T. E. MURRAY & H. R. WOODROW.

ELECTRIC WELDING MACHINE.

APPLICATION FILED SEPT. 23, 1918.

1,295,787.

Patented Feb. 25, 1919.

3 SHEETS—SHEET 1.

Fig: 1.

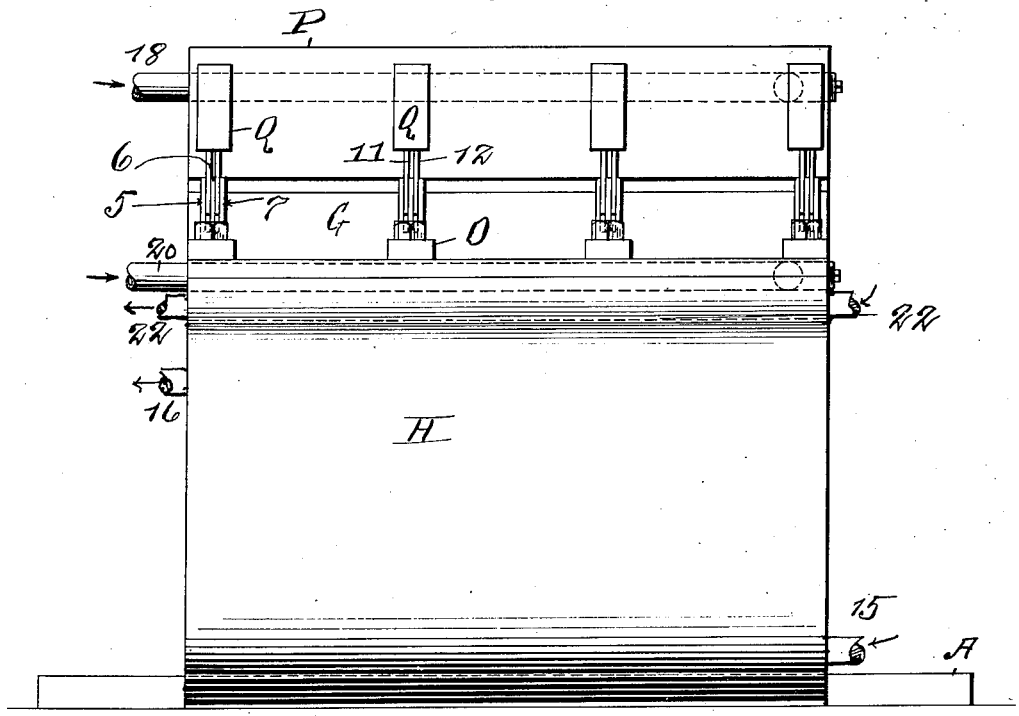
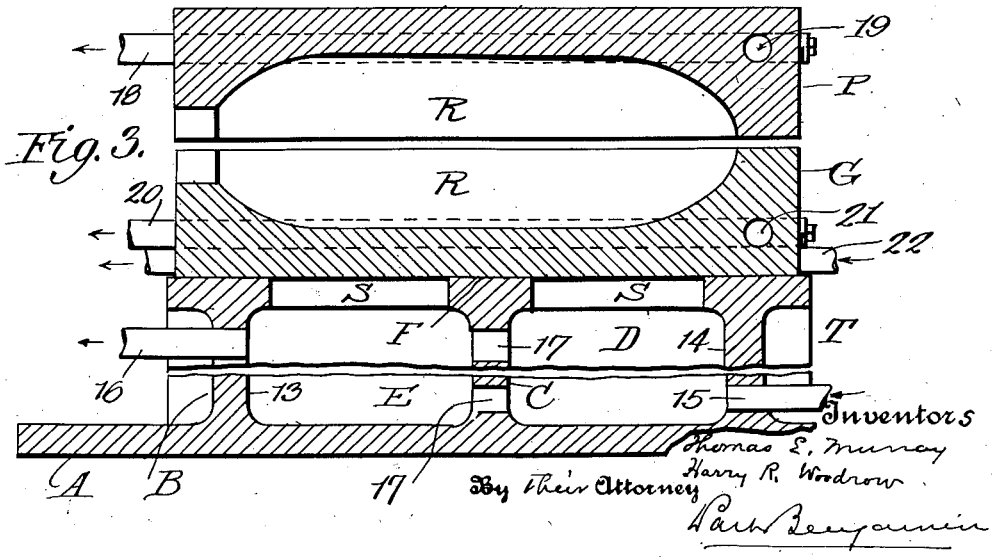


Fig. 3.



