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Novelle et al.

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(54) **BEVERAGE DISPENSING HEADS WITH LIGHTING MODULES**

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F21V 23/04	(2006.01)
B67D 1/16	(2006.01)

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USPC 222/113

See application file for complete search history.

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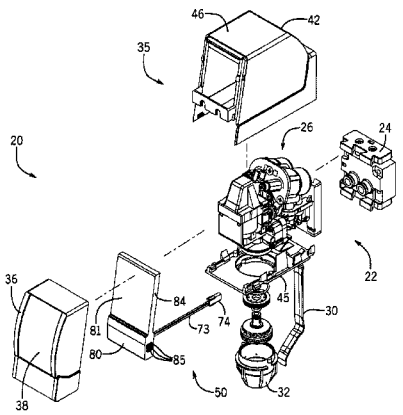
(57) **ABSTRACT**

A beverage dispensing head includes a housing having a front, a rear, and a base that extends between the front and the rear. A mixing nozzle is configured to dispense a flow of beverage via the base. A valve is configured to control the flow of beverage via the mixing nozzle, and a switch is movable into and between a closed position in which the valve opens the flow of beverage via the mixing nozzle and an open position in which the valve closes the flow of beverage via the mixing nozzle. A lighting module disposed in the housing is configured to illuminate the front of the housing and the base of the housing when the switch is moved into the closed position.

16 Claims, 11 Drawing Sheets



(51) **Int. Cl.**
F21V 8/00 (2006.01)
F21V 33/00 (2006.01)

(52) **U.S. Cl.**
CPC ***G02B 6/0021*** (2013.01); ***G02B 6/0033*** (2013.01); *B67D 2001/0089* (2013.01)

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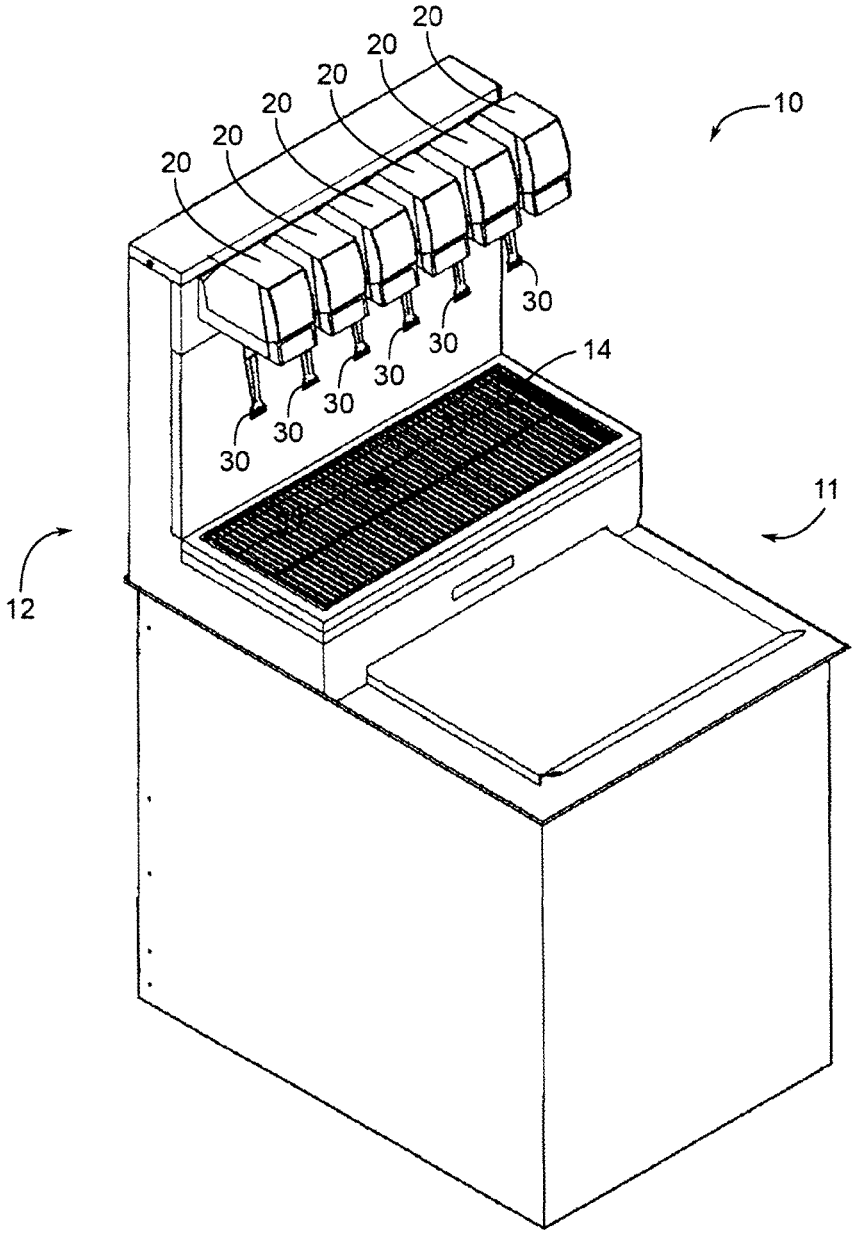

FIG. 1

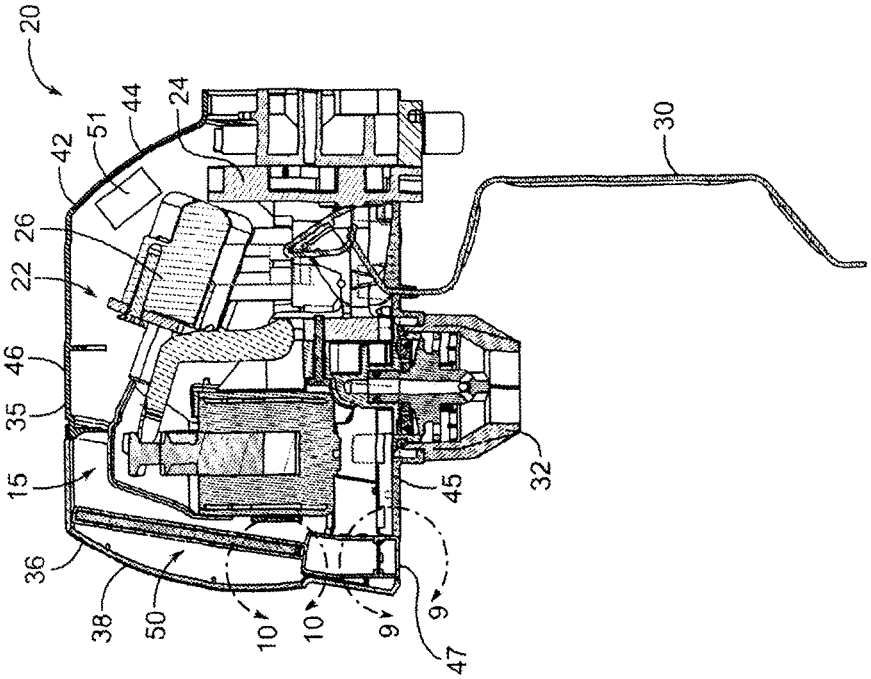
20
44
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FIG. 3

