Dec. 16, 1941. C. G. WATSON 2,266,347

ELECTROPLATING CONTACT ROLL

Filed June 25, 1938

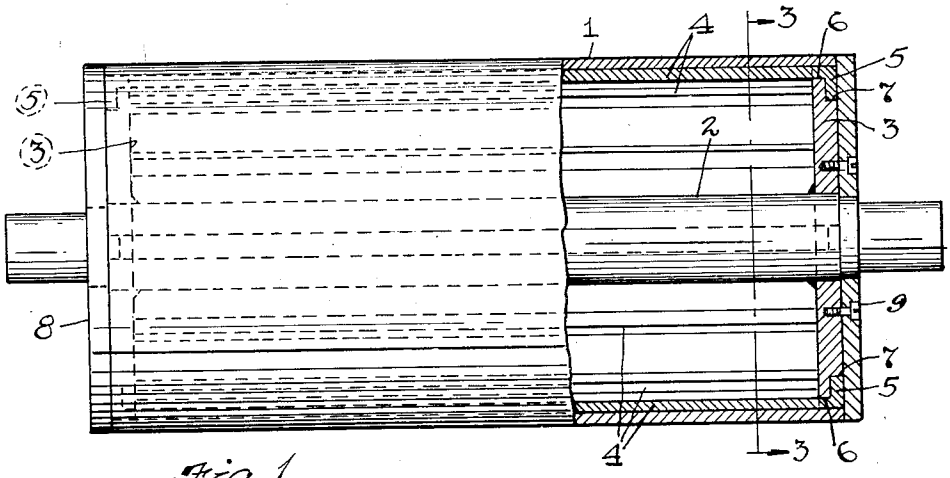


Fig. 1

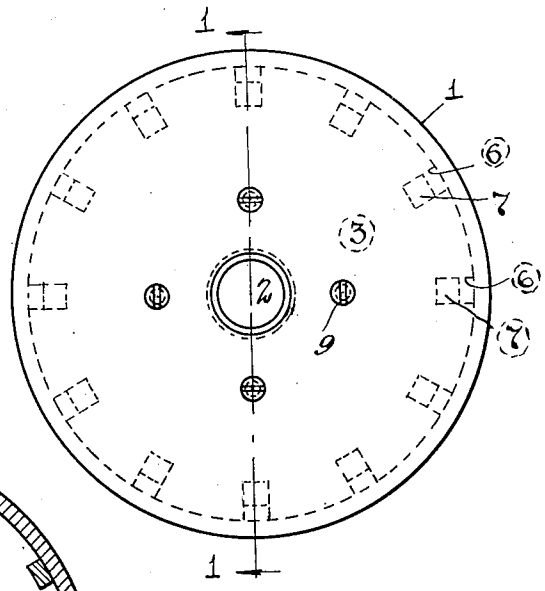


Fig. 2

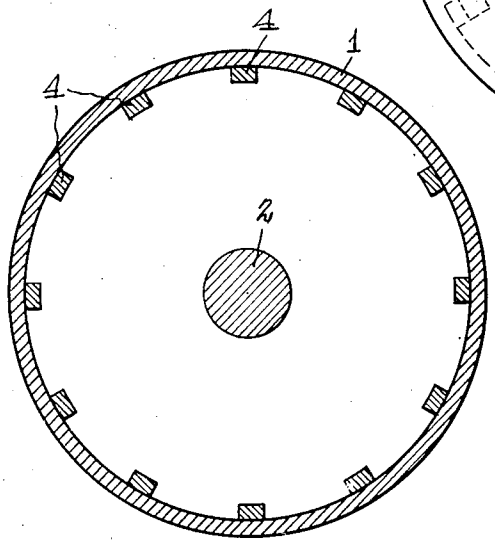


Fig. 3

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ELECTROPLATING CONTACT ROLL

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5 Claims. (Cl. 204—279)

This invention relates to improvements in contact rolls of the type used in guiding steel sheet material into an electroplating bath. In practice, such material is fed from an acid pickling bath over such contact roll into the bath used for the plating operation. To preserve such rolls from destruction by acid, they have been made with a circumferential shell of a metal which is highly resistant to acid action, such as nickel or a composition containing a large percentage of nickel. In practice it has been customary to supply the electric current used in the plating operation through these contact rolls. However, the relatively high electrical resistance of such metal shell has caused unsatisfactory distribution of the electric current along the line of contact which extends axially on the surface of the roll and across the width of the sheet. This invention discloses means whereby the desired even distribution of electromotive force along such line of contact may be approximated.

