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APPARATUS FOR THE MICROSCOPIC OBSERVATION OF ELECTROLYTIC OR CHEMICAL ETCHING OR POLISHING OPERATIONS

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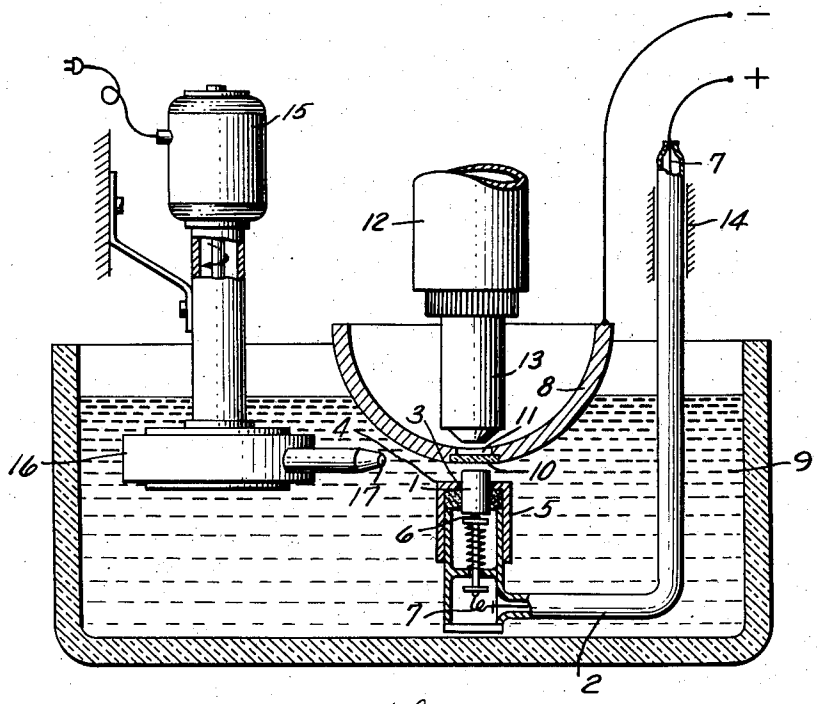


Fig. 1

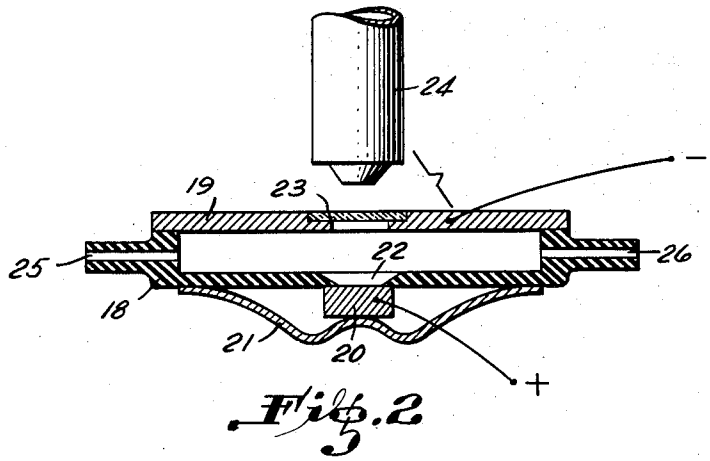


Fig. 2

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APPARATUS FOR THE MICROSCOPIC OBSERVATION OF ELECTROLYTIC OR CHEMICAL ETCHING OR POLISHING OPERATIONS

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4 Claims. (Cl. 204—273)

In metallography it is important to be able to observe the structure of the metal during electrolytic or chemical etching or polishing. This invention relates to an apparatus for the microscopic observation of such operations.

According to the invention, a shell-like or plate-like partition having a transparent window through which the etching or polishing operation can be observed is disposed between the objective of the microscope and the workpiece area to be treated and observed, the partition acting as a closure means in respect of the liquid.

Advantageously, to make the apparatus more easy to handle, that boundary wall of the bath which is opposite the transparent window has an aperture against which the workpiece area to be etched or polished is urged from the outside through the agency of a spring.

If the apparatus is used for the electrolytic etching or polishing of electrically conductive workpieces, the electrically conductive wall which bounds the bath and which has the transparent window or the metal holder of the microscope objective or a ring therearound is formed as cathode, the workpiece surface to be etched or polished being used as anode.

To obviate blisters or streaks, means for agitating the liquid are provided.

Two embodiments of the subject matter of the invention are illustrated in the drawings wherein:

Fig. 1 diagrammatically illustrates an observation device of the kind specified, used in co-operation with an electrolytic etching or polishing apparatus, and

Fig. 2 illustrates a different type of chamber in which etching or polishing can be carried out.

As can be seen in Fig. 1, a workpiece **1** which is to be electrolytically etched or polished is held on a hollow retaining arm **2** through the agency of a releasable cover **4** having an aperture **3**. Sealing means **5** close the interior of the arm **2** in sealing-tight manner.

The workpiece **1** is connected to the positive pole of a current source (not shown) by way of a resilient contact pin **6** and a cable **7** which is connected thereto and which extends through the arm **2**. The cathode consists of a part-spherical shell **8** partly immersed in the electrolyte **9**. An aperture **11** closed by a glass disc **10** is contrived in the base of the shell **8**. The workpiece **1** can be observed through the glass disc **10** during etching or polishing by means of the microscope **12**, but the objective **13** immediately above the workpiece does not come into contact with the electrolyte or etching liquid.

The arm **2** is rotatably and liftably mounted in the bearing **14** so that it can be swung forwards and raised to change the workpiece below the microscope or cathode.

A pump **16** driven by a motor **15** has a delivery aperture **17** directed between the two electrodes, maintains the bath in continuous agitation and thus prevents the formation of blisters or streaks above the anode.

Fig. 2 shows an insulated shell **18** which is connected to a metal plate **19** used as cathode. The workpiece **20** to be etched or polished is also used as anode and, through the agency of a resilient bowed member **21**, is urged inwards against an aperture **22** in the shell **18**. Through an aperture **23** contrived in the plate **19** and closed with transparent material, the etching or polishing operation can be observed by means of a microscope **24**. Also, to reduce the formation of blisters and streaks, the bath liquid can be agitated through the two apertures **25** and **26**.

I claim:

1. An apparatus adapted for the microscopic observation of electrolytic etching and polishing operations on metallic workpieces, comprising an upper wall member composed of electrical conducting material and serving as a cathode, said upper wall member having a window of transparent material for viewing therethrough with a microscope, work holding means for holding said workpiece in viewing position in close proximity below, and in vertical alignment with said transparent window, said work holding means having an aperture therein in vertical alignment with said transparent window and spring means for pressing said workpiece against said aperture, said workpiece constituting the anode when in operative position in the apparatus.

2. An apparatus according to claim 1 including agitating means intermediate said upper wall member and work holding means for agitating electrolyte during the use of the apparatus.

3. An apparatus according to claim 1 wherein said upper wall member comprises a cup-shaped member extending downwardly in close proximity to said work holding means.

4. An apparatus according to claim 1 wherein said upper wall member comprises a horizontally disposed plate.

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