Sept. 8, 1931. J. S. NORTON 1,822,308

ELECTRICALLY OPERATED WELDER'S HOOD

Filed Nov. 5, 1930

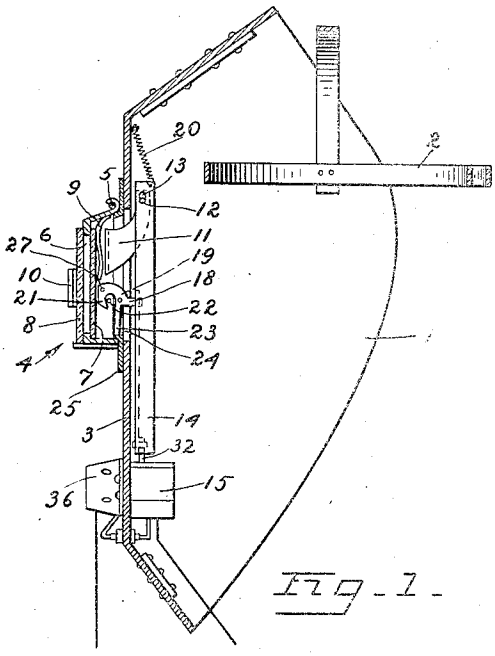


Fig. 1.

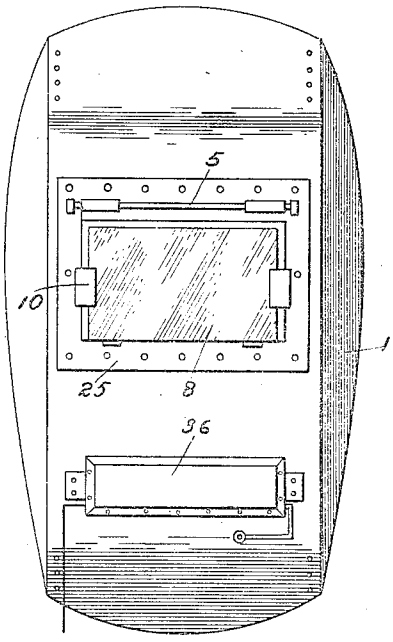


Fig. 2.

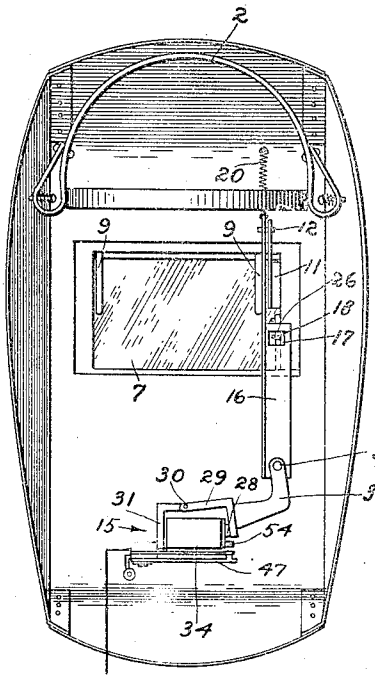


Fig. 3.

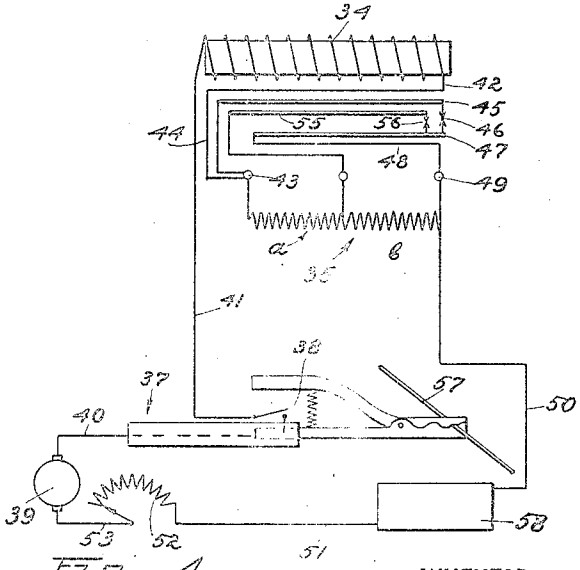


Fig. 4.

INVENTOR.
JOHN S. NORTON.

BY Munn & Co.
ATTORNEYS.

