C. H. THORNBLADE.

ELECTRIC WELDER.

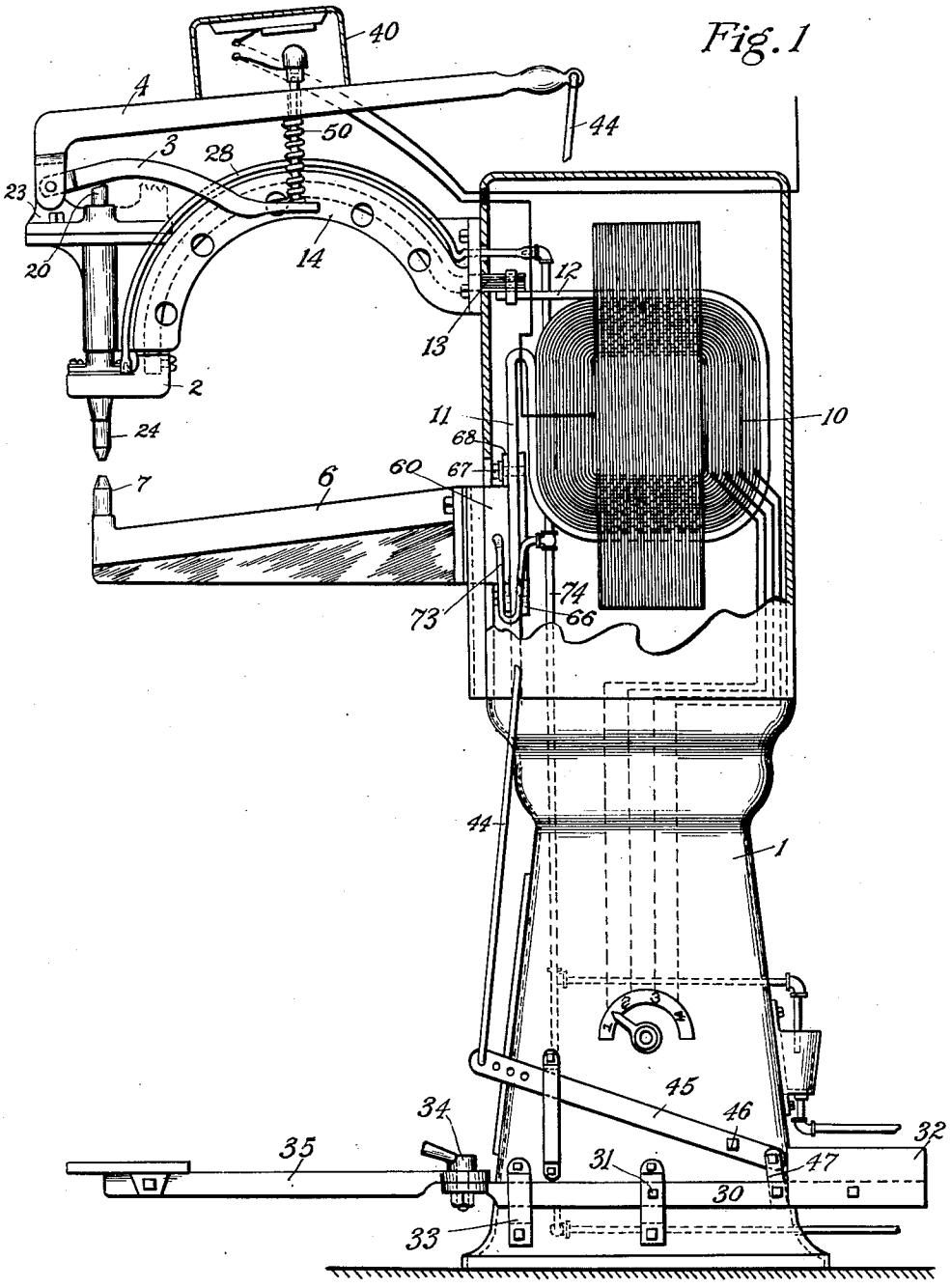
APPLICATION FILED AUG. 4, 1917.

1,292,921.

Patented Jan. 28, 1919.

4 SHEETS—SHEET 1.

Fig. 1



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4 SHEETS—SHEET 2.

