W. E. WORTHEN & R. S. GILLESPIE.

Electroplated Figures, &c.

No. 168,442. Patented Oct. 5, 1875.

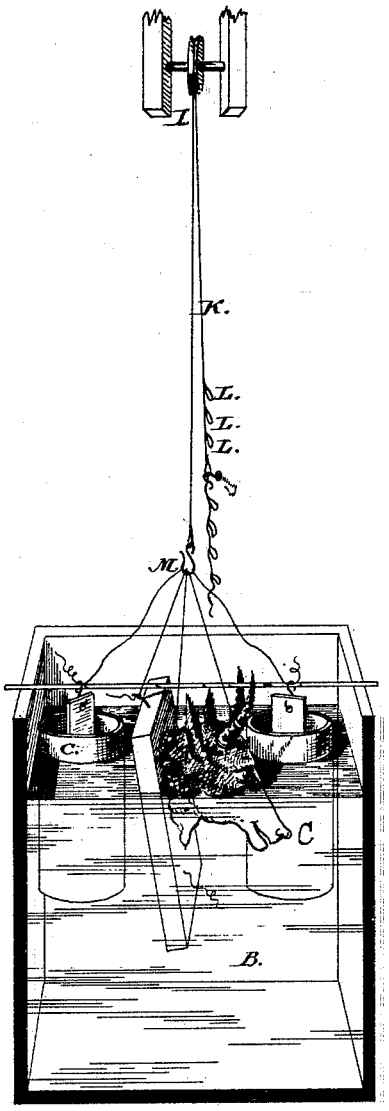

Fig. 1.

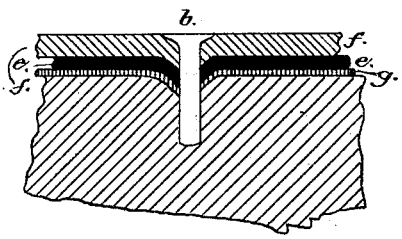

Fig. 3.

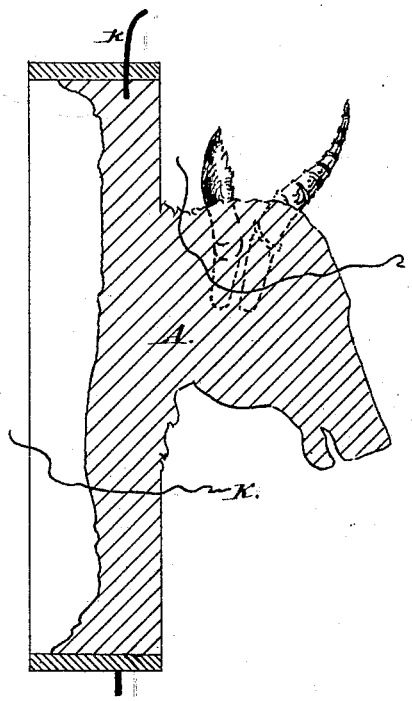

Fig. 2.

Witnesses,

John Buckingham.

Wm. C. Dey.

Inventors,

W. E. Worthen and
R. S. Gillespie
by their attorney
Thomas D. Stetson

UNITED STATES PATENT OFFICE.

WILLIAM E. WORTHEN AND RICHARD S. GILLESPIE, OF NEW YORK, N. Y.

IMPROVEMENT IN ELECTROPLATED FIGURES, &c.

Specification forming part of Letters Patent No. **168,442**, dated October 5, 1875; application filed February 19, 1875.

CASE B.

To all whom it may concern:

Be it known that we, WILLIAM E. WORTHEN and RICHARD S. GILLESPIE, both of the city, county, and State of New York, have invented certain new and useful improvements in electroplating iron or composition ornaments or figures for architectural or domestic use, of which the following is a specification:

The following is a description of what we consider the best means of carrying out our invention.

The usual cyanide process of electroplating articles of metal requires the surfaces to be first cleaned or brightened by chemical or mechanical means. Iron or zinc cannot be coated directly with copper in a sulphate-of-copper solution, as the acid of the solution has greater affinity for the iron or zinc than for the copper. Many attempts have been made to prepare and protect iron or other metals, so that they could be covered with a coat of copper in a sulphate-of-copper solution by means of electro-deposition.

By recent experiments we have proved that by carefully and evenly coating the object with a paint composed of either the sulphides or oxides of mercury, mixed with oil or some other water-proof vehicle, a conducting-surface is obtained which is not acted upon by the acids of the electroplating-bath, and upon which the metal is deposited with greater rapidity and continuity than when prepared with any other composition known to us.

