

[72] Inventors **Rinaldo Grimaldi**
Genoa;
Nereo Vantini, Rome, both of Italy
[21] Appl. No. **756,203**
[22] Filed **Aug. 29, 1968**
[45] Patented **Dec. 14, 1971**
[73] Assignee **Centro Sperimentale Metallurgico S.p.A.**
Rome, Italy
[32] Priority **Sept. 6, 1967**
[33] **Italy**
[31] **7276 A/67**

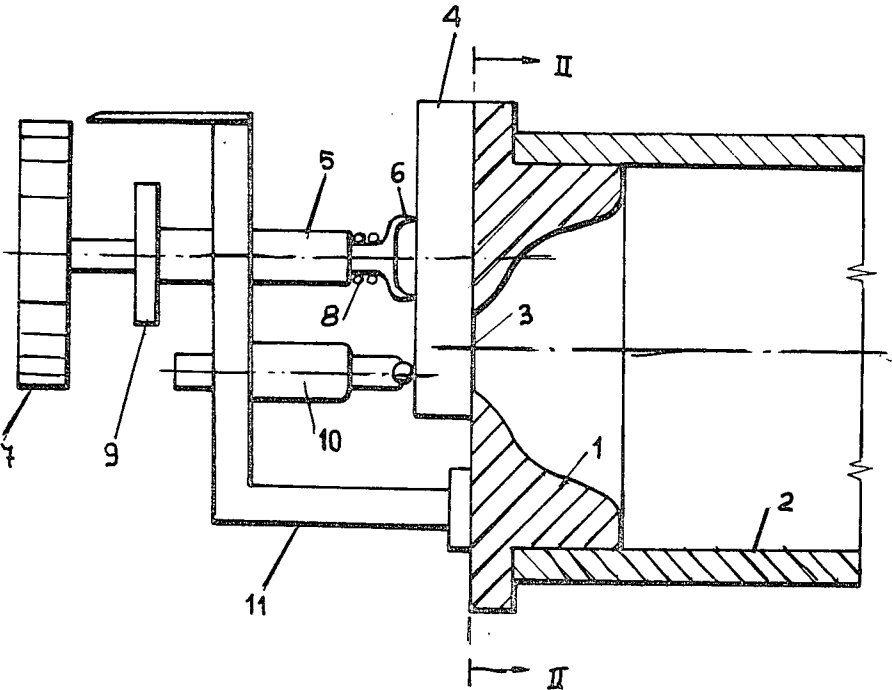
[54] **APPARATUS FOR ELECTROCHEMICALLY
TREATING AND TESTING SURFACE AREAS**
5 Claims, 4 Drawing Figs.

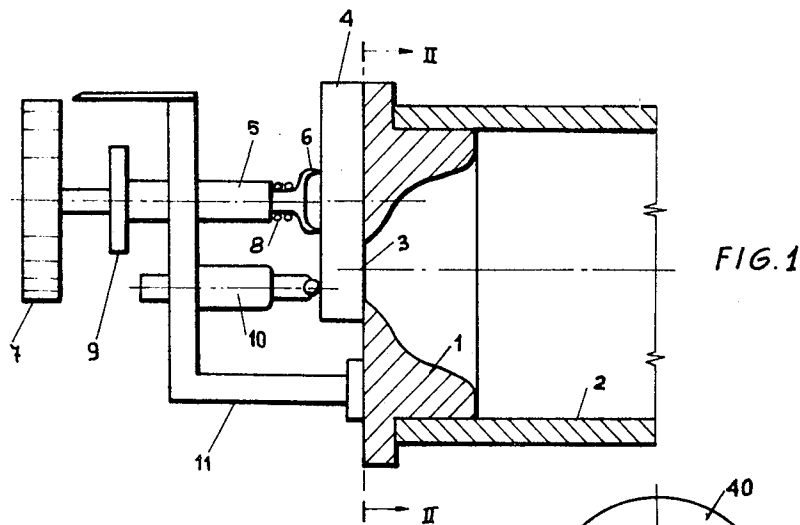
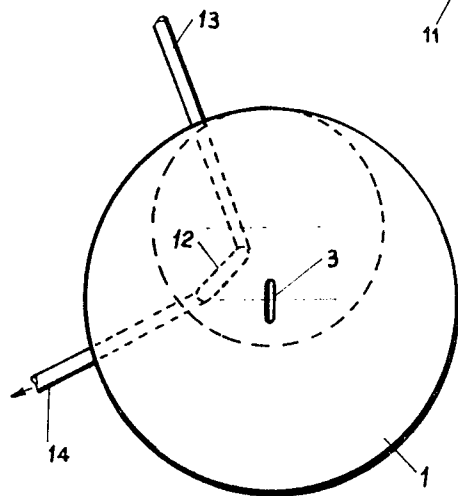
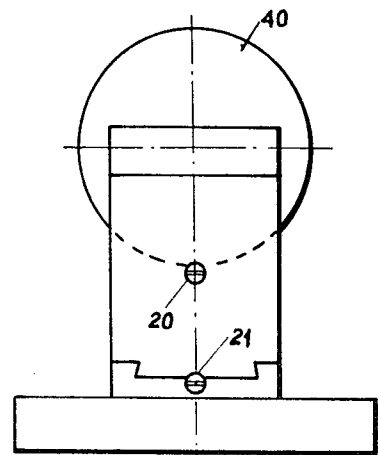
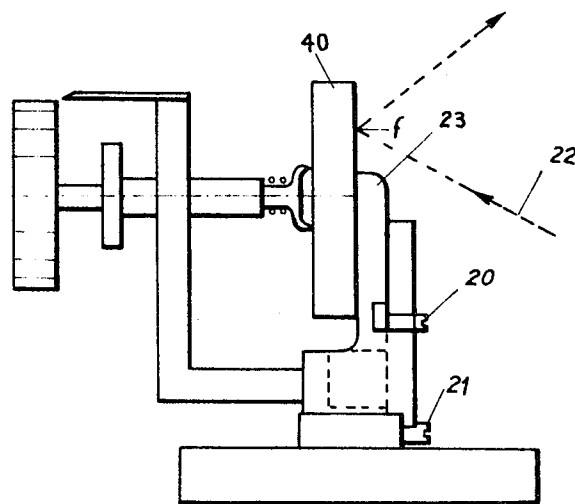
[52] U.S. Cl..... **204/195,**
204/212, 204/215, 204/224, 250/42
[51] Int. Cl..... **G01n 27/46**
[50] Field of Search..... **204/1 I,**
195, 143 G, 212, 215-218, 224

