No. 695,635. Patented Mar. 18, 1902.

E. EMERSON.

PROCESS OF MAKING METAL TUBES.

(Application filed July 28, 1899.)

(No Model.)

Fig. 1.

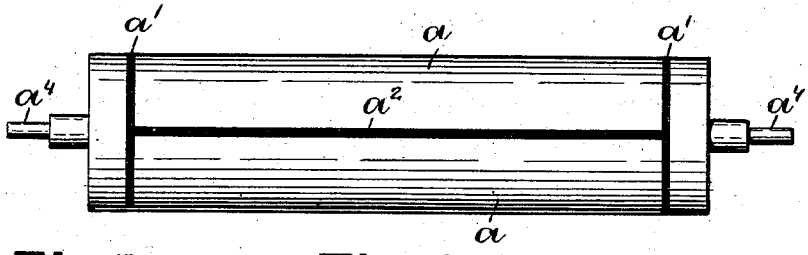


Fig. 2.

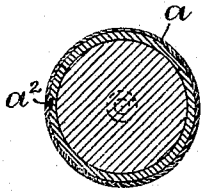


Fig. 3.

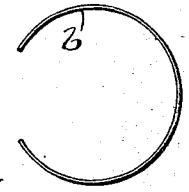


Fig. 4.

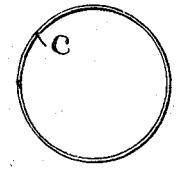


Fig. 5.

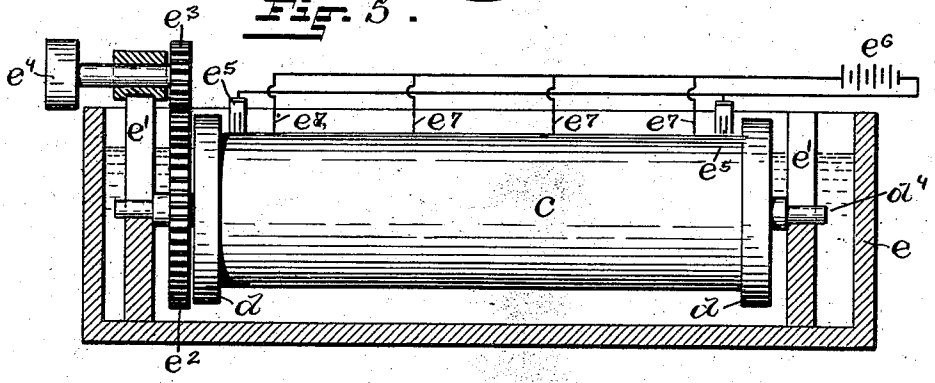


Fig. 6.

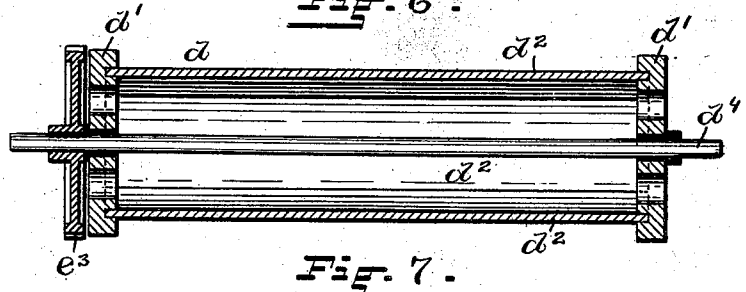
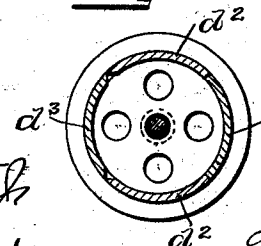


Fig. 7.



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UNITED STATES PATENT OFFICE.

ELISHA EMERSON, OF PROVIDENCE, RHODE ISLAND.

PROCESS OF MAKING METAL TUBES.

SPECIFICATION forming part of Letters Patent No. 695,635, dated March 18, 1902.

Application filed July 28, 1899. Serial No. 725,376. (No specimens.)

