No. 674,933. Patented May 28, 1901.

M. MAURAN.

ELECTROLYTIC CELL.

(Application filed Oct. 16, 1900.)

(No Model.) 2 Sheets—Sheet 1.

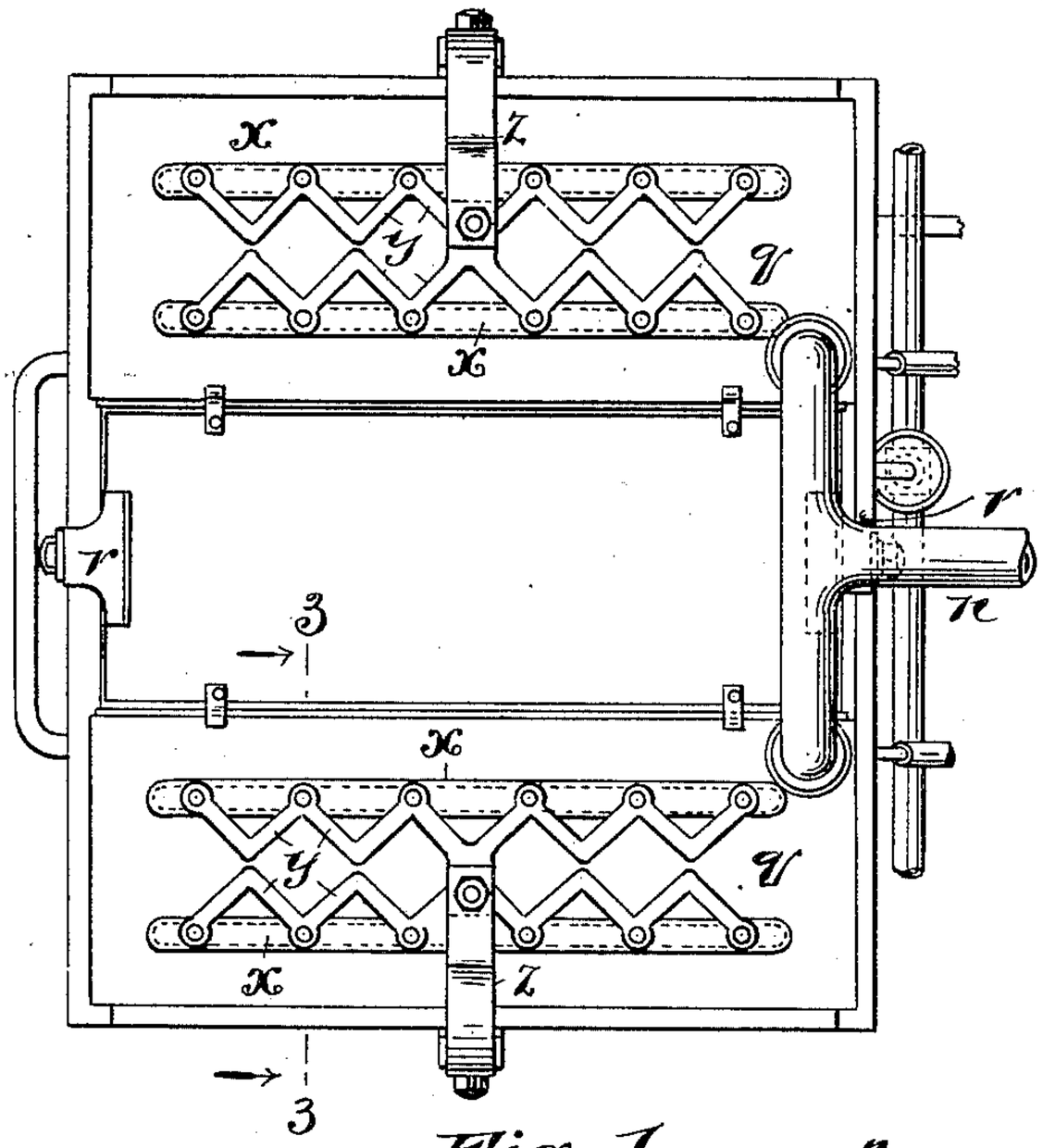

Fig. 1.

