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[54] **BATTERY-FILLING APPARATUS WITH  
ELECTRONIC SIGNALING UNIT**  
2 Claims, 2 Drawing Figs.

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73/294, 331/65  
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224; 331/65; 73/294

**ABSTRACT:** A battery-filling apparatus is provided having a wholly self-contained signaling unit connected to the handle of the filler nozzle. The signaling unit comprises a signal light, and a miniature cell, solid-state oscillator and small speaker for giving an audio signal when the electrolyte in the battery rises into contact with the tip of the filler nozzle.

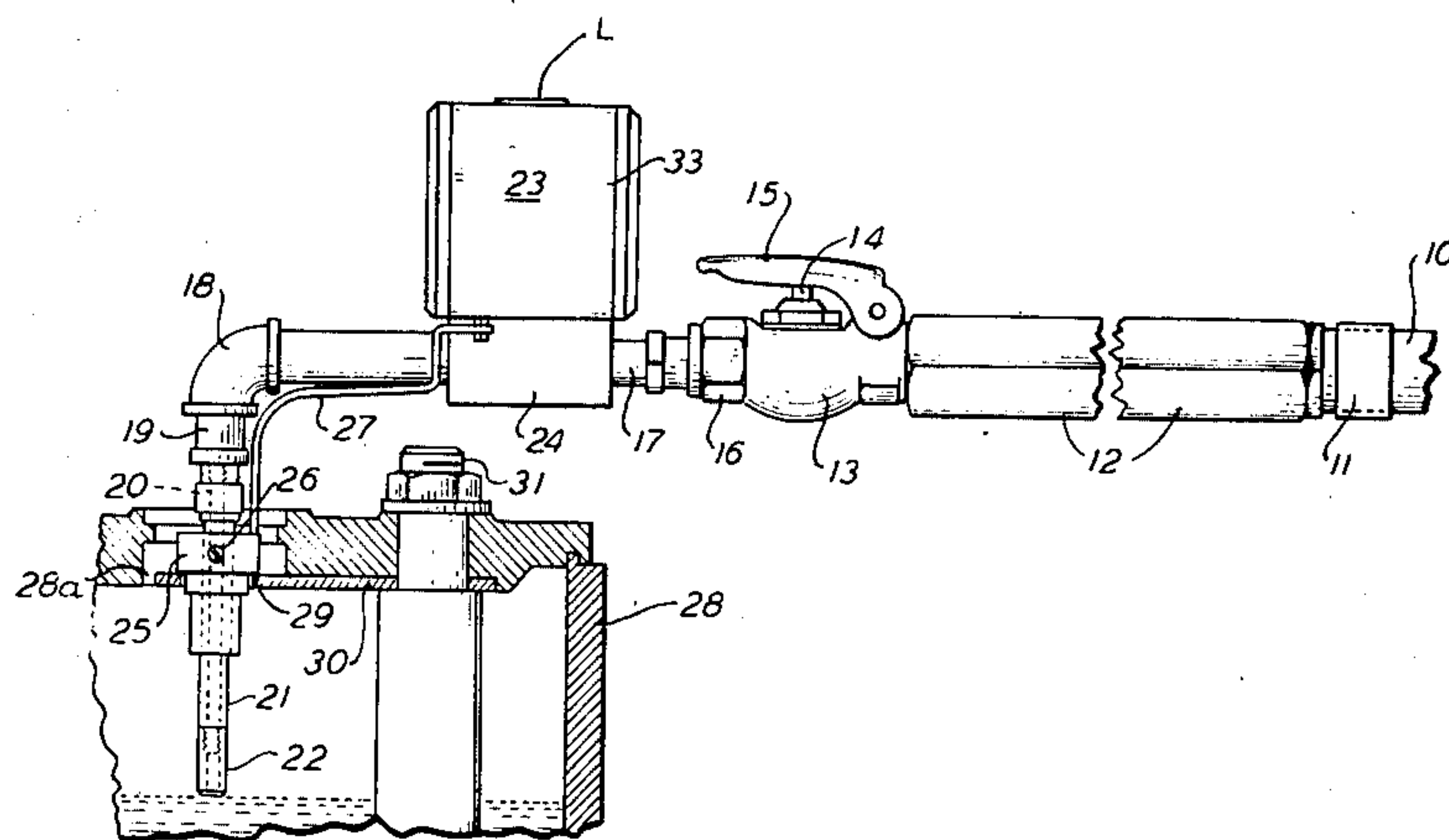


FIG. 1

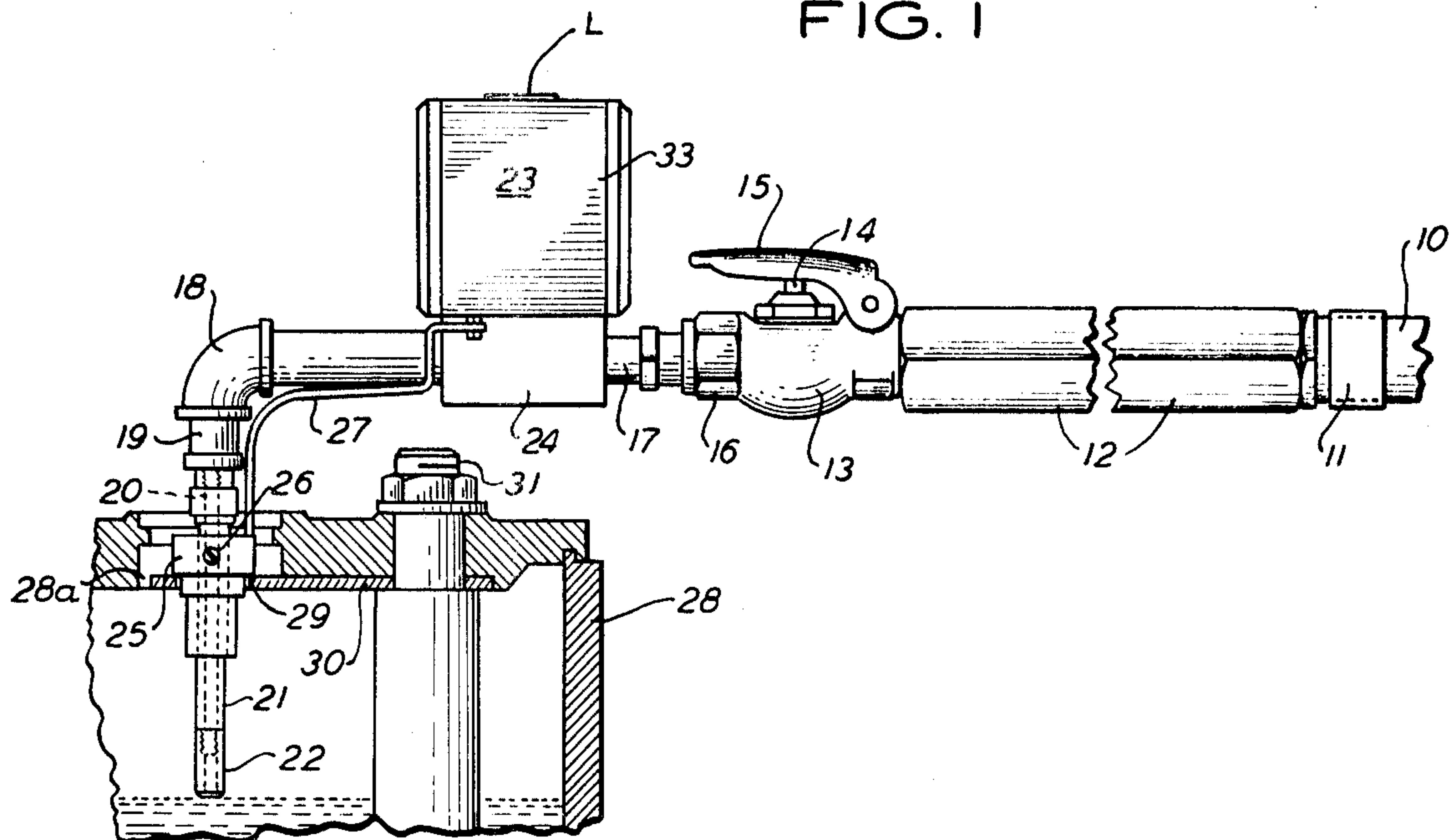
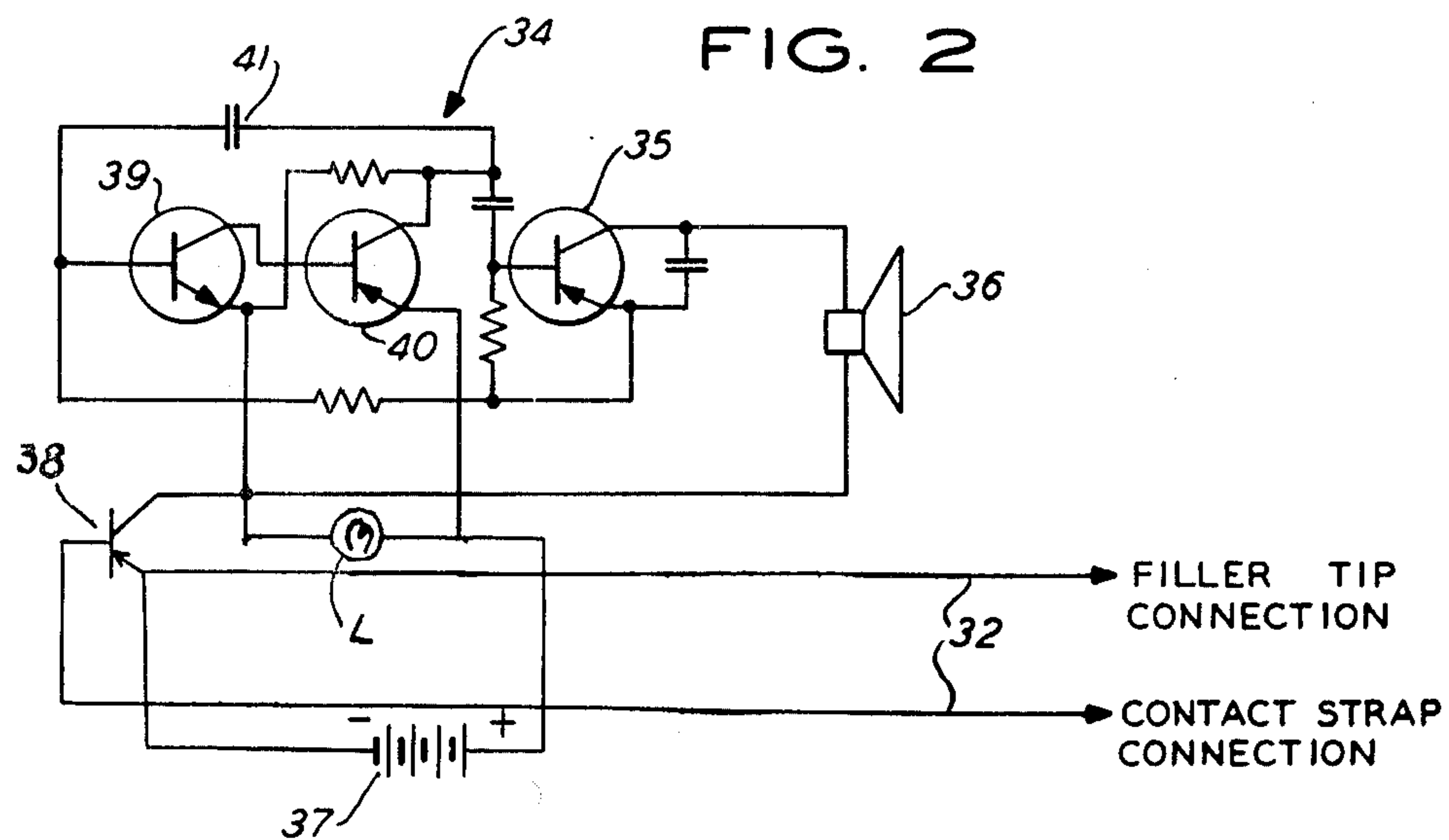


