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Patented Apr. 3, 1900.

C. L. COFFIN.  
ELECTRIC METAL WORKING APPARATUS.

(Application filed May 13, 1899.)

(No Model.)

3 Sheets—Sheet 1.

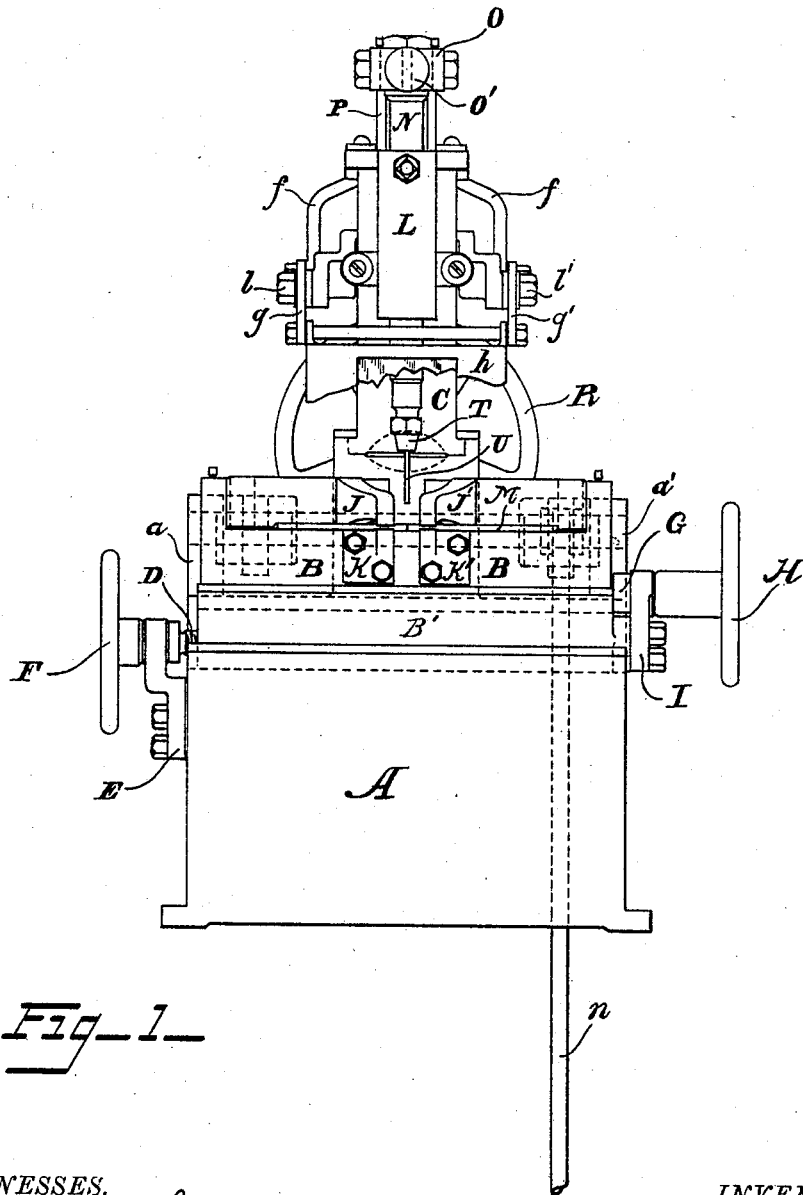


Fig. 1.

