Aug. 14, 1934. J. N. KELLY 1,970,458

APPARATUS FOR PLATING ARTICLES

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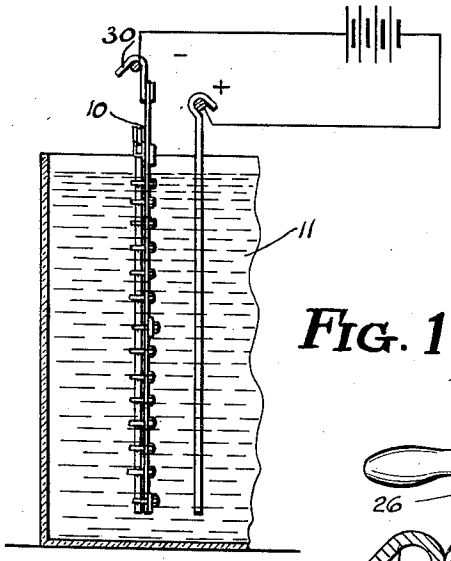
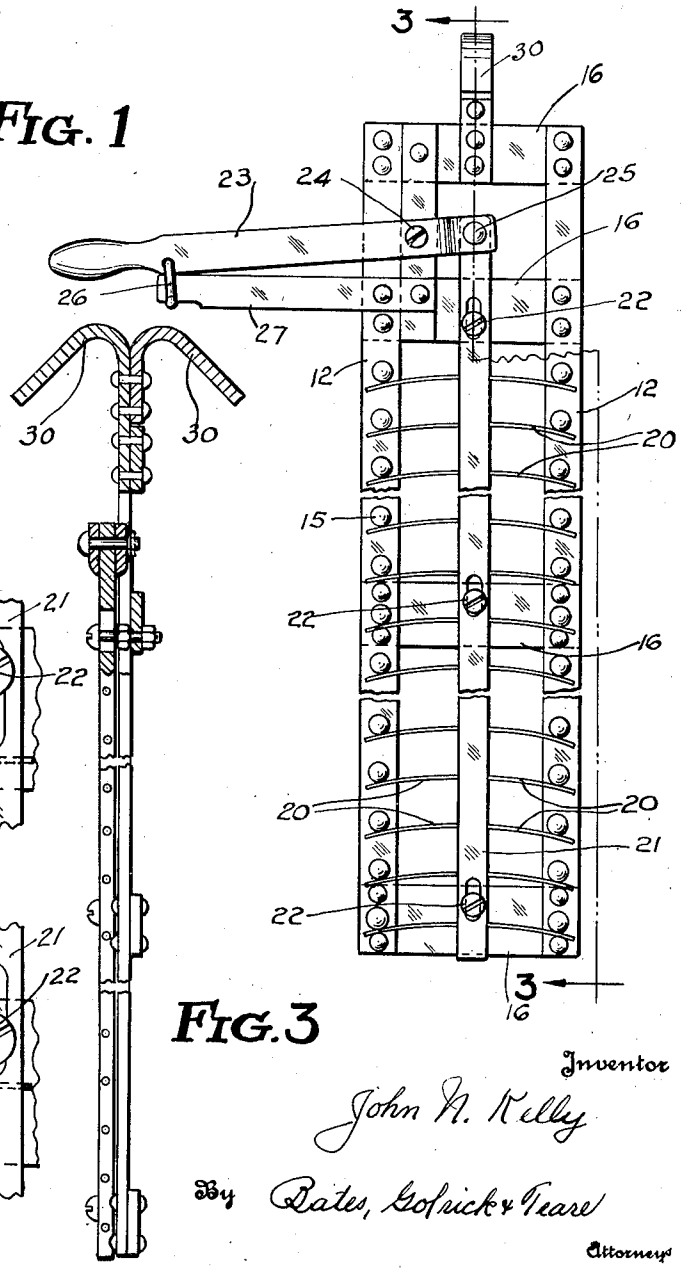