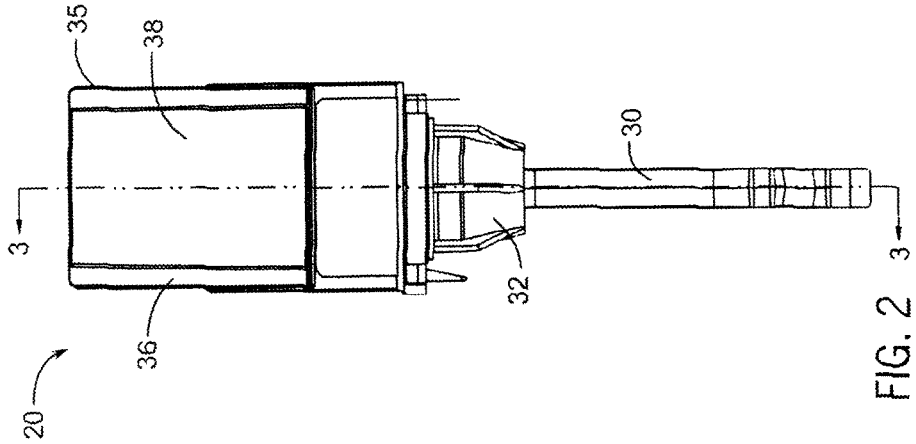
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FIG. 2