FIG. 2



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# BATTERY-FILLING APPARATUS WITH ELECTRONIC SIGNALING UNIT

Heretofore, battery-filling devices have been provided with a signaling apparatus too bulky and heavy to be carried with the filler nozzle. As a result, the signaling indicator has been provided in a unit separate from the filler nozzle, either mounted stationarily or attached to the operator's belt and connected to the nozzle by means of a separate electrical cable. The use of such separate cable connection has made the filling apparatus cumbersome to use and has restricted the portability of the filling apparatus making it more difficult to fill batteries at different locations.

An object of the present invention is to provide a small wholly contained alarm or signaling unit which is conveniently carried by the handle of the filler nozzle without encumbering the manipulation of the filler nozzle in filling batteries or the use of the filling apparatus in filling batteries at different locations.

Another object is to provide a battery-filling apparatus which provides a distinctive audio signal when the battery is filled to a correct level.

These and other objects and features of the invention will be apparent from the following description and the appended claims.

In the description of my invention, reference is had to the accompanying drawings, of which:

FIG. 1 is a side view partly broken away showing a battery-filling nozzle with an associated valve and handle and with a signaling unit mounted on the nozzle according to the invention; and

FIG. 2 is a schematic circuit diagram of a solid-state oscillator of the signaling unit.

