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E. BURBECK
MULTICONTACT SWITCH

2,686,239

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3 Sheets-Sheet 2

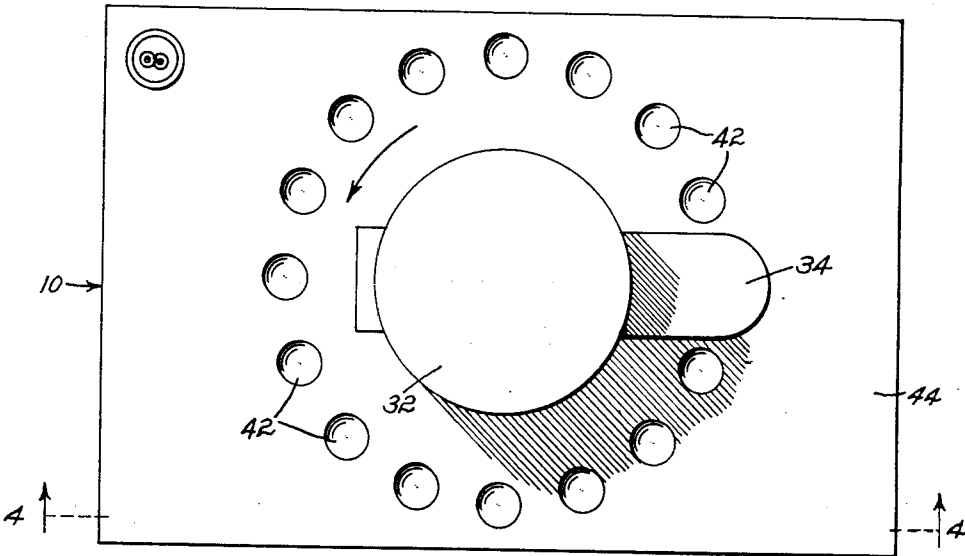


Fig. 3.

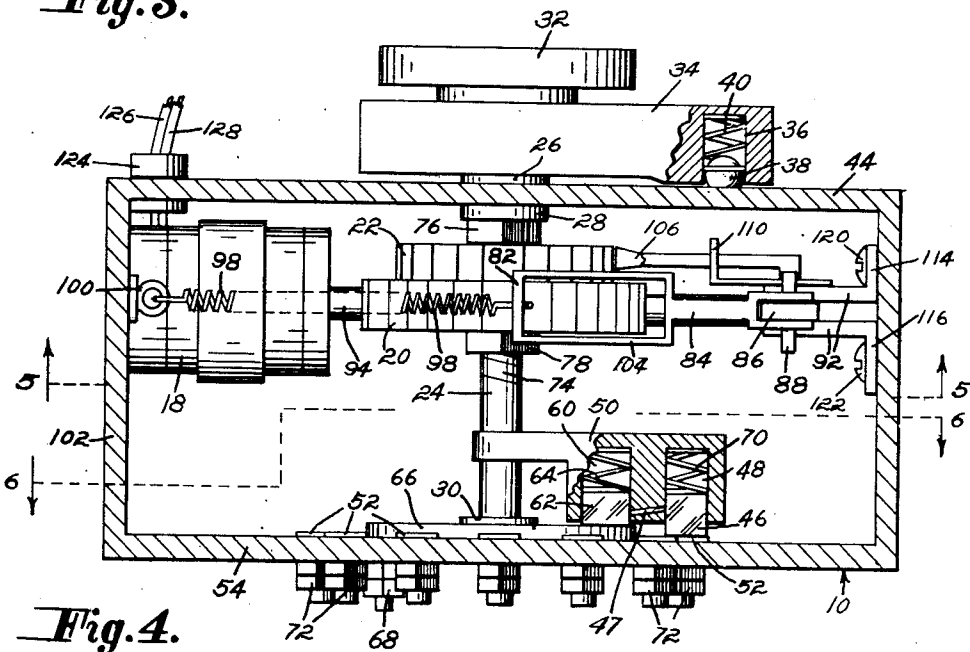


Fig. 4.

