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APPARATUS FOR PRODUCING WATER-TAKING LAYERS ON BOTH SURFACES OF LIGHT-METAL FOILS
Filed March 18, 1939

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262,800

2 Sheets-Sheet 1

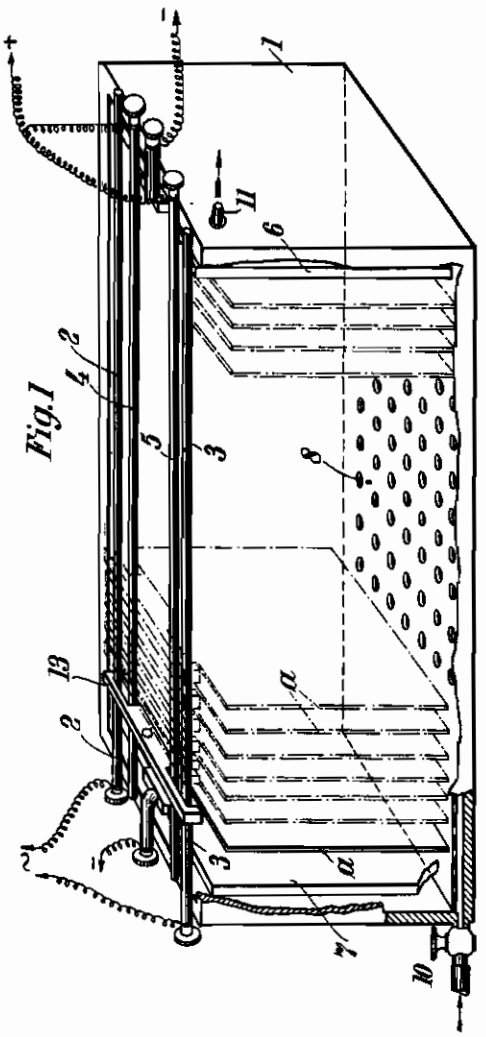

Fig. 1

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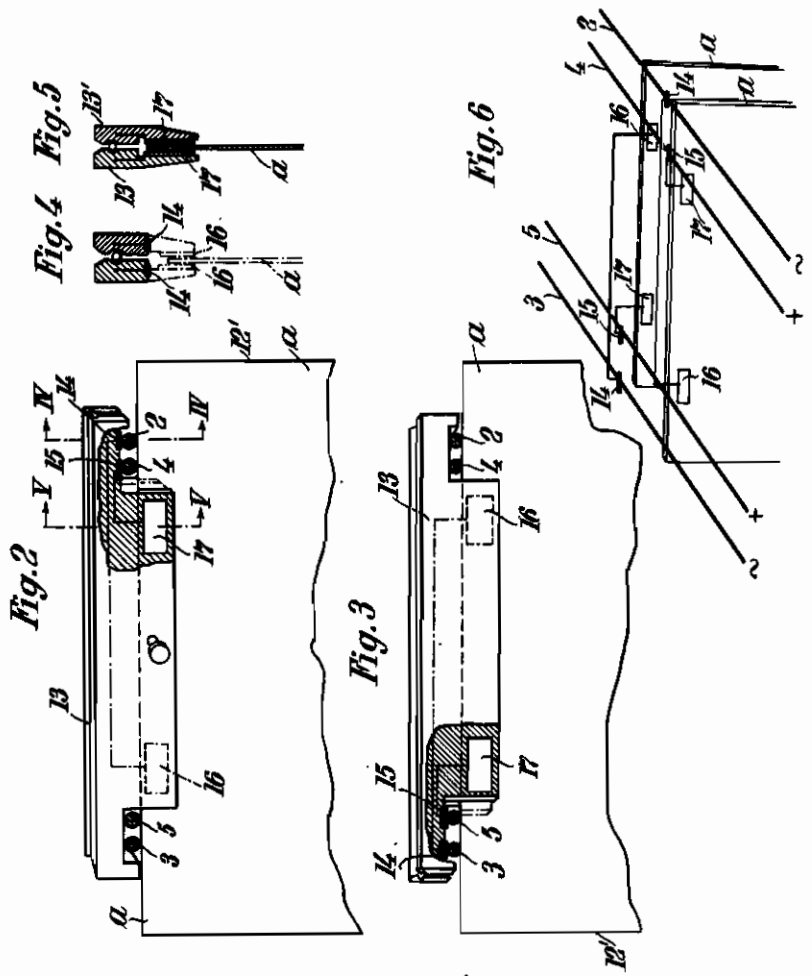

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ALIEN PROPERTY CUSTODIAN

APPARATUS FOR PRODUCING WATER-TAKING LAYERS ON BOTH SURFACES OF LIGHT-METAL FOILS

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Application filed Mareh 18, 1939

My invention relates to an apparatus for making light-metal foils, with water-taking layers on both surfaces. Foils of this kind are described in my co-pending application Ser. No. 154,262, for Light Metal Foils, filed July 17, 1937, of which the present application is a divisional.

It is an object of my invention to provide an apparatus for producing the water-taking layers on the two surfaces of the foil under economic conditions, i. e., by treating many foils together for a short period.