It is a further object of this invention to solve said problem by means which may be economically constructed and which may be operated without wear and maintenance costs.

For the attainment of said ends and others which will appear from the herein described embodiments, the invention provides a distributive cage of metal which is highly electrically conductive, which cage is mounted within the contact roll in intimate connection with the inside surface of the said shell. All elements of such cage draw electrical current from a common source such as a plate or ring mounted adjacent an end of the roll, with which plate or ring said elements are joined. Electrical current is supplied to such ring or plate by means well understood in the art, such as by brushes contacting therewith, which electrical connections being no part of the invention are not shown or described herein.

Referring to the drawing in which a preferred embodiment of the invention is shown, Fig. 1 shows an elevational view of a roll partly in cross-section; Fig. 2 shows a view of an end of the rolls with contact plate mounted thereon; and Fig. 3 shows a cross-sectional view of the roll taken intermediate the ends at 3—3. In said embodiment a shell 1 of nickel is mounted on an axle shaft 2 by end plates 3 of steel fitted within the ends of the shell 1. In spaced relation bars 4 of copper are mounted on the inside surface of the shell 1 and sweated thereto. The ends 5 of such bars pass through openings 6 provided in the end plates 3 and are bent inwardly in to L shape with the bent ends 5 fitted in recesses 7 in the end plates 3. A flat copper ring 8 is mounted on the end plate 3 by screws 9, and is drawn into intimate contact with the faces of the rod ends 5 and with the end of the shell 1. Electrical contact between the ring 8 and the rod ends 5 and shell 1 may be improved by a sweated connection therebetween.

It is apparent that the shaft 2 may be drilled axially for the introduction therethrough into the shell of a cooling medium, by means which are well understood in the art.

In operation brushes connected with a source supplying a suitable electromotive force will be mounted to contact the ring 8 continuously as the roll revolves. The low resistance of the copper bars 4 will cause the current to flow uniformly to every part of said bars from which it will flow to the shell and thence to the steel sheet passed thereover.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims, or the equivalent of such, be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In an electrically conductive contact roll comprising a cylindrical shell, a shaft, and end plates supporting such shell about such shaft as an axis, the combination of such shell, said shell being of metal highly resistant to chemical action; a plurality of bars having low electrical resistance, said bars extending substantially from end to end of said shell and being united therewith on the inner surface thereof to form an integral structure therewith; and means operative to connect said bars to a branch of a circuit carrying a suitable electromotive force, said means including a circular plate of metal of low electrical resistance, mounted on an end of such roll, which plate is in intimate contact with an end of each of said bars.

2. In an electrically conductive contact roll comprising a cylindrical shell, a shaft, and means supporting such shell about such shaft as an axis, the combination of such shell, said shell being of metal comprising a substantial proportion of nickel; a plurality of bars of copper, said bars extending substantially from end to end of said shell in spaced circumferential relation and being sweated with said shell to form an integral structure therewith; and a circular plate of copper mounted adjacent one end of said shell, said plate being united to an end of each of said

copper bars forming an integral structure therewith.

3. An electrically conductive contact roll comprising a cylindrical shell of metal relatively highly resistant to chemical action of acids, a plurality of spaced metal bars of relatively low electrical resistance extended axially substantially from end to end of said shell and brazed on the inside surface thereof, and a flat ring of metal of low electrical resistance mounted on the end of said shell and in intimate contact with the ends of said bars.

4. An electrically conductive contact roll comprising a cylindrical shell of metal relatively highly resistant to chemical action; a plurality of bars of metal having relatively low electrical resistance, which bars are brazed in spaced relation on the inside surface of said shell and are extended axially from end to end thereof; and a flat ring of metal having relatively low electrical resistance mounted in intimate contact with the ends of said bars.

5. A contact roll comprising a cylindrical shell of metal relatively highly resistant to the chemical action of acids, an axle shaft extended through said shell, metal plates mounted within the ends of said shell and supporting the ends thereof about said shaft, a plurality of metal bars of relatively low electrical resistance brazed on the inside of said shell in circumferentially spaced relation, which bars extend axially and extend through one of the said plates, and a flat ring of metal having relatively low electrical resistance mounted on one of said plates and in intimate electrical contact with the ends of said bars.

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