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SWITCH ASSEMBLY

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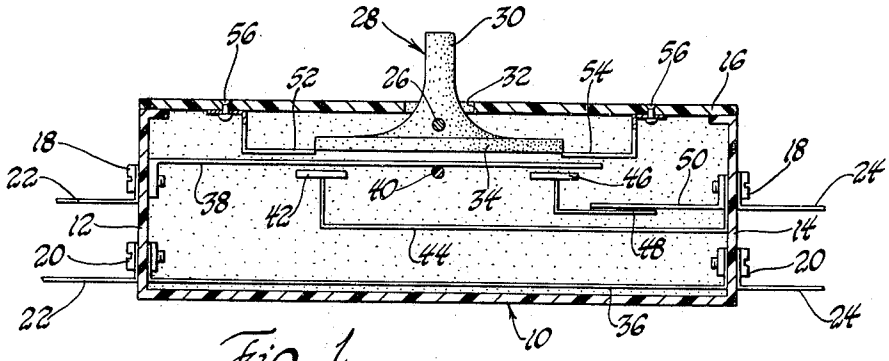


Fig. 1

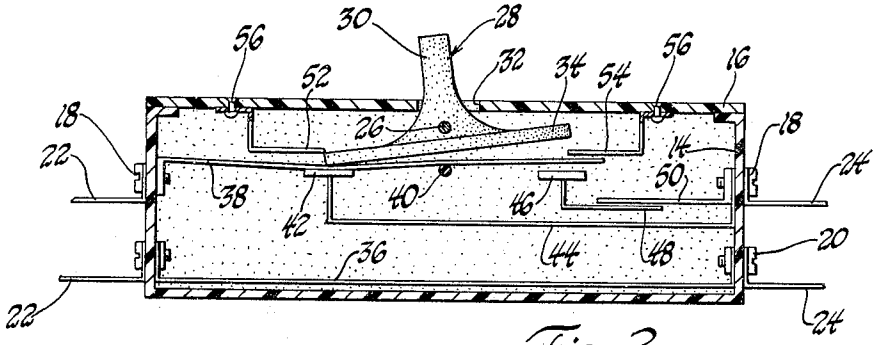


Fig. 2

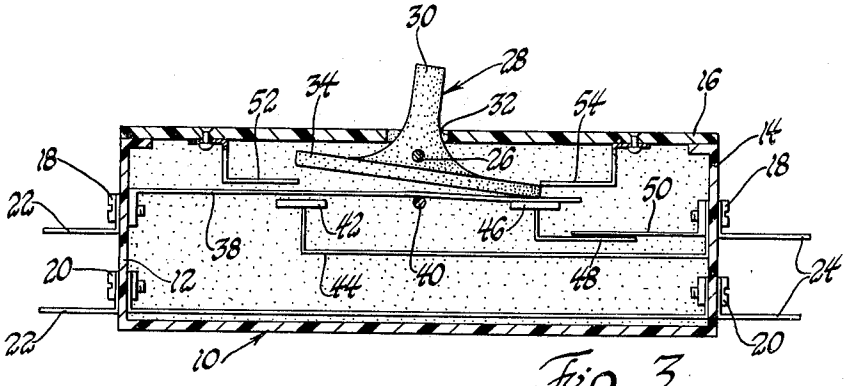


Fig. 3

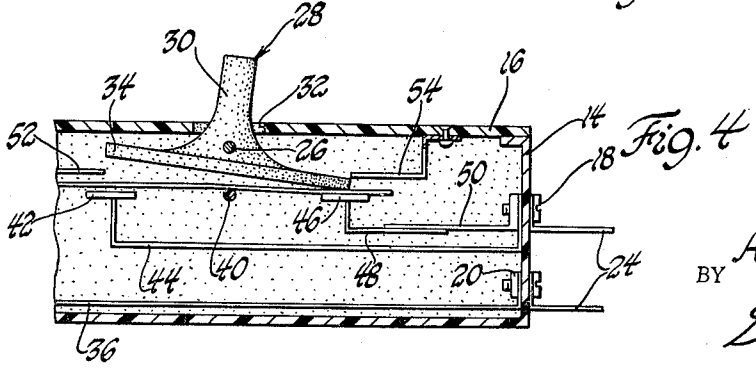


Fig. 4

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SWITCH ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

There is provided an improvement in switch assemblies of the type adapted to be mounted in a building wall, or the like, to control a light or other appliance, and wherein the assembly is of a standard size and shape to be readily mounted in an existing facility. The improvement includes an inner mechanism and wiring arrangement whereby a lever, which actuates the switch assembly, is moveable into first, second or third positions. One of such positions is an open or non-conducting position. Another position is such as to provide a continuous current flow through the switch assembly, for continuous and uninterrupted current flow to, and operation of, the appliance. Yet another position creates an interrupted current flow to provide an intermittent operating condition for the appliance. Current interruption in the last mentioned position may be accomplished by means of a bi-metallic current conductor arrangement between the switch contact and the connecting terminal.