Patented Sept. 8, 1931 1,822,308

UNITED STATES PATENT OFFICE

JOHN S. NORTON, OF SAN FRANCISCO, CALIFORNIA

ELECTRICALLY OPERATED WELDER'S HOOD

Application filed November 5, 1930. Serial No. 493,618.

My invention relates to improvements in electrically operated welder's hoods, and it consists in the combinations, constructions and operations hereinafter described and claimed.

An object of my invention is to provide an electrically operated welder's hood in which the window carrying the lens is opened by closing the circuit to a solenoid which in turn is operatively connected to the window. Novel means is provided for automatically cutting in resistances in the circuit connecting the generator with the solenoid so that the solenoid will function on circuits using but ten volts, and at the same time will not burn out on circuits using up to sixty volts. In welding, various voltages are used, this depending upon the type of work done.

A further object of my invention is to provide a device of the type described which is extremely simple in construction and which is durable and efficient for the purpose intended.

Other objects and advantages will appear as the specification proceeds, and the novel features of the device will be particularly pointed out in the claims hereto annexed.

My invention is illustrated in the accompanying drawings, in which:

Figure 1 is a vertical section through the hood showing the solenoid and resistance box in elevation,

Figure 2 is a front elevation of the hood,

Figure 3 is a rear elevation, and

Figure 4 shows a wiring diagram.

In carrying out my invention I make use of a welder's hood indicated generally at 1 having a head band 2. The front face 3 hingedly carries a window indicated generally at 4, and this window pivots about a supporting rod 5.

The window has an opening 6 therein, and a dark lens 7 is placed on the inside of the window and covers the opening 6, and a transparent protective lens 8 is disposed on the outside of the window, and this also covers the opening 6. Spring clips 9 secure the inner lens in place, and spring clips 10 secure the outer lens 8 in place. Both lenses are removable.

The window 4 carries an arm 11 that has a pin 12 slidably received in a slot 13, the slot being formed in a window-opening member 14. The member 14 is moved downwardly by a solenoid indicated generally at 15 and hereinafter described, and the member 14 carries a part 16 (see Figure 3) extending at right angles and provided with an opening 17 for receiving a projection 18 of a trigger 19. A spring 20 yieldingly moves the member 14 vertically.

The trigger 19 (see Figure 1) has a hook-shaped portion 21 for receiving a pin 22 carried by the window 4. When the window closes by gravity, the hook 21 engages with the pin 22, and a depending portion 23 of the trigger 19 contacts with the lower wall 24 of a frame 25 and prevents further movement of the trigger 19 in a counterclockwise direction when looking at Figure 1. During the initial downward movement of the member 14, the top edge 26 of the opening 17 in the member 14 engages with the projection 18 and swings the trigger 19 in a clockwise direction to release the window 4. The pin 12 slides in the slot 13 and permits this movement, after which the member 14 will swing the window into open position. A stop pin 27 (see Figure 1) is carried by the trigger 19 and abuts against the edge of the frame 25 and limits the movement of the trigger 19 in a clockwise direction.

I will now describe how the solenoid actuates the member 14. In Figure 3 I show the solenoid 15 as having a plunger 28 formed integral with a metallic support 29 that in turn is pivoted at 30 to a fixed metallic support 31. The support 29 has an extension 32, and this is pivoted at 33 to the member 14. The slight arc through which the pivot 33 moves during the actuation of the solenoid is not sufficient to cause the member 14 to bind with the arm 11 toward the projection 18. The winding of the coil 34 of the solenoid is such as to cause it to open the window 4 when a current of ten to twenty volts is passed through the coil.

As already stated, the welding voltage varies according to the type of work being done. I therefore employ novel means for

automatically cutting in resistance into the circuit as the voltage rises. The solenoid 15 is preferably placed on the inside of the hood 1, while the resistance 35 is mounted in a casing 36 and placed on the outside of the hood (see Figures 1 and 2). The welder makes use of a welding clamp indicated generally at 37 in Figure 4, and a switch 38 is placed on this clamp for closing the circuit from a generator 39 through a wire 40, the switch 38, a wire 41, the coil 34, a wire 42, a binding post 43, a wire 44, a magnetic switch arm 45, a switch 46, a conductor 47, a wire 48, a binding post 49, a wire 50, (this wire being in electrical connection with a return wire 51), a rheostat 52, and a wire 53 leading back to the generator 39. A ten to twenty volt current flowing through this circuit will be sufficient to actuate the solenoid 15.

