Sept. 13, 1966 J. P. CARLOS ETAL 3,272,964

FABRIC STEAMER

Filed June 15, 1964 2 Sheets-Sheet 1

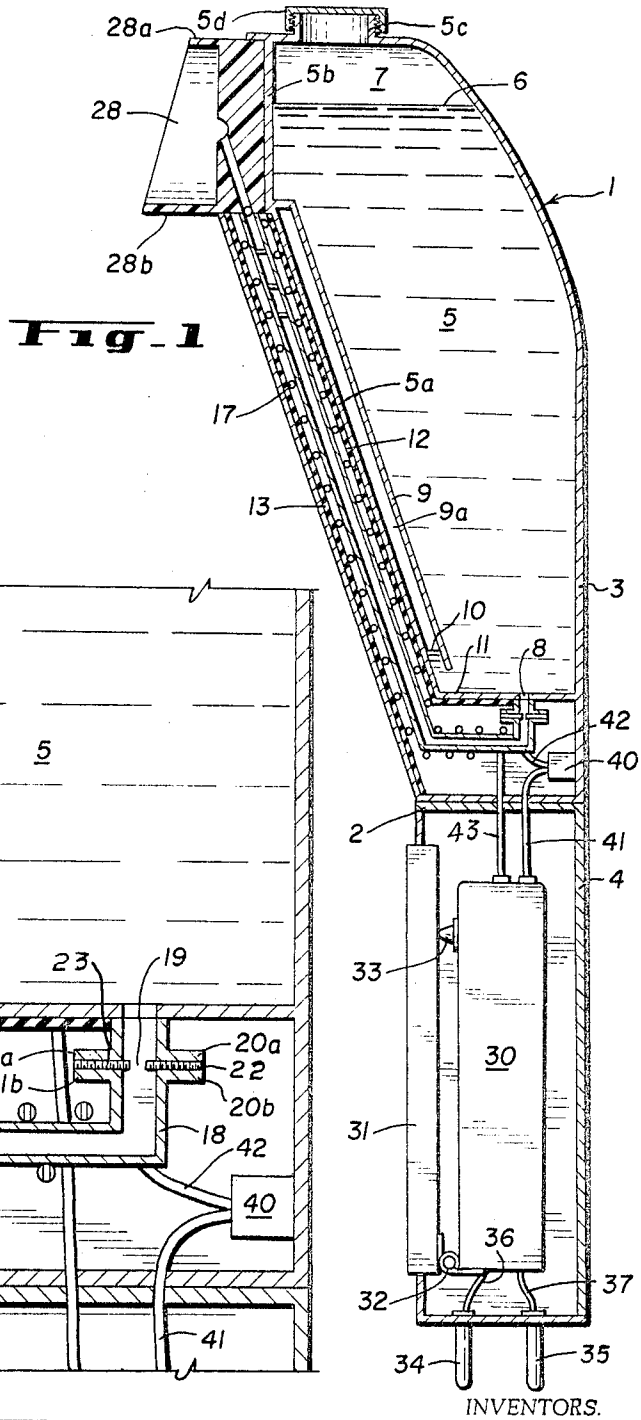


Fig_1

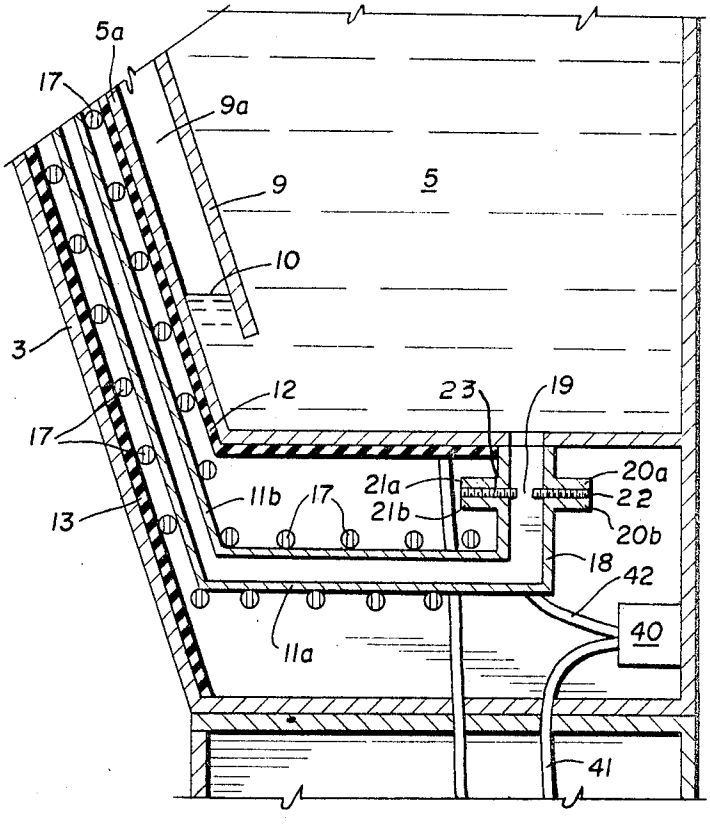


Fig_2

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Filed June 15, 1964 2 Sheets-Sheet 2

