Oct. 19, 1965 W. A. DE SMIDT 3,213,213

ELECTRICAL CONTACT ACTUATOR

Filed April 12, 1962 3 Sheets-Sheet 1

Fig. 1

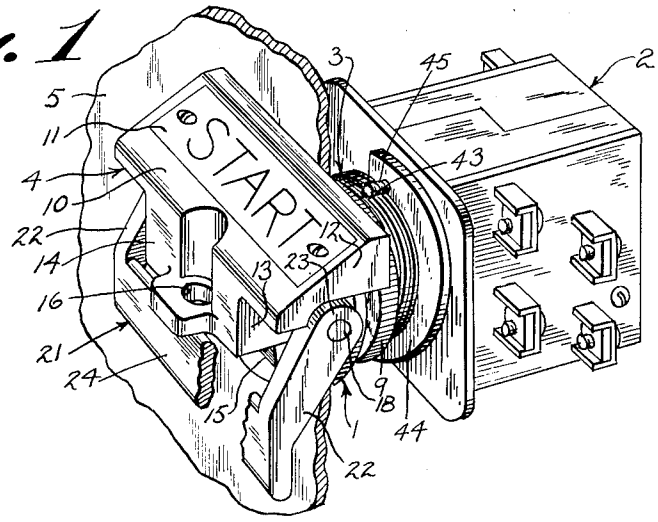


Fig. 2

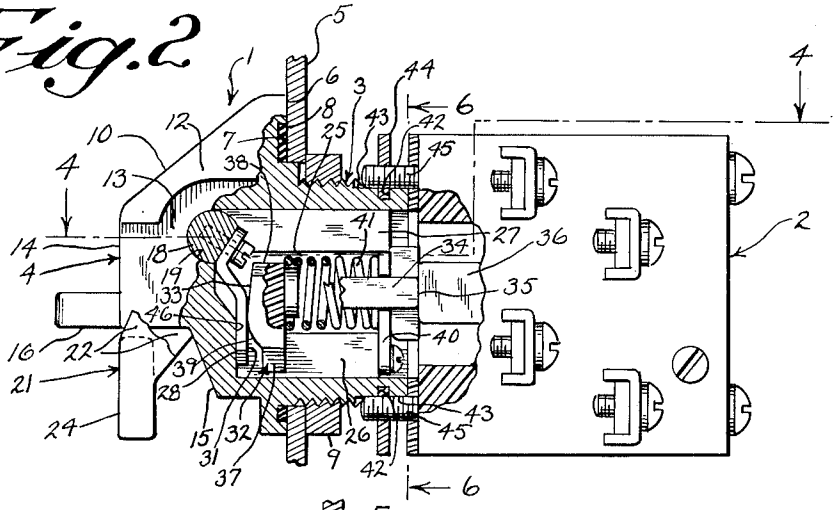
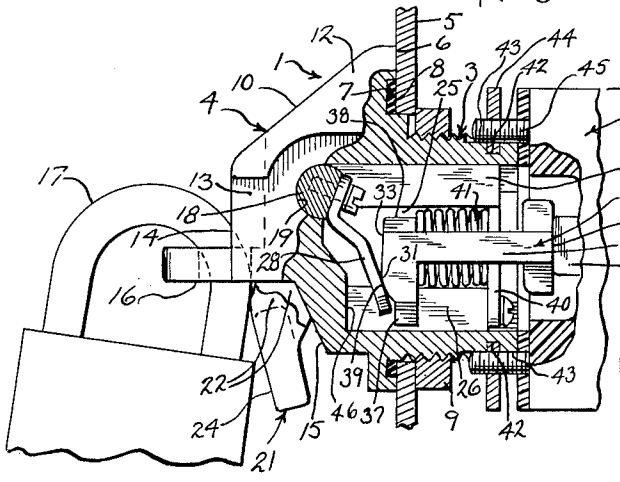


