June 17, 1969 W. J. RUSSELL 3,450,855

SEALED LIMIT SWITCH

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FIG-1

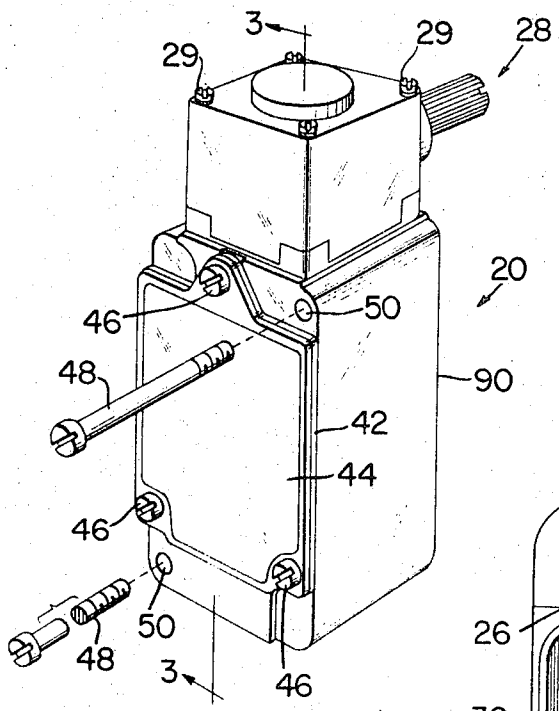
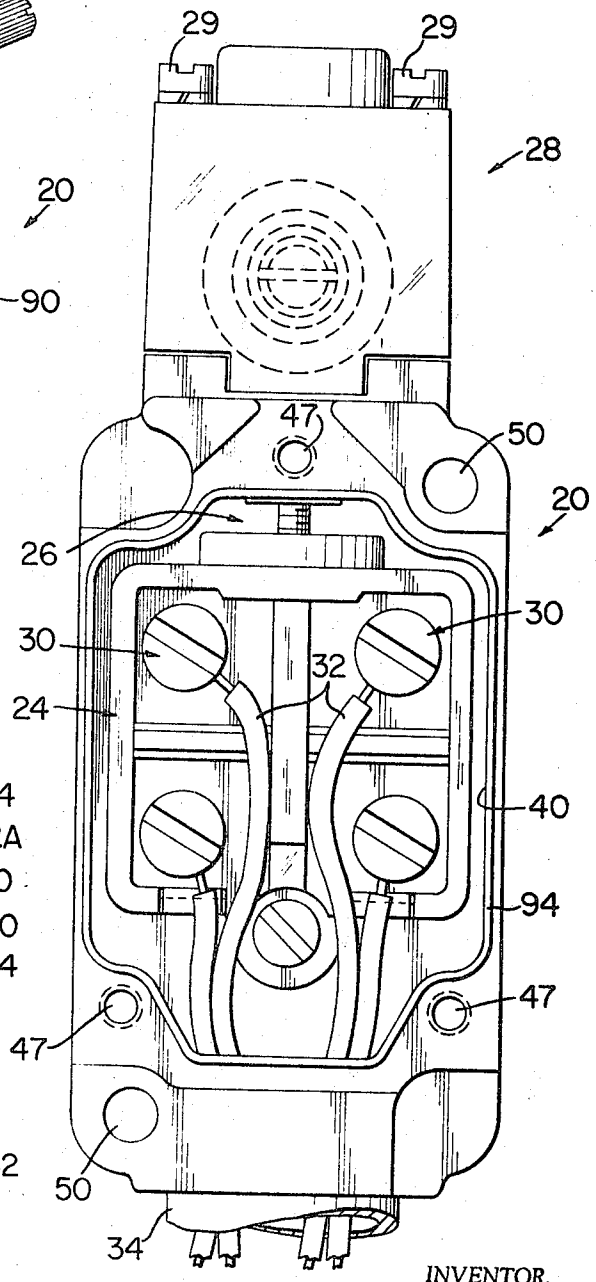


