R. G. JENCKES.

SIGN.

APPLICATION FILED JUNE 25, 1910.

988,104. Patented Mar. 28, 1911.

Fig. 1.

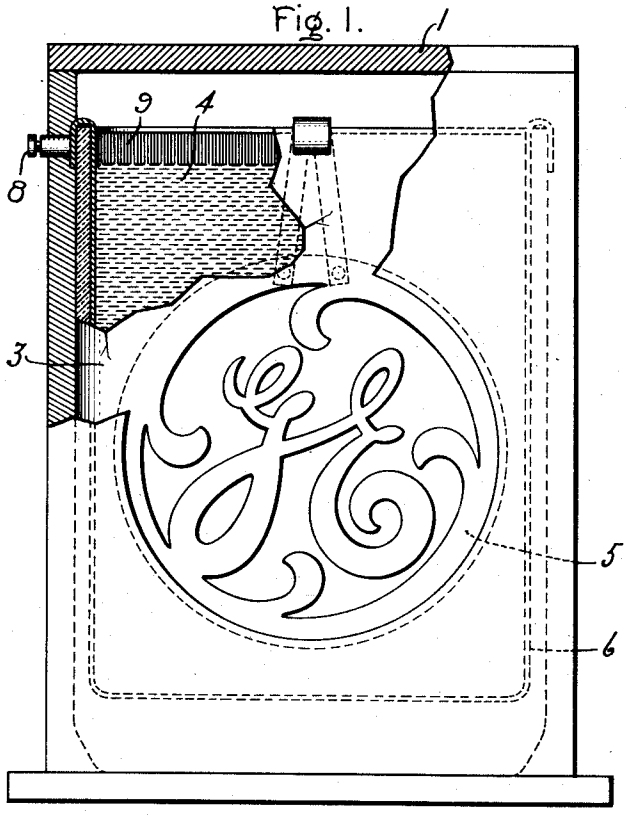


Fig. 2.

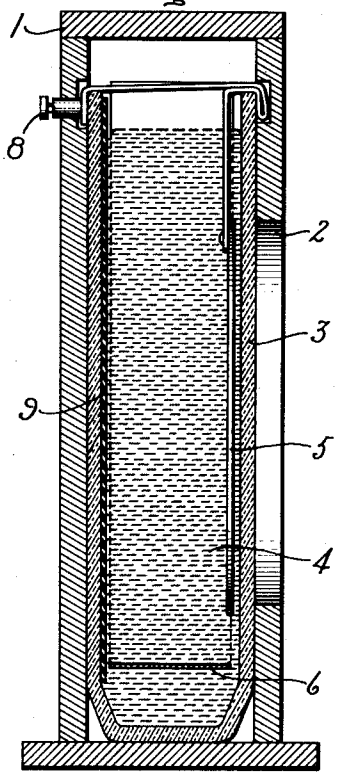
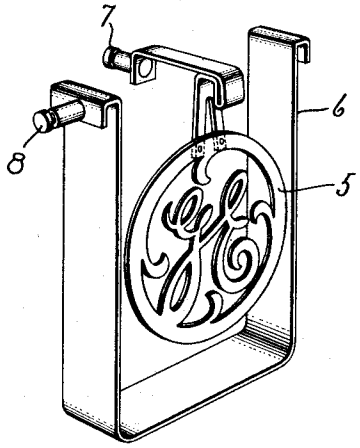


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

RAY G. JENCKES, OF MANÁOS, BRAZIL, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SIGN.

988,104. Specification of Letters Patent. Patented Mar. 28, 1911.

Application filed June 25, 1910. Serial No. 568,605.

To all whom it may concern:

Be it known that I, RAY G. JENCKES, a citizen of the United States, residing at Manáos, Brazil, have invented certain new and useful Improvements in Signs, of which the following is a specification.

My invention relates to display devices, such as luminous signs, and more particularly to signs in which the entire surface of the letter or symbol gives out light of a substantially uniform brilliancy.

When an electrode of some suitable metal, such as aluminum, is immersed in some suitable electrolyte, such as citric acid or ammonium borate, and electric current is passed through the electrolytic cell thus formed, a film forms on the surface of the electrode and tends to prevent the flow of current. An aluminum electrode, for instance, may in this manner be covered with a thin film of high insulating value, and apparently composed of aluminum oxid or hydroxid. If enough potential is applied the resistance of the film appears to be overcome and current then flows through the cell, causing the film on the electrode to become luminous. If the amount of current flowing is small, the film of the electrode gives out a uniform illumination of low intensity, while as the current density increases the film glows more brightly, until at high current densities the electrode glows quite brightly and is covered with bright spots, so that it sparkles and produces a striking and pleasing effect.