Fig. 3



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ELECTRICAL CONTACT ACTUATOR

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Fig. 4

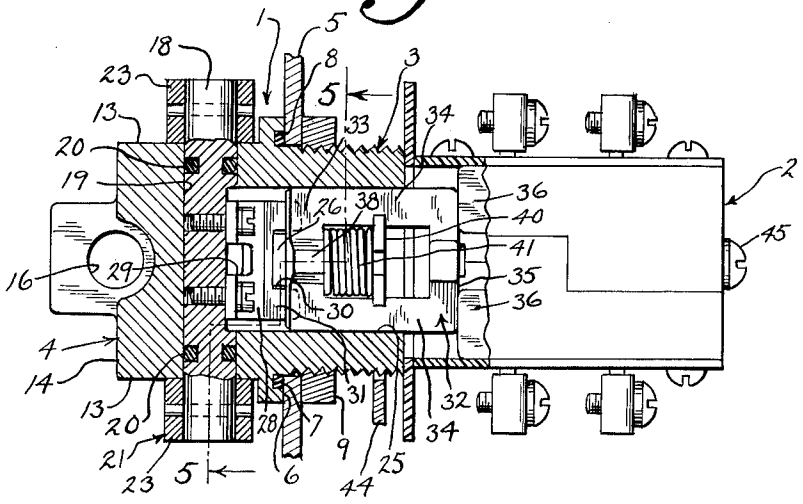


Fig. 5

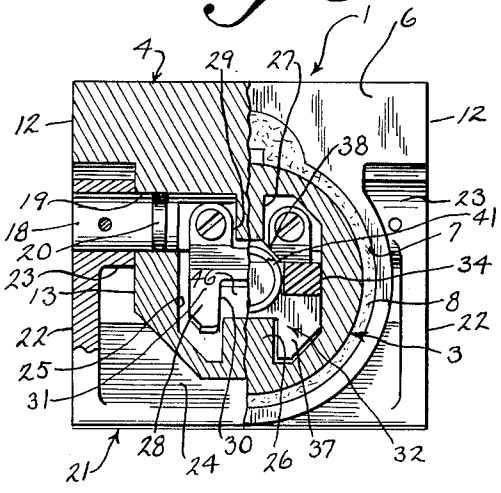


Fig. 6

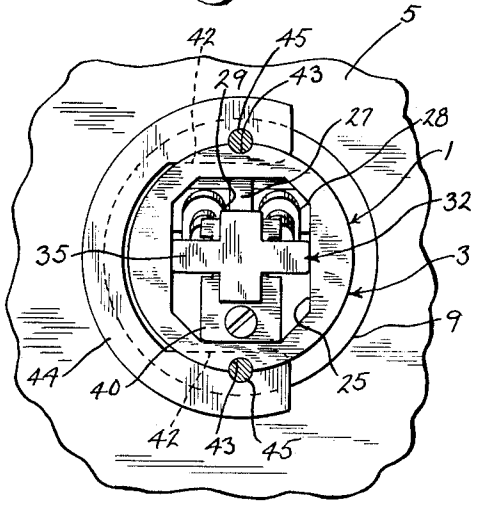
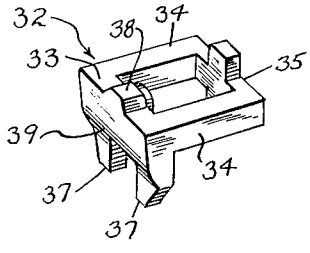


