

March 5, 1963

E. LINDENMAIER ETAL

3,080,310

ELECTROLYTIC CELL WITH ANODE ADJUSTING DEVICE

Filed Nov. 14, 1960

5 Sheets-Sheet 1

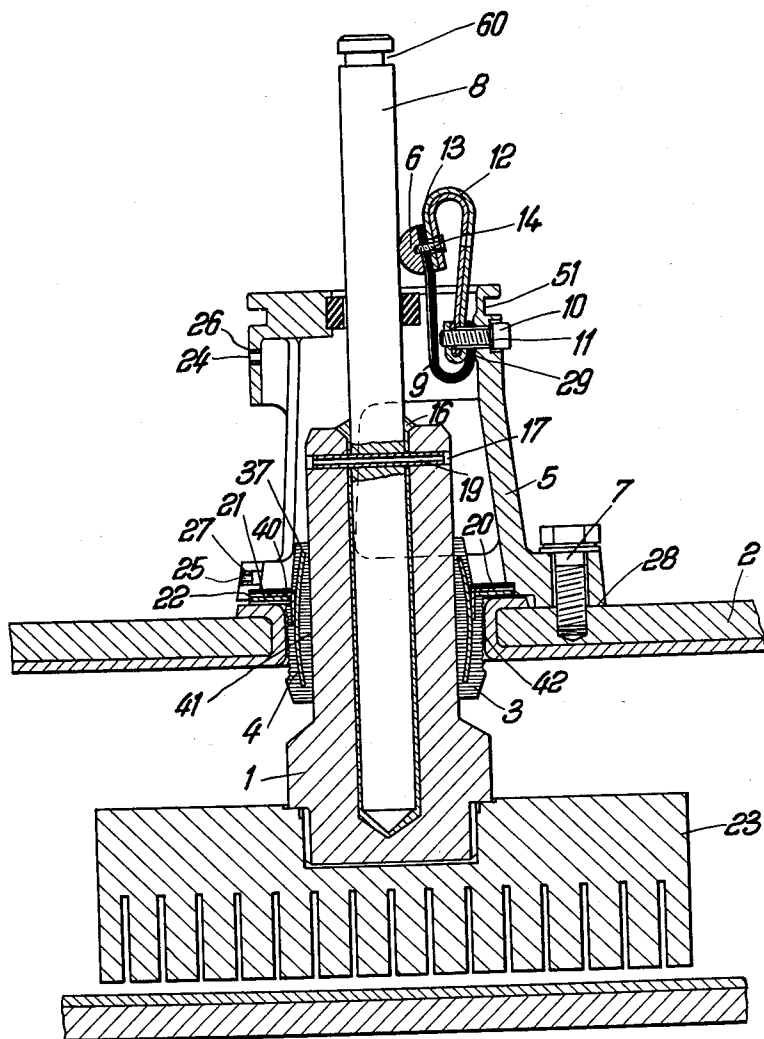


Fig. 1

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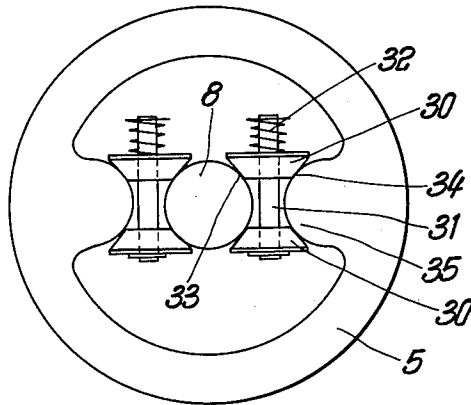


