April 5, 1932. D. J. BLOCK 1,852,797

CHROMIUM PLATING PROCESS

Filed Nov. 30, 1928

Fig. 1

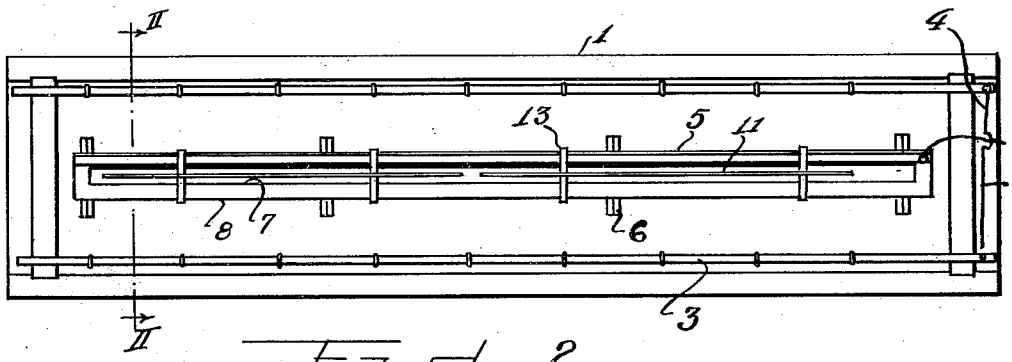
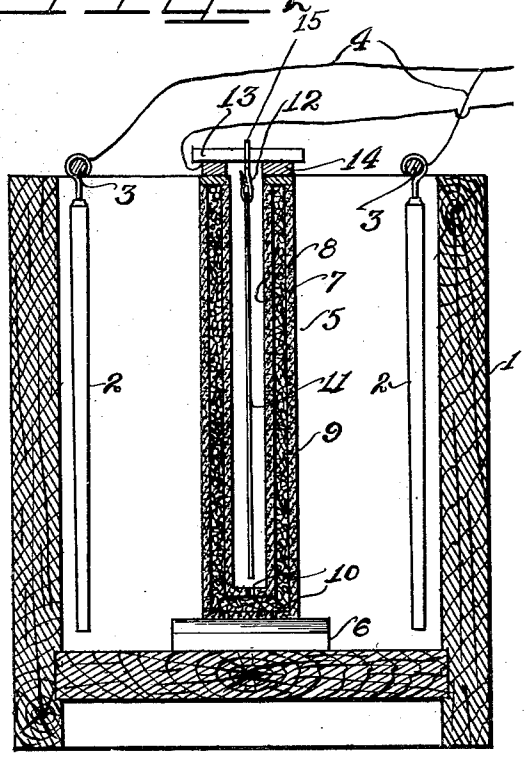


Fig. 2



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by Charles Kelly Attys

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UNITED STATES PATENT OFFICE

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CHROMIUM PLATING PROCESS

Application filed November 30, 1928. Serial No. 322,678.

This invention relates to a chromium plating process and apparatus.

In the usual chromium plating processes, the articles to be plated, which form the cathode of the cell, become covered with a film of hydrogen gas. This film has been by some considered essential to the efficient operation of the plating process, as it has been thought that the film formed a protective coating which prevented oxidation of the chromium ions at the instant of deposition.

I have now found, however, that the protective hydrogen film on the cathode is not essential to the efficient operation of the plating process, nor is it even desirable that such a film be maintained.

It is therefore an object of this invention to provide a chromium plating process and apparatus adapted to substantially eliminate the formation of this hydrogen gas film on the articles being plated, to thereby prevent polarization and increase the efficiency of the plating operation.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a top plan view of a chromium plating vat embodying the principles of my invention; and

Figure 2 is an enlarged sectional view taken on line II—II of Figure 1.

The reference numeral 1 indicates a chromium plating vat, preferably formed of wood lined with pitch or other acid resistant substance, and preferably relatively narrow and long. As in usual practice, anode strips or plates 2, preferably of lead, are suspended adjacent the side walls of the vat from anode bus bars 3, connected to a suitable source of electric current by means of wires 4. The vat 1 is adapted to be filled with any suitable type of chromium plating solution, such as the so-called Sargent solution, or a modification thereof.

In accordance with the principles of my invention, a porous cathode cell, indicated as a whole by the reference numeral 5, extends centrally of the plating vat and is supported from the floor of the vat upon spaced blocks or other supporting means 6. The porous cathode cell 5 is preferably formed of inner and outer walls 7 and 8 respectively of unglazed porcelain or tile. The space between the walls 7 and 8 of the cathode cell is adapted to be filled with a mixture 9 of gas absorbent and oxidizing materials, such as charcoal and manganese dioxide respectively. Preferably a cocoanut charcoal is used, but any type of material capable of absorbing large volumes of gas per unit volume of material is satisfactory for the purpose.

The proportion of manganese dioxide to gas absorbing material is relatively unimportant as long as sufficient manganese dioxide is present to take care of the hydrogen gas discharged at the cathode. In certain cases it may be advisable to provide passages 10 in the walls 7 and 8, to secure a better circulation of the plating solution and to prevent its unequal dilution through the formation of water.

The articles to be plated, which are here represented as sheet metal 11, are adapted to be releasably suspended by means of clamps 12 from cross-pieces 13 mounted above the cathode cell 5 on strips 14. The metal sheets 11 themselves form the cathode of the cell and are connected by means of the current conducting clamps 12 and cross pieces 13 to a lead wire 15.

Where sheet metal is being chromium plated, as here, the porous cell 5 is made relatively narrow and long to accommodate the sheets. Other forms of cathode cell could, of course, be employed where the article to be plated required different dimensions of cell.

During the plating process, since a considerable excess of current is maintained over that carried by the chromium ions, a large amount of hydrogen gas is generated at the cathode. Ordinarily, a film of this gas forms over the surface of the articles to be plated. In apparatus of my invention, however, the

hydrogen gas is substantially absorbed by the gas absorbing material within the double walled cathode cell and is therefore oxidized by the oxidizing material present. It is important that the gas absorbing material be capable of absorbing a considerable volume of gas so that the oxidizing material may at its leisure complete the oxidation of the hydrogen gas. By this means, the formation of a hydrogen film upon the articles to be plated is largely prevented and the efficiency of the plating process maintained at a high rate over long periods of time due to the absence of polarization.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In the process of chromium plating, the step of absorbing and oxidizing gas formed at the cathode to prevent polarization.

2. In the process of chromium plating, the step of absorbing and oxidizing gas formed at the cathode by means of gas absorbent charcoal and manganese dioxide to prevent polarization.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

D. JULIAN BLOCK.