

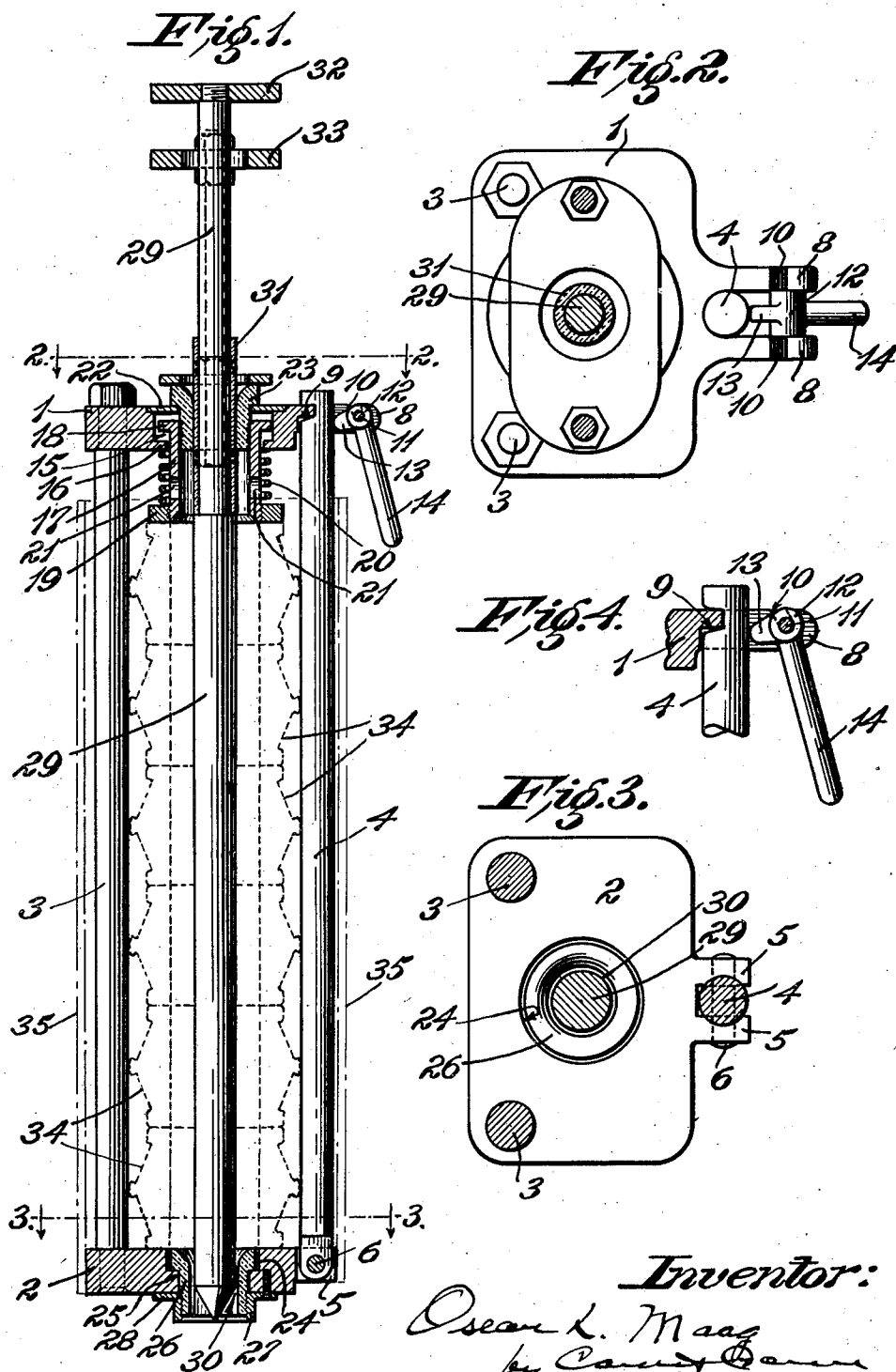
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ELECTROPLATING

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UNITED STATES PATENT OFFICE.