Inventors

Thomas E. Murray

Harry R. Woodrow.

By their Attorney

Paul Benjamin

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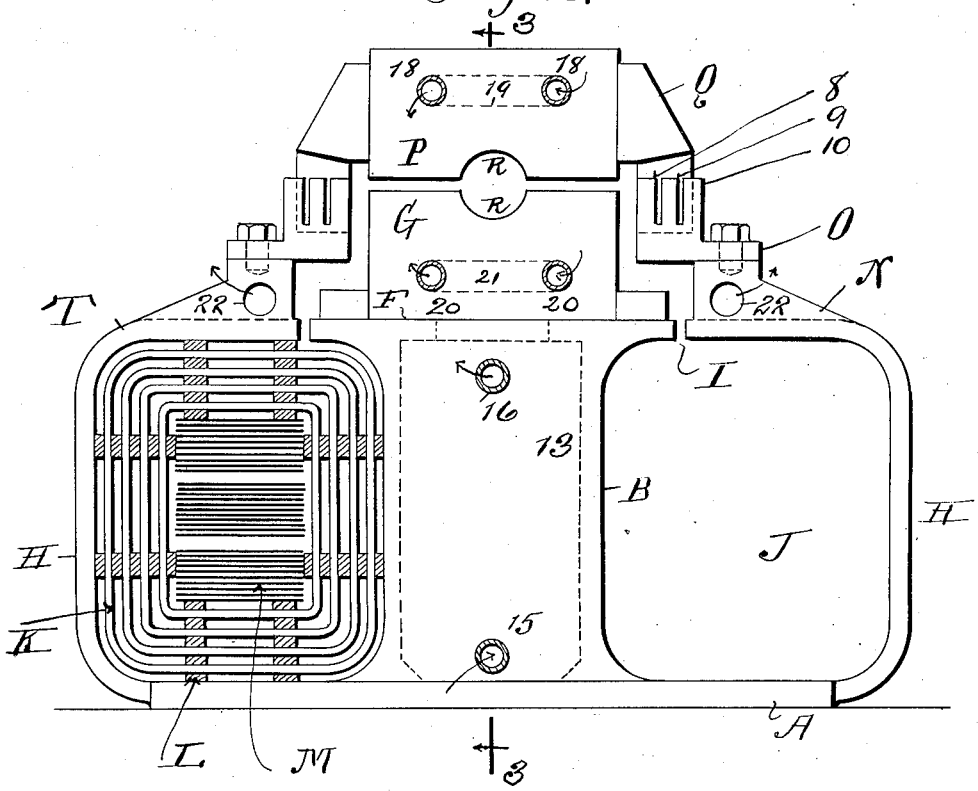
Fig. 2.



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3 SHEETS—SHEET 3.

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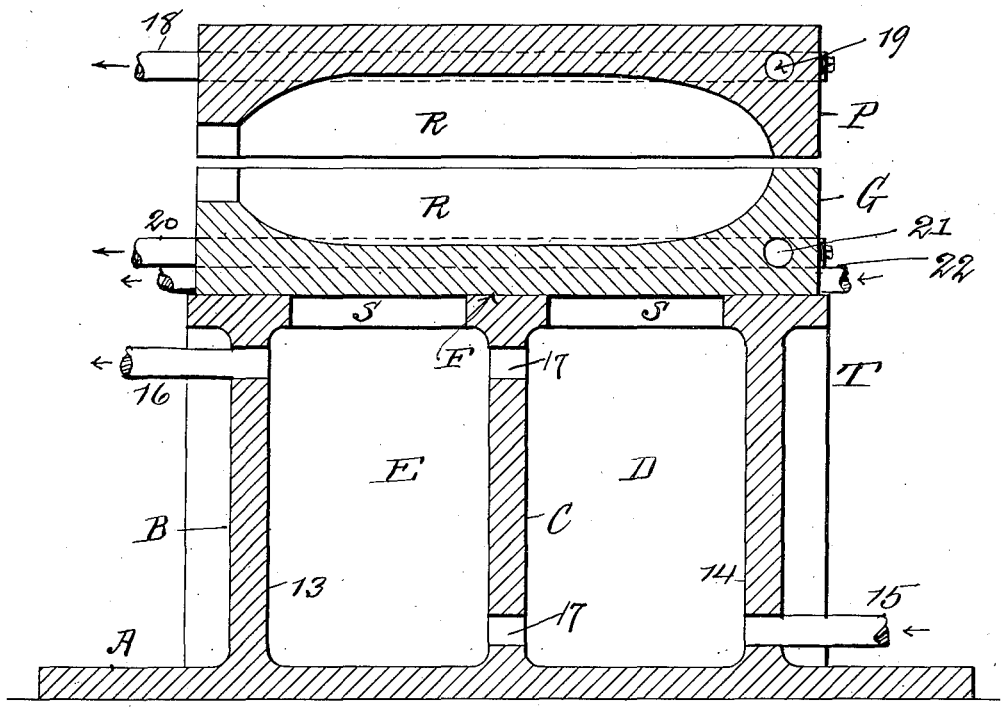

