April 1, 1941. F. W. HACKMEYER 2,236,849

SAFETY ELECTRODE HOLDER FOR ARC WELDING

Filed May 29, 1939

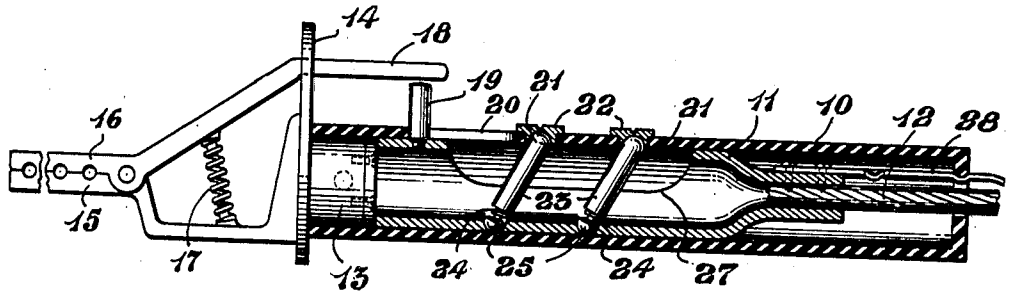


Fig. 1.

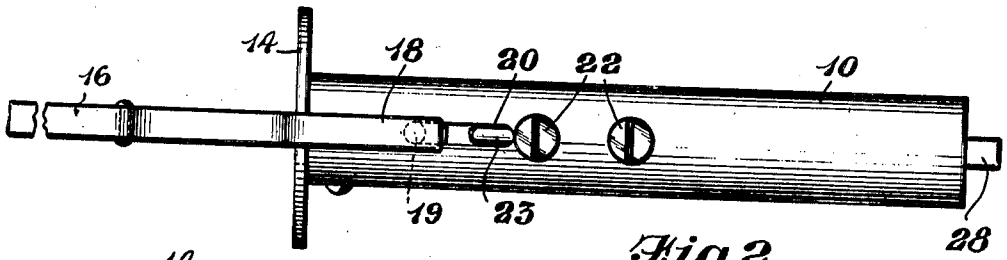


Fig. 2.

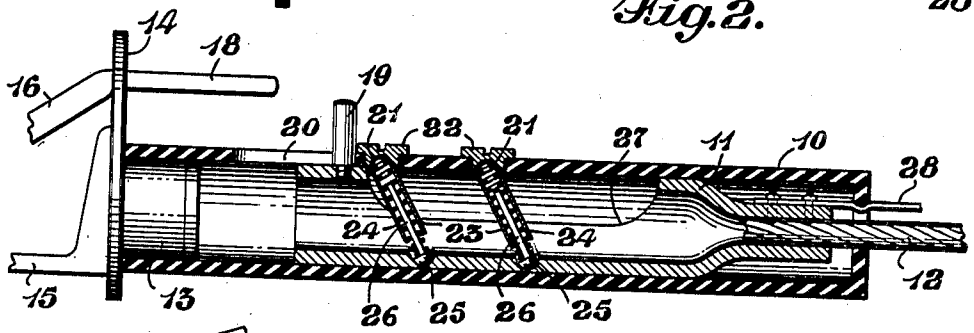


Fig. 3.

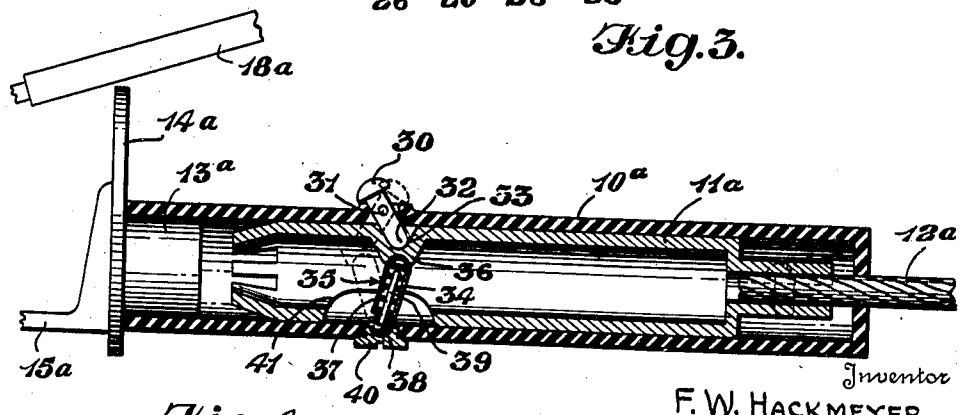


Fig. 4.