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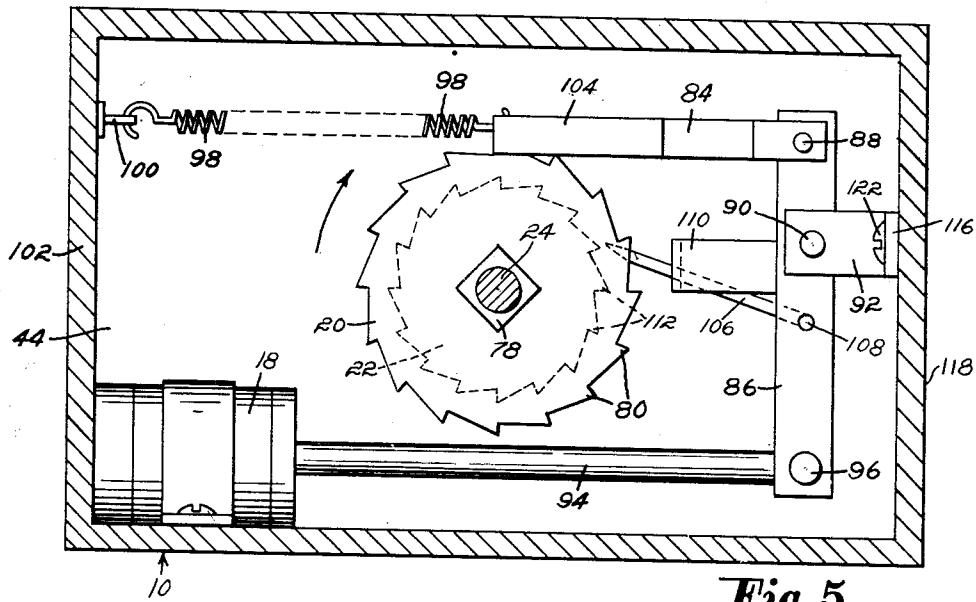


Fig. 5.

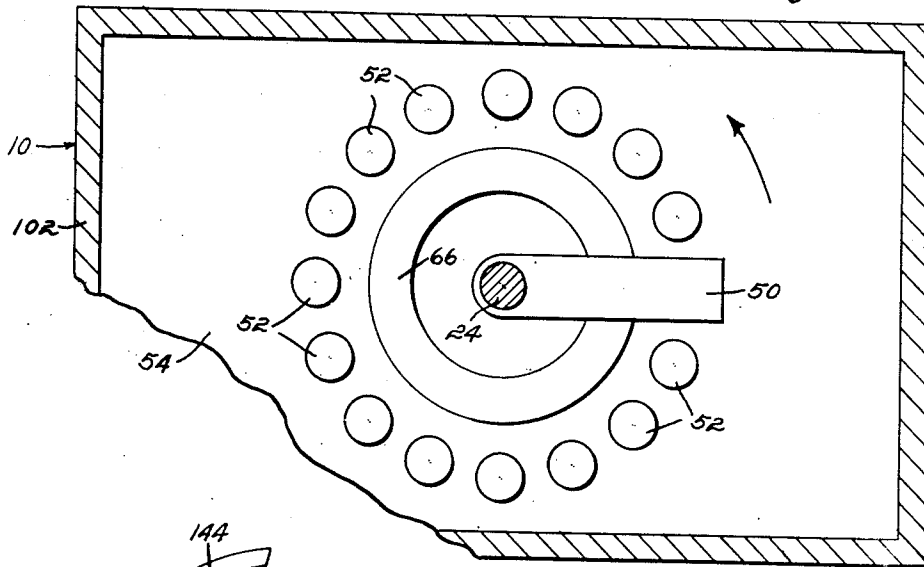


Fig. 6.

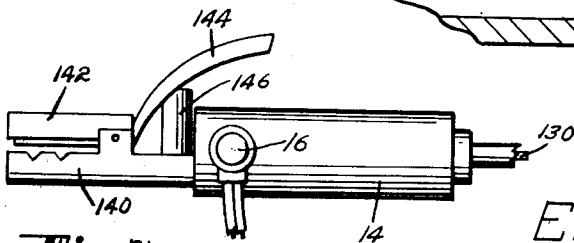


Fig. 7.

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UNITED STATES PATENT OFFICE

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MULTICONTACT SWITCH

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1 Claim. (Cl. 200—105)

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This invention relates to electric welding machines and equipment where quick change of amperage is desired and where plugging the cable in at different points is inconvenient, and in particular an electrode holder having a push button switch thereon for operating a solenoid actuated switch, the terminals of which are connected to the secondary winding of a transformer at different points throughout the length thereof, whereby with the primary winding of the transformer connected to a source of current supply the switch may be manually set or actuated by the push button on the electrode holder to supply the desired amperage to the electrode of the holder.

The purpose of this invention is to make it possible to change the amperage of current supplied to an electrode in a holder from the holder without the necessity of a welder leaving the work and walking to a transformer housing to plug the cable of the holder in at a different point.