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UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY AND HARRY R. WOODROW, OF NEW YORK, N. Y.; SAID WOODROW ASSIGNOR TO SAID MURRAY.

ELECTRIC WELDING-MACHINE.

1,295,787. Specification of Letters Patent. Patented Feb. 25, 1919.

Application filed September 23, 1918. Serial No. 255,229.

To all whom it may concern:

Be it known that we, THOMAS E. MURRAY and HARRY R. WOODROW, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Electric Welding-Machines, of which the following is a specification.

The invention relates to electric welding machines, and more especially to the construction of the transformer and of the welding electrodes in machines wherein currents of very great strength are used, and where it is consequently necessary to provide effective means for cooling the parts and for closing circuit through the electrodes. The machine herein illustrated is in practical use welding elongated projectiles formed of two longitudinal half sections of struck-up sheet metal electrically united at their registering edges, and is operating under currents ranging from 5,000 to 30,000 amperes per square inch of welding surface. With such currents the danger of overheating is great, and it is also necessary to provide means for establishing circuit between the welding electrodes which can be depended upon to carry such currents without becoming destroyed.

Our present invention, therefore, consists first, in the construction of the transformer whereby it is effectively kept cool under the conditions before stated, and of the electrodes whereby they also are cooled; and second, of the contacts on the electrodes whereby the welding circuit is closed.

In the accompanying drawings—

Figure 1 is a side elevation of our electric welding machine. Fig. 2 is a front elevation. Fig. 3 is a vertical section on the line 3, 3 and is on a smaller scale than Fig. 2.

Similar numbers and letters of reference indicate like parts.

T is the transformer, the secondary of which comprises a base plate A, preferably integral with which is a middle standard B which is internally hollow and divided by the partition C into two compartments D, E. The top of standard B forms the table F, which supports the lower electrode G. To the side edges of base plate A are united the lower edges of side walls H, which side walls extend upwardly and are bent over inwardly, and are separated from standard B by gaps I, Fig. 2. In the compartments J included between said standard, base plate and side walls, and which are open at their ends, or in other words, substantially tubular (one of said compartments being shown empty in Fig. 2), is disposed the primary winding K of the transformer. The turns of said winding are separated by spacing blocks L, so that through said compartments and between said turns and around the core M, there are free passages for air, which may be forced in a current through said passages, by any suitable means not here shown. Upon the upper surfaces of the side walls H and preferably integral therewith, are elongated ribs N, upon each of which ribs are bolted four plates O. Each plate O carries three vertical spring contact plates 5, 6, 7, Fig. 1, each plate being preferably subdivided into three sections as shown at 8, 9, 10, Fig. 2. On each side of the upper electrode P and preferably integral therewith are four brackets Q. Each bracket Q carries two downwardly extending contact plates 11, 12, which when said electrode is in lowered or welding position enter between the spring contact plates 5, 6, 7.

The electrodes G, P as here shown, are designed to receive two longitudinal half sections of a hollow projectile and are, therefore, provided with recesses R, in which said half sections are respectively placed with their longitudinal edges in registry. In the table F may be openings S closed by the electrode G.

In order to cool transformer and electrodes, we provide as follows: In the front and rear walls 13, 14, Fig. 3, of standard B, are openings communicating with a fluid (preferably water) inlet duct 15 and an outlet duct 16; and in the partition C are openings 17 communicating with standard compartments D, E. Water entering at inlet duct 15 traverses compartments D, E and escapes at outlet duct 16. In this way the secondary is cooled, internally, by the water, while it is also cooled by the air passing through the passages between and around the turns of primary winding K.

In the electrode P are two parallel ducts 18, connected at one end by a cross duct 19, so that water entering one duct 18 will pass through the electrode and escape at the other duct. In electrode G are similar parallel

ducts 20, connected by a cross duct 21, for the same purpose. In each rib N is a duct 22, through which ducts water may also be caused to pass. The electrodes G, P and the ribs N are cooled by the water circulation through said ducts.

