May 29, 1962 S. D. LAPHAM 3,036,967

PISTON RING GROOVE PLATING FIXTURE

Filed Dec. 8, 1959 8 Sheets-Sheet 1

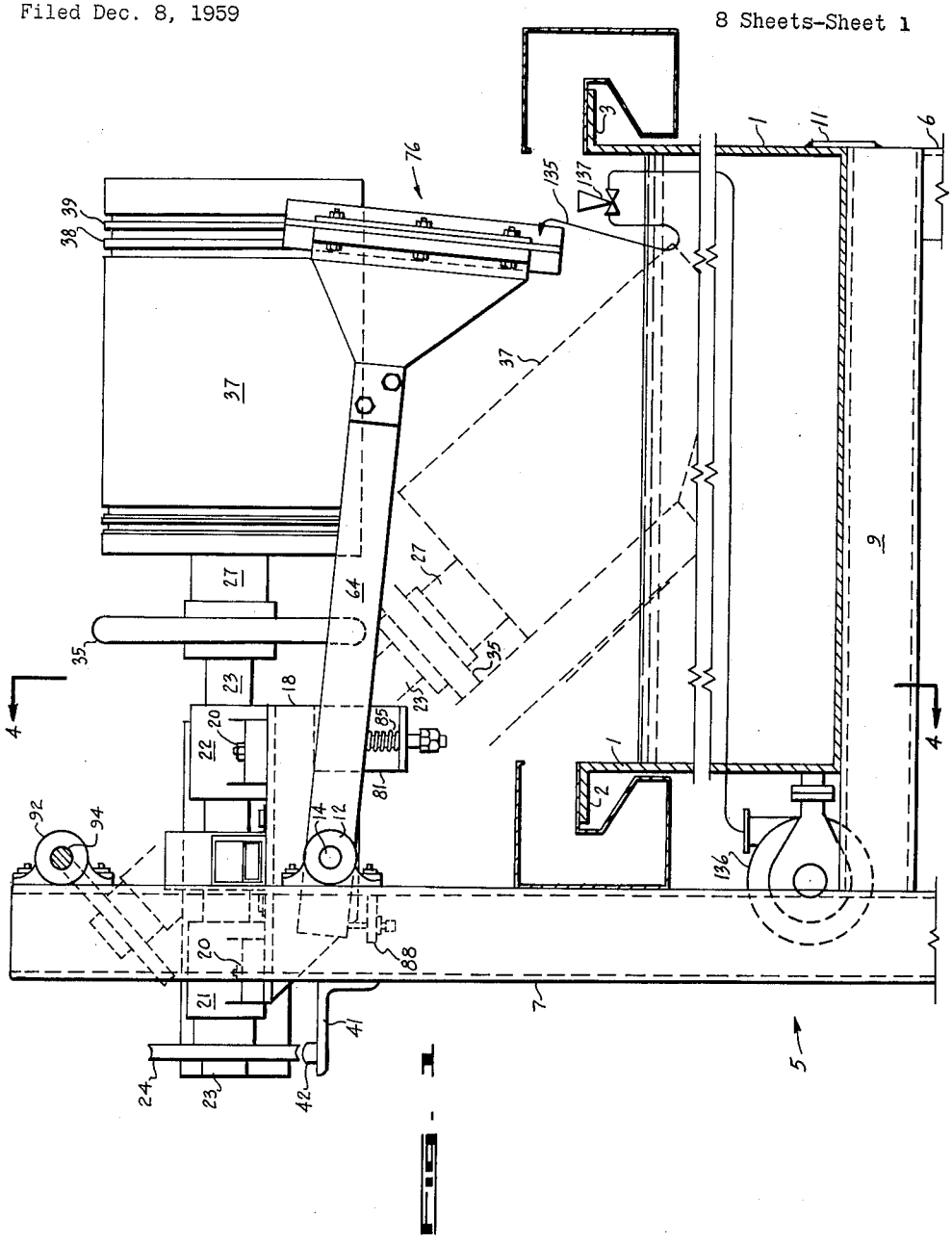



Fig. 1

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PISTON RING GROOVE PLATING FIXTURE

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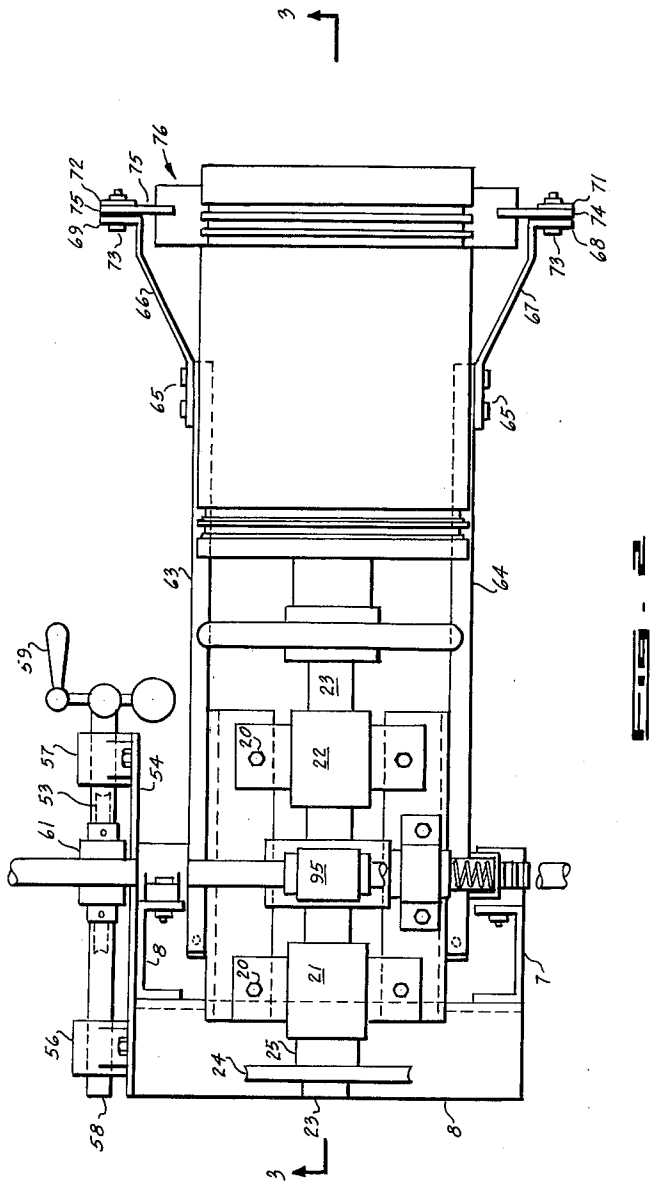


