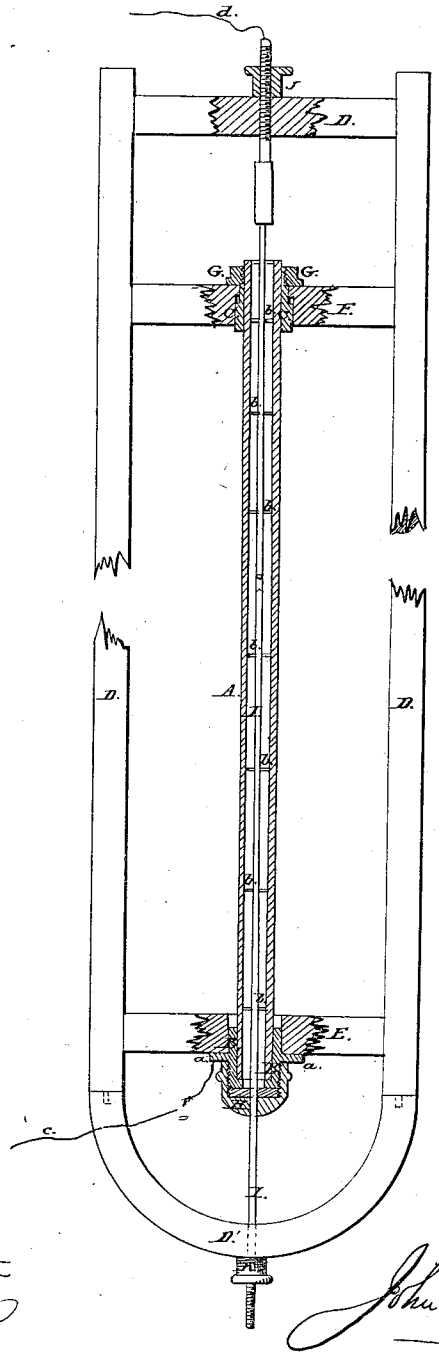
# J. Matthews, Jr.

## Coating Metals.

No. 28,690. Patented Jun. 5, 1860.




Witnesses:
W. Huntington
B. Groux

Inventor:
John Matthews Jr.

# UNITED STATES PATENT OFFICE.

JOHN MATTHEWS, JR., OF NEW YORK, N. Y.

## IMPROVEMENT IN GALVANO-PLASTIC COATINGS OF THE INTERIOR OF METALLIC TUBES.

Specification forming part of Letters Patent No. **28,590**, dated June 5, 1860.

*To all whom it may concern:*

Be it known that I, JOHN MATTHEWS, Jr., of the city, county, and State of New York, have invented certain new and useful Improvements in the Process of Coating the Interior of Lead and other Tubing with Silver by Voltaic Deposition; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, said drawing representing a central vertical section view of a piece of tubing and the apparatus employed in silvering its interior.

Many attempts have been hitherto made to silver the interior of lead and other tubing employed in mineral-water apparatus, and for other purposes, by the voltaic process; but it has hitherto been found impossible to effect a uniform deposition of the silver throughout the whole length, or even to obtain any deposition beyond a short distance from the ends of the tubing.

The object of my invention is to obtain by such process a uniform deposition of the silver on every part of the interior of a piece of tubing of any length; and to this end my invention relates to the employment as the bath or decomposition-cell of the tube itself, and to the use, for the purpose of conducting the galvanic current and for replenishing the supply of the coating metal, of a rod or wire, passing through the tube in the direction of its length.

It consists, first, in the extension or stretching of the tube and central conductor by means of screw-threads and nuts, or their equivalents, attached to their ends, for the purpose of keeping them straight, and thereby providing for the more ready insertion of the central conductor within the tube and for the prevention of metallic contact; secondly, in the use of non-conducting supports between the interior of the tube and the exterior of the central conductor, for the purpose of preventing the conductor coming in contact with the tube and preserving a uniform distance between them in all parts; thirdly, in providing for the movement of the central conductor and its non-conducting supports within the tube to permit the deposition of the metal on all parts of the interior of the tube, which could not take place if the supports were stationary.

To enable others skilled in the art to apply my invention, I will proceed to describe it with reference to the drawing.