In operation the electrode P is raised by any suitable means; the sections of the projectile to be welded are seated in recesses R in said electrodes, and the electrode P is then lowered to cause the secondary circuit of the transformer to be closed by reason of the coöperating contacts 5, 6, 7 and 11, 12 through the said projectile sections, thus effecting the welding of said sections at their registering edges. During said operation, as already described, the electrodes are cooled by the water passing through the ducts therein; the transformer primary is cooled by the air current, and the transformer secondary is also cooled by said current and by the water circulation through the standard B and ribs N.

In order to distribute the welding current, as above stated, throughout the projectile sections with substantial uniformity, the coöperating contacts may be equidistantly placed, as shown in Fig. 1.

We claim:—

1. An electric welding machine comprising a transformer, a fixed electrode and an electrode movable with respect to said fixed electrode, the secondary of said transformer comprising a hollow standard having inlet and outlet ducts for water circulation and supporting said fixed electrode.

2. An electric welding machine transformer, the secondary thereof comprising a middle standard and side walls forming a compartment open at its ends on each side of said standard, and a primary winding disposed in said compartments, the turns of said winding being substantially parallel to the said compartment walls and having air spaces between them, whereby an air current may be caused to pass longitudinally through said compartments and between said turns.

3. An electric welding machine transformer, the secondary thereof comprising a hollow middle standard having inlet and outlet ducts for water circulation and side walls forming a compartment open at its ends on each side of said standard, and a primary winding disposed in said compartments, the turns of said winding being substantially parallel to the said compartment walls and having air spaces between them, whereby an air current may be caused to pass longitudinally through said compartments and between said turns and a water current through said hollow standard.

4. An electric welding machine comprising a transformer and a fixed electrode, and an electrode movable with respect to said fixed electrode, the secondary of said transformer comprising a middle hollow standard having inlet and outlet ducts for water circulation and supporting said fixed electrode, side walls united to the base of said standard and extending upwardly and inwardly and separated at their edges from said standard, a primary transformer winding disposed in the spaces included between said standard and said side walls, the turns of said winding being separated by air spaces, contact plates on side walls, and contact plates on said movable electrode, the said electrodes having recesses to receive the objects to be welded, and the secondary circuit of said transformer being established through said objects when said movable electrode is moved to bring the contact plates on said electrodes into coöperation.

5. An electric welding machine as in claim 4, the said secondary walls having parallel ribs upon which said first named contact plates are supported.

6. An electric welding machine as in claim 5, the said ribs having integral longitudinal ducts for water circulation.

7. An electric welding machine, comprising a movable electrode and a fixed electrode, the said electrodes being of elongated form, a plurality of contacts carried upon the longitudinal sides of said movable electrode, and fixed contacts disposed in proximity to said fixed electrode and corresponding in number to and coöperating respectively with said first-named contacts: the pairs of coöperating contacts being spaced apart to distribute the welding current with substantial uniformity throughout said electrodes.

8. An electric welding machine, comprising a movable electrode and a fixed electrode, the said electrodes being of elongated form, a plurality of brackets upon each side of said movable electrode, a contact on each of said brackets, fixed metal ribs disposed in proximity to opposite sides of and parallel to said fixed electrode, and contacts on said ribs corresponding in number to and respectively coöperating with said first-named contacts.

9. An electric welding machine, as in claim 8, the said brackets being integral with said movable electrode.

10. An electric welding machine, comprising a movable electrode and a fixed electrode, the said electrodes being of elongated form and having registering cavities wherein the objects to be welded are seated, a plurality of brackets secured upon each side of said movable electrode, depending contacts on each bracket, a transformer, ribs on the secondary of said transformer disposed on opposite sides of said fixed electrode and parallel thereto, plates removably secured on said ribs and corresponding in

number to said brackets, and contacts on said plates respectively coöperating with said first-named contacts.

11. An electric welding machine, comprising two electrodes in elongated form and receiving the objects to be welded between them, and circuit connections disposed successively along the length of said electrodes and separated at predetermined intervals apart: whereby the welding current is caused to be distributed in predetermined ratio throughout the welded joint.

In testimony whereof we have affixed our signatures in presence of two witnesses.

THOMAS E. MURRAY.
HARRY R. WOODROW.

Witnesses:
GERTRUDE T. PORTER,
MAY T. MCGARRY.