The theory of its action is probably as follows: When an article is prepared with the above-described mercurial paint, preferably the red oxide, alone or mixed with the sulphide, then covered with plumbago, then placed in a bath and connected with a battery, the electrical current sets free the metallic mercury, which collects in numerous spots, which spots act as so many metallic conductors and adhesive connections. No such result can be obtained from any other metallic oxide known to us; but this we do not claim.

To further facilitate the deposition, and to make the shell still more adherent, we insert into the metallic object small pieces of copper, or of some other metal which is a good conductor of electricity, and not acted upon by acid solutions. The projecting portions of these inserted pieces we amalgamate with mercury, connecting as many of these as are required with the electrodes of the battery, which causes the deposited copper to adhere to them. When the article is finished the projecting plugs are cut off even with the shell.

In some cases, when operating on metal, we slightly countersink before inserting the plugs, and when the object is finished we cut them off, leaving sufficient to hammer up and fill the countersink, thus forming a rivet which assists in holding the shell in close contact.

In some cases we make a sufficiently strong and very desirable core or body for our figures by pouring into a metallic mold, such as is used in the manufacture of the finest castings of zinc, a hot mixture of a good conductor of electricity, as coke, charcoal, or plumbago in a powdered state, united by a cementing material which is practically non-absorbent of water or solutions. From our experiments we prefer, for cheapness, strength, and conductibility, pulverized coke and asphalt. These materials are mixed, while hot, in proportions somewhat dependent on the fineness of the coke-dust and sharpness required in the casting—the greater the proportion of the coke with a free flow of the mixture, the more the conductibility of the surface of the article under the process of electroplating. When the articles are made of such plastic composition we cast in the mass copper wires, allowing the ends to project more or less beyond the surface. We prepare and use these wires like the plugs or rivets before mentioned in figures of metal.

In preparing the articles for the bath we at first coat only the re-entering angles or the recessed surfaces with plumbago, thus making only those portions highly conductive, and by this means securing first a deposit on those places most difficult to cover. We afterward plumbago another portion, and so on. When the pieces are large we make at first only a partial immersion, and then gradually increase it, moving up the electrodes as we

proceed, by changing the connecting-wires from given plugs or attachments to others higher up. We do this because it is difficult, with a moderate battery, to secure a uniform deposit over a large surface. When we cover a large piece which is already erected—as, for instance, a fountain—we inclose it in a suitable tank and gradually allow the solution to rise, at the same time moving up the battery and electrodes.

The shell deposited is thicker than that of the usual cyanide process, ours being usually about one-fiftieth to one-thirty-second of an inch thick. It can be made much heavier on some subjects, care being taken not to destroy the artistic expression of the figure. The deposit is firm and glove-like in its close fit upon the casting.

The within-described casting covered with an electrotype-shell, and the process of forming electrotype figures by plating upon such casting, which latter has a wooden plug inserted in it, are made the subject of another application filed by us February 20, 1875.

The accompanying drawings form part of this specification, similar letters in each being employed to designate corresponding parts.

Figure 1 is a perspective view, representing a means of carrying out the invention. Fig. 2 is a section through a figure of composition, showing both the cathode-wires through the same, and the rivets or plugs. In practice we rarely apply both to the same figure. The rivets are only useful on metallic articles, except in rare instances. Fig. 3 is a magnified section of an electroplated metal surface, showing the plug hammered down to serve as a rivet.

A is the core or body; B is the bath; C C are inside batteries; I is a pulley; K is a rope; L, rings attached thereon; M, a hook. *a* is the paint; *b*, the plugs or rivets; *e*, the plumbago; *f*, the plating; *k*, cathode-wires.

The amalgamation of the wires is important to secure a perfect adhesion or soldering of the electroplate to the wires or plugs.

We claim as our invention—

1. The plugs or rivets *b b*, amalgamated to secure an adhesion or soldering of the electroplating to the same, in combination with the electrotype-shell *f* and body A, as and for purposes specified.

2. The cathode-wires *k k*, extending through the body A, to both increase the conduction of electricity and strength of the figure, in combination with the electrotype-shell *f* and said body A, as specified.

In testimony whereof we have hereunto set our hands this 2d day of February, 1875, in the presence of two subscribing witnesses.

WILLIAM E. WORTHEN.
RICHARD S. GILLESPIE.

Witnesses:
EUGENE LEBEUF,
JEAN BAPTISTE MARGET.