FIG-2



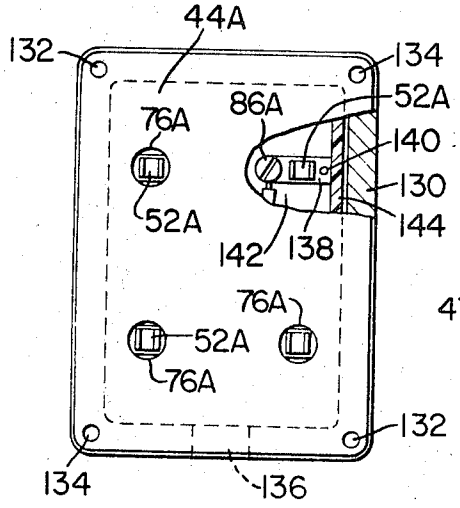


FIG-15

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SEALED LIMIT SWITCH

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FIG-3

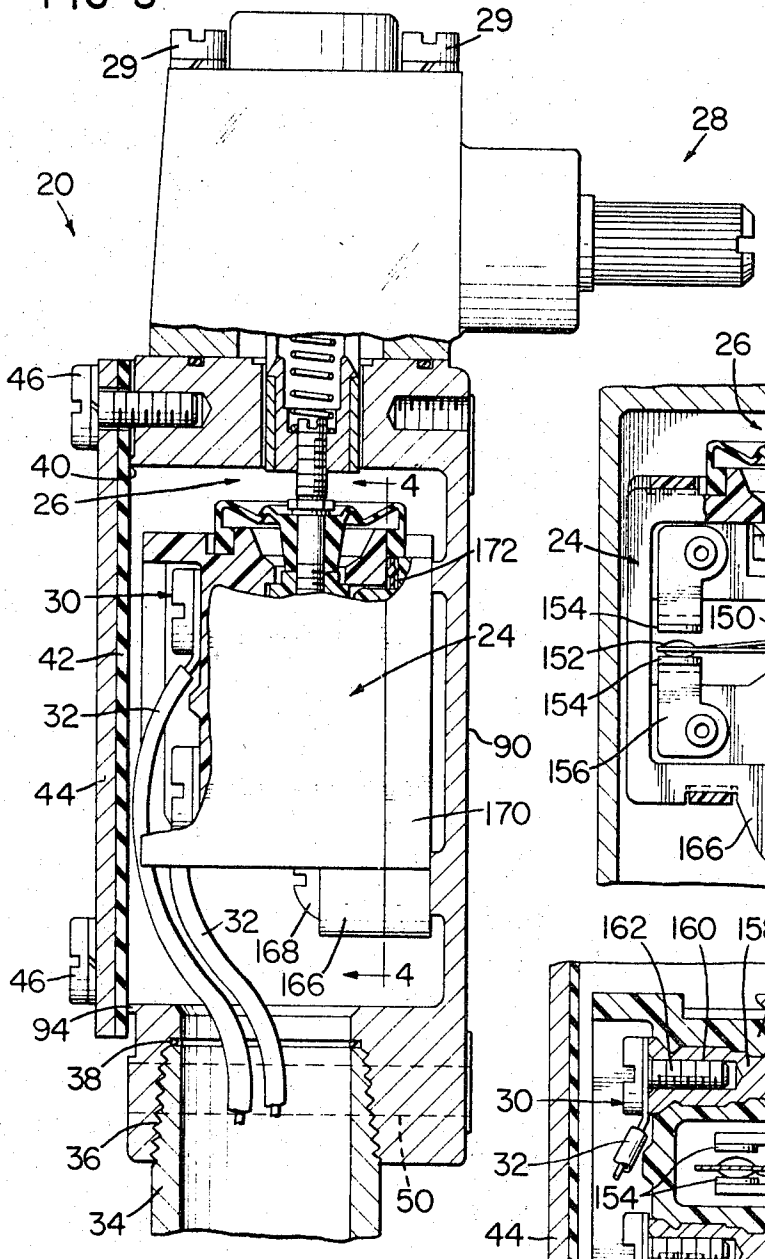


FIG-4

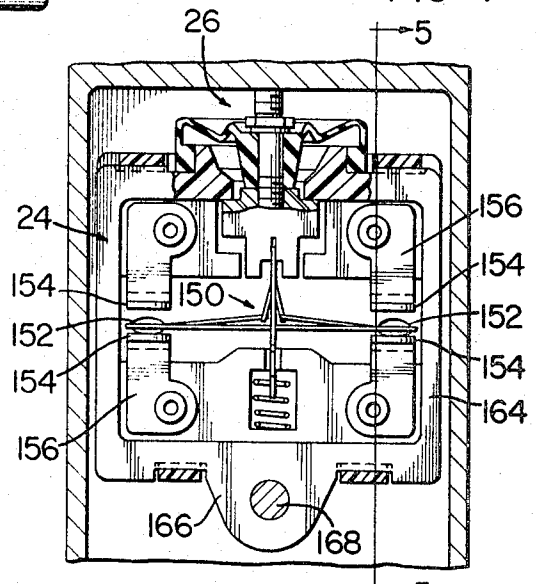
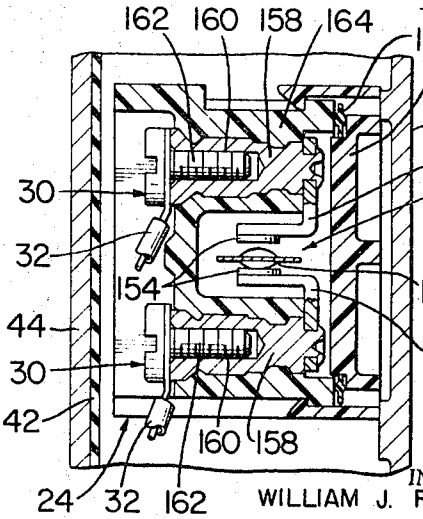


FIG-5



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SEALED LIMIT SWITCH

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FIG-6

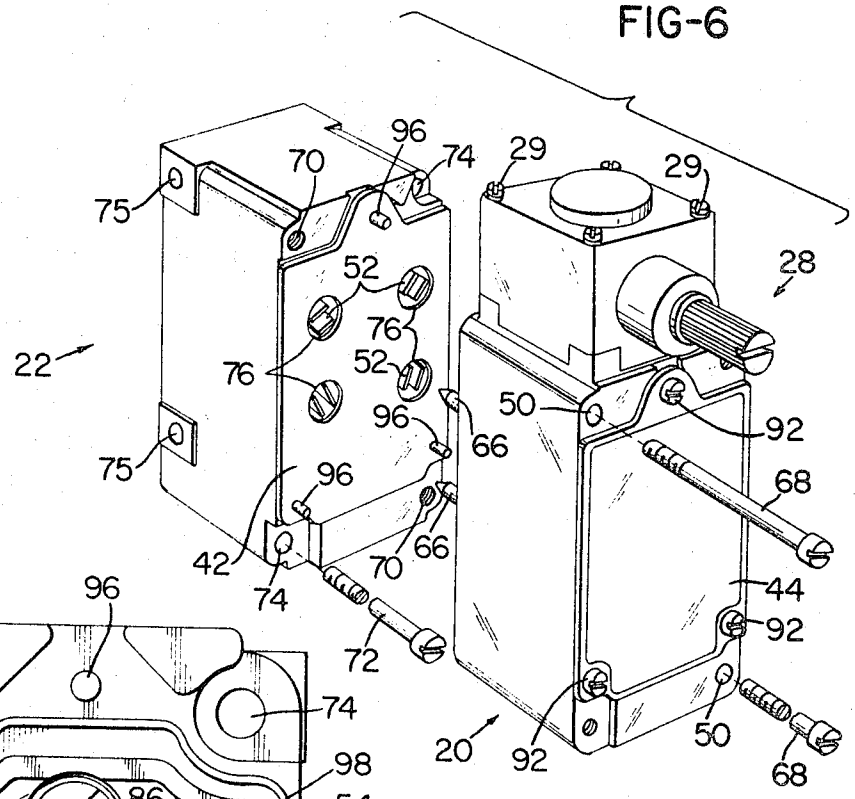


FIG-8

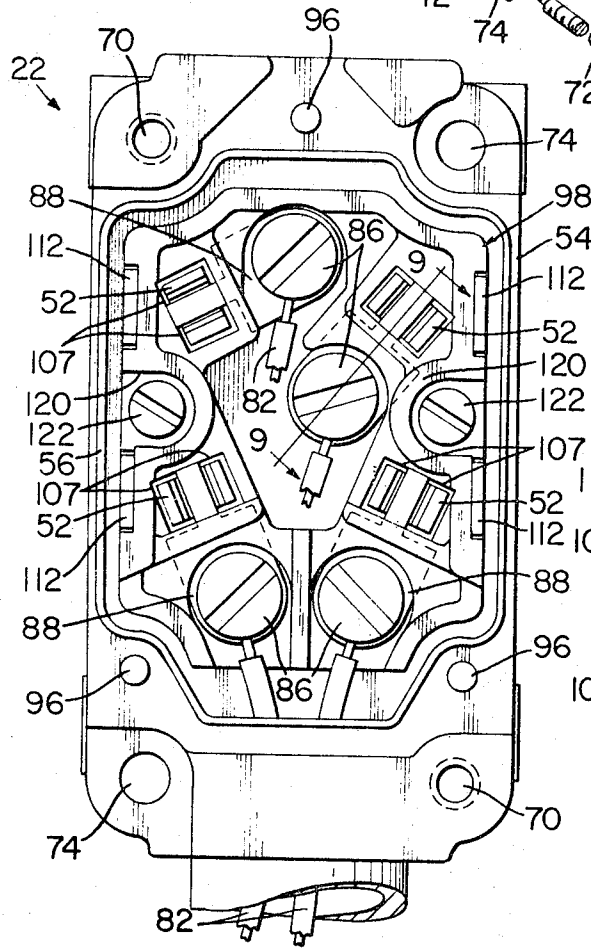
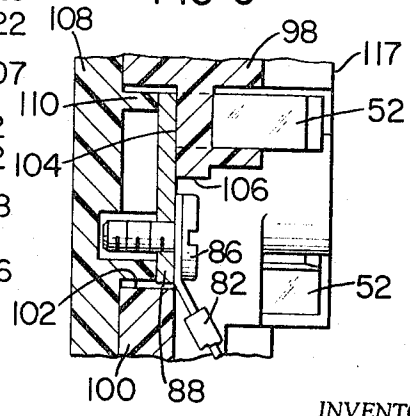