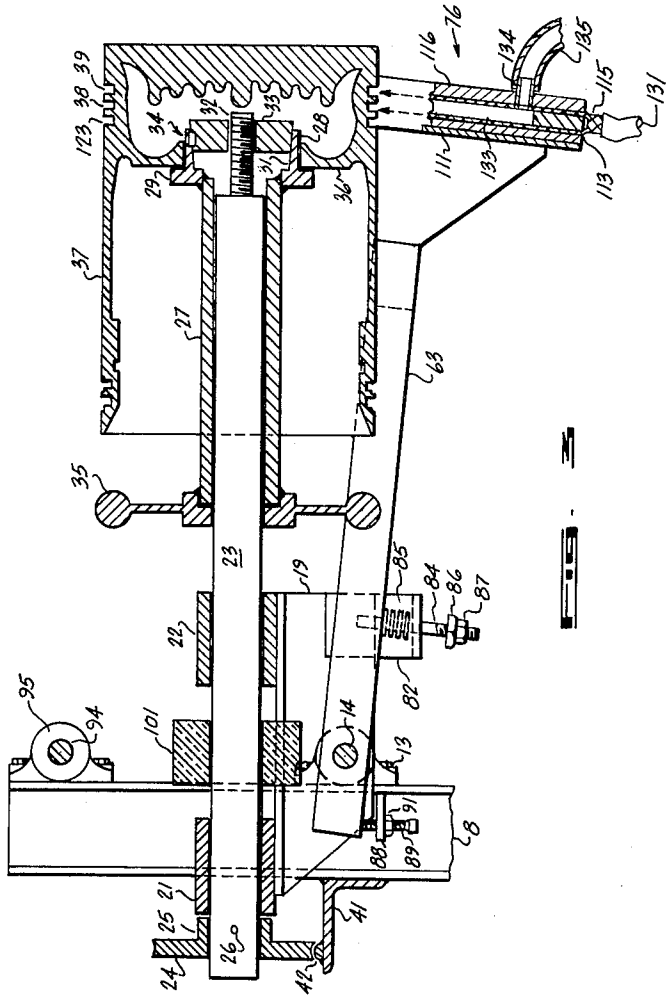
Fig. 2

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PISTON RING GROOVE PLATING FIXTURE

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PISTON RING GROOVE PLATING FIXTURE

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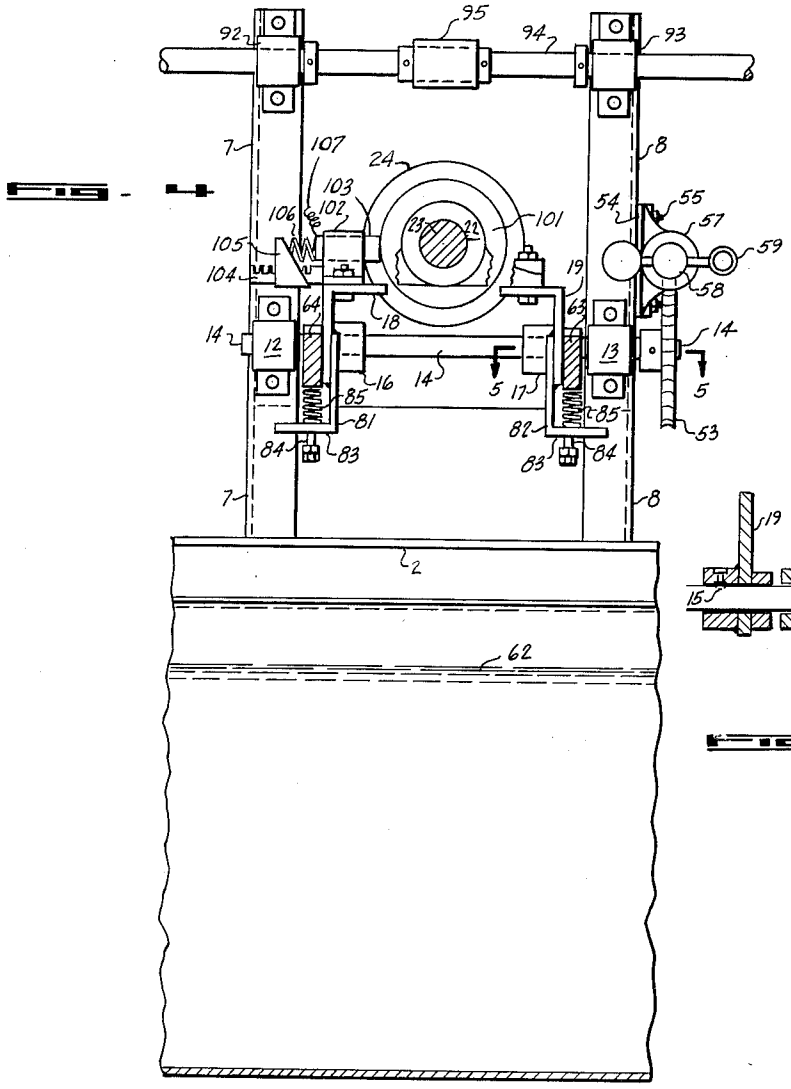



