No. 647.250. Patented Apr. 10, 1900.

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ELECTRIC METAL WORKING APPARATUS.

(Application filed Apr. 19, 1899.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.

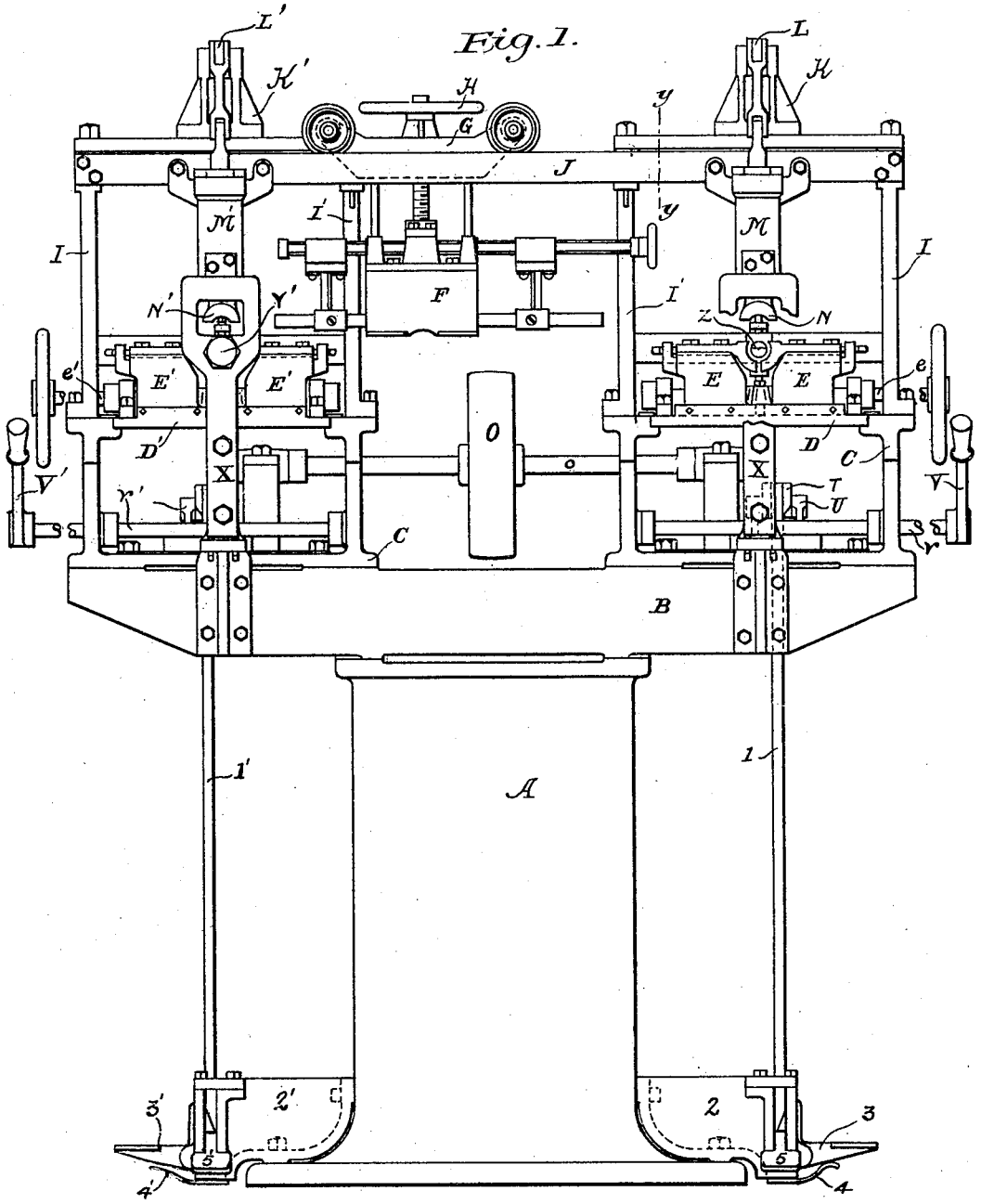