Fig. 7



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ELECTRICAL CONTACT ACTUATOR

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Fig. 8

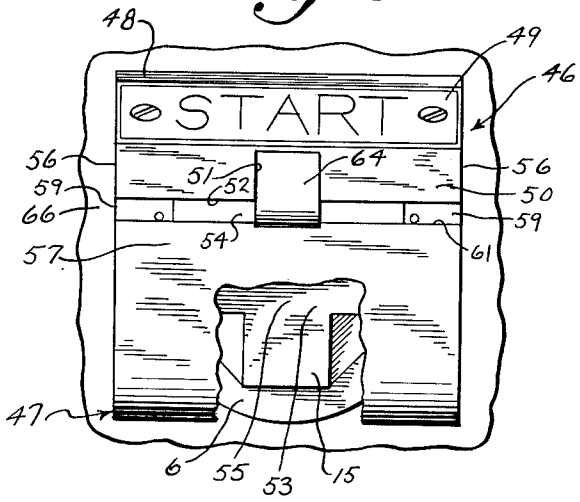


Fig. 9

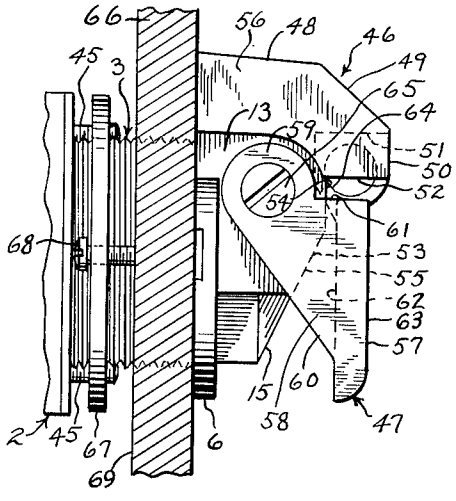
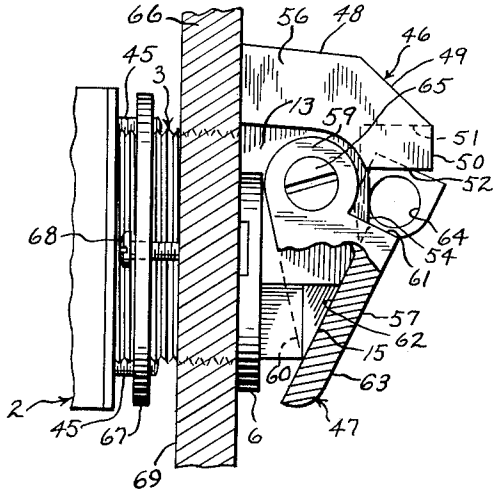


Fig. 10



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United States Patent Office 3,213,213 Patented Oct. 19, 1965

3,213,213

ELECTRICAL CONTACT ACTUATOR

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Filed Apr. 12, 1962, Ser. No. 186,911
6 Claims. (Cl. 200—17)

This invention relates to manually operated control units for opening and closing electrical contacts and the like, and it more specifically resides in a watertight unit having a casing with a rear body portion for insertion through a hole in a mounting panel and a forward head portion that will extend from such a panel, such casing containing a plunger that may be moved rearwardly for actuating associated switch contacts, or the like, there also being a pivot shaft extending transversely through the head portion which enters the casing to engage the plunger and which extends from the head to mount an operating lever, so that a manual depression of the lever pivots the shaft to actuate the plunger.

This invention primarily relates to manual control units for operating electrical contacts, which in turn momentarily close or open circuit networks for the control and operation of power circuits. Such manual control units are commonly referred to as push button units, and such term will be used occasionally herein to describe the present invention, although the embodiments described in the specification do not disclose the usual form of button that is manually engaged. It will be observed that a similar manual engagement, characterized by a pushing motion, is employed in operating the embodiments described, so that the term push button remains apropos. It is, in fact, an object of the invention to provide a manually operated unit that preserves the push type of operation while incorporating a watertight construction not readily obtainable by a unit having only a linear motion for its parts.

Commonly, electric motors for driving machines such as found in laundries, creameries, tanneries, pump houses, outdoor installations and other areas where moisture is prevalent are connected across their power sources by means of electromagnetic switches that are enclosed in cast iron, stainless steel, or aluminum cabinets with gaskets for the covers to render the enclosures watertight. The push button control units for energizing and deenergizing the electromagnetic switches are similarly encased in their own watertight cast iron, stainless steel, or aluminum enclosures, but at locations convenient to the operator. Such watertight enclosures are required to protect the electrical contacts from moisture, and in many locations there is a likelihood that water will regularly be sprayed against the device, so that moisture seepage is an acute problem. In dairies, for example, frequent application of wash water around the equipment is necessary for sanitary reasons.

The conventional watertight push button assembly usually includes a special cover for the enclosure that has been carefully machined and fitted with some form of watertight seal. Also, generally, the enclosure is cast in a special form which is expensive and which requires substantial machining. There are, therefore, disadvantages in the conventional watertight push button which arise from the special nature of the watertight enclosures employed. Thus, a need has existed for some type of self-contained watertight push button which can be installed in a standard type of enclosure having a cover which is adapted to receive and mount a watertight unit as well as other types of units.

Moreover, watertight push buttons must be able to withstand rough treatment and exposure to the elements, and they must be able to adequately isolate the comparatively

delicate electrical contact assembly and operating mechanism inside the enclosure from such external conditions. These push buttons are used in a comparatively rough industrial environment, and it is not unlikely that they will be jammed home with a sharp blow from the heel of a hand, instead of being carefully depressed.

When such devices are used out-of-doors in a cold climate they are also vulnerable to freezing and a conventional button construction can be rendered completely unusable until the ice thaws. It must be anticipated also that an operator might seek to pound a frozen button loose with a hammer, or other tool, and the need of a durable construction is apparent. Accordingly, it is an object of this invention to provide a watertight manual control unit which can be installed in a simplified enclosure of a more usual construction and which is capable of withstanding abusive treatment.

It is another object of the present invention to provide a watertight control unit assembly which is not rendered inoperative by icing conditions.

It is another object of this invention to provide a watertight control unit assembly which has an improved, longer lasting, water seal.

