Aug. 23, 1938. L. C. SMITH 2,127,848

LIQUID DISPENSING DEVICE

Filed Dec. 19, 1936 2 Sheets-Sheet 1

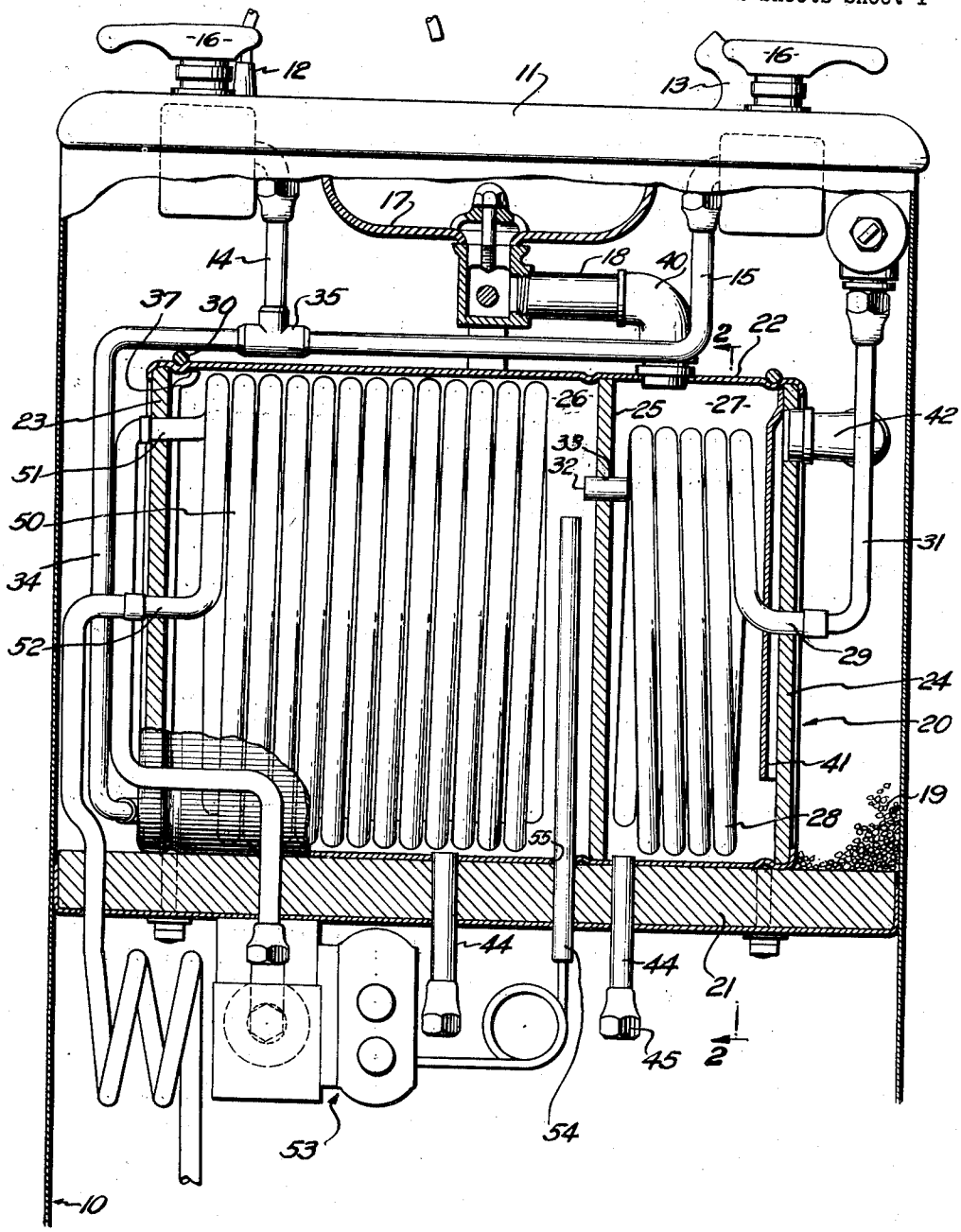


Fig. 1

Inventor
Lawrence C. Smith

By Albert R. Henry