FIG. 4

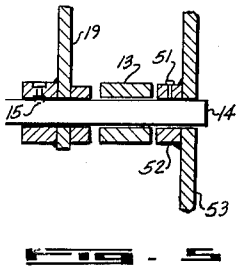



FIG. 5

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PISTON RING GROOVE PLATING FIXTURE

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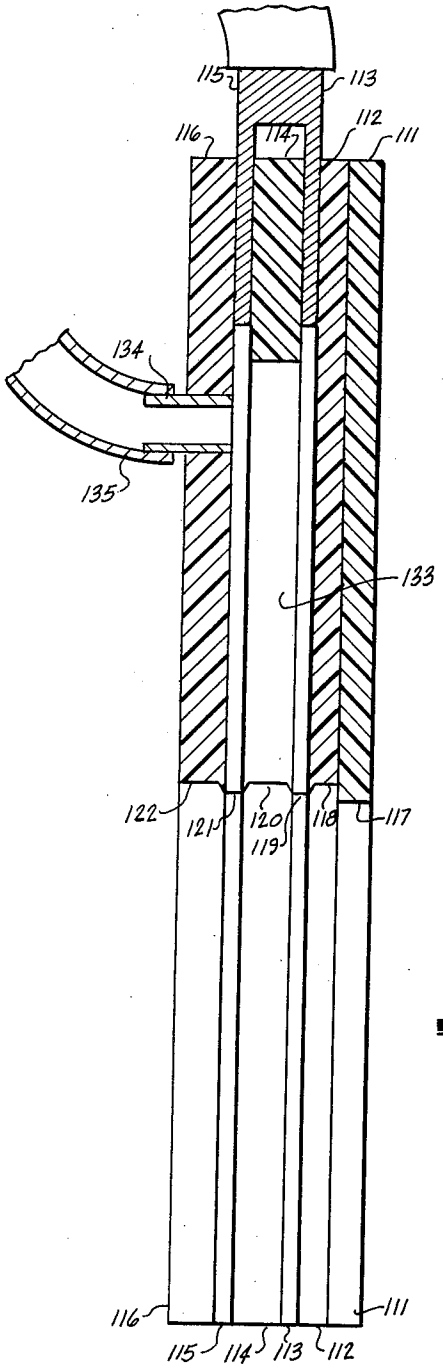



FIG - 5

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PISTON RING GROOVE PLATING FIXTURE

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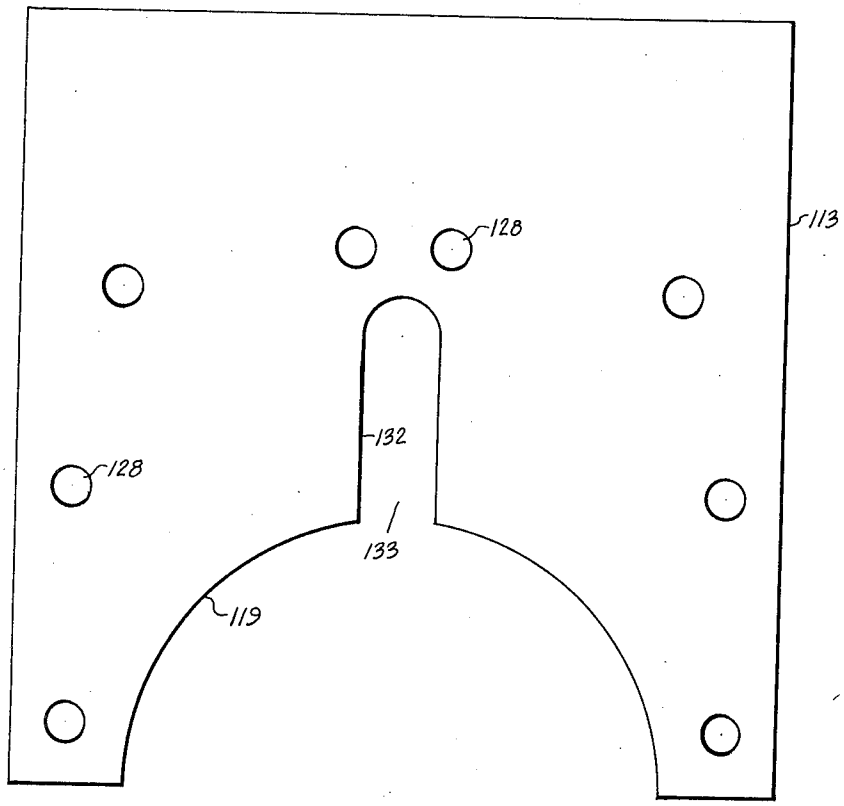