Inventor
F. W. HACKMEYER

By Munson H. Lane

Attorney

Patented Apr. 1, 1941

2,236,849

UNITED STATES PATENT OFFICE

2,236,849

SAFETY ELECTRODE HOLDER FOR ARC WELDING

Ferdinand W. Hackmeyer, Mobile, Ala.

Application May 29, 1939, Serial No. 276,427

13 Claims. (Cl. 219—8)

The invention relates to safety electrode holders for arc welding. In devices of this character it is important to provide a switch mechanism in association with the handle of the electrode holder so that the current may be cut off at certain periods particularly during the process of clamping the electrode. Failure to provide adequate cut-off mechanism has in the past resulted in severe shocks to the operator or in injury to his eyes, should the current pass through the device at a time when his eyes were not adequately shielded. This problem has been recognized by others and it is the principal object of the present invention to provide improved and simplified cut-off mechanism for such electrode holders.

According to my invention a reciprocable cable or conductor carrier is provided within a hollow insulating handle of the holder, said carrier in one position completing the circuit through the holder and in another position breaking the circuit, the carrier being held in one or the other position by means of a spring pressed plunger or plungers swingingly mounted within the holder. An important feature of the device resides in the fact that the jaws of the electrode holder can only be separated when the conductor carrier is in the circuit breaking position and cannot be separated when the conductor carrier is in the position to close the circuit.

Other features will be apparent from a consideration of the accompanying drawing and the following detailed description which are given by way of illustration rather than by way of limitation.

In the drawing:

Fig. 1 is a view partly in elevation and partly in longitudinal section showing the electrode holder and handle and the reciprocating conductor carrier in circuit closing position.

Fig. 2 is a top plan view of the same.

Fig. 3 is a view similar to Fig. 1 but showing the conductor carrier in circuit breaking position.

Fig. 4 is a longitudinal sectional view showing a modification.

Referring to the drawing in detail reference numeral 10 denotes a hollow handle for the holder composed of insulating material such as Bakelite, hard rubber, hard fibre or the like. Within the holder is mounted a reciprocable conductor carrier 11, to one end of which is secured a conductor or cable 12. The conductor carrier is composed of suitable conducting material and as shown is generally cylindrical in form with the cable carrying end of reduced diameter. At the forward end of the handle is mounted a stationary conductor 13 shown as provided with a removable front plate secured thereto by screws or other fastening means.

A guard member 14 composed of insulating material is mounted at the extreme front end of the holder. A conductor jaw 15 is secured at the front of the handle and is in electrical contact with the conductor 13. A pivoted jaw 16 cooperates with the fixed jaw 15, the two jaws being adapted to clamp between them an electrode not shown. A spring 17 reacts between the stationary jaw 15 and a lever 18 connected with the pivoted jaw, and serves to hold the jaw normally closed. By pressing downwardly on the end of the lever 18 the jaws may be opened against the compression of the spring 17 to permit grasping or releasing an electrode.

As shown an operating member or finger piece 19 is secured at the front end of the carrier 11 and projects through a slot 20 in the insulating handle 10. It will be noted that this operating member or finger piece is located below the rear end of the lever 18 when the carrier is in the forward circuit closing position. Thus the lever can only be lowered to open the jaws of the holder when the finger piece has been moved rearwardly and consequently there is no possibility of opening the jaws when the circuit is closed. The reciprocating movement of the carrier is limited by the length of the slot 20.

The carrier is urged to one end or the other of its slot by spring pressed plunger means 21, 21, pivotally mounted within the carrier and reacting between the carrier and the handle. As shown the curved upper ends of the plungers bear against the rounded under-surfaces of screw caps 22, 22, removably secured in the upper surface of the handle. Each plunger member comprises a cylindrical guide member 23 having within the same a coil spring 24 one end of which bears against the head 25 of a member whose stem 26 slides within the guide 23. It will be noted that the rounded heads 25 fit in sockets formed within the carrier in a manner similar to the engagement of the rounded ends of the guide members with the caps 22. Obviously the expansible plungers could be reversed in direction if desired so that the heads 25 would engage against the caps and the rounded ends of the guides engage against the sockets in the carrier member or other forms of expansible plunger members could be substituted if desired. The carrier member 11 is cut away at 27 to accom-

modate the plungers and permit swinging movement of the same as the carrier is moved from one to the other of its limiting positions. It will be noted that in the limiting position shown in Fig. 1 the plungers both slope downwardly and forwardly from the caps 21 so that the joint effect is to urge the carrier forward toward the member 13 thereby completing the circuit.

