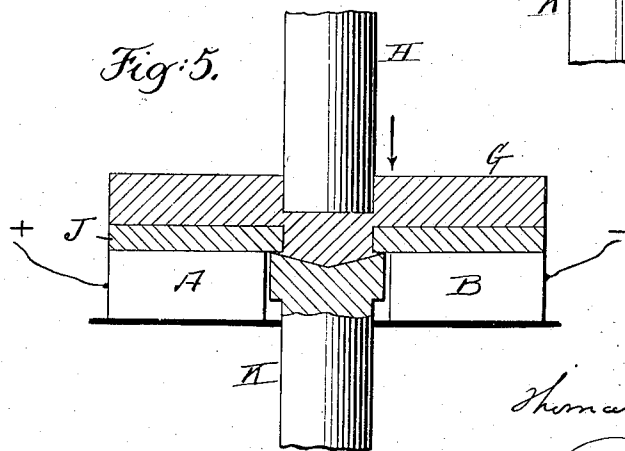
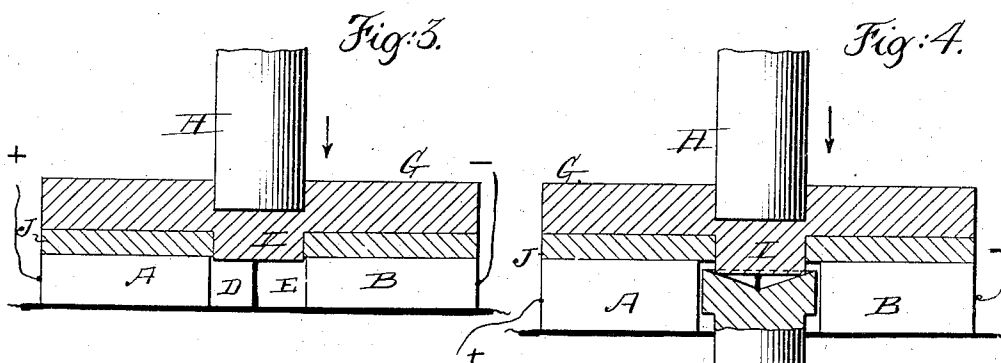
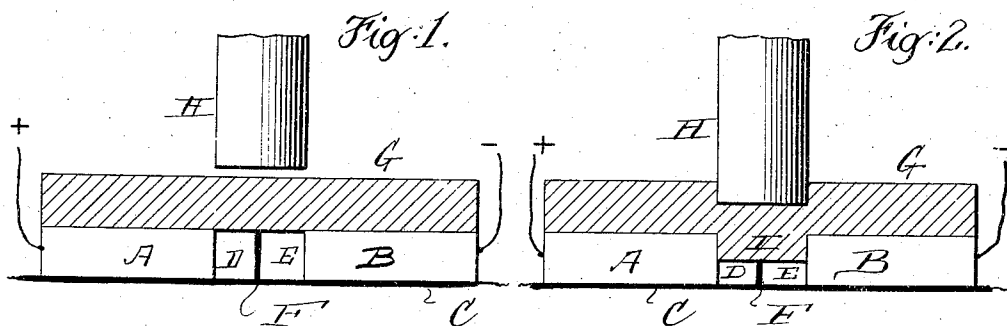


T. E. MURRAY, JR.
 METHOD OF PRODUCING INTEGRAL PROJECTIONS ON METAL PLATES.
 APPLICATION FILED OCT. 4, 1917.

1,252,289.

Patented Jan. 1, 1918.



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 BY
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UNITED STATES PATENT OFFICE.

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METHOD OF PRODUCING INTEGRAL PROJECTIONS ON METAL PLATES.

1,252,289.

Specification of Letters Patent.

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Application filed October 4, 1917. Serial No. 194,683.

To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, Jr., a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Methods of Producing Integral Projections on Metal Plates, of which the following is a specification.

The invention consists in an electrical method of forming an integral projection on a metal plate, and of electrically uniting a plate having said projection to a second plate. The invention also includes as a product of said method, two plates electrically united, one of said plates having an integral projection entering and secured in a corresponding opening in the other plate.

In the accompanying drawings—

Figure 1 shows in section the metal plate on which a projection is to be formed, with the electrodes and presser tool in elevation, the tool being in raised position. Fig. 2 is a similar view, showing the presser tool in lowered position and the extruded projection entering the opening between the electrodes. Fig. 3 is a similar view, showing the presser tool in lowered position, as in Fig. 2, and the extruded projection entering an opening in a plate to be secured by said projection to said first-named plate. Fig. 4 is a similar view, showing the end of the projection subjected to the action of a heading tool, and Fig. 5 is a similar view, showing the heading tool in place after completion of the projection head.

Similar letters of reference indicate like parts.

A and B are electrodes, preferably of copper, resting upon any suitable support or table C, preferably of insulating material. In the opposing edges of said electrodes are approximately semi-circular recesses D, E, which unite to form a substantially circular opening. Between said edges elsewhere are strips F of insulating material. The plate G, upon one side of which an integral projection is to be formed, is placed upon the electrodes A, B so as to cover the circular opening formed by recesses D, E. Circuit being established, said plate becomes heated, and the portion thereof over said opening is brought to a viscous state. A vertically moving cylindrical presser tool H having a flat circular bottom face is now forcibly brought down upon the said plate. Said

tool enters the viscid metal on the upper surface of said plate for a certain distance, and in so doing displaces a corresponding amount of metal on the lower surface of said plate, which displaced metal forms a projection I integral with the plate G, and enters the circular opening between the electrodes, as shown in Fig. 2.

Any desired number of similar projections may be formed upon the plate in like manner. Plates thus provided with projections may be used for a variety of purposes. For example, in Fig. 3, I show the projection I entering a hole in the plate J, to form a rivet for the attachment together of plates G and J. In this case, the plate J with a circular opening may be placed directly upon the electrodes, and the plate G disposed above said plate J. Circuit being established, and the presser tool being brought down, as before, the projection I is moved into the opening in plate J at the same time that it is formed, and will remain welded in place. If desired, however, I may form a head similar to a rivet head on the lower protruding end of projection I by means of an upwardly moving heading tool K striking said end while the same is still hot and plastic, as shown in Fig. 4. The head produced then takes the shape of the depression in the end face of tool K, as shown in Fig. 5.

I claim:

1. The method of producing an integral projection on a metal plate, which consists in electrically heating a localized portion of said plate to a viscous state, and then subjecting said localized portion to pressure and partial penetration over a predetermined area and on one side, whereby a quantity of metal corresponding to that displaced on said side is extruded on the opposite side.

2. The method of uniting two metal plates, which consists in producing on one of said plates an integral projection as set forth in claim 1, causing said projection to enter an opening in the other of said plates, and electrically welding said projection in said opening.

3. The method of uniting two metal plates, which consists in producing on one of said plates an integral projection as set forth in claim 1, simultaneously causing said projection to enter an opening in the other of said plates, and electrically welding said projection in said opening.

4. The method of uniting two metal plates, which consists in producing on one of said plates an integral projection as set forth in claim 1, causing said projection to enter and
5 project beyond an opening through the other of said plates, and heading over the protruding end of said projection while in a heated state.

10 5. Electrically united plates, one of said plates having an integral projection entering a corresponding opening in the other plate and electrically welded therein.

6. Electrically united plates, one of said plates having an integral projection passing through a corresponding opening in the
15 other plate, the protruded end of said projection being headed over upon said last-named plate.

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

THOMAS E. MURRAY, Jr.

Witnesses:

GERTRUDE T. PORTER,
MAY T. MCGARRY.