Fig. 7

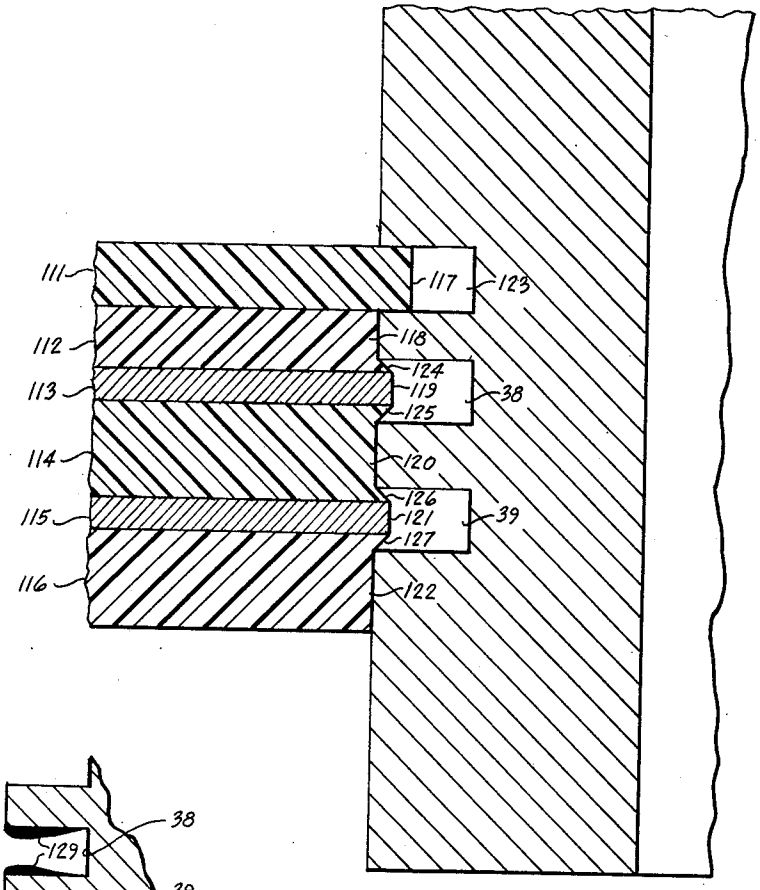
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May 29, 1962 S. D. LAPHAM 3,036,967

PISTON RING GROOVE PLATING FIXTURE

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Fig. 8



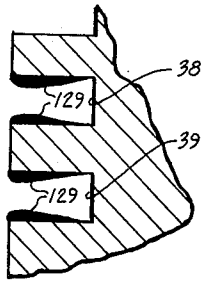




Fig. 9

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PISTON RING GROOVE PLATING FIXTURE

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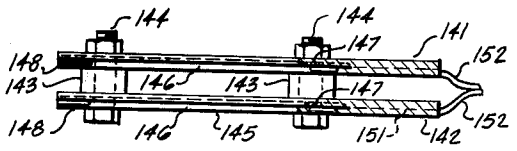



Fig. 11

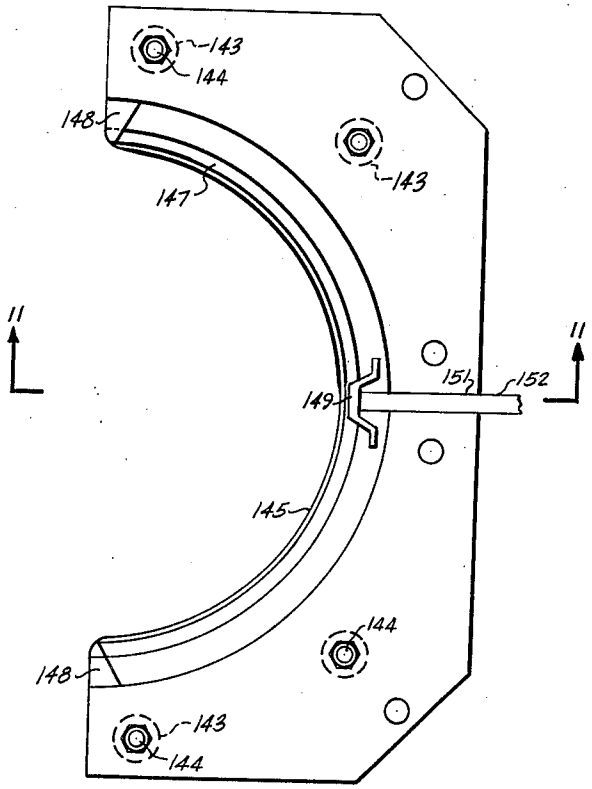



Fig. 10

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3,036,967

Patented May 29, 1962



3,036,967

# PISTON RING GROOVE PLATING FIXTURE

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Filed Dec. 8, 1959, Ser. No. 858,118
11 Claims. (Cl. 204—225)

This invention relates to and in general has for its object the provision of a piston ring groove chrome plating fixture.

Heretofore diesel engines have been run on diesel fuel oil. Recently users of such engines have been running them on cheaper oils with the result that excessive wear has been found to occur along the outer edges of piston ring groove sides. To make feasible the use of cheaper fuels, it is therefore essential to build up and remachine the worn edges of the ring grooves by chrome-plating them but without at the same time plating the sides of the piston. The reason for the latter condition is that in most cases the cylinder or sleeve within which the piston operates is already chrome-plated and, as is well known, it is more difficult to lubricate the interface between like metals than to lubricate the interface between dissimilar metals.

More specifically, the object of this invention is the provision of a plating fixture arranged to be mounted over a chrome-plating tank and which includes a piston-supporting assembly, an anode-supporting assembly and a lost-motion connection between the two assemblies whereby the two assemblies are separated when in their inoperative position and can be made to close automatically on each other as they are being moved into the plating solution.

Another object of this invention is the provision of a fixture of the character above described wherein the two assemblies are mounted for rotation on a common axis, wherein the piston-supporting assembly includes a piston-supporting shaft, and wherein means is provided for driving said shaft when both assemblies have been made to assume their operative plating positions.

Still another object of this invention is the provision of a fixture of the character above described wherein the lost-motion connection between the two assemblies includes a spring carried by the piston-supporting assembly for resiliently supporting the anode-supporting assembly and for resiliently holding an anode carried by the latter assembly in its operative plating position within the ring grooves to be plated.

An additional object of this invention is the provision of a fixture of the character above described including an anode assembly including one or more semicircular anodes arranged to be positioned within the confines of the grooves to be plated, and provided with nonconducting walls arranged to blank off the cylindrical surfaces of the piston during the plating operation.

Another object of this invention is the provision of an anode assembly including means for circulating plating solution through the grooves being plated and for removing any hydrogen formed during the plating operation.