FIG. 1

FIG. 2



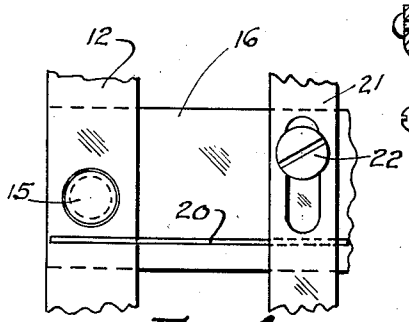


FIG. 4

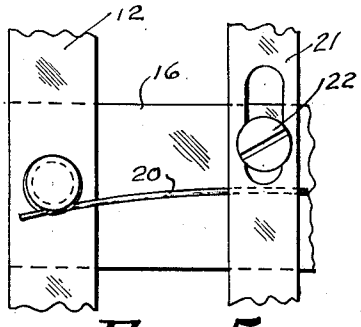


FIG. 5

FIG. 3

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APPARATUS FOR PLATING ARTICLES

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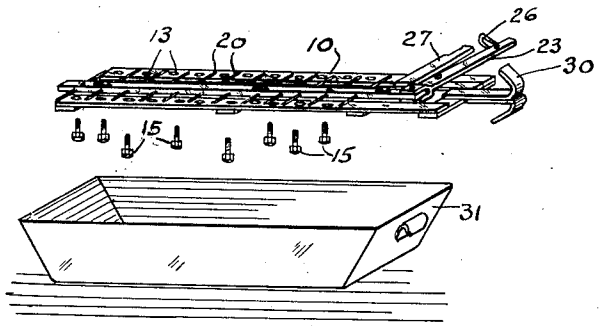


