W. PFANHAUSER.

MECHANICAL ARRANGEMENT FOR ELECTROPLATING OBJECTS.

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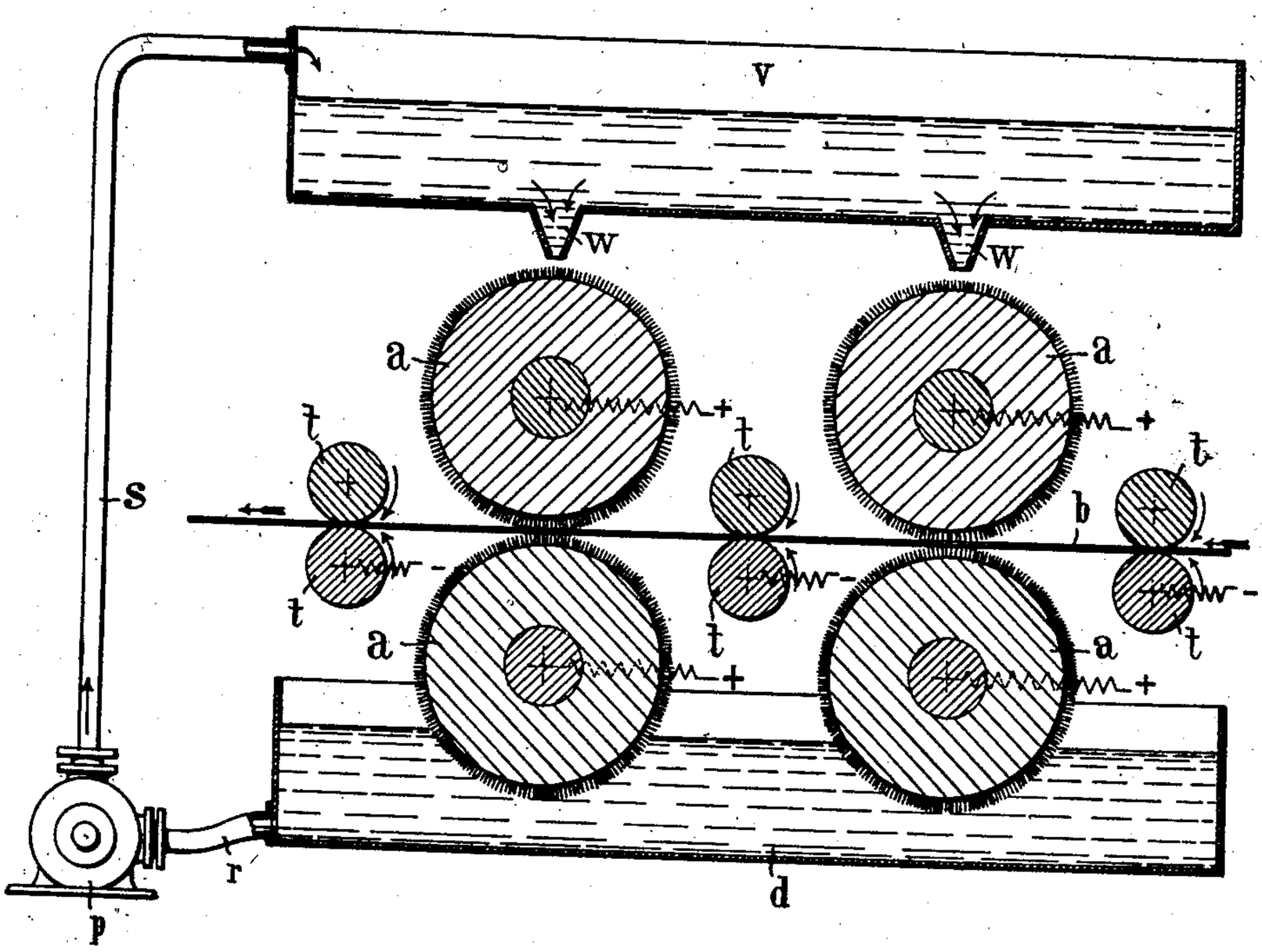

Witnesses:
L. Lang
C. Hufmann

Inventor:
Wilhelm Pfanhauser
by P. Singer atty

UNITED STATES PATENT OFFICE.

