

May 4, 1926.

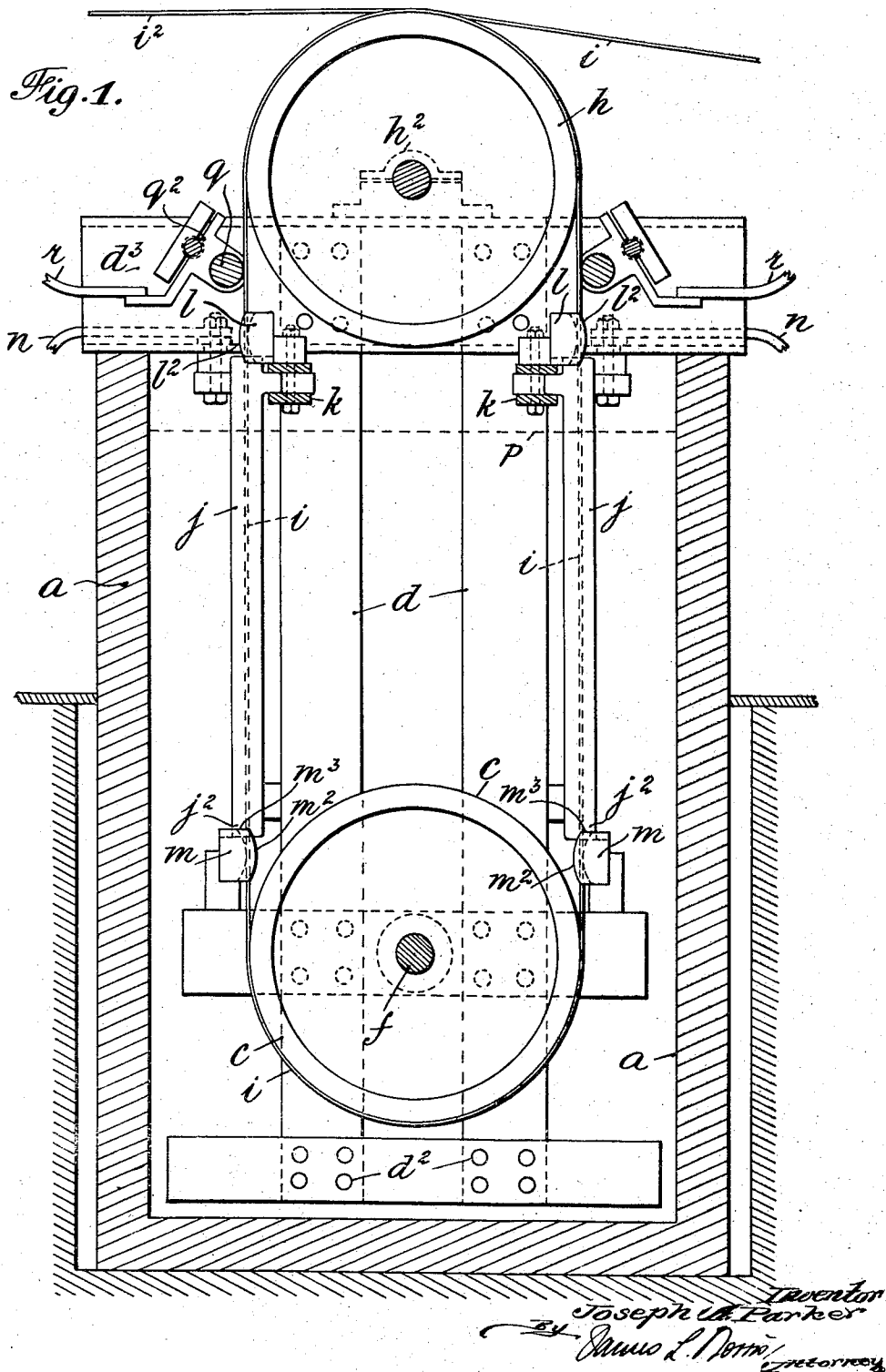
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1,583,741