Fig. 2

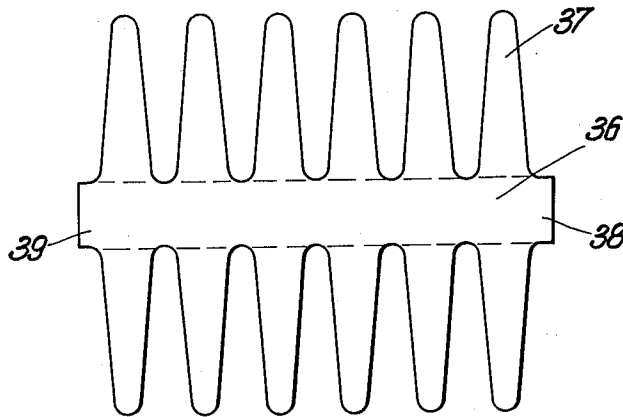


Fig. 3

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Fig. 4

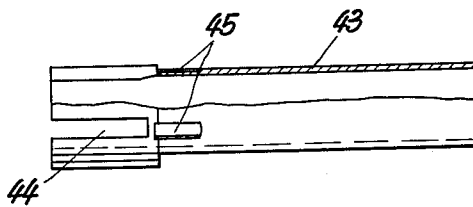


Fig. 5



Fig. 6

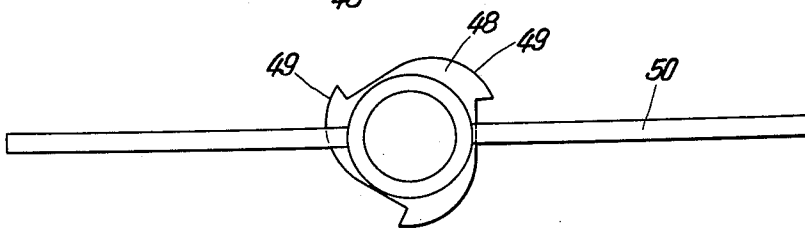
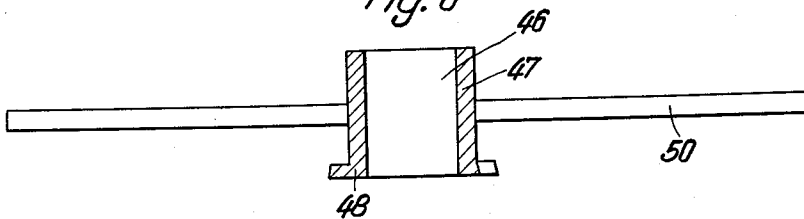


Fig. 7

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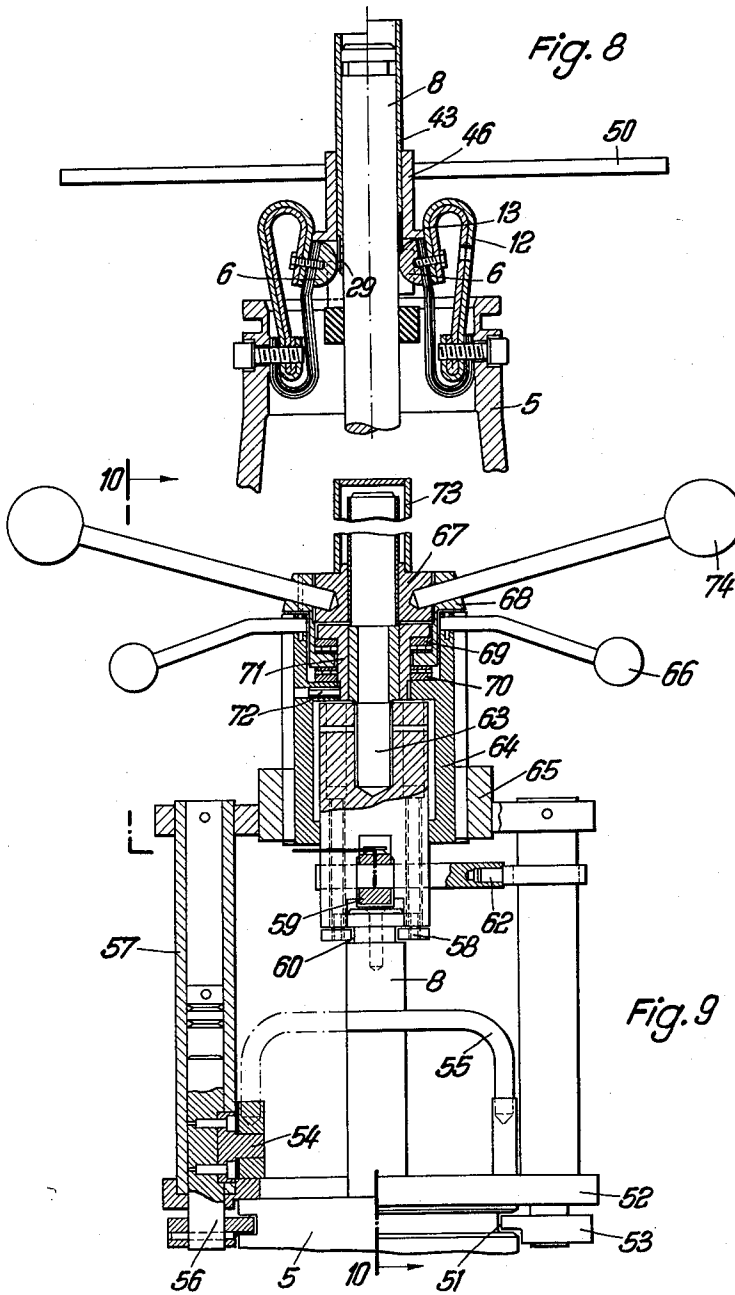
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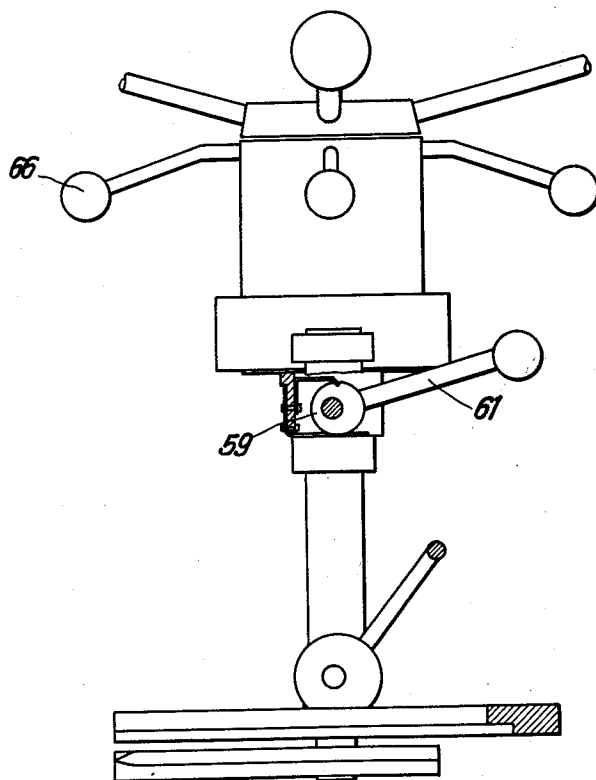


