

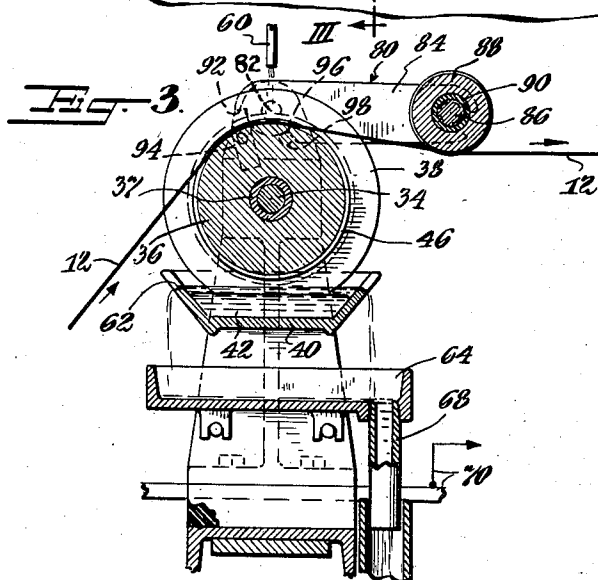
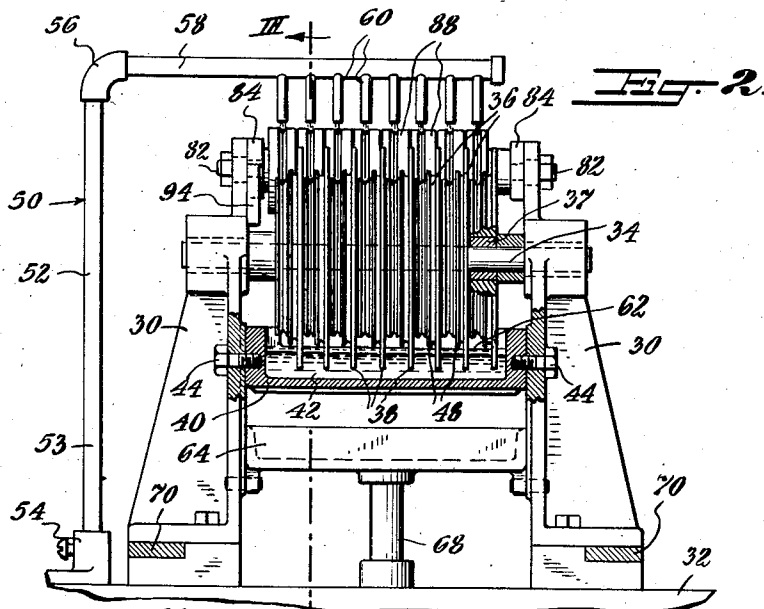
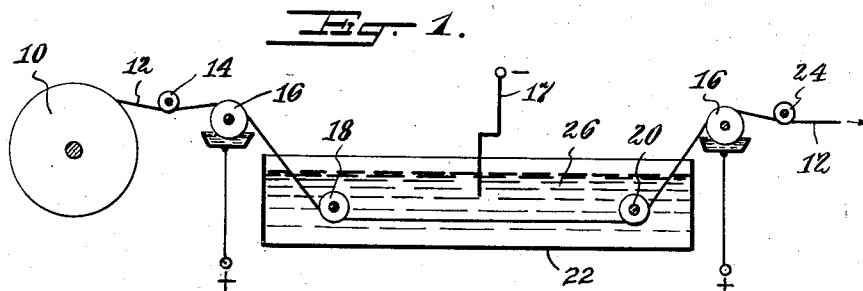
April 14, 1959

W. J. SUMMERS ET AL

2,882,214

CONTACT PULLEY ASSEMBLY FOR WIRE PLATING APPARATUS

Filed Sept. 22, 1955



INVENTORS  
Wm. J. SUMMERS and  
H. P. HASELL  
BY *John J. Kelly*  
ATTORNEY.

1

2,882,214

## CONTACT PULLEY ASSEMBLY FOR WIRE PLATING APPARATUS

William J. Summers, Caldwell, and Henry P. Hasell, Bloomfield, N.J., assignors to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application September 22, 1955, Serial No. 535,836

5 Claims. (Cl. 204—279)

The present invention relates to plating apparatus and, more particularly, to an improved contact assembly for wire plating apparatus.

In the past, a plurality of strands of wire, for example copper, have been fed to a nickel plating bath on a cylindrical drum provided with a like number of wire guide grooves. The drum in turn was mechanically connected to a suitable source of power which mechanical connection failed to give a positive contact due to oxidation or other chemical bath reactions. Due to the fact that the separately reeled strands of wire did not rotate at the same speed the frictional drag of the wire on the drum often caused excessive wear in the wire guide grooves, necessitating repeated repairs and maintenance. In addition, the frictional drag of the wires on the drum limited the size of the wire and the number of strands of wire which could be employed thereon.