Still another object of this invention is the provision of a modified form of anode for plating only one side of a ring groove and wherein the ring groove is left open for the free egress of hydrogen.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where those forms of the invention which have been selected for illustration in the drawings accompanying and forming a part of the present specification are outlined in full. In said drawings several forms of the invention are shown, but it is to be understood that it is not limited to such forms, since the invention as set forth in the claims may be embodied in other forms.



Referring to the drawings:

FIG. 1 is a side elevation of a cylinder groove plating fixture embodying the objects of my invention.

FIG. 2 is a top plan view of the fixture illustrated in FIG. 1.

FIG. 3 is a vertical section taken on the section line 3—3 of FIG. 2.

FIG. 4 is a vertical section taken on the section line 4—4 of FIG. 1.

FIG. 5 is an enlarged fragmentary horizontal section taken on the section line 5—5 of FIG. 4.

FIG. 6 is an enlarged vertical mid-section taken through the anode assembly of the fixture shown in the above figures.

FIG. 7 is a side elevation of the central Plexiglas plate of the anode assembly illustrated in FIG. 6.

FIG. 8 is an enlarged fragmentary section taken through the anode assembly in its operative position about its associated engine piston.

FIG. 9 is an enlarged fragmentary section taken through the piston ring grooves.

FIG. 10 is a side elevation of a modified anode assembly.

FIG. 11 is a horizontal section taken on the section line 10—10 of FIG. 10.

*Tank and Support Frame Assembly*

As best shown in FIGS. 1 and 4, one or more of the plating fixtures of this invention are arranged to be mounted transversely over a conventional, elongated plating tank 1, provided along its opposed upper lateral edges with outwardly extending flanges 2 and 3 and arranged to be supported on a fabricated steel frame generally designated by the reference numeral 5.

More specifically, the frame 5 includes a set of longitudinally spaced channel iron legs 6 on one side of the tank and several longitudinally spaced pairs of channel iron legs 7 and 8 disposed on the other side of the tank. Secured to and bridging these legs are channel iron cross-beams 9 and overlapping the right side of the tank and the legs 6 is steel plate or strap 11 welded to the tank and to the legs.

From an inspection of FIGS. 1 and 4 it will be seen that each pair of legs 7 and 8 extends substantially above the tank 1 and that it is these upwardly extending pairs of legs which mount my plating fixture, only one such pair of extending legs and one fixture being here shown and described.

*Piston-Supporting Assembly*

Bolted respectively to the legs 7 and 8 are axially aligned bearings 12 and 13 and journaled therein is a shaft 14. Fixed to the shaft 14 (FIGS. 4 and 5) by keys 15 are axially spaced bearings 16 and 17, and welded thereto are upstanding angle brackets 18 and 19. Bridging and fastened to the brackets 18 and 19 by bolts 20 are a pair of spaced coaxial bearing blocks 21 and 22.

Journaled in the bearing blocks 21 and 22 is a piston-supporting and drive shaft 23. Mounted on the left-hand end of the shaft 23 (as viewed in FIG. 3) is a gear 24,

and formed integral therewith is an inwardly extending flange or sleeve 25 fastened to the shaft 23 by a pin 26. Surrounding the right-hand end of the drive shaft 23 is a sleeve 27. Welded to the right end of the sleeve 27 is a collet 28 provided with an annular flange 29 and formed with an outwardly diverging inner conical surface 31. Threaded on a pin 32 formed as a coaxial extension of the shaft 23 is a plug 33 having a taper complementary to the tapered inner surface of the collet 28. The plug 33 is held against rotation relative to the sleeve 27 by a conventional keyway and key construction generally designated by the reference numeral 34 (FIG. 3). Welded to the left-hand end of the sleeve 27 is a hand wheel 35. The outer diameter of the collet 28 should be such that the collet will snugly mount the web 36 of a piston 37, the ring grooves 38 and 39 of which are to be chrome-plated.

As a result of the structure so far described, it will be noted that if the shaft 23 be held against rotation, the rotation of the handle wheel 35 in one direction serves to back off the plug 33 from the pin 32 thereby to permit the split cylindrical side walls of the collet 28 to contract. In this contracted condition of the collet, the web 36 of the piston 37 can be mounted over the collet and into engagement with the collet flange 29. This having been done, the hand wheel 35 is rotated in the opposite direction thereby to cause the plug 33 to travel inwardly on the stem 32 and so expand the collet tightly against piston web 36 and with the piston web 36 fixed against the collet flange 29. This then fixes the position of the piston ring grooves 38 and 39 relative to the drive shaft. Furthermore, it is to be noted the drive shaft assembly is mounted for rotation about the transverse shaft 14.

Extending across and welded to the frame legs 7 and 8 beneath the gear 24 is an angle bracket 41 and welded thereto is a gear tooth 42 arranged for engagement with the gear 24 when the drive shaft 23 is made to assume a horizontal position as shown for example in FIG. 3. This structure therefore serves as a lock for holding the shaft 23 against rotation, but only when the shaft is in a horizontal position.

Secured to the right-hand end of the shaft 14 by a key and keyway assembly generally designated by the reference numeral 51 is a boss 52 and welded thereto is a worm gear 53 (FIGS. 4 and 5). Welded to the web of the frame leg 8 is a plate 54, and fastened thereto by bolts 55 are a pair of spaced axially aligned bearing blocks 56 and 57. Journaled in these bearing blocks is a shaft 58 and secured to one end thereof is a hand crank 59. Keyed to the shaft in vertical alignment with the worm gear 53 is a worm 61 (FIG. 2) in mesh with the worm 53. As a result of this construction, the rotation of the shaft 58 by means of the crank 59 serves to rotate the shaft 14 and, depending upon the direction of rotation of the crank 59, to raise or lower the drive shaft assembly and with it the piston 37 carried thereby. By this expedient the piston can be immersed in plating solution 62 contained in the tank 1 or raised to a horizontal position above the tank. As above described, in this latter position of the drive shaft assembly the gear 24 has come into locking engagement with the gear tooth 42 (FIGS. 1 and 3).