APPARATUS FOR THE ELECTRODEPOSITION OF METALS ON WIRE AND STRIP

Filed Feb. 10, 1925

4 Sheets-Sheet 1



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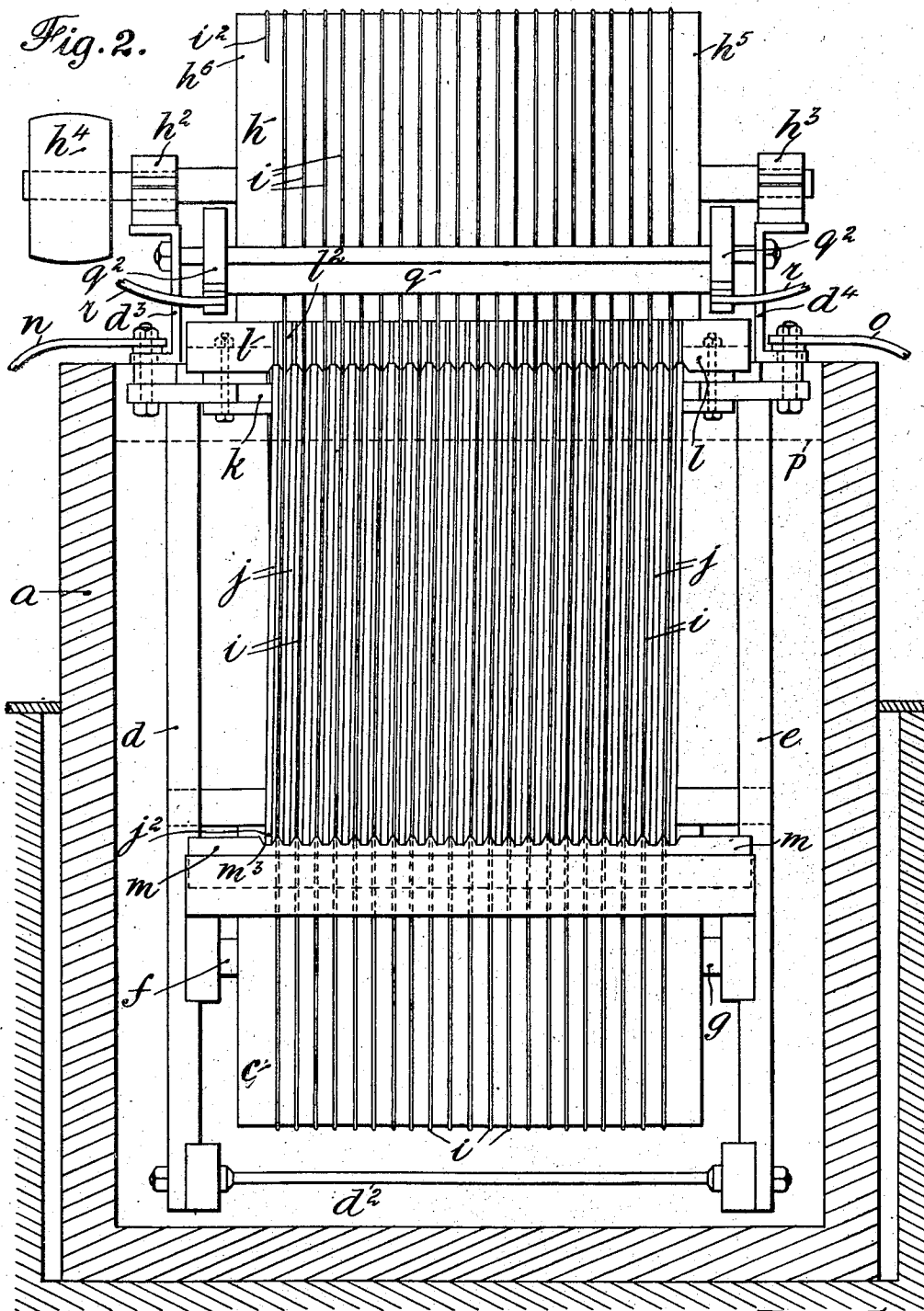


Fig. 3.

