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3,511,766

CURRENT LEAD-IN PIN

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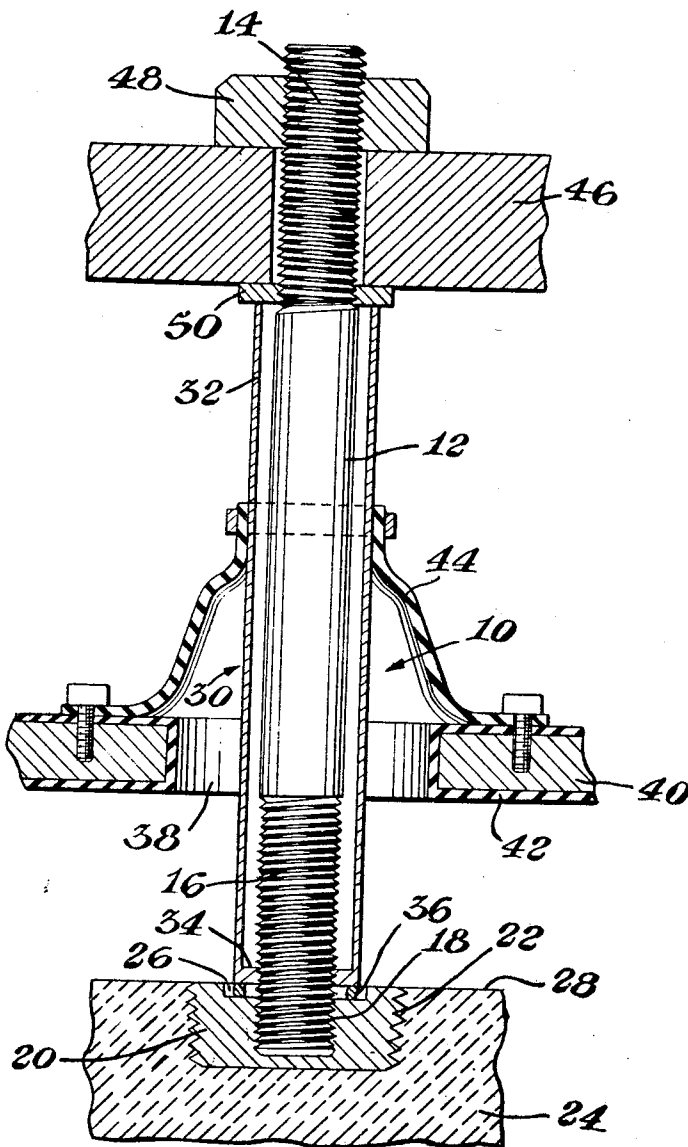


Fig. 1

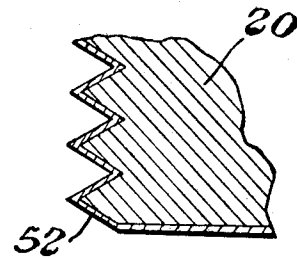


Fig. 2

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CURRENT LEAD-IN PIN

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7 Claims

ABSTRACT OF THE DISCLOSURE

The invention relates to a current lead-in member whose rod-like conductor is coupled to a bus bar at one end part and whose other end part is coupled to a titanium bushing having its outer periphery threaded and its outer surface coated with rhodium. A sleeve made of materials which are not corroded by the encountered environment surrounds the rod-like conductor and is sealed at its lower end whereby corrosive fluids adjacent to the bushing. The bushing is threaded into the anode to make electrical contact between the bus bar and the anode.

BACKGROUND OF THE INVENTION

This invention relates to a current lead-in device for use in electrolytic cells, and particularly to such a device which is adapted to be coupled between a bus bar and the anode of a so-called chlorine cell.

Such current lead-in devices usually suffer from two problems: they are not very durable in the corrosive atmosphere in which they must operate, and they have a higher electrical resistance than is desirable in view of the heavy current they are to carry.

Accordingly, a principal object of this invention is to provide an improved current lead-in device for use in electrolytic cells.

Another object of this invention is to provide an improved current lead-in for use in electrolytic cells which has a long life even when used in a corrosive environment.

A further object of this invention is to provide an improved current lead-in for use in electrolytic cells which has low electrical resistance over a long period of use.

In accordance with this invention, there is provided a current lead-in device comprising an elongated metal rod which has threaded ends. One end of the rod is screwed into a corrosion resistant metal bushing which has been coated with rhodium and is disc-like in shape with a concentric bore which accepts the threaded end of the rod. A fluid impervious sleeve having an inwardly extending flanged part surrounds the rod along most of its length, the flange threadedly engaging the threads in the end of the rod which is adjacent to the bushing. An O-ring type seal surrounding the rod is compressed between the bottom of the sleeve and the bushing.

The other threaded end of the rod extends through a bus bar and is coupled thereto in any suitable manner.