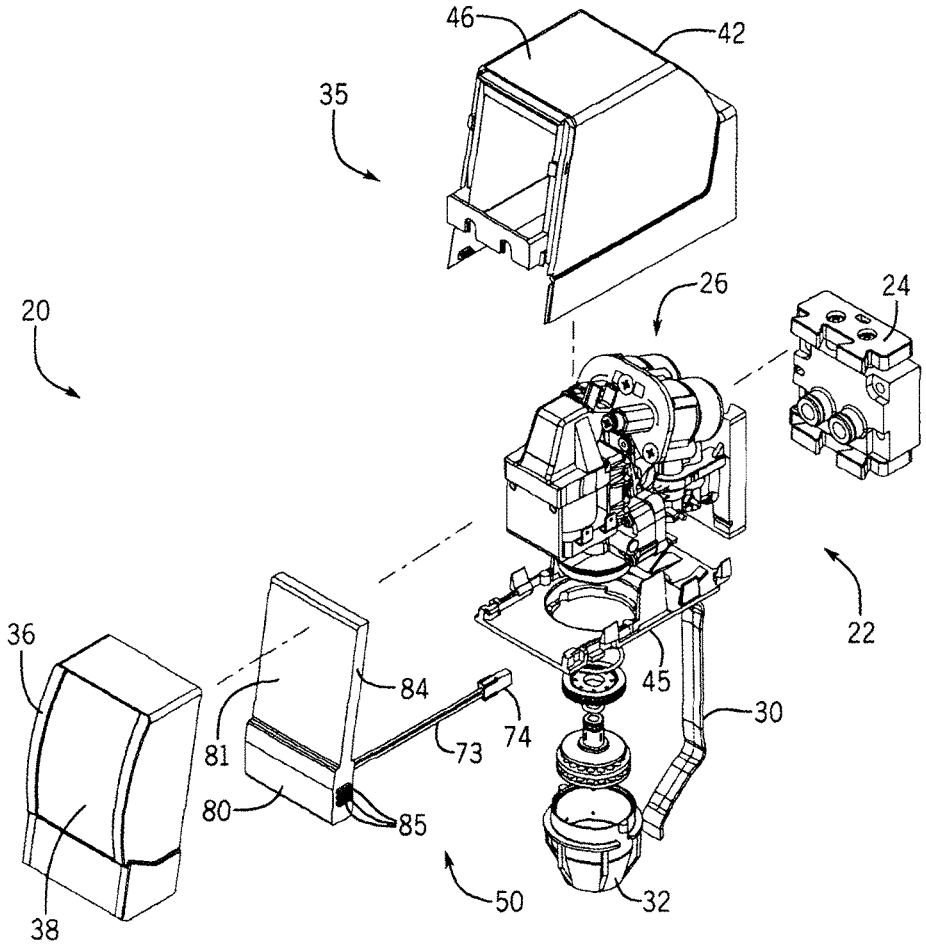

FIG. 4

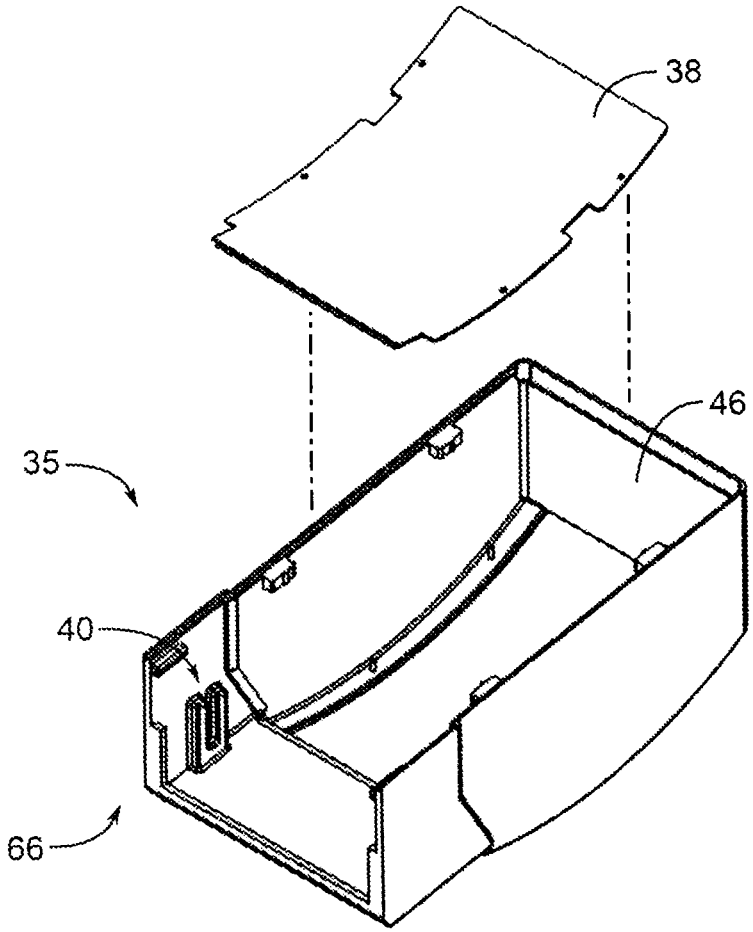

FIG. 5

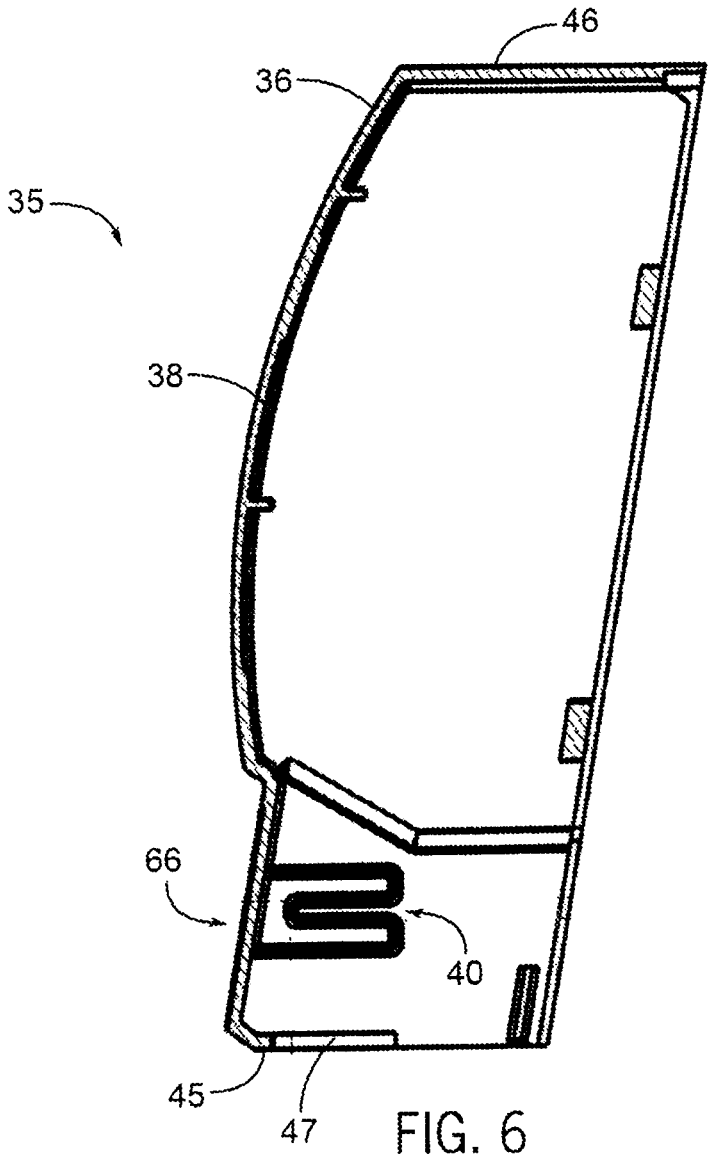

FIG. 6

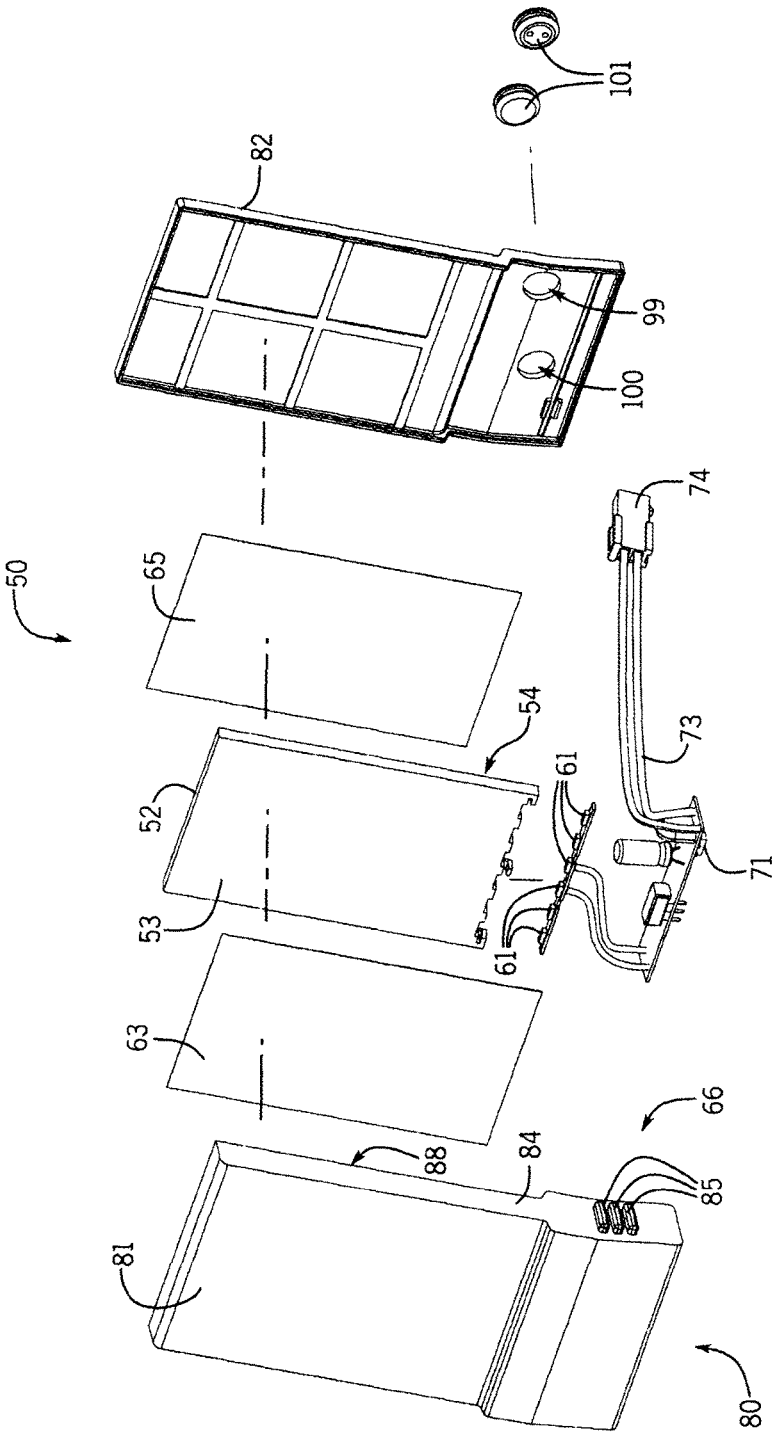

FIG. 7

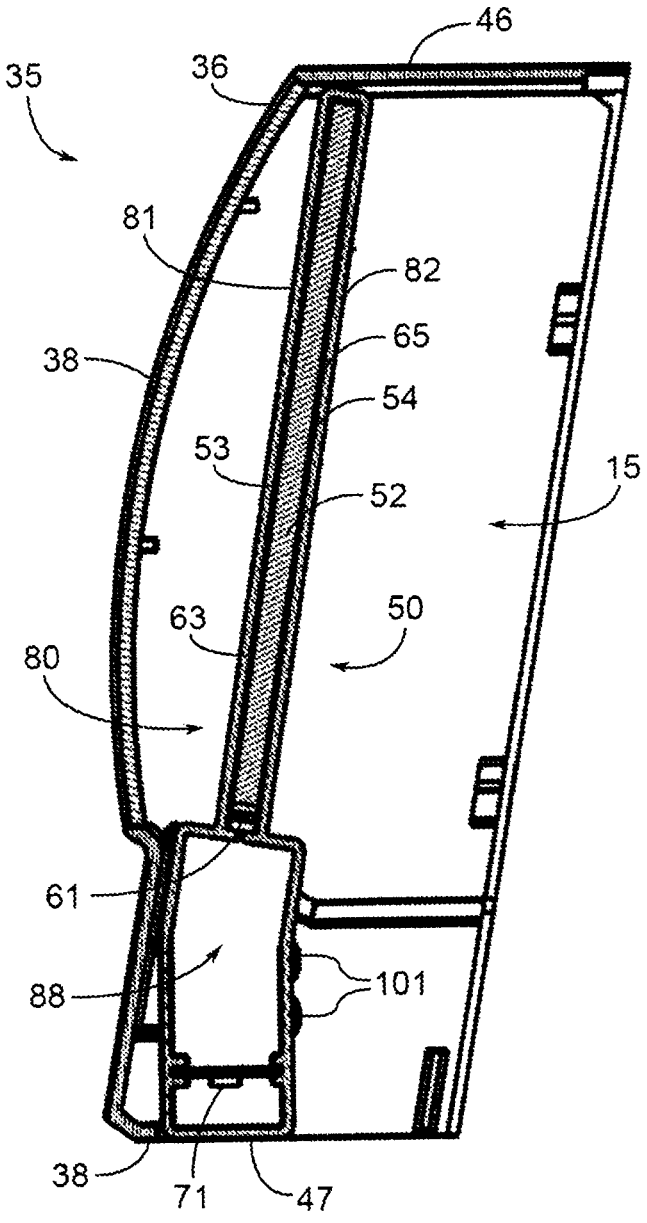