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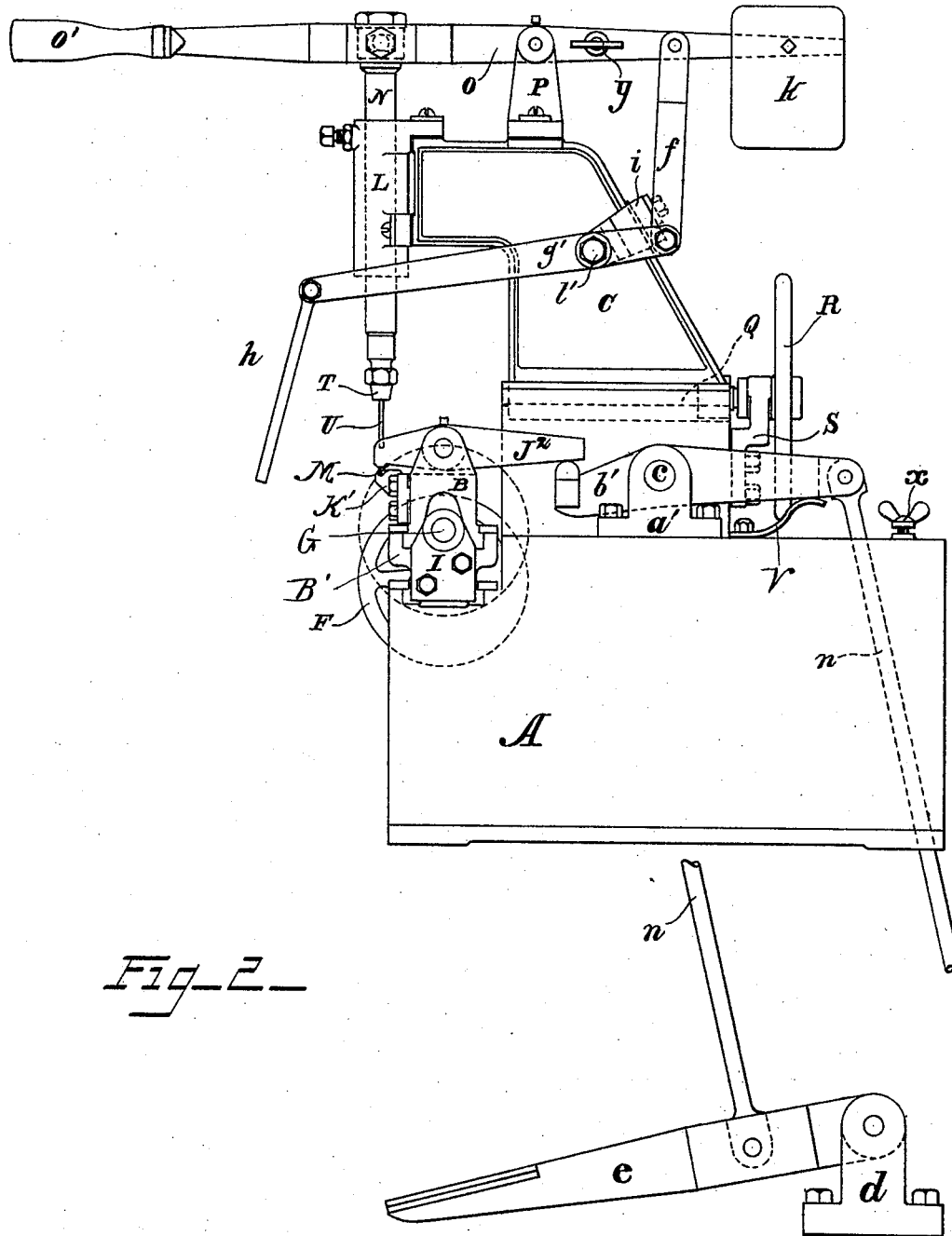
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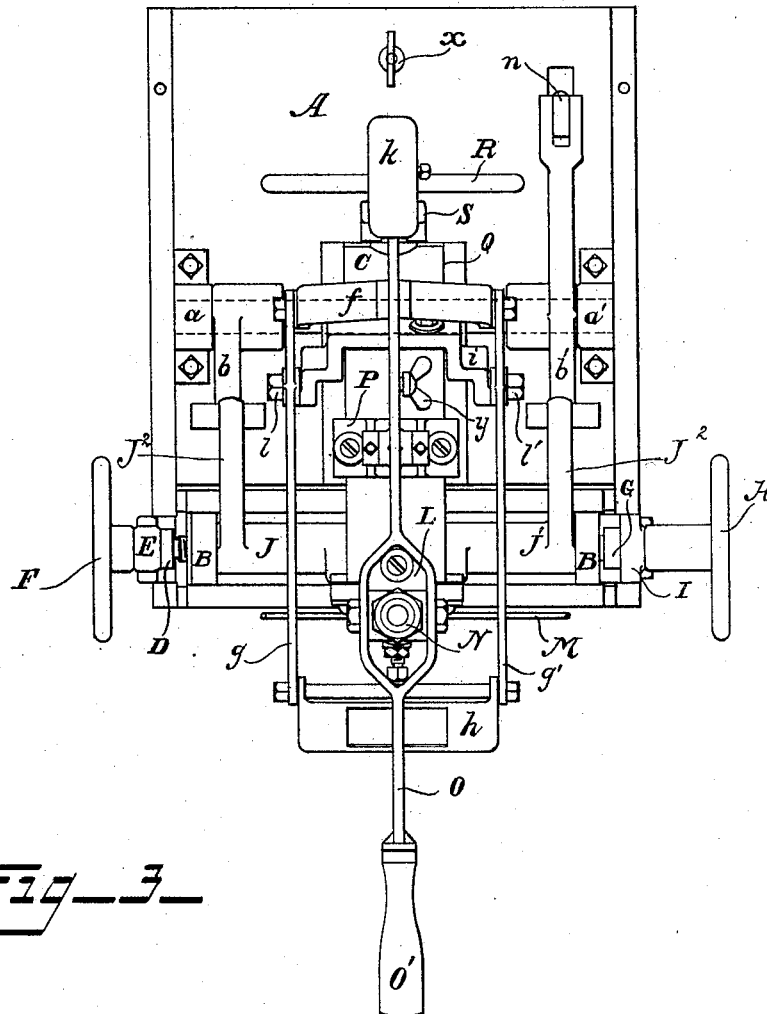