It is another object of this invention to provide a watertight control unit assembly which is lever operated.

It is another object of this invention to provide a watertight push button type assembly which will completely isolate associated electrical contacts from the rough treatment accorded such devices.

It is another object of this invention to provide a watertight control unit assembly of an improved unitary construction in which the assembly does not include a cover as an integral part of the mechanism, as in prior devices in which operating shafts, for example, have been journaled in the covers themselves. Rather, in the present invention the control unit is complete in an assembly separate from the cover and the assembly may be mounted in a plain cover that also is adapted for other types of push buttons, such as oiltight buttons and standard buttons. A simple gasket between the cover and the assembly will afford a watertight enclosure, and thus special manufacture for watertight conditions is minimized.

It is another object of this invention to provide a watertight control unit that is also explosion-proof.

The foregoing and other objects will appear in the description to follow. In the description, reference is made to the accompanying drawings which form a part hereof and in which there is shown by way of illustration and not of limitation specific embodiments in which this invention may be practiced. These embodiments will be described in sufficient detail to enable those skilled in the art to practice this invention, but it is to be understood that other embodiments of the invention may be used and that structural changes may be made in the embodiments described without departing from the scope of the invention. Consequently, the following detailed description is not to be taken in limiting sense; instead, the scope of the present invention is best defined by the appended claims.

In the drawings:

FIG. 1 is a view in perspective showing a control unit embodying the invention as it appears when installed in an enclosure cover or a mounting panel,

FIG. 2 is a side view in elevation of the control unit of FIG. 1 with parts broken away and in section to show interior construction,

FIG. 3 is a fragmentary view in side elevation of a portion of the control unit with parts thereof moved into an operated position,

FIG. 4 is a plan view in partial section taken along the section line 4—4 shown in FIG. 2,

FIG. 5 is a rear view in section without the enclosure

cover or mounting panel taken along the section line 5—5 shown in FIG. 4,

FIG. 6 is a view in section taken along the section line 6—6 shown in FIG. 2, and

FIG. 7 is a view in perspective of a plunger forming a part of the control unit,

FIG. 8 is a front view in elevation of an alternative embodiment of the invention with parts broken away to show underlying portions

FIG. 9 is a side view in elevation of the embodiment shown in FIG. 8,

FIG. 10 is a side view in elevation of the embodiment shown in FIG. 8 with the operating lever in its depressed position and with parts broken away to show underlying portions.

Referring now to the drawings, there is shown in FIG. 1 a manually operable control unit having a casing **1** of die-cast construction and an electrical contact assembly **2** which is mounted at the rear of the casing **1**. The casing **1** is preferably die-cast to provide a unitary enclosure which will be watertight and which will exhibit requisite strength, and to provide a desirable manufacturing medium for obtaining the intricate configuration which is preferable for the casing **1**. The casing **1** comprises a circular cylindrical rear body portion **3**, that is threaded about its exterior surface, and a forwardly projecting head portion **4**. The body portion **3** is of reduced transverse dimension with respect to the head portion **4**, so as to be adapted for insertion through an opening in an enclosure cover or a mounting panel, such as that which is designated by the numeral **5**.

By virtue of the greater transverse extent of the head portion **4** a flat, rearwardly facing shoulder **6** (see FIGS. 2–5) is formed at the juncture of the head portion **4** with the body portion **3**. The shoulder **6** functions as a mounting surface for the casing **1** that extends circumferentially about the forward end of the body portion **3**, and it is formed with a groove **7** which receives a gasket **8** that also completely encircles the body portion **3**. The purpose of the gasket **8** is to form a watertight seal between the rearwardly facing shoulder **6** and the front surface of the mounting panel **5** when the casing **1** is installed. For purposes of installation the body portion **3** is preferably of circular cylindrical form and is threaded, as hereinbefore mentioned, to receive a ring shaped mounting collar **9**. As seen in FIG. 1, the mounting collar **9** has an outer surface which is knurled, so that it can be tightly grasped, and its inner surface is threaded correspondingly to the threads of the body portion **3**. Thus, to install the casing **1** in the mounting panel **5** the body portion **3** is inserted through an appropriate hole in the panel **5** from the front side until the rearwardly facing shoulder **6** of the head portion **4** abuts the front surface of the panel **5**. The rear body portion **3** of the casing **1** will protrude from the rear of the panel **5** and the mounting collar **9** is then turned onto the body portion **3**. The collar **9** is drawn up tight against the inner surface of the panel **5** to pull the rearward facing shoulder **6** with its gasket **8** tightly against the front surface of the panel **5** to form a watertight seal. This installation of the casing **1** is made before the electrical contact assembly **2** is secured to the after end of the casing **1**.