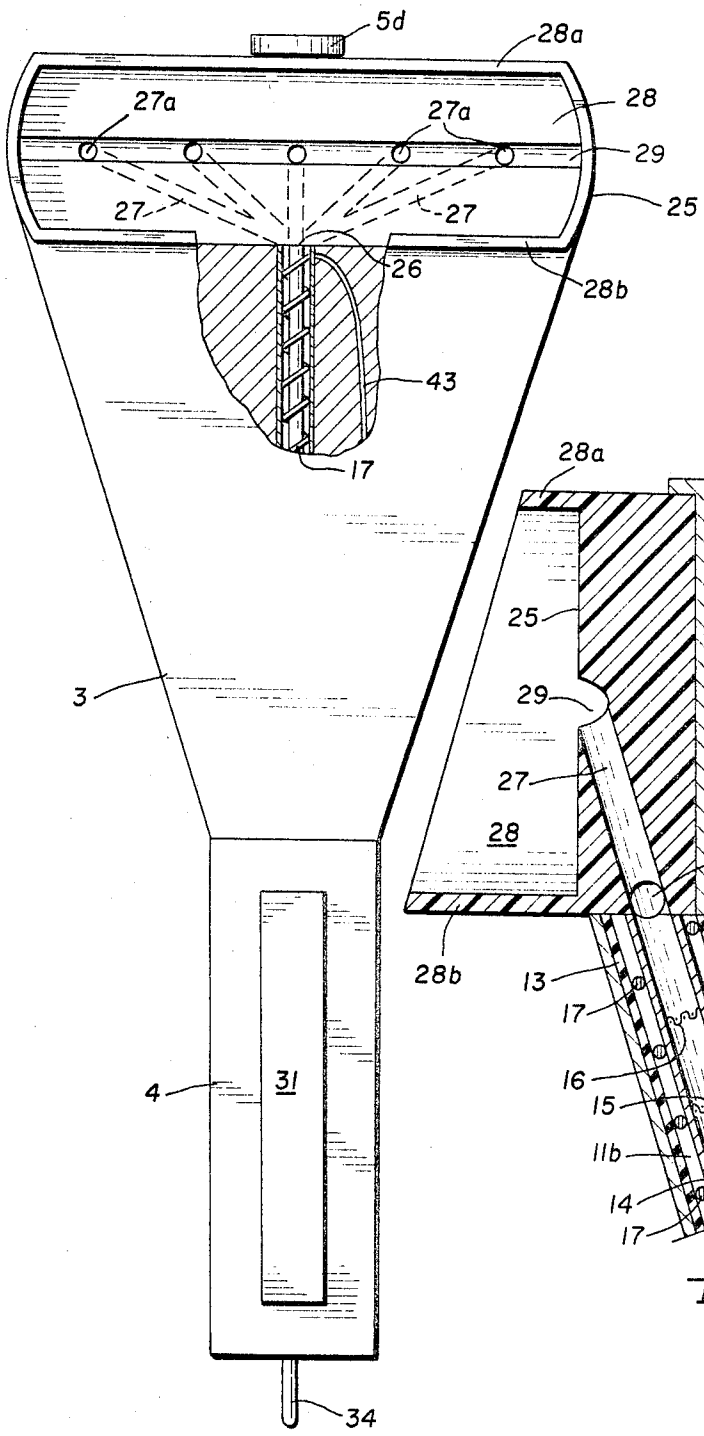


Fig_3

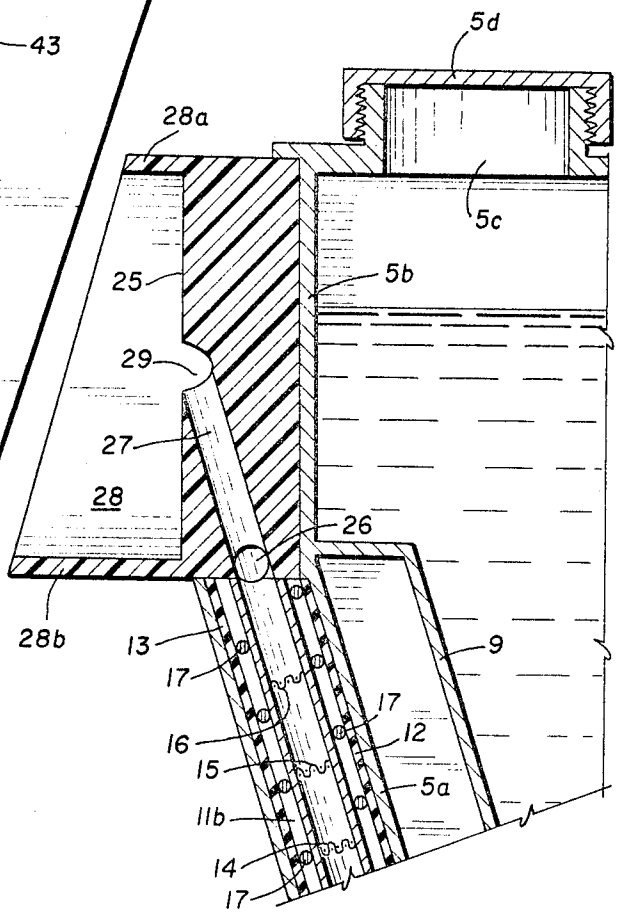


Fig_4

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3,272,964

FABRIC STEAMER

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This invention relates generally to fabric steamers and more particularly to a novel portable hand-held clothing steamer.

In commercial sales and home usage of clothing for the improvement of clothing appearance, there is need for a steamer which is fast and thorough in operation, easy and safe to manipulate, and can be conveniently moved from place to place. Prior art portable clothing steamers have not proved entirely satisfactory.

Accordingly, the object of this invention is to provide a novel portable clothing steamer which will uniformly disperse in a spreading pattern a continuous quantity of relatively dry steam.

Another obpect of this invention is to provide a hand-held portable steamer which is simple and durable in construction and can be operated with relative ease.

Another object of this invention is to provide a portable steamer including safety features so the steam chamber is heating only when the operator is holding the steamer and when the reservoir contains water.

A further object of this invention is to provide a novel portable hand-held clothing steamer having smooth material contacting surfaces and of novel shaping to facilitate ease in moving the steamer over the clothing.

Other objects reside in novel details of construction and novel combinations and arrangements of parts, all of which will be set forth in the course of the following description.

The practice of this invention will be described with reference to the accompanying drawings, in the several views of which like parts bear similar reference numerals.

In the drawings:

FIG. 1 is a side elevation view in section of a preferred embodiment of the portable steamer according to this invention;

FIG. 2 is an enlarged fragmentary sectional view of FIG. 1 showing in more detail the restricted orifice for controlling water flow from the reservoir to the heating passage;

FIG. 3 is a front elevation view partially in section of the same embodiment as shown in FIG. 1;

FIG. 4 is an enlarged fragmentary sectional view of FIG. 1 showing in more detail the cooperation between the nozzle, manifold and heating passage.