FIG. 8

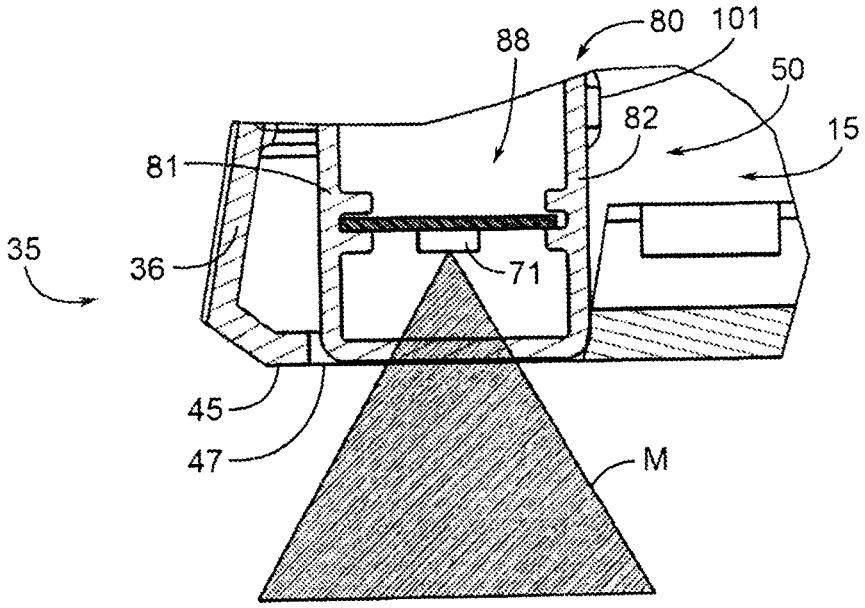
88
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FIG. 9

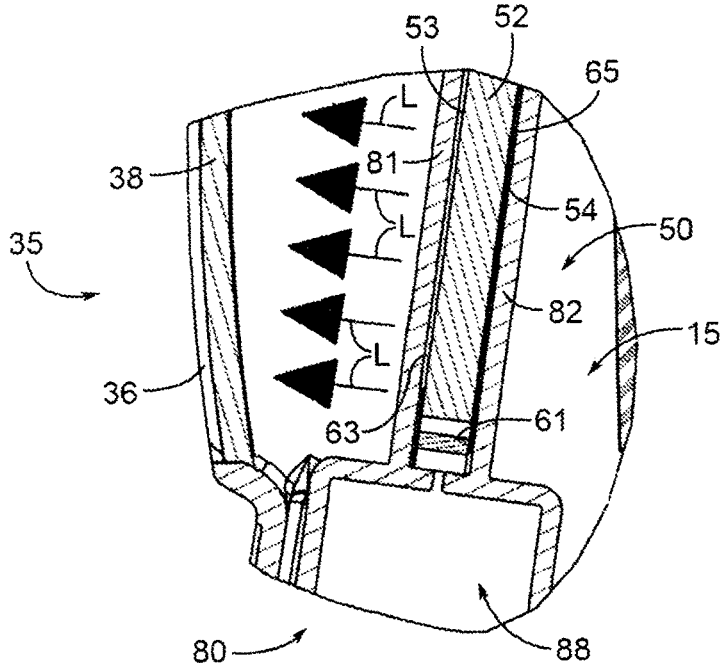
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FIG. 10

