May 4, 1965 T. E. NALBAND ETAL 3,182,009

ELECTROPLATING APPARATUS HAVING HYDRAULIC HEAVY ROLL SUPPORTING RACK

Filed Jan. 14, 1963 4 Sheets-Sheet 1

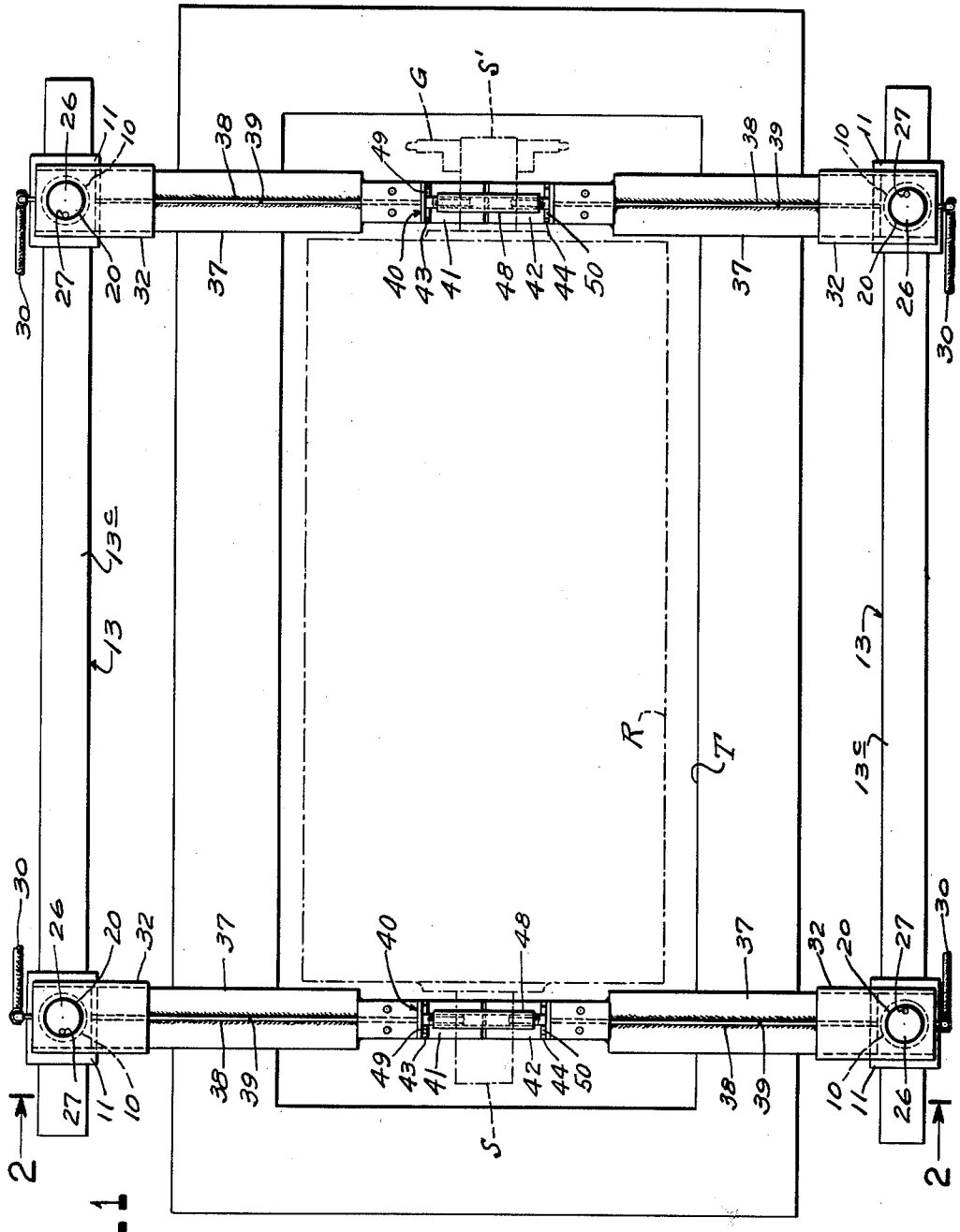


Fig. 1

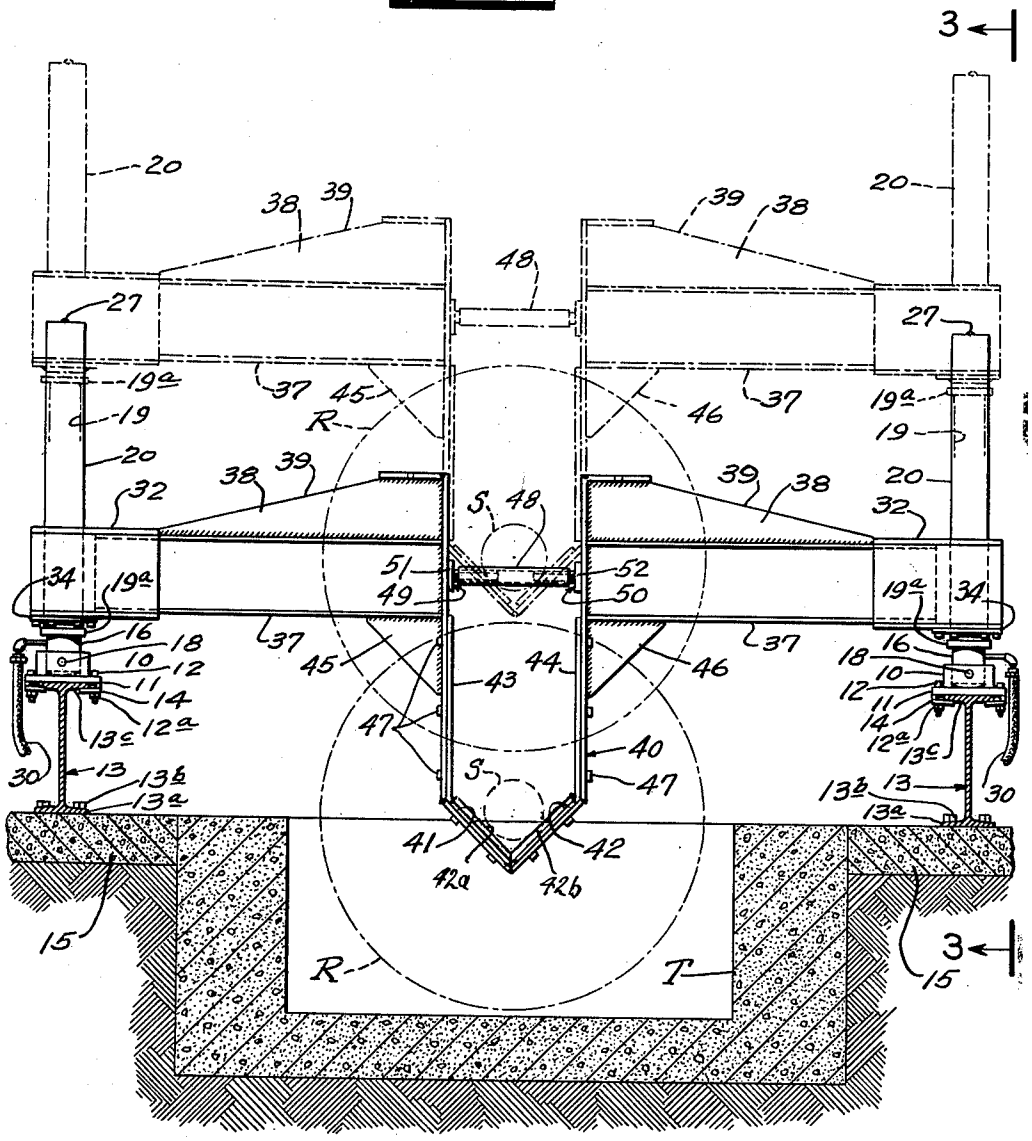
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Fig. 2