Referring now more specifically to the head portion **4** of the casing **1**, when it is viewed from the front the upper part thereof appears as a broad T. The cross piece of this T-shape comprises a downwardly and forwardly sloping surface **10** that receives a flush nameplate **11**, as seen in FIG. 1, for displaying a use designation for the control unit. The slope of the surface **10** enhances the shedding of water, and the surface **10** extends transversely to each side to form a part of a pair of protective shields **12** that overhang the sides **13** of the head portion **4**.

A vertical front surface **14** continues downward from the lower edge of the sloping surface **10** and gives the profile of the upper part of the head **4** the shape of an outward jutting promontory that overhangs the lower part of head **4**. The lower part of the head **4** is, in turn, characterized by a receded stop abutment **15** which is set well behind the front surface **14**. The front surface **14** also supports an eye **16** which is adapted to receive the shank of a padlock, such as shank **17** shown in FIG. 3, used for locking the mechanism of the control unit in a set position.

A horizontal pivot shaft **18** extends transversely through the upper part of the head portion **4** with its end emerging from each of the side walls **13** at locations directly beneath the protective shields **12**. The head portion **4** is provided with an opening **19** that accommodates the shaft **18** with a relatively close fit, and watertight seals in the form of O-rings **20**, as seen in FIGS. 4 and 5, are interposed between the shaft **18** and the wall of the opening **19** by insertion in complementary grooves provided in the shaft **18** at positions just inside the side walls **13**.

A bail shaped operating lever **21** is fastened to the ends of the shaft **18** by pinned connections so as to rotate in unison therewith. For these connections the operating lever **21** has a pair of vertically extending side arms **22** which terminate at their upper ends in hubs **23** that receive the shaft ends. The arms **22** are seen to extend alongside the sides **13** and their lower ends merge with a horizontal bridging section **24** that extends beneath the promontory-like upper parts of the head portion **4**.

When the horizontal lever section **24** is in its normal, forwardmost position, as seen in FIGS. 1 and 2, its front surface is in substantially the same plane as the vertical surface **14**. To actuate the control unit being described the operator pushes the lever section **24** rearwardly, very similarly as a push button is depressed with a linear motion, and the lever **21** then swings about the pivot of the shaft **18**, so that the section **24** is moved toward the stop abutment **15**. The stop abutment **15** will act as an arresting means for limiting the rearward motion of the lever **21**, and the mid-portion of the section **24** will strike the abutment **15** so that the operating force which is applied will be directly transmitted to the more rugged mass of the head portion **4**. In this manner any abusive, excessive forces will be absorbed by the casing **1** to minimize damage that might otherwise occur to the lever **21**. There is a direct line for the transmittal of the applied force from the front of the lever section **24**, through the section **24**, and hence to the forward face of the abutment **15** which is at the same angle of slope as the after face of the section **24** when the two parts are brought into engagement. This direct line of force transmittal minimizes side thrusts on the shaft **18** and accordingly promotes long life and maintenance of a close watertight fit for the shaft **18**.

The rear body portion **3** has a hollow interior in the form of a cavity **25** which extends into the head portion **4** and communicates with the shaft opening **19**, whereby the central portion of the shaft **18** is exposed within the cavity **25**. The cavity **25** is further characterized by a longitudinal rail or track **26** rising from the bottom of the cavity, and by a second rail or track **27** which depends from the upper wall of the cavity. Each rail **26**, **27** extends for substantially the entire longitudinal length of the cavity **25**.

An H-shaped arm **28** is fastened to a flat on the pivot shaft **18** within the cavity **25**, and it extends downwardly into the cavity **25** as shown in FIGS. 2–5. In order to utilize the full turning angle allowed by the size of the cavity **25** the mounting portion of the arm **28** is placed so as to face at a downward angle when the operating lever **21** is in its normal position. Thus, when the pivot shaft **18** is rotated the arm **28** will pivot thereon in the cavity **25** without striking the cavity wall.

The arm **28** is a rigid plate, with notches **29** and **30** cut inward from its upper and lower ends (see FIG. 5) to clear the tracks **26**, **27** of the cavity **25**. The arm **28** is also given a doglegged profile, as seen from the side, so

that it will present a vertical, rearward facing impelling surface **31** to a plunger **32** when the pivot shaft **18** is in its normal position.

