

No. 857,607.

PATENTED JUNE 25, 1907.

F. A. DECKER.
ELECTROCHEMICAL APPARATUS.

APPLICATION FILED JAN. 18, 1906.

2 SHEETS—SHEET 1.

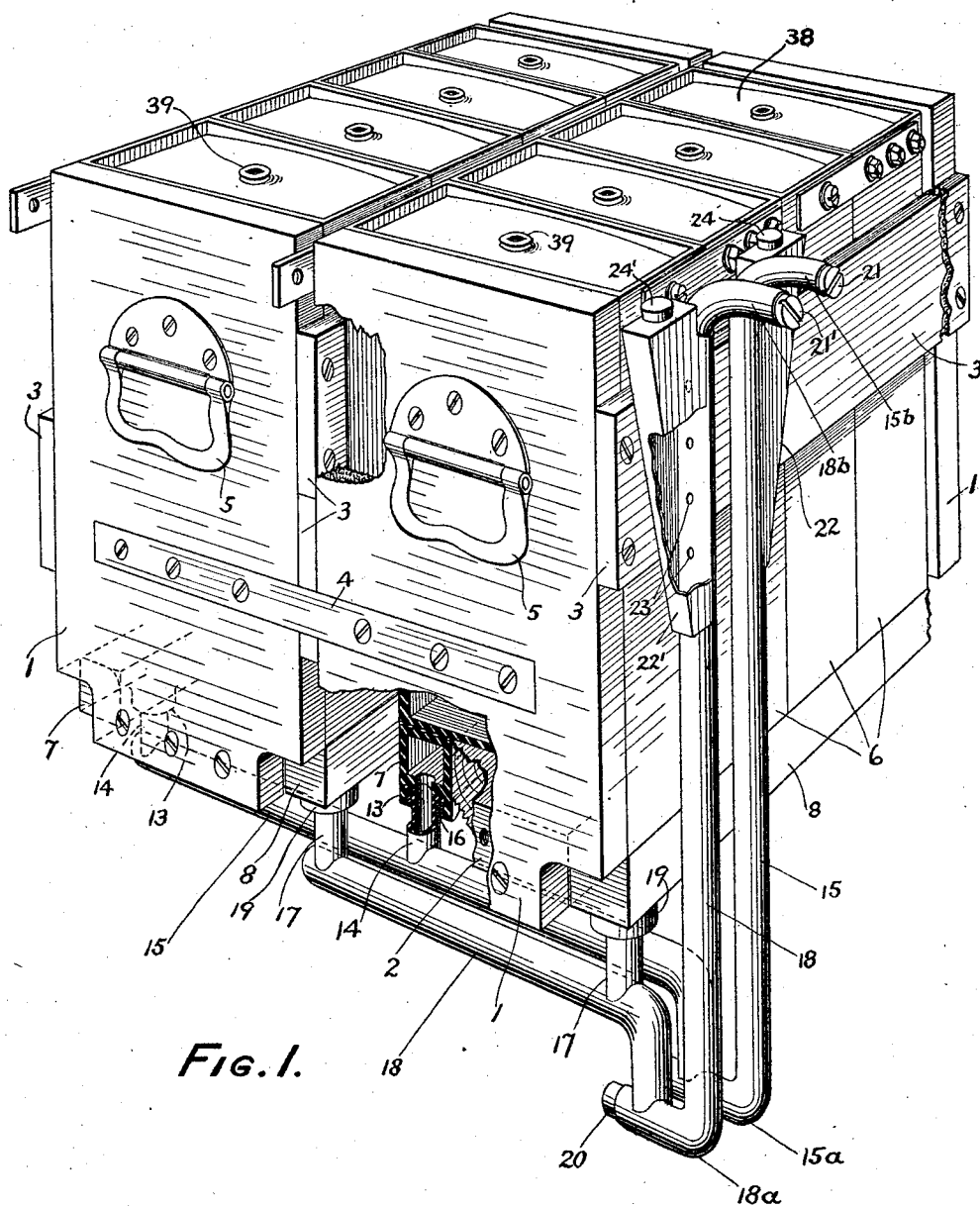


FIG. 1.