To all whom it may concern:

Be it known that I, ELISHA EMERSON, of Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Processes of Making Metal Tubes and Cylinders by Electrodeposition; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in the method of producing tubes or cylinders by the electrodeposition of metal; and it consists in forming a tube or cylinder from a thin sheet of metal preferably produced by the electrodeposition of metal, placing the same on a support in an electrolytic vat, and depositing metal until the required thickness of metal is secured.

Tubes and cylinders have heretofore been produced by electrodeposition on metal mandrels or cylinders which formed the cathode. Such cathodes are expensive. Special cathodes are required to form tubes or cylinders of different diameters, and a plant for producing the usual variety of tubes or cylinders would be too costly to be commercially successful.

The objects of this invention are to facilitate the production of tubes and cylinders by electrodeposition and reduce the cost of the plant and the cost of manufacture.

Figure 1 is a side view of a cathode such as I have used in carrying out my process. Fig. 2 is a transverse sectional view of the cathode. Fig. 3 is a sectional view of a sheet of metal stripped off from the cathode. Fig. 4 is a sectional view of a cylinder formed of a thin sheet of metal. Fig. 5 is a longitudinal sectional view of the vat containing a cylinder supporting the tube or cylinder to be built up by electrodeposition of metal. Fig. 6 is a sectional view of the supporting-cylinder, and Fig. 7 is a transverse sectional view of the same.

Similar marks of reference indicate corresponding parts in all the figures.

In the drawings, a indicates the metal cylinder forming the cathode; a' a', rings of insulating material at the ends of the cathode; a^2, a longitudinal strip of insulating material on the cathode, forming the line of division of the sheet formed on the cathode; a^4 a^4, the axles forming the bearings of the rotatable cathode-cylinder; b, a sheet of metal as it appears when removed from the cathode; c, a cylinder formed by uniting the edges of the sheet of metal b; d, the support for the cylinder or tube c, preferably a cylinder made of wood or other material having a low capacity for conducting electric energy and made collapsible, so as to facilitate the removal of the completed tube or cylinder.

As shown in the drawings, the heads d' d' are provided with an annular groove into which the staves d^2 d^2 and d^3 are inserted. The heads d' d' are are secured to the shaft d^4, and when one of the heads is removed the thin sheet-metal cylinder c may be placed on the staves or the completed cylinder removed by withdrawing the staves and the completed cylinder and pushing the stave d^3 inward, collapsing the staves to remove the completed cylinder.

The vat e is provided with the partitions e' e' to form the bearings for the shaft d^4. The gear e^2 is secured to the shaft d^4. The gear e^2 engages with the pinion e^3, which is driven by the belt-pulley e^4 from some prime motor. The brushes e^5 e^5 bear on the sheet-metal cylinder c and are connected by means of conductors with one pole of the battery or other source of electric energy e^6, from the other pole of which extend conductors connecting with the anodes suspended in the solution in the tank by the conductors e^7 e^7 in the usual manner used in the electrodeposition of metal.

In carrying out my improved process I prefer to form the sheets on the metallic cathode by the electrodeposition of the metal; but sheets of metal, preferably thin sheets, produced by electrodeposition may be used and bent up into tubes, or two or more sheets may be formed into a larger cylinder, the joints in either case being made by uniting the edges by soldering, sweating, or in any other usual manner. The so-prepared tube or cylinder is now placed on a suitable support, such as the support d, and supported in the vat partially submerged in the usual

liquor. The brushes e^5 e^5 are placed in contact with the tube or cylinder *c* and power is applied to rotate the same until the required thickness of metal is secured, when the completed tube or cylinder is removed, as above described.

By this improved process the thin sheets formed on the cathode may be made into tubes or cylinders of greatly-varying diameters and built up to the required thickness of metal. A large number of the building-up vats may be run, if required, day and night without any special attention. These vats and supports being wood or other cheap material require but a small investment compared with the metal cathodes.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The process herein described for making tubes and cylinders by electrodeposition, the same consisting in forming a thin sheet of metal by electrodeposition on a metal cathode, removing the sheet, forming the sheet into a tube or cylinder by uniting the edges, placing the tube or cylinder on a support in an electrolytic vat and depositing metal until the required thickness of metal is secured.

In witness whereof I have hereunto set my hand.

ELISHA EMERSON.

Witnesses:
B. M. SIMMS,
J. A. MILLER, Jr.