The plunger **32**, as is apparent in FIGS. 4 and 7, is a rectangular frame formed by a forward end **33**, spaced side members **34**, and an after end **35** for engaging contact actuators **36** within the contact assembly **2** that open and close associated electrical control contacts (not shown). The forward end **33** has feet **37** that extend toward the floor of the cavity **25** and straddle the guide track **26** that extends upward from the floor of the cavity. This arrangement guides longitudinal movement of the plunger **32** at its forward end. The forward end **33** of the plunger **32** also has a crown **38** at its top center which functions both as part of a spring seat and as a bearing surface to slide along the under side of the upper track **27** whenever the arm **28** forces the front of the plunger **32** upward. The after end **35** of the plunger **32** may be of any shape desired, and in the preferred embodiment illustrated it is in the shape of a cross to accommodate the particular contact assembly with which it is used.

A transverse cam surface **39** is formed across the forward end **33** of the plunger **32** by providing a downward and rearward slope for the forward faces of the feet **37**. When the operating lever **21** is depressed, causing the pivot shaft **18** to rotate, the impeller surface **31** of the arm **28** moves rearward and upward against the transverse cam surface **39**, with a sliding pivot like motion which not only moves the plunger **32** rearwardly, but slightly raises the front of the plunger **32** to avoid any possible jamming or excessive wear with the rail **26**. The sliding motion with the surface **39** of the plunger **32** also moves the point of contact between the arm **28** and plunger **32** downwardly along the arm **28**, so that turning movement of a relatively short distance is converted into a substantial amount of linear travel for the plunger **32**.

A spring retainer **40** stamped from flat stock is secured to the after end of the track **26** and extends inside the open center of the frame shaped plunger **32** as seen in FIG. 6, the retainer **40** is a rectangular shaped plate having notches cut inward from its lateral edges to accommodate the side members **34** of the plunger **32** to guide the plunger **32** as it moves. A bias spring **41** is disposed in the opening formed in the center of the frame shaped plunger **32** with its after end seated against the fixed spring retainer **40** and its forward end bearing against the front part **33** of the plunger **32**. The spring **41** thus urges the plunger **32** forward in the cavity **25**.

To mount the contact assembly **2** a pair of diametrically opposite channels **42** are cut in the outer, threaded surface of the rear body portion **3**. The channels **42** are quite narrow and extend transverse of the body portion **3**. In addition, a pair of longitudinal grooves **43** are cut in from the after end of the body portion **3** to intersect with each of the channels **42**. A C-shaped plate **44** has its ends inserted in the channels **42** and its central part encircles about the exterior of the body portion **3**. A pair of mounting screws **45**, which pass through the contact assembly **2**, extend through the grooves **43** and are threadedly engaged with the ends of the plate **44**. By drawing the screws **45** up tight the parts are held assembled.

When the operating lever **21** is depressed it will rotate the pivot shaft **18** and cause the arm **28** to push the plunger **32** rearward. The contact actuators **36** will then be moved, and in this operation the bias spring **41** is compressed against the spring retainer **40**. When the operating lever **21** is released the bias spring **41** will expand and force the plunger **32** forward, thereby causing the pivot shaft **18** to rotate for returning the operating lever **21** to its normal position. Movement in this return direction is limited by the arm **28** striking the front wall **46** of the cavity **25**, and this also dictates the extent of the forward travel of the plunger **32**.

The plunger **32** converts the limited circular movement of the arm **28**, which in an actual embodiment may have a turning radius of less than an inch, to a substantial linear motion. For the example being given such linear motion was approximately one-half inch for satisfactory operation of the contact assembly. In this movement the transverse cam surface **39** allows the arm **28** to slide along it as the arm **28** moves forward and upward through its arc. Since the arm **28** is normally vertical, the directions of the forces it can impart to the transverse cam surface **39** are rearward and upward. The slight upward force minimizes frictional contact between the plunger **32** and the track **26** so that wear is reduced and a wedging type movement with the track **26** is eliminated.

The interior working parts are fully housed within the rear body portion **3** in comparative isolation from conditions exterior of the head portion **4**. Both abusive blows that may be struck against the control unit and humid, wet conditions will not affect the working parts or the associated electrical contacts operated by the unit. The physical protection of extending an operating lever beneath a promontory portion and to the front of an arresting abutment is coupled with desirable watertight features in which the operating shaft is supported at spaced points so that tight seals for the shaft are maintained.

