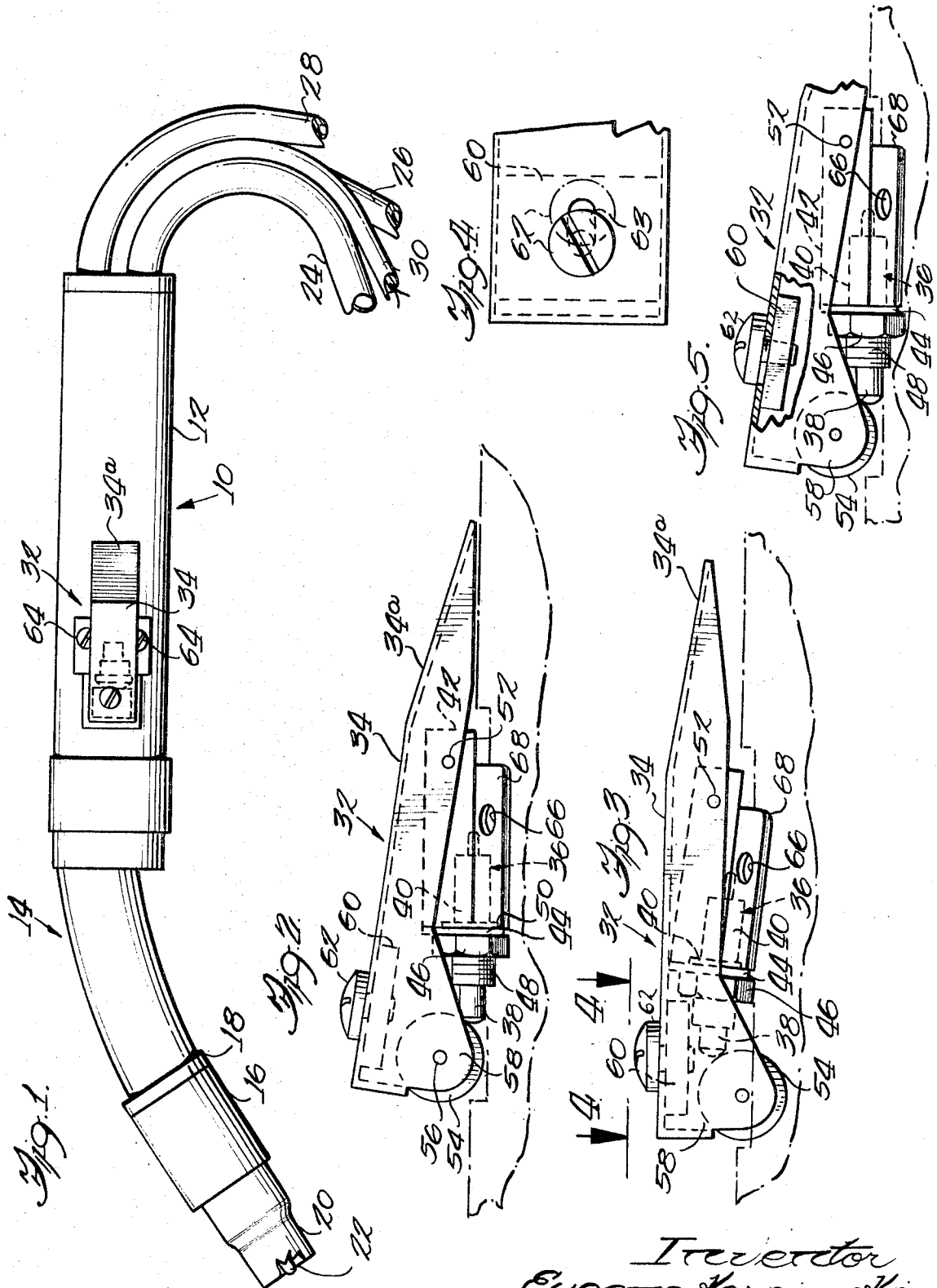


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LATCHABLE ROLLER ACTUATED PLUNGER SWITCH MOUNTED IN
A WELDING TORCH HANDLE
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LATCHABLE ROLLER ACTUATED PLUNGER SWITCH MOUNTED IN A WELDING TORCH HANDLE

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4 Claims

ABSTRACT OF THE DISCLOSURE

A switch housing has a resiliently biased, reciprocally movable plunger mounted therein which closes a circuit, in the retracted or "in" position. A depressible, finger-actuable lever or switch actuator is pivotally mounted on said housing and has a roller or the like mounted on one end portion thereof which is adapted to engage the plunger distal end and axially move the same inwardly in the course of lever depression. An abutment is adjustably positionable between said lever and housing, limiting the extent of pivotal movement of said lever and the resulting contact between the roller and plunger.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to improvements in switch assemblies. More particularly it pertains to switch assemblies normally found on manually engageable handle portions of apparatus such as the handles of a welding torch in which the making and breaking of an electrical circuit is desired for time periods of irregular length.

