

Dec. 31, 1968

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3,419,188

DISPENSER

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Fig. 1

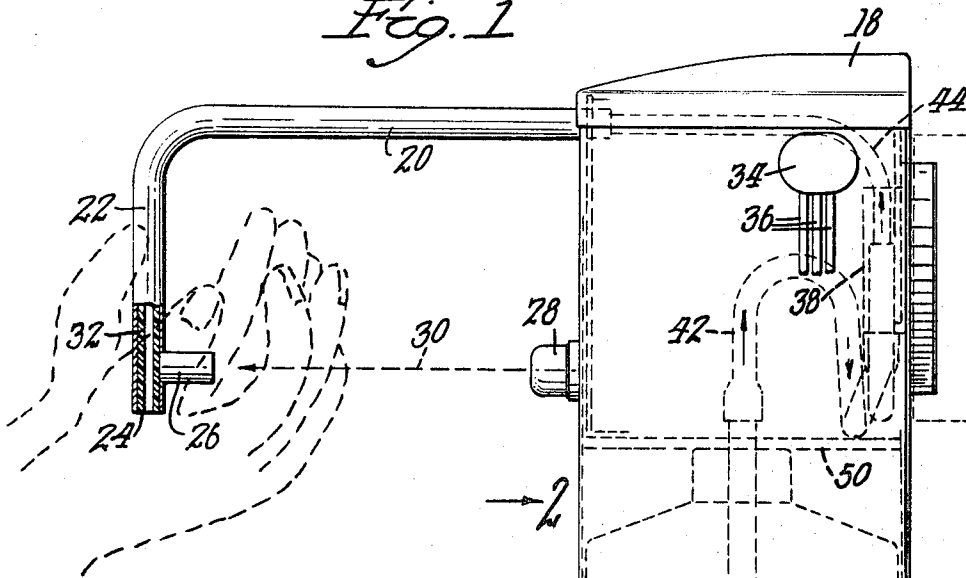
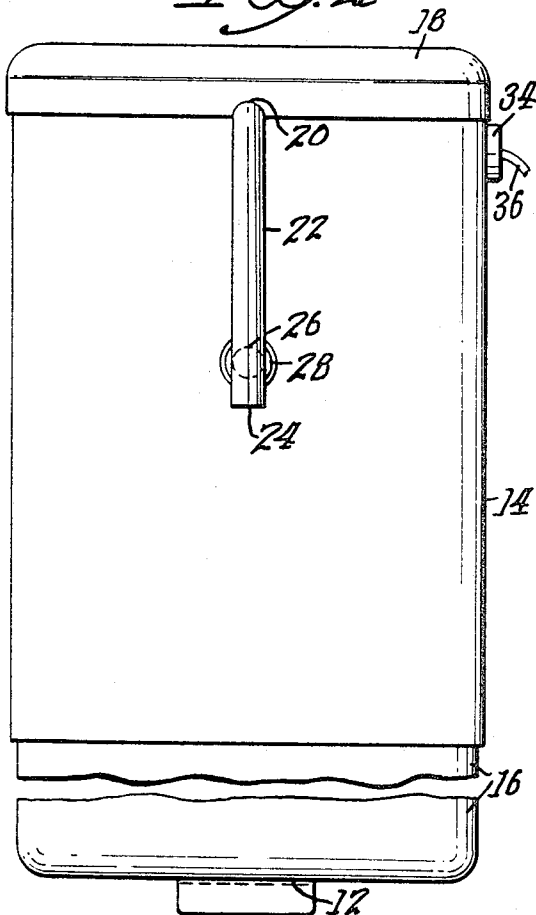