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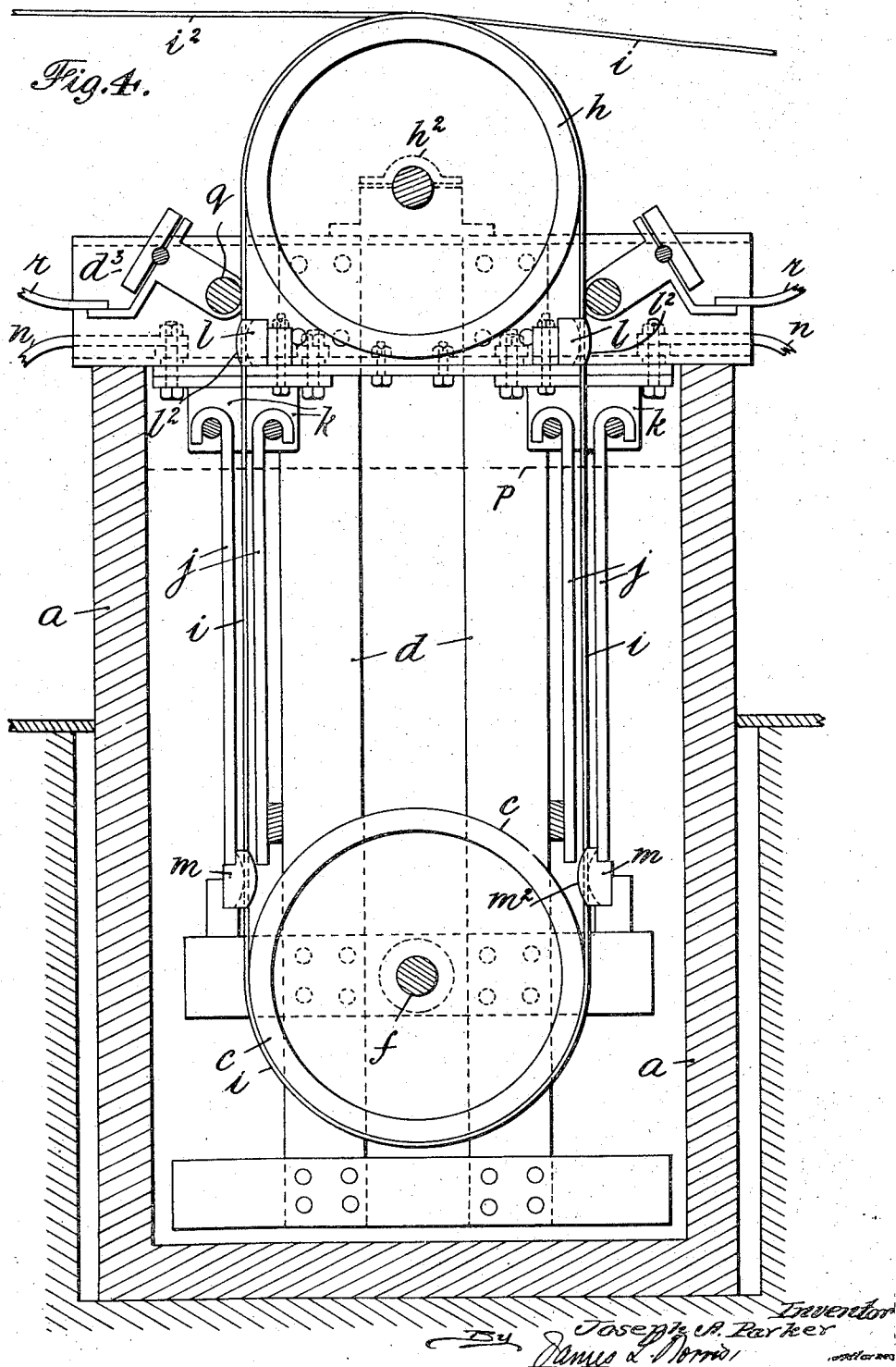
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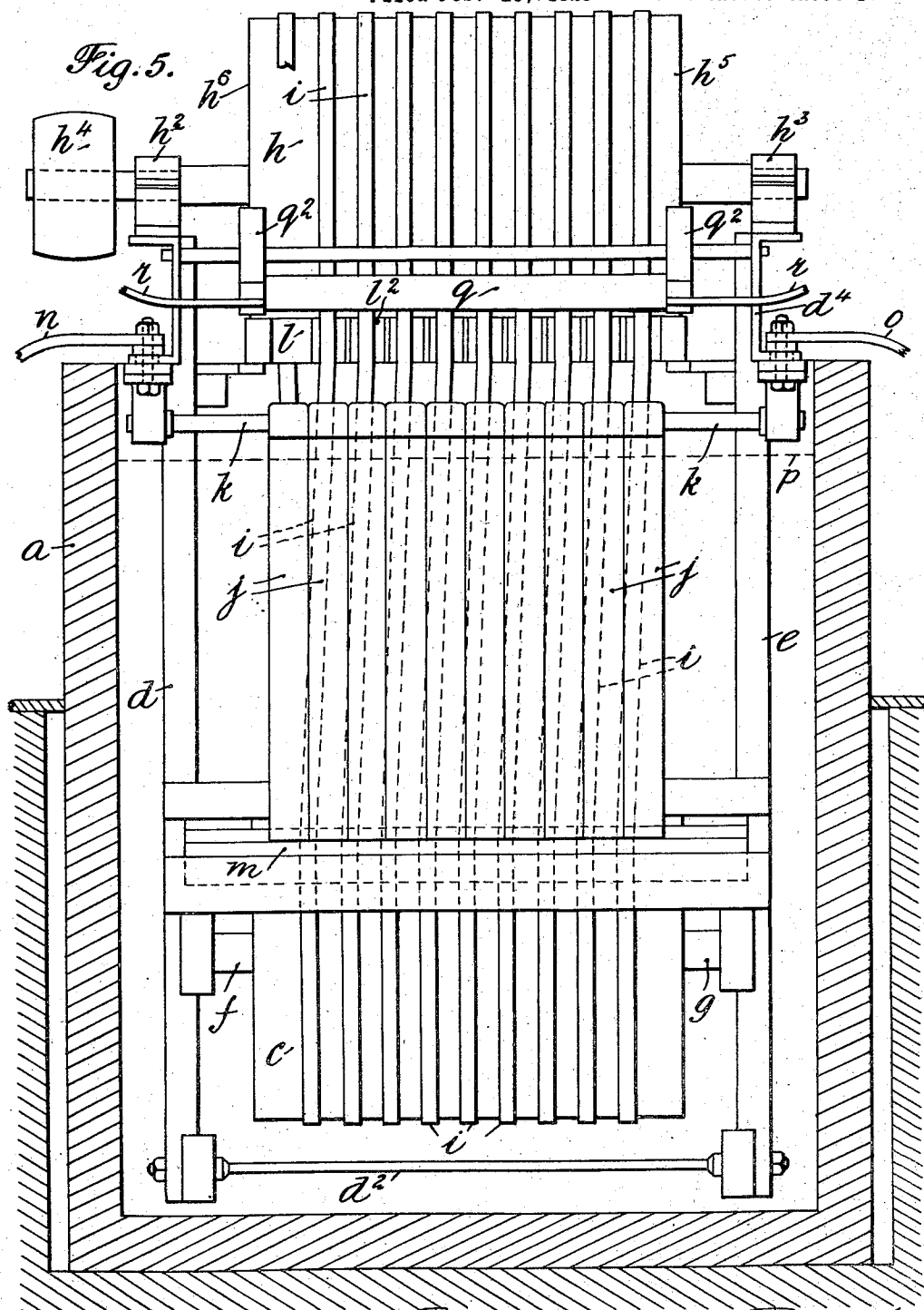
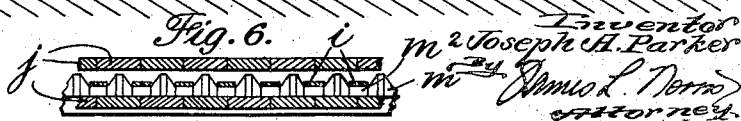
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE ELECTRODEPOSITION OF METALS ON WIRE AND STRIP.

