Feb. 22, 1966 Q. P. HOLLEMAN 3,236,959

ROTARY SWITCH WITH REPLACEABLE CONTACTS AND DETENT APPARATUS

Filed Jan. 27, 1964 2 Sheets-Sheet 1

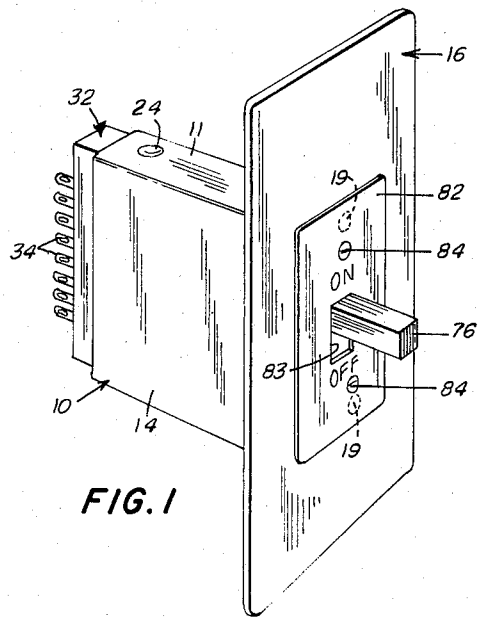


FIG. 1

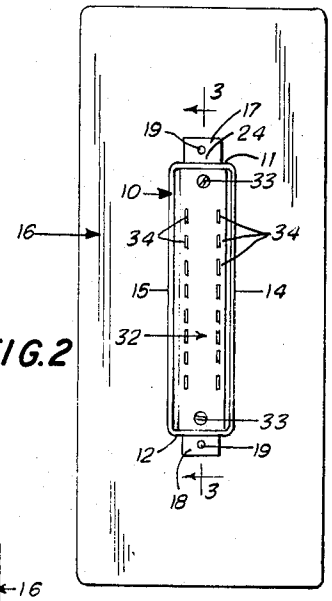


FIG. 2

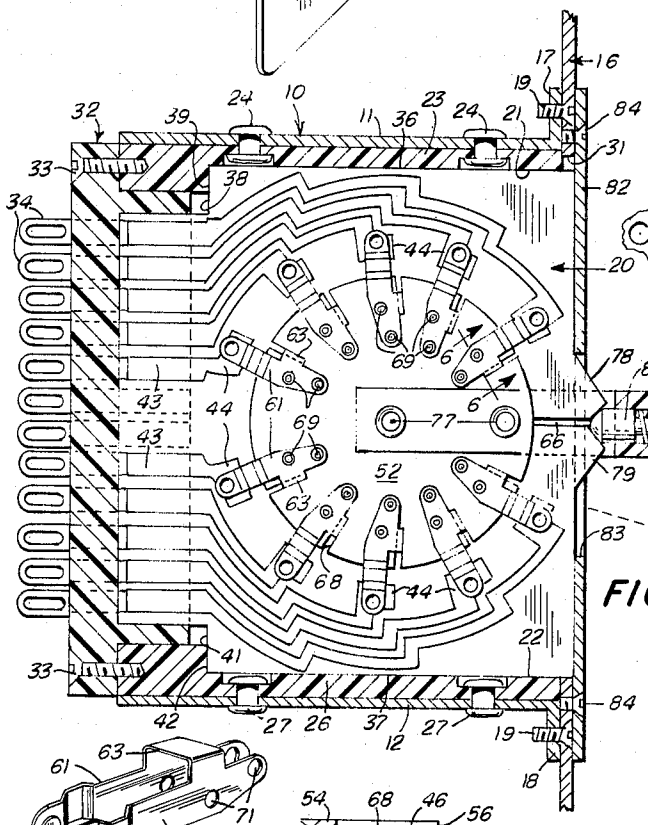


FIG. 3

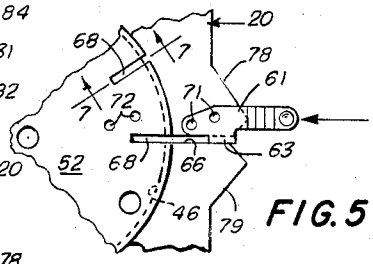


FIG. 5

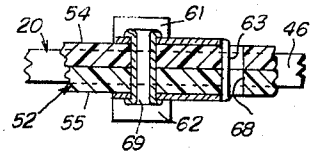


FIG. 6

FIG. 4

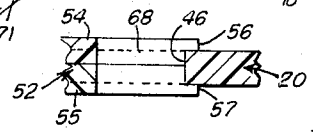


FIG. 7

INVENTOR

QUANAH P. HOLLEMAN

BY

ATTORNEY

Feb. 22, 1966 Q. P. HOLLEMAN 3,236,959

ROTARY SWITCH WITH REPLACEABLE CONTACTS AND DETENT APPARATUS

Filed Jan. 27, 1964 2 Sheets-Sheet 2

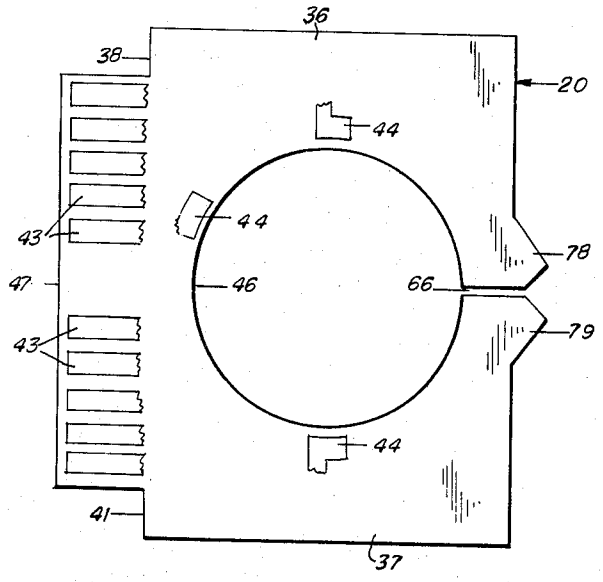


FIG. 8

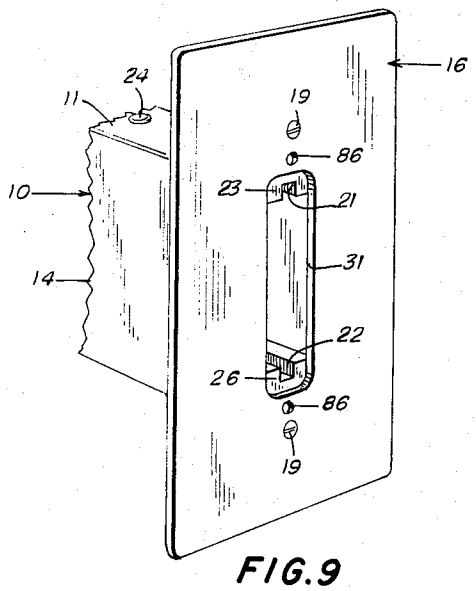


FIG. 9

INVENTOR
QUANAH P. HOLLEMAN

BY

ATTORNEY

United States Patent Office 3,236,959 Patented Feb. 22, 1966

3,236,959

ROTARY SWITCH WITH REPLACEABLE CONTACTS AND DETENT APPARATUS

Quanah P. Holleman, Norfolk, Va., assignor to Michael A. Tabet, Norfolk, Va.

Filed Jan. 27, 1964, Ser. No. 340,170
4 Claims. (Cl. 200—11)

The present invention pertains to circuit making and breaking devices of the type wherein wiper arms are moved in arcuate paths into engagement with and disengagement from circumferentially spaced contacts and the invention relates to a switch assembly wherein the contacts are carried by a panel shaped wafer unit which supports wiper arms for movement with respect to the contacts.