Fig. 2

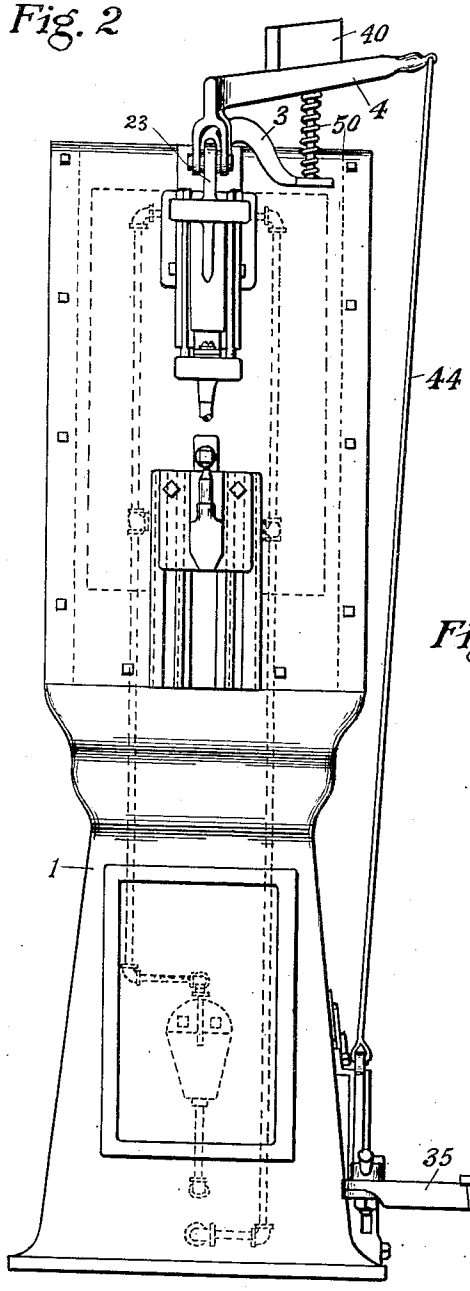


Fig. 3

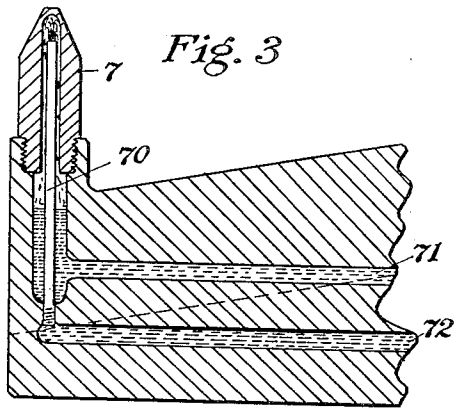
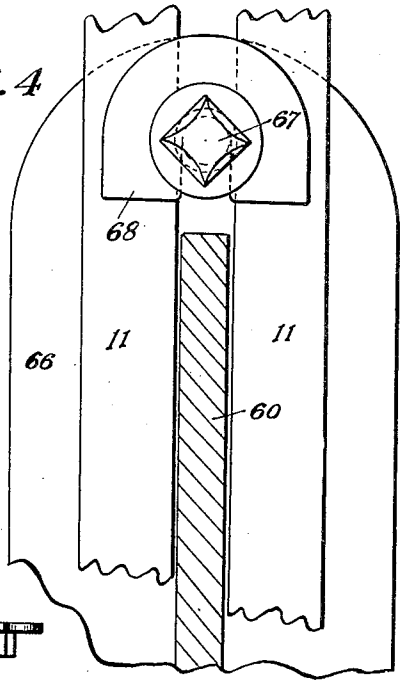


Fig. 4



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4 SHEETS—SHEET 3.