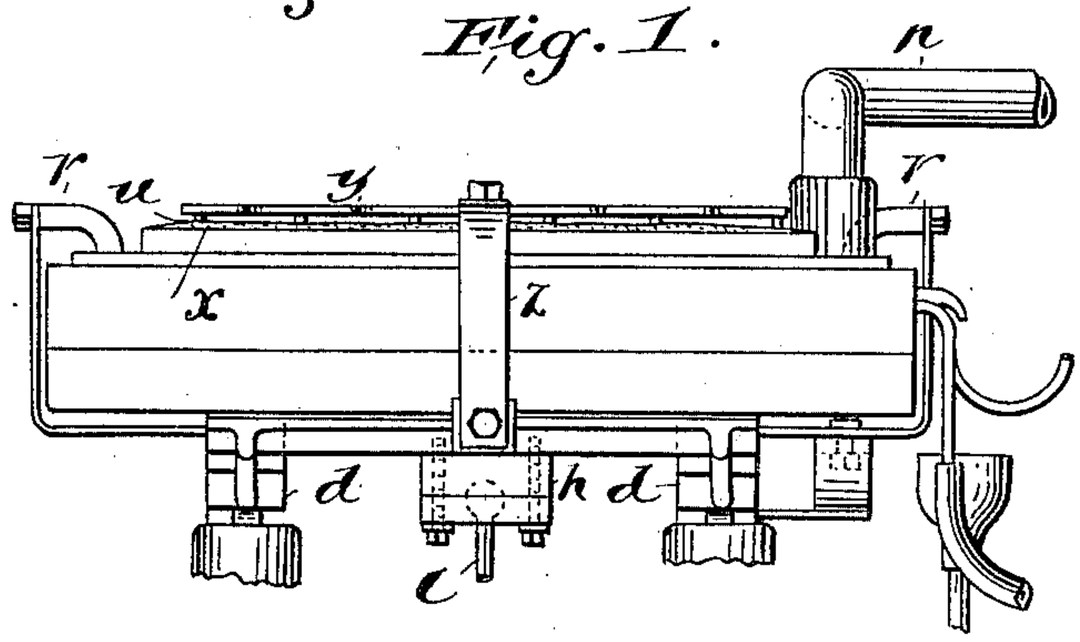

Fig. 2.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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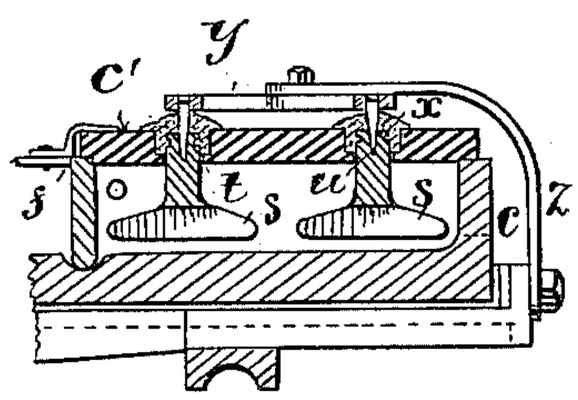

Fig. 3.

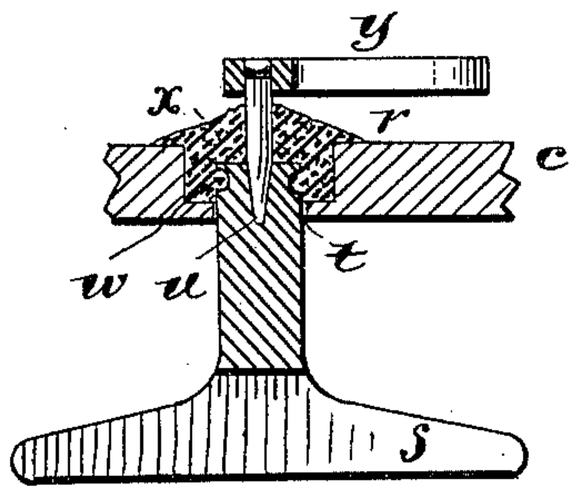

Fig. 4.

