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MEANS FOR ELECTROPLATING TUBES INTERNALLY AND EXTERNALLY

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Fig. 1.

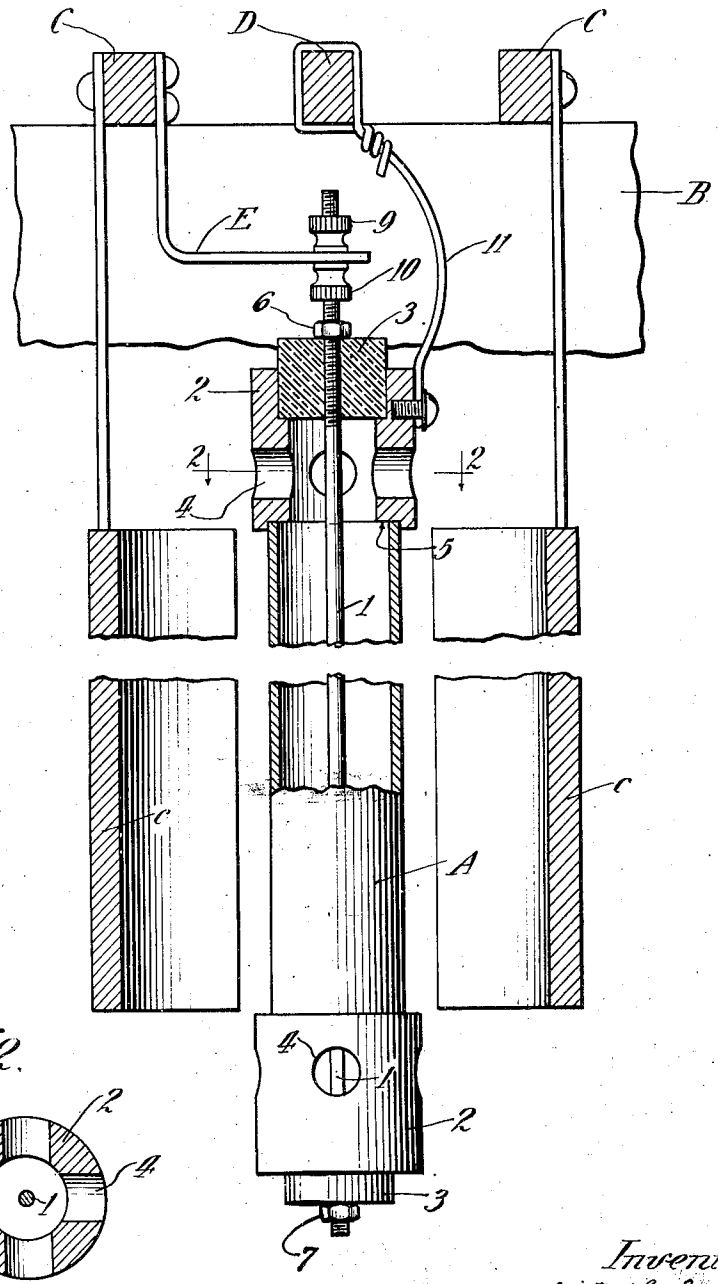


Fig. 2.

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MEANS FOR ELECTROPLATING TUBES INTERNALLY AND EXTERNALLY

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It is sometimes necessary to electroplate a tubular member both internally and externally. So far as we are aware it has heretofore been the practice first to plate either the inner or the outer side and then the other in order to secure uniform distribution of the electro-deposited metal.

The object of the present invention is to make it feasible simultaneously to plate both the inside and the outside of the tube or member having parts that are more or less tubular, in a simple manner; especially in the case of chromium plating.

The various features of novelty whereby our invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of our invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawing, wherein:

Figure 1 is a view partly in elevation and partly in section of a tube to be electroplated internally and externally and holding means therefor, the electroplating apparatus being indicated more or less diagrammatically; and Fig. 2 is a section taken on line 2—2 of Fig. 1.

In the drawings we have illustrated our invention as applied to the electroplating internally and externally of a simple tube and the detailed description will be confined to this example; as it will be understood that only the details of the combined anode and holder need be changed to adapt it to plating externally or internally, globe valves, T's, pet cocks and plumbing fixtures and laboratory fixtures in general.

Referring to the drawing, A represents the tube to be electroplated with chromium or other metal. This tube is first placed in a suitable holder which constitutes one of the anodes. In the arrangement shown, the holder consists of a rod 1 of metal, preferably iron. Arranged on this rod are clamping heads in the form of cups having their open sides directed toward each other. Each cup conveniently consists of a metal sleeve 2 closed at one end with a block 3 of insulating material not affected by the electrolyte to be employed extending into a counterbore in the sleeve; the rod being coaxial with the cups and passing through the bottoms of the latter. Each of the sleeve members has one or more, preferably a plurality of holes 4 extending through the wall thereof and is countersunk at the end forming the mouth of the cup, as indicated at 5, to provide a seat to receive one end of the work and thus bring the work accurately coaxial with the rod 1. Both ends of the rod are screwthreaded, the threads extending for a considerable distance along at least one end of the rod, preferably the upper end. Nuts 6 and 7 are placed on the rod outwardly of the insulating blocks. When one of the nuts, say the nut 7, is removed, the corresponding cup may be slipped from the rod, permitting the application of a tube. After the tube has been placed on the rod, the cup is replaced and the nut screwed on, thereby causing the tube to be firmly clamped between the two cups. By providing screwthreads throughout a considerable length of the rod, the device is adapted to receive tubes of various lengths within comparatively wide limits.

