United States Patent

[11] 3,526,226

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[54] **THERAPEUTIC INHALING DEVICE**
8 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **128/192,** 128/198, 128/207
[51] **Int. Cl.** **A61m 15/00**
[50] **Field of Search** 128/192-128/192-196, 186-188, 402; 219/271, 274, 306, 307, 316, 318, 319; 128/198, 200, 207

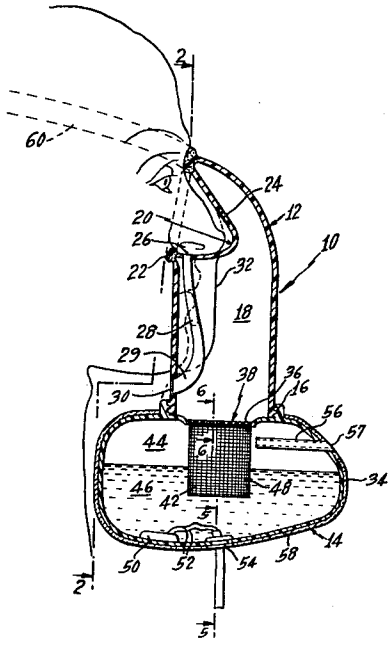
[56] **References Cited**

UNITED STATES PATENTS

120,816	11/1871	Heintzelman	128/198
2,000,988	5/1935	Robinson	128/200
2,292,568	8/1942	Kanter et al.	128/188
3,045,670	7/1962	Hirtz et al.	128/192

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ABSTRACT: A therapeutic inhaling device comprising a housing having upper and lower sections detachably secured to each other. Each of the upper and lower sections is hollow to define, respectively, upper and lower chambers. The upper chamber has an inwardly extending projection to define a nose pocket exteriorly of the upper section. One-way valve means permit air passage into said nose pocket only from the upper chamber, and out of said pocket only to the outside atmosphere. The lower chamber is adapted to contain a body of water and means for heating said body of water to a predetermined temperature. Air filtering means are provided between the upper and lower chambers so that all of the air entering the lower chamber through air inlet means, must pass through the heated and humidified atmosphere in the lower chamber as well as through the air filtering means disposed between the two chambers before being inhaled by the wearer.