Fig. 3.

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC METAL-WORKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 646,619, dated April 3, 1900.

Application filed May 13, 1899. Serial No. 716,735. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES L. COFFIN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Machines for Electrically Heating, Welding, or Working Metals, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention consists in the construction of a machine for electrically heating, welding, or working metals; and it consists particularly in the construction, arrangement, and combination of the parts, as more fully hereinafter described, and specifically pointed out in the claims.

In the drawings, Figure 1 is a front elevation of my machine, having the screen partially broken away to show more clearly the position of the electrode. Fig. 2 is a side elevation of the machine shown in Fig. 1. Fig. 3 is a top plan view thereof.

A represents the base of the machine, which may be of any suitable construction.

B' is the clamp-carriage, supported in ways at the top of the frame at the front and adjustable transversely of the machine by means of the screw-shaft D, suitably engaging a bearing thereon and supported in the bracket E and having a hand-wheel F for turning it.

Upon the clamp-carriage are supported the two blocks B, sliding in suitable guides or ways therein, as plainly shown in Fig. 2. The blocks B carry the lower or stationary jaws K K' of a pair of clamps the upper members of which are shown at J J'. The jaws J J' are adjustably secured upon rock-shafts *m* on the blocks B and have actuating arms or levers J<sup>2</sup>, extending rearwardly therefrom and into operative relation to the levers *b b'*. These levers are secured to the rock-shaft *c*, which is journaled in brackets *a a'* and is connected by the connecting-rod *n* to the foot-lever *e*, supported in the bracket *d*. One or both of the blocks B may be adjustable upon the clamp-carriage, and in this case I have shown only the right-hand block carrying the jaws K' J' as adjustable by means of a screw-shaft G, actuated by the hand-wheel H and supported and guided in the bracket I. By

this means the distance between the pairs of jaws may be varied at will.

C is a bracket movable in ways in the frame of the machine transversely to the line of movement of the clamp-carriage. The adjustment I have shown I accomplish by means of the threaded shaft Q, operated by the hand-wheel R, supported in the bracket S, Fig. 2. At the forward end of the bracket C, I secure a guide L, insulated from the bracket and in which is slidingly supported the electrode-carrier N, having at its lower end a chuck T, which carries an electrode U. The electrode-carrier N at its upper end is connected to the actuating-lever O, which has a suitable insulated handle O' and a counterweight *k* at the opposite end. The lever O is fulcrumed in the bracket P, as shown in Fig. 2.

*h* is a screen which is actuated synchronously with the electrode U, preferably by the following connections: The screen *h* is supported at the forward end of the lever *g'*, which in turn is fulcrumed upon the pin *l'* upon the brackets *i*. The lever *g'* is connected to the lever O by the connecting-rod *f*.

The parts being thus constructed, the operation of the device is as follows: The end portions of the metal to be united are placed on the lower jaws K K' of the clamp, with the ends abutting and as nearly as possible in alinement with the vertical axis of the electrode U. The operator then depresses the foot-lever *e*, which, through the connection described, lowers the jaws J J' upon the metal, which I have lettered "M." If the joint to be welded is not in alinement with the electrode, the hand-wheel F may be actuated, moving the clamp-carriage in either direction until the joint has been brought exactly in line with the axis of the electrode. If the central vertical plane of the metal at the point of juncture should be out of alinement with the axis of the electrode, the threaded shaft Q may be actuated by the hand-wheel R, so as to move the electrode-support C forward or backward until the axis of the electrode U is in the desired vertical plane with regard to the metal M. When the proper adjustments have been made, so that the electrode U is directly above the joint, the operator depresses the electrode into contact with the metal, which thus com-