*Anode-Supporting Assembly*

Journaled on the shaft 14 outboard each of the brackets 18 and 19 are a pair of anode-supporting arms 63 and 64 extending forwardly in parallelism with the shaft 23 and on either side of the lower portion of the piston 37. Fastened to the arms 63 and 64 by bolts 65 are opposed, laterally diverging plates 66 and 67 terminating in arcuate side flanges 68 and 69. Clamped between the flanges 68 and 69 and arcuate rings 71 and 72 by bolts 73 are flexible metal, arcuate anode holders 74 and 75 supporting an anode generally designated by the reference numeral 76 and which will be presently described in greater detail. Here, however, it should be noted that the holders 74 and 75 are positioned relative to the piston 37 so as to hold the anode 76 in its proper position relative to the piston ring grooves 38 and 39. The flexibility of the holders 74 and 75 allows for slight discrepancies in alignment.

*Lost-Motion Connection Between Piston- and Anode-Supporting Assemblies*

Welded to each of the angle brackets 18 and 19 at the forward ends thereof are depending angles 81 and 82 respectively underlying the support arms 64 and 63. Extending through holes or slots 83 formed in horizontal webs of the angles 81 and 82 are pins 84 having their upper ends threaded into the supporting arms 63 and 64. Mounted on the pins 84 between the arms 63 and 64 and the angles 81 and 82 are coil compression springs 85 serving to bias the supporting arms upwardly. Threaded on the lower end of each pin 84 is a limit nut 86 and a lock nut 87 serving as an adjustable stop for limiting the upward movement of the anode-supporting arms 63 and 64 relative to the drive shaft assembly (piston-supporting assembly).

Welded to and between the frame legs 7 and 8 beneath the left-hand ends of the anode-supporting arms 63 and 64 (as viewed in FIGS. 1 and 3) is a transverse plate 88 and threaded therethrough in vertical alignment with each of the arms 63 and 64 is a stop pin 89. Carried on the pin 89 beneath the plate 88 is a lock nut 91. As a result of this construction the pin 89 positively limits the counterclockwise rotation of the anode-supporting arms 63 and 64.

Here it should be noted that the anode-supporting arms 63 and 64, as well as the drive shaft or piston-supporting assembly, are mounted for rotation about the shaft 14.

*Piston Shaft Drive Assembly*

Bolted to the upper ends of the frame legs 7 and 8 are a pair of axially aligned bearing blocks 92 and 93 (FIG. 4) and journaled therein is a power-driven shaft 94. Fastened to the shaft 94 midway between the legs 7 and 8 is a worm 95 arranged to be engaged by the worm gear 24 when the drive shaft assembly has been rotated clockwise (as viewed in FIGS. 1 and 3) through an angle in the order of 45°. In this latter position of the drive shaft assembly, as best shown by dash line in FIG. 1, the worm gear 24 is in mesh with the worm 95 and consequently the rotation of the shaft 94 then serves to rotate the drive shaft 23 and the piston 37 mounted thereon. As a result of the above construction there is a lost motion between the anode-supporting assembly and the piston- or drive shaft-supporting assembly which permits the cylinder to close on the anode assembly as both the cylinder and the anode assembly are being lowered into the plating solution and which permits the piston to move upwardly relative to the anode assembly as the two assemblies are being withdrawn from the plating solution. This lost-motion connection between the two assemblies can best be understood from an inspection of FIGS. 1 and 3 showing the piston-supporting assembly and the anode-supporting assembly in their fully raised positions but with the anode 76 out of engagement with the piston 37. In this position the piston 37 can be removed from its supporting structure by backing off the plug 33. A new piston can then be substituted for plating its ring grooves 38 and 39. It should here be noted that at this time the springs 85 are under considerable compression. To immerse both assemblies the piston-supporting assembly is rotated clockwise by turning the crank 59. Although the angles 81 and 82 perforce move downwardly with the piston-supporting assembly, the springs 85 are now free to expand and to therefore force the anode-supporting assembly to close on the piston-supporting assembly and to hold the anodes thereof in resilient contact with the piston. The final closed and plating positions of the

two assemblies is shown in dash line in FIG. 1. Upon the clockwise rotation of the piston-supporting assembly, the reverse procedure takes place, but here it should be noted that the upward or counterclockwise travel of the anode-supporting assembly is arrested by the engagement of the left-hand ends of the supporting arms **63** and **64** with the adjustable stop pins **89**. The piston-supporting assembly then parts company with the anode-supporting assembly by continuing to rotate counterclockwise until the worm gear **24** engages the fixed stop tooth **42**. At the downward terminal movement of the piston-supporting assembly its worm gear **24** comes into mesh with the drive worm **95** and remains in that position until plating has been completed and the piston-supporting assembly starts to move counterclockwise under the influence of the crank **59**.

*Commutator Assembly*

Fixed to the piston drive shaft **23** for rotation therewith is copper collector ring **101**. Bolted to the bracket **18** adjacent the ring **101** is a brush-holder **102** and slidably supported therein is a brush **103**, the inner end of which is in running contact with the ring **101** (FIG. 4). Secured to the bracket **18** and extending outwardly therefrom is a rack **104** and adjustably mounted thereon is a spring retainer **105**. Mounted in the retainer **105** is a biasing spring **106**, the free end of which engages the rear end of the brush **103** and which serves to bias the brush in engagement with the collector ring **101**. Secured to the brush **103** is a pigtail **107** serving as a positive terminal for the plating circuit.

Here it should be observed that the plug **33** and collet **28** serve to establish good electrical contact between the piston **37** and the shaft **23**, and that the brush **103** serves to complete this portion of the plating circuit.