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FIG. 1

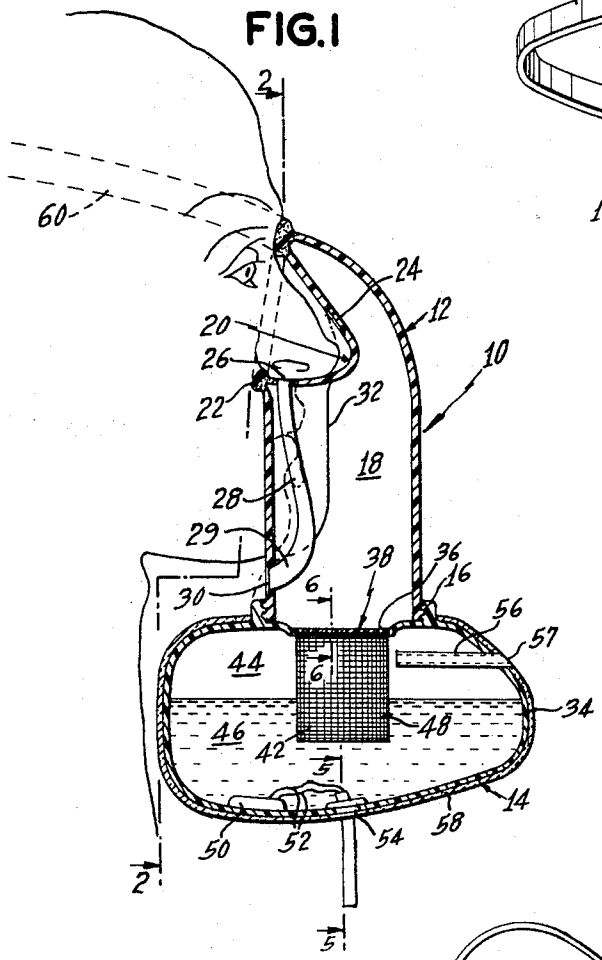


FIG. 2

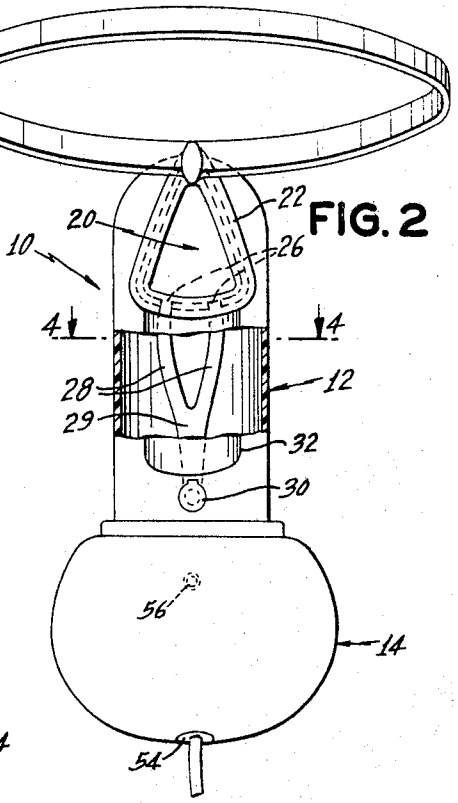


FIG. 3

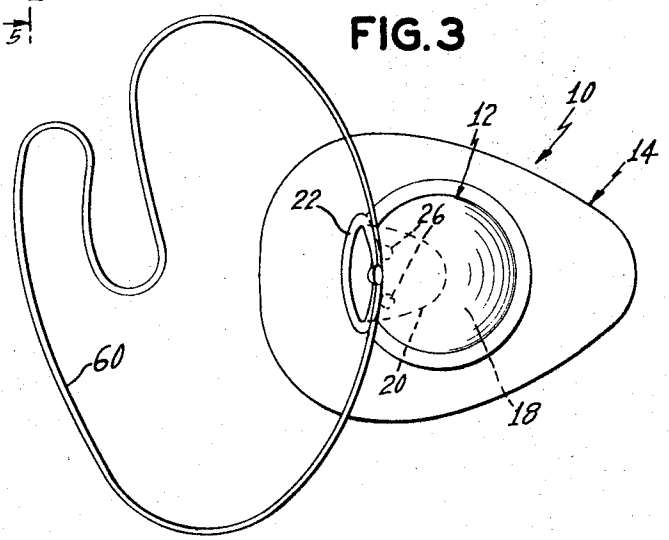
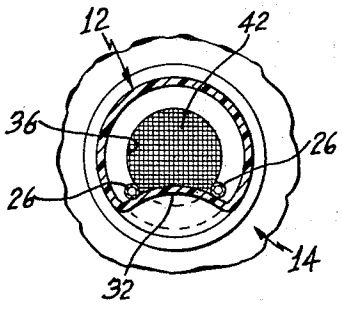