Fig. 10

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**ELECTROLYTIC CELL WITH ANODE
ADJUSTING DEVICE**
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pany
Filed Nov. 14, 1960, Ser. No. 68,755
Claims priority, application Germany Dec. 14, 1959
20 Claims. (Cl. 204-225)

The present invention relates to a device for fixing
and setting anodes in electrolytic cells, such as alkali-
chloride electrolytic cells, in which the electrical energy
is fed to the anode plate by way of a copper rod and
an anode stem to which the copper rod is secured, the
anode stem passing through the cover of the cell and
being arranged displaceably with the anode relatively to
the cover of the cell.

It is known that the internal resistance of electrolytic
cells is approximately directly proportional to the space
between the electrodes so that, with an increasing space
between the electrodes due to the consumption of the
anode material, an increase in the applied voltage for the
operation of the cell is necessary if the current strength
is to remain constant. In order to avoid this increase in
the applied voltage, it is known to construct electrodes
that can be adjusted during operation. Known devices
for achieving this object have been found to have various
limitations.

Disadvantages may exist in the apparatus for adjusting
the space itself between the electrodes, in the construction
of the current supply to the anode or in the construction
of the anode guide and support through the cell cover.
It is generally desirable that various kinds of tasks and
requirements are to be fulfilled by apparatus for the se-
curing and setting of anodes in electrolytic cells, said
tasks and requirements consisting substantially in the fact
that the supply of current to the anode must be effected
with the minimum loss of voltage and current strengths
of, for example, 1,000 to 2,000 amps. per anode should
be admissible, that simple and accurate adjustment and the
fixing of the space between the electrodes should be pos-
sible during operation by fixing the height of and pro-
viding a straight passage for the anode and that also,
despite the adjustability of the anodes, the anode guide
and support should not require any maintenance during
the life of the anode and that, in addition, simple as-
sembly, operation and maintenance of the device should
be ensured. A device for adjusting the space between the
electrodes cannot be considered in itself alone, but only
in conjunction with the current supply lead to the anode
and the guiding of the anode through the cell cover.

First of all, the anode guides and supports of known
devices have disadvantages in respect of straight guiding
of the anode stem and the adjustability of the space
between the electrodes. Thus the previous use and con-
struction of a rubber sleeve as a seal and guide for ad-
justable electrodes involves the disadvantage that the
holding power of the rubber soon diminishes due to the
pressure and temperature to which it is subjected, and
that, in addition, due to the excessive elasticity of the
sleeve, accurate adjustment and fixing of the anode and
its straight guiding can be achieved only with difficulty.

Immersion seals which have become known for sur-
mounting these disadvantages and wherein a cavity re-
mains between the anode stem and an immersion sleeve
of ceramic material, result in the cavity becoming filled
with crystallised salt during operation, whereby the sleeve
and the anode stem passing therethrough become so en-
crusted that uniform displacement of the anodes is no
longer possible.

Almost all known adjusting devices which act from the
cell cover side on the anodes make provision for a screw
device, or at least a screw thread for transmitting the
adjusting forces to be associated with each anode. Apart
from the fact that the association of a screw device with
each anode is very expensive, the fitting of each anode
stem, or of the copper rod mounted in the anode stem,
with a thread becomes a disadvantage, because each in-
dividual thread must be attended to and maintained con-
tinuously, since it is exposed to the corrosive atmosphere
of electrolytic operation. Experience has shown that
maintenance of the setting thread associated with each
anode stem, if its efficiency is to be maintained, is very
expensive and time-wasting.

Known devices for adjusting anodes in electrolytic
cells provide flexible current leads from the fixed to the
displaceable parts of the anode guide. Flexible current
leads have the disadvantage, however, that they can be
used only for small current loads, for, with an increasing
current strength, an increase in the cross section of the
flexible supply lead becomes necessary and this adversely
affects the mobility of the supply lead and requires larger
strands. Due to the mechanical forces of the flexible
supply lead, the mechanical loading of the anode guide
and support and of the anode stem is increased and has
an unfavourable effect particularly during adjustment.
In addition, the necessary current supply loops require
extra material and cause an increased voltage drop in the
supply lead. A further disadvantage resides in the fea-
ture that the large strands or strips to be connected to
the anode stem in the construction of the adjusting device
lead to considerable difficulties.