*Anode Assembly*

The anode assembly **76** and its various elements are best illustrated in FIGS. 3, 6, 7 and 8. Basically this assembly consists of a laminated structure made up of generally rectangular sheets **111—116**. Sheets **111**, **112**, **114** and **116** are preferably made of a plastic such as Plexiglas, and sheets **113** and **115** are made of lead. Formed on the corresponding sides of the sheets **111—116**, respectively, are concentric semicylindrical peripheral edges **117**, **118**, **119**, **120**, **121** and **122**. The semicylindrical edge **117** is formed on a radius somewhat smaller than the radius of the piston **37** and the width of the sheet **111** is slightly smaller than the width of the groove **123** which, as presently will appear, serves as a guide groove for locating the anode assembly **76** in proper registration with the piston. From FIG. 8 it is to be noted that the peripheral edge **117** of the Plexiglas sheet **111** extends into the groove **123** and that its side walls have a running fit with the side walls of the groove. The major portion of the semicylindrical edge **118** is on a radius equal to the radius of the piston **37** and has a running fit with the cylindrical surface of the piston. In addition to this the edge **118** is formed with an inclined portion **124** arranged to extend into the groove **38**. The edge **119** is formed on a radius equal to the maximum radius of the inclined portion **124** and the width of the sheet **113** is substantially smaller than the groove **38**. Here it should also be noted that the width of the sheet **112** is substantially greater than the width of the common wall separating the grooves **123** and **38**. The width of the sheet **114** is such that it overhangs the common wall separating the grooves **38** and **39** and the central portion of the edge **120** is formed on a radius equal to the radius of the piston **37**. Formed on the sides of the edge **120** are inclined portions **125** and **126** merging with the edges **119** and **122** and therefore extending respectively into the grooves **38** and **39**. Finally, the major portion of the edge **122** is formed on a radius equal to the radius of the piston **37** but is provided on its inner side with an inclined edge **127** extending into the groove **39** and merging with the cylindrical edge **121** of the sheet **116**.

As indicated in FIG. 7, each of the sheets **111—116** is provided with registering bolt holes **128** by which they can be bolted together to form a unitary laminated structure, the cylindrical surfaces of which form a saddle arranged to fit snugly over the lower portion of the cylinder **37**. The lead sheets **113** and **115** constitute anodes which, as shown in FIG. 8, respectively extend into the ring grooves **38** and **39** to be chrome-plated. The function of the inclined edge portions **124**, **125**, **126** and **127** is to shape the plating **129** applied to the side walls of the ring grooves **38** and **39** substantially in accordance with the half teardrop configuration shown in FIG. 9. The function of the major surfaces of the edges **118**, **120** and **122** is to seal off the piston surfaces at these zones so as to constrain plating to take place only within the ring grooves **38** and **39**. This expedient is resorted to, for in most cases the sleeve or cylinder in which the piston **37** operates is already chrome-plated and, as is well known, more wear occurs at the interface of like metals than at the interface of dissimilar metals. It is preferable, therefore, to avoid chrome-plating the external cylindrical surfaces of the piston **37**.

As indicated in FIG. 3, the anode sheets or plates **113** and **115** are connected to a common anode lead **131** which, although not shown, communicates through a suitable source of voltage and a switch with the pigtail **107** attached to the commutator brush **103** (FIG. 4).

The action of the biasing spring **85** (FIGS. 1 and 4) upon the clockwise rotation of the piston-supporting assembly serves to force the anode assembly into its operating position over the piston **37** as best shown in FIG. 8 with the guide edge **117** located in the guide groove **123** and with the anode edges **119** and **121** located within the confines of the ring grooves **38** and **39**.

*Scavenger Pump*

Electroplating is accompanied by the formation of hydrogen, and such hydrogen, if left at the site of formation, impedes further plating. In the instant case the formation of hydrogen during the plating process takes place in the ring grooves **38** and **39** and the hydrogen tends to accumulate there, even though the channels formed by these grooves and the anode assembly are open at the ends thereof.

To relieve these channels of hydrogen, the lead sheets or plates **119** and **121** and the intervening plastic sheet **120** are provided with aligned, radially extending slots **132** which together form a radial channel **133** communicating with the ring grooves **38** and **39** (see FIG. 7 wherein the lead plate **113** is provided with a slot **132**, the plates **120** and **121** being provided with identical slots).

Extending through the plates **116** (or the two plates **111** and **113** if preferred) is a nipple **134** communicating with the channel **133** and connected thereto is a flexible conduit **135**. As diagrammatically illustrated in FIG. 1, the line **135** communicates with a pump **136** through a solenoid-operated valve **137** and the pump in turn communicates with the interior of the plating tank **1**. As a result of this structure the plating solution can be made to circulate through the ring grooves **38** and **39** at any desired rate, and to carry with it all of the hydrogen being formed.

*Alternative Form of Anode Assembly*

On some occasions it is desirable to plate only one face of a ring groove, and it is to an anode assembly for this purpose that the modification illustrated in FIGS. 10 and 11 is directed.

This modification includes a pair of parallel plastic plates **141** and **142** held in spaced relationship by spacers **143** and bolts **144**. One side of each of the plates **141**

and 142 is formed with a semicircular edge 145 formed on a radius equal to the radius of the piston 37 less the depth of the ring groove 38 (or the ring groove 39). As a result of this construction the circular edges 145 of the plastic plates 141 and 142 will be disposed within the ring grooves 38 and 39 when the anode assembly is in its operative position and have a running fit with or be slightly spaced from the bottoms of the ring grooves. The gauge or thickness of the plates 141 and 142 should be somewhat less than the width of the ring grooves 38 and 39 and the spacing of the plates should be substantially equal to the spacing of the ring grooves.