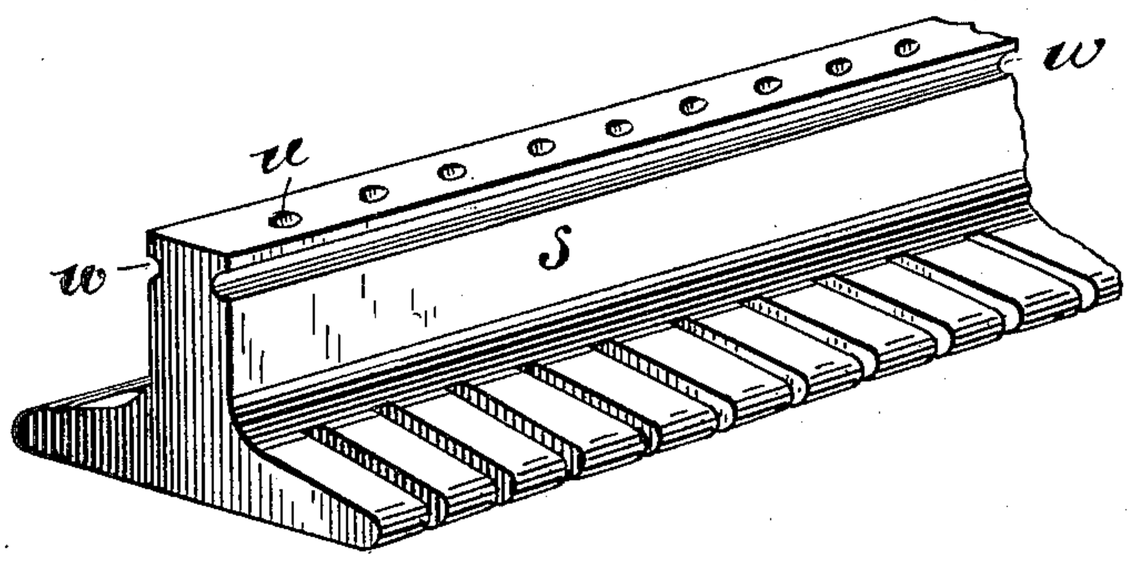

Fig. 5.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MAX MAURAN, OF NIAGARA FALLS, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO CASTNER ELECTROLYTIC ALKALI COMPANY, OF VIRGINIA.

ELECTROLYTIC CELL.

SPECIFICATION forming part of Letters Patent No. 674,933, dated May 28, 1901.

Original applications filed March 26, 1900, Serial No. 10,220, and June 14, 1900, Serial No. 20,264. Divided and this application filed October 16, 1900. Serial No. 33,308. (No model.)

To all whom it may concern:

Be it known that I, MAX MAURAN, mechanical engineer, a citizen of the United States, with residence and address at Niagara Falls, State of New York, have invented new and useful Improvements in Electrolytic Cells, (Case J,) as set forth in the following specification.

The invention is especially related to cells designed for the electrolytic decomposition of common salt—for example, the type of cells shown in United States Letters Patent to Castner, Nos. 518,135 and 528,322. It is not, however, limited to such a cell. It concerns, primarily, electrodes for such a type of cell.

This application is a divisional application covering subject-matter shown, but not claimed, in my applications Serial No. 10,220, filed March 26, 1900, and Serial No. 20,264, filed June 14, 1900.

In certain types of electrolytic cells, especially such as the Castner and similar gas-producing cells for decomposing halogen salts of the alkalies and alkaline earths, great trouble is usually experienced in keeping the joints around the electrodes clean and gas-tight and in keeping the electrical resistance low. The present improvement seeks not only to reduce the electrical resistance to a minimum by peculiar forms of electrode connections, but it also prevents leakage of gas and of current by means of such improved connections.

The drawings show one preferred embodiment of the invention.

Figure 1 is a plan view of a cell provided with the improvements. Fig. 2 is an elevation of the same viewed in the direction shown by the arrow 2 in Fig. 1. Fig. 3 is a vertical section on the plane 3 3 of Fig. 1. Fig. 4 is an enlarged sectional detail view of one of the electrodes and its connectors, and Fig. 5 is a view of one of the preferred forms of electrodes.