Fig. 5

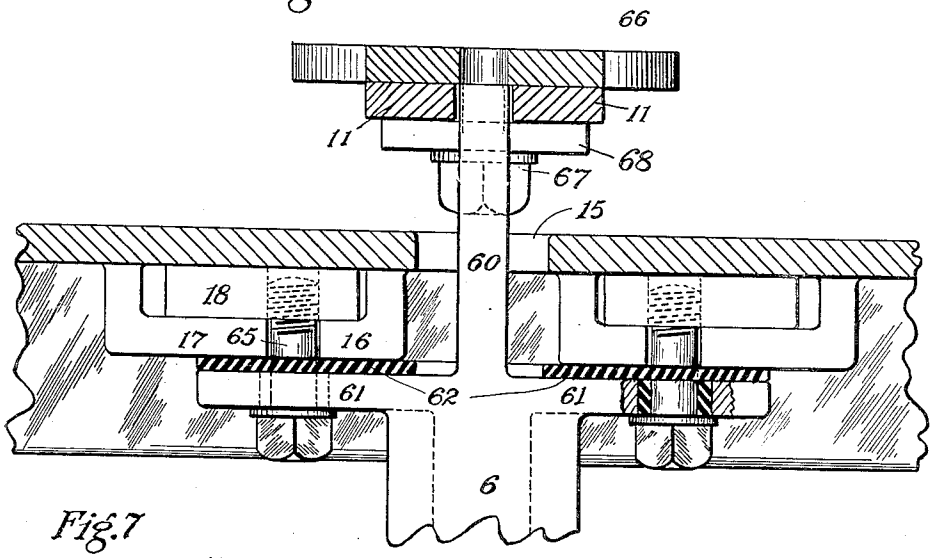


Fig. 7

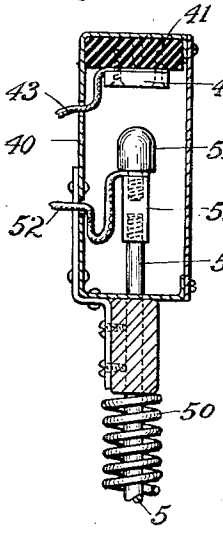
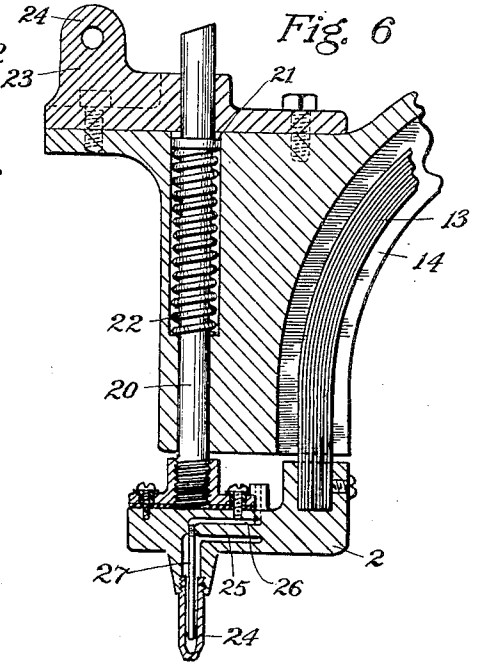


Fig. 6



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4 SHEETS—SHEET 4.

Fig. 8

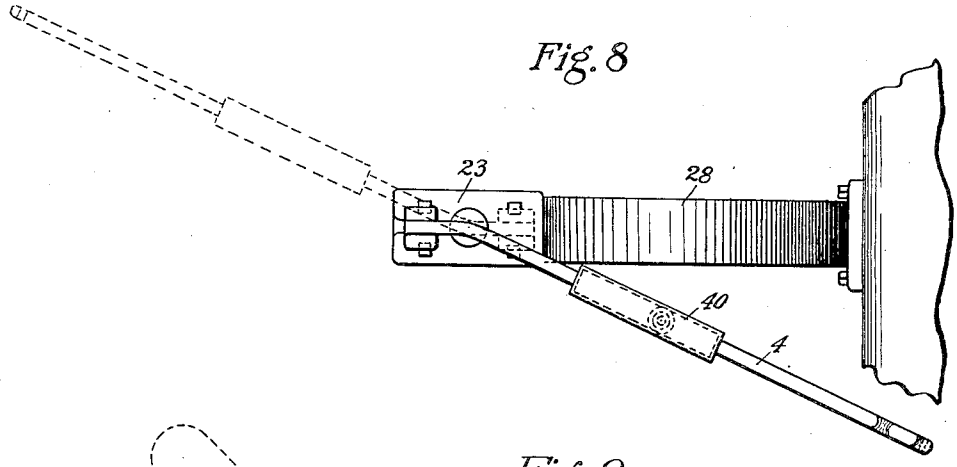
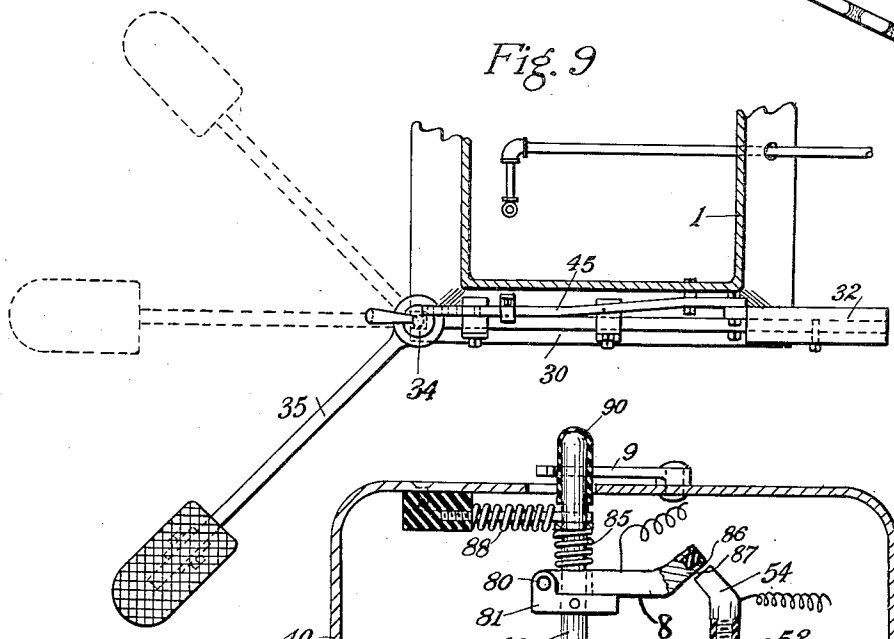