[56] References Cited			
UNITED STATES PATENTS			
3,254,013	5/1966	Williams.....	204/224
3,301,776	1/1967	Hughes.....	204/195
3,445,372	5/1969	Fromson	204/212
3,492,860	2/1970	Bailey.....	204/195

Primary Examiner—T. Tung
Attorney—Robert E. Burns

ABSTRACT: Electrochemical measures and treatments and diffractometric analysis of given areas of a same surface of a metal test strip are allowed by a device by which it is possible to obtain several tests in a relatively short period of time as compared to the time needed by conventional methods, being further sure that such different tests concern a single surface of a same test strip. Therefore, the material on which the treatments are performed not only is of the same composition, but also offers to the various successive tests a surface which is subject to the same cleaning process. The relevant metal test strip must thus assume a particular shape in order to be used with the device.





starting potential. That is an important operation concerning the opportunity of starting with the cell connected.

To start the tests it will be sufficient to move test strip 4 so as to make the first area face slot 3.

During this first step it will be possible to obtain and possibly register: both current-potential curves, for given speeds of the potential (potentiodynamic curves, very much influenced by the value of the parameter (dv/dt)), and current-time curves with preestablished potentials (potentiostatic curves by means of which it is possible to sketch the polarization curve by points).

Particularly, the first type of treatment may be of remarkable practical utility for the choice of the electrolysis conditions (corresponding to characteristics points of the curve of potentiodynamic polarization).

Therefore, provided, for instance, that for a certain potential there is in the electrode a dissolution process of a component, the electrolysis at such a potential will bring to an actual percent enrichment of the other components in the area treated electrochemically. The latter may be examined by X-rays and the results will be as more reliable as more the conditions of the surface area will remain unaltered in the period between such a test and the previous electrochemical treatment.

It is to be appreciated that the surface subjected to electrolysis are generally very active and that this disadvantage may be reduced to the minimum by operating with particular care.

In a second step successive to the electrochemical treatment, there is then performed a suitable displacement of test strip 4 in order to bring the zone of interest in correspondence with the cavity 12, where the same will be subject to a careful washing by the electrolyte and kept for a given time in a current of inert gas.

That washing operation may be performed while a second electrochemical treatment on the successive area is taking place.

Particularly, the washing may be performed by a simple movement by placing a reserve of washing solution in the conduit of the inert gas.

When the treatments (including washing) on each of the eight areas of interest are over, the cell will be disconnected and the test strip removed. For that it will be advisable to operate with the sample in the last positions with order and care, that is by disconnecting the cell and moving same to an oblique position, so as to allow removing the test strip without any discharge of electrolyte. Test strip 4 will be then mounted on the device for the examination at the diffractometer shown

in FIGS. 3 and 4, by taking care of the centering of the various areas.

The advantages offered by the device, particularly in the first use, are several.

First of all, there is a remarkable reduction of time, both for the preparation of the test strips, as a single surface is sufficient for at least eight tests, and for the steps concerning the electrochemical examination, and for the X-rays examination.

A further advantage is that of starting with the surface in the same condition through suitable displacements, possibly after a period of cathode potential preelectrolysis on an adjacent area in order to purify the electrolyte, and that allows an easier and more careful examination at preestablished conditions. The greatest advantage is obtained by the possibility of avoiding the dead times between the electrochemical treatment and the washing of the treated surface.

What we claim and desire to secure by Letters Patent is:

1. Test apparatus comprising, an electrolytic cell for containing therein an electrolyte in operation, a cap on said cell having a through opening, means to hold a testpiece against an external surface of said cap with a test surface in registry with said opening, and in a fluidtight manner, means for rotating said testpiece relative to said opening for subjecting different areas of said test surface to electrolyte in said cell, said cap having a cavity on said external surface spaced from said opening disposed so that said test surface areas are placed in registry with said cavity upon rotation away of said testpiece to move the treated areas from said opening, means for supplying a flow of a material into said cavity onto said areas of said test surface for removing the electrolyte from each area subsequent to being subjected to said electrolyte.

2. Test apparatus according to claim 1, in which said means for supplying a flow of materials comprises two conduit means extending into said cavity.

3. Test apparatus according to claim 1, in which said means to hold a testpiece comprises a rotatable pin, means mounting the pin for axial reciprocal movement, means biasing the pin into engagement with the testpiece when said testpiece is mounted on said apparatus.

4. Test apparatus according to claim 3, in which said pin comprises a bifurcated tip engaging said testpiece.

5. Test apparatus according to claim 4, including means for rotating the pin manually having graduations to designate the different angular positions to which said pin is rotated to cause said different areas to be in registry with said opening on said cap and in registry with said cavity in position for cleaning the electrolyte thereon.

* * * * *

50

55

60

65

70

75