For the purpose of plating the tube internally, the tube must be acting as the cathode and the rod as the anode. Therefore one of the sleeves and the rod should be provided with or constitute terminals. In addition to serving as part of a holder for the work and as an anode, the rod may also serve as the means for suspending the work in the plating bath. In the drawing we have diagrammatically illustrated so much of the plating apparatus as is necessary to explain the use of our invention, including a fragment of the tank B, anode bus bars C, C, a cathode bus bar D, and anodes *c*, *c*, depending from the bus bars C, C. The anodes *c*, *c* are plates or sheets curved to produce almost a complete cylinder when placed with their concave sides toward each other. One of the anode bus bars has an angle bracket E fastened thereto and provided at its free end with a jaw into which the upper end of the rod 1 of the holder may be slipped. On the rod are two knurled nuts 9 and 10 adapted to engage opposite sides of that arm of the bracket through which the rod passes, so as to secure the rod

to the bracket and complete a good electrical connection between the rod and one of the anode bus bars. The upper sleeve 2 of the holder has a wire 11 fastened thereto. This wire is adapted to be wrapped around the cathode bus bar, placing the sleeve and therefore the work in electrically conductive relation to the cathode bus bar.

The cathode bus bar lies between the other two bus bars, so that the work, when suspended in the plating bath, will lie within and at the axis of the cylindrical shell formed by the two anodes *c*, *c*. In some cases the anodes *c*, *c* need not be curved but may be flat or of any other shape.

Assuming that the parts have been assembled as shown in the drawing, and that the tank contains the requisite electrolyte, preferably one adapted for the deposition of chromium, and that the proper current is flowing, it will be seen that there will be an even deposition of metal around the interior of the work because of the centralized anode. Similarly, since the work lies between the two outer anodes, there will be uniform distribution of the metal deposited on the exterior of the work.

The openings in the sides of the cups between which the work is held permit the electrolyte to circulate, so that the strength of the electrolyte producing the internal plating will not become unduly diminished. Furthermore, as gases are evolved within the tube during the plating process, they are permitted to escape through the holes in the upper cup instead of building up a pressure.

The present invention is particularly useful for electroplating with chromium, but it is not limited to this particular field.

While we have illustrated and described with particularity only a single preferred form of our invention, we do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of our invention constituting the appended claims.

We claim:

1. A combined anode and holder for a tube to be electroplated, comprising a rod, a clamping head in the form of an inverted perforated cup on the upper end of the rod, and a second clamping head on the lower end of the rod, the heads being adjustable relatively to each other and one of them being detachable.

2. A combined anode and holder for a tube to be electroplated, comprising a rod, a clamping head on the upper end of the rod, and a second clamping head on the rod below the other head, one of the heads being detachable, the upper head having a part of conducting material insulated from said rod and adapted to engage a tube arranged in the holder, means for suspending said rod in electrically conductive relation to a bus bar, and means for connecting said part of conducting material to a second bus bar.

3. A combined anode and holder for a tube to be electroplated, comprising a rod, a clamping head in the form of an inverted cup on the upper end of the rod, and a second clamping head in the form of an upright cup on the rod below the upper head, one of the heads being detachable, the rim portion of said cups being the contact-making part with the ends of a tube clamped between them, and both cups being perforated.

4. In an electroplating apparatus, a tank provided with bus bars, a rod, means for suspending the rod in electrically conductive relation with one of said bus-bars, clamping heads on said rod to hold a piece of work, one of said heads having a part of conducting material adapted to contact with the work, and means for electrically connecting said part to another of the bus bars.

5. A combined holder and anode comprising a rod, two clamping heads slidable on the rod, shoulders on the rod to limit the relative movements of the heads away from each other, one of said shoulders being a nut screwed on the rod, said heads being in the form of cups with their mouths directed toward each other, and each cup comprising a perforated metal sleeve and a bottom of insulating material through which the rod passes.

6. A combined holder and anode, comprising a rod, two clamping heads on the rod, each head consisting of a metal sleeve counterbored at each end and a block of insulating material fitting into each of the counterbores and forming with each sleeve a cup, the cups having their mouths directed toward each other, and shoulders, at least one of which is a nut, on the rod to limit the movements of the cups away from each other.

In testimony whereof, we sign this specification.

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