Formed in each of the plates 141 around its circular edge 145 is a semicircular recess 146, the depth of such recess being equal to about half the thickness of the plate. Embedded in each plate within the confines of its recess 146 is a semicircular lead anode 147 having an exposed outer face.

Fixed to each of the plates 141 and 142 adjacent its circular edge 145 and within the confines of its recess 146 are flat spacing lugs 148 and 149 overlaying the circular anode 147. The gauge or depth of these lugs should be such that they do not extend above or beyond the outer face of the plates. The lugs also serve to hold the anode 147 from contacting the walls of the ring grooves.

Formed in each plate on its median line is a groove or channel 151 and accommodated therein is a lead 152 for connecting the anode with a source of electric current.

With an assembly only one side of each of two ring grooves can be plated. Here it is unnecessary to pump the plating solution around the ring grooves for, contrary to the anode assembly earlier disclosed the instant assembly does not close the ring grooves and consequently no hydrogen is trapped therein.

This anode assembly, like the assembly 76, is arranged to be secured to flexible holders 74 and 75 and to be held against the flat faces of the circular edges against the sides of the ring grooves which are not to be plated and with the circular anodes 147 thereof facing but spaced from the groove sides to be plated.

During the actual plating operation the shaft is slowly rotated under the influence of worm gear 24 and the power-driven shaft 94.

As a result of this type of fixture, pistons can be quickly mounted on the piston-supporting assembly and accurately located on the drive shaft 23. As the piston assembly is lowered into the plating solution the anode assembly automatically functions to close the anodes on the piston and the clockwise rotation of the piston-supporting assembly brings the worm gear 24 into mesh with the power-driven worm 95 so as to rotate the piston during the plating operation. The anodes are precisely located adjacent the groove surfaces to be plated and are sufficiently large to carry the required plating current, and provision is made in the first anode assembly described for circulating the plating solution through the ring grooves and for scavenging the hydrogen being formed.

Although only one such unit has been described, any number thereof can be mounted on the plating tank.

In both modifications of the anode, means should be provided for blanking off the ring grooves adjacent the peripheral ends of the ring grooves so that electric current will not pass around such ends and cause an electrolytic deposition on the adjacent peripheral walls of the piston.

I claim:

1. A piston ring groove plating fixture comprising: a frame; a piston-supporting member journaled in said frame for rotation on a first axis between a first inoperative position and a second plating operative position; a rotary shaft journaled in said supporting member on a second axis transverse to said first axis; means mounted on said frame for rotating said supporting member; means mounted on said frame for rotating said shaft on its own axis in response to the movement of said supporting member into its operative position; and an anode assembly mounted on said frame in the locus of said piston-supporting member and arranged to engage a piston mounted on said shaft as said piston-supporting member moves into its operative position.

2. A fixture of the character set forth in claim 1 wherein means is provided on said shaft for detachably securing a piston coaxially thereto and for locating said piston on said shaft relative to a predetermined point thereon.

3. A fixture of the character set forth in claim 1 wherein said anode assembly is journaled in said frame coaxially with said supporting member and wherein there is a lost-motion connection between said supporting member and said anode assembly arranged to cause said supporting member and anode assembly to close on each other in response to the rotation of said supporting member to its operative position and arranged to cause said supporting member and anode assembly to move away from each other in response to the rotation of said supporting member from its operative position to its inoperative position.

4. A piston ring groove plating fixture comprising: a frame; a first shaft journaled in said frame; means mounted on said frame for rotating said first shaft from a first position to a second position and vice versa; a piston-supporting member fixed to said shaft; a second shaft journaled in said supporting member on an axis transverse to said first shaft; means mounted on said second shaft for detachably securing a piston thereto for rotation therewith; an anode-supporting member journaled on said first shaft; a lost-motion connection for connecting said anode-supporting member to said piston-supporting member, said connection being arranged to cause said piston-supporting member and said anode-supporting member to close upon each other in response to the terminal movement of said piston-supporting member in one direction and to separate from each other in response to the movement of said piston-supporting member in the opposite direction; and means mounted on said frame and responsive to the said terminal movement of said piston-supporting member for rotating said second shaft.

5. A fixture such as set forth in claim 1 wherein said anode assembly includes a pair of laterally spaced arcuate anodes receivable in a pair of ring grooves of said piston when said supporting member is in its plating operative position.

6. A fixture such as set forth in claim 5 wherein said arcuate anodes are disposed between arcuate insulating plates and wherein said plates are arranged to engage the cylindrical surfaces of said piston adjacent its said ring grooves to thereby seal off said cylindrical surfaces from said grooves.

7. A fixture such as set forth in claim 1 wherein an electric collector ring is fixed to said shaft and wherein said frame mounts a brush in sliding engagement with said collector ring.

8. A fixture such as set forth in claim 1 wherein said anode assembly includes a flexible arcuate anode-supporting strip and wherein a pair of laterally spaced arcuate anodes are suspended from said strip.

9. A fixture such as set forth in claim 8 wherein said anodes are separated by insulating plates having arcuate peripheral portions arranged to seat on said piston adjacent its piston ring grooves.

10. A fixture such as set forth in claim 1 wherein: one end of said shaft terminates in a coaxially threaded stud; a sleeve circumscribes said shaft and is provided at one end with an internally tapered collet, an externally tapered plug is threaded on said stud in axially sliding engagement with said collet, said plug being splined to said collet.

11. A piston ring groove plating fixture comprising: a

frame; a piston-supporting assembly journaled in said frame intermediate its ends for rotation about a fixed axis; an anode-supporting assembly mounted on said frame; a lost-motion connection between said piston-supporting assembly and said anode-supporting assembly; means for rotating said piston-supporting assembly about said fixed axis; a shaft journaled in said piston-supporting assembly; means on said shaft for detachably securing a piston coaxially thereto; a worm gear fixed to one end of said shaft; and a worm journaled in said frame in the locus of said worm gear.



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