Fig. 2



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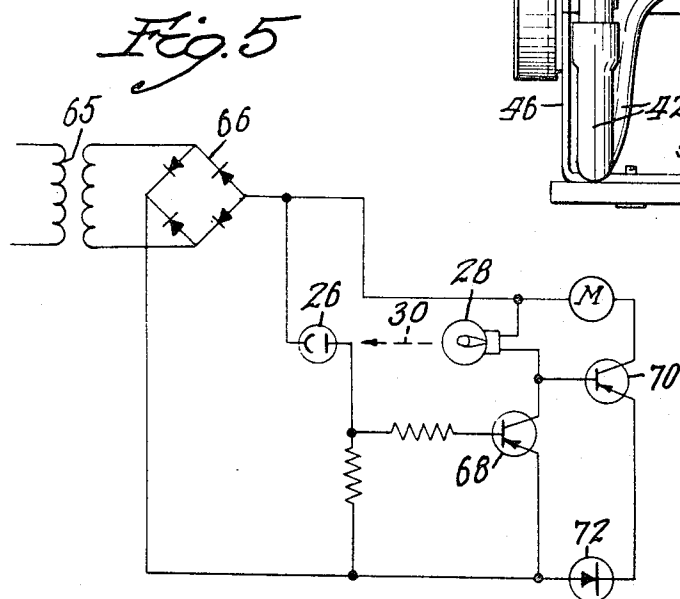
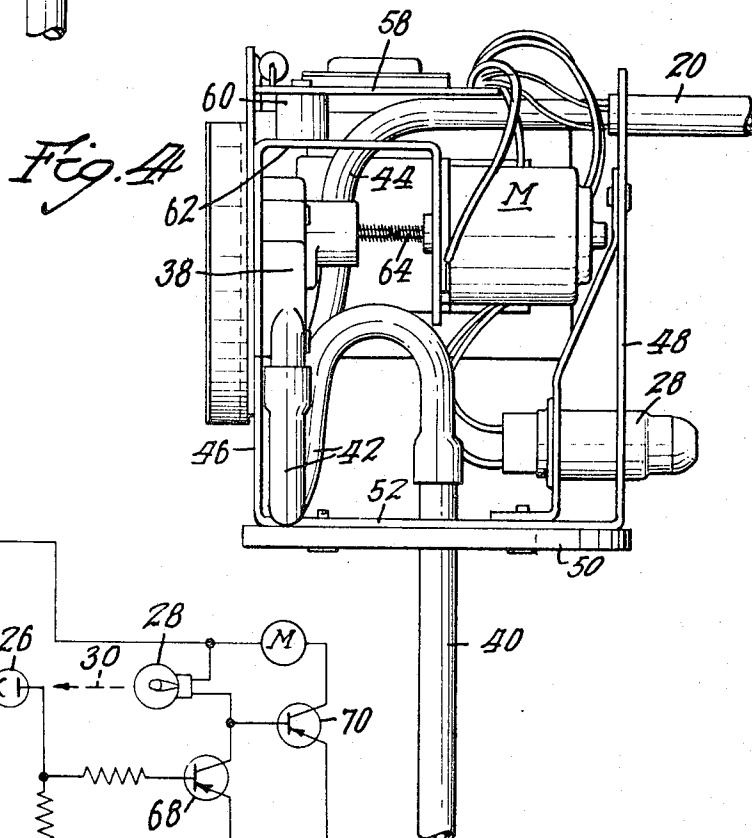
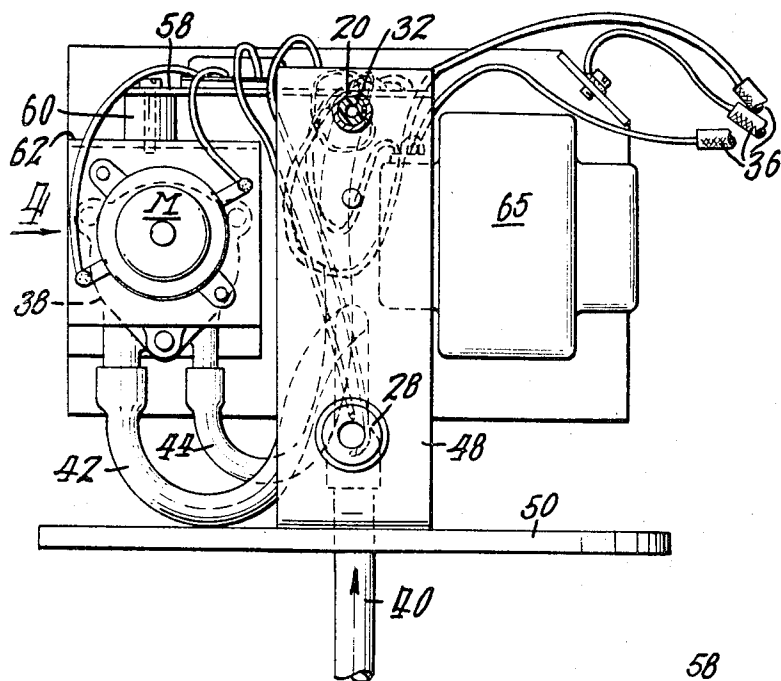
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3,419,188

DISPENSER

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This invention relates to a new and improved dispenser particularly for semi-fluid materials e.g. antiseptic fluid-like materials often used in the medical profession. This material must be received and rubbed over the hands thoroughly without touching anything, so that it is not desirable to push a button or pull a lever, etc. in order to make the dispenser discharge its contents.