Various attempts have been made to facilitate welding by providing means on an electrode holder for turning the current on and off but when it is desired to change the amperage of the current to compensate for large or small breaks or gaps to be welded, or for different thicknesses of material, it is necessary for the welder to leave his work and walk to the welding machine in order to withdraw the plug of the cable from the electrode holder and place the plug in a different socket. This results in considerable loss of time and is annoying to the operator.

With this thought in mind this invention contemplates a solenoid actuated switch device in combination with a transformer whereby with the switch device adjusted through the solenoid by a push button on an electrode holder a welder may readily regulate the amperage as an electrode in the holder is used.

The object of this invention is, therefore, to provide means whereby a switch device mounted to coact with a transformer of a welding outfit may be actuated with a push button on an electrode holder of the welding outfit to increase the number of turns of the secondary winding that are connected in the circuit in order to increase the length of the secondary winding of the transformer to regulate the amperage of current supplied through the transformer to an electrode in the holder.

Another object of the invention is to provide an attachment for welding equipment which provides means for regulating the amperage of cur-

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rent supplied to an electrode thereof from the electrode holder, that may be applied to equipment now in use.

A further object of the invention is to provide apparatus with which a welder can regulate the amperage of current supplied to a welding electrode at the electrode holder in which the parts are formed with conventional equipment.

A still further object of the invention is to provide an improved welding machine in which a welder can regulate the amperage of current supplied to an electrode from a holder in which the electrode is held which is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a transformer connected to a suitable source of current supply, a multi-contact switching device having a plurality of terminals with each terminal connected to a secondary winding of the transformer at a different point, ratchet wheels for actuating and holding the switch device, a solenoid for turning the ratchet wheels, and a push button mounted on an electrode holder of the welding machine.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is an elevational view illustrating the improved welding equipment with the wiring thereof shown diagrammatically.

Figure 2 is a diagrammatic view showing the circuits of the improved welding apparatus.

Figure 3 is a front elevational view of the switch device housing.

Figure 4 is a longitudinal section through the switch device housing, looking upwardly, and taken on line 4—4 of Figure 3.

Figure 5 is a vertical section through the switch device housing being taken on line 5—5 of Figures 1 and 4.

Figure 6 is a similar section taken on lines 6—6 of Figures 1 and 4.

Figure 7 is a detail illustrating an electrode holder with a push button mounted thereon.

Referring now to the drawings wherein like reference characters denote corresponding parts the improved welding outfit of this invention includes a switch housing 10, a transformer 12, an electrode holder 14 having a push button switch 16 thereon, and a solenoid 18 for actuating the switch device through ratchet wheels 20 and 22 on a shaft 24 in the switch device housing.

The shaft 24 is journaled in the housing in bearings 26 and 28 at one side and 30 at the other, and the outer end of the shaft is provided with

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a knob 32 by which the shaft may be manually rotated. An outer arm 34 is mounted on the shaft between the knob and housing and the outer end of the arm is provided with a recess 36 in which a ball 38 is located and the ball is urged outwardly by a spring 40 whereby the ball snaps into recesses 42 in the front wall 44 of the housing as a brush 46 in a recess 48 in an inner arm 50 registers with one of a series of terminals 52 on a rear wall 54 of the housing. By this means the inner arm is positioned over one of the terminals that are connected by wires 56 to the secondary winding 58 of the transformer 12, and the spring actuated ball also prevents the inner arm being moved out of this position by vibrations resulting from use of the welding outfit or machine.

The inner arm 50, which is also mounted on the shaft 24, is provided with another recess 60 in which a brush 62 is positioned and the brush 62 is urged outwardly by a spring 64 so that it is held in continuous contact with a contact ring 66 that is positioned around the shaft and secured in the wall 54 by bolts 68 which also provide terminals for connecting wires to the ring. The brush 46 in the recess 48 of the inner or contact arm 50 is urged outwardly by a spring 70 and the terminals or contact points 52 are secured in the rear wall 54 by bolts 72 which also provide means for connecting the wires 56 to the terminals.

The shaft 24 is provided with threads 74 on which the ratchet wheels 20 and 22 are threaded and the ratchet wheels are secured in the position shown in Figure 4 by lock nuts 76 and 78. The teeth 80 of the wheel 20 are positioned to be engaged by a pawl 82 on a ratchet bar 84 which is pivotally connected to one end of a lever 86 by a pin 88, and the lever, which is pivotally mounted by a pin 90 in a bracket 92, is actuated by the solenoid 18 through an extended core 94 which is pivotally connected to the lever by a pin 96. A spring 98 which is connected to the ratchet bar 84 and to an eye 100 on an end wall 102 of the housing actuates the ratchet bar in the return movement when the solenoid is deenergized. A wire or the like 47 is employed for causing an electrical contact between the brushes 46 and 62, said member appearing diagrammatically in Figure 2 and being represented by full lines in Figure 4.