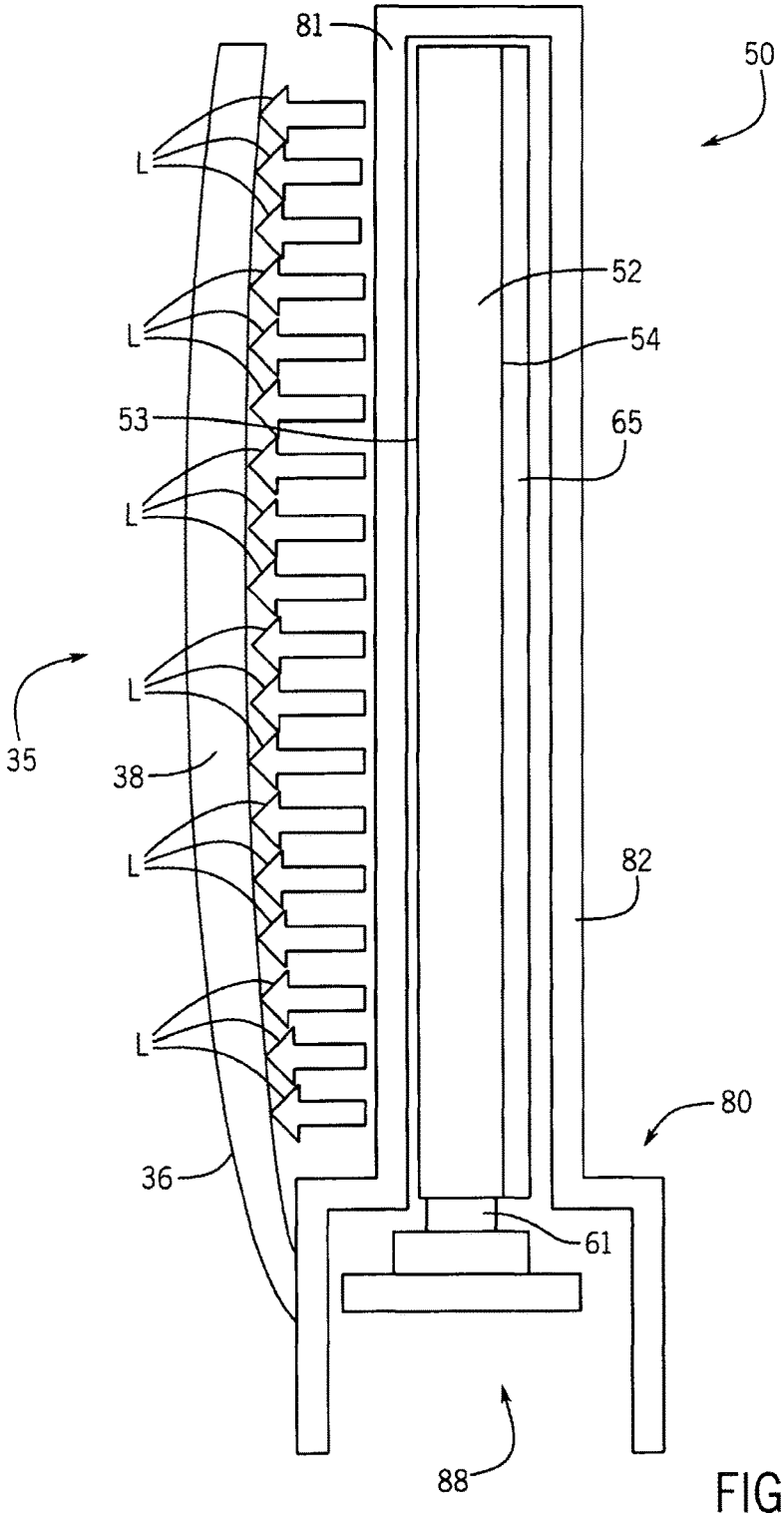

FIG. 11

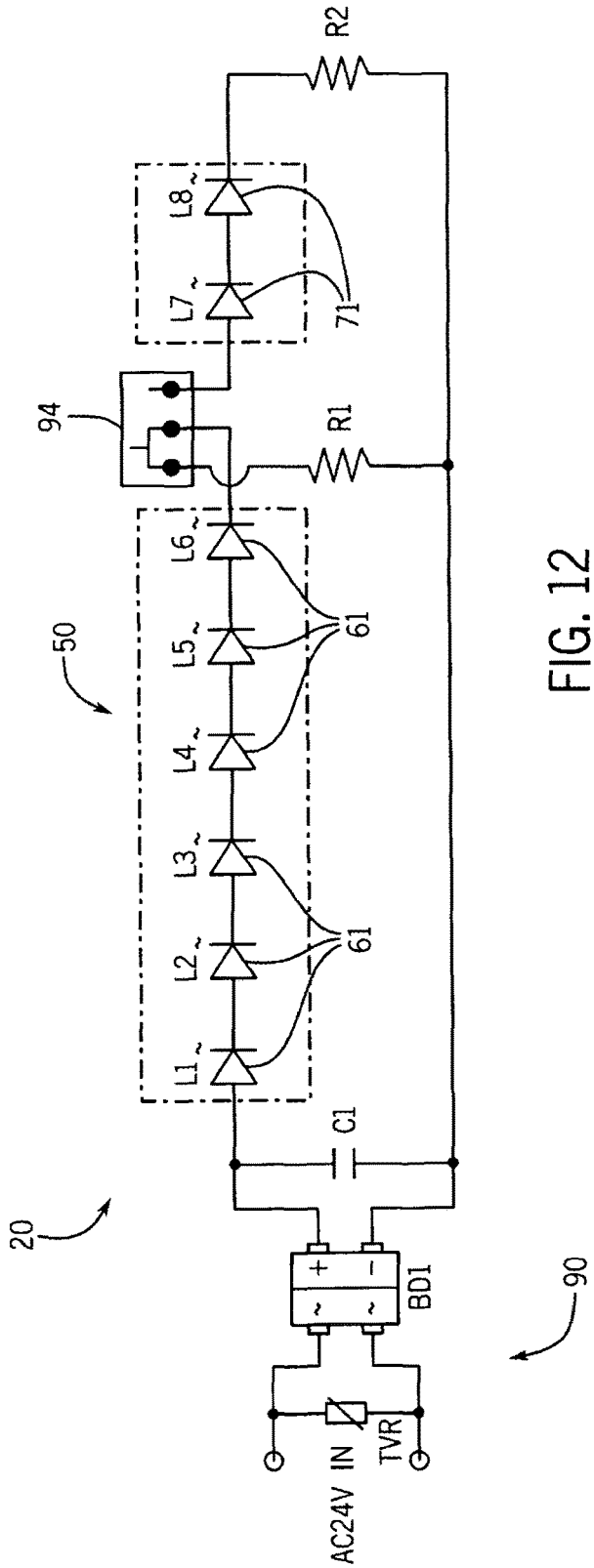

FIG. 12

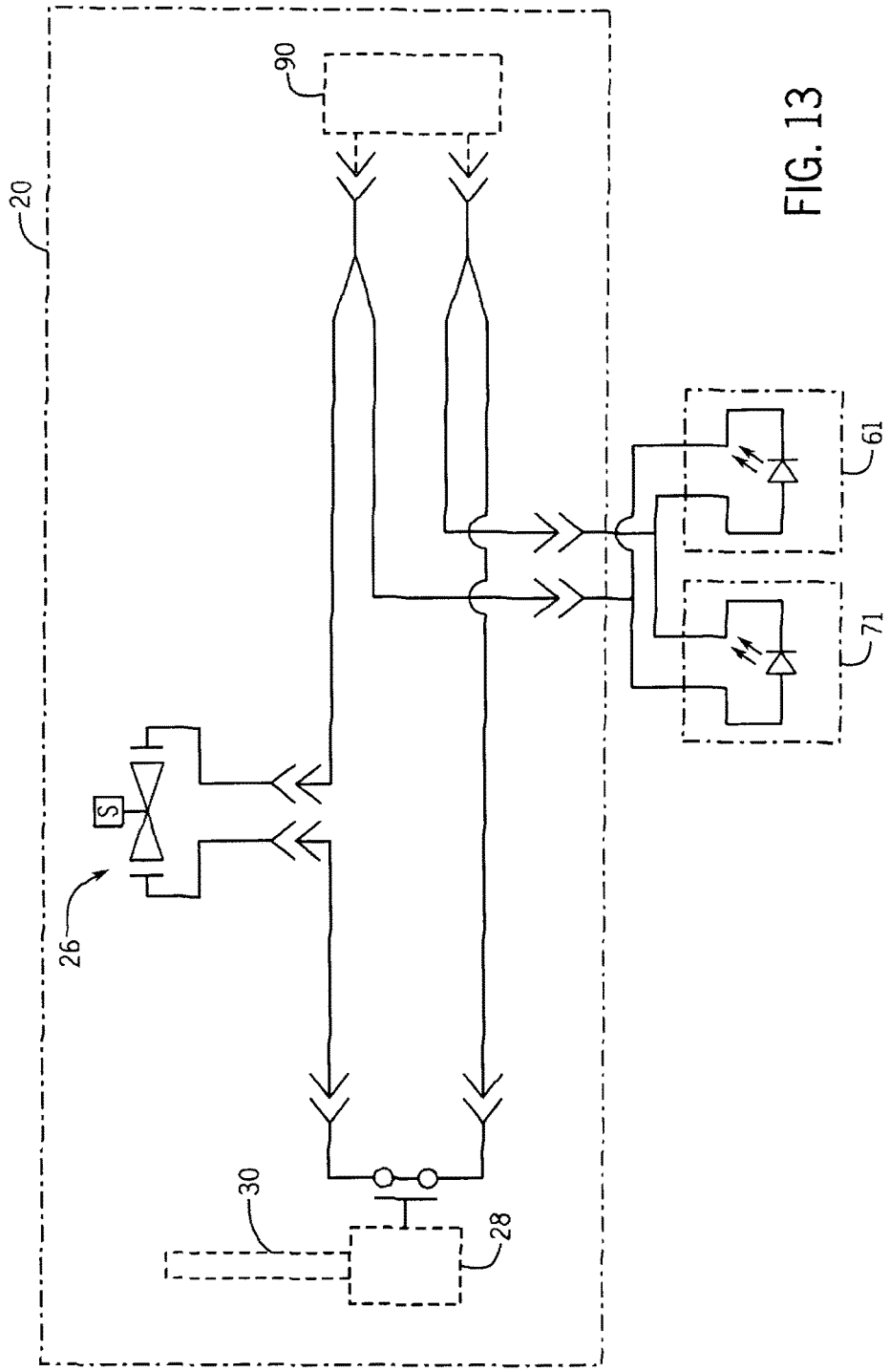

FIG. 13

BEVERAGE DISPENSING HEADS WITH LIGHTING MODULES

CROSS-REFERENCE TO RELATED APPLICATION

The present application is based on and claims priority to U.S. Provisional Patent Application Ser. No. 62/344,606 filed Jun. 2, 2016, the disclosure of which is incorporated herein by reference.

FIELD

The present disclosure relates to beverage dispensing heads, particularly beverage dispensing heads having lighting modules that illuminate portions of the beverage dispensing head.

BACKGROUND

The following U.S. Patents and U.S. Patent Application are incorporated herein by reference in entirety.

U.S. Pat. No. 6,648,185 discloses an electrically operated pre-mix valve including a cup lever operable to activate a switch to energize a solenoid. The solenoid operates a first lever, which then contacts and operates a second lever. The second lever, in turn, moves against the contact end of an actuating shaft. The actuating shaft is thereby moved to permit beverage flow through the valve and out of a nozzle thereof. The valve uses a compound lever system to gain a mechanical advantage for substantially lessening the opening force required to be applied by the solenoid.

U.S. Pat. No. 8,770,446 discloses a system and method for dispensing a predetermined portion of a beverage or drink additive using a cost effective portion control valve that replaces electrical components with mechanical components.

U.S. patent application Ser. No. 14/253,614 discloses a valve dispensing system that can be used in a beverage dispenser. In particular, the valve dispensing system has individual valve module components that control the flow of a beverage or beverage component, and a plurality of valve module components may be combined to form a system capable of dispensing a plurality of beverages and/or beverage components.

SUMMARY

This Summary is provided to introduce a selection of concepts that are further described below in the Detailed Description. This Summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used as an aid in limiting the scope of the claimed subject matter.

In certain examples, a beverage dispensing head includes a housing having a front, a rear, and a base that extends between the front and the rear. A mixing nozzle is configured to dispense a flow of beverage via the base. A valve is configured to control the flow of beverage via the mixing nozzle. A switch is movable into and between a closed position in which the valve opens the flow of beverage via the mixing nozzle and an open position in which the valve closes the flow of beverage via the mixing nozzle. A lighting module disposed in the housing is configured to illuminate the front of the housing and the base of the housing when the switch is moved into the closed position.

