Jan. 28, 1930. J. G. NEWEY ET AL 1,744,792

ELECTROPLATING APPARATUS

Filed Sept. 20, 1927 3 Sheets-Sheet 1

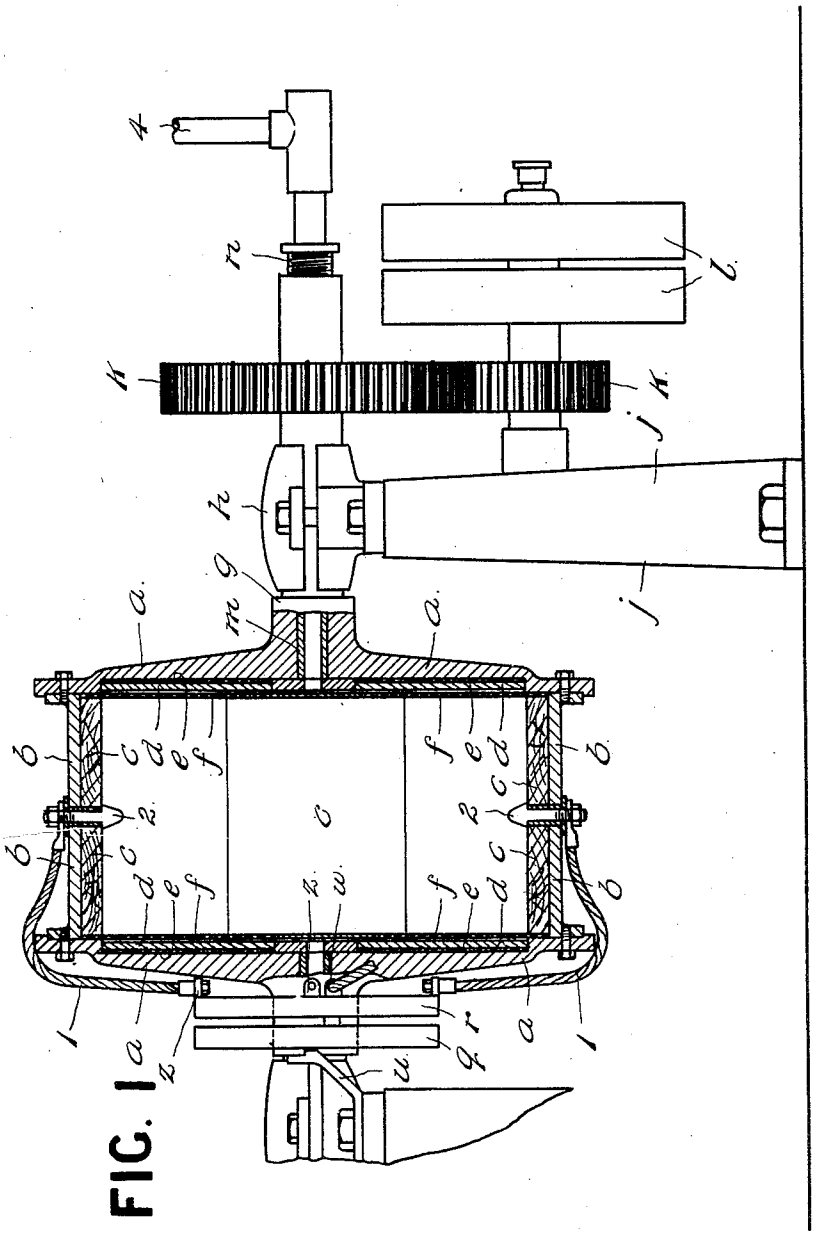


FIG. 1

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ELECTROPLATING APPARATUS