FIG. 4



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FIG. 8

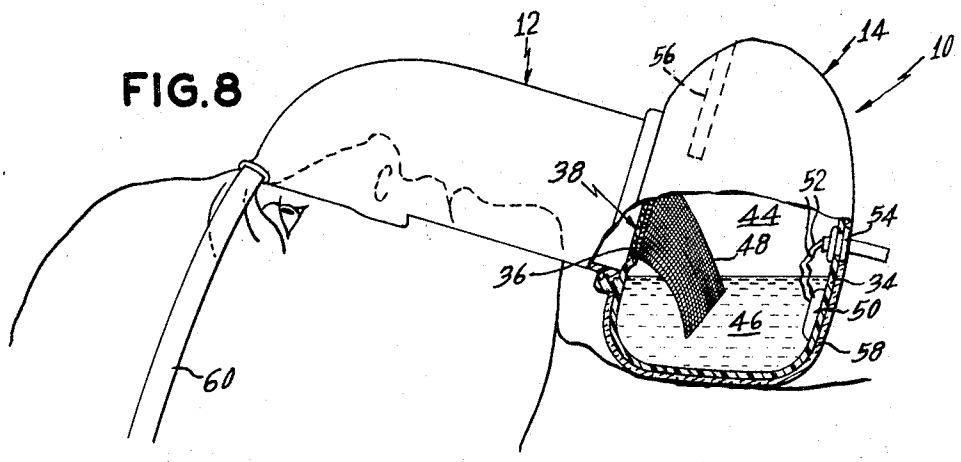


FIG. 7

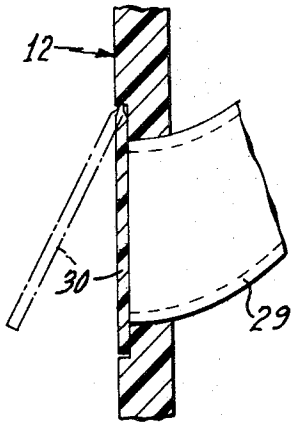


FIG. 5

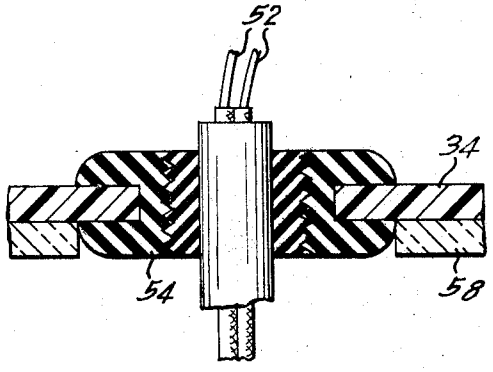
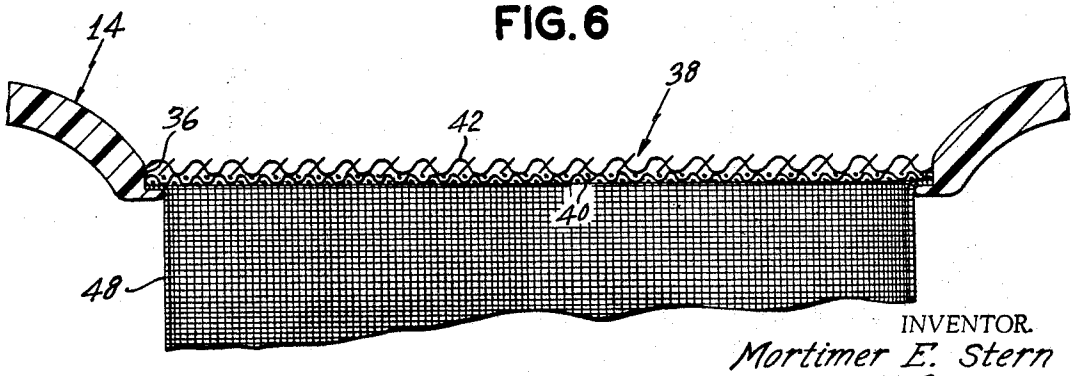


FIG. 6



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THERAPEUTIC INHALING DEVICE

BACKGROUND OF THE INVENTION

Respiratory ailments ranging from simple colds to complicated bronchial infections occur frequently among children, as well as adults. Even those ailments which are not serious, or which are curable, nevertheless create great discomfort to those afflicted therewith.

The most common way of dealing with these ailments for the dual purpose of relieving the patient's discomfort and restoring the patient's health is to condition the air prior to its inhalation. Such conditioning of the air consists essentially of moistening and pre-heating the air, and this is most frequently accomplished by heating and moistening the air in the atmosphere surrounding the patient by means of a wide variety of devices ranging from the old-fashioned tea kettle to the more sophisticated electrically operated vaporizer in use today. While the above described manner of conditioning the air to be inhaled has a great deal of merit, it is also accompanied by numerous disadvantages. For one thing, such devices condition the air in the entire surrounding atmosphere which may not be desired by others sharing the same. Furthermore, the humidified heated air produced by these devices may reach the eyes and other parts of the body resulting in the creation of new discomforts. These deficiencies have led to the development of therapeutic inhaling devices of the type which are applied directly to the user, such as face masks. While many such masks have been developed, none of these have proved to be entirely satisfactory for a number of different reasons. In some instances, these therapeutic masks have been so complicated that the cost thereof made their use prohibitive. Others are too bulky and cumbersome that in effect they provide more discomfort than relief. Others still have not provided sufficient safety precautions against the possibility of harm and injury.

