

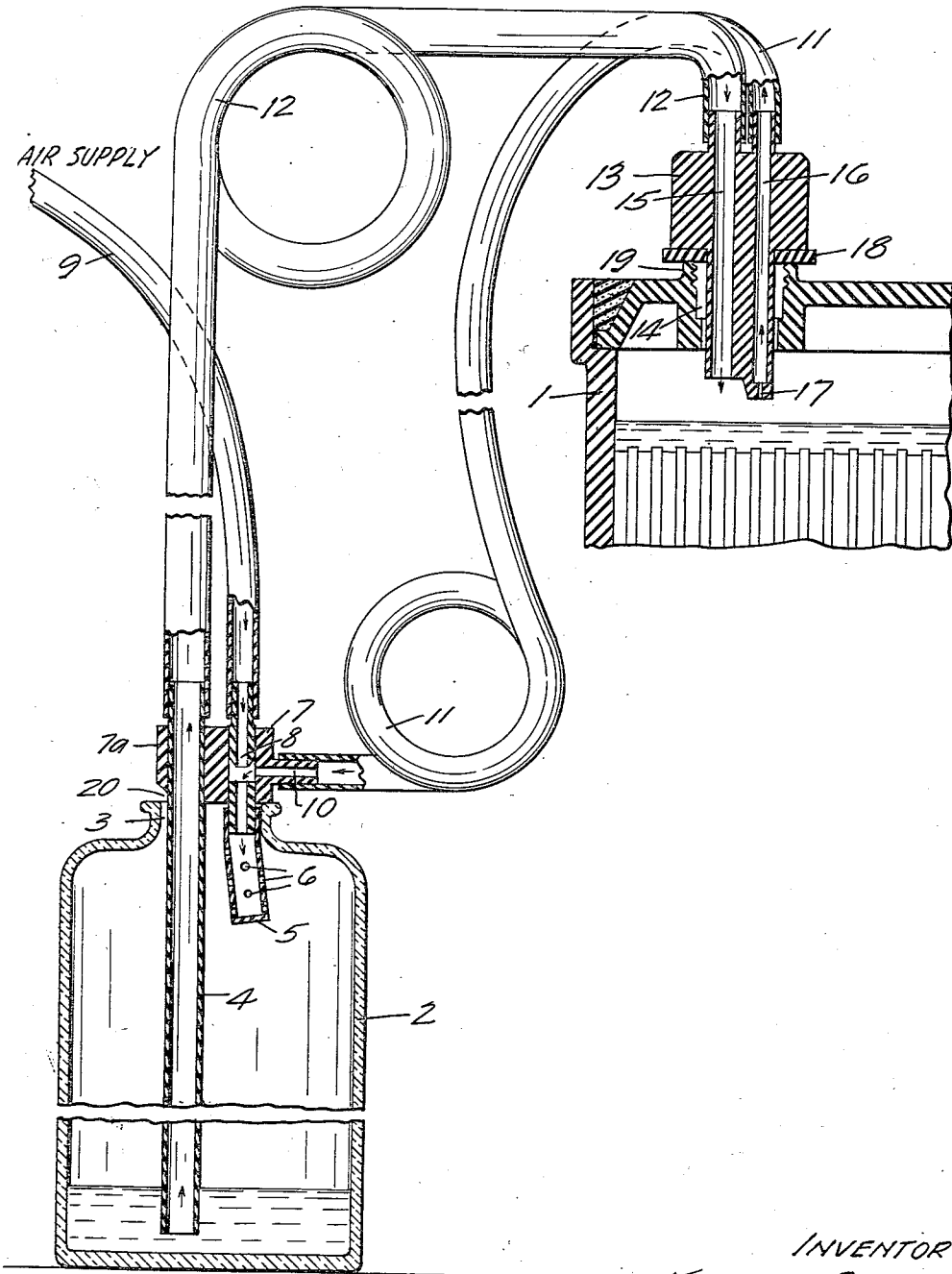
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K. DAWKINS

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ELECTROLYTE DISPENSING APPARATUS

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INVENTOR  
KENNETH DAWKINS  
BY *John E. Shuman*  
ATTORNEY

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## ELECTROLYTE DISPENSING APPARATUS

Kenneth Dawkins, Minneapolis, Minn., assignor to Gould-National Batteries, Inc., St. Paul, Minn., a corporation of Delaware

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4 Claims. (Cl. 141—54)

This invention relates to liquid dispensing apparatus and particularly to apparatus for filling the cells of storage batteries with electrolyte.

It is an object of my invention to provide improved apparatus of the class described which is capable of dispensing corrosive liquids, e. g., either acid or alkaline electrolytes, safely, rapidly and in controlled quantities.

A particular object is to provide liquid dispensing apparatus wherein flow of the liquid from a reservoir to a battery cell or other receptacle to be filled is induced by means of an ejector type jet pump operated by compressed air and so located and connected to the reservoir as to return to the reservoir any liquid that may be drawn into the pump.

The invention also includes certain other novel features of construction which will be more fully pointed out in the following specification and claims.

The accompanying drawing illustrates, by way of example and not for the purpose of limitation, a preferred embodiment of my invention which is particularly adapted for the filling of storage battery cells with electrolyte.

The single view in the drawing shows the apparatus, somewhat diagrammatically, partially in vertical sectional view and partially in side elevational view.