Fig. 9



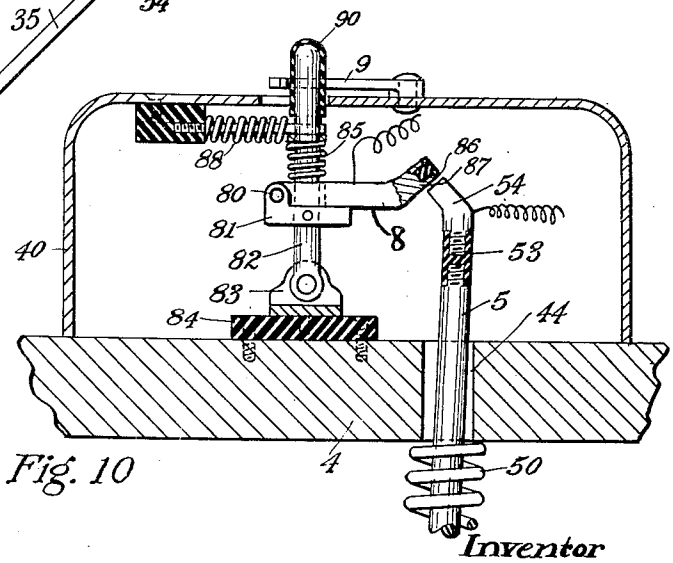


Fig. 10

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UNITED STATES PATENT OFFICE.

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ELECTRIC WELDER.

1,292,921. Specification of Letters Patent. Patented Jan. 28, 1919.

Application filed August 4, 1917. Serial No. 184,411.

To all whom it may concern:

Be it known that I, CARL HUGO THORNBLADE, a citizen of the United States, and a resident of the city of Seattle, county of King, and State of Washington, have invented certain new and useful Improvements in Electric Welders, of which the following is a specification.

My invention relates to an electric welding machine and consists of certain novel parts and combinations of parts which will be hereafter described and then particularly pointed out in the claims.

The object of my invention is to provide certain improvements which facilitate the better operation of the machine and render the same more convenient for the operator. A special feature of improvement of my invention consists in the mechanism by which the yielding terminals are controlled and also by which the contact terminals through which the application of current to the yielding terminals is controlled, may be applied only for a limited time, which time may, to a considerable measure, be standardized, whereby burning of the work by too extended application of the current may be largely prevented.

In the accompanying drawings I have shown my invention in a type of construction which is now preferred by me.

Figure 1 is a side elevation of a machine built in accordance with my invention, portions of the casing thereof being broken away to better show interior parts.

Fig. 2 is a front elevation of a machine.

Fig. 3 is a section through the outer end of the lower bracket or work supporting arm and the lower welding electrode.