SUMMARY OF THE INVENTION

The therapeutic device of the present invention has as its primary object the provision of an inhaling device which is simple in construction, yet effective in accomplishing the stated objectives. These objectives include not only the conditioning of the air prior to its inhalation by the humidifying and heating thereof, but also includes the filtering of such air, prior to its inhalation, to remove therefrom harmful impurities normally present in the air, such as, pollen, smoke particles, toxic gases, and the like. In accordance with the invention, the therapeutic device can be worn without interfering with the normal functions of the wearer, such as, reading, writing, sitting, standing, walking, etc. On the other hand, the therapeutic device in accordance with the invention can also be worn in a reclined condition so that the wearer can utilize the device while sleeping, without discomfort and risk of injury, even while turning from side to side, or completely around.

The therapeutic device in accordance with the invention comprises a housing made up of two sections detachably secured to each other. The upper one of these sections includes the nose pocket and defines the passageway for the filtered and conditioned air to the nose. The lower section consists of an enclosed chamber containing water, thermostatically controlled means for heating the water to a predetermined temperature, air inlet means and air filtering means, the latter being interposed between said two sections requiring all of the air to pass through said air filtering means prior to its inhalation. The lower section is shaped so that the water contained therein remains confined therein when said device is worn by the wearer either in a normally upright position or in a reclining position.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal section of the therapeutic device shown on a wearer in the normally upright position;

FIG. 2 is a view of the device with parts shown in section, taken along line 2—2 of FIG. 1;

FIG. 3 is a plan view thereof;

FIG. 4 is a section taken along line 4—4 of FIG. 2;

FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 1;

FIG. 6 is an enlarged sectional view taken along line 6—6 of FIG. 1;

FIG. 7 is an enlarged view in section of the flap valve used on the device; and

FIG. 8 is a view showing the device on a wearer in reclining position, with parts shown in section.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, therapeutic device **10** is seen as comprising upper section **12** and lower section **14** detachably secured to each other by means of cooperating threads **16**. Upper section **12** consists of a casing preferably made of plastic and defining chamber **18**. Section **12** includes an inwardly extending portion **20** which defines a nose pocket for the wearer, the periphery of which is provided with a foam seal **22** so that device **10** may be worn in air tight relation with the nose pocket and thus prevent air from the atmosphere from being inhaled unless it first passes through the device **10**. Nose pocket **20** is provided with one-way valve **24** adapted to permit air flow therethrough only from chamber **18** into the pocket. Valve **24** is preferably a flap valve which opens only when the pressure in chamber **18** is higher than that inside the nose pocket, such condition existing during inhalation which creates a vacuum within the nose pocket. When the wearer is exhausting air through the nose, the pressure inside the nose pocket exceeds that in chamber **18** to maintain flap valve **24** closed and prevent the exhaled air from passing into chamber **18**. Such exhaled air passes instead through a pair of apertures **26** in nose pocket **20** which connect to a pair of tubular sections **28**, associated, respectively, with the wearer's nostrils. Tubular sections **28** converge into a single section **29** which communicates with one-way valve **30**. Said one-way valve **30** is preferably a flap valve similar in construction to flap valve **24** and permits one-way passage of the air only from section **29** to the atmosphere as best shown in FIG. **7**. Thus, any air exiting nose pocket **20** is discharged into the atmosphere through flap valve **30** and is not intermingled with the conditioned air inside chamber **18**. A receptacle (not shown) could be provided adjacent valve **30** for accommodating any condensation of the exiting air. As best shown in FIG. **4**, upper section **12** is recessed as at **32** to define a chin pocket for the wearer. Thus it is seen that the only air which can be inhaled is that which passes into nose pocket **20** from chamber **18** through one-way valve **24**. On the other hand, all of the air exhaled passes through sections **28**, and **29** into the atmosphere through one-way flap valve **30**.