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ELECTRO-PLATING.

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My invention relates to a device for holding articles in proper relation to the anode during the process of electro-plating. Its principal objects are to provide for the assembling of hollow articles in the form of a tube concentric with the anode; and to provide for the circulation of the plating bath and the escape of gas therefrom. The invention consists principally in an article assembling cage hereinafter described and claimed. It also consists in the combination of such cage with the anode; it also consists in the combinations and arrangements of parts hereinafter described.

In the accompanying drawing, which forms part of this specification, and wherein like reference numerals refer to like parts wherever they occur,

Fig. 1 is a vertical sectional view of my device with a tubular series of hollow articles indicated in broken lines;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1; and

Fig. 4 is a detail view of the locking device.

My device comprises a top plate 1 and a bottom plate 2 secured together by rods 3, 4 that are preferably three in number and equidistant from a common axis. Some (preferably two) of these rods have their ends reduced to pass through holes provided therefor in the top and bottom plates respectively, which plates bear against the shoulders thus formed on the rods. The lower plate has a pair of lugs 5 extending from its margin, and on them is mounted a horizontal pintle 6 that passes through the flattened lower end of one of the cage rods whereby said rod 4 is pivotally mounted on said lower plate between said lugs. The upper plate has a pair of outwardly projecting lugs 8 arranged to serve as a guide for the upper end of said pivotal rod; and the upper end of this pivotal rod has a notch 9 in its side that permits it to straddle the marginal portion of the upper plate. The lugs of said upper plate have in their upper edges slots 10 that incline downwardly and outwardly and are of a size to receive the pintle 11 of a cam or bent lever 12.

This bent lever comprises a cam arm 13 and a handle arm 14, the cam arm being slightly longer than the straight line distance between the pintle of the cam or bent lever when mounted in said slots, and the pivotal rod, when said pivotal rod is in its locked position. In locked positions, the cam arm inclines downwardly from the pintle on one side thereof and the handle arm inclines downwardly on the other side. By this arrangement, the locking device may be quickly mounted or removed; and when mounted, it serves to press the pivotal rod into proper engagement with the top plate, the leverage action of the handle arm tending to hold said locking device in position.

The top plate has a large hole 15 extending therethrough and located centrally with respect to the cage rods. The lower portion of this hole is of smaller diameter than the upper portion thereof, thus forming an annular shoulder 16. Extending downwardly through the hole in the top plate is a hollow sleeve 17 whose upper end is provided with a circumferential rib 18 that overlaps said shoulder 16. The lower end of said sleeve has a screw thread on its outer surface on which is mounted a ring nut 19. Surrounding the sleeve is a helical spring 20, one end of which bears against the lower surface of the top plate and the other end of which bears against said ring nut. Opposite said spring the sleeve is provided with radial perforations 21 intended for the escape of the electro-plating fluid and the gases generated in the process of electro-plating.

The top surface of the upper plate is recessed to receive a plate 22 through which an insulating bushing 23 extends into the upper portion of said sleeve. The lower plate has a centrally disposed hole 24 extending therethrough with the lower portion of smaller diameter than the upper portion to form a shoulder 25 for the support of an insulating bushing 26 that extends through said hole. The lower end of this bushing is screw threaded for engagement with a threaded ring 27 that is provided with a circumferential flange 28 by which it is secured to the lower

side of said lower plate. The anode 29 extends through both the upper bushing and the lower bushing, its lower end being smaller than the diameter of the lower bushing so as to leave an annular channel 30 between them.

The portion of the anode opposite the upper bushing is provided with a porcelain tube 31 for insulation. The top portion of the anode is suitably connected to a bus bar 32 connected to a suitable source of electric power. The second bus bar 33 is suitably connected to the top plate, which in turn is electrically connected through the cage rods to the bottom plate so that the cage or holding device, together with the work therein, functions as the cathode.