A represents a piece of lead tubing, which may be of indefinite length, undergoing the silvering process on its interior surface. It has temporarily attached, by soldering or otherwise, at its lower end, a flanged socket, B, and at its upper end a socket, C, and each of the said sockets has a screw-thread cut on its exterior, the thread on the lower socket being below the flange *a*.

D D′ E F is a strong framing somewhat longer than the piece of tubing. The sockets B and C are fitted to the cross-pieces E and F of the framing, and the flange *a* of the lower socket, B, bears against the bottom of the cross-piece E, and a nut, G, is applied to the screw-thread of the upper socket, C, above the cross-piece F, for the purpose of stretching or extending the tube to a perfectly straight condition. The tube should be kept as nearly as practicable in an upright condition. The lower socket, B, is closed by a stuffing-box, H, through which passes the central conducting rod or wire, I, which passes longitudinally through the tube. The gland of this stuffing-box should be of hard india-rubber or other non-conducting substance, or bushed with such substance, to keep the conductor I insulated from the tube. The said conductor I is considerably longer than the framing, so that it may extend through the ends thereof, and has screw-threads cut on its exterior for a considerable distance from its ends, and these screw-threads are fitted with nuts J and K outside of the two ends of the framing, said nuts serving to keep the conductor stretched or extended perfectly straight and out of contact with the tube, and also serving, by unscrewing one away from the framing and screwing the other toward it, to move the conductor longitudinally within the tube. The central conductor, I, may be of solid silver, or of copper coated with silver, as I propose to make it serve not only as a conductor, but as a means of replenishing the supply of silver for coating the interior of the tube, and if made of copper coated with silver its coating will require to be renewed after one or more tubes have been coated. The bottom piece, D′, of the framing is made movable to afford convenience for inserting the tube and central conductor.

*b b* are rings, of india-rubber or other non-ducting material, fitted tightly to the exterior of the conductor I at suitable distances apart, and fitting loosely to the interior of the tube A, constituting the supports for keeping the conductor out of contact with the tube. Instead of these rings, a strip of india-rubber may be wound spirally round the central conductor for the same purpose.

*c* represents a wire for connecting the positive pole of the battery with the lower end of the tube *a*, and *d* represents a wire for connecting the negative pole of the battery with the upper end of the central conductor.

The process is conducted in the following manner: The tube, having had the sockets B and C attached to it, is placed in the framing from the bottom thereof, while the bottom piece, D′, is removed therefrom, and extend to a straight condition by screwing down the nut G. The central conductor, I, with the supporting-rings *b b* upon it, is then passed through the tube from the bottom and through the top piece of the framing, and the gland of the stuffing-box H applied and screwed up, after which the bottom piece, D′, of the framing is put on, and the nuts J and K put on the conductor and screwed up closely to the framing, to stretch or extend the conductor to a perfectly straight condition. The tube is then filled up with the solution of silver, and the connections between the tube and conductor with the battery made by the wires *c* and *d*, as before described, and the deposition of the silver in the interior surface of the tube A immediately commences, the deposit being uniform on every part of the said surface, except where the non-conducting supports *b* come in contact with it, and as no deposit, or a very imperfect deposit, takes place on those parts, the conductor I is required to be frequently moved in a longitudinal direction to change the position of the said supports. This may be effected by unscrewing one of the nuts J K and screwing the other up or down by hand, as may be required; or a continuous movement of the said conductor and its non-conducting supports may be effected by some suitable mechanism applied to the nuts or applied to the conductor in any other way. By the constant or frequent shifting of the non-conducting supports within the tube, as above described, the deposit of silver on the interior of the tube may be made of uniform thickness on every part covered by the silver solution, and such deposit may be made of such thickness as may be desired, according to the length of time that the process may be continued, the time necessary being determined by practice.

A quantity of solution may be poured into the tube at the top as often as is necessary to make up for any loss by evaporation or the evolution of gases, in order that the deposit may extend to the top, or as nearly as practicable to the top, of the tube. The deposit of silver on the interior of the tube is represented in the drawing by bright red color.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The extension or stretching of the tube by screw-threads and nuts, or their equivalents, substantially as and for the purpose herein set forth.

2. The use of non-conducting supports *b b*, applied substantially as and for the purpose herein specified.

3. Providing for the longitudinal movement of the central conductor and its non-conducting supports *b b* within the tube, substantially as and for the purpose herein set forth.

JOHN MATTHEWS, JR.

Witnesses:

B. GIROUSE,

M. M. LIVINGSTON.