FIG-9



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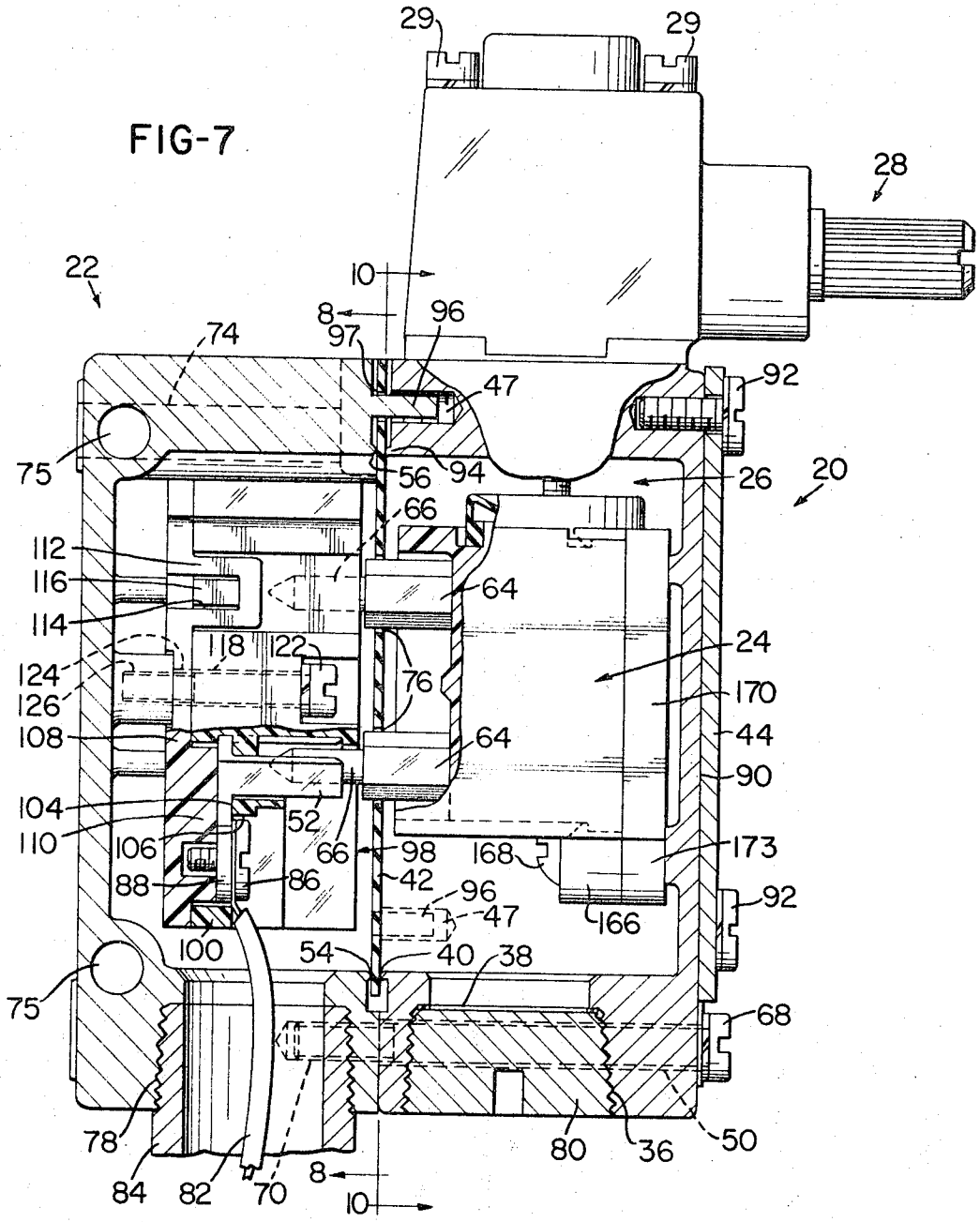
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FIG-7