In carrying out my invention, a plate or electrode, preferably of aluminum, is immersed in a suitable electrolyte and the film on the surface of the electrode is in any suitable manner shaped to form the desired letter or device. This result is most easily accomplished by forming the electrode of sheet metal cut or otherwise formed into the desired shape and covering the entire electrode with a film by immersing the electrode in the electrolyte and passing current through it. Any suitable vessel may be used for holding the electrolyte, although in the preferred construction the electrode is immersed in a glass vessel having transparent walls, and in order to secure the full advantage of the luminescence of the electrode a dark background is provided in some suitable way, preferably by mounting a dark lining in the vessel behind the electrode.

My invention will best be understood in connection with the accompanying drawing, which, merely for purposes of illustration, shows one of the various forms in which my invention may be embodied, and in which—

Figure 1 is a front view of a sign embodying my invention, with a portion cut away to show the electrode and electrolyte: Fig. 2 is a transverse section of the sign shown in Fig. 1; and Fig. 3 is a perspective view showing the electrodes removed from the cell and in their proper relation to each other.

In the particular form of device shown in the drawings, the various parts of the sign are contained in an opaque casing 1 of wood or other suitable material having in one wall an opening 2 through which the luminous electrode may be observed. The casing contains a suitable vessel 3, which is preferably formed of glass or other transparent material, and in any case has a transparent portion in registry with the opening 2. This vessel 3 contains some suitable electrolyte 4, such as a solution of citric acid or ammonium borate, and preferably transparent enough to permit objects in the vessel to be seen through the transparent wall. An electrode 5, which is preferably a plate cut out to form the desired letter, figure, or other symbol, but which may be a plate with the film on its surface arranged in the desired form, is suspended in the electrolyte 4 to register with the opening 2 so that the electrode will be visible to the observer. A second electrode 6 is also mounted in the vessel 3 and is immersed in the electrolyte, and the two electrodes are provided with terminals 7 and 8, by means of which both electrodes may be connected to a suitable source of current, which will flow from one electrode to the other through the electrolyte in the cell, and thereby render the electrode 5 luminous whenever there is a film on the surface of the electrode. The luminous electrode 5 is rendered more distinct by providing it in any suitable manner with a dark background, which in the preferred construction is secured in the interior of the vessel 3 by inserting a dark colored lining 9 made of any suitable material which is not acted upon by the electrolyte. In the preferred construction, the electrode 6 is made in such a form that it is out of registry with the

opening 3 and is, therefore, hidden from the observer by the walls of the casing 1.

The operation of the device is as follows: By means of the terminals 7 and 8 the sign is connected to any suitable source of current, and thereby current is caused to flow from one electrode to the other. The electrode 5 is covered with a thin film, and as the current flows between the electrodes this film becomes luminous to an extent dependent upon the current density, and since the electrode 5 is mounted in registry with the opening 2, the figure or symbol represented by the electrode becomes visible to the observer. A soft, even glow on the electrode 5 is produced by a low current density, while the electrode becomes bright and sparkling if a high current density is used. The variations in current density may be secured in many ways well-known to those skilled in the art, and, therefore, no means are illustrated in the drawings.

My invention may be embodied in many other forms than that shown and described, and I, therefore, do not desire to limit myself to the precise arrangement disclosed, but intend to cover all modifications which are within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. A luminous display device comprising a vessel provided with a window and containing an electrolyte, a film coated electrode in the form of a letter or symbol mounted in said vessel to register with the window in said vessel, a second electrode mounted in said vessel, and means for supplying electric current to both said electrodes.

2. A luminous sign comprising a vessel having a transparent wall and containing a transparent electrolyte, an electrode having a surface film in the form of a letter or symbol and immersed in the electrolyte with the film adjacent the transparent wall of said vessel, a coöperating electrode immersed in the electrolyte, and means for supplying electric current to said electrodes to render the film on the first electrode luminous.

3. A luminous sign comprising a vessel containing an electrolyte and having a window, the interior of said vessel forming a dark background for said window, an electrode in the form of a letter or symbol immersed in the electrolyte adjacent the window and in front of the dark background, a second electrode immersed in the electrolyte, and means for supplying electric current to both said electrodes to cause the first electrode to become luminous.

4. A luminous sign comprising a vessel having one wall provided with a transparent portion and the opposite wall provided with a dark portion opposite said transparent portion, a transparent electrolyte in said vessel, a film coated electrode in the form of a letter or symbol immersed in said electrolyte in front of said dark portion and in registry with said transparent portion, a second electrode immersed in said electrolyte, and means for supplying current to both said electrodes to cause the first electrode to become luminous.

5. A luminous sign comprising an opaque casing having an opening in one wall thereof, a transparent vessel mounted in said casing and containing an electrolyte, an aluminum electrode in the form of a letter or symbol immersed in the electrolyte to register with said opening, a dark lining in said vessel mounted behind said electrode to form a dark background therefor, a second electrode immersed in the electrolyte, and means for supplying electric current to said electrodes to render the first electrode luminous.

In witness whereof, I have hereunto set my hand this 23rd day of May, 1910.

RAY G. JENCKES.

Witnesses:
H. F. Dose,
J. M. Robinson.