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APPARATUS FOR ELECTROPLATING ARTICLES HAVING POCKETS OR RECESSES THEREIN

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Fig. 1.

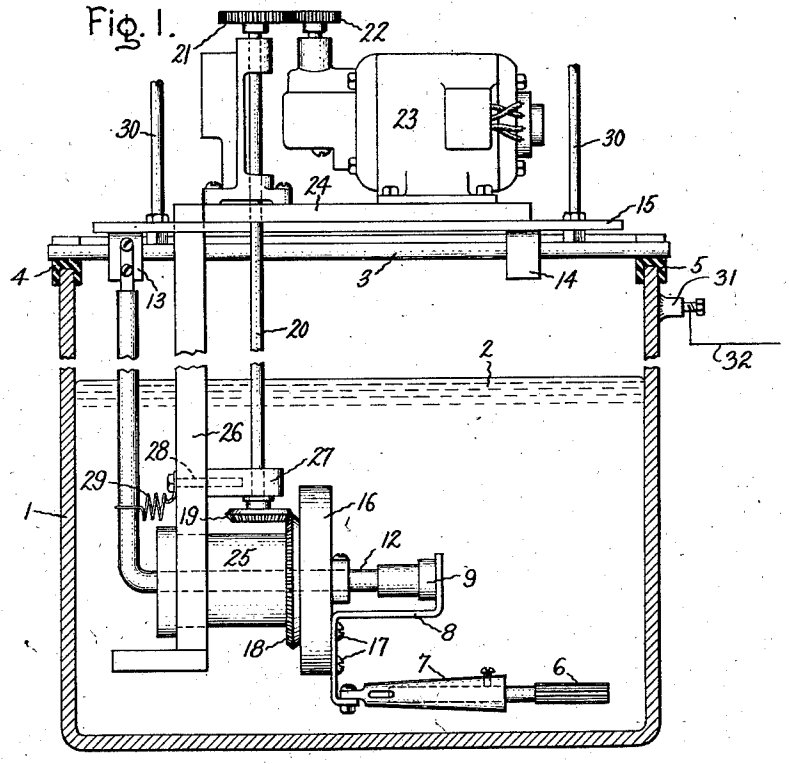
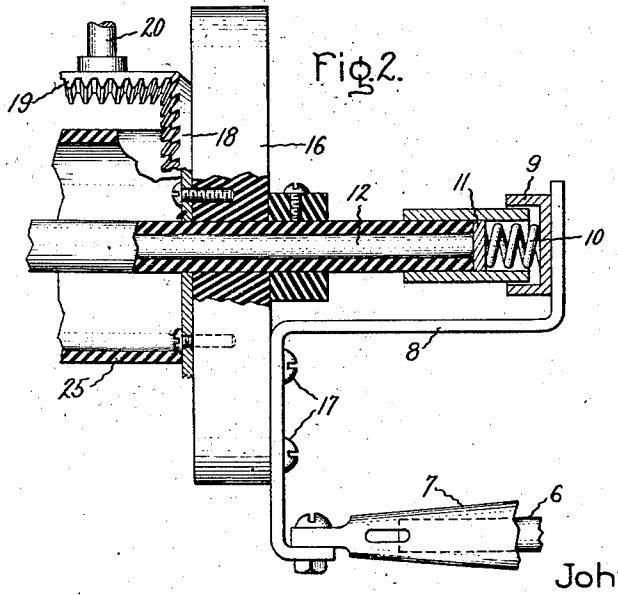


Fig. 2.



Inventor:
John V. Lundstrom,
by Harry E. Dunham
His Attorney.

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APPARATUS FOR ELECTROPLATING ARTICLES HAVING POCKETS OR RECESSES THEREIN

John V. Lundstrom, Scotia, N. Y., assignor to General Electric Company, a corporation of New York

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1 Claim. (Cl. 204—199)

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The present invention is an electroplating apparatus, particularly for chromium plating articles having one or more pockets or recesses therein. Ordinarily in electroplating articles such as reamers, drills, taps, dies and other articles having pockets where gas may collect, the electrodeposited metal either does not plate in the recesses or the plating is uneven and incomplete leaving exposed bare portions of the foundation or base metal. This is due to the fact that if an article is hung in an electroplating bath the lower portion of the article tends to receive the heaviest metal coating because the hydrogen gas given off during the plating process forms a curtain in front of the article to be plated and this curtain increases progressively in thickness from the bottom to the top of the article to be plated. In electroplating an article having pockets or recesses therein the hydrogen gas trapped in such pockets resists deposition of any metal therein.