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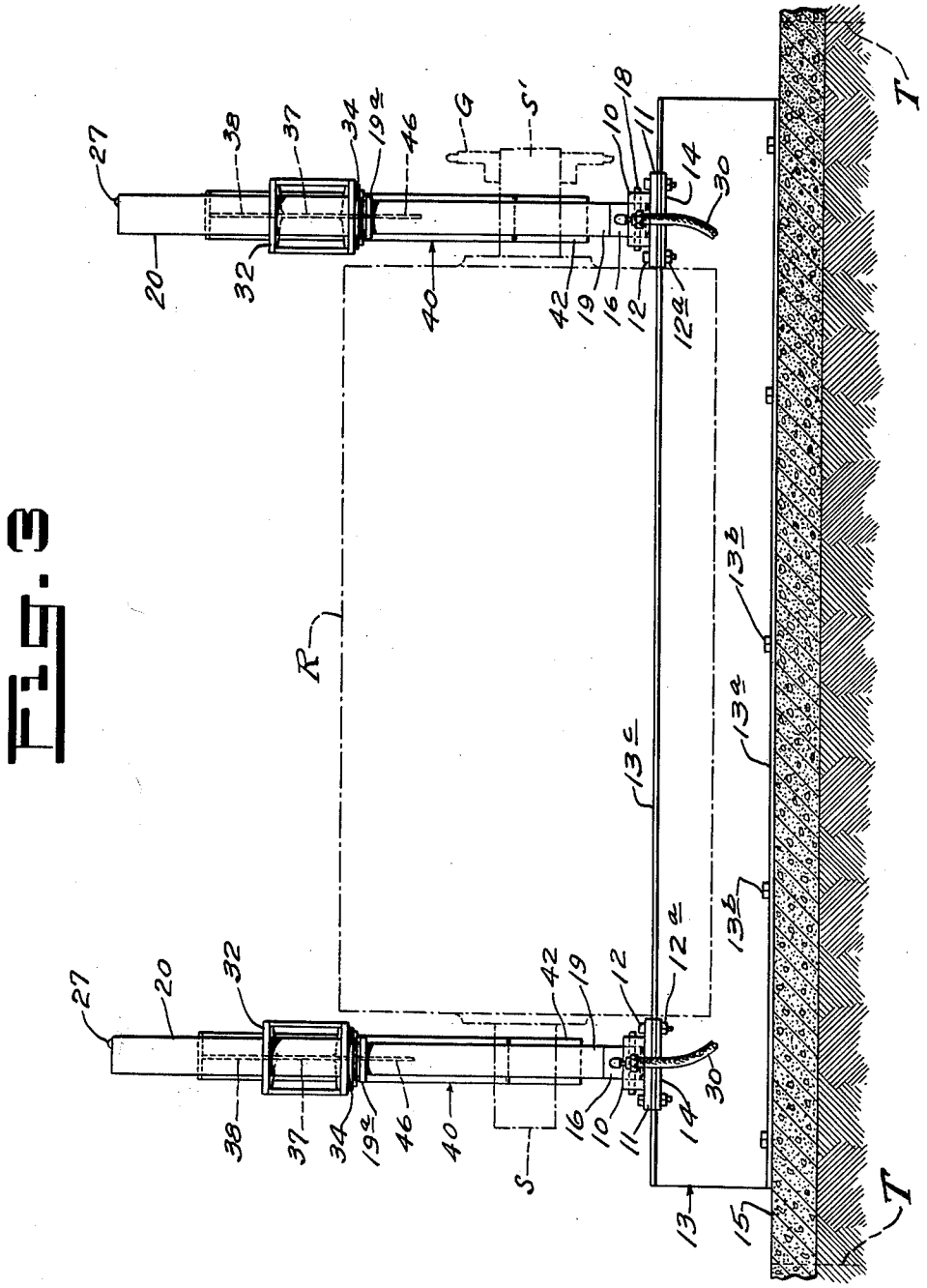