Description of the prior art

The prior art discloses switch constructions disposed on the handle portions of welding torches or the like as in Meyer U.S. Letters Patent No. 3,249,734. In the construction disclosed in this patent, however, the switch is never closed unless pressure is applied to a hand-engageable lever or switch actuator. Thus, when the switch is to remain closed for an extended period of time, pressure must be constantly applied, which application may on occasion lead to uncomfortable fatigue or cramping of the welder's hand.

The prior art switch constructions are generally complex in structure being composed of many parts which may be of unusual design and thus replaceable, if at all, with difficulty. Normally the known switches for torches or the like are not possessed of flexibility in operation and simplicity of construction such as are embodied in the provided construction.

SUMMARY

It is an object of this invention, therefore, to provide an adjustable switch assembly which is readily positionable into a constantly closed position thereby rendering pressure application unnecessary. The provided switch may also be readily adjusted into a position in which constant finger pressure is necessary to maintain the

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switch closed whereby the circuit controlled by the switch may be instantaneously closed or opened.

It is another object of this invention to provide a novel switch assembly in which a roller, or the like, actuator for a resiliently biased switch plunger mounted on a pivotal lever arm is controlled in the course of its pivotal movement relative to said resiliently biased plunger by means of an abutment positioned between said lever arm and the switch housing on which said plunger is mounted.

A further object is to provide a switch assembly which is readily adjustable, operable and repairable, being composed of a minimum number of parts of basic design.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of a welding torch employing the switch assembly of this invention.

FIG. 2 is an enlarged side elevational view of the switch assembly of FIG. 1 in one operational position, illustrating some of the components thereof in dotted lines.

FIG. 3 is a view similar to FIG. 2 in a further operational position.

FIG. 4 is a fragmentary top plan view of certain components taken substantially in the direction of arrows 4—4 of FIG. 3, and

FIG. 5 is a fragmentary view similar to FIGS. 2 and 3 in a still further operational position.

DETAILED DESCRIPTION

Referring now to FIG. 1 of the drawing, a welding torch 10 is illustrated comprising a hollow tubular handle 12 composed of insulating material and a metallic welding tip means 14 connected to the handle. A nozzle body member 16 engages an insulation bushing 18 and is engaged at its opposed end by gas cup 20. A terminal portion of a contact tip means 22 is shown projecting from the open end of the gas cup.

The torch 10 is of the type used in a continuous welding apparatus and accordingly employs a power cable 24, a gas-feeding conduit 26, an insulation-covered conduit 28 adapted to carry welding wire, and a switch cord 30 connected to switch assembly 32.

The invention herein presented is directed to the switch assembly which may be employed in torch constructions such as are disclosed in the copending applications Ser. Nos. 692,585 and 658,110, filed Dec. 21, 1967 and Aug. 3, 1967, respectively, and entitled Handle Construction and Welding Torch for Continuous Welding Apparatus, respectively.

Actuation of the switch of switch assembly 32 closes circuits for energizing a drive mechanism (not illustrated) for feeding welding wire (not illustrated) through the conduit 28 and tip means 22 and for supplying welding current through power cable 24. Also, mechanism (not illustrated) is energized which passes gas through the conduit 26 and gas cup 20.

It is apparent that in the normal course of use a welding torch such as torch 10 is employed for irregular time periods. Thus if a long weld of a continuous nature is to be made, it is essential that the energizing switch be maintained closed so that the appropriate mechanism employed in conjunction with the torch may be maintained energized. In the course of effecting such a long weld, it

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would be desirable if switch 36 of the switch assembly 32 were maintained in a closed position without the necessity of continually applying finger pressure to the actuator arm 34 which effects closing of the switch. Also it is apparent that if the torch is to be employed at short irregular intervals, it is desirable that the welder be able to energize and de-energize the apparatus employed in conjunction with the torch by instantaneous finger actuation of the lever arm 34.

Utilizing the switch assembly 32 of this invention, the lever arm 34 may be readily positioned so as to maintain switch 36 of the assembly 32, more clearly seen in FIGS. 2, 3 and 5, in a closed position without the necessity of constantly applying finger pressure. Switch 36 includes a reciprocally movable plunger 38 which is composed of electrically insulating material and is resiliently biased, as by a coil spring or the like disposed within switch body 40, into an extended position. When the plunger 38 is in such position, the switch 36 is open and the electrical circuits controlled thereby are inoperative. When the plunger is forced to retract into switch body 40 in opposition to the spring member (not illustrated) the switch 36 is closed and the circuits controlled thereby are operational.

It will be more clearly seen from FIGS. 2, 3 and 5 that switch 36 is retained to the apertured flange portion 44 of switch housing 42 by means of a nut 46 which engages threaded portion 48 of the switch and holds an opposed portion 50 of the body 40 against the flange 44.

As is seen from FIG. 1, lever arm 34 is readily engageable by the fingers of the welder as he grasps the handle portion 12 of the torch. The lever arm 34 is pivotally mounted on switch housing 42 by means of pin 52 as is most apparent from FIGS. 2, 3 and 5. Mounted on the end portion of the lever arm 34, which is adjacent the switch plunger 38, is a roller 54 of durable, electrically insulating material. The roller 54 is rotatably mounted on a transverse pin 56 extending between opposed twin mounting portions 58 of the lever arm.