Various other features, objects, and advantages will be made apparent from the following description taken together with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The present disclosure is described with reference to the following Figures. The same numbers are used throughout the Figures to reference like features and like components.

FIG. **1** is an example beverage dispensing machine.

FIG. **2** is a front view of an example dispensing head.

FIG. **3** is a cross section view of the dispensing head of FIG. **2** along line **3-3** in FIG. **2**.

FIG. **4** is an exploded view of the dispensing head of FIG. **2**.

FIG. **5** is an exploded view of a front of a housing.

FIG. **6** is a cross section view of the housing of FIG. **5**.

FIG. **7** is an exploded view of an example lighting module.

FIG. **8** is a cross section view of the example housing of FIG. **5** and the lighting module of FIG. **7**.

FIG. **9** is an enlarged view along line **9-9** in FIG. **3**.

FIG. **10** is an enlarged view along line **10-10** in FIG. **3**.

FIG. **11** is a side view of an example lighting module and a front of a housing.

FIG. **12** is an example circuit diagram.

FIG. **13** is an example circuit diagram.

DETAILED DESCRIPTION

In the present description, certain terms have been used for brevity, clarity and understanding. No unnecessary limitations are to be inferred therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes only and are intended to be broadly construed. The different apparatuses described herein may be used alone or in combination with other apparatuses. Various equivalents, alternatives and modifications are possible within the scope of the appended claims.

Through research and experimentation, the present inventors have recognized that beverage dispensing machines with discrete post-mix beverage dispensing heads (which dispense a single type of beverage from a single nozzle) do not include apparatuses for illuminating the housing of the beverage dispensing heads, the dispensing beverage, and/or working areas (e.g. drip tray) of the dispensing machines. The present inventors have also recognized that the lights that illuminate working areas of beverage dispensing machines having multi-flavor post-mix beverage dispensing heads (which dispense different flavors of beverages from a single nozzle) are not easily integrated into beverage dispensing machines with discrete post-mix beverage dispensing heads. Through research and experimentation, the present inventors have developed the presently disclosed lighting modules, which can be coupled to the discrete post-mix beverage dispensing heads. The present inventors have developed lighting modules that are self-contained and can be connected to the existing electrical circuit that provides power to the discrete post-mix beverage dispensing head.