Referring to FIGS. 1 and 2, the clothing or fabric steamer is illustrated as comprising a housing generally indicated by numeral **1** divided by a partition **2** into upper and lower compartments **3** and **4**, respectively. A reservoir **5** is enclosed within the upper compartment **3** with one wall of the upper compartment forming a wall of the reservoir **5**. The other wall of the reservoir inclines upwardly in an inclined portion **5***a* and has a vertical portion **5***b*. The top of the reservoir **5** has an inlet **5***c* with a threaded portion extending outwardly for receiving a threaded cap **5***d* which encloses the reservoir **5**. A quantity of water is supplied to the reservoir through the inlet **5***c* to establish a liquid level **6** with an air column **7** extending above that level. An opening **8** extends through the bottom of the reservoir for gravity flow of the water therethrough. An inverted tubular member **9** closed at the top and open at the bottom extends along the inclined side **5***a* of the reservoir with the inclined side **5***a* included as one side of the tubular member **9**. This tubular member **9** forms another air column or air trap **9***a* within the reservoir and establishes a water level **10**

substantially below the water level **6** of the main body of reservoir water. This air trap **9***a* assists in the gravity flow of the water through the opening **8** in the bottom of the reservoir.

A heating passage **11** extends through the upper compartment **3** and converts the water passing into the passage **11** from the reservoir **5** to steam. Passage **11** has a horizontal portion **11***a* (FIG. 2) extending below the reservoir and an inclined portion **11***b* extending substantially parallel to the inclined side **5***a* and inclined tubular member **9** of the reservoir **5**.

Insulating layers **12** and **13** enclose heating passage **11** to contain heat generated therein. Layer **12** extends between passage **11** and the reservoir inclined side **5***a*. Layer **13** extends between passage **11** and compartment **3**, partition **2**. One or a plurality of screens, here shown as screens **14**, **15**, **16**, preferably of a fine wire mesh, are spaced at selected intervals in the upper part of the passage of inclined portion **11***b* to retain droplets of water. Suitable heating means are provided for heating passage **11**. We prefer to use a resistance-type heating coil **17** wound around passage **11** extending the entire length thereof and being surrounded by insulating layers **12** and **13**.

Between the reservoir opening **8** in the bottom of reservoir **5** and one end of horizontal portion **11***a* there extends a conduit portion **18** defining a restricted opening or restricted orifice **19** for controlling the flow of water from the reservoir to the heating passage **11**. In a preferred arrangement, restricted orifice **19** comprises a pair of upper and a pair of lower horizontal flange portions **20***a*, **21***a*, **20***b* and **21***b*, respectively, flaring centrally of conduit portion **18**. Flange portions **20***a* and **20***b* hold a plate **22** in force fitting relation and similarly flange portions **21***a* and **21***b* hold a plate **23**. Plates **22** and **23** extend horizontally toward the center of conduit portion **18** to define a restricted opening **19** hereinafter referred to as the orifice. Orifice **19** is a relatively small opening which will allow very little liquid to drain into the passage prior to heating and which will keep the water accumulation in the passage to a minimum so as to disperse a relatively dry steam onto the clothing.

Referring particularly to FIGS. 3 and 4, the front view of upper compartment **3** is shown to be preferably funnel-shaped and extends to a manifold member generally designated by numeral **25** which protrudes from an upper portion of upper compartment **3**. Manifold member **25** includes a conductive portion inclusive of an input branch **26** extending from the passage inclined portion **11***b* and plural output branches **27**. Plural output branches **27** terminate in plural outlets **27***a* which extend along a line transverse to insulated passage **11** to disperse steam released therefrom.

A nozzle portion **28** surrounds the outlets **27***a* for directing the steam discharge in a spreading pattern to a surface area of clothing over which the steamer is moved. Nozzle portion **28** is shaped with an upper extension **28***a* and lower extension **28***b* extending outwardly above and below the outlets **27***a*, respectively, with curved side portions to define a substantially rectangular shaped nozzle. A cavity portion **29** extends along the outlets the width of nozzle **28**. Upper extension **28***a* extends outwardly from the outlets a lesser extent than lower extension **28***b* with lower extension **28***b* suitable for contacting the clothing to remove wrinkles if desired. In addition, nozzle portion **28** is shaped so the depth, dimension or distance from the outlets **27***a* along the extension **28***a* or **28***b* is substantially less than the width or dimension of the nozzle or the nozzle distance measured along the line transverse to passage **11** referred to hereinabove. By way of comparison, the total distance between outlets **27***a* is also substantially greater than the length of noz-

zle extension 28*a* or 28*b*. By having this substantial spacing between outlets 27*a* and their enclosure by the nozzle portion 28 as above described, it is possible to produce a very satisfactory dispersion of the steam generated in the heated passage 11. This produces a uniform steaming action on the clothing treated.