It is an object of the present invention to provide an apparatus suitable for electroplating metallic devices having pockets or recesses therein. It is a further object of the invention to provide an apparatus for chromium plating tools such as reamers, drills, taps, dies and the like. Other objects will appear hereinafter.

The novel features which are characteristic of my invention are set forth with particularity in the appended claim. My invention itself however will best be understood from reference to the following specification when considered in connection with the accompanying drawing in which Fig. 1 is a view partly in elevation and partly in section of an apparatus whereby my invention may be carried into effect; while Fig. 2 is a detail view on an enlarged scale of a portion of the apparatus disclosed in Fig. 1.

Referring more particularly to the drawing, I have indicated at 1 a metal tank containing a plating solution or electrolyte 2 which may be for example a chrome plating bath as set forth in the patent to Fink No. 1,581,188, the tank having a suitable electrical connection such as binding post 31 and conductor 32 connected to any suitable direct current source of energy not shown. An electrically conducting bar 3 extends across the top of the tank and is insulated therefrom by channeled insulators 4 and 5. The bar 3 is connected to the same source of direct current as conductor 32. The article to be plate is illustrated as a reamer 6 rigidly mounted in a holder 7. The holder 7 is detachably secured to one end of a metal bracket 8, the other end of the bracket being provided with a cup-shaped member 9 which bears against a spring 10. The spring 10 forces a plate 11 into contact with one end of an insulated electrically conducting rod 12. The opposite end of conductor 12 is connected to one of two inverted V-shaped members 13 and 14 secured to the underside of a wooden or other suitable platform 15. The platform 15 rests on the rod 3 and edge of the tank 1. The V-shaped members 13 and 14 are supported on the bar or rod 3. The intermediate portion of the bracket 8 is secured to a rotatable cylindrical member 16 by means of screws 17. The member 16 is made of insulating material and is rotatably mounted on the insulated conducting rod 12. A bevel gear 18 is bolted to the member 16 and engages a second bevel gear 19 mounted on a vertical shaft 20 which is driven through gears 21 and 22 by an electric motor 23. The shaft 20 and motor 23 are supported on a base 24 which is mounted on platform 15.

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A cylindrical insulator 25 provides a bearing for the insulated conducting rod 12 and is in turn supported on a bearing in a flat bar 26 of any suitable insulating material, for example a composition having a phenol-aldehyde resin base. The bar 26 is rigidly secured to the base 24 in any suitable manner. A bearing 27 for shaft 20 is rigidly secured to the bar 26 by means of a bolt 28. A coiled spring 29 is secured at one end to the bar 26. The other end of the spring engages the vertical portion of the insulated conducting rod 12 and forces the opposite end of the conductor 12 into contact with the plate 11.

Although the tank 1 may serve as the anode, I prefer to employ one or more lead plate anodes, not shown, which may be mounted in the tank 1 and connected to the other terminal of a direct current source of power. A handle which comprises two vertical portions 30 and a horizontal portion, not shown, permits removal from the tank 1 of the entire electroplating apparatus with the exception of the conducting bar 3. In order to prevent undesired plating of any metal portions of the electroplating apparatus such portions may be covered with a lacquer or other suitable insulation.

In operation, electric current flows from the anode through the electrolyte to the cathode article 6 to be plated and through the bracket 8, spring 10, and the conducting rod 12. In the meantime motor 23 rotates the insulating member 16 and the article to be plated. The axis of the article to be plated is considerably offset from the axis of rotation of the member 16 so that the article to be plated describes a cylindrical

surface of relatively large diameter as compared to the diameter of the article to be plated. This wide circle of rotation shakes off any trapped hydrogen which may have collected in the pockets in the reamer 6 and apparently prevents hydrogen from collecting at the reamer 6. As a result the electrodeposited coating is applied evenly over the entire article including any pockets or recesses therein where gas might ordinarily collect.

Although I have illustrated my invention particularly in connection with chromium plating, it will be understood that it is not restricted to chromium plating but may be employed in electroplating zinc, cadmium or other metals where gases are evolved in the plating operation.

What I claim as new and desire to secure by Letters Patent of the United States is:

An electroplating apparatus comprising a tank for holding an electrolytic bath, a disk of insulating material mounted therein for rotation about a horizontal axis, a metal bracket secured to said disk and flexibly connected to a stationary, insulated, conducting rod extending through said disk, said stationary rod being connected to one pole of a source of electric current, said bracket being provided with a socket for detachably and rigidly supporting the article to be plated at one end thereof for rotation about the axis of said disk during the plating operation, and means for completing an electric circuit through the said tank, electrolytic bath, article and bracket.

JOHN V. LUNDSTROM.

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