The cell *c* and its manner of support need not be here mentioned in detail, as they are not part of the matter claimed in this application. The partitions *f*, which divide it into three compartments, dip into and are sealed in mercury at the bottom of the cell, as well understood in Castner cells. The cathodes in the central compartment are indicated at *r*. Commonly in cells of this character anodes, consisting of a series of carbon pencils parallel to each other and with their axes in a horizontal plane and secured in the wall of the cell, have been used. This involves a large number of carbon pencils, with the attending expense of mounting and caring for them and the danger of leakage, displacement, and leakage both of solution and of current. The construction is, furthermore, objectionable for the reason that in removing and replacing the carbons and their mountings the side of the cell has often to be removed, thus involving trouble from imperfect joints. The improvement described in my application, Serial No. 20,264, dispenses with the large number of carbons and eliminates one chief danger of breakage and displacement. The anodes are supported from the top or cover *c'* of the cell. This avoids the troubles arising from imperfect joints below the surface of the electrolyte. The form of such improved anodes *s s* is shown clearly in Figs. 3, 4, and 5. They are preferably of inverted-T section and are supported from above by the shank of the T. The horizontal flanges are slitted or channeled vertically and horizontally, as shown at *s*, so that chlorin or other gases forming on the lower faces of the anodes readily rise and escape through the channels. A series of holes *u* are formed in the upper surface of the anode. Conducting-plugs, preferably of ordinary arc-lamp carbons copper-plated and tinned at their head ends to facilitate soldering, are driven in, making good electrical contact between the plugs or rods *v* and the anode. The anode should also be provided with cement-engaging projections or recesses *w*. After the upward-projecting portion or support of the anode has been placed in the slot or opening *t* in the cover of the cell, cement preferably of a dense character, such as Portland cement, is applied, as at *x*, so that by entering into the recesses *w* and entirely surround-

ing the upper part of the anode the anode will be firmly held and supported, and at the same time a very complete closure and filling up of the space around the anode between it and the cover is effected. Only the plugs or rods *v* project upward from the cement *x*.

The peculiarly-shaped metallic connectors *y*, which form the subject of the present invention, are provided with perforations to fit closely around the rods or plugs *v* and with the zigzag or crooked portions between the neighboring perforations. Such improved connectors are capable of use in many other relations and are not limited to the anodes described nor to the precise forms and designs shown. The crooked portions afford ready adaptability in the connectors to slight variation between the projections of the electrodes, in this instance the plugs *v*. Such variation may be due to irregularity in spacing the plugs, to the subsequent contraction and expansion of the parts under changing temperatures, or to other causes. When the connectors have been placed in position upon a series of plugs, solder may be run in between the end of the plugs and the connector *y*, so as to unite these parts and produce a very intimate union, and consequently a low electrical resistance. I find it convenient to make the connectors *y* of lead in order that the soldering-iron may partially melt the lead in the immediate vicinity of the top of the plugs *v* and facilitate the soldering.

A cell provided with the improvement combines low resistance with unusual freedom from corrosion, and the danger of breaking the electrodes or other parts and of leakage of current or battery fluid due to the expansion or contraction stresses, which would arise in a straight metal connector secured at several points, is entirely eliminated.

Having now set forth one preferred form of my invention and explained one manner in which it may be applied and employed, I claim, without enumerating the many modifications that may be made without departing from the principles of the invention, the following several characteristic features:

1. In combination with an electrode provided with a plurality of projections for terminal connection, a tortuous connector for said projections surrounding and soldered thereto, substantially for the purposes set forth.

2. In combination with an electrode provided with a plurality of projections for terminal connection, a tortuous connector for said projections having apertures or recesses to receive and surround said projections and being secured thereto, substantially for the purposes set forth.

Signed this 11th day of September, 1900, at Niagara Falls, New York.

MAX MAURAN.

Witnesses:
ANNIE V. MULLIN,
G. M. TUTTLE.