The appliance hereinbefore described is designed especially for electro-plating the interior of hollow articles such, for instance, as cones 34 for roller bearings which are indicated in broken lines. The spacing of the locking rods is such that when the parts are locked together, all three bars will be in contact with the periphery of the cones at their larger diameters and such cones will be in central alinement with each other and with the anode. In assembling such cones, or similar work, the anode is first withdrawn endwise, and the pivotal rod of the cage is released and swung down. The cones are then placed in the cage with the lowermost cone resting on the lower plate with its circumference in contact with the two fixed rods of the cage. The other cones are similarly placed one above the other so as to form a substantially continuous tube, against the uppermost of which the spring presses the sleeve, thereby clamping the assembled cones firmly together. The pivotal rod is then swung into place and locked with the locking device whereby any cones that may be out of alinement are forced into proper position. The cage thus filled and locked is then placed in the bath and the anode is inserted therein in axial alinement with said cones.

In addition to the simplicity of my device and the readiness with which the work can be assembled and locked therein, my device contributes greatly to the uniform plating of the work, because the annular channel around the lower end of the electrode and the perforations of the sleeve above the work assure a continuous current of the plating bath and a continuous elimination of the gases generated in the plating process. At the same time, the axial arrangement of the anode with respect to the surfaces to be plated contributes greatly to the uniformity of the plating.

The foregoing description is with respect to articles that can be assembled endwise to form a substantially imperforate tube. When it is desired to electro-plate the interior of hollow articles whose sides are perforated or notched, they are assembled as hereinbefore described but the entire device with the

articles assembled therein is then enclosed in a hollow open-ended shell 35 (indicated in broken lines) whose lower end fits over the lower plate of the appliance tightly enough to insure an adequate current of the bath inside of the work.

Obviously the appliance hereinbefore described admits of considerable modification without departing from my invention and I do not wish to be restricted to the details thereof.

What I claim is:

1. A device for positioning and holding in endwise abutment tubular articles to be electroplated internally which comprises top and bottom members and rods connecting the same, said rods being equidistant from a common axis and one of them being pivoted to one of said members and detachably connected to the other member whereby the closing of said pivotal rod centers said articles in the form of a continuous tube in contact with all of said rods.

2. A device for positioning and holding in endwise abutment tubular articles to be electroplated internally which comprises top and bottom members and rods connecting the same, said rods being equidistant from a common axis, one of them being pivoted to one of said members and detachably connected to the other member whereby the closing of said pivotal rod centers said articles in the form of a continuous tube in contact with all of said rods and a locking device for locking said pivotal rod in position.

3. A work holding device for use in electroplating comprising end members and rods connecting the same, one of said rods being movable for insertion of the work, and one of said end members having a spring-pressed piece arranged to bear against the end of the work.

4. A work holding device for use in electroplating hollow articles comprising end members having alined holes therethrough and rods connecting said end members and equidistant from the axis of said holes, one of said rods being movable for insertion of the articles, and one of said end members having a spring-pressed sleeve extending through its hole for resiliently holding the articles in abutment endwise to form a continuous channel in alinement with said holes.

5. A work holding device comprising end members having alined holes therethrough and rods connecting the same and equidistant from the axis of said holes, one of said rods being movable for insertion of the work, one of said end members having a spring-pressed sleeve extending through its hole for resiliently holding the work, and said sleeve having lateral perforations.

6. A device for use in electroplating the interior of tubular work comprising a work holding cage having openings through the

ends thereof and an anode extending through said openings and spaced from the walls thereof, said cage comprising end members having alined holes therethrough and rods 5 connecting the same and equidistant from the axis of said holes, one of said rods being movable for insertion of the work, one of said end members having a spring-pressed sleeve extending through its hole for resiliently holding the work and said sleeve having lateral 10 perforations.

Signed at Canton, Ohio, this 7th day of September, 1926.

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