Filed Sept. 20, 1927 3 Sheets-Sheet 2

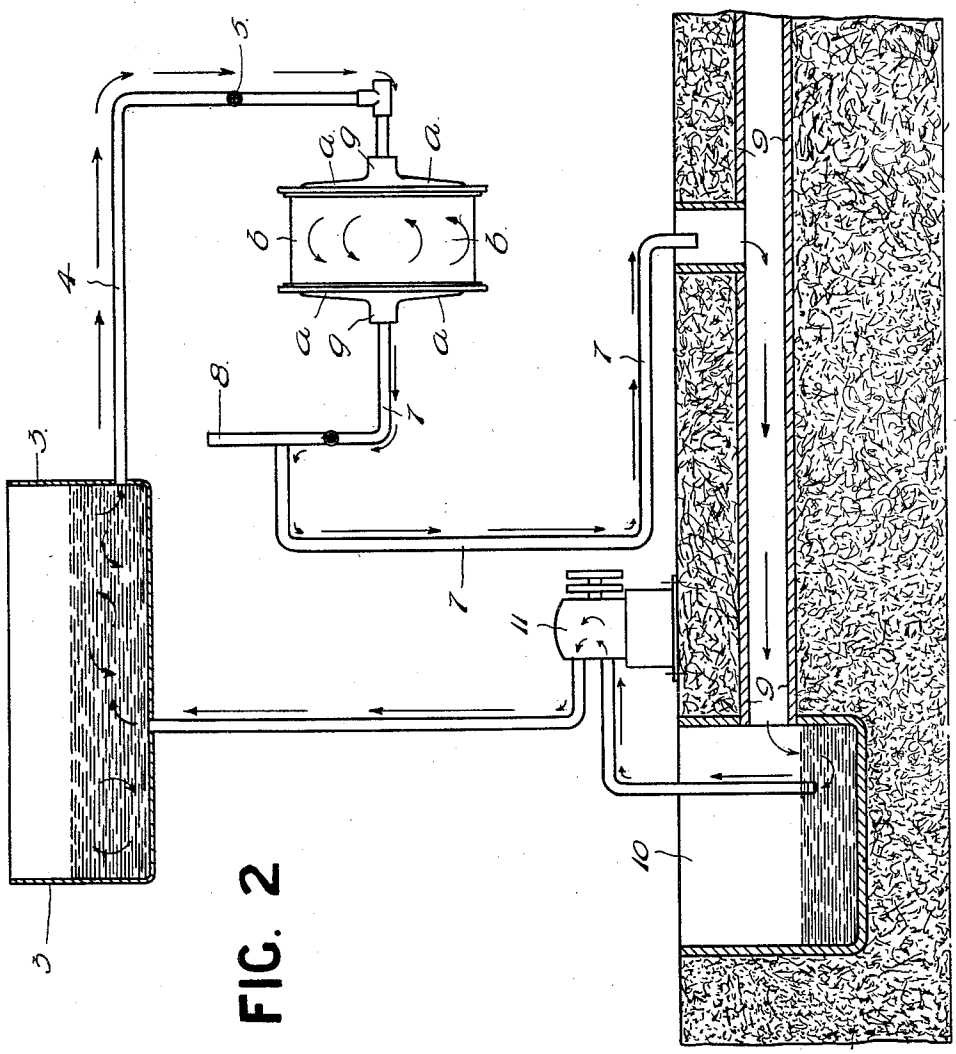


FIG. 2

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ELECTROPLATING APPARATUS

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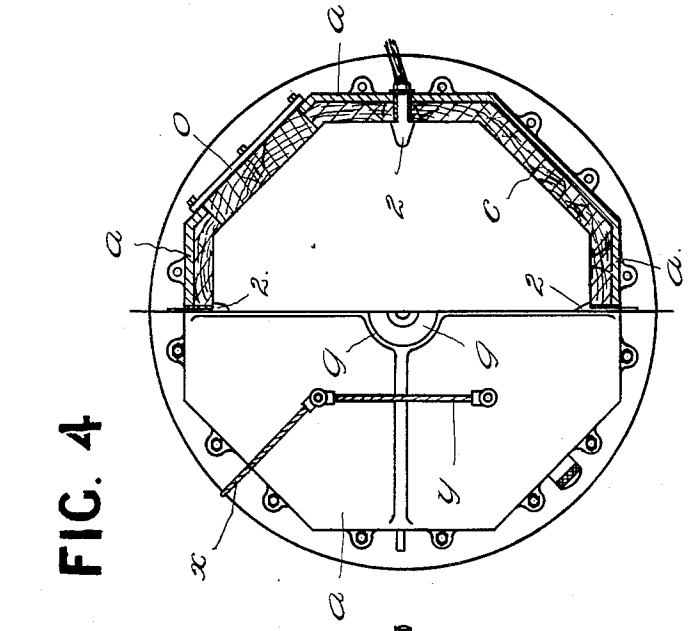


