Sept. 11, 1956 W. H. JACKSON 2,762,772

CONTACT FOR ELECTROPLATING MACHINES

Filed July 28, 1952

2 Sheets-Sheet 1

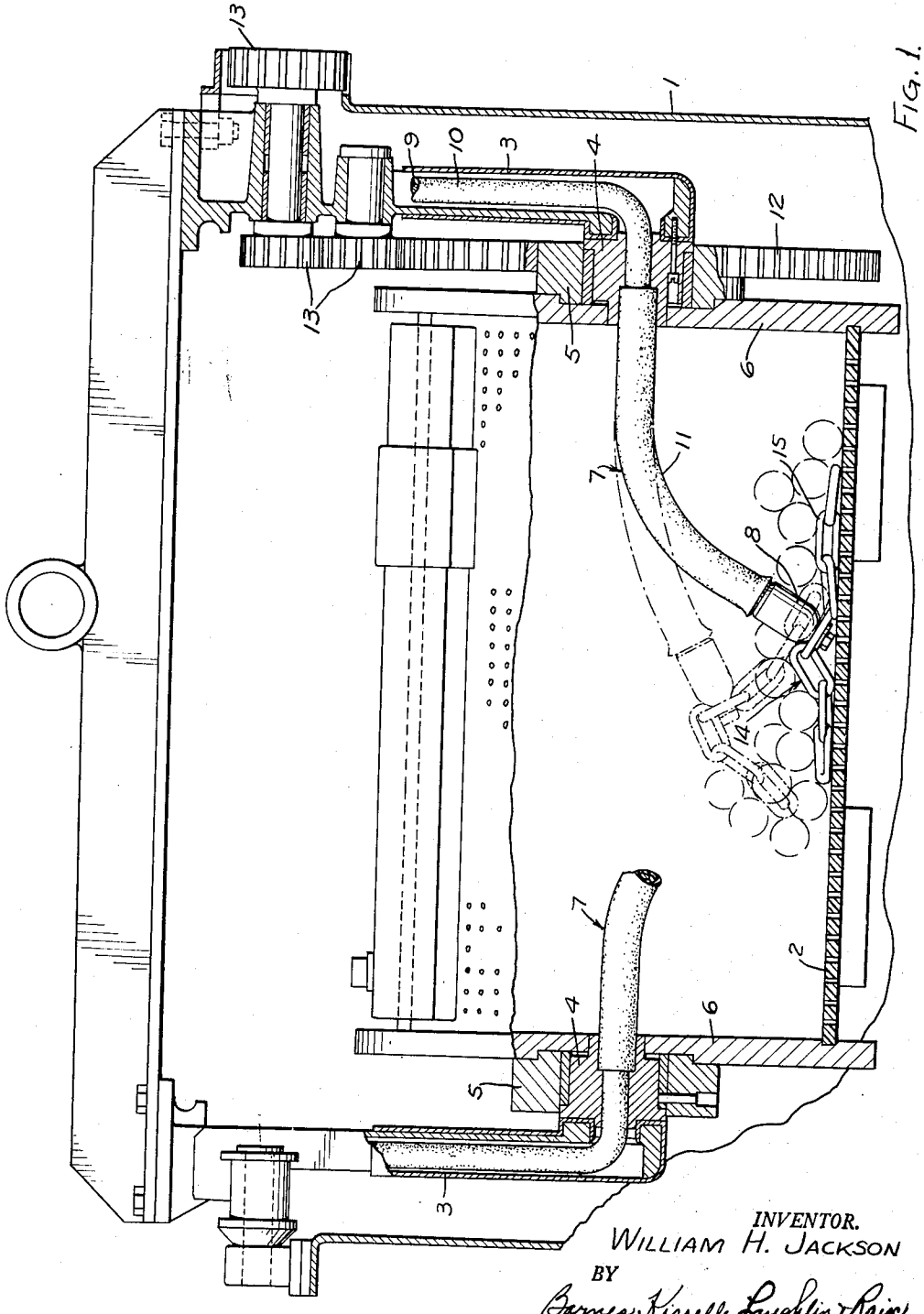

FIG. 1.