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Fig. 2

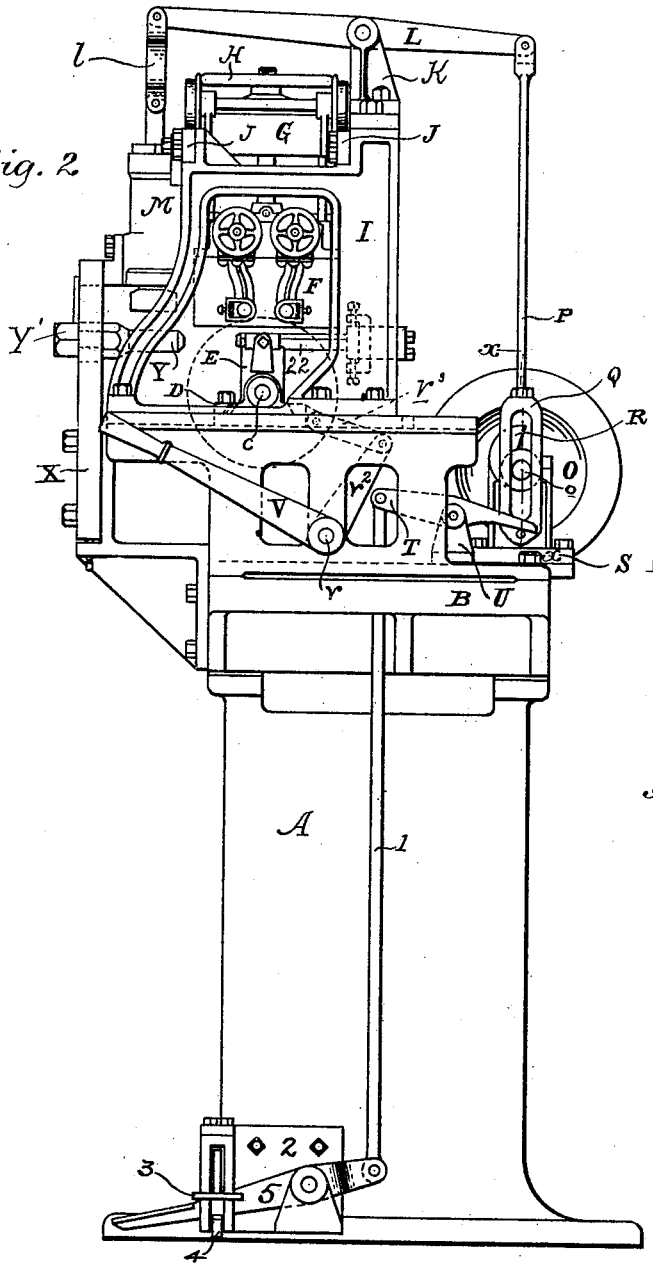


Fig. 8.

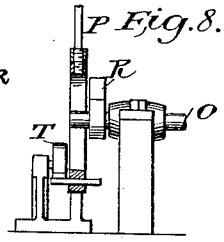
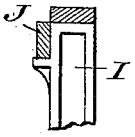


Fig. 9.



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(No Model.) 4 Sheets—Sheet 3.