Attorney

Aug. 23, 1938. L. C. SMITH 2,127,848

LIQUID DISPENSING DEVICE

Filed Dec. 19, 1936 2 Sheets-Sheet 2

Fig. 3

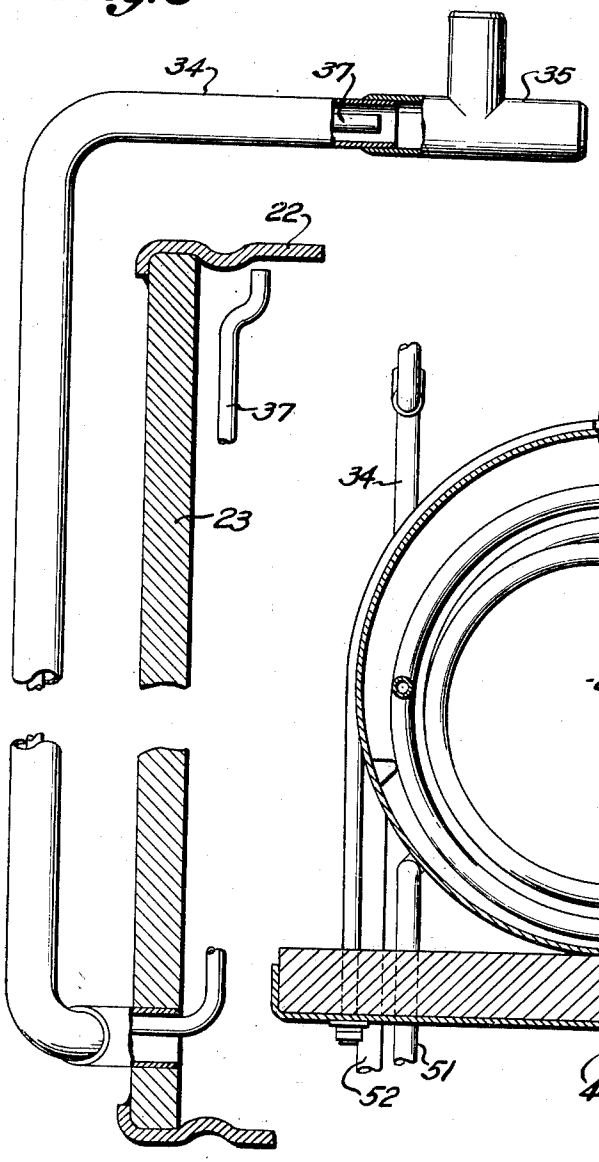
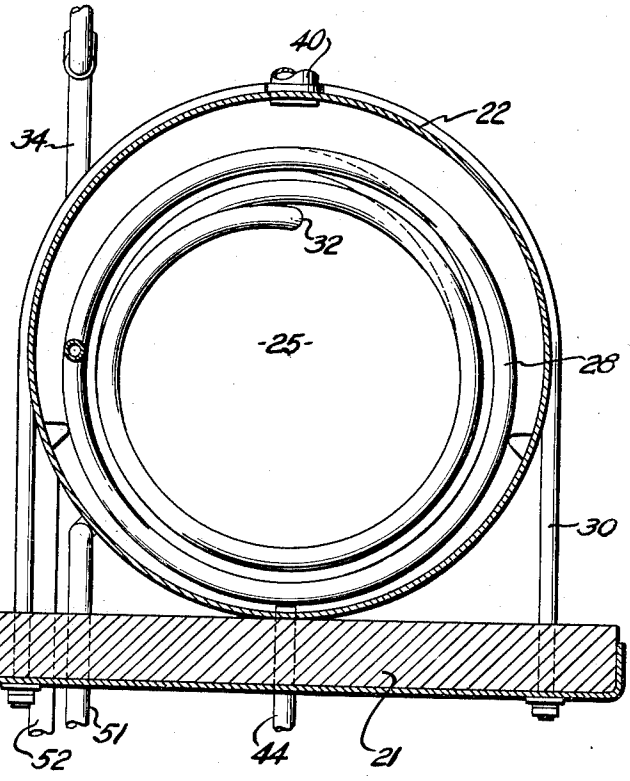