The alternative embodiment illustrated in FIGS. 8, 9 and 10 differs from the above described embodiment in the shape of its upper head portion **46** and its operating lever **47**. In the alternative embodiment, a broad roof portion **48** slopes gently downward from the mounting panel **66** until it meets a narrower, more sharply downward sloping nameplate-bearing surface **49**. The nameplate-bearing surface **49** terminates in a narrow vertical upper front surface **50**, which extends the full width of the upper head portion **46**, except for a deep notch **51** cutting through its center.

A horizontal bottom surface **52** extends from the lower edge of the upper front surface **50** rearwardly to join a lower front wall **53** at a point approximately below the junction of the roof portion **48** and the nameplate-bearing surface **49**. The lower front wall **53** extends downward a short distance to create a narrow vertical strip **54**, with a central groove **63** cut in it in alignment with the notch **51** in the upper front surface **50**. The lower front wall **53** angles rearwardly from the bottom of the vertical strip **54** to form a slanting portion **55** which merges with the stop abutment **15**. The roof portion **48** of the upper head portion **46** forms protective shields **56** which overhang the ends of a horizontal pivotal shaft **65** protruding beyond the sides **13**.

The operating lever **47** is cast in the form of a broad, horizontally extending bridging section **57** suspended at its ends across the lower front wall **53**, under and rearward of the upper front surface **50**, by triangular shaped side arms **58** extending front hubs **59**, which are immovably fastened around the protruding ends of the shaft **65**. The triangular side arms **58** may be visualized as having a rear side **60** slanting forward and downward from the rear of each hub **59** to merge with the bridging section **57** near its bottom edge, and a top side **61** extending horizontally forward from the front side of each hub **59** to the top of the bridging section **57**. The bridging section **57** has a vertical front face **62** extending downward from the top side **61** that is rounded at the bottom to join with a rear side **62**. A horizontally oriented eye **64** to receive a padlock shank (not shown) entering from the side is formed on the center of the top edge of the bridging section **57** to fit in the notch **51** in the center of the upper front surface **50** and the groove in the lower front wall **53** when the operating lever **47** is in its normal, forwardmost position as shown in FIG. 9.

In addition to the above recited structural characteristics of the embodiment illustrated in FIGS. 8, 9 and 10, that embodiment is also modified so as to satisfy the standards for an explosion-proof push button. The horizontal pivotal shaft **65** has a screw-thread fit in its mounting in the head portion **46**, with at least the minimum five

threads required for entering parts, although this mounting does not appear in the drawings. The mounting panel **66** is of much heavier gauge than the mounting panel **5** shown in the previous embodiment, and the control unit mounting opening in it is threaded to permit the rear body portion **3** of the control unit to be screw-fitted therein. The C-shaped plate **67** is also of heavier gauge than its counterpart (44) in the previous embodiment and a screw **68** is fitted through a threaded hole in it to bear against the inside surface **69** of the mounting panel **66** wedging the threaded surface of the trunk portion **3** tightly in the mounting panel **66**.

Thus, the control unit of the present invention may be modified to be explosion-proof as well as waterproof. The purpose of the threaded fittings is to provide a tortuous path for the expulsion of gases from the inside of the control unit and the enclosure. It is to be understood that the invention in either embodiment may be waterproof, or explosion-proof, or both, as desired by employing the various modifications as described above.

The operating lever **47** of the alternative embodiment presents a much larger bridging section **57** than the corresponding operating lever **21** of the first embodiment. Similariy to the first embodiment, the operating lever **47** of the alternative embodiment may be retained in its depressed position by a padlock shank or other instrument inserted through the eye **64**. It should be noted that the bridging section **57** is substantially recessed rearwardly of the vertical upper front surface **50**, which can, therefore, present an abutment to moving objects which might otherwise depress the operating lever **47** and a means for shedding water from the roof portion **48** and the nameplate-bearing surface **49** beyond the bridging section **57**. Also, the broad bridging section **57** extending across the whole lower front wall **52** presents a shield against water sprayed horizontally against the front of the switch. When the operating lever **47** is in its depressed position, the bridging section **57** abuts the stop abutment **15** which will receive any forces then exerted on the operating lever **47**, protecting the more delicate inner mechanisms of the push button and switch described above.

I claim:

1. In a manually operated control unit the combination comprising: a casing having a rear body portion, a forward projecting head portion with a rearwardly facing mounting surface to form a watertight union with a mounting panel and with a stop abutment formed beneath the forward projection thereof, and a longitudinal cavity extending through a substantial portion of its length; a pivot shaft extending transversely through said head portion and entering said cavity; sealing means between said shaft and said head portion; an operating lever joined with and depending from said pivot shaft for swinging movement therewith which has a transverse section disposed to the front of said stop abutment and is engageable therewith for limiting its rearward motion; an arm disposed in said cavity secured to said pivot shaft for forward and rearward movement within the cavity in response to turning of the shaft; a plunger mounted in said cavity, for longitudinal movement thereon which has a forward end adjacent said arm to be moved rearwardly thereby; a spring retainer secured at the after end of said body; and a bias spring interposed between said plunger and said spring retainer and urging said plunger forward.