According to the present invention a device for fixing
and setting an anode in an electrolytic cell in which the
electrical energy is fed to the anode plate by way of a
copper rod and an anode stem to which the copper rod
is secured, comprises a guide casing adapted to be
mounted on a cell cover above an opening therein through
which the anode stem passes and having in its upper part
remote from the cell cover, a guide sleeve for the copper
rod, a packing sleeve or resilient corrosion-resistant ma-
terial for sealing the anode stem to the cell cover, the pack-
ing sleeve having embedded therein a spring for pressing
the sleeve against the anode stem, and having a flange
for resting on the cell cover, said flange having a center-
ing ring by which the packing sleeve may be located in
the guide casing, and pressure loaded contacts for trans-
mitting current to the copper rod, the copper rod and the
guide casing being adapted in the parts thereof remote
from the cell cover to receive a removable adjusting de-
vice for adjusting the position of the anode relatively to
the cover.

The use of a guide casing which, in its upper part
remote from the cover and in its lower part facing the
cover, is provided with sleeves for guiding the copper rod
and anode stem, has the advantage that the anode is
guided at two places removed from each other so that
reliable straightness of the anode with simple assembly
may be readily ensured.

Simultaneously, due to the embedded spring in the
packing sleeve, the anode may be reliably secured. The
guide casing may preferably be provided simultaneously
for conducting current. For this purpose it is manu-
factured, for example, of aluminum with an applied
corrosion-resistant protective layer or any other pref-
erably electrically efficiently conductive material capable
of being cast and secured to the cell cover. Thus for
example, in the case of a current conducting cover, a
short current supply lead is possible and it is also pos-
sible, by selecting the cross section, to keep losses low
in this part of the supply lead. Of course, the current can

be fed to the guide casing by means of contact rails, cable conductors or the like or through the cover and rails. In addition, the casing may serve simultaneously as a shunt and have measuring points which are provided for obtaining the level of current proportional to the drop in voltage. The current per anode and consequently the distribution of the current in the cell is easy to check. In addition the guide casing can be provided with spring-loaded contacts in such manner that said guide casing serves simultaneously as an abutment for the contact springs. Moreover, there is the possibility that the casing may be constructed simultaneously as an abutment for a removable anode adjusting device acting in the manner of a draw-off apparatus. In order to render possible the attachment of the removable adjusting device by placing it over the guide casing, the copper bar and guide casing preferably have, on their ends remote from the cover, annular grooves in which claws or clamps of the adjusting device can engage.

The sealing of the anode stem to the cover of the cell and the securing of the anode stem is achieved by the present invention in that a packing sleeve of elastic corrosion-resistant material such as rubber, synthetic rubber or synthetic plastic material with an embedded spring is provided, and that the object of the spring is to press the sleeve against the anode stem. Preferably the embedded spring is constructed as a spreader or slotted sleeve, the spreading arms of which terminate in the direct vicinity of the sealing surface of the sleeve in contact with the anode stem. This feature makes it possible for subsequent resilience of the sleeve to be limited to the minimum during adjustment of the anode and consequently exact adjustment and fixing of the space between the electrodes is possible. The spring which is arranged inside the packing sleeve and which should have such dimensions as not to weaken on account of the stresses to which it is subjected prevents the anode slipping through even when the condition of the sleeve deteriorates by aging or corrosion.

It is advisable to connect the centering ring in the flange of the packing sleeve rigidly to the spring embedded in said packing bush, for example to the closed annular sleeve portion of the spring. The ring is constructed so that only the outer peripheral or contact surface provided for centering is visible. Due to this rigid connection between the centering ring and the sleeve-like spring embedded in the packing sleeve, the centering property is transmitted from the centering ring to the spring. Thus, by means of the centering ring, the packing sleeve and consequently the anode can be centered without difficulty, for example, in a recess in the guide casing.

Instead of the arrangement of flexibly constructed current connections between the cell cover and the copper rod secured to the anode stem for conducting from the fixed to the displaceable parts of the anode guide and support, the invention provides spring-loaded contacts. With correct assessment of the contacts and the contact pressure, it is possible to load each contact with 1,000 amps. or more so that the individual anodes can operate with current strengths of 2,000 amps. or more. The application of such high current strengths opens up the possibility of fitting the cells with a smaller number of anodes so that the manufacture and operation of electrolytic cells is greatly simplified with resultant economic advantages. The contacts also obviate the use of additional power for changing the curvature of flexible leads during adjustment of the anodes. Maintenance of the contacts is not necessary if the current transmission surfaces are provided with a suitable corrosion-resistant coating, preferably of good electrically conductive material, lead and tin alloys or nickel alloys being preferred. Point contacts have the further advantage that in continuous operation the drop in voltage amounts to only a few milli-volts even with high loads.