This invention relates to switch assemblies, and more particularly to a switch assembly which may be selectively operated to provide either constant current flow or interrupted current flow through to the appliance with which the assembly is associated.

In the electric circuitry of houses, buildings and other structures, it is common to provide switch assemblies for operating the lights and other appliances, internally and externally of the structure. Such assemblies are generally mounted in the walls of the structure in standard mounting boxes, to which the lamp and appliance wiring is secured from within the building wall structure. Such assemblies are normally "on-off" switches, utilizing a lever member which may be selectively moved to either the "on" or the "off" position, thus conveying the electrical current to the appliance when it is desired to operate the appliance. It may be desirable, in many installations, to provide a third mode of operation for the appliance, whereby an intermittent or interrupted current flow is provided for creating a flashing light, for example, for some desired purpose.

Although the concept of a flashing light, through the use of various electrical components, is not new and several devices have been provided in the past to accomplish this result, most such devices are complicated and expensive affairs, normally mounted externally of the switch assembly and seldom located for ready access thereto for replacement, repair and the like. In addition, such devices require considerable and expensive installation, should it be desired to provide the interrupted current flow operation to the present wiring of the structure or object with which the switch assembly is used. Thus, there has been a demand for a switch assembly which is self-contained to provide the interrupted or intermittent current flow as one of several conditions of operation.

The device in which this invention is embodied comprises, generally, a housing having terminal connectors secured thereon, the housing being of such size and shape to readily fit within the standard openings and box constructions presently in existence in building structures.

Disposed within the housing is a lever member that is pivotable into any one of three positions. One of such positions is an at-rest, or non-conducting, position, a second position is such as to apply a continuous current flow through the assembly, and a third position is such as to provide an interrupted or intermittent current flow to the appliance or lamp with which the switch assembly is associated. Disposed within the housing is a through conductor which may be conveniently connected to one of the dual wires normally found in the wiring system. A second conductor extends partly through the housing and adjacent the lever member, and is adapted to be engaged thereby. First and second contact means are mounted in the housing and adjacent the second conductor, such that when the lever member is operated to one position the second conductor will engage one of the contact means for current flow in the desired mode. Movement of the lever member to another position will cause the current conductor to engage the other contact means for current flow in the other mode.

Such a device, being of a size and shape to conveniently fit within existing or standard electrical systems and at the same time being completely self-contained to provide the desired result, is easily mounted in new construction or to replace the present switch assemblies which do not provide such a result. The construction of the assembly is extremely simple and economical to manufacture and produce, may be easily mounted in the building structure and has little chance for misfunction or break-down of the various parts within the assembly. There are few moving parts, thus minimizing the wear and breakage problems, and the result is a device that is positive in its operation to produce the desired result.

These and other advantages will become apparent from the following description, used to illustrate a preferred embodiment of the invention when taken with the accompanying drawing in which:

FIGURE 1 is a cross-sectional view of a switch assembly embodying the invention and illustrating the parts thereof in the "off" position of operation;

FIGURE 2 is a cross-sectional view similar to FIGURE 1, showing the various parts in a position of operation providing continuous current flow;

FIGURE 3 is a cross-sectional view similar to FIGURE 1, showing the parts in a condition of operation providing intermittent current flow but at that phase of the cycle where there is no current flow; and

FIGURE 4 is a partial cross-sectional view similar to FIGURE 3, showing the various parts in operation in the condition of interrupted current flow and at that phase of the cycle where current flow is permitted.

Referring more particularly to the drawing, where the showings are for the purpose of illustrating a preferred embodiment of the invention only and not for the purpose of limiting same, FIGURE 1 illustrates the switch assembly in the condition of operation wherein the lamp or appliance with which the switch assembly is associated would be in a non-operating condition. A housing, indicated generally by the numeral **10**, of hollow box-like configuration, has end walls **12** and **14** and a cover **16** securable thereto in any suitable manner. The housing **10** is conveniently sized and shaped to fit within existing facilities and components useable in standard building structures and may be readily installed to replace existing switch assemblies that do not provide the functions or operations desired.

A plurality of terminal connectors, indicated by the numerals **18** and **20**, are mounted in the end walls **12** and **14** and may be of any suitable construction to permit incoming electrical wires **22** to be conveniently secured to

the switch assembly. Similarly, outgoing electrical wires **24** are secured to the terminal connectors **18** and **20** in the end wall **14**.

