(No Model.) 2 Sheets—Sheet 1.

C. L. COFFIN.

ELECTRIC METAL WORKING DEVICE.

No. 483,424. Patented Sept. 27, 1892.

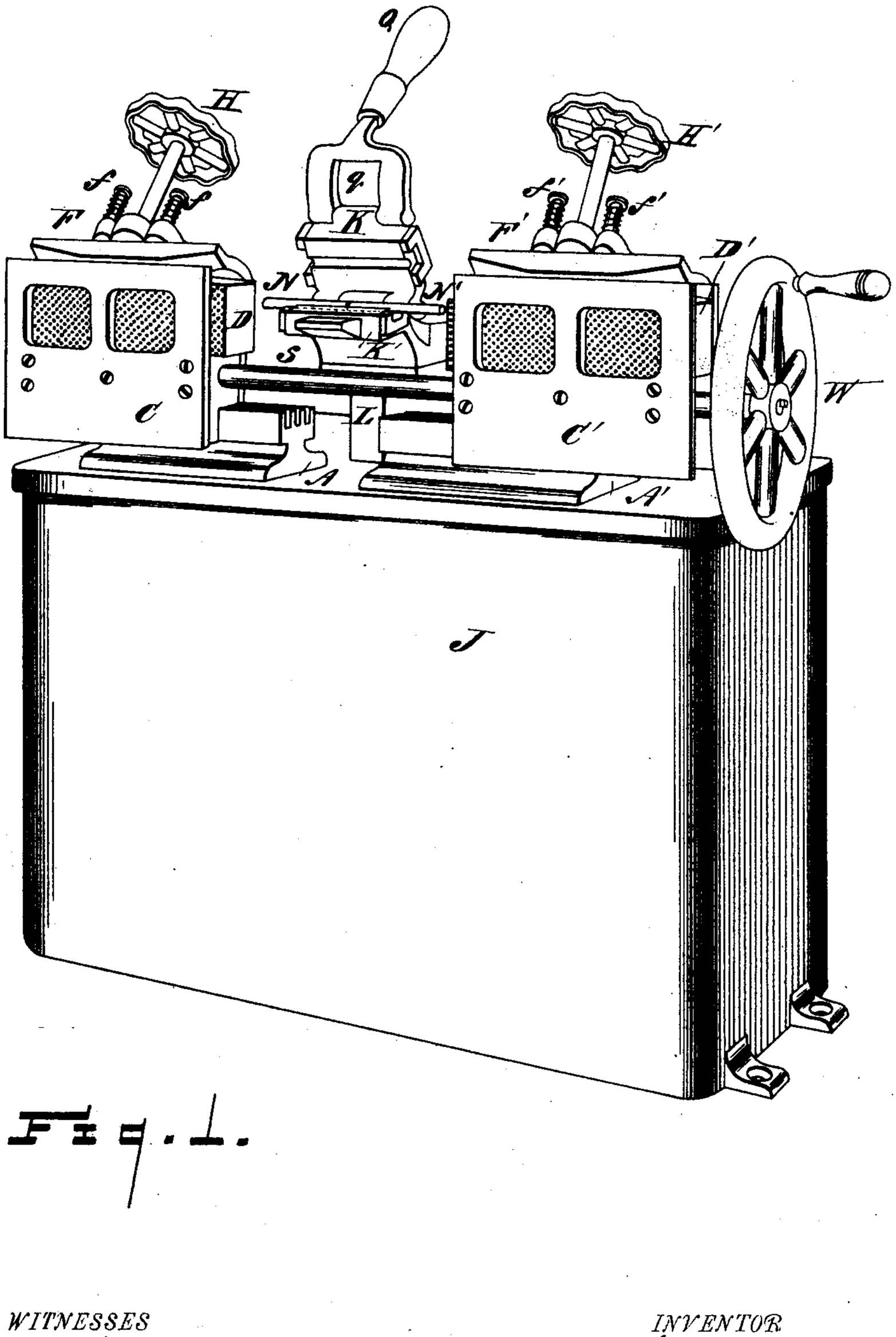

Fig. 1.

WITNESSES

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Fig. 2.