The contacts may be formed in various ways. It is preferable to form the contacts as sliding contacts which are provided on the guide casing and rest against the copper rod. It is, however, also quite possible to form the contacts, as roller contacts, which may be so shaped as to rest both on contact surfaces of the guide casing and on the copper rod and to roll on the said contact surfaces during the adjustment of the anode.

Since the contacts can rise against the force of the springs pressing thereon, it is possible to switch off individual anodes during operation. For this purpose the resilient contacts or the mountings thereof are provided with freely accessible supporting surfaces for receiving a tool having preferably bevelled or spiral contact surfaces for raising the contacts. The contacts are preferably constructed in such manner that they rest against the copper rod toward its free end over which, when the contacts are raised, an insulating tube is slipped which keeps the contacts in the raised position without touching the contact surfaces provided for the transmission of current.

In accordance with the present invention a device for fixing and setting the anodes is constructed to receive a removable adjusting device which comprises a pair of securing members adapted to be attached respectively to the guide casing and to the copper rod, and two screw-threaded adjusting members one mounted within the other, for coarse and fine adjustment of said securing members relatively to one another. The attachment of the adjusting device is preferably obtained by means of clamps or claws which are preferably actuated by eccentrics and engage in recesses, for example, in annular grooves of the guide casing and the copper bar.

The adjusting device which can be separated or removed from the anodes has the advantage that only one such adjusting device is necessary for several cells and thus for several hundred anodes. The costs of such a device are much less than the costs of a screw adjusting device in which each anode is associated with only one simple screw-thread arrangement with corresponding setting screws. Maintenance of the adjusting device requires no more than the normal attention given to an individual tool.

The invention will be further described by way of example with reference to the accompanying drawings, in which:

FIG. 1 is a section through an anode mounting for an electrolytic cell constructed in accordance with the present invention,

FIG. 2 shows an embodiment of contacts for supplying current to the anode differing from those employed in the anode mounting of FIG. 1,

FIG. 3 is a developed view of a spring embedded in a packing sleeve of the anode mounting of FIG. 1,

FIGS. 4 and 5 are respectively a side elevation, partly in section, and an end view of an insulating tube to be threaded on a copper rod supporting the anode to maintain the contacts in the raised position,

FIGS. 6 and 7 are respectively a sectional elevation and a plan view of a tool for raising the spring-loaded contacts,

FIG. 8 is a sectional elevation of part of the anode mounting showing the co-operation of the tool of FIGS. 6 and 7 for raising the contacts with the insulating tube of FIGS. 4 and 5,

FIG. 9 is a front elevation, partly in section of a removable adjusting device for adjusting the position of the anode, and

FIG. 10 is a side elevation of the adjusting device of FIG. 9 the lower part being sectioned on the line 10-10 of FIG. 9.

Referring to the drawings and more particularly to FIG. 1, an anode stem 1, to which an anode 23 is secured passes through an opening in a current-conductive cell cover 2. The cover is sealed to the stem by means of a

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packing sleeve 3. Embedded in the packing sleeve 3 is a spring 4 which is constructed as a double conical spreader the developed shape of which is apparent from FIG. 3.

A guide casing 5 is secured to the cell cover 2 by means of screw 7. The casing 5 is of material having good electrical conductivity and serves simultaneously as a support for pressure-loaded contacts 6, three of which are distributed about the periphery of a copper rod 8. The contacts 6 are electrically connected to the casing 5 by means of flexible copper strips 9 retained by a holding screw 10, under the screw head of which a spring washer 11 is arranged. The screw 10 simultaneously holds leaf springs 12 which produce the necessary contact pressure. The copper strips 9 are hard soldered to the contacts 6. The copper strips 9 and contacts 6 are secured to the leaf springs 12 by screws 14, which are preferably constructed as self tapping screws. The leaf springs 12 are constructed at 13 in such manner as to form contact surfaces for a lifting tool to be described hereinafter.

An insulating sleeve 15 is mounted by means of a bayonet connection in the end of the casing 5 remote from the cell cover 2 and serves as an upper guide for the copper rod 8. The latter is located in a central bore of the anode stem 1 by means of a lead and tin alloy 16 cast into said bore. For positively securing the rod 8 in the anode stem 1, the copper rod 8 and the anode stem are provided with bores 17, in which a transverse pin 19 constructed preferably as a weak spreader pin is inserted. This pin 19 ensures that the anode 23, secured to the anode stem 1, can be raised even with such high short circuit currents that the heat produced thereby renders the lead and tin alloy 16 unable of itself to hold the parts 1 and 8 together.

The packing sleeve 3 has a flange 20 in which a centering ring 21 is embedded in such manner that only the outer peripheral surface 22 becomes visible on the outside surface of the flange 20. The centering ring 21 is received in a recess in the guide casing 5 so that the anode stem is centrally guided and maintained in the recess of the cell cover 2.