An object of the invention is to provide a switch assembly wherein a panel formed of insulating material carrying conductors and switch means thereon is releasably supported with the conductors engaging contacts of a multiple contact receptacle forming a part of the switch assembly including plate means releasably holding the panel in operative relationship with the contacts and having an opening therethrough accommodating an actuating handle for the switch arms.

A more specific object of the invention is to provide a rotary switch assembly wherein the structure of each wiper arm unit provides a conductive member extending from a wiper arm at one side of the wafer panel to a wiper arm at the other side of the panel.

A further object of the invention is to provide a switch assembly which includes at least one removable wafer unit wherein a projection at one edge of the wafer panel provides part of a detent mechanism holding the actuating handle for the switch in its operated positions.

Other objects and features of the invention will be appreciated and become apparent to those skilled in the art as the present disclosure proceeds and upon consideration of the accompanying drawing taken in conjunction with the following detailed description wherein an embodiment of the invention is disclosed.

In the drawing:

FIG. 1 is a perspective view of a switch assembly embodying the invention adapted for substantially flush mounting with a wall or the face of the switchboard.

FIG. 2 is a rear elevational view.

FIG. 3 is a transverse sectional view on a larger scale and taken on the line 3—3 of FIG. 2.

FIG. 4 is a further enlarged perspective view of one of the wiper arm units.

FIG. 5 is a fragmentary side elevational sectional view of a portion of the wafer panel and a portion of the rotor illustrating a step in the assembly of a wiper arm unit on the rotor.

FIG. 6 is an enlarged fragmentary sectional view taken on the line 6—6 of FIG. 3.

FIG. 7 is a fragmentary sectional view taken on the line 7—7 of FIG. 5.

FIG. 8 is a side elevational view of the wafer panel with the rotor member and the actuating handle omitted.

FIG. 9 is a view of the frame structure with the cover plate and the wafer unit removed.

Referring to the drawing there is shown at **10** a frame which may be of rectangular formation viewed in section and includes a top wall **11** and a bottom wall **12**. The side walls **14** and **15** of the frame join the top and bottom walls. The frame is attached to a front plate **16** by any suitable means such as by lugs **17** and **18** carried by the top and bottom walls **11** and **12** and screws **19**. The plate **16** forms a part of the switch frame and is adapted to cover an outlet box or to close an opening in a switchboard.

The top and bottom walls of the frame **10** are provided with guideway grooves **21** and **22**. In the embodiment shown in the drawing the guideway groove **21** is formed in an elongated member **23** secured to the top wall **11** by means of rivets **24**. A similar member **26** secured to the bottom wall **12** by rivets **27** is provided with the guideway groove **22**. The grooves **21** and **22** are arranged in a single plane. The front plate **16** is provided with a slot **31** which is of such dimension as to provide an open area between the guideway grooves **21** and **22**.

A multiple contact receptacle **32** of a conventional type and formed of insulating material is mounted on the frame **10**. The multiple contact receptacle may be secured to the rear portion of the frame in any suitable manner such as by means of screws **33** which extend into the members **23** and **26**. The multiple contact receptacle **32** is provided with a slot extending longitudinally of the central interior thereof which is aligned with the grooves **21** and **22** and is adapted to receive an end portion of the wafer unit. Resilient contact elements are supported within the slot of the multiple contact receptacle along opposite sides thereof. These contact elements extend through the multiple contact receptacle and provide terminals **34** for the switch assembly.

