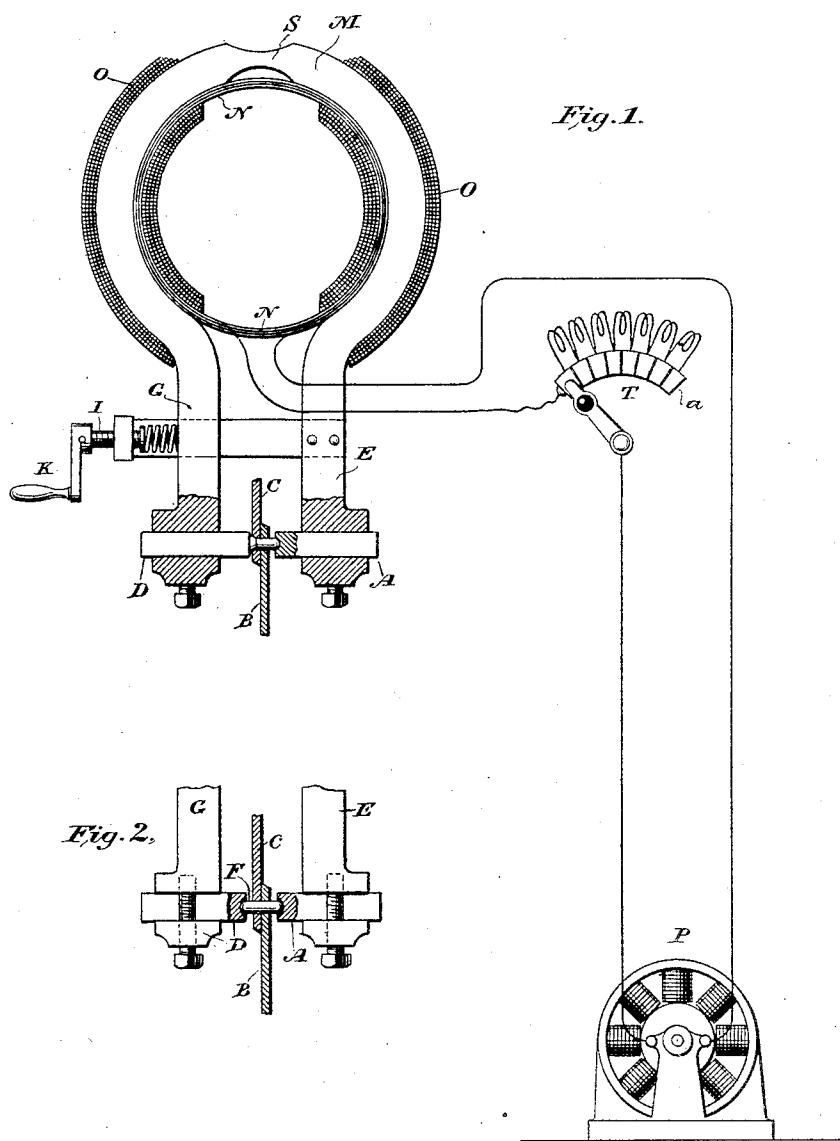


(No Model.)

E. THOMSON.
ELECTRIC RIVETING APPARATUS.

No. 580,475.

Patented Apr. 13, 1897.



Witnesses
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UNITED STATES PATENT OFFICE.

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ELECTRIC RIVETING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 580,475, dated April 13, 1897.

Application filed June 14, 1889. Serial No. 314,303. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Electric Riveting Apparatus, of which the following is a specification.

My invention relates to apparatus for setting or securing metallic rivets employed for fastening two pieces of metal or other material together.

The object of my invention is to provide an apparatus in which the heating effect of an electric current may be employed for heating and softening the rivet while in position in the work and may be immediately set or headed when sufficiently heated.

To this end my invention consists, essentially, in mounting the heading-tool and the anvil, or the part upon which the opposite ends of the rivet rests, upon the terminals of a bar or conductor forming the secondary of a converter. The anvil and tool are made massive and of any proper good conductor—such, for instance, as copper—and their cross-section or current-carrying capacity is made greater than that of the rivets which it is desirable to use with the apparatus.