Lower section **14** is defined preferably by a pear shaped bowl member **34** detachably secured to upper section **12** as by previously described cooperating threads **16**. The bowl opening **36**, of generally circular shape, is closed by filtering device **38** best shown in FIG. **6**. Air filtering device **38** preferably comprises a lower layer **40** which may be a metal screen and an upper layer **42** which is preferably made of cloth or paper. Chamber **44** defined in bowl **34** contains a body of water **46**. A skirt **48** made of fabric or paper extends from filtering device **38** into body of water **46** for the purpose of maintaining layer **42** in wet condition. Thus layer **42** defines filtering means for the air passing from chamber **44** to chamber **18**, permitting passage of air but removing therefrom impurities normally present therein, such as pollen, smoke particles, toxic gases and the like. The body of water **46** is maintained at a predetermined temperature by means of an immersion heater **50** thermostatically controlled exteriorly of the mask. In this connection, and as best seen in FIG. **5**, immersed wiring **52** extends exteriorly of lower section **14** by means of sealed connector **54**. Lower section **14** is provided with an inwardly extending open ended tubular member **56** which defines air inlet means into chamber **44**. Bowl shaped member **34** is preferably covered with insulation **58** for substantially the entire extent thereof in order to minimize heat transfer from chamber **44** to the outer atmosphere.

The manner in which the therapeutic device **10** is used is as follows. Lower section **14** is provided with the requisite amount of water and while this can be done with section **14** secured to upper section **12**, it is simpler and preferable to provide the water while lower section **14** is detached. In detached condition, lower section **14** is held in position so that inlet tube **56** is substantially vertical with entrance **57** thereof being uppermost. Water can then be poured in through inlet **56** until the level of the water, when section **14** is in said position, is slightly lower than the edge of bowl opening **36**. Lower section **14** can then be threaded on to upper section **12** and the therapeutic device **10** can now be worn by the wearer, as shown in FIG. **1**, by means of a suitable head strap **60**. The immersion heater **50** can then be energized and conventional thermostatic control means are provided so that the water can be maintained at the desired temperature. It will be understood, of course, that the water can be preheated to the desired temperature prior to the placing of the therapeutic device **10** on the wearer, so that it can be used precisely as intended as soon as it is worn.

As the wearer inhales, a vacuum is created within nose pocket **20** opening up flap valve **24** and drawing air from the outer atmosphere into chamber **44** of lower section **14**, through air inlet **56**. The atmosphere within chamber **44** being warm and highly humid, as a result of heated body of water **46**, the air which enters chamber **44** is warmed up to a predetermined desired temperature and is also substantially humidified. Such air then passes through filtering device **38** which captures a substantial amount of the impurities which may be present in the air, such as pollen, smoke particles, toxic gases, and the like. Thus, the air passing into chamber **18** of upper section **12** is heated, humidified, and filtered and such air enters nose section **20** through flap valve **24** where it is inhaled by the wearer. Upon exhalation, the air leaving the nostrils of the wearer cannot re-enter chamber **18** as the pressure within the nose pocket **20** is greater than that of said chamber. Such exhaled air, however, can pass through sections **28** and **29** and out to the atmosphere through one-way valve **30**.

The filtering device **38** needs to remain wet to perform the filtering function in the most efficient manner, and this is the function served by the plurality of wicks **48** which extend from lower layer **42** into the body of heated water **46**. In this connection, it should also be pointed out that filtering device **38**, in addition to capturing the impurities present in the air, also imparts added moisture to the air passing therethrough.