FIG. 3

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Fig. 4

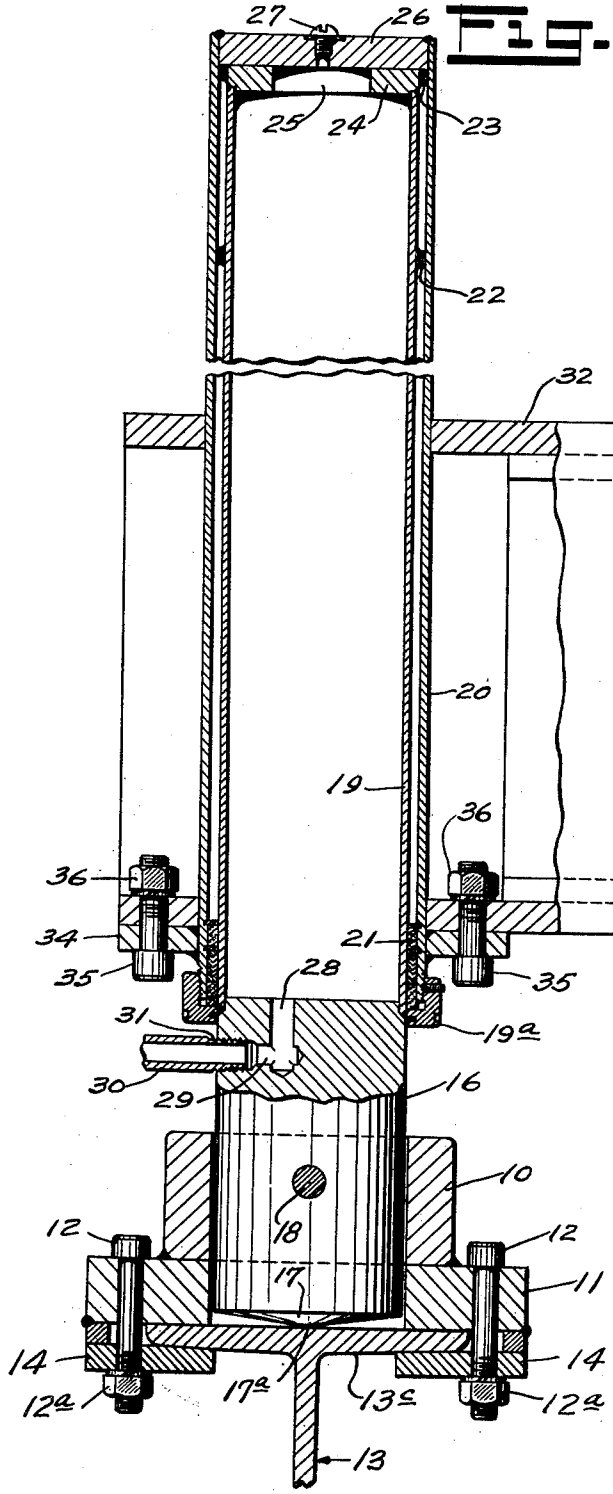
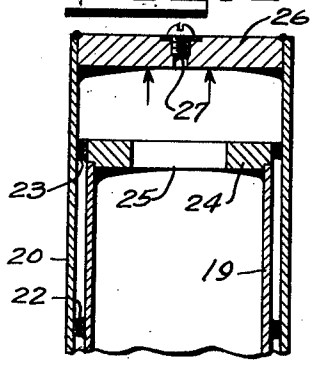
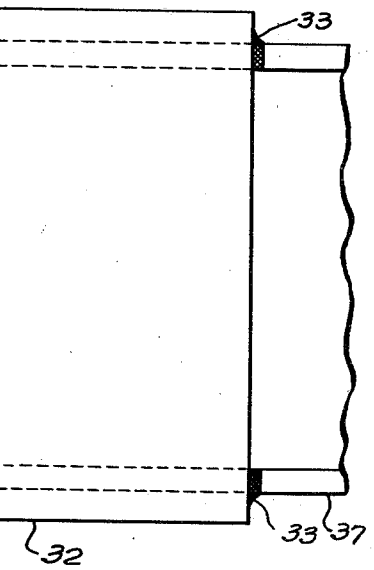