Prior art post-mixed beverage dispensing heads commonly used in the industry receive two independent fluids (e.g. a flavor syrup and carbonated water) and dispense a beverage formed from the two fluids. Reference is made to the above-incorporated U.S. Patent Application and U.S. Patents for further description of the components and operation of the prior art post-mixed beverage dispensing heads.

Referring to FIG. **1**, a beverage dispensing machine **10** has a plurality of post-mix beverage dispensing heads **20** for dispensing beverages to an operator. The beverage dispensing machine **10** includes a drip tray **14** for collecting any beverage that may spill during operation. The beverage dispensing machine **10** has a front side **11** for filing beverage receptacles (e.g. cups) with the beverage from the dispensing heads **20** and a rear side **12** opposite the front side **11** (which may be orientated toward a consumer). It will be recognized that each of the plurality of dispensing heads **20** in a beverage dispensing machine **10** can include any of the components and features described herein.

Referring to FIGS. **2-4**, each dispensing head **20** includes a housing **35** that covers and protects a valve assembly **22** (described further herein). The housing **35** includes a front **36**, a rear **42** opposite the front **36**, a base **45** that extends between the front **36** and the rear **42**, and a top **46** opposite the base **45** that extends between the front **36** and the rear **42**. The housing **35** defines a cavity **15** in which the valve assembly **22** and a lighting module **50** (described further herein) are disposed.

The front **36** is removably coupled to the dispensing head **20** and includes a display window **38** that can be either transparent or translucent. The display window **38** is removably coupled to the front **36** (FIG. **5**). The display window **38** can be made of any suitable transparent or translucent material including glass, plastic, and/or the like. The display window **38** is configured to receive a graphic (e.g. an adhesive sticker) that displays indicia that corresponds to the beverage dispensed from the dispensing head **20** (e.g. an adhesive sticker having a beverage brand or flavor name (e.g. "Cherry Cola", "Diet Cola") is received on the display window **38**). In certain examples, the display window **38** is curved so as to form a lens for focusing light from the lighting module **50**. The front **36** is removably coupled to the dispensing head **20** such that the removal of the front **36** exposes the internal components of the dispensing head **20** (FIG. **4**).

The rear **42** includes a rear display window **44** (FIG. **3**) that can be either transparent or translucent. The rear display window **44** is removably coupled to the rear **42**. The rear display window **44** is configured to receive a graphic, such as an adhesive sticker. The rear display window **44** can be made of any suitable transparent or translucent material including glass, plastic, and/or the like.

The base **45** includes a lighting opening **47** (FIG. **3**) that is separate from the display window **38**. A mixing nozzle **32** is removably coupled to the base **45** and is configured to dispense a beverage to the operator via the base **45** to the beverage receptacle.

Each dispensing head **20** further includes a valve assembly **22** (FIGS. **3-4**) having a valve back block **24**, a valve **26** configured to control flow of beverage through the mixing nozzle **32**, and a switch **28** (FIG. **13**) that is movable into and between a closed position in which the valve **26** opens the flow of beverage via the mixing nozzle **32** and an open position in which the valve **26** closes the flow of beverage via the mixing nozzle **32**. The valve **26** can include any number of valves such as solenoid valves, check valves, and/or the like. Reference is made to the above incorporated U.S. Patents and U.S. Patent Application for further examples of valves for dispensing a beverage from the dispensing head **20**.

Each dispensing head **20** further includes a lever **30** that extends from the base **45** of the housing **35** and is coupled to the switch **28** such that movement of the lever **30** causes the switch **28** to move to the closed position the valve **26** opens the flow of beverage via the mixing nozzle **32** and the lighting module **50** illuminates. That is, the lever **30** is configured to activate flow of beverage via the mixing nozzle **32** by moving the switch **28** to a closed position. In one example operation, a beverage receptacle is pressed against the lever **30** such that the lever **30** causes the switch **28** to move to the closed position. Reference is made to the above incorporated U.S. Patents and U.S. Patent Application for further details regarding examples of a dispense of beverage from the dispensing head **20**.

Referring to FIGS. **7-11**, the dispensing head **20** includes a lighting module **50** disposed in the cavity **15** (FIG. **8**) defined by the housing **35**. The lighting module **50** is configured to illuminate the front **36** of the housing **35** and the base **45** of the housing **35** when the switch **28** (FIG. **13**) is moved into the closed position. That is, the lighting module **50** is configured to illuminate the display window **38** and/or the lighting opening **47** when the switch **28** is moved into the closed position. Illumination of the display window **38** can cause the graphic received on the display window **38** to illuminate and thereby display indicia to the operator. The lighting opening **47** is oriented toward the point of dispense of the beverage, i.e. the mixing nozzle **32**, the flow of beverage into the beverage receptacle, and/or the drip tray. The illumination of the display window **38** and the lighting opening **47** can be simultaneous or sequential.

The lighting module **50** includes a first light source **61** orientated toward the display window **38** that emits light and a second light source **71** orientated toward the lighting opening **47** that emits light. The light sources **61**, **71** include at least one light emitting diode (LED), and the light sources **61**, **71** can include a printed circuit board.

The lighting module **50** further includes a light guide **52** that vertically upwardly guides light from the first lighting source **61** alongside the display window **38**. In certain examples, the light guide **52** extends alongside a majority of the display window **38**. The light guide **52** includes a front surface **53** for dispersing the light toward the display window **38** and a rear surface **54** opposite the front surface **53** that reflects light from the first light source **61** toward the display window **38** (see FIGS. **10** and **11** which include light arrows L that depict light directed toward the display window **38**). The front surface **53** includes a diffuser film **63** that diffuses the light toward the display window **38**. The rear surface **54** includes a reflective film **65** that reflects light from the first light source **61** toward the display window **38**. The rear surface **54** has reflective properties that increase as the rear surface **54** extends away from the first light source **61** (i.e. the reflective properties of the rear surface **54** can include reflectivity, light absorption, light scattering, and/or the like, the strength of which increases further away from the first light source **61**). In certain examples, the light guide **52** defines a cavity (not shown) that receives the light and vertically upwardly guides the light from the lighting source **61**. The light guide **52** can be made of any suitable transparent or translucent material such as plastic, glass, and the like.

The lighting module **50** is removably coupled to the housing **35** by a manually operable mating connection **66** (FIGS. **6-7**). The mating connection **66** includes a boss **85** (FIG. **7**) on one of the lighting module **50** and the housing **35** and a channel **40** (FIGS. **5-6**) defined in the other of the lighting module **50** and the housing **35**. The channel **40** is configured to receive the boss **85**. In the example depicted in FIGS. **5-7**, the boss **85** is on the lighting module **50** and the channel **40** is defined in the housing **35**.