Disposed within the housing **10** is a pivot shaft **26** on which is mounted a toggle or lever member, indicated generally by the numeral **28**. Member **28** includes an actuating portion **30** which may be moved by the operator about the pivot pin **26**, and such portion is freely moveable in a slot **32** formed in the cover plate **16**. A cross portion **34** is provided on the lever member **28** within the housing **10** to actuate the various parts of the assembly, as will become hereinafter more apparent.

Extending across the interior of the housing **10** is a conductor **36** which is connected to two of the terminals **20** in the opposite end walls of the housing. Conductor **36** may be connected through the terminals **20** to one of the two wires normally associated with usual electrical circuitry, and passes through the housing **10** in uninterrupted fashion.

Extending part way into the housing **10** from the incoming terminal connector **18** in end wall **12** is an electrical conductor **38** which is disposed in the housing adjacent the cross portion **34** of the lever member **28**. Conductor **38** may be of a flat metallic material having self-supporting properties, as well as conducting properties. For example, conductor **38** may be a copper strip. Generally centrally of the housing **10**, and extending transversally thereof, is a fulcrum pin **40** that engages the under-surface of the conductor **38**. As will become hereinafter more apparent, the fulcrum pin **40** provides positive action of the switch assembly in moving from one position to another.

Adjacent one end of the lever member **28** and on the opposite side of the conductor **38** is a contact **42**, suitably mounted in the housing **10** and shown for convenience in FIGURE 1 to be at the left-hand side of the fulcrum pin **40**. Contact **42** is connected by a conductor **44** to the outgoing terminal **18** in the end wall **14**, for accomplishing one condition of operation as will be hereinafter described.

On the opposite side of the fulcrum pin **40** from the contact **42** is a second contact **46**, also disposed on the opposite side of the conductor **38** from the right-hand end of the cross portion **34** of the lever member **28**. Contact **46** has extending therefrom a first conductor **48**, having a portion closely adjacent and underlying a portion of a second conductor **50** that is also connected to the terminal **18** in the end wall **14**. Conductor **48** and conductor **50** are formed of different metallic materials, having different coefficients of thermal expansion, to provide an interrupting means for current flow from the contact **46** to the terminal **18**.

Spring members **52** and **54** are mounted in the under-surface of the cover **16**, such spring members engaging the end surfaces of the cross member **34** on the lever member **28**. The spring members **52** and **54** may be secured in the housing cover **16** in any suitable manner, as by rivets **56**.

Having thus described the structure of the switch assembly, reference is now to be had to FIGURE 2, illustrating the parts thereof in the condition of operation wherein a continuous current flow is provided from the incoming wires **22** to the outgoing **24**, one set of which are continuously connected by the conductor **36**. The lever member **28** has been pivoted to the position shown in FIGURE 2, wherein the left-hand end of the cross portion **34** passes by spring **52** and depresses the portion of the conductor **38** to the left of the fulcrum pin **40** into engagement with the contact **42**. Current is thus conveyed from the incoming wire **22**, through the terminal **18** in end wall **12** and the conductor **38** to the contact **42**, and through the conductor **44** to the terminal **18** in end wall **14**, where it continues on in uninterrupted fashion through the wire **24**. The spring **52** maintains the cross portion **34** and the conductor **38** in engagement with the contact **42**. The fulcrum pin **40** causes the right-hand end of the conductor **38** to raise, thus assuring that the right-hand end will not engage the contact **46**. Since there is no current flow through the contact **46** and the conductors **48** and **50**, these parts are out of operation.

Should it now be desired to provide an intermittent or interrupted current flow from the inlet wires **22** to the appliance with which the switch assembly is associated, the lever member **28** is pivoted to the position shown in FIGURES 3 and 4. In so doing, the left-hand end of the cross portion **34** snaps by the spring **52** and the right-hand end of the cross portion **34** similarly snaps by the spring member **54**. The right-hand end of the conductor **38** is depressed into engagement with the contact **46**. Again, the fulcrum pin **40** assures disengagement of the conductor **38** from the contact **42**. At the instant of contact of the conductor **38** with the contact **46**, current will begin to flow through the conductor **48** toward the conductor **50**. Since heat is generated by the current flow, the conductor **48** is caused to engage the conductor **50**, as illustrated in FIGURE 4, for current flow through the two conductors to the terminal **18** in the end wall **14**, and thence to the outlet wire **24**. As the current continues to flow, heat generated thereby will cause the conductor **50** to disengage from the portion of the conductor **48** when a suitable temperature is reached, thus causing a disengagement of the portion of conductor **50** adjacent the portion of conductor **48**, and a condition as illustrated in FIGURE 3. With such condition, current flow will cease between contact **46** and the terminal **18**, thus cutting off current flow to the appliance through the outlet wire **24**. At such time as the conductor **50** cools, engagement will again be established with the conductor **48**, in the position shown in FIGURE 4, and current will flow to the appliance. This cycle is repeated as the current flows and as the temperatures rise and fall in the conductors **48** and **50**. Thus, an intermittant or interrupted current is provided to the terminal **18** and the outlet wire **24**, causing the appliance to turn on and off as the conductors **48** and **50** engage and disengage.