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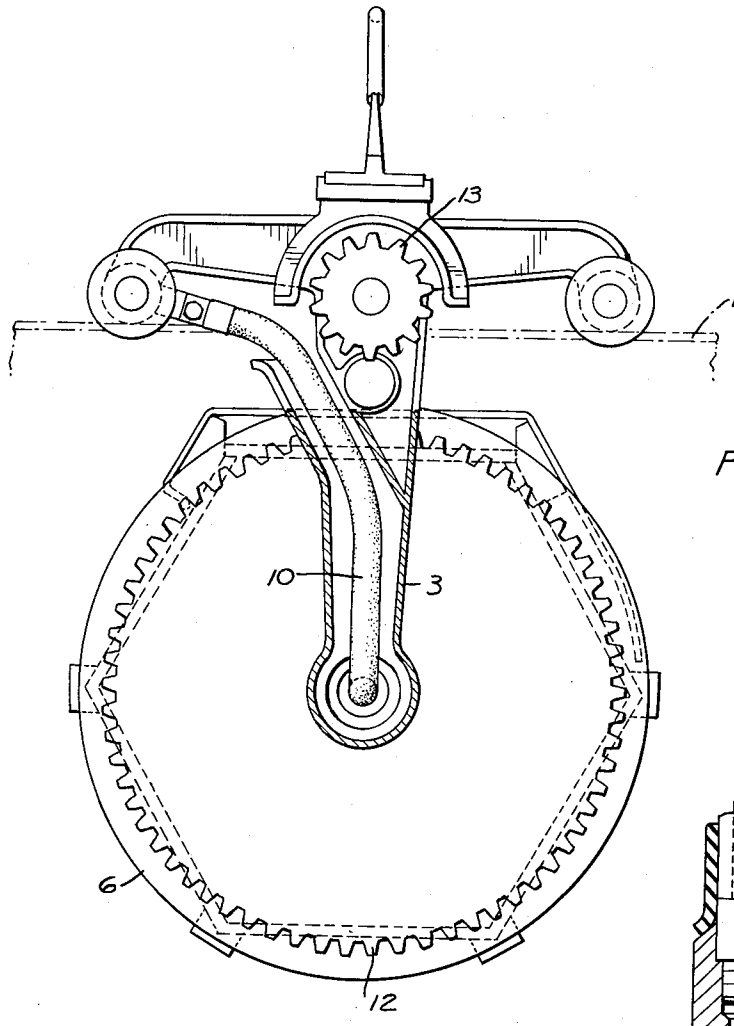

FIG. 2

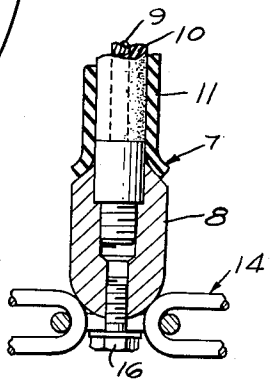

FIG. 3.

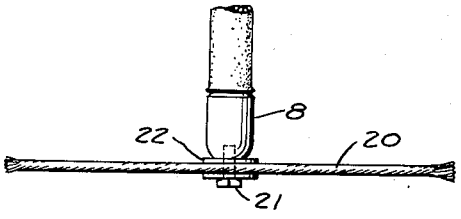

FIG. 4.

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CONTACT FOR ELECTROPLATING MACHINES

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Application July 28, 1952, Serial No. 301,329

1 Claim. (Cl. 204—213)

This invention relates to a contact for an electroplating machine.

Plating barrels of the type shown in the United States patents to Jackson 2,249,609 and Bogle 2,035,633 have gone into extensive commercial use. Such a plating barrel usually has two cathode contacts and the flexible type contact shown in the Jackson patent is the most popular. This flexible type contact comprises a contact ball or knob attached to the end of a heavy rubber covered stranded copper wire cable.

One of the problems which has arisen with the use of the flexible type cathode contact is arcing between the knob end of the cathode and the work. This results in burning or pitting of the work and also in double plating. Double plating and arcing is occasioned by the fact that the flexible cathode under some operating conditions, especially when large pieces of work are being tumbled and plated in the barrel, temporarily breaks contact with the work. When the cathode contact breaks electrical contact with the work, plating ceases and an arc is struck between the cathode contact and the work, causing pitting of the work, and as soon as the contact is again made between the cathode contact and the work, plating resumes, resulting in an electrodeposit being plated out on the previous electrodeposit, which is termed double plating. Double plating is usually considered undesirable because of the lack of adhesion between the subsequently and previously deposited plates and pitted plate is usually rejected as unsatisfactory.

It is an object of this invention to obviate the above described disadvantage of the flexible cathode contact by maintaining the cathode contacts in continuous electrical contact with the work pieces during the plating operation and this object is achieved by providing a flexible arc preventer of electrically conducting material between the cathode contact and the work and this flexible arc preventer is continuously in electrical contact with the work.

In the drawings:

Fig. 1 is a longitudinal vertical sectional view through a plating machine having flexible type cathode contacts one of which is provided with a flexible arc preventer.