2. In a manually operated control unit the combination comprising: a casing having a hollow rear body portion open at its after end for insertion in a mounting panel and a forward jutting head portion that broadens transversely from the rear portion to engage such a mounting panel in a watertight seal; a rotatable shaft extending transversely through said head portion forming a watertight seal therewith and having an arm extending within the hollow interior of said rear body portion; an operating lever exterior of said head portion joined to said shaft for rotating the same; a longitudinally movable plunger within said hollow interior cooperatively engageable by said arm on said shaft to be moved in response to shaft rotation; a mounting plate embracing the outer surface of said rear body portion of said casing and adapted to receive mounting bolts; a contact assembly fastened across the after end of said rear body portion by bolts secured to said mounting plate with a slidable contact member engaging said plunger; and a mounting member adapted to engage the outer surface of said rear body portion and the rear surface of said mounting panel to hold the control unit in said mounting panel.

3. In a manually operated control unit the combination comprising: a casing having a hollow rear body portion open at its after end and a forward jutting head portion, said rear body portion having a raised track extending longitudinally through its hollow interior; a rotatable shaft mounted by said head portion having an arm extending within said hollow interior straddling said raised track to present a vertical impelling surface when in its normal position and movable forwardly and rearwardly through a longitudinally extending arc; a longitudinally movable plunger within said hollow interior having a curved cam surface extending transversely across its forward end to abut said arm and to form a surface across which said arm will move and slide as said arm is moved in said hollow interior imparting motion to said plunger; and a contact assembly mounted across the after end of said casing and having a slidable member engaging the after end of said plunger to open and close contacts when said plunger is moved.

4. In a manually operated control unit the combination comprising: a casing having a hollow rear body portion open at its after end and a forwardly jutting head portion, said rear body portion having a raised track extending longitudinally through its hollow interior; a rotatable shaft mounted by said head portion having an arm extending within said hollow interior movable forwardly and rearwardly through a longitudinally extending arc; an operating lever exterior of said head portion joined to said shaft for rotating the same; a longitudinally movable plunger within said hollow interior having a four sided open frame comprised of laterally spaced side members, a front member crossing over said track and a rear member that presents a rearwardly facing working surface movable from the rear body portion upon rearward movement of the plunger, said plunger having feet on each side of said track to straddle the same and further having a front face disposed in the arc of said arm to be struck thereby; a spring seat extending through the open frame of the plunger at the rear of the frame; and a bias spring inserted in said open frame bearing at one end against the spring seat and its other end against the front member of the frame.

5. In a manually operated control unit the combination comprising: a casing having a rear body portion for insertion in a mounting panel and a forward jutting head portion that broadens transversely from the rear portion to present a mounting surface, said head portion having a promontory-like upper part and a stop abutment beneath and set back from the forward extremity of the upper part; a rotable shaft extending transversely through said upper part of said head portion and protruding from the sides thereof; an operating lever having depending arms that are attached to the ends of said shaft and which extend alongside the sides of the head portion, and having a transverse section bridging between said arms which crosses the front of said abutment and is disposed beneath said promontory-like upper part of said head portion, whereby a rearward depression of said transverse section moves the same toward the abutment and pivots said shaft; means connected with said shaft for transmitting a rotary motion of said shaft in a substantially rectilinear direction; and a plunger within said rear body portion of

said casing cooperatively engageable with said means to be moved substantially rectilinearly in response to shaft rotation.

6. In a manually operated actuator for electrical contacts, the combination comprising: a casing having a rear body portion for insertion in a mounting panel and a forward jutting head portion that broadens transversely from the rear body portion to present a mounting surface; a rotatable shaft journaled transversely through said head portion and having at least one end protruding from the sides thereof; an operating lever having at least one depending arm that is attached at one end to the protruding end of said shaft, whereby a rearward depression of an end of said operating lever remote from said shaft pivots said shaft; means connected with said shaft for transmitting a rotary motion of said shaft in a substantially rectilinear direction; and a plunger within said rear body

portion of said casing cooperatively engageable with said means to be moved substantially rectilinearly in response to shaft rotation.

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