Application filed February 10, 1925. Serial No. 8,230.

To all whom it may concern:

Be it known that I, JOSEPH ARTHUR PARKER, subject of the King of Great Britain, residing at Arno House, Llantarnan Road, Cwmbran, South Wales, have invented certain new and useful Improvements in Apparatus for the Electrodeposition of Metals on Wire and Strip, of which the following is a specification.

The invention relates to apparatus for the electrodeposition of metals on wire and strip.

The apparatus is of character which embodies a vat or tank to contain the electrolyte and the anodes. The wire or strip to be treated travels in an endless winding manner over and between two drums or equivalents, one of which is immersed in the electrolyte and the other of which is located above the level of the electrolyte as, for example, above the tank or vat. The wire or strip, during its endless travel under tension is alternately exposed to the solution and to the atmosphere. The drums are made of insulating material and preferably are disposed in vertical alignment. The wire or strip to be treated is fed onto the top of the upper drum at one end of the drum, passes downwardly and around the lower drum at the same end, then upwardly and around the upper drum and then downwardly round the lower drum and so on in endless winding manner with the coils thus formed in spaced relation until it is taken off at the other end of the upper drum, thus passing through the electrolyte a sufficient number of times to be efficiently plated, and between each immersion being exposed to the atmosphere. The winding is caused by staggered guiding grooves of the apparatus.

A desirable arrangement is to positively pull the wire off the drums against tension applied to the wire at the entrance side and such pull also serves to revolve the drums. Each stretch of wire or strip between the drums passes freely between two anode surfaces so that there is a very large area of anode surface in close proximity to each stretch; and the anodes are preferably in the form of narrow bars detachably supported by upper bearers. The cathode connections for the wire or strip are preferably in the form of a copper roller or bar on each side of the drums with which the wire or strip wipes in its travel. The bar anodes

may hang from a notched upper bearer and engage a notched lower bearer.

Two desirable embodiments of the invention one for wire, and the other for narrow strip, are illustrated in the accompanying drawings, wherein:

Fig. 1 is a transverse vertical section of an apparatus for use with wire.

Fig. 2 is a longitudinal sectional elevation of the apparatus shown in Fig. 1.

Fig. 3 shows a transverse sectional detail of the arrangement of anodes used in the apparatus shown in Figs. 1 and 2.

Fig. 4 is a transverse vertical section of an apparatus for use with strip.

Fig. 5 is a longitudinal sectional elevation of the apparatus shown in Fig. 4.

Fig. 6 is a transverse sectional detail of the arrangement of anodes used in the form of apparatus shown in Figs. 4 and 5.

Similar letters of reference indicate like parts in all the figures of the drawings, both as to the apparatus shown in Figs. 1 to 3 and as to the apparatus shown in Figs. 4 to 5, as they differ only in the proportion of parts enabling the first form to accommodate wire and the second form to accommodate strips.

a is the tank or vat which contains the electrolyte. A drum c of insulating material is supported at the lower portion of the tank by bearers d and e suspended from the top of the tank and which carry trunnions f and g on which the drum c rotates. The lower ends of the bearers d and e are rigidly connected together by lower stays, one of which is shown at d^2 . The bearers d and e are supported at the upper end of the tank by the channel bars d^3 , d^4 .

A second rotary drum h , also formed of insulating material, is supported above the upper end of the tank and has trunnions journaled in bearings h^2 , h^3 which are supported on the tops of the channel bars d^3 , d^4 . This upper drum h may be revolved, if desired, from a pulley h^4 , but preferably it is revolved as otherwise hereinafter stated. The wire or strip i to be treated is first fed onto the top of the drum h at the end h^5 (Fig. 2) of said drum and passes downwardly around the lower drum c at the adjacent end and then upwardly and then around the upper drum and then downwardly around the lower drum again and so on in endless winding manner, with the coils spaced apart, to

the end h^6 of the upper drum. Said wire or strip therefore passes downwardly and upwardly through the solution many times and between each passage through the solution is exposed to the atmosphere while travelling above the level of the solution and around the upper drum h so that said wire or strip in its passage through the machine is alternately exposed to the solution and to the atmosphere, the drums c and h or their equivalents being of any suitable length to expose the strip or wire the desired number of times to both the solution and the atmosphere and thus to complete the electrodeposition of metal thereon.

It is preferable to positively draw the wire or strip by suitable power connection off the drum at i^2 against tension on the wire at the feed side, said drawing of the wire resulting in revolving the drums. If desired, as an alternative arrangement, the shaft of the drum h may carry a pulley h^4 which may be driven by a belt from a suitable source of power.