Fig. 4 is a section taken through the inner end of the lower bracket arm, illustrating the manner of attaching the secondary leads thereto.

Fig. 5 is a section taken just above the lower bracket arm, illustrating the manner of supporting the same from the frame and of attaching the leads thereto.

Fig. 6 is a vertical section through the upper or movable welding electrode.

Fig. 7 is a transverse or cross section through the main controlling lever and the current contacting members.

Fig. 8 is a plan view illustrating the manner of adjusting the controlling arm in different positions.

Fig. 9 is a plan view with the base of the frame in section, showing the construction of the foot lever and the manner of adjusting the extension end thereof.

Fig. 10 is a vertical longitudinal section through a portion of the upper bar and the current controlling contacts.

The apparatus of the welding machine is mounted upon and in a frame 1, which may be of any shape which is found suitable for the purpose. In the upper part of this case or frame, I have shown a transformer 10. The secondary of this transformer has its ends 11 and 12 projecting for connection with the leads which extend to the welding terminals. The upper end 12 of the secondary is connected with a lead 13 which is composed of a series of thin copper plates or strips, which are bent to conform to the curvature of the upper arm 14, the same lying within a channel thereof which opens downwardly.

The upper arm 14 is fixedly secured to the frame. The outer end of the leads 13 are connected with a block 2 which is fixed to a vertical rod 20 which is mounted to reciprocate within bearings formed in the outer end of the arm 14. This rod 20 has a collar 21 thereon and the upper end of the hole in the arm 14 which receives the rod 20, is enlarged to receive this collar and also to receive a helical spring 22, which surrounds the rod and which acts to normally hold the terminal carrying block 2 raised. The upper end of the rod 20 projects in the clear a sufficient distance to enable it to be engaged by a lever by which it may be depressed.

Secured to the outer end of the arm 14 is a block 23 which has thereon pivot lugs 24 by which the lever for actuating the rod 20 may be pivoted. This block is secured in such manner, as by bolts, that it may be loosened and turned into a different position, thereby resulting in placing the controlling handles in different operating positions, making it possible to control the application of the current by hand from either side of the machine, or from the front. Such adjustment is shown in Fig. 8, in which another position of the lever is shown by dotted lines.

The lever 3 is pivoted upon the ears 24 and extend over and in position to engage the upper end of the rod 20. Pivoted upon the same ears, or in such other manner or

position as is desirable, is the primary operating lever 4. This lever is actuatively connected with the secondary lever 3 through the means of a spring 50, which spring engages the outer end of the lever 3 and a middle part of the lever 4. This spring 50 should have a superior working effect over the spring 22; that is, the spring 50 should be strong enough so that it will compress the spring 22 enough to insure contact of the upper welding electrode with the work, before the spring 50 is materially compressed.

The current contacting members are engaged by the movement of the lever 4, which occurs after the contact of the movable welding electrode with the work, and by the movement of the lever, this being due to the compression of the spring 50.

In Fig. 7 one form of contact mechanism is shown. A rod 5 is connected with the lever 3, preferably by a pivot connection, which will permit a slight rocking movement of the lever. This may not involve an actual pivot pin but may be secured simply by a socket for the reception of the end of the rod 5.

Upon the upper end of the rod 5 is a contact member 51 which is electrically connected with a power lead 52. This contact member 51 should preferably be insulated from the rod 5 by which it is carried. This may be done by connecting the same through the medium of a sleeve or block 53 of insulating material. This contact member should be inclosed within a casing, as 40, by which it is protected from accidental contact by the work. Within this casing is an insulating block 41, carrying a contact block 42 of conducting material which is connected with the other end 43 of the power lead.

The downward movement of the lever 4 carries with it the lever 3 until the upper welding terminal has contacted with the work. Further movement of the lever 3 is thus resisted and continued movement of the lever 4 will compress the spring 50 and cause the contact members 51 and 52 to be brought into engagement, thus closing the power circuit and providing the current for the transformer.

In Fig. 9 I have shown a type of current contacting members by which the current used is controlled by mechanism of the type which I now prefer to use. In using an electric welding machine it is possible, if the electrodes are held too long upon the work, to burn the work and to cause serious injury thereto. It is, therefore, desirable to have some means whereby the time during which the current is applied may be automatically limited within certain ranges.