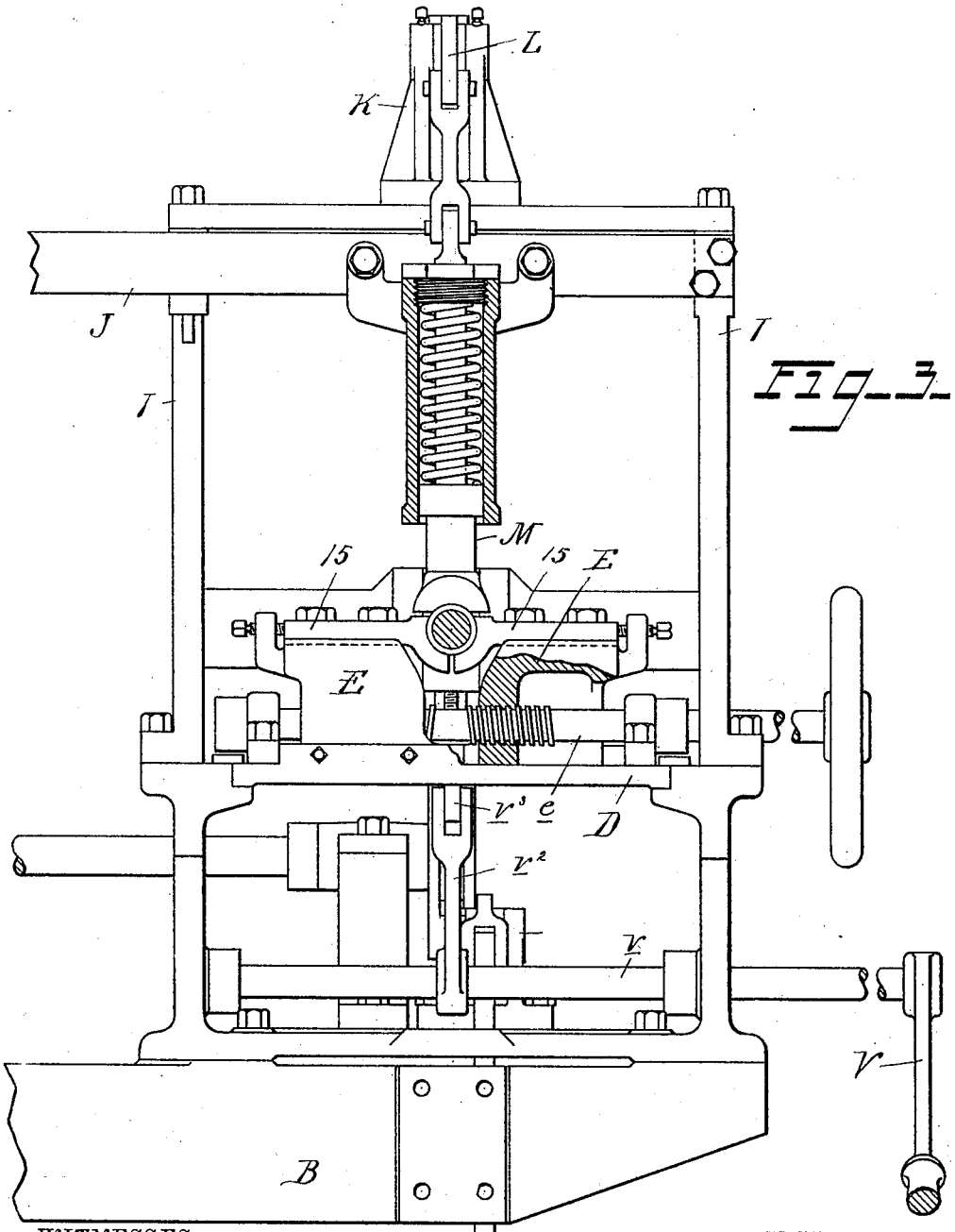

Fig. 3.

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(No Model.) 4 Sheets—Sheet 4.

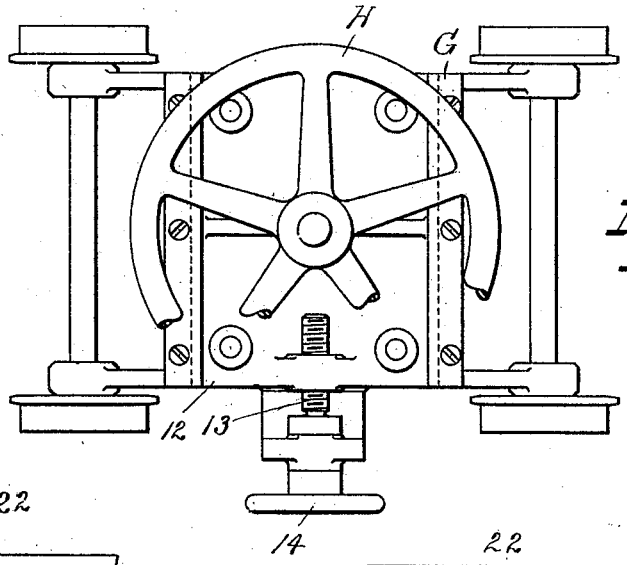

Fig. 4.