When the solenoid is energized, the flux will flow through the closed metallic circuit formed by the plunger 28 and the supports 31 and 29. The flux path will reach the saturation point when approximately twenty volts is passed through the coil 34. Any rise in voltage above this will cause some of the flux to pass from the plunger 28 along the metallic switch arm 45 and thence to the support 31 and back to the plunger 28. The magnetic circuit will tend to shorten itself, and therefore when the voltage reaches a predetermined amount, the magnetic circuit will pull the arm 45 toward the bar 54 of the solenoid and will open the switch 46. This will cause a portion *a* of the resistance 35 to be thrown into the coil circuit. The current will now flow from the wire 42 through the portion *a* of the resistance and then through a second switch arm 55, through a switch 56, and to the conductor 47. The resistance *a* in series with the coil 34 permits the coil to take care of a higher voltage.

The switch arm 55 is heavier than the arm 45 and will move toward the bar 54 after the voltage is again raised. In practice, the switch arms 45 and 55 are placed in the same plane and the conductor 47 is placed beneath them. The increasing of the voltage will cause an increase in the magnetic circuit to flow outside of the coil and arm 45 and some will pass through the arm 55. The arm 55 will then be attracted to the bar 54 which will open the switch 56. This then throws in the second portion *b* of the resistance 35. The current will now flow from the wire 42 through both portions of the resistance *a* and *b* and then on through the wire 50. With both resistances in the circuit, the coil 34 will be able to handle voltages up to a maximum of sixty volts.

From the foregoing description of the various parts of the device, the operation thereof will be readily understood.

The hood is used in the usual manner, and the window 4 is normally closed. The operator moves the welding clamp 37 so that the welding electrode 57 touches the work 58, whereupon a circuit is closed with the generator 39. If the operator wishes to see the work, he removes the electrode 57 and then closes the switch 38, whereupon the solenoid 15 will open the window in the manner already described. The resistance 35 consisting of the portions *a* and *b* will be automatically thrown in, this depending upon the voltage of the current being used. It should be noted that the switch arms 45 and 55 will vibrate from the time the voltage is high enough to first attract the arms until the time the voltage rises to such a peak as to permanently hold the arms in raised position. The first attracting of the arm 45, for example, to the bar 54 will throw in the resistance portion *a*, and this will immediately decrease the flux which in turn will reduce the magnetism and permit the arm 45 to again close the switch 46. This will take place so rapidly as to cause a buzzing effect of the arm 45, the buzzing slowing up as the voltage is increased until such time as the arm is held permanently in raised position. The same is true of the arm 55 except that the voltage is higher before this arm will be acted upon. By this buzzing effect I prevent the sudden increasing of power in the coil 34, and this will cause a more uniform operation of the window 4 regardless of whether the voltage used in the welding operation is ten volts or up to sixty volts.

Although I have shown and described one embodiment of my invention, it is to be understood that the same is susceptible of various changes, and I reserve the right to employ such changes as may come within the scope of the claims hereto annexed.

I claim:

1. The combination with a hood having an eye opening therein, of a window normally covering the eye opening, a solenoid for opening the window, and resistances automatically cut into the circuit as the voltage increases so as to keep the voltage of the current flowing through the solenoid within predetermined limits.

2. In combination, a welder's hood, a window carried thereby, means for opening the window, a solenoid for actuating said means, a resistance carried by said hood, a switch for connecting the solenoid with a source of current, and automatic switches for cutting in and out portions of the resistance into the circuit as the voltage varies above predetermined limits.

3. In combination, a welder's hood, a window carried thereby, means for opening the window, a solenoid for actuating said means, a resistance carried by said hood, a switch carried by the welding clamp for connecting the solenoid with a source of current, and automatic switches for cutting in and out

portions of the resistance into the circuit as the voltage varies above predetermined limits.

4. A solenoid comprising a coil, a metal frame extending from one end of the coil, a plunger carrying member hinged to the frame and forming with the frame a closed path for the flow of flux, a resistance, magnetizable switch arms normally cutting out portions of the resistance in the current flowing to the coil, the voltage of the current when increased saturating the closed flux path, whereby the additional flux created will flow through the switch arms and magnetize them, said arms requiring different magnetic strengths to open the switches, whereby portions of the resistance are cut into the circuit as the voltage is increased.

JOHN S. NORTON.