When the operating member 19 reaches the rear end of the slot the parts are in the position shown in Fig. 3 in which the plungers are both swung beyond the perpendicular and their joint effect is now to urge the carrier away from the member 13 thus keeping the circuit open until the conductor carrier is manually moved to the forward position against the tension of the plunger springs.

A spring catch 28 may be employed to retain the parts in one or the other of the limiting positions until the catch is depressed and the carrier actuated by means of the finger piece 19.

The operation of the device will be apparent from the foregoing description. Before it is possible to grasp an electrode it is necessary to move the conductor carrier rearwardly thereby opening the circuit and permitting the lever 18 to be lowered against the tension of the spring 17. As the carrier is moved rearwardly both of the expansible plungers are swung past the perpendicular position and from that time on the springs urge the carrier to the rearward position where the circuit is broken. Thus there is no danger of the conductor carrier being inadvertently brought into contact with the member 13 which is in circuit with the conductor jaws. When the electrodes have been grasped and all is in readiness for the welding operation, the finger piece 19 is moved forwardly and the plungers are again swung past the perpendicular position with a snap action whereupon the springs urge the conductor carrier to the forward position.

In Fig. 4 a modified construction is shown which however operates in a manner similar to the device just described. The reference numeral 10*a* denotes a suitable handle of insulating material similar to the handle 10. The reference numeral 11*a* denotes the conductor carrier and the reference numeral 12*a* denotes the conductor or cable. At the front end is mounted a stationary contact member 13*a* which is electrically connected to the stationary jaw 15*a* of the electrode holder, the upper jaw of which (not shown) is adapted to be operated by a suitable lever 18*a* against the tension of a spring. A guard member 14*a* of insulating material may be employed if desired. All of these parts function similarly to the corresponding parts of the apparatus described in the first embodiment of the invention.

As shown a finger piece 30 is pivoted at 31 within the handle the rounded lower end 32 of which fits into a socket 33 in the carrier. The swinging movement of the finger piece serves to reciprocate the conductor carrier 11*a* either forwardly or rearwardly such carrier being held in either position by the action of a single spring pressed plunger 34 similar to the members 21, 21 described in the embodiment shown in Figs. 1 to 3. As shown the plunger comprises an outer guide member 35 rounded at one end and adapted to engage in a socket formed in a boss 36 projecting inwardly from the surface of the carrier 11*a*. The plunger is provided with a coil spring 37 mounted within the guide 35 and bearing at one end against the head 38 of a member having a stem 39 slidably fitting within the guide 35. The guide 35, the head 38, the stem 39 and spring 37 constitute the cooperating members of the expansible plunger. The head 38 is rounded and fits in a socket formed in a removable screw cap 40 mounted in the carrier member. Obviously the plunger 34 could be reversed if desired so that the head 38 would engage the socket in the carrier member and the rounded end of the guide would engage the screw cap 40 mounted in the stationary handle. The carrier is cut away as at 41 to allow for swinging movement of the plunger 34. The operation of the device is similar to that described in connection with the first embodiment of the invention except that a single plunger is employed and the finger piece is pivoted instead of reciprocable. If desired a finger piece or catch similar to the catch 28 shown in the first embodiment of the invention may be employed in connection with the modified construction.

The invention has been described in detail for the purpose of illustration but it will be obvious that modifications and variations may be resorted to as will be apparent to those skilled in the art without departure from the spirit of the invention.

It will be apparent that the present device is simple in construction and the improved switch may be installed in most of the holders at present in commercial use by cutting the necessary slots and holes in the insulated handles of such holders, the latter being then plugged with suitable screw caps after the switch mechanism has been installed. The end of the spring catch 28 projects through the rear of the handle and is readily accessible.

It will also be apparent that while in the first embodiment of the invention the plungers are shown as parallel to one another, it may be desirable to have the forward plunger sloped at a more acute angle with reference to the handle when in the circuit closing position so that a better contact may be insured. In such case the forward plunger may not reach the perpendicular position when the switch mechanism is moved rearwardly, only the rear plunger passing the perpendicular. It will be further noted that exposed portions of the holder such as handle 10, finger piece 19, plugs 22, 22 and handle member 18 of the first modification, and handle 10*a*, finger piece 30, plug 38 and handle member 18*a* of the modification shown in Fig. 4, are of insulating material so that shocks and short-circuiting are avoided.

I claim:

1. In a safety electrode holder having expansible jaws, a hollow handle, a reciprocable cable carrier mounted within the handle adapted to make and break a circuit through said holder, and means for preventing the opening of said jaws until the circuit is broken by said reciprocable carrier.