Fig. 5





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3,182,009

ELECTROPLATING APPARATUS HAVING HYDRAULIC HEAVY ROLL SUPPORTING RACK

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Filed Jan. 14, 1963, Ser. No. 251,430
4 Claims. (Cl. 204—212)

This invention relates to electroplating apparatus, and more particularly to a hydraulically raised and lowered horizontal rack for supporting a heavy rotating roll being plated in a tank of electrolyte.

One object of the present invention is to provide an electroplating apparatus of the above nature in which the roll supporting rack comprises a pair of horizontal sections connected at their outer ends to four vertical hydraulic cylinders containing liquid under pressure.

A further object is to provide an apparatus of the above nature, in which each cylinder surrounds a fixed vertical plunger ram having a rounded base for providing a self-aligning engagement with an underlying surface on which it is supported.

A still further object is to provide an apparatus of the above nature which will be simple in construction, inexpensive to manufacture, easy to install and manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view, there has been illustrated on the accompanying drawings one form in which the invention may conveniently be embodied in practice.

In the drawings:

FIG. 1 represents a top plan view of the improved hydraulic rack and electroplating apparatus.

FIG. 2 is a vertical sectional view of the same, taken along the line 2—2 of FIG. 1.

FIG. 3 is a vertical sectional view of the same, taken from the line 3—3 of FIG. 2.

FIG. 4 is a vertical cross-sectional view, on a larger scale, taken through one of the hydraulic cylinders and its fixed ram, showing how said cylinder and ram are connected to the horizontal roll supporting rack and the bottom pedestal respectively.

FIG. 5 is a fragmentary cross-sectional view of the upper part of the hydraulic cylinder and the fixed ram tube shown in FIG. 4, in which the cylinder has been elevated to a partly raised position.

Referring now to the drawings, in which like reference numerals denote corresponding parts throughout the several views, the numeral **10** indicates four hollow pedestals provided with rectangular base flanges **11**, each of which flanges is secured by means of bolts **12** and nuts **12***a* (FIGS. 2, 3, 4) to the top flanges **13***c* of a pair of horizontal I-beams **13**, the bases **13***a* of which are secured by means of anchor bolts **13***b* to a concrete base **15**. Provision is also made of pedestal clamping spacers **14** located between the top flanges **13***c* of the I-beam **13** and the nuts **12***a*.

The bottom of each pedestal **10** is adapted to receive a fixed solid cylindrical plunger ram **16** having a conical bottom **17** (FIG. 4) provided with a rounded central tip **17***a*, which rests upon the top flange **13***c* of the I-beam **13**, so as to form a self-aligning stable mounting on said I-beam, irrespective of the weight of the heavy roll R, being plated in the apparatus.

Each plunger ram **16** is secured to its pedestal **10** by a cross pin **18**, as clearly shown in FIG. 4 of the drawing, and said plunger ram **16** is also rigidly secured, as by welding, to an upper vertical tube **19**, held in spaced relation with a vertical hollow hydraulic cylinder **20** by three circular gaskets **21**, **22**, **23** (FIG. 4).

The top of the fixed tube **19** is closed by means of a ring plate **24** having a central aperture **25**, through which the hydraulic liquid under pressure is adapted to freely pass.

The bottom of each cylinder **20** is provided with an angular ring **19***a* secured thereto as by set screws. The angular ring **19***a* is tapped and screwed upon the threaded lower end of the cylinder **20**.

The top of the hollow cylinder **20** is provided with a plug **26** having at one side a removable bleeder screw **27** to release air from the hydraulic cylinder **20** whenever necessary.

The top of the plunger ram **16** is also provided near one side with a vertical passage **28** connected with a side horizontal passage **29** (FIG. 4), which is tapped at its outer end for receiving a threaded end **31** of a flexible metal hose **30** connected to a suitable controlled source of hydraulic liquid under pressure.