Hence, it has been found advantageous according to the present invention to provide an improved contact assembly for wire plating apparatus which eliminates the replacement of worn drums, assures positive current contact between the wires undergoing plating and the power supply and permits a full capacity frictionless run of the wire regardless of size. The improved contact assembly of the invention comprises a plurality of metal contact pulleys, each running independently on a pulley shaft and being provided with a flange for immersion into a reservoir of mercury located underneath and connected to a suitable source of supply. In addition, each pulley is provided with a mercury drainage groove adjacent to the contact flange to prevent mercury being spooned into the wire contact grooves. Means are also provided for washing the pulleys and the wire to remove any cleaning chemicals or acids therefrom. This water collects on top of the mercury in the reservoir to seal the mercury from contact with the air and minimize oxidation thereof. The excess water may drain from the mercury reservoir into a water tray supported on the pulley shaft and mercury reservoir castings therebeneath. A positive pressure roller assembly is provided to insure positive wire pulley contact.

In its general aspect the present invention has as its objective an improved contact pulley assembly for a wire plating apparatus.

A further object is a positive contact assembly for a wire plating apparatus which eliminates frictional drag and excessive wear between the wires and the assembly, assures positive contact between the power supply and the wire undergoing plating, maintains the wire in a clean condition and protects the positive contact means from oxidation, and is capable of handling an unlimited number of strands of wire of any size.

Other objects of the invention will become apparent to those skilled in the art to which it appertains as the description thereof proceeds, both by direct recitation and implication from the context.

Fig. 1 is a diagrammatic side elevational view of a portion of a wire plating apparatus wherein the im-

2

proved contact assembly of the invention is contained. Fig. 2 is an enlarged end elevational view of the improved contact assembly of the invention.

Fig. 3 is a vertical sectional view of the contact assembly along the line III—III of Fig. 2 in the direction of the arrows.

Fig. 4 is an enlarged fragmentary sectional view of the bottom portion of one of the individual contact pulleys showing the mercury reservoir contact flange and the mercury drainage groove adjacent thereto.

Referring now to the drawings and, more particularly, to Fig. 1 the reference numeral 10 designates a spool or a plurality of spools from which a plurality of wires 12, for example copper, to be nickel plated is unreeling, and passed under a like number of guide rollers 14 to the contact assembly 16 of the invention. Each of the wires 12 then passes under guide rollers 18 and 20 immersed in, the example shown in Fig. 1, an alkaline cleaning bath 22 and thence to a second contact apparatus 16 of the invention, under a second guide roller 24 and into a further treatment bath (not shown) of the nickel plating apparatus.

In the alkaline cleaning bath 22, the wires 12 in electrical contact with the contact assembly 16 of the invention are connected, as hereinafter explained, to a source of direct current which makes the wires 12 positive or anodic. The electrolyte 26 in the bath is maintained negative by electrode (or electrodes) 17 immersed therein and connected to the negative pole of the source of direct current.

### Contact assembly

The contact assembly 16 of the invention has a means for mounting and supporting the assembly comprising a pair of castings 30 (Fig. 2) upstanding from a suitable table or mounting bracket 32. A pulley shaft 34 is secured in the upper hubs of the bearings 30. A plurality of stainless steel contact pulleys 36, eight in the present showing of Fig. 2, are mounted on plastic insert bushings 37 on the pulley shaft 34 so that each of the pulleys rotate independently thereon. As shown particularly in Figs. 3 and 4, each of these pulleys 36 is provided with a peripheral mercury contact flange 38 for immersion in a mercury reservoir 40 (containing mercury 42). The reservoir 40 is secured, as by bolts 44, between the inner side walls of the castings 30. In addition, each of the contact pulleys 36 is provided with a V-like wire engaging groove 46 for engagement with one of the wires 12, shown in Figs. 1, 2 and 3. Further, each pulley 36 has an annular mercury drainage groove 48 (Fig. 4) adjacent the flange 38 to prevent any mercury contacting wire engaging portions of the pulley 36.

The invention also contemplates wire washing means 50 for providing a continuous flow of water over the wires 12 and pulleys 36 to wash away any cleaning or acid salts on the wires 12 and to provide a constant protective film over the mercury 42 in the reservoir 40. The wire washing means 50 may comprise (Fig. 3) a manifold 52 connected to a suitable source of water and consisting of a vertical section 53 upstanding from an elbow 54 on the table 32 and connected by means of a second elbow 56 to a generally horizontal portion 58 from which depends a plurality of delivery nipples 60, one for each of the pulleys 38 and the wires 12. Any excess water in the mercury reservoir 40 flows through suitable apertures or drainage openings 62 therein into a water collection tray 64 mounted below the reservoir 40 between the side walls of the castings 30. This water tray 64 is provided with a gravity type drainage aperture 68 for removal of the water therefrom.