2. In a safety electrode holder having expansible jaws, a hollow handle, a reciprocable cable carrier mounted within the handle adapted to make and break a circuit through said holder, and means for preventing the opening of said jaws until the circuit is broken by said reciprocable carrier, said means including a finger piece on said carrier projecting through a slot in the handle which finger piece is directed beneath an extension of one of said expansible jaws when the cable carrier is in circuit closing position.

3. In a safety electrode holder having expan-

sible jaws, a hollow handle, a cable carrier movably mounted within the handle adapted to make and break a circuit through said holder, and means for preventing the opening of said jaws until the circuit is broken by said carrier.

4. In a safety electrode holder having expansible jaws, a hollow handle, a cable carrier movably mounted within the handle adapted to make and break a circuit through said holder, and means for preventing the opening of said jaws until the circuit is broken by said carrier, said means including a finger piece on said carrier projecting through a slot in the handle which finger piece is directed beneath an extension of one of said expansible jaws when the cable carrier is in circuit closing position.

5. In combination with a welding tong having handles and a gripping member, means normally urging said gripping member to closed position, a switch member formed in one handle and movable relative thereto for making and breaking the circuit to said gripping member, and means whereby the gripping member may be opened only when the circuit is broken.

6. In a safety electrode holder having hinged expansible gripping jaws, means normally urging said jaws to closed position, a handle connected with one of said jaws, a switch member within said handle and movable with reference thereto, a second handle connected with the other of said jaws adapted to be moved toward the first named handle to open the jaws, and switch operating means carried by the first named handle movable to one position to make a circuit and to another position to break the circuit through said holder, which operating means when the circuit is closed lies in the path of movement of said second handle, whereby opening of the jaws while the circuit is closed is prevented.

7. In combination with a welding tong having a gripping member and handle elements therefor; a combined handle and switch for one of said elements, having switch operating means for actuating said switch to make and break the circuit to said welding tong, and means associated with the other of said handle elements adapted to contact said switch operating means on initial opening movement of said gripping member.

8. In combination with a welding tong having a gripping member and handle elements therefor; a handle for one of said elements and a combined handle and switch for the other element, having switch operating means for actuating said switch to make and break the circuit to said welding tong, and means associated with the first named handle adapted to contact said switch operating means on initial opening movement of said gripping member.

9. A welding tong comprising a pair of pivoted gripping jaws, arms rigid with said gripping jaws and extending beyond the pivot point, means normally urging said jaws into gripping or closed position, a combined handle and switch carried by one of the arms having switch operating means and means associated with the other of said arms adapted to contact said switch operating means on initial opening movement of said gripping member.

10. In a welding tong having handles and a gripping member and means urging said gripping member into gripping or closed position; a switch formed in one handle for making and breaking the circuit to said gripping member and including switch operating means adapted to be moved to one position to open said switch and break the circuit to said tong, and to be moved to another position to close said switch, and means, cooperatively related to the other handle and movable therewith adapted on initial opening movement of said jaws to contact the said switch operating means when the same is in switch closing position.

11. In a welding tong having handles and a gripping member and means urging said gripping member into gripping or closed position; a switch formed in one handle for making and breaking the circuit to said gripping member and to the other handle and including switch operating means adapted to be moved to one position to open said switch and break the circuit to said tong, and to be moved to another position to close said switch, the second handle having a portion adapted to contact said switch operating means on initial opening movement of said jaws when said operating means is in switch closing position.

12. In a welding tong having handles and a gripping member, means normally urging said gripping member to the closed or gripping position; a switch member formed in one handle and movable relative thereto for making and breaking the circuit to said gripping member, switch operating means projecting from the first handle and movable to open and closed positions, and means, cooperatively related to the second handle and movable therewith, adapted on initial opening movement of the jaws to contact the said switch operating means when the same is in the switch closing position.

13. In a safety electrode holder having movable electrode gripping jaws, means normally urging said jaws to the closed or gripping position, and a hollow handle member rigid with one of said jaws; a switch housed within said handle member, a switch actuating member projecting from the handle member and movable to one position for making and to another position for breaking the circuit to said gripping jaws, and means associated with the second of said jaws and movable therewith as the jaws are opened or closed, the said switch actuating member being in the path of movement of said last named means when the circuit is closed, and adapted to be engaged thereby on initial opening of the jaws, whereby opening of the jaws while the circuit is closed is avoided.

FERDINAND W. HACKMEYER.