As is apparent from FIG. 2, the end of plunger 38 engages the roller 54 below and rearwardly of its axis thereby tending to hold the lever arm 34 in the upward position. As the lever arm 34 is depressed, roller 54 will engage the resiliently biased plunger 38 forcing the same to retract into the body of the switch 36 (i.e., closes the switch). It will also be noted, by comparing FIGS. 2 and 3, that as the switch lever arm is depressed further, the plunger 38 passes above the axis of rotation of the roller 54 (FIG. 3). In this position, the lever arm 34 will be locked in a fixed position relative to the switch housing 42, and the switch remains locked in closed position. The roller 54 and plunger 38 comprise, in essence, an over-center device. To open the switch 36, it is necessary to depress the rear portion 34a of the lever arm 34 which pivots clockwise about pin 52 and causes the plunger to assume the position shown in FIG. 2.

In accordance with the invention, when it is desirable to have the plunger 38 of the switch 36 under the immediate control of the welder, an adjustable abutment 60 and its locking screw 62, more clearly seen in FIGS. 2, 3 and 5 are moved along a slot 63 (FIG. 4) which is formed in the upper surface of lever arm 34 over the roller 54.

The locking screw 62 engages a tapped hole in the abutment thereby to lock the abutment at either of two desired positions along the length of the slot 63. When the abutment and screw are moved to the right as illustrated in solid lines in FIG. 5 and in dotted lines in FIG. 4, the abutment 60 will be in a position to contact the upper surface of the switch housing 42 as will be most apparent from FIG. 5. The lever arm 34 may then be depressed only to a limited extent toward the underlying switch housing and handle 12. That is, the abutment 60 in the position of FIG. 5 will prevent the resiliently mounted plunger 38 of the switch 36 from

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passing beyond the axis of rotation of the roller 54. But, it will still enable the lever arm 34 to be depressed to a sufficient degree so as to move the plunger 38 inwardly to effect desired closing of the circuit control switch.

If the welder employing the torch 10 is desirous of having the switch 36 in a closed position for an extended period of time, he will move the abutment 60 and screw 62 to the left end portion of the slot 63 in the manner illustrated in full line in FIG. 4 and in FIGS. 2 and 3. In this position the abutment does not prevent the lever arm from moving downwardly to the full extent.

Correspondingly, if a welder desires momentary control of the switch 36, the abutment 60 of the switch assembly will be moved to the position of FIG. 5.

The provided switch assembly 32 is composed of a minimum number of simple and readily replaceable parts. The assembly 32 may be readily disengaged from the handle 12 of the torch 10 by removing two retaining screws 64 which readily engage tapped holes in the handle 12 after traversing apertures 66 of flanges 68 of the housing, see FIGS. 2, 3 and 5.

While particular embodiments of this invention have been shown and described, it will be understood, of course, that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing teachings. Therefore, it is contemplated by the appended claims to cover any such modifications as incorporate those features which may be said to constitute the essential features of these improvements, within the true spirit and scope of the invention.

What is claimed is:

1. In a welding torch or the like having a manually engageable handle, a switch assembly mounted on said handle; said switch assembly having a housing, means for connecting said housing to said handle, a finger-engageable lever pivotally mounted on said housing and pivotable about an arcuate path into a depressed position adjacent said handle, an extensible, resiliently-biased plunger mounted on said housing; roller means pivotally mounted on said lever adapted to engage said plunger and force the same into a retracted position when said lever is in a depressed position; said roller being so located relative to said plunger that its pivot point may cross the longitudinal axis of said plunger as said lever is pivoted from its normal to its depressed position; an adjustable stop means interposed said lever and housing for regulating the extent to which said lever may be depressed.

2. The switch assembly according to claim 1 in combination with means for locking said adjustable stop means in a position whereby said plunger may engage roller portions on only one side of said common plane.

3. The switch assembly according to claim 1 wherein said adjustable stop means comprises a reciprocally movable abutment mounted in an upper surface portion of said lever disposed over said roller.

4. In a welding torch or the like having a manually engageable handle, a switch assembly mounted on said handle; said switch assembly comprising a switch housing, a switch mounted on said housing means detachably securing said housing to said handle, a finger-engageable lever mounted on said housing and movable in the direction of said underlying handle into a depressed position; said switch having an extensible, resiliently-biased plunger reciprocally movable along a longitudinal axis into positions which open and close an electrical circuit controlled by said switch, a roller mounted on said lever with its axis of rotation disposed substantially transversely to the plunger axis and adapted to have an arcuate surface portion thereof strike the distal end of said plunger whereby an axial force component is imparted to said plunger forcing the same to retract into said switch when said lever moves into a depressed position; adjustable, sliding stop means mounted on said lever for regulating the extent of which said lever may be depressed in one position of

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adjustment; the axis of rotation of said roller passing across said plunger longitudinal axis with said stop means in another position of adjustment whereby said lever is locked in place and may not return to its initial position without being urged against said biased plunger thereby forcing the same to retract to enable the roller axis of rotation to pass across said plunger longitudinal axis; the electrical circuit controlled by said switch assembly being closed when said lever is in the locked position.

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