The lighting module **50** is further electrically coupled to the dispensing head **20** by a manually operable electrical connection **73** (FIG. **7**). The electrical connection **73** couples to lighting module **50** to the electrical circuit that receives power for a power source **90** (FIGS. **12-13**) and that is electrically coupled to the valve **26** (FIGS. **12-13**). In the example depicted in FIG. **7**, the electrical connection **73** is a wire harness that has a male connection end **74** that is configured to mate with a female connection receiver (not shown) on the dispensing head **20** (FIG. **4**).

Referring to FIG. **7**, the lighting module **50** includes a casing **80** that defines a cavity **88** that receives the light guide **52**, the first light source **61**, and/or the second light source **62** to thereby protect and seal the light guide **52**, the first light source **61**, and/or the second light source **62** from contaminants and moisture. The casing **80** includes a front panel **81** and a rear panel **82** opposite the front panel **81** that hermetically seals with the front panel **81**. The front panel **81** includes a pair of opposing sides **84** that extend toward the rear panel **82**. The front panel **81** is configured to allow light to travel from the light guide **52** to the display window **38** and/or the lighting opening **47**. The panels **81**, **82** can include transparent, translucent, and/or opaque sections.

The rear panel **82** defines an opening **99** that allows the electrical connection **73** to be received there through while still maintaining the hermetic seal with the front panel **81**. The rear panel **82** also defines an access opening **100** that receives a removable grommet **101**. The grommet **101** can be removed to allow inspection and/or maintenance to the components in the casing **80**.

In certain examples, the dispensing head **20** includes a rear lighting module **51** (FIG. **3**) configured to illuminate the rear display window **44** of the rear **42**. The rear lighting module **51** is similar to the lighting module **50** and can include any of the components described with reference to the lighting module **50**. In certain examples, the rear lighting module **51** includes a second manual electrical connection that electrically couples the rear lighting module to the dispensing head **20**.

Referring to FIGS. **12-13** example circuit diagrams for the dispensing head **20** and the lighting module **50** are shown. The lighting module **50** is coupled to the power source **90** via the electrical connection **73** (FIG. **7**). In certain examples, the power source **90** is a **24** Volt AC power source. In certain examples, a slide switch **94** is included and configured to electrically uncouple to the second light source **71** from the circuit such that the second light source **71** does not emit light.

The lighting module **50** and/or the electrical circuits to which the lighting module **50** is coupled via the electrical connection **73** can include electrical devices and/or components which vary the operation of the lighting module **50** (i.e. various electrical devices may cause the light sources **61**, **71** to blink, dim, gradually illuminate, and/or perform other functions).

What is claimed is:

1. A beverage dispensing head comprising:

a housing having a front with a display window, a rear, and a base with a lighting opening, wherein the base extends between the front and the rear and wherein the housing defines a cavity;

a mixing nozzle coupled to the base and configured to dispense a flow of beverage via the base;

a valve disposed in the cavity and configured to control the flow of beverage via the mixing nozzle;

a switch movable to open the valve to thereby open the flow of beverage via the mixing nozzle and close the valve to thereby close the flow of beverage via the mixing nozzle; and

a lighting module disposed in the cavity and configured to illuminate the display window, the lighting opening, and the flow of beverage via the mixing nozzle when the switch is moved to open the valve, the lighting module having a first light source that emits light toward the display window, a light guide that vertically upwardly guides light from the first light source alongside the display window, a second light source that emits light toward the lighting opening, and a reflective rear surface that reflects light emitted from the first light source toward the display window and has a reflective property that increases as the reflective rear surface extends away from the first light source.

2. The beverage dispensing head according to claim **1**, wherein the display window is separated from the lighting opening.

3. The beverage dispensing head according to claim **2**, wherein the display window is curved so as to form a lens for focusing light from the lighting module.

4. The beverage dispensing head according to claim **2**, wherein the light guide forms a cavity for receiving the light and for vertically upwardly guiding the light from the first light source; and wherein the light guide further comprises a front surface for dispersing the light towards the display window.

5. The beverage dispensing head according to claim **4**, wherein light guide extends alongside a majority of the display window.

6. The beverage dispensing head according to claim **2**, further comprising a lever coupled to and extending from the base of the housing and wherein the lighting opening is oriented towards a point of dispense for the flow of beverage so that via the lighting opening the lighting module illuminates a beverage receptacle as the beverage receptacle is pressed against the lever and receives the flow of beverage.

7. The beverage dispensing head according to claim **1**, wherein the lighting module is removably attached to the housing by a manually operable mating connection and to the valve by a manually operable electrical connection.

8. The beverage dispensing head according to claim **7**, wherein the manually operable mating connection comprises a boss on one of the lighting module and housing and a channel on the other of the lighting module and housing.

9. The beverage dispensing head according to claim **7**, wherein the manually operable electrical connection comprises a wire harness.

10. The beverage dispensing head according to claim **1**, wherein the housing, mixing nozzle, valve, switch, and lighting module form a dispensing head combination that is one of a plurality of identical dispensing head combinations for dispensing different beverages, wherein the plurality of identical dispensing head combinations together form a beverage dispensing station.

11. The beverage dispensing head according to claim **1**, further comprising a rear lighting module disposed in the cavity and configured to illuminate the rear of the housing when the switch is moved into the closed position.

12. The beverage dispensing head according to claim **11**, wherein the rear of the housing comprises a rear display window; and wherein the rear lighting module is configured to illuminate the rear display window.

13. A discrete beverage dispensing head comprising:

a housing defining a cavity and having a front, a rear opposite the front, and a base extending between the front and the rear;

a mixing nozzle coupled to the base and configured to dispense a flow of beverage via the base;

a valve disposed in the cavity and configured to control the flow of beverage via the mixing nozzle;

a switch movable to open the valve to thereby open the flow of beverage via the mixing nozzle and close the valve to thereby close the flow of beverage via the mixing nozzle; and

a lighting module disposed in the cavity and configured to illuminate the front and the base when the switch is moved into the closed position, the lighting module having a first light source that emits light toward the front, a second light source that emits light toward the base, and a casing defining a casing cavity in which the first light source and the second light source are received and hermetically sealed;

wherein the front is removable such that the lighting module can be received in the cavity and the casing coupled to the housing.

14. The discrete beverage dispensing head according to claim 13, wherein the casing has a front casing panel and an opposite, rear casing panel, and wherein the lighting module has a wire harness that extends away from the rear casing panel to thereby electrically couple the lighting module to the discrete beverage dispensing head.

15. The discrete beverage dispensing head according to claim 14, wherein the lighting module has a boss configured to contact the housing as the lighting module is received into the cavity.

16. The discrete beverage dispensing head according to claim 13, wherein the lighting module has a light guide that vertically upwardly guides light from the first light source alongside the display window, and a reflective rear surface that reflects light emitted from the first light source toward the display window and has a reflective property that increases as the reflective rear surface extends away from the first light source.

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