The anodes j are shown as in the form of numerous bars rigidly suspended from upper bearers k , one on each side the drums c and h . Said anode bars are spaced apart, as clearly represented by the drawings, so that each stretch of wire or strip passing through the electrolyte also passes between two anode bars so that there is a very large area of anode surface in close proximity to each stretch of wire. The wire or strip travels spirally over the drums and is so guided by upper and lower fixed bars l and m grooved, respectively, at l^2 and m^2 in staggered relation, the wire or strip therefore being spirally guided to the drums c and h as it traverses the grooves l^2 and m^2 . The bars m , m in Figs. 1 to 3 have grooves m^3 , m^3 in their upper sides to receive the lower ends j^2 of the anode bars j the proper distance apart.

The anode bars j are connected to a source of electric energy by leads n and o . The level of electrolytic solution in the tank a is indicated by the letter p .

The cathode connections are made with the wire or strip on both sides of the drum h at a position above the electrolyte and may comprise bars q against which the wire or strip i wipes as it passes to or from the drum h . These bars q are supported by the brackets q^2 supported by the channel bars q^3 , q^4 but insulated from the latter. The cathode connections from the source of energy to the bars q are at r .

The invention is particularly adaptable for the electro-deposition of spelter on wire or strip but the apparatus can be very conveniently adapted for the electrodeposition on wire or strip of other metals, such as copper, tin, gold, silver, nickel, brass, lead and platinum.

Having now described my invention what I claim and desire to secure by Letters Patent is:—

1. An apparatus for the electro-deposition of metals on continuous lengths of material, comprising a tank to contain electrolyte, a pair of drums of non-conductive material spaced apart and around which the material to be treated moves in a coil, one of said drums adapted to be submerged in the electrolyte in the tank with the other above the level of such electrolyte, anodes depending into the tank closely adjacent the stretches of material between said drums, and cathode means bearing against said stretches of wire above the level of the electrolyte in said tank.

2. Apparatus according to claim 1 wherein the anodes comprise a plurality of bars spaced apart and between which the stretches of treated material pass on their movement between and around the drums.

3. Apparatus for the electro-deposition of metals on continuous lengths of material, comprising a frame, a drum of non-conducting material journaled at each end of said frame and over which the material to be treated moves in a coil, said frame adapted to be partially submerged in a tank containing an electrolyte with one of said drums immersed in the electrolyte and with the other drum above the level of the electrolyte, a plurality of anodes depending from said frame and adapted to extend into the electrolyte in said tank in close proximity to the stretches of material moving between said drums, and cathodes bearing against said stretches of material between the level of the electrolyte and the upper drum.

4. An apparatus according to claim 3 embodying guiding means adjacent each of the drums for guiding the material to be treated over the drums in spaced coils.

5. An apparatus for the electro-deposition of metals on continuous lengths of metallic material, comprising a frame embodying bars, a roller having its shaft supported by said bars, bearers depending from said bars, a second roller having its journal supported by said bearers adjacent the lower ends of the latter, said rollers adapted to have a continuous strip of metallic material to be treated movable around them in a coil, a plurality of anodes depending from said bars in close proximity to the paths of travel of the stretches of material moving between said rollers, and cathodes bearing against said stretches of material above said bars.

6. An apparatus for the electro-deposition of metals on a continuous length of metallic material, comprising a plurality of upper bars, a plurality of lower bars, a plurality of bearers connecting said upper and lower bars, a roller supported by said upper bars,

a roller supported by said lower bars, members extending transversely of said upper bars, a plurality of spaced anodes depending from each of said members in close proximity to the paths of movement of the stretches of metallic material from one of said drums to the other, members extending transversely of said lower bars and supporting the lower ends of said anodes, and cathodes above the upper ends of said anodes and adapted to bear against said stretches of material.

7. Apparatus according to claim 6 wherein said upper and lower bars are provided

with means to maintain the coils of metallic material to be treated in proper spaced relation during their passage over said rollers.

8. Apparatus according to claim 6 wherein the upper and lower bars have spaced notches in which the upper and lower ends of the anodes are mounted and are provided between said notches with grooves through which the metallic material to be treated passes in its movement from one of the rollers to the other.

In testimony whereof I have hereunto set my hand.

JOSEPH ARTHUR PARKER.