In the guide casing 5 bores 24 and 25 are formed in the region of the upper and lower part of the flange, in which bores heavily stressed tin-plated bushes 26 and 27 are preferably inserted. The bores 24 and 25 provided with the heavily stressed bushes 26 and 27 serve as monitor sockets for the attachment of a volt-meter, the tin-plated bushes being inserted to prevent corrosion in the bores.

In order to reduce contact resistances and for reasons of corrosion, the contact surfaces 28 between the cell cover 2 and the guide casing 5 as also the surfaces 29 between the copper strips 9 and the guide casing 5 are copper-plated, preferably spray-copper plated. The contacts 6 and the copper rod 8 have a corrosion-resistant metal coating, preferably of a lead and tin or nickel alloy.

Instead of the sliding contacts 6 of FIG. 1 roller contacts 30 may be used as shown in FIG. 2. These roller contacts 30 can be arranged to turn on axles 31 and be pressed towards each other by means of helical compression springs 32 so that the contact making surfaces 33 and 34 come into contact both with the copper rod 8 and with contact-making projections 35 of the guide casing 5.

The spring 4, which is provided in the packing sleeve 3 and the developed view of which is shown in FIG. 3, comprises a centre portion 36 with spreader fingers 37 arranged on both sides thereof. The end pieces 38 and 39 of the centre portion 36 are connected together, preferably by spot-welding, so that a closed annular spring 4 is produced. As shown in FIG. 1 the spreader fingers 37 or at least a part thereof, are bent sufficiently in the direction of the anode stem for only a thin sealing layer of the packing sleeve 3 to remain between the fingers 37

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and the anode stem 1. In this manner subsequent spring movement of the packing sleeve 3 after the above adjustment is reduced to an admissible minimum.

FIG. 1 also shows that the centering ring 21 is connected by means of angle plates 20 firmly to the centre portion 36 of the spring 4. Since the packing sleeve 3, in the released condition, has a smaller diameter than the anode stem 1, the sealing surface 41, which is preferably smooth, in the slipped-on condition, is in hard contact with the anode stem 1. On the other hand, the outer diameter of the packing sleeve 3 is selected such that the outer, preferably grooved sealing surface 42 is firmly in contact with the cell cover 2. In this manner the anode stem is completely sealed to the cover, said sealing effect being further increased by the contact surfaces of the flange 20 with the cell cover 2.

In order to raise the contacts 6 from the copper rod 8 and to keep them in the raised position, the devices shown in FIGS. 4 to 7 are provided. FIGS. 4 and 5 show an insulating tube 43 which can be slipped over the copper rod 8 and is provided with recesses 44 and depressions 45. The recesses 44 are arranged, in accordance with the arrangement of the contacts 6, so that the contacts 6, when the insulating tube 43 is slipped on, at first remain in contact with the copper rod 8 through the recesses 44. The diameter of the insulating tube 43 is such that a raising tool 46 (FIGS. 6 and 7) can be slipped over the insulating tubes 43. The raising tool 46 itself comprises a tubular portion 47 and a cam ring 48 with contact surfaces 49 which co-operate with the contact surfaces 13 of the leaf springs 12 (FIG. 1). Handles 50 are provided to provide the necessary turning movement.

In order to raise the contacts 6, as shown in FIG. 8, the insulating tube 43 is first slipped over the copper rod 8 so that the contacts 6 remain in contact with the copper rod 8 through the recesses 44 (as shown on the right side of FIG. 8). The lifting tool 46 is slipped over the insulating tube 43 and, for raising the contacts 6, turned by the handles 40 so that due to the co-operation of the contact surfaces 13 with the contact surface 49, the contacts 6 are raised by pressing back the leaf springs 12. In the raised condition, the insulating tube 43 is pushed further towards the cell cover 2 so that the depressions 45 are located between the contacts 6 and the copper rod 8. This position is reproduced on the left side of FIG. 8. The depressions 45 are formed in such manner that the contact making points of the contacts 6 are exposed and the metal corrosion protection of the contact 6 is not damaged by the sliding on and off of the insulating sleeve 43. After removing the lifting tool 46, the anode can be switched on again by withdrawing the insulating tube 43.

The construction and securing of a removable adjusting device for adjusting the position of the anode can be seen from FIGS. 9 and 10. In order to receive the adjusting device, the guide casing 5, as apparent from FIGS. 1 and 9, is provided with an annular groove 51. This annular groove 51 serves to secure a clamp of the adjusting device, formed of a pressure plate 52 and a counter pressure member 53 which can be pressed by means of an eccentric 54 and an actuating stirrup 55 against the pressure plate 52 engaging in the annular groove 51. The pressure member 53 is secured by means of guide rods 56 which are held in supporting and insulating tubes 57. By means of the eccentric 54 and the pressure plate 52, as also the pressure member 53, the removable adjusting device can be secured without play to the guide casing 5. For play-free attachment of the adjusting device to the copper rod 8, holding claws 58 are provided which co-operate with an eccentric 59. The holding claws 58 are adjusted in height so that they engage in an annular groove 60 of the copper rod 8. By actuating a lever 61 a pressure is exerted on the upper face of the copper rod 8 by means of the eccentric 59 so that the copper rod 8 is secured without play between the