Fig. 2



Inventor
Lawrence C. Smith

By Albert R. Henry

Attorney

Patented Aug. 23, 1938

2,127,848

UNITED STATES PATENT OFFICE

2,127,848

LIQUID DISPENSING DEVICE

Lawrence C. Smith, Kenmore, N. Y., assignor to Fedders Manufacturing Company, Inc., Buffalo, N. Y.

Application December 19, 1936, Serial No. 116,765

3 Claims. (Cl. 62—141)

This invention relates to liquid dispensing devices, and it is particularly applicable to refrigerated dispensers of the regenerative type where the waste liquid is utilized to pre-cool entrant liquid.

The invention is directed to a cooling unit structure formed with refrigerated and regenerative chambers which are thermally related in such manner as to protect the refrigeration system from overloads incurred through the operating irregularities of the dispenser. As a further safeguard, means are provided to maintain predetermined liquid volumes in the dispenser through the provision of an air separator which prevents the accumulation of air in the dispenser chambers.

Other features of the invention are more specifically set forth in the accompanying specification and drawings, wherein:

Fig. 1 is a longitudinal section through the dispenser and cooling unit thereof;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged longitudinal section through the delivery portions of the cooling unit.

The cooling system of the invention may be utilized with any desired type of liquid dispensing equipment, regardless of the number of valved liquid outlets contained therein. In the drawings the invention is organized with a familiar type of dispensing cabinet **10**, having a removable cap plate **11** upon which is mounted liquid outlet fittings **12** and **13** having branch delivery pipes or draught arms **14** and **15** respectively, in which valves **16** are interposed. The fittings **12** and **13** are of the glass filling and bubbler types respectively, and both are devised to direct waste water into a bowl **17** which drains through a waste pipe **18**.

The cooling unit **20** is located in the cabinet immediately beneath the plate **11**, and it rests on a shelf **21** which, in cooperation with a granular cork or like packing **19** insulates the unit from heat ingress. The unit consists of a large tank or cylinder **22**, capped by heads **23** and **24**, and having a partition **25** secured therein to form within the cylinder a refrigeration chamber **26** and a regeneration chamber **27**. U-bolts **30**, extending about the cylinder **22**, secure the unit to the shelf **21** (Fig. 2).

A regenerative radiator device, which may be in the form of a coil **28**, is disposed within the chamber **27**, and its inlet terminal **29** extends through the head **24** and is connected to a tube **31** leading to a city pressure line or other liquid supply source. The remaining terminal **32** projects through a hole **33** in the partition **25**, and thus directs liquid into the chamber **26**. Liquid is directed from the chamber **26** through a discharge conduit **34**, and thence into the supply pipes **14** and **15**, which are connected thereto by a fitting **35**.

To prevent the accumulation of air in the upper portion of the chamber **26**, a small injector tube **37** (Fig. 3) is disposed within the conduit **34**, and it projects therefrom to a high point in the chamber **26**. It will be apparent that if one or both valves **16** are opened, the flow of liquid through the conduit **34** will cause air to be sucked out of the tank and carried along with the emergent fluid.

Waste liquid entering the waste pipe **18** from the bowl **17** is directed into the regeneration chamber **27** through a connection **40** between the pipe **18** and the top of the cylinder **22**. The drainage liquid flows about the coil **28** and into a baffle **41** and finally emerges from the unit in a drain pipe **42** secured in the head **24**.