FIG. 10

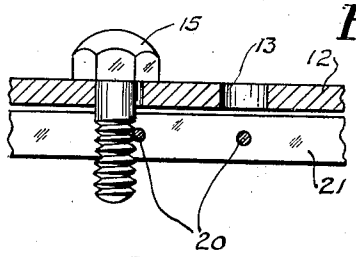


FIG. 7

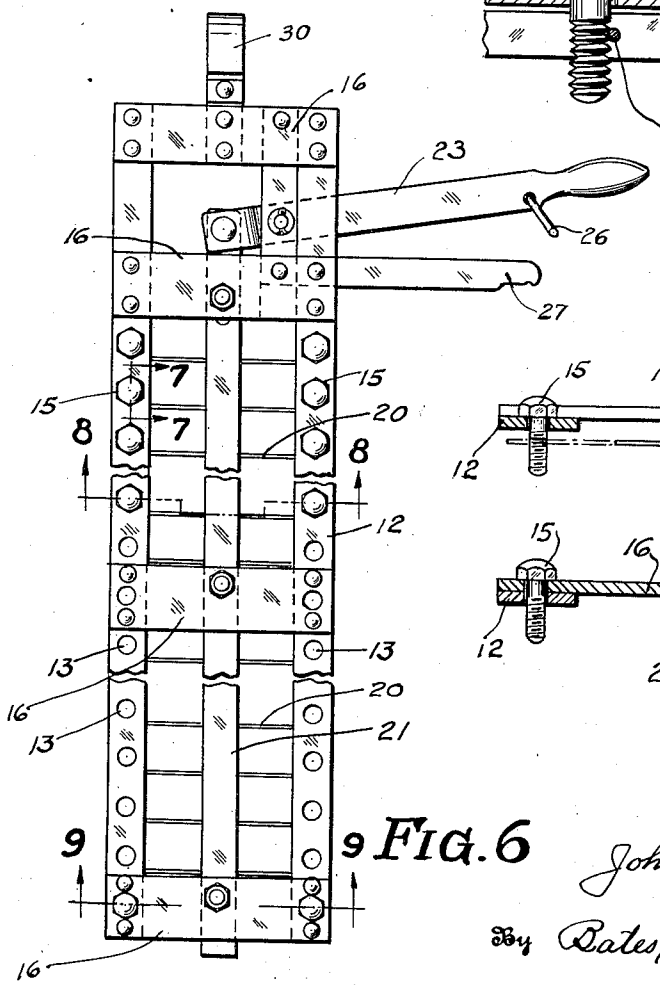


FIG. 6

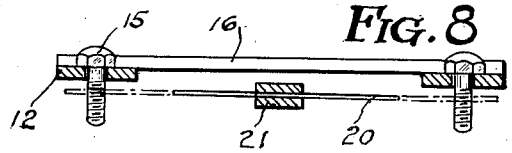


FIG. 8

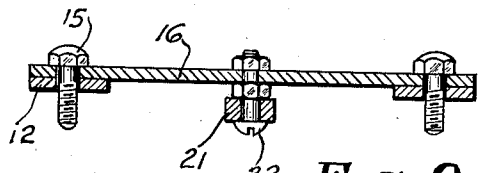


FIG. 9

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APPARATUS FOR PLATING ARTICLES

John N. Kelly, Cleveland, Ohio

Application April 22, 1931, Serial No. 532,010

8 Claims. (Cl. 204—5)

This invention relates to a method and apparatus for enabling relatively small articles to be plated economically. It has been found, particularly in the art of chromium plating that in order to obtain best results, a relatively tight contact must be maintained between the article and the electrode. One method heretofore employed for such purpose has included the use of a wire which has been wrapped around the article and then suspended from the current carrying rod, which usually extends across the top of the bath. This method however is too expensive for use in connection with the plating of bolts for it requires too much time to attach and disconnect the wires and to suspend them individually upon the bar. In an effort to remedy this objection, another method was devised wherein the bolts were threaded into plates, which in turn were suspended within the bath, but this procedure necessitated the individual handling of the bolts as it was necessary to turn each bolt several times in order to hold it securely in position, and to release it at the end of the plating operation. A further objection to this method is the fact that a holder is suitable for only one bolt size and type of thread. Accordingly, where such articles are plated on a production basis, and where many sizes and thread types are being handled, it is obvious that the number of holders that would have to be carried in stock would reach prohibitive proportions.

An object of the present invention therefore, is to greatly simplify the method of handling small articles, such as bolts, so as to reduce materially the plating cost and also the amount of apparatus that must be retained in stock for holding the articles during the plating operation.

Referring now to the drawings, Fig. 1 is a section through a plating tank having apparatus embodying my invention; Fig. 2 is a side elevation of the article holder removed from the bath; Fig. 3 is a section taken on the line 3—3 in Fig. 2; Fig. 4 is a side elevation on an enlarged scale taken through the holder and illustrating the clamping member out of contact with the article to be plated; Fig. 5 is a similar view showing the clamp in contact with the article; Fig. 6 is a side elevation of the holder in open position; Figs. 7, 8 and 9 are sections taken on the correspondingly numbered lines in Fig. 6, and Fig. 10 is a perspective view illustrating the manner in which the bolts may be released from the holder during the plating operation.

My invention is shown, as applied to the plating of bolts but it is adapted for use in connection with the plating of any small article on a production basis. The preferred arrangement of the invention comprises a holder 10, that is adapted to be suspended within a plating bath 11, and that is provided with means for enabling the articles to be quickly engaged and released at the start and end respectively of the plating operation.

The holder may assume various forms, but the preferred arrangement comprises current carrying bars 12 that are provided with spaced openings 13 into which the bolts 15 or other articles to be plated may be inserted. Where bolts are to be plated, the openings are larger than the diameter of the bolts, so that the threaded shanks may be passed through the openings as is shown, for example, in Fig. 7. The holder may also comprise an open frame in which the member 12 comprises longitudinal bars, which are connected by cross bars 16 at spaced intervals to provide sufficient rigidity to withstand handling during use.

To maintain the articles in proper position within the holder, I provide a clamp which preferably is adapted upon the operation of a single actuator to clamp all of the bolts simultaneously. Such clamp may comprise a plurality of yieldable wires 20 that are attached rigidly to the bar 21, which in turn is movable longitudinally of the holder through the pin and slot connections 22. The bar 21 in turn is adapted to be actuated by a lever 23, which may be pivotally mounted at 24 to the holder, and at 25 to the bar. In Fig. 6, the clamp is shown in the open position at which time the flexible members 20 are out of contact with the articles to be plated. In Fig. 3, however, it is shown in the clamped position at which time, the keeper 26 is hooked over a notched bar 27 and is held in such position by the spring tension of the wires, which are in contact with the bolts.