In the present case mechanism is provided by which the material is discharged at a predetermined position to the degree desired by providing a photosensitive cell (or its lamp) adjacent said position where it receives a beam from a lamp, the beam proceeding in a path which is normally interrupted by the hands of the operator as placed in position under for instance a spout in order to receive the material, so that with the beam thus in a sense automatically interrupted by the operator, the device proceeds to dispense material and it does so for as long a time as a hand remains in this position blocking the beam.

When the beam is interrupted, a circuit is completed to actuate a motor to drive a pump forcing the material through a tube to the spout adjacent the photocell (or the lamp), so that the pump is thus actuated to discharge the material where desired. As soon as the hands are removed from the path of the light beam, the pump stops and the material in this case does not drip. This action will last until the container for the material is emptied.

New and improved means is also provided for ensuring that the motor will not operate if the lamp fails, as naturally if the lamp went out, this would react on the photoelectric cell the same as though the beam were merely interrupted.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which:

FIG. 1 is a view in side elevation illustrating the device;

FIG. 2 is a view in front elevation illustrating the mechanism, looking in the direction of arrow 2 in FIG. 1;

FIG. 3 is a view in front elevation thereof with parts broken away and looking in the direction of arrow 3 in FIG. 2;

FIG. 4 is a view in elevation looking in the direction of arrow 4 in FIG. 3, and

FIG. 5 is a diagram of the electric circuit.

Referring to FIG. 1, there is shown a plate or the like 10 adapted to be mounted on a wall, stand, etc. This plate has a supporting shelf 12 at its lower end and it has secured thereto an inverted canister or container 14 which is open at the bottom and receives the container 16 of material to be dispensed. The canister or container 14 is continuous except for its open bottom, or it may have a removable cover at 18.

At the forward face of the canister or container, i.e., opposite the supporting plate 10, there is an outwardly extending tube 20 which may e.g. have a downturned end 22 terminating at 24, this end forming a spout where the material is ejected. On the downturned portion 22 adjacent the end 24 of the tube there is provided a small housing 26 which is on a level with and facing another small housing 28. The housings 26 and 28 contain a lamp and a photo-electric cell. In the present case it is preferred that the lamp be in the housing 28 and that fine wires (not

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shown) lead from a source of supply of electricity thereto to provide the beam which is indicated at 30, but it is to be understood that these parts are of course interchangeable. For example, a photoelectric cell could be utilized in the housing 28 with a lamp adjacent to it for reflection from a mirror at 26 should this be found to be desirable.

In the present case, in the tube 20 there is provided a rubber or plastic flexible tubing 32 and this is provided for the particular material involved, so that when the pump to be described ceases its operation, the material will not dribble from the orifice at 24. The reference numeral 34 indicates merely a lead-in connection from wires 36 which can be plugged in anywhere as may be desired.

The pump is indicated generally in FIG. 1 at 38. It is driven by an electric motor M and receives the material to be dispensed from the container 16 through an elongated tube 40 which leads into the pump housing as for instance at 42.

The material runs through the pump which may be conveniently e.g. a gear pump and outwardly through a smaller tube 44 which is the initial end of the tube 32.

There is a main bracket consisting of an upright rear member 46, upright forward member 48, and a horizontal member 50, the latter mounting a plate 52. The rear member 46 may be secured with respect to housing 14 and plate 10. Pump 38 is driven by the motor M which is energized as will be explained in the circuit diagram whenever the light beam at 30 is interrupted, and the electrical connections are put on a board 58 conveniently mounted by an insulating plug 60 with relation to an inverted U-shaped bracket 62 having the pump mounted on it, see particularly FIG. 3. The motor is connected to the pump 38 through a shaft 64 and drives the pump whenever the beam of light is interrupted.

The reference numeral 65 in FIG. 5 illustrates a transformer so that sixty cycle 120 volt alternating current can provide twelve volt current. This current is rectified at 66, see FIG. 4.