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FIG-10

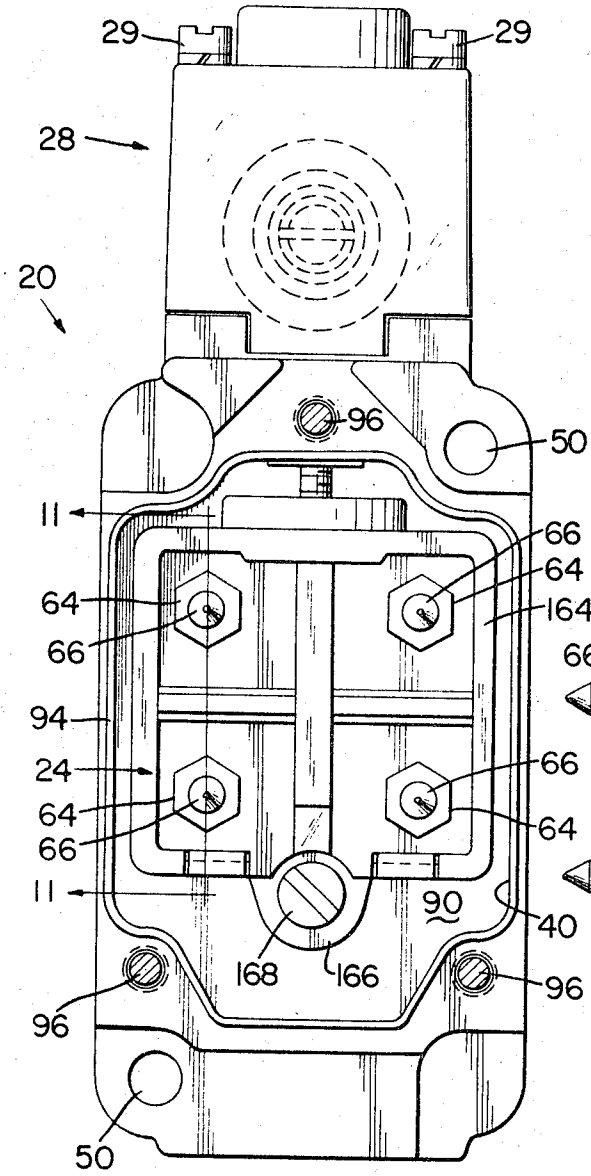


FIG-11A

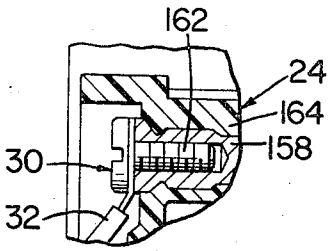
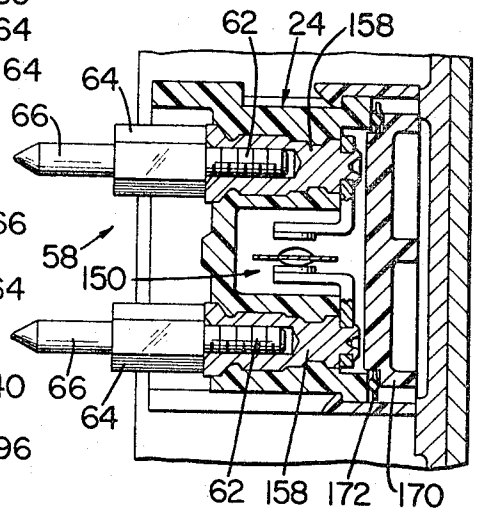


FIG-11



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FIG-12

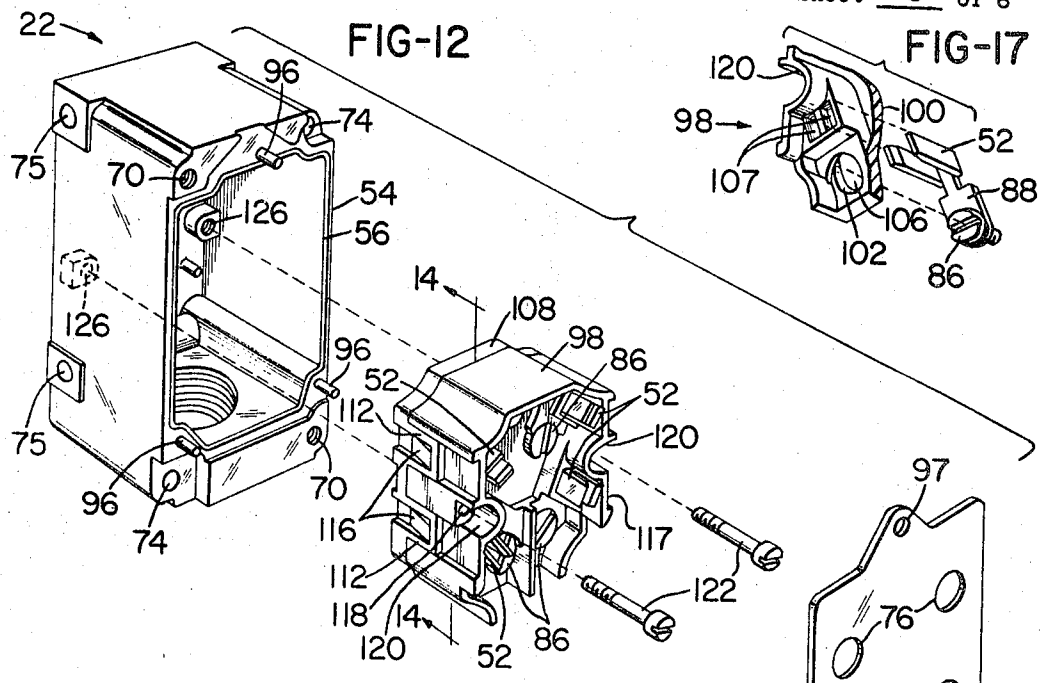


FIG-17

FIG-14

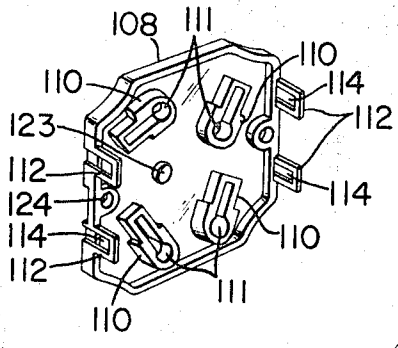
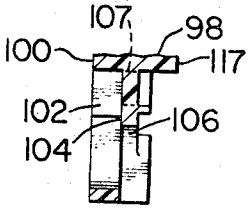


FIG-16



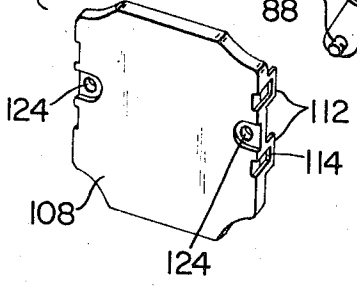
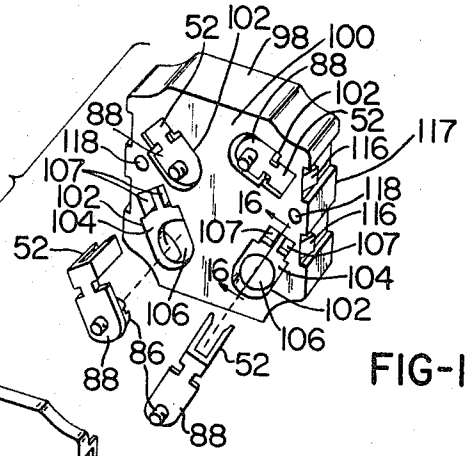


FIG-13



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United States Patent Office 3,450,855
Patented June 17, 1969

3,450,855

SEALED LIMIT SWITCH

William J. Russell, Malvern, Pa., assignor to Robertshaw Controls Company, Richmond, Va., a corporation of Delaware

Filed Sept. 2, 1966, Ser. No. 577,011
Int. Cl. H01h 9/02
U.S. Cl. 200—168 13 Claims

ABSTRACT OF THE DISCLOSURE

This application discloses a switch casing construction with a switch therein. Switch power lines are connected to connecting means or screws on the switch to connect switch power lines for control of one or more circuits by the switch. A switch access opening is provided on the casing for access to the switch line connecting means, for attaching the switch power lines to the switch. A cover is provided for the access opening, which will be used when the switch casing construction is to be used alone without any plug-in casing. Such switch casing construction can be mounted on any support desired, and may operate in the usual manner. A plug-in casing has prong interlock means in the casing and plug-in power line connecting means for connection of the plug-in power lines to the interlock means. A plug-in access opening is provided for access for the prong interlock means in the plug-in casing. A plug-in change prong interlock means or construction is provided to replace the switch power line connecting means, so that the switch casing may be changed to be connected to the plug-in casing. This is accomplished by omitting the cover and securing the switch casing and the plug-in casing together at the access openings and with power lines connected to the plug-in power line connecting means.