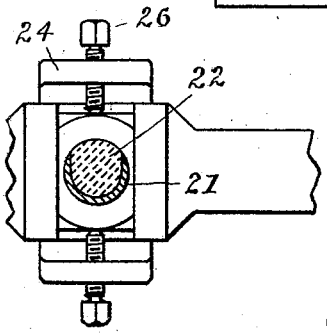

Fig. 7.

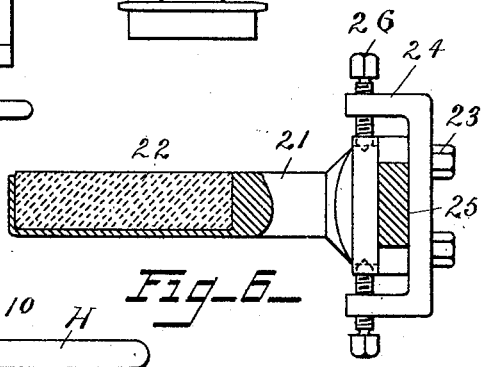

Fig. 6.

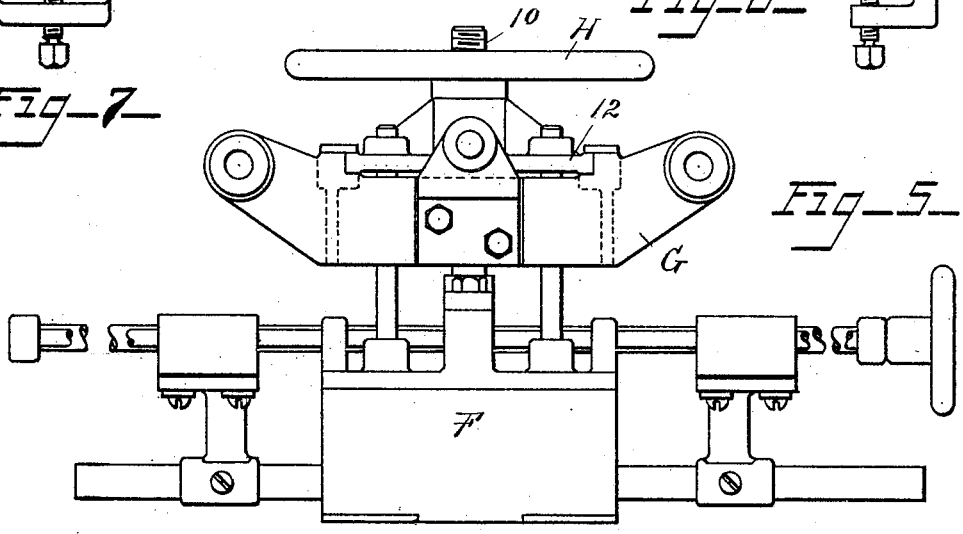

Fig. 5.

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UNITED STATES PATENT OFFICE.

CHARLES L. COFFIN, OF DETROIT, MICHIGAN.

ELECTRIC METAL-WORKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 647,250, dated April 10, 1900.

Application filed April 19, 1899. Serial No. 713,600. (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 Apparatus for Welding and Working Metals, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to an apparatus for welding and working metals; and it consists in the construction and combination of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a front elevation of a double machine embodying my invention. Fig. 2 is an end elevation thereof. Fig. 3, partially in section, shows a construction of the spring swage or hammer, the right and left threaded shafts which control the clamp, and the relation of the clamp and the swage to the mandrel. Fig. 4 is a horizontal projection of the furnace-carriage, showing the lateral adjustment of the furnace and its support upon the carriage. Fig. 5 is an elevation showing the furnace and furnace-carriage and the vertical adjustment and the lateral adjustment. Fig. 6 is a side elevation, partially in section, showing the hearth with the fire-brick linings and the means for adjusting it vertically. Fig. 7 is a front elevation of the hearth and its support. Fig. 8 is a section on line x x, Fig. 2. Fig. 9 is a section on line y y, Fig. 1.

