A MULTIPOINT ELECTROLYZER FOR METAL POLISHING

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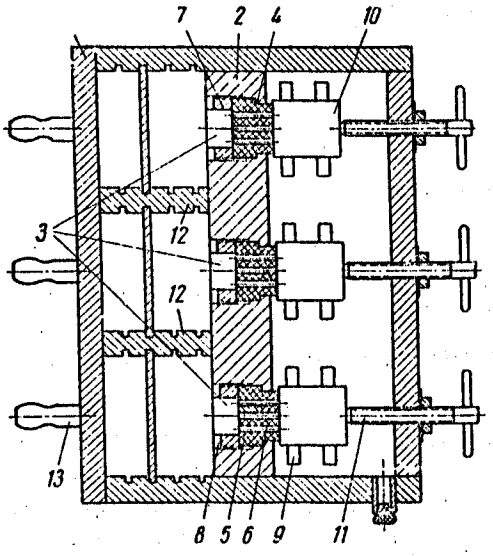
Electropolishing of specimens of a large surface area is connected with difficulties met in rigorously parallel alignment of the anode and the cathode. High-quality polishing can be achieved in an electrolyzer.* However, only one polished surface of a restricted size can be obtained by means of this electrolyzer.



Electrolyzer for the polishing of metals and alloys.

In order to be able to study the structure of a large metal surface it is necessary that the metal be polished at several points.

The author designed, constructed, and tested an electrolyzer for simultaneous polishing of several specimens (see figure), which proved to be convenient in operation.

A tank 1 made of Plexiglas or vinyl plastic, is divided by a reinforced partition 2 into two parts. Three openings 3 provided with beads 4 at the outlet, are drilled in the partition. Rubber plugs 5, provided with symmetrically arranged openings with inserted glass tubes 6 of a diameter of 3 mm, are fitted tightly into the openings. The number of openings corresponds to the required number of spot polishings on the specimen surface and depends on the size of the specimen.

In the described electrolyzer, each plug has five openings and the electrolyzer is designed for simultaneous polishing of three specimens having a surface of 2-3 cm^2 each. Plugs of a larger diameter with a greater number of openings will be necessary for polishing specimens of a larger surface area.

The plugs are snugly fitted in their sockets by holding washers 7, which are screwed in by means of a metallic plate inserted in grooves 8.

Racks 9, facing each plug, are placed at the bottom of this half of the tank, where specimens 10 to be polished are placed. The latter are pressed against the rubber plugs by means of screws 11.

The left-hand portion of the tank is divided by two partitions 12. Grooves for holding metallic plates – cathodes are made in the side walls of the three cells formed by these partitions.

The distance between the electrodes is regulated by placing the cathode plates into nearer or farther grooves. The grooves provide a possibility of placing the cathodes in the exact vertical position, i.e., parallel to the specimens which form the anodes.

The gases liberated on the cathode escape freely upward without disturbing the normal electrolysis process. If a certain shift of the electrolyzer in the vicinity of cathodes takes place, it is not transmitted to the anode compartment due to the small diameter of openings in the plugs and their considerable length, which exerts a favorable influence on the quality of the polished surface.

The electrolyte is supplied to each electrolysis cell of the left-hand part of the tank by rubber hoses fitted to connecting pipes 13.

The described arrangement can be successfully applied for the preparation of quality surfaces on specimens of any metals and alloys which can be treated by electropolishing.

*M.L. Bernshtein, Modern Metallographic Methods of Structure Investigations [in Russian] (Metallurgizdat, 1947).