This invention relates to a sealed limit switch with plug-in change means and a plug-in receptacle.

A switch construction, according to this invention, may include a switch casing with a switch in the casing. A power line switch connector means may be provided inside of the casing, with a switch connector access opening means on the casing for access to such connector means. Such switch construction may be used by itself, to be attached to a support in any suitable manner, as desired.

Additionally, such switch construction may also be used with a plug-in casing and with a plug-in change means, so that the switch construction may be plugged into the plug-in casing or receptacle, after the plug-in receptacle has been connected to a power line.

The construction is such that the plug-in receptacle may be mounted on a supporting surface or board, with the power line or power lines connected to a connector, or connectors in the plug-in receptacle. Thereafter the switch construction may be plugged in to the plug-in receptacle, or unplugged therefrom, in an efficient manner.

Further, this invention may include a name plate or cover which may be used with the switch construction alone over the access opening of the switch construction, and such name plate or cover may be transferred to another position on the switch casing.

Plug-in change prong means may replace the power line switch connectors of the switch construction. Then the switch casing and plug-in casing may be united in a plugged-in manner.

A gasket construction may be used in connection with the name plate or cover on the switch construction when used alone. Additionally, such gasket may be used between the two casings, when they are united, hermetically to seal both the switch casing and the plug-in casing.

Other features of this invention are apparent from this description, the appended claimed subject matter, and/or the accompanying drawings, in which:

FIGURE 1 is a perspective view of the switch construction when used alone, without the plug-in casing construction.

FIGURE 2 is a front view of the switch construction of FIGURE 1, in enlarged scale, with the name plate, or cover, and the gasket construction removed.

FIGURE 3 is a vertical cross section generally transverse to FIGURE 2, and taken along the line **3—3** of FIGURE 1.

FIGURE 4 is a vertaical cross section taken generally along the line **4—4** of FIGURE 3.

FIGURE 5 is a cross section taken generally along the line **5—5** of FIGURE 4.

FIGURE 6 is a diagrammatic exploded perspective view of the switch construction, and the plug-in construction, before they are united into the assembly condition shown in FIGURE 7.

FIGURE 7 is a vertical cross section, partly in elevation, showing the switch construction and the plug-in construction of FIGURE 6 in united form, and in enlarged scale.

FIGURE 8 is an elevation of the plug-in receptacle, along the line **8—8** of FIGURE 7.

FIGURE 9 is a cross section taken generally along the line **9—9** of FIGURE 8.

FIGURE 10 is a view somewhat similar to FIGURE 2, with the plug-in change means or prongs having replaced the power line connector means of FIGURE 2.

FIGURE 11 is a cross section taken along the line **11—11** of FIGURE 10.

FIGURE 11A is a view of a portion of FIGURE 11, before the plug-in prong construction has replaced the power line connector means of FIGURES 2 and 3.

FIGURE 12 is a diagrammatic, exploded, perspective view of the plug-in receptacle construction before it is assembled.

FIGURE 13 is an exploded rear view of the insulating plug-in cup construction shown in the central part of FIGURE 12.

FIGURE 14 is a perspective view of the connector holding wall taken along line **14—14** of FIGURE 12.

FIGURE 15 is a plan view of another embodiment of a plug-in receptacle.

FIGURE 16 is a cross section along line **16—16** of FIGURE 13.

FIGURE 17 is a perspective exploded view of the lower right hand corner of a portion of FIGURE 13 and looking in the opposite direction.

Certain words may be used in this specification and claimed subject matter which indicate direction, relative position, and the like. Such words are used for the sake of brevity and clearness. However, it is to be understood that such words are intended to be used in connection with the views of the drawings, and that in actual use, parts so described may be in a different direction, relative position, and the like. Examples of such words are "vertical," "horizontal," "upper," "lower," etc.

A switch casing means or construction is generally indicated at **20** in the various figures. A plug-in casing means or construction is generally indicated at **22** in the various views. Such switch casing or construction **20** may be used independently of the plug-in casing or construction **22**, as shown in FIGURES 1–5. However, certain parts of the switch casing or construction **20** may be changed, as hereinafter described, and such switch casing or construction **20** may then be used in combination with

the plug-in casing or construction **22**, as shown in FIGURES 6–14, as will become apparent.

The switch casing or construction **20**, as shown in FIGURES 1–5 may have any type of suitable switch means **24** inside the casing **20**. Switch actuating means or actuator means **26** may actuate the switch **20** inside the casing and may have operable or operating means **28** outside the casing. Said operating means **28** is mounted on said switch casing **20** and connected on said casing so that the operating means may be mounted in any one of four different horizontal directions. The operating means **28** is mounted on the casing in any suitable manner. For example, screws **29** extend through the casing of the operating means and into the casing **20** to hold the casing of the operating means **28** firmly on the casing **20**.

A switch power supply or power line connector, connectors, or connecting means **30** may be provided on the switch **24**. Such connecting means may include one or more screws with screw heads. Switch power lines **32** may be connected to the power line connecting means **30**, when the switch construction **20** is to be used alone, as shown in FIGURES 1–5. Such power lines **32** may enter the switch casing **20** through a power line conduit **34**, which may be inserted and sealed in the conduit or switch power line receiving opening means **36**. For example, the conduit **34** may be threaded into the opening **36**, and sealed by a gasket at **38**. However, the opening **36**, and the end of conduit **34** may be smooth and may be secured together by epoxy adhesive or the like, if desired. The power lines **32** may be inserted in the casing **20** from the conduit **34** and may be secured to the power line connectors or screws **30** in any well known manner.

A substantially flat switch access opening means **40** may be provided on one wall of the switch casing **20**. Such opening means **40** may be covered by a flexible gasket means **42** and by a cover, means such as a name plate or cover plate **44**. The gasket **42**, and name plate or cover **44** may be secured over the opening means **40** by means of the screws **46**. The screws **46** may pass through openings **97** in the gasket, FIGURE 12, and into threaded holes **47** in casing **20**, shown in FIGURE 2. The cover **44** and gasket **42** may be removed from their positions shown in FIGURES 1 and 3 by removing the screws **46**, and then the power lines **32** may be secured to the connector means **30**, or may be removed from such connector means **30**, as desired. The gasket **42** and cover **44** may then be replaced after removal, as desired.

When the switch construction **20** is to be used by itself, as shown in FIGURES 1–5, the casing **20** may be mounted on a supporting surface or board by means of the mounting screws **48**, which may be inserted in the internally smooth corner openings **50**, which extend completely through the casing **20**, so that the mounting screws **48** may be inserted into and secured to the mounting board or surface, not shown.

When the switch construction **20** is to be used in combination with the plug-in casing means or construction **22**, the parts may be assembled or arranged as shown in FIGURES 6–14.