WITNESSES:

Robert K. Ketchum
Sam. H. Buck

INVENTOR

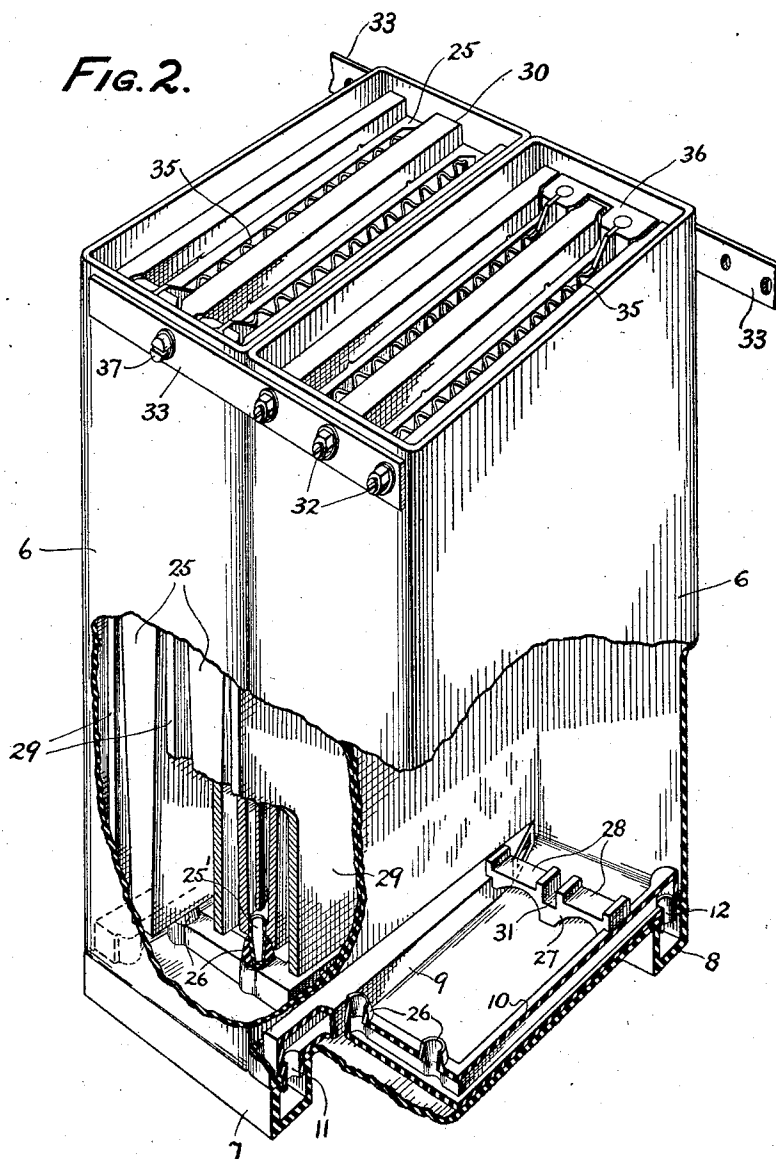
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2 SHEETS—SHEET 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTROCHEMICAL APPARATUS.

No. 857,607.

Specification of Letters Patent.

Patented June 25, 1907.

Application filed January 16, 1906. Serial No. 296,262.

To all whom it may concern:

Be it known that I, FRANK A. DECKER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Electrochemical Apparatus, of which the following is a specification.

This invention relates to the construction of battery and electrolytic systems. It contemplates providing improved means for conveniently and compactly connecting a number of cells together for facilitating the operations of filling and emptying them, for retaining the solutions therein, for avoiding corrosion and deterioration from the acids, and for preventing electric leakage.