The edges of nozzle 28 which contact the clothing are substantially smooth to freely move over the clothing surface. We prefer the nozzle to be made from a lightweight material, such as a plastic like Teflon, which will freely move over the contacting surfaces without snagging. If desired, the nozzle portion 28 and manifold member 25 can be formed of a plastic material and suitably attached to the upper compartment 3 as illustrated. However, it is clear that nozzle portion 28 and manifold member 25 could easily be formed as an integral part of compartment 3 using the same material therefor.

The lower compartment 4 is shaped for hand clasping by the operator of the portable steamer. We prefer a generally cylindrical shaped lower compartment 4. Within lower compartment 4 there is mounted a switch 30 to be actuated by a squeezing action of the operator to control the electrical power to the heating coil 17. Switch 30 includes a squeeze-type trigger or handle 31 extending through a side of lower compartment 4 and pivotally mounted by a hinge 32. Depression of handle 31 depresses a pin 33 on switch 30 which will connect the electrical power to the heating coil through switch 30. Upon release of handle 31, the electrical power will be removed thereby requiring a depressing or squeezing of handle 31 for operation of the steamer. This type of switch avoids any problem of having the passage 11 heating when the steamer is not being used.

A pair of electrical terminals 34 and 35 is mounted at the lower end of lower compartment 4 for connection to a standard electrical power supply. Electrical inlet leads 36 and 37 extend from electrical terminals 34 and 35, respectively, to the inlet terminals of switch 30.

A protective device 40 in the nature of a thermocouple or the like is mounted on the vertical wall of upper compartment 3 below reservoir 5 and electrically connected between switch 30 and heating coil 17. An electrical lead wire 41 extends from the outlet side of switch 30 to protective device 40 and a lead wire 42 extends from the protective device 40 to one end of heating coil 17. Another electrical lead wire 43 is connected from the other outlet of switch 30 to the opposite end of heating coil 17 at the upper end of passage 11. When the water in reservoir 6 is exhausted, the temperature of upper compartment 3 will increase significantly actuating thermocouple 40 which disconnects the electrical power from the heating coil, thereby preventing further heating of the device.

The capacity of the steamer may vary, but we prefer the reservoir capacity to be about the equivalent of one cup of water which will provide continuous steam for approximately twenty minutes.

While we have described the invention as particularly suitable for clothing, it is distinctly understood that this invention is equally suitable for steaming rugs, fabrics and the like. It is apparent that various modifications in material and shape may be made in the invention without departing from the spirit and scope thereof. It is distinctly understood that the invention is not limited to the above described embodiment, but that modifications may be made within the scope of the invention and such variations as are covered by the scope of the appended claims.

We claim:

1. A portable fabric steamer comprising a housing, an enclosed reservoir within the housing for containing a column of water having an air column portion for assisting flow of the water through a bottom opening in the reservoir by gravity flow, a passage extending from the bottom opening of the reservoir to a point of discharge in a wall of the housing for converting water to steam, at least one layer of heat insulation between the passage and the adjoining housing surfaces and between the passage and the reservoir, an orifice between the opening of the reservoir and the passage for controlling the flow of water from the reservoir to the passage, heating means disposed adjacent and in heat exchange relation with the passage for heating the passage, a manifold member disposed on the housing having a fluid conductive portion inclusive of an input branch extending from the insulated passage and plural output branches having outlets at intervals along a plane transverse to the insulated passage to disperse the steam released from the passage, and a nozzle portion enclosing the output branches adapted to direct the steam discharge in a spreading pattern to a surface area of a fabric over which the steamer is moved.

2. A portable fabric steamer as set forth in claim 1 wherein said passage includes a horizontal portion with said orifice disposed between the bottom opening and one end of the horizontal portion and an inclined portion extending upwardly from the other end of said horizontal portion in adjacent relationship to said reservoir and terminating below the upper extent of the reservoir.