The plug-in casing or construction **22** may have a permanent prong interlock means **52** which may be plug-in connector, connectors, or connector means or prong receiving fork members **52**. Such connector, connectors, or connector means **52** may be spaced, prong receiving fork members somewhat similar to the usual prong-receiving fork connectors or members of a usual plug-in receptacle construction. According to this invention the fork members **52** may be loosely mounted in the casing **22** to accommodate themselves to variations in the assembly of the prong points **66**.

The plug-in casing or plug-in construction **22** may be provided with a substantially flat plug-in connector access opening means **54**, FIGURES 6, 7 and 8 which may include the gasket receiving and sealing bead **56**.

Plug-in change prong interlock means or prongs **58**, FIGURES 7 and 11, may replace the power line switch connectors **30** of FIGURE 11A. The power supply connectors or screws **30** may be removed or unscrewed from the switch construction at **11A**, and the plug-in change prong interlock means or prongs **58**, of FIGURE 11, may be screwed in to the receiving sleeve connectors **158** of the switch construction **20**. The prong means **58** may include a screw or threaded portion **62** at one end, an intermediate turning or wrench-receiving portion or hexagonal portion **64**, and a prong point **66** at the other end. The prong point **66** is insertable into the power line plug-in connector or connectors or prong interlock members **52**. It is therefore to be seen that the plug-in change prong means of FIGURE 11 replaces the power line switch connector **30** of FIGURE 11A.

After the change means or prongs **58** have replaced the switch connectors **30**, the switch casing construction **20** and the plug-in construction **22** may be secured together, as shown in FIGURE 7 with both the access opening means **40** and **54** aligned with each other. The gasket **42** covers the main part of the access openings or opening means **40** and **54** as shown in FIGURE 7, and may be screwed or bolted together by the uniting screws **68**, which pass through smooth openings **50** and enter the threaded openings **70** in the switch casing **22**. Previously, the mounting screws **72** may have been inserted into the internally smooth openings **74** in the plug-in casing **22**. The openings **74** are not internally threaded, but the openings **70** are internally threaded, to receive the threaded ends of the uniting screws **68** which pass through the internally smooth openings **50**. The mounting screws **72** are insertable in the openings **74**, and the threaded ends **76** thereof may be screwed or bolted to the mounting board or surface, not shown. In this manner the plug-in receptacle **22** may be mounted on a board by the screws **72**, and thereafter the switch casing **20** may be secured to the plug-in casing construction **22** by the uniting screws **68**. During this process of uniting the switch construction **20** and plug-in construction **22**, the prong points **66** are inserted through gasket openings **76** in gasket **42** and into the power line plug-in connectors or prong receiving members **52** which are further to be described. While this uniting operation is being performed, the casing means securing means or screws **68** secure the casings together. The switch connector access opening means **40** and the plug-in access opening means **54** are aligned and held together with the plug-in change means or prongs **58** passing through both of such access openings.

The plug-in casing **22** may also have internally smooth mounting openings **75**, FIGURES 6 and 12 through which mounting screws, similar to screws **72**, may be inserted, to secure the plug-in construction **22** by its side against the supporting surface.

The switch casing **20**, and the plug-in casing **22** may be substantially parallelepipeds with respective access opening means **40** and **54** on respective sides of such parallelepipeds.

The switch casing **20** may have a switch power line opening means or conduit opening **36** and the plug-in casing **22** may have a plug-in power line opening **78**, FIGURES 3 and 7. When the casings **20** and **22** are to be united, as shown in FIGURES 6 and 7, a removable closure member or plug means **80**, FIGURE 7, may be inserted and sealed in the switch opening **36**. Such plug **80** may be sealed by the gasket **38** or by a suitable sealing compound. At this time, plug-in power line or lines **82**, which may be carried by power line conduit **84**, may enter the casing **22** through means opening **78** and may be connected to plug-in power line connectors, connector means, or screws **86**, which may be screwed into the bases **88**, which are integral with the plug-in connectors or connector means **52** in a manner to be more fully described.

The gasket **42** and the cover or name plate **44** are used

over the access means or opening **40** when the switch construction **20** is used alone without the plug-in construction **22** as illustrated in FIGURES 1–5.

When the switch construction **20** and the plug-in construction **22** are to be used together, the name plate **44** is transferred to the side wall **90**, FIGURE 7, of the switch construction **20** and is secured thereto by the screws **92**, or by screws **46** which have been removed from their position in FIGURE 2. The gasket **42** in FIGURE 7, remains against the access opening **40** of switch construction **20**, or is caused to engage such access opening **40** in the same manner that it engaged such access opening in the construction of FIGURES 1–5. The access opening **40**, FIGURE 2, has a continuous outward bead **94**, FIGURE 2, which is substantially of the same size and contour as the bead **56**, FIGURES 8 and 12, of the access opening **54** of the plug-in construction **22**.

When the switch construction **20** and the plug-in construction **22** are brought together, as shown in FIGURES 6 and 7, the beads **56** and **94** are aligned, and tightly seal or engage the gasket **42** as is shown in FIGURE 7. The permanent prong interlock or electrical interconnector means **52** and the plug-in change prong interlock or electrical interconnector means **62**, **64** and **66** are in engagement with each other in the plug-in casing means **22** with the plug-in change prong interlock or electrical interconnector means **62**, **64**, **66** passing through both of said access opening means **40** and **54**.

In order to align the gasket **42** between the openings **40** and **54**, the openings **54**, FIGURES 6 and 12, is provided with pegs **96** over which the openings **97** in the gasket **42** are mounted, as shown in FIGURE 6. The pegs **96** are of sufficiently small diameter so that they may be inserted in the threaded openings **47**.

The plug-in casing **22**, FIGURES 12–14, receives a molded insulative cup **98**, which has an integral molded insulative bottom **100**. The bottom **100** has connector receiving openings **102** which receive the bases **88** of the connecting pieces shown in FIGURE 13. The bases **88** and the prong receiving members **52** are parts of one unitary or integral piece. The openings **102** each have an intermediate wall **104** which prevents the bases **88** from passing completely through the openings **102** in bottom **100**, of FIGURE 13. The intermediate wall **104** has screw-receiving openings **106** to receive the screw heads of screws **86** and prong-receiving openings or connector-receiving opening **107** to receive the prong receiving members **52**. The prong receiving members or connectors **52**, and the heads of the screws **86** may be inserted respectively in the openings **107** and **106**, so that the connectors **52** and the screw heads of screws **86** extend into the cup **98** as shown in FIGURE 12.

In FIGURE 13, the two upper bases **88** have been inserted in the openings **102** and are pressed against the wall **104**. The two lower bases **88** of FIGURE 13 have not been inserted in the openings **102**, but they will be inserted therein, as shown by the dotted lines in FIGURE 13. After all the bases **88** have been inserted in the openings **102**, the connector holding wall **108**, FIGURE 13, is moved diagonally upward, to engage and hold the bases **88** in place. The protrusions **110**, FIGURE 14, will engage the bases **88**, and hold the bases **88** in place.

