, said member being provided with a peripherally serrated flange extending radially from said stem portion inwardly of opposite ends thereof, one side of said flange having cam surfaces formed thereon receiving the detent portions of one group of resilient contact arms during the rotation of the first actuator member, a second one-piece actuator member essentially entirely within the housing and having a stem portion journaled in the terminal member and journaled at its opposite end in a second of the apertured embossments, said second actuator having a peripherally serrated flange in meshing engagement with the flange of the first actuator to be driven thereby upon rotation of the hand manipulable portion, one side of the flange of the second actuator having cam surfaces formed thereon receiving the detent portions of a second group of resilient contact arms upon rotation by the first actuator, the other side of the last-named flange being provided with notched cam surfaces arranged adjacent the periphery thereof, and a resilient positioning member carried by one of the second of the apertured embossments in the other housing wall and maintained thereon by the second actuator member and having a yoke portion surrounding a third of said embossments, said positioning member further including a tongue portion having a detent thereon engageable with the cam surfaces on the other side of the flange to index the actuator members.

7. A rotary switch comprising a substantially rectangular housing having a pair of spaced walls, one of which comprises a terminal member removably secured to said housing, the other of said walls having apertured embossments thereon, a pair of horizontally spaced groups of resilient contact arms attached to the terminal member and having detent portions spaced from said walls, a pair of one-piece actuator members each comprising a stem portion journaled in the terminal member and one of the apertured embossments in the other housing wall, each of the actuators having an integral disc-shaped flange serrated about its outer circumference for meshing engagement with the other of said flanges whereby rotation of one actuator drives the other actuator, one side of each of said flanges having arc-shaped radially surrounding and circumferentially spaced cam surfaces formed thereon receiving in pressing contact the detent portions of one group of resilient contact arms during rotation of the actuator members, the other side of one of the flanges being essentially flat and the other side of the other flange being provided with circumferentially spaced cam surfaces arranged adjacent the periphery thereof, and a resilient positioning member carried by one of the apertured embossments in the other housing wall and maintained thereon by the other actuator member and having a yoke portion surrounding another embossment, said positioning member further including a tongue portion having a detent thereon engageable with the cam surfaces on the other side of the other flange to index the actuator members.

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