As shown particularly in Fig. 3 the castings 30 are connected by a bus-bar conductor 70 to a suitable source of electrical power.

3

In order to insure positive contact of the wires 12 with the pulleys 36, a positive pressure roller assembly 80 (Figs. 2 and 3) is mounted on a pair of stud shafts 82 projecting from the upper portions of the castings 30. This pressure roller assembly 80 has a pair of levers 84, one on each of the shafts 82. The levers 84 in turn carry a pressure roller shaft 86 on the outer portions thereof for mounting thereon a plurality of pressure rollers 88 suitably rotatable on bushings 90 on the shaft 86.

At least one of the levers 84 is provided with a latching or dog receiving notch 92 (Fig. 3) for reception therein of a dog 94 suitably pivoted on the inner side walls of the left hand (when viewed in Fig. 2) casting 30, and a stop pin receiving notch 96 (Fig. 3) for engagement with a stop pin 98 (Fig. 3). Thus it will be seen from a consideration of Fig. 3 that by pivoting the dog 94 in a counterclockwise direction, the pressure roller assembly 80 may be rotated counterclockwise and upwardly to permit the threading of the wires 12 in the grooves 46 of the rollers.

Although a preferred embodiment of the invention has been disclosed, it will be understood that modifications may be made within the spirit and scope of the invention.

We claim:

1. A positive contact assembly between a plurality of wires to be plated and a source of electrical power and comprising mounting and supporting means, a reservoir on said mounting and supporting means, mercury in said reservoir and covered with a protective film of water to prevent oxidation of said mercury and the escape of vapors therefrom and for cooling said mercury to prevent enhanced vaporization therefrom, a pulley shaft in said mounting and supporting means above said reservoir, a plurality of electrically conducting contact pulleys on said shaft, each of said pulleys being in contact with one of said wires and said mercury and means on said supporting and mounting means for washing said pulleys and said wires and providing said protective film on said mercury.

2. A positive contact assembly between a plurality of wires to be plated and a source of electrical power and comprising mounting and supporting means, a reservoir on said mounting and supporting means, mercury in said reservoir and covered with a protective film of water to prevent oxidation of said mercury and the escape of vapors therefrom and for cooling said mercury to prevent enhanced vaporization therefrom, a pulley shaft in said mounting and supporting means above said reservoir, a plurality of electrically conducting contact pulleys on said shaft, each of said pulleys being in contact with one of said wires and said mercury, means on said supporting and mounting means for washing said pulleys and said wires and providing said protective film on said mercury and a positive pressure roller assembly on said mounting and supporting means for maintaining positive electrical contact between said wires and said pulleys.

4

3. A positive contact assembly between a plurality of wires to be plated and a source of electrical power and comprising mounting and supporting means, a reservoir on said mounting and supporting means, mercury in said reservoir and covered with a protective film of water to prevent oxidation of said mercury and the escape of vapors therefrom and for cooling said mercury to prevent enhanced vaporization therefrom, a pulley shaft in said mounting and supporting means above said reservoir, a plurality of electrically conducting contact pulleys on said shaft, each of said pulleys being in contact with one of said wires and said mercury and having a peripheral drainage groove to prevent said mercury from being carried by said pulley into contact with said wire, means on said supporting and mounting means for washing said pulleys and said wires and providing said protective film on said mercury and a positive pressure roller assembly on said mounting and supporting means for maintaining positive electrical contact between said wires and said pulleys.

4. A positive contact assembly between a wire to be plated and a source of electrical power and comprising mounting and supporting means, a reservoir on said mounting and supporting means, mercury in said reservoir and covered with a protective film of water to prevent oxidation of said mercury and the escape of vapors therefrom and for cooling said mercury to prevent enhanced vaporization therefrom, a pulley shaft in said mounting and supporting means above said reservoir, an electrically conducting contact pulley on said shaft, said pulley being in contact with said wire and said mercury.

5. A positive contact assembly between a plurality of wires to be plated and a source of electrical power and comprising mounting and supporting means, a reservoir on said mounting and supporting means, mercury in said reservoir and covered with a protective film of water to prevent oxidation of said mercury and the escape of vapors therefrom and for cooling said mercury to prevent enhanced vaporization therefrom, a pulley shaft in said mounting and supporting means above said reservoir, a plurality of electrically conducting contact pulleys on said shaft, each of said pulleys being in contact with one of said wires and said mercury and having a peripheral drainage groove to prevent said mercury from being carried by said pulley into contact with said wire.

#### References Cited in the file of this patent

#### UNITED STATES PATENTS

|           |              |                |
|-----------|--------------|----------------|
| 611,148   | Rawson       | Sept. 20, 1898 |
| 1,900,534 | Wilkins      | Mar. 7, 1933   |
| 2,702,320 | Stock et al. | Feb. 15, 1955  |
| 2,704,794 | Hanson       | Mar. 22, 1955  |
| 2,717,285 | Rayburn      | Sept. 6, 1955  |