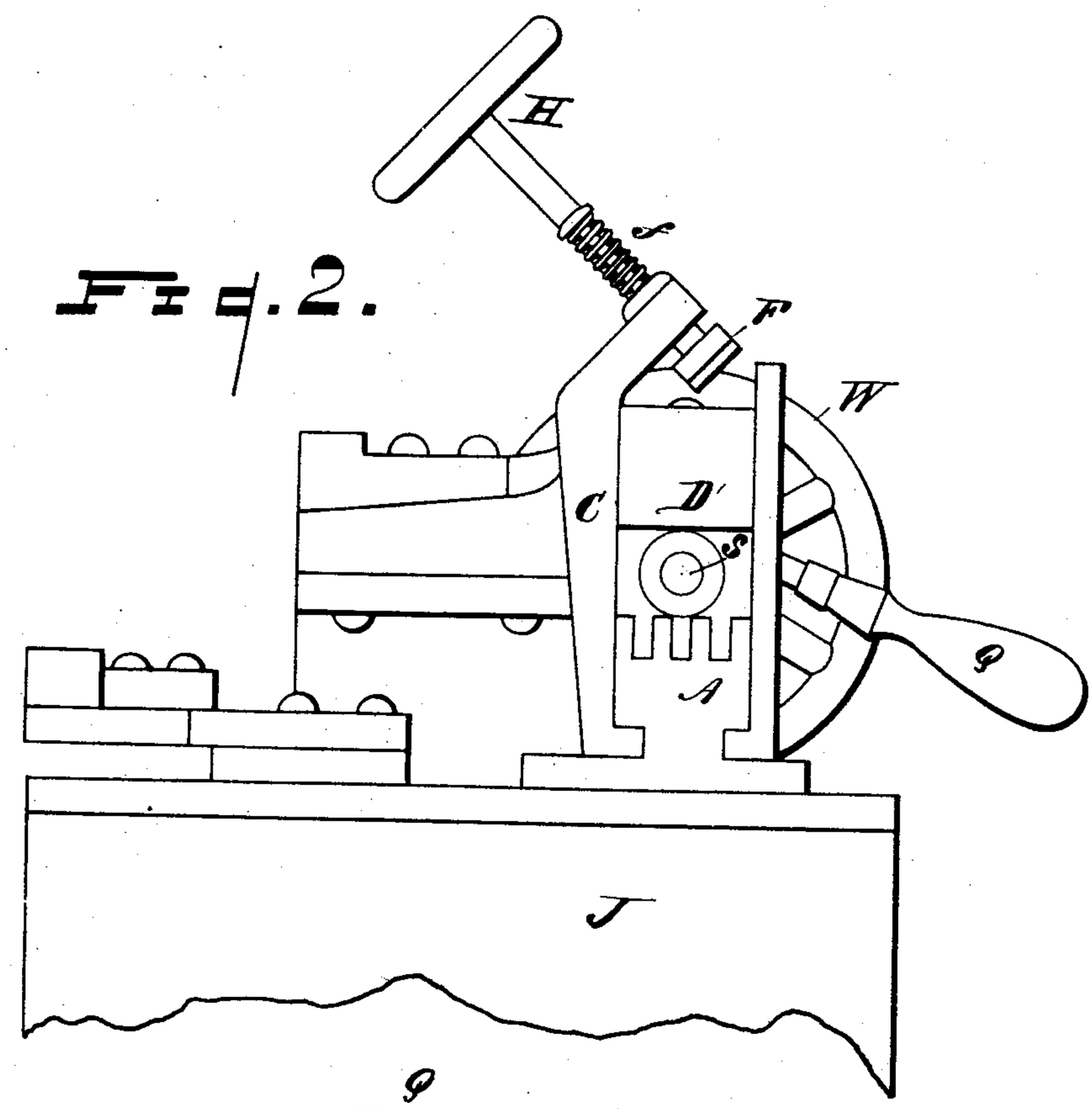


Fig. 3.