In the device shown in Fig. 10, the current will be applied only for a certain length of time, even if the lever by which the same is controlled is held down a much longer time. In this drawing, a short section of the lever 4 is shown, this being shown as a longitudinal section. This is provided with a hole 44 through which the rod 5 passes. The contact member carried by this rod is shown as of a special construction. This consists of a block 54 having its upper end laterally offset toward the complemental contact member. The complemental contact member consists of a block 8, which is pivoted at 80 to a ring 81, which surrounds a rod 82, which rod is pivoted to a block 83 which is supported from the arm 4, through the means of an insulative block 84. A spring 85 surrounds the rod 82 and acts upon the block 8 in such manner as to hold it down and toward the complemental contact member 54. The ring 81 upon which the block 8 is pivoted, acts also as a stop to prevent downward movement of the block beyond a certain point.

Upon the outer end of the block 8 is secured an insulating block 86. The outer end of this block 8 also has an inclined under surface 87, which forms the actual contact surface which is engaged by the member 54. When, in the downward movement of the lever 4, the two members 54 and 8 are brought into contact, the block 8 will be pushed upward until the contacting surfaces between the same and the member 54 causes the latter to slide up the block 8. This may slide entirely past so that the lateral projection of the contact member 54 is above the end of the block 8. It will thus be seen that the time during which the power circuit is closed is simply that while the block 8 is swinging upward to such position that the two members 54 and 8 are in contact.

On the downward movement of the rod 5 and the contact member 54 carried thereby, the latter contacts with the insulating surface 86 of the block 8 and the circuit is not closed. As the block 8 is mounted on a rod 82, which is pivoted in such manner that it may swing away from the contact member 54, the block 8 is pushed to one side to permit passage of the contact member 54. This rod 82 is held up, or toward the rod 5, by means of a spring 88 which will permit its being pushed back to accommodate the downward movement of the contact member 54.

If it be desired at any time to prevent this swinging movement of the rod 82, this may be done by the means of a latch 9, which is pivoted upon the outside of the small casing 40 which is carried by the arm 4. The end of the rod 82, which projects through the casing, is provided with an insulating cap 90. When so secured, the length of time during which the current is applied may be controlled by the length of time which the controlling arm 4 is held

down. In this condition the automatic feature just described will be inoperative.

The block 2 is provided with means for the detachable securing thereto of the upper welding electrode 24. This electrode should be hollow, as is shown in Fig. 6, and a cooling water circulation therefor be provided. This water circulation is provided by means of the channels 25 and 26 which are provided therein, one of these, as the channel 26, being extended as pipe 27 into the hollow interior of the welding terminal or electrode 24. The water supply connection to these points is by means of a flexible pipe 28.

The front of the machine is provided with a slot 15 which is adapted to receive a web 60 which forms the inner extremity of the lower bracket or arm 6. The casing 1 is also provided with flanged ribs 16 and 17 at each side of the slot 15. The flanges of these ribs are separated from each other a sufficient distance to receive clamping bolts 65. Beneath the flanges 16 and 17 are blocks 18 which snugly fit and slide within the spaces between these flanges and the body of the casing 1. The arm 6 has laterally extending flanges 16 and 17. Between flanges 61 and these flanges 16 and 17, are placed insulating plates or sheets 62. Bolts 65 pass through flanges 61 of the bracket or arm, and screw into the blocks 18, which are held in the recess beneath the flanges 16 and 17 of the frame. In this manner this bracket arm may be vertically adjusted and secured in any position within a considerable range.

The inner end of the web 60, which extends within the frame or casing, has lateral flanges 66. The secondary lead 11 of the transformer is brought down against the outer face of these flanges and is secured thereto by means of bolts 67 and washers 68. These bolts, it will be noticed, are above and below the body of the bracket arm 6 so that these securing bolts are readily accessible from the outside.

By the type of construction described, the bracket arm may be readily adjusted to any position. The bolts by which it is secured and by which the leads are secured thereto, are all readily accessible from the outside. I have shown a cooling system for the lower welding electrode 7, which also is hollow, as is shown in Fig. 3. This has a pipe 70 extending therein and discharging the water close to the tip of the electrode. The arm is provided with channels 71 and 72, for the conveyance of the cooling water and these are connected, by means of a flexible tube 73, with the water supply pipe 74, to which pipe the tube 28, which supplies water to the outer electrode, is also connected.

