

R. BARRIE.
Reproducing Objects by Electricity.
No. 218,473. Patented Aug. 12, 1879.

Fig. 1.



Fig. 2.

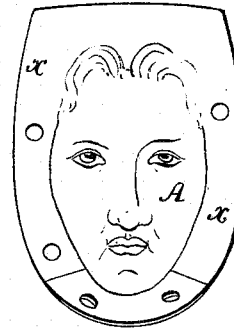


Fig. 3.

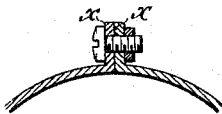


Fig. 4.

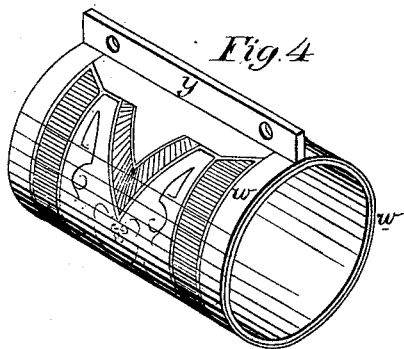
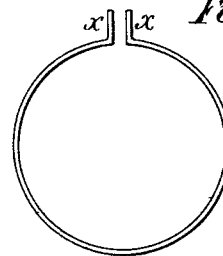


Fig. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

ROBERT BARRIE, OF CHELSEA, MASSACHUSETTS.

IMPROVEMENT IN REPRODUCING OBJECTS BY ELECTRICITY.

Specification forming part of Letters Patent No. **218,473**, dated August 12, 1879; application filed May 15, 1879.

To all whom it may concern..

Be it known that I, ROBERT BARRIE, of Chelsea, Massachusetts, have invented a new and useful Improvement in Reproducing Objects, of which the following is a specification.

My invention relates to the production of metallic copies of busts and other undercut objects; and my invention consists in first obtaining an electro-deposited hollow mold, severed or in sections, from the object, and then electro depositing metal on the interior of the mold, this deposit being a metallic reproduction of the original, and the same mold being used for the production of as many copies as may be desired.

My invention further consists of the hollow electro-deposited mold made in sections, and of the manner, described hereinafter, of forming flanges on the sections.

In the accompanying drawings, Figure 1 is a side view of a bust with part of the mold attached to the same to illustrate my invention; Fig. 2, a front view of one of the sections of the mold; Fig. 3, a sectional view, showing the flanges of the sections; and Figs. 4 and 5, views illustrating a mode of making copies of a napkin-ring by my invention.

Supposing that, in carrying out my invention, I select for reproduction the bust shown in Fig. 1, which may be of bronze, Parian, or plaster. The first step in the process is to divide the surface of the bust into a number of sections, the dividing-lines being such as the general conformation of the bust, the disposal of the drapery, hair, &c., and the undercutting of different parts of the bust may suggest as the proper course, in order that a coating of metal deposited on any one of the sections may be removed without bending or distorting it.

In the bust shown in the drawings, for instance, it would be necessary to divide the surface into twelve sections, one being the face-piece A, a front view of which is shown in Fig. 2; one, B, for the front of the neck and under part of the chin; one for the front D of the bust, including the front of the shoulders and drapery; one for the back E of the lower part of the bust; two, F F, for the lower portion of the back of the head and back of the

shoulders; two, G G, for the back of the head; two, H H, for the top of the head, and two ear-pieces, I I.

It will be understood that more or less than this number of sections may be required, according to the character of the bust or other object of which the copy has to be made.

I next prepare the surface of the bust so that it will stand a sulphate-of-copper solution, and then proceed to cover certain of the sections with a thick layer of wax, leaving as many sections as possible uncovered, but taking care that a section of wax intervenes between any two of the uncovered sections.

The uncovered sections and the edges of the layers of wax adjacent thereto are then coated with a film of plumbago or bronze-powder, or otherwise prepared for a non-adhesive deposit, and the bust is then placed in the bath, in which it remains until the desired thickness of copper has been deposited.