To this end, I provide a vat for an electrolyte with a pair of conductor bars extending along the vat and supplied with alternating current. The clamps by which the foils are suspended from the bars, are equipped with conductors for alternately connecting the successive foils to one and to the other bar.

It is another object of my invention to provide an apparatus in which the foils are also subjected to the action of direct current in order to improve the operation of the apparatus.

To this end, I arrange a second bar at the side of each alternating-current bar and connect the second bars to the positive terminal of a source of direct current. A lead electrode is arranged at either end of the vat and connected to the negative terminal of the direct-current source. Additional conductors are provided on the clamps for alternately connecting the successive foils to one and to the other second or direct-current bar.

By these means, I obtain a given number of foils with the water-taking layers on both surfaces for every cycle of operation, and the layers are finely porous and uniform. If, in the case of foils of aluminium, or aluminium alloy, the electrolyte is very weak, at the rate of not more than ½% of acid in the solution, and is used at room temperature, the water-taking layers are satisfactory and consist substantially of aluminium oxide, or aluminium hydroxide.

In the accompanying drawing, apparatus embodying my invention are illustrated diagrammatically by way of example.

In the drawing

Fig. 1 is a perspective illustration of an apparatus for treating a set of foils, with the front wall of its vat partly broken away.

Figs. 2 and 3 are perspective illustrations of clamps for suspending the foils from the conductor bars of the vat, showing the alternating connection of successive foils to the bars.

Fig. 4 is a section on the line IV—IV, and

Fig. 5 is a section on the line V—V in Fig. 2.

Fig. 6 is a diagram of connections.

Referring now to the drawing, and first to Fig. 1, the vat 1 of the apparatus if filled with electrolyte, preferably of the abovesaid concentration, and at room temperature. Conductor bars 2 and 3 are arranged along the sides of the vat and supplied with alternating current from a suitable source, not shown, and 4 and 5 are the second bars referred to which are connected to the positive terminal of a source of direct current, not shown. Electrodes 6 and 7, of lead, are arranged at opposite ends of the vat 1 and connected to the negative terminal of the source of direct current. The direct-current bars and electrodes may be dispensed with. If only alternating current is used the vat 1 may be open at the top.

The foils *a* are suspended from the bars 2, 3 and 4, 5, if the latter are provided, by suitable clamps 13 as will be fully described below. A perforated plate 8 is placed below the lower ends of the plates *a* and at a short distance above the bottom of the vat 1. Compressed air is introduced into the space below the plate 8. The streams of compressed air issuing from the holes in the plate 8 rise in the electrolyte and remove the gas bubbles which form during the operation. A vent 11 is provided for removing the mixture of gas and air from the vat.

The foils *a* are suspended in the space between the inner surfaces of electrodes 6, 7 in parallel relation to each other and at right angles to the bars 2, 4 and 3, 5. The clamps 13 which engage the foils between their jaws 13' are preferably made of hard rubber and equipped with a spring tending to force their free ends against the foil *a* from both sides.

The two jaws are recessed near their ends and contacting plates 14 and 15 are inserted in the recesses. Fig. 2 shows the position of the contact plates 14 and 15 in that jaw which is in front. The contact plates are in the recess at the right of this jaw and engage the alternating-current bar 2 and the direct-current bar 4 at the corresponding side of the vat. In the recess at the left, the insulating material of the jaw bears directly on the alternating-current bar 3 and the direct-current bar 5 at this side of the vat.

Fig. 3 shows the position of the clamp 13 on the subsequent foil where the clamp 13 is reversed with respect to its position in Fig 2. Here, the contact plates in the recess at the left engage respectively the alternating-current bar 3 and the direct-current bar 5 at that side of the vat while in the recess at the right the insulating material bears on the bars 2 and 4.

Fig. 6 shows diagrammatically the position of the contact plates 14 and 15 in a first foil *a* and the subsequent foil *a*, and it will be understood that in the third foil they are again in the same position as in the first one, etc.

A contact strip 16 is connected to each plate 14 and another contact strip 17 is connected to each plate 15, the strips being spaced apart for a distance almost equal to the length of the jaws at their lower ends. The wires connecting

the plates and strips are embedded in the insulating material of the jaws whose strips engage opposite surfaces of the foils, as shown in Fig. 4 for the strips 16, and in Fig. 5 for the strips 17.

It will appear that in each pair of successively arranged foils the foils are alternately connected to the bars at their opposite ends. Thus, the end of the first foil *a* adjacent its vertical edge 12' at the right, Fig. 2, is connected to those bars 2, 4 which are at the same side of the vat at this end of the foil, and conversely the end of the subsequent foil *a* adjacent its vertical edge 12' at the left, Fig. 3, is connected to the bars 3, 5 at the same side as this end of the foil, and opposite to the end connected in Fig. 2.

With a weak electrolyte of not more than ½% of acid in the solution, as described, and with alternating and direct current, foils are obtained which can be used on both surfaces and are satisfactory for offset printing.

HERMANN WOLFF.