In the drawing, a fragmentary portion of a storage battery to be filled is indicated by the numeral 1 and a source of supply or reservoir for the liquid is indicated at 2. This reservoir may comprise a large glass container or "carboy" of common type in which the electrolyte, for example, battery acid, is shipped to battery manufacturers and service stations and from which the acid may be dispensed. The reservoir 2 has a top opening 3 and extending downward through this opening is a tube 4 through which the liquid contents may be withdrawn. Projecting into the upper portion of the reservoir is a pump discharge member 5 which is preferably formed with a multiplicity of openings 6 from which air and excess liquid may be discharged into the reservoir.

An injector pump indicated generally by the numeral 7 may be supported on the reservoir 2 and is formed with a body member 7a through which the tube 4 extends. The jet pump with its discharge member 5 and the tube 4 may be moved, as a unit, from one reservoir to another, as required, quickly and easily. The pump 7 has a nozzle 8 which is supplied with air through a flexible tube or conduit 9 and a suction passage 10 is formed in the pump and disposed to communicate with one end of a flexible tube or conduit 11 extending to the battery cell or other receptacle to be filled. A third tube 12 extends in continuation of the tube 4 at one end and is adapted to supply the acid or other liquid to a passage through a closure member 13 for the cell 1. The closure member 13 is extended downward through an opening 14 in the top of the cell 1 and is formed with a passage 15 communicating at its lower end with the interior of the cell and at its upper end with the conduit 12. A second passage 16 is formed in the closure member 13 and is connected at its upper end to the conduit 13. At its lower end, the pas-

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sage 16 is formed with a restricted port 17 which communicates with the interior of the cell 1 at an elevation corresponding to the maximum elevation required for the electrolyte in the cell.

A resilient gasket 18 is provided to seal the connection between the closure member 13 and an annular flange 19 which projects upward from the top of the battery cell. The body of the pump 7 fits loosely on the reservoir 2 and is formed with a vent passage 20 through which air from the pump 7 is conducted from the top of the reservoir to the exterior atmosphere.

### Operation

With liquid in the reservoir 2 and the lower end of the tube 4 submerged in the liquid, the pump 7 is made operative by supplying air under suitable pressure, e. g. at 5-20 lbs. per square inch, through the conduit 9. The air is discharged from the pump through the openings 6 in the member 5 within the reservoir 2. Thus a partial vacuum is created in the passage 10, conduit 11 and passage 15. The operator then merely inserts the lower end portions of the passages 15 and 16 through the top opening 14 in the battery cell 1 to be filled and presses down on the closure member 13 to seal the connection with the cell formed by the gasket 18 in contact with the flange 19. This causes a partial vacuum to be created in the upper portion of the battery cell and in the passage 15, conduit 12 and tube 4, sufficient to induce flow of liquid from the reservoir to the battery cell through tube 4, conduit 12 and passage 15. When the liquid in the cell reaches the elevation of the port 17, the latter is closed by the liquid and the pressure in the cell is raised sufficiently to stop the flow from the reservoir to the cell. The operator then merely withdraws the closure 13 from the opening in the filled cell. The operation may be repeated to fill the successive cells merely by moving the closure member 13 from one cell opening to another. Excess acid, in small amount, is drawn from each cell into the passage 16 and flows from the upper end thereof through the conduit 11 to the jet pump 7 which returns the excess to the reservoir 2 through the openings in the member 5.

By this arrangement for returning the excess corrosive liquid from the filled cells to the reservoir, I avoid damage which might otherwise be caused due to the corrosive nature of the liquid if it were allowed to come in contact with ordinary waste facilities, such as ordinary waste pipes and connections. Compressed air at suitable pressures is available at most automotive service stations as well as in battery manufacturing plants where the corrosive liquids are used in the filling of battery cells. Such compressed air is a convenient source of power for the operation of my jet pump. My improved dispensing apparatus possesses the further merit of greatly facilitating the rapid filling of a large number of cells or other receptacles while requiring a minimum of skill and work on the part of the operator.

I claim:

1. In liquid dispensing apparatus for filling a receptacle having a top opening, and including a closure for said opening, passages formed in said closure respectively for conducting liquid to said receptacle and for exhausting air from said receptacle, a reservoir for the liquid and a flexible conduit disposed to receive liquid at one end from said reservoir and communicating at the other end with said passage for conducting liquid to said receptacle; the improvements which comprise, a jet pump adapted to be operated by compressed air, means for supplying air under pressure to said pump, means for conducting the discharge from said pump into said reservoir, and a second flexible conduit connected at one end to one of said passages for exhausting air from said receptacle and connected at the other end to said pump whereby said pump may be made

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operative to draw air and excess liquid from said receptacle and to discharge the same into said reservoir.

2. Dispensing apparatus in accordance with claim 1 wherein said closure is provided with means which are operative by manually applied downward pressure for sealing the closure at the sides of said top opening of the receptacle.

3. In liquid dispensing apparatus for filling a receptacle having a top opening, a closure for said opening, a passage formed in said closure for conducting liquid to said receptacle, a second passage extending through said closure for exhausting air from said receptacle, said second passage being formed with an intake port adapted to be positioned at an elevation corresponding to the elevation of the liquid when the receptacle is full, a reservoir for the liquid, a flexible conduit disposed to receive liquid at one end from said reservoir and communicating at the other end with said passage for conducting liquid to said receptacle, a jet pump adapted to be operated by com-

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pressed air, means for supplying air under pressure to said pump, means for conducting the discharge from said pump into said reservoir, and a second flexible conduit connected at one end to said passage for exhausting air from said receptacle and connected at the other end to said pump whereby said pump may be made operative to draw air and excess liquid from said receptacle and to discharge the same into said reservoir.

4. Dispensing apparatus in accordance with claim 3 wherein said intake port for the second passage through said closure is formed to restrict the flow from said receptacle to said second passage.

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