claws 58 and the eccentric 59. A bifurcated member 62 ensures that it is not possible for the claws 58 and the eccentric 59 to turn relatively to the tubes 58 about the copper rod 8. In order to adjust the anodes and to set the necessary space so that the adjusting device can be slipped on the guide casing 5 and the copper rod 8, spindle 63 and sleeve 64 are provided. The sleeve 64 receives the spindle 63 and is mounted in a lock nut 65 and serves for coarse adjustment. The pitch of the thread is selected between 5 and 10 mm. per rotation. For turning the sleeve 64, lever knobs 66 are provided. The spindle 63 is journaled in a nut 67 which preferably has a pitch of 1 mm. per rotation so that fine adjustment is possible. The nut 67 rests, during rotary movements, against the sleeve 64 or against a sleeve 71 by way of a collar 68 and one of two thrust bearings 69, 70 inside the sleeve 64, which sleeve 71 is non-rotatably connected by means of the transverse pin 72 to the sleeve 64. A cover hood 73 is provided to protect the part of the spindle 63 extending out of the nut 67. Connected to the nut 67 are round knobs 74 which serve to actuate the device.

The manipulation and operation of the adjusting device is effected by first placing the device over the guide casing 5 so that the pressure plate 52 rests on the guide casing 5 and the pressure members 53 engage in the groove 51 of the guide casing 5. The knobs 66 are operated for coarse adjustment by turning the sleeve 64 which is disposed in the nut 65. In this manner, within a short period, a desired spacing between the pressure plate 52 and the claws 58 of the apparatus can be rapidly obtained so that the claws 58 engage in the annular groove 60 of the copper rod 8. By means of the actuating stirrup 55, the eccentric 54 is actuated in such manner that the pressure member 53 is moved towards the pressure plate 52 so that the apparatus is located without play on the guide casing 5. By subsequent actuation of the eccentric 59 by way of the handle member 61, the claws 58 are secured without play to the copper rod 8. For accurate setting of the spacing of the anode from the cathode to fractions of a millimetre, the fine adjusting device is used which comprises the spindle 63, the nut 67 and the actuating knobs 74. By means of suitable measuring devices (not shown in the drawings) the electrode spacing adjustment may be immediately ascertained. Operation is therefore extremely simple and requires no special knowledge. After adjustment, the adjusting device can be removed by releasing the eccentrics 54 and 59 again and can be used for setting other anodes so that only one adjusting device is necessary for a plurality of anodes.

The entire anode guide and support can be assembled and dismantled in a simple manner. For assembly the anode stem 1 is introduced from below through the opening in the cell cover 2 and the packing sleeve 3 slips from above on to the anode stem 1. Then the guide casing 5 with already mounted contacts 6 is slipped from above over the copper rod 8 and secured to the cell cover 2 by the screws 7. The device is dismantled in the reverse sequence. An exchange of contacts 6 however does not necessitate dismantling the guide and support, but is possible under current load without the whole cell having to be switched off. The exchange of the contacts is effected during operation in that an anode is deenergised by means of the lifting tool 46 and the insulating tube 43. However by a suitable construction of the lifting tool and of the insulating tube the contacts 6 of the individual anodes may be successively de-energised and exchanged, the anode remaining conductive, for when removing a contact 6, at least one contact rests against the copper rod 8. This is possible if each individual contact 6 can be loaded with a multiple of its rated current without being damaged.

We claim:

1. In apparatus for fixing and setting an anode in an

electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which passes through an opening in a cell cover, the combination comprising a guide casing mounted on said cell cover above said opening therein, a guide sleeve for slidably guiding said copper rod in the upper part of said guide casing remote from the cell cover, a packing sleeve of resilient corrosion-resistant material for slidably sealing said anode stem to said cell cover, spring means embedded in said packing sleeve for pressing the sleeve against the anode stem, said packing sleeve holding said anode stem against slippage having a flange resting on the cell cover about said opening therein, a centering ring embedded in said flange of said packing sleeve for locating the packing sleeve in the guide casing, contacts for transmitting currents to the copper rod, and means for biasing said contacts against said copper rod.

2. The combination according to claim 1 wherein said spring means embedded in said packing sleeve comprises a metallic slotted sleeve forming a spreader spring the arms of which terminate in the direct vicinity of the sealing surfaces of the packing sleeve in contact with the anode stem.

3. The combination according to claim 1 wherein said contacts provide electrical communication from said guide casing to said copper rod and wherein said guide casing serves for conducting the anode current and has measuring points which are provided to enable the existing voltage drop and consequently the current strength proportional to this voltage drop to be measured.