The invention, as well as additional objects and advantages thereof, will best be understood when the following detailed description is read in connection with the accompanying drawing, in which:

FIG. 1 is a fragmentary side elevational view showing the device of the invention coupled to the anode of electrolytic cell, and

FIG. 2 is a fragmentary view, in section, of the bushing shown in FIG. 1.

Referring to the drawing, there is shown a current lead-in device, indicated generally by the numeral 10, which is composed of an elongated metal rod 12, usually made of copper, which has threaded upper and lower end parts 14, 16, respectively.

The lower end 16 of the rod 12 is screwed (or, alternatively, press fitted or splined, for example) into a threaded bore 18 in a bushing 20 which is coupled by means of peripheral threads into a bore 22 which extends downwardly from the surface 28 of the anode 24. The bushing is trapezoidal in shape in vertical cross-sectional configuration and round in transverse cross-sectional configuration. The surfaces 52 of the bushing 24 are coated with rhodium.

A small counter-bore 26 concentric with the bore 18 is disposed in the upper surface of the bushing 20.

A tubular sheath 30, whose walls 32 and bottom inwardly extending flange 34 are made of a material which is not subject to attack by the surrounding environment has the threads of the flange 34 engaging the threads of the lower end 16 of the rod 12.

The sheath 30 contacts the rod 12 only at the flange 34. The flange 34 bears against and compresses a plastic O-ring type seal 36 made of rubber, Teflon (polytetrafluoroethylene), or Kel-F, for example by virtue of it being screwed downwardly on the threads of the rod 12.

The device 10 extends upwardly through a bore 38 in the anode cover 40 which has a rubber layer 42 over its surfaces. A suitable seal, such as the seal 44, is coupled between the anode cover 40 and the sheath 32.

The upper end 14 of the rod is electrically coupled to a bus bar 46 by means of a nut 48 and washer (or nut, alternatively) 50 below the bus bar 46.

In setting the device in operation, the sleeve 30 is screwed onto the lower end of the metal (usually copper) rod 12 after the parts have been cleaned to remove oxide coatings. The flange 34 and walls of the sleeve 32 are usually made of titanium, but may be made of ceramic material, zirconium, tantalum or some plastic material (polyvinylchloride, for example) which can stand the environment in the cell.

Then, with the gasket 36 in place and the threads of bore 18 cleaned, the rod is screwed into the rhodium plated bushing. The sleeve 30 is then screwed tightly against the seal ring 36 to effect a fluid tight seal between the environment and the lower part of the rod 12 (through the space between the flange 32 and the top of the bushing 20).

With the cover seal 44 coupled between the sleeve and the anode cover, the conductive rod 12 is thus protected from the environment existing in the cell.

The surface of the bushing 20 may be coated (plating is the economic way to coat) with any of the platinum group metals, but the cost of plating with the other metals would be much more expensive.

The titanium in the bushing 20 may be replaced by zirconium, tantalum or niobium provided suitable plating may be accomplished on the surface of the metal.

The copper in the rod 12 may be replaced by other conductive metal, with an accompanying loss of conductivity in the rod.

It has been found that lead-in devices in accordance with this invention have a longer useful life than do prior art lead-in devices for such cells.

Further, the lead-in devices in accordance with this device result in a power savings in operating electrolytic cells as a result of their very low electrical resistance over a long operating life.

What is claimed is:

1. A current lead-in device for use in electrolytic cells, comprising an elongated rod-like conductor having opposed threaded ends, a sleeve having an inner diameter substantially larger than the outer diameter of said rod-like conductor, said sleeve having an annularly shaped inwardly extending flange sealed to one end thereof, the inner peripheral edge of said flange being threaded, said sleeve and said flange being made of a corrosion resistant

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terial, said flange being threaded over one end of said
 -like conductor, a bushing whose outer surface is
 ted with a metal of the platinum group, said bushing
 ing a top, bottom and side walls, said bushing having
 ore extending inwardly from said top, said bore being
 aded and of such diameter that it accepts the threaded
 of said rod-like conductor to which said sleeve is
 pled, an O-ring type compressible seal, said seal being
 ratively disposed surrounding said rod-like conductor
 compressed between said inwardly extending flange
 said sleeve and the top of said bushing, said bushing
 g adapted to be mechanically coupled to an anode
 an electrolytic cell whereby said rod-like conductor
 nds through but is spaced from a cover of said cell,
 ns for effecting a fluid tight seal between said cover
 said sleeve, and means for electrically coupling a
 bar to said other threaded end of said rod-like mem-

A device in accordance with claim 1, wherein said
 like member is made of copper.

A device in accordance with claim 1, wherein said
 ing is made of titanium.

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4. A device in accordance with claim 1, wherein said
 bushing is plated with rhodium.

5. A device in accordance with claim 1, wherein said
 sleeve and flange are made of titanium.

6. A device in accordance with claim 1, wherein said
 O-ring seal is made of polytetrafluoroethylene.

7. A device in accordance with claim 1, wherein said
 O-ring seal is made of a material which is not subject to
 corrosive attack by chlorine.

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