The lever 4 may be directly engaged and operated by hand. I have also shown means by which this may be controlled by the foot. A rod 44 is secured to the swinging end of this lever and extends downward to a connection with a lever 45. This lever is pivoted at 46 upon the frame and is connected by a link 47 with a main foot lever 30, which lever is pivoted at 31 upon the frame. A weight 32 may be secured to this lever in such position as to insure its returning the lever system to its normal position. An extension lever section 35 is pivoted to the end of the lever 30, to swing upon a vertical axis, and may be secured in adjusted position by the clamping bolt 34. This permits adjusting the foot-engaging end of the lever to any position within quite a considerable arc and thus promotes the convenience of the operator.

What I claim as my invention is:

1. In an electric welder, in combination, a movable welding terminal, two levers mounted upon a common pivot, one being engageable with to move said terminal, a spring interposed between said levers, and switch terminals for the welding current carried, one by each lever.

2. A device of the character set forth in claim 1 having a spring acting to return the movable welding terminal and its lever, said spring being inferior in its effect to that of the spring which is interposed between the levers.

3. In an electric welder, in combination, a compound lever connected to operate the terminals, the two parts of said lever having current make-and-break devices adapted to making a passing contact by the application of the welding electrodes to the work.

4. In an electric welder, in combination, a pair of welding electrodes, a make-and-break mechanism controlling the current supplied to said electrodes, and means for automatically causing a break in said mechanism after closing the same.

5. In an electric welder in combination, with the terminals, a lever for applying said terminals a second lever, a spring forming an actuative connection between said levers, and current controlling members carried, one by each lever and adapted to permit one to pass by the other to thereby automatically break the circuit.

6. In an electric welder in combination, with the terminals, a lever for applying said terminals, a second lever, a spring forming an actuative connection between said levers, and current controlling members carried, one by each lever, and normally held apart by said spring, said members and the relative movement between the two levers being adjusted to produce an electric contact of a momentary character.

7. In an electric welder in combination, with the terminals, a lever for applying said terminals, a second lever, a spring forming an actuative connection between said levers, a rod connected with one of said levers and

guided from the other, a contact member carried by said rod and a complemental contact member carried by the other lever and normally held out of contact by the spring, said contact members having inclined contact surfaces and relative movement to carry one past the other, one of the contact surfaces which engage on the return movement being of an insulating character.

8. In an electric welder in combination, two welding electrodes, a lever connected to apply said electrodes to the work, two make-and-break members, one movable by said lever to contact with and pass by the other during the movement of applying the electrodes, and means for preventing electrical contact between said make-and-break members on the return movement thereof.

9. In an electric welder in combination, two welding electrodes, a lever connected to apply said electrodes to the work, two make-and-break members, one movable by said lever to contact with and pass by the other during the movement of applying the electrodes, one of said make-and-break members having an insulating face contacting with the other to prevent closing the circuit on the return movement thereof.

10. An operating means for an electric welder comprising a pivoted lever having an operative connection with the movable welding electrode and an extension section for said lever adjustable about an axis lying at the outer end of the first lever and in the plane of the movement of the lever.

11. In an electric welder, a hollow frame having a vertical slot and bracket seating faces alongside said slot, a work supporting bracket having insulated supporting bearings on said faces and a rib extending through said slot and having a vertical face, a terminal of a transformer secondary paralleling said vertical face, and means for adjustably securing said terminal to the vertical face of said rib.

12. In an electric welder, a frame having a vertical slot in its face and undercut flanges outside thereof and alongside said slot, a bracket arm having faces engaging the outer faces of said flanges and a web extending through said slot and having laterally extending flanges, means for securing a secondary lead upon said inner flanges, blocks sliding beneath the under cut flanges outside of the frame, and bolts for drawing said blocks and the outer flanges of the bracket together.

13. In an electric welder, a frame having a vertical slot in its face, and bracket supporting faces adjacent said slot, a work supporting bracket having a flange extending through said slot and provided inwardly of the slot with a vertical face, means for securing said bracket for adjustment lengthwise of said slot, a transformer secondary having a terminal paralleling said inner face of the bracket, and means for securing said terminal to said inner face of the bracket to permit adjustment.

Signed at Seattle, Washington, this 30th day of July, 1917.

CARL HUGO THORNBLADE.