A is a frame or base having the top or super base B. Upon this superbase are the standards or frames I I'. In this case I have shown four, connected together at the top by the rails J, these standards being made of suitable shape to permit the travel of the furnace, as hereinafter described. These rails support a wheeled carriage G, on which is hung the furnace F, which is vertically adjustable by means of the threaded shaft 10 and hand-wheel H. The shaft 10 is supported from the laterally-movable plate 12. (See Fig. 5.)

The furnace is a suitable electric furnace—such, for instance, as that shown in my previous patent, No. 530,019—having suitable electrical connections and carbons between which a voltaic arc is formed in the well-known manner.

The furnace has a lateral adjustment in relation to its carriage. This may be accomplished by moving the plate 12, from which it is suspended, by means of the adjusting-bolt 13 and its hand-wheel 14, the bolt being journaled in a bearing on the frame of the carriage and having screw-threaded engagement with a bearing on the plate, as shown in Fig. 4. The opening, slot, or mouth of the furnace may be thus adjusted vertically to and from the article to graduate the heat and may be adjusted laterally and longitudinally in relation to the article by moving the carriage and afterward by turning the hand-wheel 14. Thus the heat may be directed upon any desired spot. Between the pairs of standards I I' are supported in suitable ways the clamp-beds D D', having clamp-blocks E E', movable to and from each other by the right and left screw-threads on the shafts e e'. Upon the clamp-blocks are suitable jaws 15, adapted to fit upon the article to be welded. In this instance they are shown shaped to fit upon splice rings or thimbles, such as used in coupling parts of bicycle-frames together, the jaws when closed leaving exposed the joint where the ends of the blank meet to be welded. The clamp-beds are moved in their ways by means of the levers V V', attached to rock-shafts v v', which are connected to the clamp-bed by links v^3 and arms v^2. This movement of the clamp-bed is adapted to bring the clamped article under the furnace and away from the furnace and into operative relation with the anvil Y, adjustably supported in a standard or bracket X at the front of the machine. The adjustment is effected by the clamping-screw Y', which passes through an enlarged hole in the standard.

Above the anvils are swages or hammers M M', having feet N N'. In this case I show a spring-hammer. A pneumatic, steam, or electric hammer, it is evident, could be substituted. The spring is compressed in its case by the lever L, journaled on the bracket K. The lever has the rod P at the opposite end, and a pin on the lower end of this rod is adapted to be struck by the cam R on a driven shaft o to compress the spring and release it to

strike the blow. The pin on the rod may be drawn out of operative relation to the cam by the foot-lever 5, connecting-rod 1, and lever T and may be so held by the spring-hook 3. (See Figs. 1 and 2.) This hook is actuated by a spring 4. To set the hammer at work, the operator trips hook 3, which releases lever 5, and the spring in the hammer-case draws the pin on the rod P into proper relation to the cam. To stop it, the operator depresses lever 5 until the spring-hook engages it and locks it. The standard or post X has a suitable sight-hole at the top, covered with colored glass, so that the operator may observe the progress of the work.

At the rear of the machine and projecting forward in line with the opening in the jaws of the clamp is a hearth-supporting arm 21, in which is supported a suitable hearth 22 of fire-brick or similar material. This is adjustable laterally by means of the bolts 23, which clamp its supporting yoke or frame 24 upon the bar 25. It is vertically adjustable in guides on its frame by means of the screws 26 at top and bottom of its supporting-frame, as shown in Figs. 6 and 7.

In the drawings I have shown two clamps, with their coöperating anvils and hammers, being, in fact, two complete machines, with a single furnace adapted to be moved on its track to either clamp. It is evident, however, that a single furnace and a single clamp-anvil and hammer would make a complete machine.