A panel shaped wafer unit **20** as best shown in FIG. 8 is formed of insulating material and is generally rectangular shaped. The edge portions **36** and **37** are adapted to be accommodated in the guideway grooves **21** and **22**. A shoulder **38** on the wafer panel is adapted to engage a shoulder **39** formed on the member **23** and a similar shoulder **41** on the wafer panel is adapted to engage a shoulder **42** formed on the member **26**. These inter-engaging shoulders limit the inward sliding movement of the wafer unit into the frame **10**. The wafer unit carries conductors **43** thereon which extend to circumferentially spaced contacts **44** carried by one face of the wafer. The contacts **44** are arranged about a relatively large central opening **46**. Similar circumferentially spaced contacts (not shown) are provided at the opposite face of the panel and conductors extend therefrom and terminate at the edge **47** of the wafer. When the wafer unit **20** is in position shown in FIG. 3, end portions of all of the conductors **43** carried by both faces of the panel engage the contact elements within the slot of the multiple contact receptacle **32**.

A rotor **52** is mounted on the wafer unit **20** for rotation substantially in the plane of the panel. The rotor is formed of two disc-shaped elements **54** and **55** which when assembled in face to face relationship is accommodated in the circular opening **46**. The disc-shaped element **54** carries an annular flange **56** and the disc-shaped element **55** carries an annular flange **57**. These flanges overlie opposite faces of the wafer panel **20** adjacent the opening **46** and prevent dislodgment of the rotor from the panel. Rivets or the like are employed to hold the disc-shaped elements **54** and **55** in assembled relationship but such fastening elements are not relied on for providing electrical conductors from one face of the rotor to the other face.

A plurality of wiper arms **61** are mounted on one side of the rotor **52** and a plurality of wiper arms **62** are mounted on the opposite side of the rotor. In order to provide a reliable electrical connection from one wiper arm **61** to an associated wiper arm **62** a bridge element **63** as best shown in FIG. 4 is provided which connects one wiper arm with the other. Each wiper unit is desirably formed of sheet metal and the bridge element **63** is formed integral with both arms **61** and **62**. The arm portions **61** and **62** are resilient and extend beyond the periphery of the rotor **52** and are adapted to engage the contact **44** on opposite faces of the wafer panel.

In order to provide for the mounting of a wiper unit

on the rotor **52** after the disc-shaped elements **54** and **55** are assembled and arranged within the opening **46** a slot **66** is provided in the panel as best shown in FIG. 8. This slot extends from an edge of the panel to the central opening **46**. The bridge member **63** of the wiper unit is arranged in the slot **66** and moved towards the periphery of the rotor **52** as shown in FIG. 5. A radially disposed slot **68** provided in the disc-shaped elements **54** and **55** at the periphery of the rotor **52** accommodates the bridge element **63** when the slot **68** is in radial alignment with the slot **66**. The wiper arms **61** and **62** then overlie opposite faces of the rotor **52** and opposite faces of the panel. Rivets **69** extend through openings **71** in the wiper unit and holes **72** in the disc-shaped elements **54** and **55**. These rivets hold the wiper blade unit in place and also secure the disc-shaped elements **54** and **55** to each other. Any number of suitable wiper units may be mounted on the rotor **52**. When the wiper arms **61** are in the position shown in FIG. 3 and in engagement with the contacts **44** the wiper arms **62** at the other faces of the panel engage contacts on that face of the wafer panel. Thus in the embodiment shown in the drawing ten circuits are completed through the switch assembly when the rotor **52** is in the position shown in FIG. 3.

An actuating handle **76** is attached to the rotor **52**. The handle is bifurcated at its inner end to lie along opposite faces of the rotor and to span the panel. The handle may be secured to the rotor by means of rivets **77**. The front edge portion of the wafer panel adjacent the outer end of the slot **66** carries two projections **78** and **79**. A spring urged plunger **81** mounted within the handle **76** is adapted to engage the edge of the panel between the projections **78** and **79** when the switch is in the "On" position shown in FIG. 3. The handle **76** is desirably formed of insulating material and may be moved to the position shown in dotted lines in FIG. 3 to cause the rotor **52** to turn in a clockwise direction and move the wiper arms **61** and **62** from engagement with the contacts **44** to the "Off" position when the plunger **81** engages the lower angular surface of the projection **79**. The plunger in cooperation with the projections provides a releasable detent mechanism holding the handle **76** in either operated position.

