

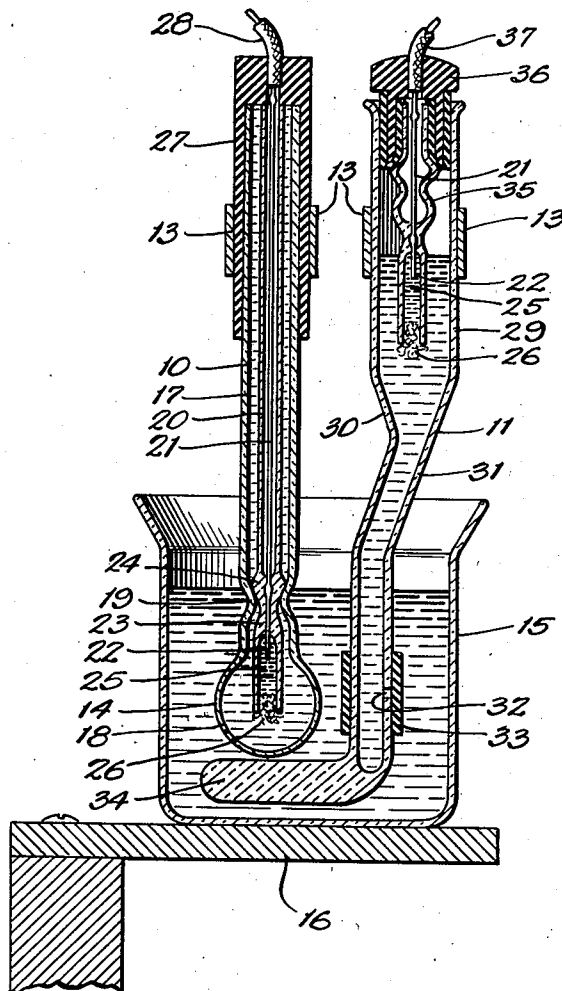
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ELECTRODE ASSEMBLY

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ELECTRODE ASSEMBLY

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1 Claim. (Cl. 204—195)

This application is a divisional from my co-pending application Serial No. 343,332, filed July 1, 1940.

This invention relates to an electrode assembly, particularly intended for use with hydrogen ion meters.

One of the objects of the invention is to provide an improved electrode assembly whereby the delicate glass electrode may be effectively protected by a reference half-cell.

A further object of the invention is to provide an improved reference half-cell.

Other objects, advantages and capabilities of the invention will appear from the following description of a preferred embodiment thereof, taken in conjunction with the accompanying drawing which is a sectional elevation through the glass electrode and reference half-cell, these elements being shown in normal cooperative relation.

Referring to the drawing, my improved assembly comprises a glass electrode 10 and a reference half-cell 11. The glass electrode and reference half-cell are supported in cooperative arrangement, as shown in the drawing, by means of suitable clips 13.

In normal operation, the bulb 14 of the glass electrode, and the lower end of the reference half-cell, are immersed in a suitable liquid which may be contained in a small beaker 15. This beaker may be supported on a movable shelf 16 in known manner, or in the manner described in the parent application.

The glass electrode 10 comprises a tube 17 which has a thin wall bulb 18 at its lower end. Near the bulb 18, the tube 17 is provided with a waist or contraction 19. A smaller tube 20 extends through the tube 17 into the bulb 18. A copper wire 21 extends through the tube 20 and it is connected to a platinum wire 22. This platinum wire passes through a press or closed portion 23 of the tube 20.

Above the press 23, the tube 20 is provided with an enlarged or projecting portion 24 which rests upon the waist 19, thus locating the tube 20 in the glass electrode. The lower end of the tube 20 is open and the platinum wire 22 projects into this space. A drop of mercury 25 is held against the wire 24 by capillary attraction. Below the globule of mercury 25 is a layer or strata of saturated calomel solution, this solution containing a certain amount of undissolved calomel. The lowermost end of the tube 20 is closed by a plug of cotton 26 or other suitable fibrous material.

The bulb 18 contains any suitable solution. For example, this solution may consist of a mixture of M/20 potassium acid phthalate and decinormal potassium chloride.

After the tube 20 has been placed in position, the annular space between this tube and the tube

17 is filled with tar, asphalt or other suitable material, which extends down to the waist 19 and enlargement 24. The upper end of the tube 20 may be enclosed in a sleeve 27 of plastic or other suitable material through the upper end of which sleeve extends the insulated conductor 28.

The reference half-cell comprises an outer tube 29 which is preferably reduced at 30 to a smaller cross-sectional area which enables a beaker 15 of smaller size to be employed. As shown in the drawing, the tube 29 may have an inclined portion 31 which brings the lower end of the tube 29 into close propinquity to the glass electrode. At approximately the level of the bulb 18, the tube 29 is provided with a small opening 32 and around the tube, adjacent this opening, is a tightly fitting rubber band 33.

The lower extremity of the tube 29 carries a projecting portion 34 which is preferably solid. This solid projecting portion 34 extends below the bulb 18 and preferably beyond the bulb as shown in the drawing. It will be understood that the beaker 15 is moved upwardly, past the bulb 18, and the position of the projecting arm 34 protects the bulb from accidental injury when placing the beaker in position.

The upper end of the tube 29 receives a tube 35, the lower end of which is precisely similar to the lower end of tube 20 previously described. This lower end of the tube is immersed in a suitable solution within the tube 29, for example a saturated solution of potassium chloride. The upper end of the tube 35 is supported in a rubber cork 36 or other suitable closure for the upper end of the tube 18.

The conductor 37 is connected through the copper wire 21 to the platinum wire 22 as in the glass electrode. It will be understood that a film of liquid extends along the interior of the rubber band 33 and that conductive connection is established between the liquid within the tube 29 and the glass electrode through this film of liquid.

Although the invention has been described in connection with specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of the invention, except in so far as set forth in the accompanying claim.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

In an electrode assembly, a reference half-cell comprising a tube, an electrolyte therein, said tube having an orifice in a side thereof and a circumambient rubber band resiliently engaging said tube, overlying said orifice and substantially preventing diffusion between said orifice and the edges of said band.

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