The use of the machine is as follows: The operator by the lever V moves the clamp in position in front of the anvil, (the furnace at this time preferably being in use at the other clamp,) opens the clamp by turning the hand-wheel on the shaft *e*, inserts the splice-ring which is to be welded, and closes the clamp upon the ring, leaving the meeting edges exposed. Then by the lever V he moves it back under the furnace-track, which brings the hearth into the ring. The furnace is then moved over the clamp, (having previously been adjusted,) so that the mouth of the furnace is over the joint in the article at the desired distance, and it is held there long enough to bring the article to a welding heat. The hearth prevents the heat radiating too freely out beneath the joint. The operator then moves the lever V and brings the clamp forward, engaging the blank over the anvil, and then starts the hammer, which completes the joint. The ring is then disengaged from the clamp, the clamp opened, the ring removed, and the operation repeated. It is desirable to have the clamp exposed to the heat of the furnace during the heating of the blank in welding thin thimbles, as the clamp is raised to a very high temperature, and when the article is clamped in position it is heated at once to the heat of the clamp before the furnace heat strikes it, and this initial heating prevents the distortion of the article, which is apt to occur if the furnace heat is brought directly upon the cold blank.

The point where the furnace is supported over and in heating relation to the blank in the clamp I refer to in the claims as the "heating-point."

What I claim as my invention is—

1. In an apparatus for welding and working metal, the combination with the frame, of a multiple of pairs of clamps arranged at different points on the frame and a movable electrical furnace adapted to be moved into heating relation to each clamp or to a position between the clamps.

2. In an apparatus for welding and working metal, the combination with the frame, of a plurality of clamps for the blanks, at separated points on the frame, an anvil and hammer for each blank with means for effecting operative relation between each anvil and hammer and the corresponding clamp, and a movable furnace adapted to be moved into heating relation to each clamp.

3. In an apparatus for heating, welding and working metals electrically, the combination with a clamp-carriage movable to and from the side of the machine, adjustable clamps thereon movable in a direction at right angles to the path of motion of the clamp-carriage; and carrying thereon clamp-jaws approximately conforming to the article to be welded; a hearth and an anvil adjustable with relation to the clamps, with a furnace having vertical adjustment and movable at right angles across the path of motion of the said clamp-frame.

4. In an apparatus for heating, welding and working metals electrically, the combination with a clamp-carriage movable to and from the side of the machine, adjustable clamps thereon movable in a direction at right angles to the path of motion of the clamp-carriage; and carrying thereon clamp-jaws approximately conforming to the article to be welded; a hearth and an anvil adjustable with relation to the clamps; means for hammering or swaging the article when placed upon said mandrel with a furnace having vertical adjustment and movable at right angles across the path of motion of the said clamp-frame.

5. In a machine for welding and working metal, the combination of a frame, a stationary hearth at the back of the frame, a stationary anvil at the front of the frame, a clamp movable in ways from the anvil to the hearth, and an electrical furnace over the hearth.

6. In a machine for welding and working metal, the combination of a frame, a stationary hearth and a stationary anvil, a hammer at the anvil, a clamp movable in ways from the anvil to the hearth and an electrical furnace moving in ways transverse to the movement of the clamp in the plane of the hearth, substantially as described.

7. In a machine for welding and working

metal, the combination of a frame, a clamp movable in ways across the frame, a stationary anvil, at one end of the clampways, a hammer over the anvil, an electrical furnace at the other end thereof, and a lever for moving the clamp along the ways into operative relation to the anvil or furnace.

8. In a machine for welding and working metal, the combination of a frame, a clamp, a screw-shaft for opening and closing the clamp, ways in which the clamp may travel from front to back of the frame, a stationary anvil at one end of the clamp ways, a hammer at the anvil, an intersecting way at the other end of said clampways, and an electric furnace movable on said intersecting way.

9. In a machine for welding and working metal, the combination of a frame, a clamp for the blank movable in ways from front to rear of the machine, a stationary anvil at the front of the machine, in the path of the clamp, an electric furnace movable on ways at an angle to the clampways, and intersecting the same at a distance from the anvil.

10. In a machine for welding and working metals, the combination of a pair of connected clamp-blocks, adjustable to and from each other, jaws thereon adjustable on the blocks, ways in which the clamp-blocks travel across the machine, an electrical furnace at one end of the ways, and a hearth beneath the furnace adapted to be adjusted in desired relation to the opening between the clamps.

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

CHARLES L. COFFIN.

Witnesses:
JAMES WHITTEMORE,
M. B. O'DOGHERTY.