A cover plate **82** is provided with an opening **83** through which the handle **76** extends. The plate **82** overlies the frame plate **16** and closes the slot **31**. The projections **78** and **79** on the wafer panel extend through the opening **83** as shown in FIG. 3. The plate **82** prevents the wafer unit **20** from being dislodged or withdrawn from the frame and the multiple contact receptacle **32**. The plate **82** is releasably held in place by screws **84** (FIG. 1) which are threaded in openings **86** in the frame plate **16**.

While the invention has been described with reference to structural details it will be appreciated that the size of the frame **10** may be increased to accommodate a number of wafer units in side by side spaced relationship. The number of contacts and conductors arranged on each wafer unit may be varied along with changes in the number of the wiper arms. Such modifications and others may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

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

1. In a switch of the rotary type, a panel of insulating material, said panel having an opening therethrough, a rotor mounted for rotation within said opening to turn in the plane of said panel, circumferentially spaced contacts carried by opposite faces of the panel adjacent said opening, said panel having a slot therethrough extending from one edge of the panel to said opening, said rotor having a slot in a peripheral portion adapted to be aligned with the slot in said panel, a wiper arm at one face of the panel for engaging and disengaging the contacts at the associated face of the panel, a wiper arm at the opposite faces of the panel for engaging and disengaging the contacts at the associated face of the panel, a bridge element connecting said wiper arms and extending through the slot in the rotor, and means securing the wiper arms to the rotor.

2. In a switch of the rotary type, a panel of insulating material, said panel having an opening therethrough, a rotor mounted for rotation within said opening to turn in the plane of said panel, circumferentially spaced contacts carried by opposite faces of the panel adjacent said opening, said panel having a slot therethrough extending from one edge of the panel to said opening, said rotor having a radially disposed slot in a peripheral portion adapted to be aligned with a slot in said panel, a wiper arm for engaging and disengaging the contacts at one face of the panel, a wiper arm for engaging and disengaging the contacts at the other face of the panel, a bridge element connecting said wiper arms, said bridge element being movable through the slot in the panel and through the slot in the rotor, means securing the wiper arms to the rotor with the bridge member accommodated in the slot in the rotor, a projection on said panel, an operating handle secured to the rotor extending beyond said projection, and a spring biased member carried by the handle for engaging opposite portions of said projection.

3. In a switch of the rotary type, a panel of insulating material, said panel having an opening therethrough, a rotor mounted for rotation within said opening to turn in the plane of said panel, circumferentially spaced contacts carried by a face of the panel adjacent said opening, a wiper arm carried by said rotor for engaging and disengaging said contacts, conductors extending from said contacts and carried by said panel, a frame, a contact receptacle supported by the frame with the conductors engaging the contacts thereof, said frame supporting the panel for movement from the contact receptacle, an operating handle secured to the rotor extending beyond an edge of the panel, a detachable plate carried by the frame overlying said edge of the panel, and said plate having an opening therethrough which the handle extends.

4. In a switch of the rotary type, a panel of insulating material, said panel having an opening therethrough, a rotor mounted for rotation within said opening to turn in the plane of said panel, circumferentially spaced contacts carried by a face of the panel adjacent said opening, a wiper arm carried by said rotor for engaging and disengaging said contacts, conductors extending from said contacts and carried by said panel, a frame, a contact receptacle supported by the frame with the conductors engaging the contacts thereof, said frame supporting the panel for movement from the contact receptacle, an operating handle secured to the rotor extending beyond an edge of the panel, a detachable plate carried by the frame overlying said edge of the panel, said plate having an opening through which the handle extends, a projection on the panel extending to the opening in said plate, and a spring actuated member carried by the handle for engaging opposite sides of the projection.

References Cited by the Examiner

UNITED STATES PATENTS

2,662,942	12/1953	Winkler	200—18
3,089,923	5/1963	Wright	200—11 X

KATHLEEN H. CLAFFY, *Primary Examiner.*