When it is again desired to return the switch assembly to the position shown in FIGURE 1, where the current flow is completely stopped through either contact **42** or **46**, the lever member **28** is moved to the middle position, whereby the right-hand end of the cross-portion **34** snaps past the spring **54** and the two springs **52** and **54** maintain the lever member **28** in the neutral position.

Thus, a switch assembly is provided which permits two different modes of operation of an appliance with which the switch assembly is associated, in a simple and efficient manner, and in a manner that is positive in its operation. The device contains relatively few parts, is easily manufactured and produced, is economical and efficient, and may be mounted in existing facilities where the intended result is desired.

The present invention has been described in connection with certain structural embodiments; however, it is to be appreciated that various changes may be made in the structural embodiments without departing from the intended spirit and scope of the present invention as defined by the appended claims.

Having thus described the invention, I claim:

1. A switch assembly comprising;

a housing having a plurality of terminal connectors secured therein and a conductor extending between two of said connectors;

a lever member pivotally mounted in said housing and selectively moveable between first, second or third positions;

a current conductor extending from another one of said connectors and adjacent said lever member;

first and second contact members mounted in said housing and adjacent said current conductor and spaced

therefrom when said lever member is in said second position;

a conductor extending from said first contact to a fourth connector, said current conductor being moveable into engagement with said first contact by said lever member when said lever member is in said first position to convey current to said fourth connector;

and current conducting means extending from said second contact to said fourth connector and including current interrupting means for conveying interrupted current flow to said fourth connector, said current conductor being moveable into engagement with said second contact by said lever member when said lever member is in said third position.

2. The switch assembly set forth in claim **1** and further including spring means in said housing and engageable with said lever member for maintaining said lever member in said first or said second or said third position.

3. The switch assembly set forth in claim **1** wherein said current interrupting means includes a first conductor secured to said second contact and formed of a metallic material, and a second conductor secured to said fourth connector and formed of a different metallic material than said first conductor in said means, said first and second conductors in said means being separable to interrupt current flow therethrough when said conductors are heated by current flow therethrough.

4. The switch assembly set forth in claim **1** and further including a fulcrum pin secured in said housing and adjacent said current conductor and operable when engaged by said current conductor to move the portion thereof adjacent one of said contacts away from said one of said contacts when said lever member moves said current conductor into engagement with the other of said contacts.

5. A switch assembly comprising:

a housing having terminal connectors thereon;

a lever member pivotally mounted in said housing and selectively moveable between first, second or third positions;

first current conducting means in said housing and including normally open contact means adapted to be closed by said lever member when said lever member is moved to said first position for conveying uninterrupted current flow through said housing and said terminal connectors;

and second conducting means in said housing and including normally open contact means being adapted to be closed by said lever member when said lever member is moved to said second position for conveying current flow through said housing, and interrupting means in said housing being continually alternately closed and opened by current flow therethrough when said lever member remains in said second position for conveying interrupted current flow through said housing and said terminal connectors.

6. The switch assembly set forth in claim **5** wherein said first conducting means includes a current conductor connected to one of said terminal connectors and disposed adjacent said lever member and moveable by said lever member into engagement with said contact means in said first conductor means.

7. The switch assembly set forth in claim **6** wherein said second conducting means includes said current conductor in said first conducting means, said current condutor being moveable by said lever member into engagement with said contact means in said second conducting means and out of engagement with said contact means in said first conducting means when said lever member is moved from said first to said third position.

8. The switch assembly set forth in claim **7** wherein said interrupting means includes first and second conductors having portions thereof disposed in adjacent spaced relation, said first and second conductors being formed of different materials whereby heat generated by current flow therethrough causes alternate engagement and disengagement of said adjacent portions.

9. The switch assembly set forth in claim **8** and further including a fulcrum member mounted in said housing and engaging said current conductor between said first and second contact means, whereby engagement of said current conductor by said lever member in said first position causes closing of said first contact means and greater opening of said second contact means, and engagement of said current conductor by said lever member in said third position causes closing of said second contact means and greater opening of said first contact means.

10. The switch assembly set forth in claim **9** and further including spring means in said housing and engageable with said lever member to hold said lever member in said first or said second or said third position when said lever member is moved to one of said positions.

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