In the accompanying drawings, Figure 1 represents a perspective view of the invention with parts broken away for the purpose of showing the interior construction, and Fig. 2 represents a perspective view of two cells detached from the system and having parts broken away to illustrate the construction of the several parts connected therewith.

As shown in the drawings, the invention comprises crates composed essentially of the ends 1, bottom strips 2 and the side strips 3 connected together to form an open frame work, the width of the bottom strips being considerably less than that of the ends so that the sides of the former will lie well within the sides of the latter and the side strips being staggered so that in joining crates the juxtaposed strips lie one above the other. Such crates are connected together in sets by straps 4 secured to corresponding ends thereof disposed in line and are handled separately or in their connected relation by the handles 5 on the ends thereof. These crates contain respectively nests of cells comprising the envelopes 6 of rubber, celluloid or other suitable material, held between the ends 1 and sides 3 and having their bottoms resting on the strips 2. Conduits 7 and 8 of like material disposed under the envelopes and extending across the ends thereof, on either side of the strips 2, are connected to the respective envelopes 6 by rubber, celluloid or like cement vulcanized or otherwise fixed. Conduits 9 and 10 of similar material are disposed within and secured as above described to the bot-

toms of the envelopes, a nipple 11 on each conduit 9 extending downwardly therefrom through the bottom of the envelop into frictional engagement with a corresponding aperture in the conduit 7 and a nipple 12 on each conduit 10 extending downwardly therefrom through the bottom of the envelop into frictional engagement with a corresponding aperture in the conduit 8.

The conduits 7 have integrally formed therewith and depending therefrom the recessed bosses 13 which receive flanged branches 14 of a lead (metal) conduit 15, the branches being held in the recesses or undercut sockets by rubber or other suitable cement 16 packed therein. In a similar manner the branches 17 of a lead (metal) conduit 18 are connected to the conduits 8 through the bosses 19 thereon. The conduits 15 and 18, provided respectively with horizontally and vertically disposed members, are respectively provided with drops 15^a and 18^a having plugged outlets 20 at the lowest points, and with the necks 15^b and 18^b with the plugs 21 and 21' in their outlets. Chambers 22 and 22' on the sides of the necks are filled and emptied therefrom through the openings 23 by which free communication is established between the respective chambers and necks, caps 24 and 24' covering sight openings through which the height of the fluid contained therein can be inspected.

Within the envelopes are the wedge shaped cups 25 of cross section contracting from top to bottom to provide a corresponding increasing cross-sectional area of solution, dividing the cell into wedge shaped spaces or communicating compartments exterior thereto contracting from the bottom to the top and communicating with the conduit 9. The cups have tapered nipples 25' in the bottoms thereof which form frictional connections with the tapered sockets 26 in the transverse members of the L-shaped conduits 10, the cups being supported thereby and by bridges 27 bearing on the conduits and the bottoms of the envelopes and having seats 28 therein for engaging the cups. Within the spaces formed outside the cups are the carbon plates 29 having flanged tops 30 supported on the tops of the cups and their bottoms engaged by the seat 31 of the bridge, connecting bolts 32 passing through the conducting members

33 and the envelops into the electrode flanges to connect them in multiple. Within the cups are the corrugated zinc plates 35 supported by the couplings 36 connecting them in multiple, the couplings being connected by the screws 37 to the conducting members 33.

The tops of the respective cells are normally closed by the lids 38 which telescope within the envelops and are arched to permit the better ventilation of the several compartments thereunder, the lids having the knobs 39 through the tops thereof.

From the foregoing it will be understood that fluids for the sets of compartments containing the carbon and zinc electrodes of the entire nest of cells can be charged through the spouts 15^b and 18^b, the heights to which they rise being determinable by removing the caps 24 and 24' and inspecting the contents of the vessels 22 and 22', while all the cells can be drained either through the outlets 20, or the spouts 15^b—18^b.