The bust is then removed, when it will be found that each of the sections not covered with wax has a coating of copper deposited upon it, and that each of these deposits has on all sides a flange due to the deposit of copper upon the edges of the layers of wax adjacent to said uncovered section.

Each of the deposits of copper is now covered with wax to prevent further deposition, leaving the faces of the flanges, however, free from wax. The layer of wax is then removed from such of the other sections as now have to receive a deposit, the faces of the flanges adjacent to these sections being prepared for a non-adhesive deposit. The bust is then again subjected to the bath until the desired deposit of copper has been made, when it is removed and treated as before, the operation being repeated until all of the sections into which the surface of the bust has been divided have received a deposit of copper, each deposit being bordered with a flange, *x*, of the desired depth.

Before removing the sections from the bust the flanges should be drilled, so as to form openings for the reception of steadying-pins and screws or bolts, by means of which the sections may be fastened together, as shown in Fig. 3.

Strips of metal may, if desired, be soldered

to the backs of the flanges *x* before the latter are drilled, the object of these strips being to stiffen and strengthen the flanges.

After the sections have been detached from the original bust and secured together without the intervention of the said bust, there will be a complete mold, the interior of which will be of the exact conformation of the bust.

All that is now necessary to make a counterpart of the original bust is to coat the exterior of the mold with wax, or other like material incapable of receiving a metallic deposit, and suspend the mold in an electroplating-bath, when a coating of metal will be deposited in the interior only of the mold. When this coating is of the desired thickness, the mold may be removed from the bath, and when the several sections are detached from each other, an exact counterpart of the original bust will be presented, a little trimming only being necessary to make the reproduced bust complete.

It will be understood that before the mold is subjected to the electroplating-bath its interior must be so prepared that there can be no adhesion of the electro-deposited metal to the metal of the mold.

In putting the sections together it is advisable to interpose a thin coating of wax between the joints.

The flanges *x* have twofold objects. They afford the means of securing the sections together, and at the same time so strengthen the sections that they cannot be easily distorted.

To reproduce simple objects—such as napkin-rings, &c.—the preferable mode of procedure is as follows: The exterior surface of the ring is prepared for receiving a metallic deposit, the interior of the ring being coated with wax or other material, the latter extending beyond each end of the ring. The ring thus prepared is subjected to the bath, and a deposit, *w*, of copper formed on the same. A strip, *y*, of metal, having suitable holes therein, is then soldered to the coating *w*, as in Fig. 4, and this strip and the coating is then severed, as in Fig. 5, so that the coating can be sprung apart in order to permit the withdrawal of the ring, the split strip forming the flanges *x* of the mold, which is now ready to

be used for making copies of the original ring in the manner above set forth.

If a number of molds of the ring are desired, a copy may be taken from the mold, Fig. 5, when the latter is sprung apart, as shown, and from the copy thus obtained other molds, with flanges complete, can be readily made, wood or slate pins being inserted into the holes in the flanges prior to subjecting the mold to the action of the bath, so as to insure the formation of openings in the flanges formed by the deposit.

Other modes of making the molds than those above set forth may be adopted. Thus the bust shown in Fig. 1 may be completely covered by the deposit, and the latter may then be cut on the proper lines, so as to permit the removal of the sections, to which flanges are afterward soldered; or thin strips of wax may be secured to the bust on the lines dividing the sections, so that in subjecting the bust to the action of the bath a deposit will be made on both sides of the strips, thus forming flanges around the different sections of the mold.

I claim as my invention—

1. The mode herein described of producing metal copies of busts and other undercut objects, the said mode consisting in first obtaining an electro-deposited hollow mold, severed or in sections, from the object, as described, and then electro-depositing metal in the interior of the mold, as set forth.

2. The mode herein described of forming flanged sections of a hollow mold for reproducing objects—that is to say, bordering that part of the object from which the section of a mold has to be made with wax or like substance, and then electro-depositing metal on the surface of the object within the border and on the border itself, substantially as set forth.

3. The within-described hollow electro-deposited mold, made in sections, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT BARRIE.

Witnesses:

JOHN KELDIE,
JAMES ROBERTSON.