The construction of therapeutic device **10** is such that it can be worn without any difficulty or discomfort in the reclining position as best shown in FIG. **8**. In such reclined condition, it will be noted that the therapeutic device is well supported on the wearer by the head strap **16** as well as by the chin which is in supporting engagement with the plastic casing forming upper section **12**, at chin pocket **32** thereof (see FIG. **4**). In the reclined condition of the wearer, it is clear that the level of the water is sufficiently low as to prevent any accidental passage of water into the nose pocket which might produce choking. The various components within therapeutic device **10** perform in the reclined position of the wearer precisely in the same manner as in the upright position thereof. In this connection it should also be noted that the skirt **48** is sufficiently long and flexible that it can extend into the body of water **46**, in the reclined condition. This could either be accomplished by weighting the bottom edge of the skirt so that gravity will pull it down or by manipulating it into the requisite position. Also, it will be noted that the immersion heater is located off to one side of the bottom surface of lower section **14** so that it is immersed in the reclined condition of therapeutic device **10** as well as in the upright position thereof. For this purpose, wiring **52** has sufficient slack to permit gravity to automatically force the heater in the lowest position, for complete immersion.

The casings forming upper and lower sections **12** and **14** of therapeutic device **10** as well as the components included therein are of low weight materials so that the overall weight of the device is easily kept down to below the level where it might cause discomfort to the wearer, especially in the reclining position.

From the above, it will be seen that the therapeutic device of the present invention accomplishes all of its intended objectives, namely, those of providing heated, humidified and purified air to the wearer with a maximum of comfort, and without any discomfort to others who may be in the vicinity of the wearer. The device can be worn in almost any position with the same amount of comfort and, as a result of its construction, does not expose the wearer to any risks. It will be understood that filtering devices other than those specifically described herein could be used and that additional components for treating the air to be inhaled could be incorporated within the basic framework of the therapeutic device as described. For example, the air could also be medicated either by providing conventional means containing the medication through which the air passes or by incorporating the medication in the water body. Generally, it will be understood that the invention may be embodied otherwise than as herein specifically illustrated or described, and that in the illustrated embodiment certain changes in the details of construction and in the form and arrangement of parts may be made without departing from the underlying idea or principles of this invention within the scope of the appended claims.

I claim:

1. A therapeutic inhaling device comprising:

a. a housing having an upper and lower section secured to each other;

b. said upper and lower sections being hollow and defining, respectively, upper and lower chambers;

c. said upper section having an inwardly extending projection defining a nose pocket exteriorly of said upper section;

d. valve means on said upper section providing unidirectional air flow from said upper chamber to said nose pocket;

e. said lower chamber being adapted to contain a body of water and heating means therefor;

f. air passage means between said lower chamber and the atmosphere;

g. air filtering means disposed between said upper and lower chamber whereby all air entering said lower chamber from the atmosphere through said air passage means passes through said filtering means prior to its entry into said upper chamber from where it passes, through said valve means, into said nose pocket; and

h. said air filtering means comprising a layer of impregnable material maintained in wet condition by wick means extending from said layer into said body of water.

2. A therapeutic device in accordance with claim **1**, wherein said upper and lower sections are detachable.

3. A therapeutic device in accordance with claim **2**, wherein there is provided air passage means between said nose pocket and the atmosphere, including unidirectional valve means, for exiting the exhaled air from said nose pocket.

4. A therapeutic device in accordance with claim **1**, wherein strap means are provided for secure attachment of said device to a wearer in an upright position and in reclining position.

5. A therapeutic device in accordance with claim **4**, wherein said lower section is a pear shaped bowl and said upper section is cylindrically shaped, with said upper section being narrower in cross-section than said lower section, whereby the water contained in said lower section, when said device is worn in reclined position, is below the level at which it can flow into said upper section.

6. A therapeutic device in accordance with claim **5**, wherein there is provided air passage means between said nose pocket and the atmosphere, including unidirectional valve means, for exiting the exhaled air from said nose pocket.

7. A therapeutic device in accordance with claim **1**, wherein said heating means is adjustable exteriorly of said device for controlling the temperature of said body of water.

8. A therapeutic device in accordance with claim 7, wherein strap means are provided for secure attachment of said device to a wearer in an upright position and in reclining position, and wherein said lower section is a pear shaped bowl and said upper section is cylindrically shaped, with said upper section being narrower in cross-section than said lower section, whereby the water contained in said lower section, when said device is worn in reclined position, is below the level at which it can flow into said upper section.