3. A portable hand-held fabric steamer comprising a housing divided by a partition means into upper and lower compartments, an enclosed reservoir within the upper compartment for containing a column of water and air with a bottom opening in the reservoir for gravity flow of the water from the reservoir, a passage within the upper compartment extending from the bottom opening of the reservoir to a point of discharge in a wall of the upper compartment for converting water to steam, at least one layer of heat insulation between the passage and the adjoining surfaces of the housing and between the passage and the reservoir, an orifice between the bottom opening of the reservoir and the insulated passage for controlling the flow of water from the reservoir into the passage, a tubular member closed at the top and open at the bottom within the reservoir forming an air trap for assisting the gravity flow of the reservoir water into the passage, electrical heating means disposed adjacent and in heat exchange relation with the passage for heating said passage, a manifold member having a fluid conductive portion inclusive of an input branch extending from the other end of the passage and plural output branches having outlets at intervals along a plane transverse to the insulated passage to disperse steam released therefrom, a nozzle portion enclosing the outlets for directing the steam discharge in a spreading pattern to a surface area of a fabric cover over which the steamer is moved, and an electrical switch mounted within the lower compartment to control electrical power to the heating means.

4. A portable hand-held fabric steamer as set forth in claim 3 wherein a protective means is mounted within the upper compartment and electrically connected between an electric switch in the lower compartment and the electrical heating means for cutting off the electrical power to the electrical heating means when the water in the reservoir is exhausted.

5. A portable hand-held fabric steamer as set forth in claim 3 wherein said passage includes a horizontal portion with said orifice disposed between the bottom opening of the reservoir and one end of the horizontal portion and an inclined portion extending upwardly from the other end of the horizontal portion, and said tubular member extends substantially parallel to the inclined portion of the passage.

6. A portable hand-held fabric steamer as set forth in claim 3 wherein said nozzle portion is shaped so that the distance from each outlet to an article of fabric being steamed is substantially less than the total spacing between the outlets.

7. A portable hand-held steamer as set forth in claim 3 wherein said electrical heating means includes a heating coil wrapped around said passage substantially

throughout its lengthwise extent and said coil is substantially disposed within said heat insulating layers.

8. A portable hand-held steamer as set forth in claim 3 wherein screens are positioned in an upper portion of the passage to retain droplets of water in the passage.

9. A portable hand-held fabric steamer comprising a housing divided by a partition means into upper and lower compartments with the lower compartment shaped for hand clasping, an enclosed reservoir within the upper compartment for containing a column of water and air with an opening in the bottom of the reservoir for gravity flow of the water from the reservoir, a passage within the upper compartment extending from the bottom opening of the reservoir and having a horizontal and an inclined portion extending to a point of discharge in a wall of the upper compartment for converting water to steam, at least one layer of heat insulation between the passage and the adjoining surfaces of the housing and between the passage and the reservoir, an orifice disposed between the bottom opening of the reservoir and one end of the horizontal portion of the insulated passage for controlling the flow of water from the reservoir to the passage, a tubular member closed at the top and open at the bottom within the reservoir extending substantially parallel to the inclined portion of the passage and forming an air trap for assisting the gravity flow of the reservoir water into the passage, an electrical heating coil wrapped around the passage in heat exchange relation with the passage for heating said passage, a manifold member having a conductive portion inclusive of an input branch extending from the inclined portion of the passage and plural output branches having outlets at intervals along a plane

transverse to the insulated passage to disperse steam released therefrom, a nozzle portion enclosing the outlets having smooth material-contacting surfaces, the nozzle portion shaped so that the distance from each outlet to the contacting edge of the nozzle is substantially less than the total spacing between the outlets, a lower side extending beyond the outlet a greater distance than an upper side for directing the steam discharge in a spread pattern to a surface area of a fabric over which the steamer is moved, an electrical switch mounted within the lower compartment having a pivotal handle portion extending through one side of the lower compartment to connect electrical power to the heating coil upon depression of the handle and to disconnect electrical power upon release of the handle, and a protective means mounted within the upper compartment electrically connected between said switch and said heating coil for cutting off the electrical power when the water in the reservoir has been exhausted.

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