While the apparatus is designed for operation with two fluids, it will be understood that it is adapted for various modes of operation as by the introduction of a single fluid through one set of conduits into one set of compartments and permitting it to overflow into the other set of compartments to be drawn off by the other set of conduits, affording a continuous circulation if desired.

Having described my invention, I claim:—

1. In apparatus of the class described, a plurality of crates arranged in parallel with corresponding ends connected together, each crate having bottom strips of less width than the ends and side strips disposed at different elevations permitting juxtaposed side strips of joined crates to lie one above the other, in combination with a series of cells in each of said crates, and conduits secured to the bottoms of the envelops of the cells and disposed on either side of the bottom strips thereof, the conduits communicating with the interiors of the respective cells.

2. In apparatus of the class described, a set of cells each having one or more horizontally disposed insulating conduits within and cemented to the bottom thereof, and one or more horizontally disposed insulating conduits without and cemented to the bottoms of the several cells, each of the exterior conduits communicating with a conduit within each cell.

3. In apparatus of the class described, a cell having an exterior conduit communicating with the interior at the bottom thereof, said conduit having a drop forming a trap therein with an outlet below the bottom of said cell.

4. In apparatus of the class described, a cell having an exterior conduit connected therewith at the bottom thereof, said conduit having a mouth near the top of said cell, and a

sight chamber having a mouth, said chamber being connected to said conduit near the top thereof so as to communicate therewith.

5. In apparatus of the class described, a plurality of envelops, and a rubber conduit conforming and vulcanized to the bottoms and communicating with the interiors thereof.

6. In apparatus of the class described, a number of cells each having one or more conduits within the bottom thereof, and one or more exterior conduits connected to the bottoms of said cells and communicating with a conduit in each of said cells, said exterior conduit or conduits rising to or near the top of said cells.

7. In apparatus of the class described, a set of cells each having one or more conduits within and cemented to the bottom thereof, and one or more conduits without and cemented to the bottoms of the several cells, the exterior conduit or conduits communicating with an interior conduit of each of said cells.

8. In apparatus of the class described, a plurality of sets of cells, each cell having one or more conduits therein, one or more conduits exterior to each set of cells, each exterior conduit communicating with an interior conduit of each cell of its set, a recessed boss on each of said exterior conduits, and conduits having flanged branches thereon secured in said recessed bosses, each of said last named conduits communicating with a set of said first named exterior conduits.

9. In apparatus of the class described, a cell having therein a cup tapering from the top to the bottom and a space exterior to said cup tapering from the bottom to the top, conduits in the bottom of said cell communicating respectively with said cup and said space.

10. In apparatus of the class described, a cell having therein a cup and a space exterior to said cup, a conduit in the bottom of said cell having a tapered socket therein, a tapered nipple in the bottom of said cup fitting in said tapered socket, and a conduit exterior to said cell with which said interior conduit communicates.

11. In apparatus of the class described, a cell, a rubber conduit vulcanized to the interior of said cell, a second rubber conduit vulcanized to the exterior and communicating with the interior of said cell and a nipple directly connecting said conduits.

12. In apparatus of the class described, a cell, an insulating conduit in and cemented to the bottom thereof having tapered sockets therein, cups having tapered nipples seated in said sockets, a second insulating conduit without and cemented to the bottom of said cell, and a nipple connecting said conduits.

13. In apparatus of the class described, a plurality of battery cells, an insulating con-

duit disposed along the bottoms vulcanized
to and communicating with said cells and
within each cell a conduit of comparatively
small bore connected with said first named
5 conduit.

14. In apparatus of the class described, a
cell having therein a cup, a conduit in the
bottom of said cell, said cup and conduit hav-
ing a connection comprising a tapered nipple
10 and a tapered socket fitting therein, and a

conduit exterior to said cell with which said
interior conduit communicates.

In testimony whereof I have hereunto set
my hand this 11th day of January 1906, in the
presence of the subscribing witnesses.

FRANK A. DECKER.

Witnesses:

ROBERT JAMES EARLEY,
UTLEY E. CRANE, Jr.