WILHELM PFANHAUSER, OF LEIPZIG, GERMANY.

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936,472. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed June 18, 1909. Serial No. 502,962.

To all whom it may concern:

Be it known that I, WILHELM PFANHAUSER, company director, a subject of the Emperor of Germany, and resident of 13 Schwägrichenstrasse, Leipzig, in the Kingdom of Saxony, Germany, have invented new and useful Improvements in Mechanical Arrangement for Electroplating Objects, of which the following is a specification.

The coating or electro-plating of stationary objects, which are either electrical conductors in themselves or can be converted into such, with metal deposits by means of a brush, the deposit being applied by moving the brush to and fro on the surface to be plated, as in painting, is known. If, to accelerate the depositing action, a higher electro-motive force is employed, the deposit becomes rough, as, for instance, is the case when electro-plating sheet metal with zinc or lead, with a current of about three and one half amperes per ten square inches, and which arises owing to the single metal crystals sprouting from the pores of the flannel pad containing the electrolyte in a direction vertical to the surface to be electro-plated. This method was improved by the brush being operated by mechanical power and by its receiving a rotary, as well as a to-and-fro, movement. All these methods have, however, the common disadvantage that the electro-plating is always dependent on the feeling or sensitiveness of the operator. If the hand pressure is altered, the resistance and also the strength of the current are altered. The amount of the metal deposit is thus subject to constant alteration and a uniform electro-plating in which all parts receive exactly the same amount of coating is quite impossible.

In addition to the above, there is the further disadvantage in using brushes that a very high electro-motive force of at least 30 volts must be employed which is not usual in galvanizing factories and this increases the expense of the electro-plating enormously.

The arrangement forming the basis of the present application does away intentionally with the operation by hand and is characterized by the feature that anodes of roller form or other form suitable for the objects to be plated and covered with felt, flannel, porous stones etc. are arranged in pairs over each other and receive a uniform rotary motion around their axis. The object to be electro-plated whose negative pole is joined up to the source of current is drawn through these anodes by means of feed rollers and is then, after turning on the current, electro-plated in a perfectly uniform degree. Seeing the pressure of the rollers carrying the anodes under the non-conducting material is exactly the same on all portions of the object in electrical connection with the negative pole, the distance between the anodes and cathodes always remains the same, so that the resistance and the strength of the current likewise remain the same and insure the mechanical coating being perfectly even.

An arrangement corresponding to the invention is shown in the accompanying drawing in vertical section and in which *a* are the anode rollers. These latter are arranged in pairs over each other and the sheet metal *b* to be electro-plated is fed between them. The rollers contact in their rotary movement in a tangential direction with the object to be electro-plated. In front, between and behind the anode rollers are arranged feed rollers *t* which serve to move forward the object to be electro-plated.

The rotary speed of the anode rollers *a* can be varied the same as that of the feed rollers *t*. The electrolyte flows out of the upper receptacle *v* through the outlet-opening *w* on to the anode rollers *a* and drops thence into the lower recepacle *d* to be then pumped back through the pipes *r* and into the upper receptacle *v* by means of the pump *p*.

In using rotary anodes it is possible to allow several of them to act successively on the metal to be electro-plated, an increased deposit being then obtained at the same speed or the same deposit with an increased speed.