The retaining wall **108** has forwardly directed ears **112**, which have openings **114**. The openings **114** lock over the slanting tongues **116**, which are shown in FIGURES 12 and 13. This connector holding engagement of ears **112** and tongues **116** will hold wall **108** in position, as shown in FIGURE 12.

In this manner, the complete insulative cup assembly **98**, **108** of FIGURE 12 is produced, so that the power line plug-in connectors **52** extend outwardly toward the rim **117** of the cup **98**, and are ready to receive the plug-in prongs **58** with the prong points **66** entering the connectors **52**, as is apparent from FIGURE 6 where the connectors **52** are exposed in the openings **76** in the gasket **42**. Also, the power lines **82**, FIGURES 7 and 8, can be attached under the heads of screws **86**.

The outside wall of the cup **98** has internally smooth screw-receiving openings **118**, FIGURE 12, which are exposed by the offset curls **120**, so that the cup-mounting screws **122** may be inserted into the openings **118**, and can pass through the openings **124** in the wall **108** and may be inserted into the threaded screw-receiving openings **126**, in the casing **22**, FIGURE 12.

The prong-receiving fork members **52** and bases **88**, of FIGURES 12–14 are loosely mounted in the cup **98**, so that a slight moving action can take place. This insures that the prong points **66** can enter the prong-receiving members **52** without any binding action. The electrical connection is very good, however, since the current travels from the power lines **82**, FIGURE 7, through the screws and screw heads **86**, to the bases **88**, and to the prong-receiving members **52**. The members **52** and **88** are integral so that the current is easily carried.

The protrusions **110**, FIGURE 14, have the same general shape as the members **88**, so that these protrusions push the members **88** toward the cup **98**, when the wall **88** is snapped into position. The protrusions **110** have openings **111**, which receive the ends of the screws **86** loosely therein. The protrusions **110** fit in the openings **102** fairly snugly, to center the plate or wall **108** against the bottom **100** of the cup **98**.

The button **123** engages the bottom **100** of the cup **98** and cooperates with the ears **112** in maintaining a tight fit between the ears **112** and the slanting tongues **116**.

The differently slanted bases **88** aid in maintaining effective contact between the prong points **66** and the prong receiving members **52**.

Another embodiment of a plug-in receptacle or casing **130** is shown in FIGURE 15. In this construction, the metal casing **130** may have the general function and shape of the plug-in casing **22**, and may have openings **132** to receive screws corresponding to screws **68** of FIGURE 6 and may have openings **134** to receive screws corresponding to screws **72** of FIGURE 6. That is, openings **132** correspond to openings **70** of FIGURE 6, and openings **134** correspond to openings **74** of FIGURE 6. An opening **136** may correspond to power line opening **78**, of FIGURE 7, through which power lines **82** may pass to be attached to the retaining screws **86A** which are inserted in the prong-carrying plate **138**. The plate **138** may be riveted at **140** into the bottom **142** of the insulative cup **144**. The prong-carrying plate **138** may have attached thereto prong receiving fork members **52A**, which correspond to connectors **52** of the previous figures. The fork members **52A** are carried sufficiently loosely by the prong carrying plate **138** to accommodate slight variations in the assembly of the prong points **66**. Three similar prong receiving members **52A** may be connected and carried by similar prong-carrying plates similar to plate **138**. In this manner, power lines corresponding to power lines **82** of FIGURE 7 may be attached to the power line connectors or screws **86A**, in the same manner that power lines **82**, FIGURE 7, are attached to the power line connectors or screws **86** of the bases **88** of FIGURE 7. A gasket **44A** may be placed over the access opening of the casing **130**. The gasket **44A** may have openings **76A** through which the prong points **66** may pass.

Any type of switch construction may be placed in the casing **20**. However, merely by way of example, the switch construction disclosed in the application of Werner Robert Bauer, Ser. No. 493,108, filed Oct. 5, 1965, now Patent No. 3,317,697, patented May 2, 1967, may be used. Reference is made to such application, if necessary, for further description of the switch construction per se. In general, the switch may have a snap-acting blade construction **150**, FIGURE 4, which has double movable contacts **152** at each end of the blade **150**. These

contacts **152** engage the stationary contacts **154**. The stationary contacts **154** are carried by sheet metal angle members **156**, which are riveted to metal conductors **158**, FIGURE 5. These metal conductors **158** have threaded openings **160**, which receive the screws **162**, which have the screw heads **30** to which the power lines **32** are connected. The metal conductors **158** are embedded in the insulative switch casing **164**. The casing **164** has the downward extension **166** through which a mounting screw **168** may be inserted and may be secured to the rear wall **90** of the casing **20**. The casing **164** has a cover **170**, which is hermetically sealed to the casing **164** by the flexible gasket **172**. The cover **170** has an extension **173** which matches extension **166** and through which the screw **168** passes. The entire switch casing **20** may be hermetically sealed, as more fully described in said copending application Ser. No. 493,108.

The operating means **28** may be of the character more fully described and disclosed in the application of William J. Russell, Ser. No. 299,612, filed Aug. 2, 1963, now Patent No. 3,252,345, patented May 24, 1966, to which reference is made, if necessary, for a further description of the operating means extending from the casing **20**.

Thus a switch construction **20** is provided with an access opening **40** which is hermetically closed by name plate or cover **44** and gasket **42**. Also, a plug-in receptacle **22** is provided with an access opening **54**. The name plate or cover **44** may be removed from opening **40** and may be mounted on the rear wall **90** of the switch casing **20**. Then the switch construction **20** and the plug-in casing **22** may be united with the access openings **40** and **54** aligned and sealed by the gasket **42**. The switch actuator **26** is flexibly hermetically sealed as disclosed in said copending aplication 493,108. The opening **36** is sealed either by the conduit **34** or the plug **80**. The opening **78** is sealed by the conduit **84** and the operating means **28** is sealed where it connects the actuating means **26**. Hence the switch casing **20** is sealed when used alone, and the casings **20** and **22** are sealed when they are used together.

Thus the switch construction **20** may be used by itself with the cover over the access opening **40** or it may be plugged in to the plug-in receptacle **22** with plug-in change means or prongs electrically uniting the receptacles **20** and **22**, in a very efficient manner.

While the form of the invention now preferred has been disclosed as required by statute, other forms may be used, all coming within the scope of the claimed subject matter which follows.