pletes the electric circuit. The depression of the lever likewise lowers the screen *h* in position in front of the work, so that the operator may inspect the work through the screen, which is usually colored glass. The operator now slightly raises the lever *O*, so as to form a small arc through it and the metal to be welded, and retains the lever in this position until the proper temperature is obtained. The hand-wheel *H* may then, if desired, be turned, which will move one pair of clamps toward the other a sufficient distance to squeeze the parts together at the joint or, if necessary, to upset the metal. The operator now releasing his hold of the lever *O*, the counterweight *k* will return the parts to their normal position and also throw the screen up out of the way. The operator then removes his foot from the lever *E* and removes the work from the clamps. The jaws are separated as soon as the pressure is removed from the treadle *e* by the action of the spring *V*, which rocks the levers *b b'*, lowering the forward ends thereof and permitting the arms *J<sup>2</sup>* to fall by gravity, thereby raising the upper jaw.

It will be seen that the counterweight *k* will normally hold the electrode away from the work, and through the multiplying-lever *g'* the screen *h* will not only clear the work, but will be drawn up a considerably-greater distance than the electrode, so as to clear the electrode. This not only draws the screen away from the work, so that the operator can readily get at it or the jaws, but also clears the electrode, so that it may be replaced or adjusted at any time. The terminals of the electric circuit are connected, respectively, to the binding-screws *X* and *Y*. (Shown in Fig. 2.)

What I claim as my invention is—

1. In a machine for electrically heating, welding and working metals, the combination of a base, a clamp-carriage, ways across the front of the machine in which said carriage is adjustable, the blocks *B*, adjustable longitudinally on said carriage to and from each, other, a stationary jaw and a movable jaw supported on each block, and an actuating device for the movable jaws on the base, at all points of adjustment thereof.

2. In a machine for electrically heating, welding and working metals, the combination of the clamp-carriage movable in ways across the front of the machine, the blocks *B* on the carriage, means for adjusting the blocks to and from each other longitudinally of the carriage, the stationary jaws on the blocks, the rock-shafts on the blocks, the movable jaws secured to the rock-shafts, an actuating-arm extending out from each rock-shaft, a rock arm or lever for each jaw-actuating arm, and a common actuating device for the last-mentioned levers.

3. In a machine for electrically heating,

welding or working metals, the combination of work-clamps, connected to one terminal of a source of electrical energy, and an electrode connected to the other terminal of relative longitudinal and transverse adjustments between the clamps and electrode, and means for moving the electrode and work to and from each other.

4. In an apparatus for heating, welding and working metals electrically, the combination with a base, a clamp-carriage movable across the front of the base, two pairs of clamps thereon, means for adjusting said pairs of clamps to and from each other longitudinally of the carriage, the said clamp being connected to one terminal of the source of electric energy, a bracket adjustable at right angles to the adjustment of the clamps, and a vertically-movable electrode connected to the other electric terminal, on said bracket.

5. In a machine for electrically welding metals, the combination with a base, of two pairs of clamps adapted to hold the ends of the parts to be joined in contact, an electrode, the terminals of a source of electrical energy being connected respectively to the clamps and the electrode, a screw-shaft for adjusting the clamp-carriage longitudinally of the base, a bracket in which the electrode is supported, a screw-shaft for adjusting the bracket across the path of movement of the clamp-carriage and a counterweighted lever for moving the electrode vertically in the bracket.

6. In a machine for electrically welding or working metals, the combination of a work-holder, a lever for moving the arc-forming mechanism into operative relation to the work, a screen and means for moving the screen differentially from and synchronously with said arc-forming mechanism.

7. In a machine for electrically welding or working metals, the combination of a work-holder, connected to one terminal of the current, a movable electrode connected to the other terminal, a lever for actuating the electrode a screen and mechanism for moving the screen away from the work and the carbon.

8. In a machine for electrically welding or working metals, the combination of a work-holder connected to one terminal of the current, a movable electrode connected to the other terminal, a counterweighted lever to which the electrode is connected and by means of which it is actuated, a screen, a multiplying-lever upon which the screen is secured and a connection between the screen-supporting lever and the counterweighted lever for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES L. COFFIN.

Witnesses:

JAMES WHITEMORE,  
M. B. O'DOHERTY.