The pawl 82 forms an end of a yoke 104 of the ratchet bar 84, and the device is also provided with a latch 106 that is pivotally mounted on the lever 86 at the point 108 and the latch, which is slidably mounted in a guide 110 that extends from the bracket 92, is positioned to engage teeth 112 of the small ratchet wheel 22, as shown in Figure 5. The latch provides means for stopping rotation of the shaft whereby the brush 46 is positioned to engage one of the terminals 52.

The bracket 92 is formed as shown in Figure 4, with outwardly extended arms and the arms are provided with flanges 114 and 116 which are secured to an end wall 118 by screws 120 and 122. The switch device housing is provided with a socket 124 from which wires 126 and 128, which are connected to the solenoid 18, extend to the electrode holder and source of current supply.

The ring 66 in the switch device is connected by a wire 130 to the electrode holder 14 as shown in Figure 2, and a circuit is completed through this wire to an electrode 132 in the holder, as the electrode engages a piece of work, such as a fender 134 of a motor vehicle, the said

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piece of work being grounded by a wire 136, which extends to a ground 138.

A conventional electrode holder may be used, and in the design shown, the holder is provided with a stationary jaw 140 and a movable jaw 142. The jaw 142 is actuated by a handle 144 to release an electrode and a spring 146 engages the handle for urging the jaw 142 toward the jaw 140 for gripping the electrode.

The push button switch 16 on the holder 14 is connected by the wire 126 to the solenoid 18 and by a wire 148 to a battery 150, the opposite terminal of which is connected to the solenoid by the wire 128.

The primary winding 152 of the transformer 12 is connected by a wire 154 to a source of current supply as indicated at 156 and the opposite terminal of the battery is connected by a wire 158 to a ground 160. The opposite terminal of the primary winding is connected by a wire 162 to a ground 164.

With the parts arranged in this manner a welder can readily change the amperage of the current to the electrode by pressing the push button 16, and with a terminal of the switch device grounded with a ground connection 168 and connected to one end of the secondary winding through one of the terminals 52, a circuit is completed to the electrode and through the work to the ground. Each time the button 16 is pressed the ratchet bar 84 is actuated by the solenoid 18 through the lever 86 whereby the large ratchet wheel 20 is rotated the distance of one tooth, and in this movement the latch 106 advances to stop the movement of the ratchet wheels and shaft, so that the contact arm 50 travels from one terminal to another. By this means a welder at the electrode may advance the amperage of the welding current as desired.

From the foregoing description it is thought to be obvious that a welding apparatus or machine constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof, and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice, except as claimed.

Having thus fully described the invention what I claim as new and desire to secure by Letters Patent, is:

In a multi-contact switch, the combination which comprises a switch housing having a front wall, a rear wall, and a continuous wall connecting said front and rear walls, a transversely disposed shaft journaled in said front and rear walls and extended through said front wall, a contact ring mounted on said rear wall and positioned around the shaft, a row of spaced radially disposed terminals mounted in the rear wall and spaced from the contact ring, an inner arm carried by said shaft and positioned to bridge the contact ring and terminals, a ratchet wheel mounted on said shaft, a bracket mounted on the inner surface of the end wall of the housing, a lever pivotally mounted in the bracket, a solenoid mounted in the housing, a core positioned in and extended from the solenoid, said core being pivotally connected to the lever whereby the lever is actuated by the solenoid, a

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ratchet bar pivotally connected to the end of the lever opposite to the end to which the core of the solenoid is connected, said ratchet bar having a yoke at one end and said yoke positioned to straddle the ratchet wheel, a spring connected at one end to the yoke and at the other to the housing, a small ratchet wheel also mounted on said shaft, the teeth of the small ratchet wheel being oppositely positioned in relation to the teeth of the former ratchet wheel, a latch carried by the lever and positioned to engage the teeth of the small ratchet wheel to stop the ratchet wheels and shaft with contacts of the inner contact arm bridging the contact ring and one of said terminals, said front wall having a row of recesses in the outer surface positioned around and concentric with the axis

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of the shaft, said recesses being positioned to correspond with the terminals of the rear wall, an arm having a spring actuated ball therein mounted on the shaft and positioned whereby the ball coacts with the recesses to position the inner contact arm to correspond with the terminals.

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