FIG. 4

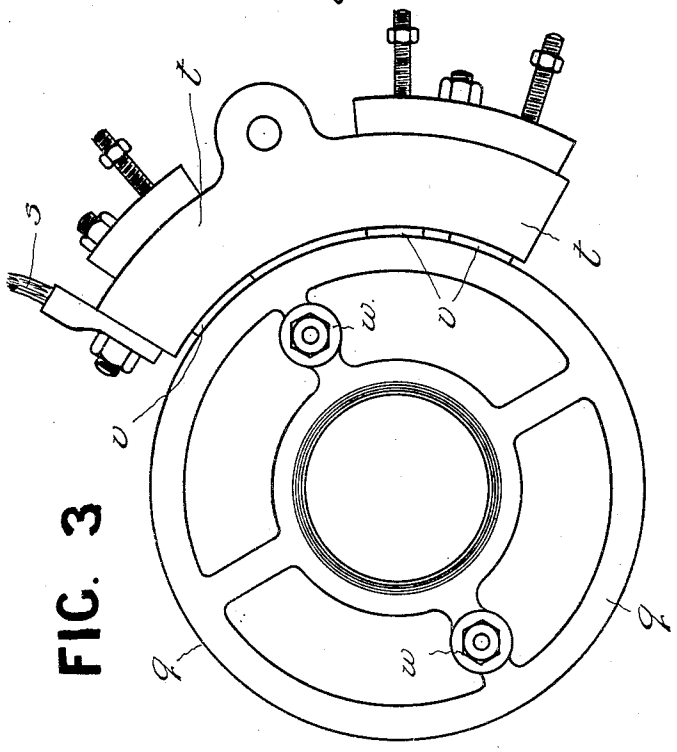


FIG. 3

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1,744,792

UNITED STATES PATENT OFFICE

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ELECTROPLATING APPARATUS

Application filed September 20, 1927, Serial No. 220,761, and in Great Britain October 9, 1926.

This invention relates to improvements in electroplating apparatus, and refers to apparatus particularly adapted for electro-depositing nickel or other metal on small articles which are treated in bulk.

Such articles are commonly plated by placing them in a rotating perforated basket immersed in electrolyte in a suitable vat or tank, anode plates being suspended along the sides of the tank, and the articles in the basket being brought into contact with studs or plates connected to the electrical current supply.

A plant of this type occupies a considerable amount of floor space and is comparatively inefficient from an electrical standard owing to current leakages at various points, and further the plant involves heavy labour costs in handling the articles when charging or removing them from the tank.

The object of our invention is to provide a simple and extremely compact form of electro-plating apparatus which enables a vat or tank to be dispensed with, and which is substantially automatic in action, so that it requires a minimum amount of attention. A further advantage of our improved apparatus is that owing to the method of its operation the plating process is greatly accelerated and wastage of electrolyte and of anode material is reduced to a minimum, so that a considerable saving can be effected over the other types of apparatus.

Our invention comprises an improved electro-plating apparatus, consisting of a closed rotatable barrel of suitable insulating material, adapted to receive the electrolyte and the articles to be plated, having anode plates mounted in or upon its end walls, and cathode contact studs or plates with which the articles to be plated make contact arranged at intervals around its periphery.

Current is conveyed to the anode plates and the contact studs by means of brushes engaging slip rings on the spindle or trunnions of the barrel, and the anode plates are protected by covering plates of perforated celluloid or other suitable material, so that the articles to be plated cannot come into direct contact with the anodes. Preferably the celluloid covering plates are spaced a short distance, say one quarter to one half inch, from the anode plates.

For the most efficient working of the apparatus, the electrolyte is preferably circulated continuously through the barrel from an overhead tank, the electrolyte being fed into and discharged from the barrel through hollow trunnions. By this means the concentration of the electrolyte can be maintained substantially constant, and the temperature rise is kept small as the electrolyte is cooled by its circulation.

A practical form of electro-plating barrel in accordance with our invention is illustrated in the accompanying drawings in which:—

Figure 1 is a side elevation in part section of the barrel and its mounting.

Figure 2 is a diagrammatic illustration of the circulation of the electrolyte.

Figure 3 is a side elevation of one slip-ring and collector brushes for conveying current to the barrel.

Figure 4 is an end elevation in half-section of the barrel on a reduced scale.

As shown in Fig. 1 the barrel consists of metal end plates *a* bolted to a body consisting of a metal shell *b* with a wooden lining *c*, the body being of octagonal or other polygonal section. An annular recess in the inner face of each end of the barrel receives an anode plate *d* of ring form held against a ring of insulating material *e*. A disc of celluloid *f* is arranged in front of and spaced from the anode plate and is perforated with small holes except for a circular area in the centre.