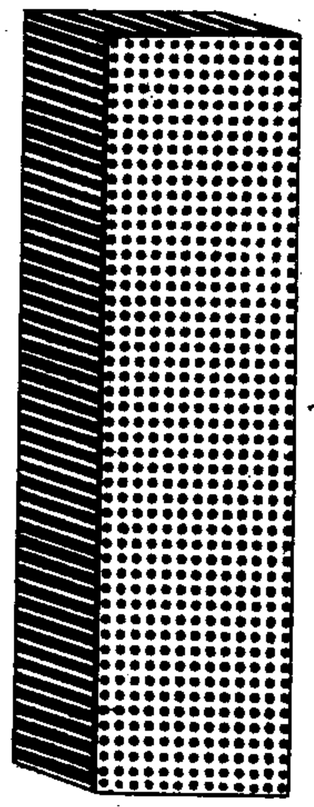
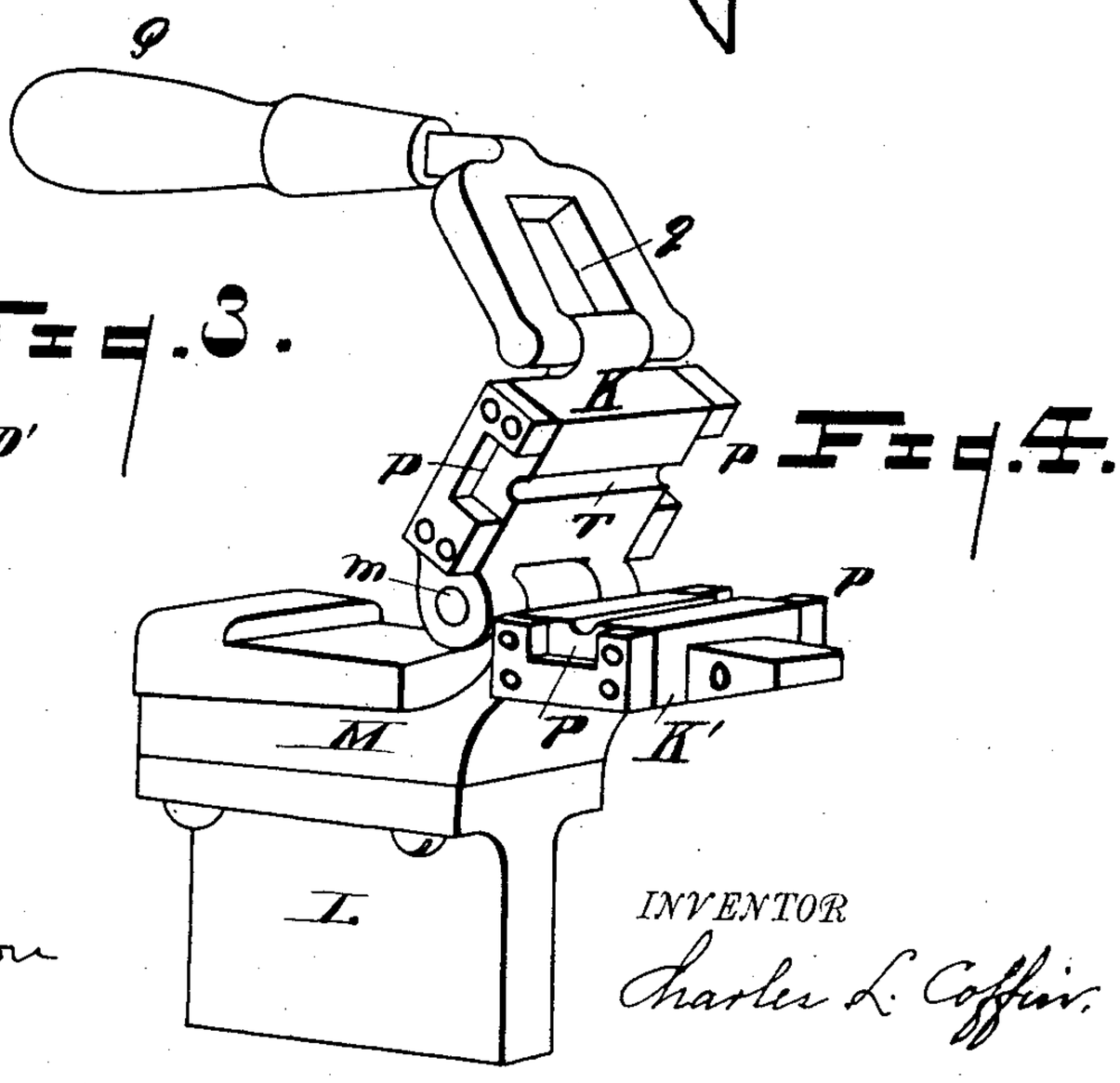


Fig. 4.



WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

CHARLES L. COFFIN, OF DETROIT, MICHIGAN.

ELECTRIC METAL-WORKING DEVICE.

SPECIFICATION forming part of Letters Patent No. 483,424, dated September 27, 1892.

Application filed December 11, 1891. Serial No. 414,713. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. COFFIN, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Electrically Working Metal, of which the following is a specification.

My invention consists in an apparatus for electrically working metal, hereinafter fully described and claimed. It is particularly adapted for forming heads on bolts or machine-screws and work of that kind.

Figure 1 is a front elevation of a complete machine. Fig. 2 is a side elevation with the base partly broken away. Fig. 3 is a perspective of one of the perforated clamping-blocks, and Fig. 4 is a perspective of the upsetting clamp and die.

J represents a frame in which is contained a transformer or converter of any known type, (this is so well known that I do not deem it necessary to illustrate the same,) whose secondary is open; but its terminals project above case J and are represented at A and A′.

C and C′ represent two movable blocks mounted upon the terminals A A′ of the secondary of the transformer and connected by a right-and-left-screw-threaded shaft S, provided with a hand-wheel W, by means of which said blocks C and C′ may be moved toward or away from each other. The screw-shaft S is insulated from said blocks to prevent completing the circuit of the secondary.