Fig. 2 is an end view of the plating machine shown in Fig. 1.

Fig. 3 is an enlarged detail showing the connection between the arc preventer and the cathode contact knob.

Fig. 4 is a view similar to Fig. 3 showing a modified form of arc preventer.

Referring more particularly to the drawings, the plating machine is generally the same as that shown in the Jackson Patent 2,249,609 and comprises a tank **1** for the plating solution, a rotating, perforated cylinder or barrel **2** of plastic material, hangers **3**, stationary collar bearings **4** bolted to the lower ends of hangers **3**, sleeve bearings **5** fixed to the end walls **6** of the barrel **2** and serving to rotatably support the barrel **2** upon collar bearings **4** which are journaled in bearings **5**.

The cathode contact assembly designated **7** is of the

flexible type. By way of illustration, the flexible contact shown herein is of the type shown in the above said Jackson patent and comprises a metal contact ball or knob **8** which is fixed to the end of a stranded wire cable **9** of any suitable metal such as copper, an inner elastic or rubber cover **10** which extends through bearing **4** down to the ball **8** and an outer cover or sleeve of elastic or rubber material **11** which extends from within bearing **4** to knob **8**.

One end of the barrel has a ring gear **12** affixed thereto which is connected in driving relation with an electric motor (not shown) by a gear train **13**. The work pieces being plated within the barrel are shown in the dotted lines, Fig. 1.

During the plating operation, barrel **2** is rotated on bearing supports **4** and the work is tumbled within the barrel, the current traveling from soluble anodes (not shown) through the solution to the work and thence to the cathode contact assembly **7**. The cathode contact knobs **8** will contact the work and ride along with the work as it travels and tumbles in the barrel. As the work travels upwardly with the barrel, the cathode will sometimes follow the same, as shown in the dotted lines Fig. 1, and as the work tumbles down back to the lower portion or bottom of the barrel, the cathode, being flexible, will usually follow the work, but in some instances the cathode knob **8** will break contact with the work.

To obviate this contingency a flexible arc preventer **14** is secured to the ball or knob **8**. The arc preventer should be of electrically conducting material and flexible, preferably so that it will always tend to fall by gravity from the end of the knob **8** downwardly toward the bottom-most portion of the barrel. By way of illustration, the arc preventer is shown as a link chain **15** of any suitable metal, such as steel or copper. Chain **15** is uncovered or non-insulated and is secured to the knob **8** by a bolt **16** screwed into a tapped hole in the lower end of knob **8**.

From the above it is evident that chain **15** will always provide one or a plurality of contacts with the work even though contact between the cathode knob **8** and the work should be broken either by the work tumbling away from the cathode knob or the cathode **7**, **8** flexing away from the work (dotted line showing in Fig. 1). Since contact will be maintained at all times with the work, the evolution of hydrogen in the bath and the exploding of the same within the plating barrel will be greatly reduced.

In Fig. 4 I have shown a modified form of arc preventer which comprises a flexible stranded steel wire **20** which is secured by bolt **21** and washers **22** to the cathode knob **8**. The flexible metallic conductor of current **20** functions to avoid arcing in substantially the same manner as the link chain **15**.

The chain **15** is the preferred form of flexible arc preventer because it is limp, that is, tends at all times to droop toward the bottom of the barrel **2** and thus maintain contact with the articles being plated. In those cases where a flexible stranded steel wire **20** is used, the wire preferably should be limp. Chain **15** is an example of a flexible arc preventer where the flexibility of the element is due to the loose hinging together of its component parts; namely, the links, whereas the flexibility of the stranded wire cable **20** is inherent in the small strands of which it is composed.

I claim:

In an electroplating machine for electroplating articles in bulk having a perforated barrel rotatably supported at each end for supporting the articles in the plating bath during the plating operation, a flexible cathode lead fixed at one end and projecting into the barrel through an end thereof at its axis of rotation, said flexible cathode lead having an insulating cover terminating short of

the end thereof, a free moving uninsulated cathode contact knob at the end of the cathode lead for electrical contact with the articles being plated, and an arc preventer in the form of a length of flexible link chain secured substantially at its center in electrical conducting relation to said cathode knob to provide a plurality of cathode contact points on both sides of said contact knob whereby said knob makes continuous electrical contact with the articles being plated during its movement among said articles.

UNITED STATES PATENTS

References Cited in the file of this patent

894,482	Catlin	July 28, 1908
2,249,609	Jackson	July 15, 1941

FOREIGN PATENTS

834,575	France	Aug. 22, 1938
558,517	Germany	Sept. 8, 1932