Since the article receiving openings are larger than the articles to be plated, it is apparent that the articles may be quickly inserted in the respective openings, then clamped and suspended as a unit within the bath. To this end, the top of each holder may be provided with a hooked shaped portion 30, which is adapted to engage the current carrying bars that normally extend across and above the level of the liquid in the tank. At the completion of the plating operation, the holder may be removed from the bath, and then held in inverted position above a pan 31, as is shown in Fig. 10. When the keeper is released, the articles drop by gravity into the pan.

Before the holder is used, it is coated with an

electric insulating enamel, and then the walls of the openings 13 are reamed out so that current conducting contact may be made between the bolts and the bars.

An advantage of my method is that the cost of plating articles has been reduced at least one-half of that required for plating by any other method, of which I am aware. Furthermore, the frictional contact that is made with the electrode and the article is sufficiently tight that each article is plated in a satisfactory manner. In addition, the apparatus is well adapted for plating small articles on a production basis for it enables a large number to be handled, as a unit, and quickly attached and released at the start, and end, respectively, of the plating operation.

I claim:

1. In a device of the character described, the combination with an article holder adapted to receive a plurality of articles to be plated, a clamp for yieldably engaging the articles and holding them in frictional contact with the holder, and a single actuator for said clamp, whereby all of the articles may be clamped or released simultaneously upon operation of the actuator.

2. In a device of the character described, the combination with a holder having spaced article receiving openings therein, and a flexible clamp carried by the holder and movable with relation thereto, said clamp when moved in one direction being adapted to engage all of the articles substantially simultaneously and to hold them in current conducting contact with the holder, and when moved in the opposite direction being adapted to release all of the articles substantially simultaneously whereby they may drop by gravity from the holder.

3. In a device of the character described, the combination with a holder having article receiving openings therein, a member slidably mounted on the holder, and yieldable means carried by the member and adapted to engage the articles and to urge them into contact with the holder, said means being adapted upon actuation of the member in a reverse direction to release said means whereby the articles may be simultaneously released from the holder.

4. In a device of the character described, the combination with a holder having article receiving openings arranged in rows therein, a second member disposed between the rows and movable with relation to the first member and spaced yieldable wires carried by the second member and extending laterally therefrom, said wires being adapted frictionally to engage articles within the first member and to hold them in current carrying contact therewith when the member is moved in one direction whereby the articles and holder may be handled as a unit and to release the articles, as a unit from the holder at the completion of the plating operation when the member is moved in the opposite direction.

5. A device of the character described, comprising a frame having a plurality of spaced openings therein and adapted to receive articles to be plated, spaced yieldable clamping members for urging them into close contact with the frame and means for releasing the yieldable members simultaneously from the frame.

6. A plating rack having means thereon for suspending it in a plating bath and comprising a current carrying member, and a flexible clamp carried thereby and movable with reference thereto, the clamp when moved in one direction being adapted to engage substantially simultaneously the shanks of bolts that are positioned in spaced relationship in a row, so as to leave the heads of the bolts entirely clear of the rack, and to hold them in current conducting relationship to the member and when moved in the opposite direction being adapted to release all of the bolts, whereby they may be dropped substantially simultaneously from the rack.

7. A plating rack having a hook at the top thereof for suspending it in a plating bath, a clamp beneath the hook and having a portion thereof extending in a lateral direction and being movable with relation to the hook so as to clamp articles in rows while allowing the ends of them to be free of the rack, said clamp when moved in one direction being adapted to engage all of the articles substantially simultaneously, and when moved in the opposite direction being adapted to release all of the articles where they may be dropped substantially simultaneously from the rack.

8. A bolt plating rack, comprising a flexible member that is adapted to engage by frictional contact the shanks of bolts to be plated and to hold them in predetermined spaced relationship to each other, means for moving the member lengthwise of the rack to engage and release the bolts simultaneously.

JOHN N. KELLY.