What is claimed is:

1. In combination: a switch casing means to cooperate in said combination; a switch means in said switch casing means to operate in said switch casing means; switch access opening means on said switch casing means, said switch access opening means being subtantially flat, and said switch means being entirely inside said switch casing means; a plug-in casing means to be connected with said switch casing means; permanent prong interlock means in said plug-in casing means receiving and connecting with plug-in change prong interlock means; plug-in power line connecting means on said permanent prong interlock means to connect said permanent prong interlock means to said plug-in power lines; substantially flat plug-in access opening means on said plug-in casing means for plug-in access to said permanent prong interlock means in said plug-in casing; plug-in change prong interlock means connecting with said permanent prong interlock means; and switch casing means and plug-in casing means securing means securing said switch casing means and said plug-in casing means together with said switch access opening means and said plug-in access opening means aligned together, and with said plug-in change prong interlock means and said permanent prong interlock means in engagement with each other in said plug-in casing means and with said plug-in change prong interlock means passing through both of said access opening means to cause said plug-in power lines to be controlled by said switch means.

2. A combination according to claim **1** in which said plug-in change prong interlock means includes at least one prong construction, each with a threaded portion at one end, a prong point at the other end, and an intermediate turning means between said threaded portion and said prong point.

3. A combination according to claim **1** in which said plug-in casing means has mounting screw receiving opening means for mounting said plug-in casing means on a supporting surface by means of mounting screws; and said switch casing means has mounting screw receiving opening means for mounting said switch casing means on said plug-in casing.

4. A combination according to claim **1** in which said permanent interlock means in said plug-in casing means includes prong receiving fork members loosely mounted in said plug-in casing.

5. In combination:

a plug-in casing means (**22**) to cooperate in said combination;

permanent prong interlock means (**52**) in said plug-in casing means (**22**) to connect with plug-in change prong interlock means;

plug-in power line connecting means (**86**) on said permanent prong interlock means (**52**) electrically to connect plug-in power lines (**82**) to said permanent prong interlock means;

substantially flat plug-in access opening means (**54**) on said plug-in casing means (**22**) for plug-in access to said permanent prong interlock means (**52**);

a switch casing means (**20**) to cooperate in said combination;

a switch means (**24**) in said switch casing means (**20**) having electrical contacts (**152, 154**) to open and close an electrical circuit;

a plurality of power conductor connecting means (**158**) on said switch means (**24**) electrically connected to said contacts (**152, 154**);

a plurality of plug-in change prong interlock means (**58**) removably connected to said plurality of conductor connecting means (**158**) and insertable into and connecting with said permanent prong interlock means (**52**);

substantially flat switch access opening means (**40**) on said switch casing means (**20**) for access to said change prong interlock means (**58**) and for interengagement with said plug-in access opening means (**54**);

and casing means securing means (**68**) to secure said switch casing means (**20**) and said plug-in casing means (**22**) together with said substantially flat switch access opening means (**40**) and said substantially flat plug-in access opening means (**54**) aligned together, and with said plug-in change prong interlock means (**58**) and said permanent prong interlock means (**52**) in engagement with each other in said plug-in casing means through both of said access opening means to cause said plug-in power lines (**82**) to be controlled by said switch means.

6. A combination according to claim **5** in which a cover means (**44**) is to be used as a name plate (**44**) on a side wall (**90**) of said switch casing means.

7. A combination according to claim **5** in which each of said conductive connecting means (**158**) is an internally threaded opening means (**160**) and in which each of said plug-in change prong interlock means (**58**) has a threaded portion means (**62**) at one end inserted in said internally threaded means (**160**) an intermediate turning portion means (**64**) to be turned by a tool, and prong point means (**66**) at the other end, so that said prong point means (**66**) is inserted in said permanent prong interlock means (**52**) when said casing are secured together.

8. A combination according to claim 7 in which each of said permanent prong interlock means (52) is a prong receiving fork member means with a power line connector screw head (86) accessible from said plug-in access opening means (54) to receive said prong point means (66).

9. A combination according to claim 5 in which said plug-in casing means (22) and said switch casing means (20) are each substantially parallelepipeds with abutting, substantially equal parallelogram sides with respective abutting relatively large plug-in access opening means (54) and switch access opening means (40) and in which screw receiving opening means (50), (70), (74) provided adjacent the corners of said parallelepipeds to receive screws to attach said plug-in casing means (22) and said switch casing means (20) together, to mount said plug-in casing (22) to a support, and mount said switch casing (20) to a support.

10. In combination:

a plug-in casing means to cooperate in said combination;

permanent electrical interconnector means in said plug-in casing means to connect with plug-in change electrical interconnector means;

plug-in power line connecting means on said permanent electrical interconnector means electrically to connect plug-in power lines to said permanent electrical interconnector means;

substantially flat plug-in access opening means on said plug-in casing means for plug-in access to said permanent electrical interconnector means;

a switch casing means to cooperate in said combination;

a switch means in said switch casing means having electrical contacts to open and close an electrical circuit;

a plurality of power conductor connecting means on said switch means electrically connected to said contacts;

a plurality of plug-in change electrical interconnection means removably connected to said plurality of conductor connecting means and insertable into and connecting with said permanent electrical interconector means;

substantially flat switch access opening means on said switch casing means for access to said change electrical interconnector means and for inter-engagement with said substantially flat plug-in access opening means;

and casing means securing means securing said switch casing means and said plug-in casing means together with said substantially flat switch access opening means and said substantially flat plug-in access opening means aligned together, and with said plug-in change electrical interconnector means and said permanent electrical interconnector means in engagement with each other in said plug-in casing means and with said plug-in change electrical interconnector means passing through both of said access opening means to cause said plug-in power lines to be controlled by said switch means.

11. In combination:

a switch construction; a plug-in casing; plug-in prong interlock means in said plug-in casing; plug-in power supply connecting means on said plug-in prong interlock means; plug-in access opening means on said plug-in casing providing access to said plug-in prong interlock means, said plug-in casing being in the form of a plug-in casing cup bottom and a plug-in casing cup side wall construction forming a plug-in casing rim which forms said plug-in access opening means receiving a mating switch casing access opennig means of said switch construction which has a switch casing which is similarly shaped in the form of a switch casing cup bottom and a switch casing cup side wall construction forming said mating switch casing access opening means, and which said switch construction has a switch means entirely within said switch casing opening means and with mating interchangeable switch prong interlock means interlocking with said plug-in prong interlock means, said switch casing has a flat name plate secured on the outside of said switch cup bottom by plate fastening means attached to said switch casing cup bottom, said interchangeable prong interlock means having removable screw means which are removable from said switch construction said plug-in access opening means also providing access to said plug-in power supply connecting means for connecting and disconnecting said power supply to said power supply connecting means on said plug-in interlock means, said plug-in casing having a second access opening means to introduce plug-in power supply conductor means for connection to said plug-in power supply connecting means on said plug-in prong interlock means, and securing means securing said switch construction and said plug-in casing together.

12. A combination according to claim 11 in which a resilient flat sheet cover seal member is placed over said access opening means of said plug-in casing to be engaged by said casing access opening means of said switch construction.

13. A combination according to claim 12 in which each of said respective access opening means has a mating flat bead to engage and hold said resilient sheet cover seal member.

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