The uni-directional current then passes through the circuit shown in FIG. 4 which includes the photoelectric cell and the lamp together with a pair of power transistors indicated at 68 and 70. It will be seen that the lamp is normally on and it energizes the photoelectric cell, but if the light beam is interrupted the resistance in the cell will increase. Normally the current passes in a circuit through transistor 68 and the lamp and cell and back to the rectifier, but when the beam at 30 is interrupted, the resistance of the photoelectric cell increases to such an extent that the current has to proceed through the transistor 70, through the motor M (and lamp) and back to the source again. The photoelectric cell resistance is normally low when the light is on the cell but otherwise is high.

Should the lamp however go out, the transistor at 70 is unable to pass current to prevent passing through the motor windings to energize it and therefore the motor will not operate. Otherwise of course the pump would keep on operating, with the lamp out, and all the material in the container 16 would be lost.

The diode at 72 provides a unidirectional bias of low resistance value to the transistor at 70 and a very high resistance in the reverse direction. This tends to stabilize the circuit and provides reverse transient voltage protection to the power transistor at 70.

The tubing 32 is without valves of any kind and the flow characteristics and retention of prime are functions of the tube diameter relative to the viscosity of the material dispensed. Also, when the motor and pump cease, there is no drip.

The bottle or canister 16 is open at its neck to easily receive the tube 40, and is quickly and easily snapped into place on the shelf 12. The empty bottle is disposable.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A dispenser comprising a support, means forming a spout having an orifice, means forming a passage leading through the spout to the orifice from a container of material to be dispensed, and a lamp member and cooperating photosensitive cell member in close association with said spout, the beam from the lamp member being in a position wherein it is interrupted by the hands of a user of the dispenser placed to obtain material from said orifice, means to drive material from the container through the passage to the orifice, and means for energizing said last-named means in circuit with said members and operable upon interruption of the beam, one of said members being located on said spout.

2. The dispenser of claim 1 including means preventing operation of said material driving means in the presence of a dark lamp.

3. The dispenser of claim 1 wherein the passage forming means comprises a tube with the spout being located at its end in spaced relation to the support, the cell and lamp members being located so that the beam extends generally between the support and the spout.

4. The dispenser of claim 1 wherein the passage forming means comprises a tube with the spout being located at its end in spaced relation to the support, the cell and lamp members being located so that the beam extends generally from the support to the spout, the tube being turned down at its end to form the spout and the beam being located no lower than the orifice.

5. The dispenser of claim 1 wherein the passage forming means includes a tubular member and a corresponding soft tubing therein having a lesser interior diameter and restricting drip of the material when the motor shuts off.

6. The dispenser of claim 1 including a flexible tube in the passage, said tube having an interior diameter of a size having flow characteristics related to the viscosity of the material preventing drip and retaining prime during inoperative periods of the means to drive the material.

7. The dispenser of claim 1 wherein the container is removable and including means to temporarily mount the container on the support, the container having an open mouth, a depending dip tube secured relative to the means to drive the material, the means to mount the container being located to hold it upright with the dip tube located therein.

8. An electric circuit comprising a source of current, a photosensitive cell and a lamp connected with respect thereto, the lamp when energized projecting a beam to the cell, a device in the circuit normally unenergized but adapted to be energized when the beam is interrupted, said device being in parallel circuit with the lamp,

means in circuit with the lamp and the device preventing energization of the device when the lamp is inoperative, and

a diode in circuit with the said means providing a unidirectional bias of low resistance to said means and high resistance in the reverse direction.

9. A dispenser comprising a support having a front and a rear, a spout on the support at the front thereof, said spout extending forwardly with respect to the support, a passage leading to the spout from a container of material to be dispensed, means on the support for holding the container,

a lamp member and a cooperating photosensitive member, one of said members being on the spout and the other member being located on said support generally behind the spout, the beam from the lamp member being interrupted by the hand of a user of the dispenser when positioned at least partially to the rear of the spout,

means to drive material to be dispensed from the container through the passage to the spout, and means for energizing said material driving means in circuit with said members and operable only upon interruption of the beam.

10. A dispenser comprising a support, a spout extending from said support forwardly thereof and having an end orifice spaced from said support,

a lamp member and a photosensitive cell member, one of which is mounted on the spout closely adjacent the orifice, the other member being mounted on said support, a beam of light normally being provided by the lamp member to fall on said photosensitive member, said beam extending between the support and the spout adjacent the orifice,

a container on the support, a pump on the support, a passage from the container through the pump and through the spout,

and a circuit with said members and operable upon interruption of the beam, whereby the hand of the user must be at least partially in line with the orifice to interrupt the beam of light and thus be in position to receive material from the orifice.

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U.S. Cl. X.R.

222—76; 250—210