Additional drain pipes **44** enter the bottom of both the chambers **26** and **27**, and they are sealed by caps **45**. These pipes are utilized only when it is desired to clean the chambers, which involves a complete drainage thereof.

The refrigeration chamber **26** contains a large refrigerant coil **50**, whose inlet and outlet terminals **51** and **52** extend through the head **23** and are connected to pressure and suction sides of a refrigeration system. An inlet control device **53** for the refrigerant circuit is disposed beneath the shelf **21**, and a thermostatic bulb **54** forming part thereof is inserted in the chamber **26** through a hole **55**. Inasmuch as the operation of systems of this type is well understood by those skilled in the art, a complete description and illustration of the entire system is not necessary.

It will be observed that the thermostatic bulb **54** is located in close proximity to the coil terminal **32**, which serves as a liquid inlet for the chamber **26**. Thus, the relatively warm liquid entering the chamber affects the bulb and the associated control device **52** to the end that the refrigerant system responds to the liquid inlet temperature during all periods of use of the dispenser, that is, when one or both of the valves **16** are open. When the valves are closed, liquid ceases to enter the chamber **26**, whereupon the bulb will rapidly respond to the mean temperature of the liquid body therein.

The waste liquid, in passing through the regenerative chamber **27**, directly contacts the coil **28**, and, having a considerably lower temperature

than the uncooled liquid in the coil, it absorbs heat therefrom, and thus performs a useful heat exchange function before passing to the drain. It will be understood that the emergent liquid directed into the chamber **27** is but a few degrees warmer than the liquid in the chamber **26**, and thus during active periods only a small heat exchange action takes place through the separating partition **25**. During long periods of inactivity of the dispenser, the thermal communication between the chambers afforded by this partition permits the quiescent liquid in the chamber **27** to be maintained at a low temperature. This insures the maintenance of substantially constant temperatures in both chambers, regardless of operating conditions, and thus the liquid is always pre-cooled before introduction into the refrigeration chamber **26**, and consequently the refrigeration system is not subjected to violent loads which would be incurred if warm water were introduced into the chamber **26**.

It will be apparent that various modifications, such as the utilization of any other known type of refrigeration system, or structural variations in the shape or type of the coils and chambers may be made by those skilled in the art without departing from the scope of the invention, as set forth in the following claims.

I claim:

1. In a liquid dispenser, a tank having a metallic partition forming two thermally connected chambers therein, refrigeration means associated with one chamber, a radiator disposed in the remaining chamber and having a liquid inlet connected externally of the chamber to a liquid supply source and a liquid outlet directed into said first chamber, a draught arm extending from said first chamber, a waste conduit adapted to direct waste liquid received from the draught arm into said remaining chamber, and a drain conduit communicating with said remaining chamber.

2. In a liquid dispenser, a tank provided with a metallic partition to form a pair of thermally connected chambers, refrigeration means associated with one chamber and including a thermostatic control bulb mounted in said chamber, a radiator in the remaining chamber having a liquid inlet connected externally of said chamber to a liquid supply source and a liquid outlet directed into said first chamber, said outlet being disposed to direct liquid from the radiator onto said bulb, a draught arm extending from said first chamber, a waste conduit adapted to direct waste liquid received from the draught arm into said remaining chamber, and a drain conduit communicating with said remaining chamber.

3. In a liquid dispenser, a metallic tank provided with an internal partition wall to form a pair of chambers, a refrigerant expander disposed in one of said chambers, inlet and outlet pipes connected to said expander and passing through the wall of said tank, a liquid discharge pipe in communication with said chamber, a liquid inlet pipe communicating through the wall of said tank with the other of said chambers, said inlet pipe terminating in a heat exchange coil disposed in said other chamber, the end of said coil entering said first named chamber through said partition wall, a waste liquid line in communication with said second chamber, a waste discharge line connected to said second chamber, and thermostatic receiving means disposed in said first named chamber adjacent said coil and passing through said partition wall.

LAWRENCE C. SMITH.