The battery-filling assembly shown in FIG. 1 comprises a flexible hose 10 connected at one end to a source as of distilled water (not shown) and at the other end by a fitting 11 to one end of a tubular handle 12. Inserted into the outer end of the handle is a valve 13 having a press button 14 operable by a pivoted finger piece 15. The outer end of the valve is connected by a fitting 16 to one end of a pipe 17. The outer end of the pipe is connected by an elbow 18 to a short pipe 19. Threaded into the outer end of the pipe 19 is a steel tube 20 provided with an insulating sleeve 21 preferably of Teflon. This tube forms a filling nozzle for the apparatus. Threaded into the end of the steel tube 20 is a tubular head 22 of the diameter of the Teflon sleeve 21. The head 22 in cone tipped and provided one terminal for a signaling unit 23 according to the invention. This terminal is connected via the tube 20, pipe 19, elbow 18, and pipe 17 to the signaling unit mounted via a clamp 24 on the portion of the pipe 17 near the valve 13. A metal collar 25 is press-fitted onto Teflon sleeve 21 and secured firmly thereto by a setscrew 26 to form a second terminal for the signaling unit connected to the unit by a lead wire 27. The battery to be filled, which is fractionally indicated at 28, has a filler opening 28a receiving the filler nozzle. In the opening 28a is a ledge 29 formed by an apertured end portion of a strap 30 connected at the other end thereof to one post 31 of the battery as in accordance with the teaching of my application Ser. No. 682,062, filed Nov. 13, 1967, titled "Battery With Insulative Case and Electric Filling Apparatus Therefor." The filler nozzle is inserted into the battery until the collar 25 abuts against the ledge 29 as a stop to locate the filler nozzle in a correct filling position. When the electrolyte

risers to a level contacting the tip 22 of the nozzle a control circuit 32 is completed for the signaling unit 23 via the pipe 17, elbow 18, pipe 19, tube 20, and head 22 to the electrolyte and back from the electrolyte via the battery post 31, strap 30, collar 25, and lead wire 27. Such completion of the control circuit 32 starts the signaling unit 23 in the manner herein next described.

The signaling unit 23 comprises a small box 33 secured by the clamp 24 to the pipe 17. In this box is located an indicator lamp L and a solid-state oscillator 34 feeding through an output transistor 35 to a small speaker 36. The transistors are powered from a miniature voltaic cell 37 via an SCR 38. The SCR is normally nonconducting. However, when the electrolyte rises to complete the control circuit 32 as above described, the SCR 38 is rendered conducting to connect the cell 37 across the lamp L and to the oscillator 34 and output transistor 35. The oscillator 34 comprises two transistors 39 and 40 respectively of the NPN- and PNP-types. Feedback from the collector of the transistor 40 is via a condenser 41 to the base of the transistor 39 to activate the oscillator when the cell 37 is connected between the emitters of the two transistors. The oscillator, which is set to operate at an audible frequency typically 1,000 c.p.s., feeds to the base of output transistor 35 which in turn feeds through the speaker 36 to provide the audible signal. Since the speaker is of a miniature type, and since the oscillator 24 and output amplifier 35 are of a solid-state type requiring very small operating power the voltaic cell 37 is permitted to be of a miniature type. Thus, the entire signalling equipment can be housed in a very small box and, being also of very small weight, it is permitted to be mounted on and carried with the filler nozzle without encumbering the use of the filling apparatus. Further, since the signaling apparatus is wholly self-contained it does not restrict the portability of the filling apparatus permitting therefore the filling apparatus to be used for filling batteries with ease at different locations.

I claim:

1. A battery-filling apparatus including a filler tube with a nozzle adapted to be inserted in the filler opening of a battery, said battery having a conductor bar on the rim of the opening electrically connected to the electrolyte of the battery, said nozzle having a surrounding conductive sleeve insulated from the filler tube to abut said conductor bar and locate the filler nozzle in the battery, and said nozzle having a conductive tip connected electrically to the filler tube, a handle for said nozzle, and a self-contained signaling unit secured to said handle and including a miniature cell, a solid-state oscillator and a sound transducer to give an audio signal when said oscillator is operative, and said signaling unit having a control circuit including a normally nonconductive SCR for connecting said cell to said oscillator, said SCR having base and emitter elements of which one is electrically connected to the tip of said nozzle via said filler tube and the other has a separate lead wire connection along said tube to said sleeve to cause said base and emitter elements to be interconnected when the electrolyte level reaches said tip to render said SCR conductive and start said oscillator to give a warning signal.

2. The battery-filling apparatus set forth in claim 1 wherein said signaling unit also includes a signal lamp connected via said SCR to said miniature cell to give a signal light when the level of the electrolyte reaches the tip of said nozzle.

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