The numeral **32** indicates four short horizontal outer roll supporting H-beams which are rigidly secured upon the four vertical hydraulic cylinders **20**, as shown in FIG. 4.

The short H-beams **32** are supported at their outer ends by four horizontal square bottom plates **34** which embrace said cylinders **20** and are connected to said H-beams **32** by bolts **35** and nuts **36** (FIG. 4). The short outer H-beams **32** are adapted to embrace four central inner horizontal H-beams **37** and are secured thereto, as by welding at **33**. The H-beams **37** have reinforcing vertical webs **38** provided with inclined top edges **39**.

The roll supporting rack is also provided with a pair of depending central vertical roll troughs **40** having V-shaped bottoms comprising a pair of copper-lined inclined lower ends **41**, **42**. A pair of angular steel strips **43**, **44** are bolted to said trough **40** and are provided with copper strips **42***a*, **42***b*, for conducting electric current to the reduced end shafts S and S_1 of the heavy roll R which is to be electroplated in the apparatus. The shaft S_1 is provided with a sprocket gear G which is adapted to be continuously rotated by a motor-driven chain, not shown. The inner H-beams **37** are secured by triangular webs **45**, **46** and bolts **47** to the troughs **40**.

In order to prevent collapsing or inward movement of the sides of the trough **40** due to the heavy weight of the roll R supported thereby, provision is also made of a pair of horizontal screw jacks **48** provided with bases **49**, **50**, having flanges **51**, **52** which are seated within cups engaging the sides of said roll trough **40** above the shafts S and S_1.

Operation

In the operation of this apparatus, hydraulic liquid will be pumped simultaneously through the four tubular rams **16** into the hydraulic cylinders **20** by manually pressing control buttons, not shown, thus raising the heavy roll R to the desired height. The roll R which is supported by the vertical trough **40** will be rotated during the plating by means of the sprocket gear G on the shaft S_1 operated by the motor driven chain, not shown.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not limited to this specific disclosure, but may be modified and embodied in various other equivalent forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new and for which it is desired to obtain Letters Patent is:

1. An electroplating apparatus comprising a tank and hoist means for raising and lowering rolls to be plated from and to said tank, said hoist means being mounted on a support disposed adjacent said tank and comprising a pair of horizontally extending racks each comprising first and second similar horizontal members spaced at their inner end portions to provide a central opening in said rack, horizontally spaced members secured to said horizontal members and depending vertically downwardly respectively from said inner end portions thereof, means connecting said vertical members at the lower ends thereof, said connecting means providing bearing surfaces for rotatively supporting said rolls to be plated, said connecting means including conductors for introducing electrical current to said rolls, means for rotating said rolls to be plated, and four similar vertical hydraulic cylinders, each cylinder being secured to an outer end portion of a horizontal member so as to provide for raising and lowering of said racks, said central openings permitting positioning of said roll onto said bearing surfaces.

2. The combination in electroplating apparatus as set forth in claim 1 wherein there is provided a spreader means for the vertical members of each rack, each spreader means being adapted to engage and maintain its corresponding vertical members in horizontally spaced relationship and being removable for free vertical passage of the end shaft of a roll between said members.

3. The combination in electroplating apparatus as set forth in claim 2 wherein said connecting means each comprises a generally V-shaped member connected at free end portions with lower end portions of corresponding vertical members and provided on its upper surface with a V-shaped copper bearing and conductor for electrical current.

4. The combination in electroplating apparatus as set forth in claim 3 wherein each of said cylinders is connected with its corresponding rack member with a cylinder ram movable downwardly from the cylinder, wherein a supporting pedestal is provided for each ram with a concave surface for receiving the end of the ram, wherein each ram has a generally convex end surface, and wherein each ram is pinned to its pedestal so as to pivot with respect to the pedestal forward and away from a roll held by the apparatus and yet be restrained against pivotal movement in a plane parallel to the axis of such a roll.

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JOHN H. MACK, *Primary Examiner.*