The present arrangement has the advantage, in galvanizing sheet metals, in presence of the methods used hitherto of electro-plating metals between parallel anode plates that the same amount of metal is deposited on all parts of the sheet metal to be electro-plated, while in the method hitherto used, as has already been explained, the parts of the cathodes lying nearest to the anodes receive a greater deposit owing to the inequalities of the electrodes or to the defective regulation of the distance. The edges were also hitherto covered with a thicker coating of

metal than the center parts owing to the scattering of the lines of the current corresponding to the scattering properties of the electrolytes employed. In the present method angle-iron, U-iron, corrugated metal etc. can be evenly electro-plated on all sides. All that is necessary is to give the rotary anodes which are covered with non-conducting material and impregnated with electrolyte a corresponding size or profile.

The parts described can also easily be so arranged that the objects passing through same can be cleaned in one passage of oxygen and fat either electrolytically or mechanically, and, after electro-plating, said object can also be dried or burnished or polished. The application of the current is best effected by contact rollers which lie between the anode rollers.

A further advantage of the present invention is that the uniform and rapid electroplating can be effected mechanically with a minimum of electro-motive force, since it is possible by the present method to reduce the distance of the electrodes from each other to $\frac{1}{2}$ mm. so that the necessary tension to overcome the resistance in the electrolyte needs only be very small despite the high conductivity.

The method of electro-plating metals is, for instance, as follows: An elastic roller is pressed on to the sheet metal from above. The metal is thus not only moved forward by the rotary motion of the lower roller, but, seeing the latter is connected with the negative pole, a steady and intimate contact is also insured. Owing to the objects to be electro-plated being passed through the anode rollers automatically, a larger production is obtained. By the arrangement of upper and lower anode rollers the electroplating of both sides of the object is effected simultaneously which represents a considerable technical advance over galvanizing by hand.

A further advantage is obtained by the arrangement of rotary feed rollers by the objects to be galvanized being fed flat through the anode rollers, so that the pressure is perfectly equal on all portions.

Having now fully described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. An electroplating apparatus comprising in combination, movable means connected with one pole of a circuit for applying the electrolyte to the material, and means connected with the other pole for moving the material with respect to said mechanism.

2. An electro-plating apparatus comprising in combination, movable mechanism connected with one pole of a circuit for applying the electrolyte to both sides of the material passing therebetween, and means connected with the other pole for moving the material with respect to said means.

3. An electro-plating apparatus comprising in combination, movable mechanism connected with one pole of a circuit for applying the electrolyte to the material, and means for moving the material with respect to said mechanism, said material being connected with the other pole of the circuit.

4. An electro-plating apparatus comprising in combination, movable mechanisms for successively applying the electrolyte to the material and connected with one pole of the circuit, and means for moving the material with respect to said mechanisms and connected with the other pole of the circuit.

5. An electro-plating apparatus comprising in combination, movable mechanisms for successively applying the electrolyte to both sides of the material and connected with one pole of the circuit, and means for moving said material with respect to said mechanisms and connected with the other pole of the circuit.

6. An electro-plating apparatus comprising in combination, a pair of rollers engaging both sides of the material for applying electrolyte thereto and connected with one pole of a circuit, and means for advancing the material between said rollers and connected with the other pole of a circuit.

7. An electro-plating apparatus comprising in combination, a plurality of pairs of rotatable anode rollers connected with one pole of a circuit and spaced apart from each other for applying electrolyte to the material, and a plurality of pairs of feed rolls disposed on opposite sides of said anode rollers for advancing the material therebetween and connected with the other pole of a circuit.

8. An electro-plating apparatus comprising in combination, a plurality of pairs of anode rollers connected with a pole of a circuit with the rollers of each pair disposed in super-posed relation, a tank for discharging electrolyte upon the uppermost rolls of each pair, a tank in which the lowermost rolls of each pair are partially submerged, means for effecting circulation of the electrolyte between said tanks, and a plurality of pairs of feed rolls connected with the other pole of the circuit and disposed on opposite sides of said anode rolls for advancing the material therebetween.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILHELM PFANHAUSER.

Witnesses:
MAX PHTOTTER,
HEINRICH HEDMANN.