H and H′ represent two screw-shafts threaded through projections on the upper part of blocks C and C′ and each carrying a follower F F′, which is preferably guided by two guide-rods *f f* and *f′ f′*, around which I preferably place spiral springs, as shown in Figs. 1 and 2, to raise the followers automatically when the screw-bolt H H′ is retracted, though each screw-bolt may be swiveled to its follower, so as to actuate it positively in both directions.

D and D′ represent perforated blocks of metal, preferably copper, secured in blocks C C′, which serve the purpose of completing the circuit of the transformer-secondary through the articles to be worked. As there is a tendency in these blocks to heat when heating-currents are passed through them, I perforate them, as shown in Figs. 1 and 3, for the purpose of permitting free access of air through said blocks, and thus preventing their heating.

L represents a post secured to frame J and insulated therefrom.

M represents a support adjustably secured on post L and provided with a horn O, which projects between the blocks C and C′.

K and K′ represent two halves of a clamp, which are preferably pivoted together, as shown in Fig. 4, by the pin *m*, the lower one of which K′ is fastened on the support M in any convenient manner, while the upper part is provided with a pivoted handle Q and means for locking the two parts K K′ together. The means which I have illustrated for this is a slot *q*, formed in the lower end of handle Q, adapted to lock under projection O of support M; but any lock which will hold the two parts of the clamp firmly together may be substituted for the slot *q* and projection O shown.

T represents one-half of a groove formed in each part of the clamp K K′, of such size as when said die is locked together to firmly clamp between the two parts of the clamp the material to be worked. At one or both ends of the clamp I attach a die P P, of the shape and size to which it is desired to upset the material to be worked. It is of course fully understood by metal-workers that the clamps K K′ and the dies P will vary with each size and form of work which it is desired to do.

N N′, Fig. 1, represent two articles to be worked, which may be supposed to be bolts, on which heads are to be formed.

The operation of my invention is as follows: The rods N N′ being placed in the groove T of the clamp K′ with their ends projecting from said clamp a sufficient distance to furnish metal enough to form a head on each, the upper half K′ of the clamp is closed down and locked, thus firmly holding rods N N′ in position. By means of the screw-shaft S and hand-wheel W the blocks D D′ are now brought in contact with the ends of articles N N′, when an electric current from a suitable source is turned on and heating-currents are passed through blocks D D′ and articles N N′, the circuit between said articles N N′ when not in contact being completed by the clamp K K′. This heats the articles N N′ on their point of contact with blocks D D′, and when sufficiently heated the

screw-shaft S is rotated in such manner as to draw blocks C C′ D D′ together, thus upsetting the ends of articles N N′ into the dies P. As soon as this is done, the current is shut off, blocks C C′ separated, clamps K K′ opened, articles N N′ removed, a new article placed in the clamp, and the operation repeated.

Instead of using a transformer, the blocks C C′ or D D′ may be connected directly with the poles of a generator, or both of said blocks C C′ or D D′ may be connected with one pole of the generator and the clamp K K′ connected with the other pole, in the first of which cases the current will flow from block C or D through articles N N′ and out through block C′ or D′, or vice versa, while in the other case the current will flow from blocks C C′ or D D′ through articles N N′ into clamp K K′ and then out, or vice versa. It is evident that block C′ may be entirely omitted and that the block C may be connected with one pole of the generator and clamp K K′ with the other pole and only one article worked at a time; but it is just as easy to heat two bolts at one operation, and two bolts can be heated in practically the same time required to heat one.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an apparatus for working metal electrically, a clamp for holding the article to be worked and carrying a die, a movable conductor for applying pressure to the article to be worked when heated, and means for passing a heating-current through said article, substantially as shown and described.

2. In an apparatus for electrically working metal, the combination of two movable conductors, means for forcing said conductors together or apart, a clamp and die located between said conductors, and means for passing an electric current through said conductors and an article held in said clamp, substantially as shown and described.

3. In an apparatus for electrically heating metal by passing heating-currents therethrough, a conductor for making electrical contact with the article to be heated, provided with straight air-draft passages, whereby the conductor is kept cool, substantially as shown and described.

4. In an apparatus for electrically working metal, the combination of the movable blocks C C′, the screw-shaft S, perforated conductors D D′, secured in said blocks C C′, clamp K K′, held in line between said conductors D D′, and means for passing an electrical current through said conductors D D′ and the work held in clamp K K′, substantially as shown and described.

5. In an apparatus for electrically working metal, the combination of movable block C, perforated block D, clamp K K′, carrying the die P, and means for passing an electric current through block D, clamp K K′, and the article to be heated, substantially as shown and described.

CHARLES L. COFFIN.

Witnesses:
GERTRUDE H. ANDERSON,
GEO. H. LOTHROP.