The barrel is mounted on hollow trunnions *g* carried in bearings *h* which are mounted at the upper ends of standards *j*. The barrel is shewn as being driven through gearing *k* from a pulley *l* connected by belting to a line-shaft, but it may if desired be driven by an electric motor through suitable gearing.

Each trunnion has a tubular lead-lined passage *m* extending through it and opening into the space between the anode plate *d* and the celluloid cover plate *e*.

At the outer end of each trunnion is a gland *n* to receive a stationary pipe forming part

of the circulating system for the electrolyte as described below. An opening fitted with a cover *o*, Fig. 4, is provided in one face of the barrel for the insertion of the articles to be treated, and a drain plug *p* is provided in the opposite face.

Current is conveyed to the electrodes in the barrel from insulated slip rings *q*, *r*, mounted on one end of the barrel. As shown in Fig. 3, a positive lead *s* is taken to a holder *t* mounted on the bracket *u*, Fig. 1, and the holder carries brushes *v* bearing on the periphery of the ring. Fixed lugs *w* on the spokes of the ring *q* are connected by leads to insulated studs passing through the ends of the barrel into the anode plate, the lead *x*, Fig. 1, to the farther anode plate being taken across the outside of the barrel. The studs for each anode plate may be interconnected by external leads as shown at *y* in order to equalize the current density over the plate.

Lugs *z* on the other slip ring *r* are connected by leads 1 as shown in Fig. 1, to the cathodes which are formed by insulated conical-headed studs 2 mounted in the body of the barrel and projecting into the interior so that they make contact with the articles in the barrel. The circulation of the electrolyte is shown diagrammatically in Fig. 2. The electrolyte flows from an overhead tank *e* through a pipe 4 provided with a stop-cock 6 into one end of the barrel. After circulating through the barrel it leaves the other end through a pipe 7 provided with a vent or stand-pipe 8 and flows by gravity into a conduit 9 leading to a sunk tank 10 from which it is returned to the over-head tank 3 by a pump 11. The tanks may serve any number of barrels which may conveniently be arranged in line and can be driven from the same line-shaft.

When a batch of articles has been plated the electrolyte supply is cut off by closing the stop-cock 6 and the electrolyte is drained off into the conduit 9 by removing the drain-plug *p*. The cover *o* is then removed, and by rotating the barrel the opening is brought to the bottom so that the finished articles are discharged into a suitable container.

We claim:—

1. Electro-plating apparatus comprising a closed rotatable barrel, hollow trunnions on which said barrel is mounted, recesses in the inner faces of the ends of said barrel, anode plates mounted in said recesses, perforated plates of insulating material covering said recesses and anode plates, cathode studs arranged at intervals around the periphery of said barrel, and means for circulating electrolyte through the hollow trunnions and barrel and over the anode plates.

2. Electro-plating apparatus comprising a closed rotatable barrel, hollow trunnions on which said barrel is mounted, an anode plate mounted in a recess in each end of said barrel, perforated plates of insulating material covering but spaced from said anode plates, cathode studs arranged at intervals around the periphery of said barrel, means for feeding electrolyte through one trunnion into the space between the adjacent anode plate and the perforated cover plate, and means for withdrawing electrolyte from the space between the other anode plate and its cover plate.

3. Electro-plating apparatus comprising a rotatable barrel body of polygonal section, a lining of insulating material for said body, end closures for said body, recesses in said end closures, insulated anode plates detachably mounted in said recesses, perforated plates of insulating material covering said anode plates and closing said recesses, cathode studs arranged at intervals around the periphery of said barrel body, and means for circulating electrolyte through said body and over said anode plates.

4. Electro-plating apparatus comprising a hollow rotatable barrel, hollow trunnions on which said barrel is mounted, an insulated anode disc mounted in recesses in each end of said barrel, a disc of insulating material covering but spaced from each anode disc, perforations in the outer parts of said insulating discs, cathode studs arranged at intervals around the periphery of said barrel, means for feeding electrolyte through one of said hollow trunnions against the imperforate centre of one insulating disc so that the electrolyte flows outwardly over the surface of the adjacent anode disc, and then enters the barrel through the perforations in the outer part of said disc, and means for withdrawing electrolyte through the other hollow trunnion.

Dated this 1st day of September, 1927.

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