In the accompanying drawings I have shown in Figures 1 and 2, in plan, forms of apparatus embodying my invention, together with the circuits and connections thereof.

A indicates a block or piece of metal, preferably of copper, of large mass forming the anvil of the apparatus and fastened or mounted on a suitable bar or support M E of conducting material, such as copper, constituting the second bar of a transformer.

B C indicate two plates or pieces of metal to be secured together by means of a rivet F.

D indicates another piece or block of metal fastened upon or forming the opposite head or end of the bar or rod constituting the secondary. The part D, in conjunction with A, forms the heading or setting tool of the apparatus and may be moved against the rivet F while in position between the anvil and tool by means of a screw I, provided with a suitable handle turning in an armor-support K, which forms an extension from the support E or is otherwise suitably supported.

The end of the screw I works directly against the arm G, carrying the tool D, or may work upon a spring interposed between the screw or support G.

The curved bar M E, of copper, forms the secondary of an induction-coil or transformer. The primary of said transformer (indicated at N) is made of a number of turns of insulated wire and is supplied with alternating current preferably from any suitable source P, such as an alternating-current generator. The circulation of the alternating currents in the coil N induces a current of great volume in the conductor M, which latter current passes from one pole to the other directly through the rivet F when the latter has been put in position between them, so as to bear at its opposite ends against said anvil and tool. The two conductors N M, forming the primary and secondary, may be wound with iron wire, (indicated at O,) for the purpose of increasing the efficiency of the induction-coil in the well-known manner.

In order to permit a movement of the anvil and tool relatively to one another, the secondary M may at the point S be thinned a little in order to cause it to be slightly springy, or the two sides of the conductor may be hinged together at such point.

The current passing through the tool, the rivet, and the anvil may be regulated in any desired way, by preference through some device which would change the strength of the current in the primary coil N. A suitable means for this purpose would be an artificial resistance T, interposed in the circuit between the primary and the generator P. The conformation given to the face of the anvil against which the rivet rests and to the heading-tool is immaterial.

When the rivet-blank is already headed at one end before being placed in position in the apparatus, the anvil may have a flat face or may have a face conforming to the already-formed head of the rivet. The tool should have a face properly formed to upset or swage the opposite end of the rivet into the desired form. In case the rivet is to be swaged or set into a countersunk opening in the pieces to be welded the face of said tool may be flat.

It is obvious that the rivet may be put into

the apparatus in the form of a plain blank, as shown in Fig. 2, and that both anvil and tool may have their faces where they grasp the rivet-heads hollowed out so as to form a rounded head on the rivet when the same is set by the operation of the apparatus. These are matters of detail in the conformation of the heading-tool and anvil which do not affect the nature of my present invention.

10 The apparatus is operated in the following manner: The screw I, having been turned so as to permit the tool and the anvil to be separated sufficiently, the pieces to be riveted together are introduced between the anvil and tool with the rivet or rivet-blank in position.

15 As before stated, the rivet may be a plain blank, as indicated in Fig. 2, or may be already headed at one end. When the rivet is in position, the screw I is turned so as to compress the rivet firmly between the anvil and tool, and the current is then turned onto the primary of the transformer. The artificial resistance may be gradually withdrawn from the circuit of the primary, thus gradually increasing the current-flow passing through the rivet and finally heating the same until it attains the temperature necessary for swaging or heading it. When this temperature is at-

tained, the screw I may be turned to force the tool strongly toward the anvil, thus setting the rivet in obvious fashion.

It is of course not necessary that the current should be turned gradually on, though that is the natural and proper manner, especially where rivets of very different sizes are employed. The general function of the artificial resistance is simply to regulate or govern the flow of current for the usual and obvious purpose.

What I claim as my invention is—

In an electric riveting apparatus, the combination with a transformer whose secondary is a bar or rod, of a metallic anvil secured to and supported upon one terminal of said bar, and a metallic heading-tool mounted opposite to the anvil upon the other terminal of said bar, substantially as and for the purpose set forth.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 25th day of May, A. D. 1889.

ELIHU THOMSON.

Witnesses:

JOHN W. GIBBONEY,
WM. J. HALL.