4. The combination according to claim 1 wherein said contacts are slidable on said copper rod.

5. The combination according to claim 1 wherein said contacts comprise rollers in rolling contact with said copper rod.

6. In apparatus for fixing and setting an anode in an electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which passes through an opening in a cell cover, the combination comprising a guide casing mounted on said cell cover above said opening therein, a guide sleeve for slidably guiding said copper rod in the upper part of said guide casing remote from the cell cover, a packing sleeve of resilient corrosion-resistant material for sealing said anode stem to said cell cover, spring means embedded in said packing sleeve for pressing the sleeve against the anode stem, said packing sleeve having a flange resting on the cell cover about said opening therein, a centering ring embedded in said flange of said packing sleeve and enclosed therein so that only its outer peripheral surface is exposed, said guide casing having at its lower end an internal annular recess receiving said flange and cooperating with said centering ring outer peripheral surface to locate the packing sleeve in the guide casing, contacts for transmitting currents to the copper rod, and means for biasing said contacts against said copper rod.

7. The combination according to claim 6 wherein said centering ring is rigidly connected to said spring means.

8. In apparatus for fixing and setting an anode in an electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which passes through an opening in a cell cover, the combination comprising a guide casing mounted on said cell cover above said opening therein, a guide sleeve for slidably guiding said copper rod in the upper part of said guide casing remote from the cell cover, a packing sleeve of resilient corrosion-resistant material for slidably sealing said anode stem to said cell cover, spring sleeve means embedded in said packing sleeve for pressing the sleeve against the anode stem, said packing sleeve having a flange resting on the cell cover about said opening therein, a centering ring embedded in said flange of said packing sleeve for locat-

ing the packing sleeve in the guide casing, contacts for transmitting currents to the copper rod, and contact spring means mounted on said guide casing for biasing said contacts against said copper rod.

9. The combination according to claim 8 wherein said contacts comprise rollers in rolling contact with said copper rod and on said guide casing to provide electrical communication from said guide casing to said copper rod.

10. In apparatus for fixing and setting an anode in an electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which passes through an opening in a cell cover, the combination comprising a guide casing mounted on said cell cover above said opening therein, a guide sleeve for slidably guiding said copper rod in the upper part of said guide casing remote from the cell cover, a packing sleeve of resilient corrosion-resistant material for slidably sealing said anode stem to said cell cover, contacts for transmitting currents to the copper rod, spring means for biasing said contacts against said copper rod adjacent a free end thereof remote from said anode stem, and an insulating tube slipped over the free end of said copper rod to keep said contacts in a raised position.

11. The combination according to claim 10 comprising a corrosion-resistant good electrically-conductive coating on said copper rod and said contacts.

12. The combination according to claim 11 wherein said coating consists of a tin alloy.

13. The combination according to claim 11 wherein said coating consists of a nickel alloy.

14. In apparatus for fixing and setting an anode in an electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which passes through an opening in a cell cover, the combination comprising a guide casing mounted on said cell cover above said opening therein, a guide sleeve for slidably guiding said copper rod in the upper part of said guide casing remote from the cell cover, a packing sleeve of resilient corrosion-resistant material for sealing said anode stem to said cell cover, said packing sleeve having a flange resting on the cell cover about said opening therein, means for locating the packing sleeve in the guide casing, contacts for transmitting currents to the copper rod, means for biasing said contacts against said copper rod, and means removably connected to said copper rod and said guide casing in the parts thereof remote from the cell cover constituting an adjusting device for adjusting the position of the anode relatively to the cover.

15. The combination according to claim 14 wherein said copper rod and said guide casing have annular grooves in their ends remote from the cover by which said adjusting device may be secured.

16. An electrolytic cell comprising a cathode, at least one anode, a cell cover, said cell cover having an aperture therein, an anode stem rigid with respect to said anode and extending through said aperture in said cell cover, a copper rod secured to said anode stem, a guide casing mounted on said cell cover above said aperture therein and about said anode stem and said copper rod, a guide sleeve mounted in the upper part of said guide casing remote from the cell cover and slidably guiding said copper rod, a packing sleeve of resilient corrosion-resistant material slidably guiding the anode stem and sealing the anode stem to the cell cover, contacts for transmitting current to said copper rod and means for biasing said contacts against said copper rod.

17. An electrolytic cell according to claim 16 wherein said anode stem has a bore therein in which said copper rod is located and further comprising a cast lead and tin alloy in said bore and securing said copper rod to said anode stem and a pin which passes through the copper rod and anode stem transversely thereof to further secure said copper rod to said anode stem.

18. An electrolytic cell according to claim 17 wherein said pin is a weak spreader pin.

19. An adjusting device for adjusting the position of an anode in an electrolytic cell in which the electrical energy is fed to the anode plate by way of a copper rod and an anode stem to which the copper rod is secured and which extends through an opening in a cell cover and in which the copper rod is guided in a guide casing, comprising in combination a pair of securing members removably secured respectively to the guide casing and to the copper rod and two screw threaded adjusting members mounted in said securing members and mounted one within the other and having coarse and fine screw threads for coarse and fine adjustment of said securing members relatively to one another.

20. An adjusting device according to claim 19 in which at least one of said securing members includes clamps and an eccentric for actuating said clamps to secure that securing member without play to one of said guide casing and copper rod.

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