July 30, 1957 M. P. REHORN 2,800,891

PERSONAL HEATING SYSTEM

Filed March 2, 1953 2 Sheets-Sheet 1

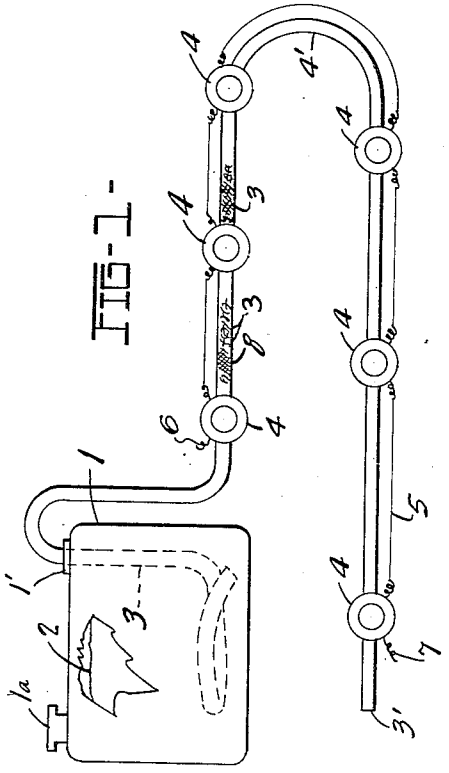


FIG-1-

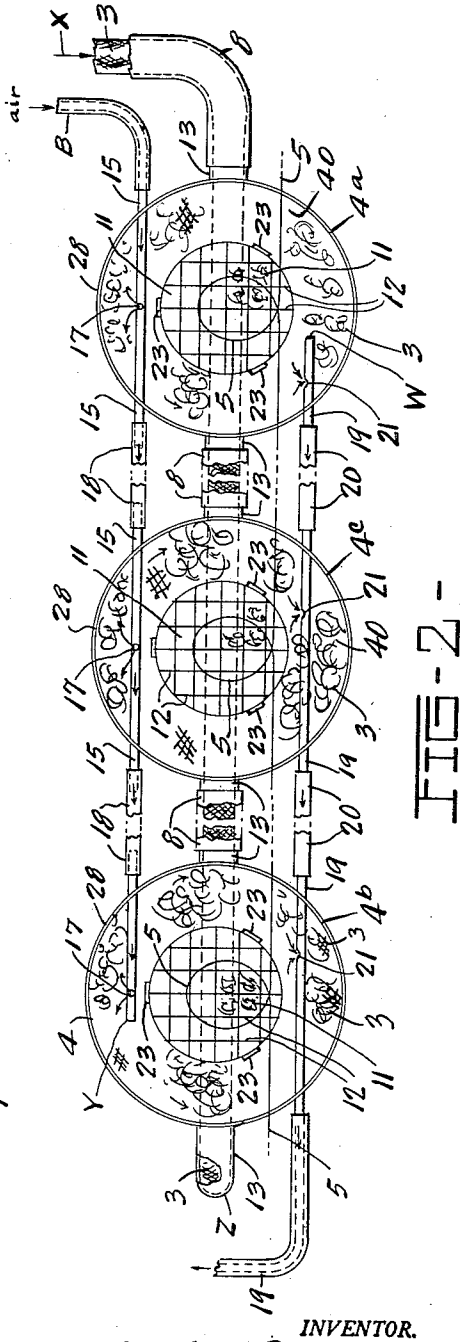


FIG-2-

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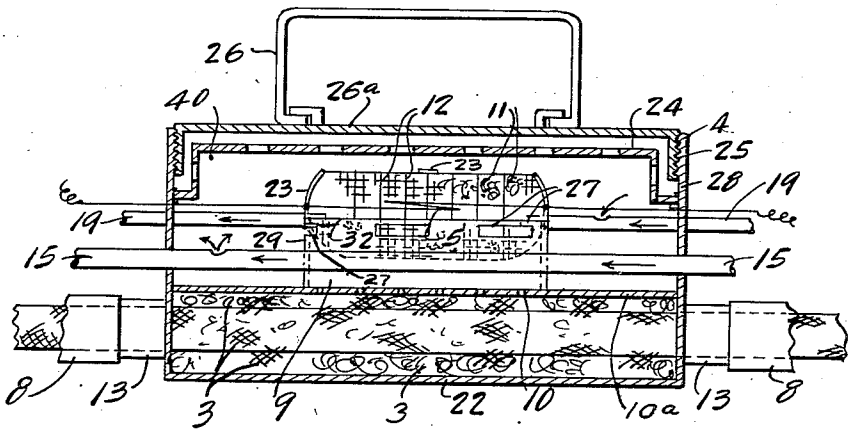


FIG-3-

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United States Patent Office

2,800,891

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PERSONAL HEATING SYSTEM

Miles P. Rehorn, Apple Creek, Ohio

Application March 2, 1953, Serial No. 339,567

3 Claims. (Cl. 126—208)

This invention pertains generally to heating systems, and in particular to a heating system which may be worn or carried on the person.

The principal object of this invention is to provide a convenient, practical and inexpensive means of keeping a person warm in sub-zero weather while he is engaged in outdoor activity or sleeping out of doors.

A further object of the invention is to provide a unique, convenient and practical means of igniting or starting such a heating system, and a means of regulating the heat as the temperature rises or falls or as the individual becomes more or less active.

A further object of the invention is to provide such a heating system as that defined above which will operate under water without damage to the system.

Other objects of the invention will be evident in the disclosures of the following specifications.

Referring to the figures of the accompanying drawings:

Fig. 1 is a schematic representation of one form of the invention which incorporates the use of a fuel tank or pouch, a continuous wick, and occasional burners, all of which together operate according to the principles of the invention.

Figs. 2 and 3 show details of the form of the invention depicted in Fig. 1.

There is a well-known principle of physics and chemistry which the present invention makes use of: When vapor from gasoline, alcohol or other similar vaporizing fuel is caused to pass from a container through an opening, thence through a deposit of platinum asbestos, carbon, pumice stone or other platinumized material, the platinumized material combined with the said vapor is capable of being made to glow and give off heat until all of the fuel has been used up. Heat is generated by catalysis. The amount of heat may be lessened by decreasing the amount of air reaching the burners or increased by increasing the flow of air.

Referring to Fig. 1, a fuel tank or pouch **1** contains a liquid evaporating fuel **2**. Beginning inside the fuel tank (at the bottom) or pouch is a wick **3** which passes through a fuel tight hole **1'** in the top of the tank **1**, and is extended to any desired length. The tank or pouch **1** may be worn on the back, shoulder, side, or chest of the person. The wick **3** is contained within a tube or casing **8** of flexible material, except in and near the burners. Said material must be fuel-proof, water-proof and air-tight. A heavy flexible plastic such as that of which plastic clothes lines are made or that of which fuel lines for model airplanes are made, may be used. Connected to the casing **8** at intervals therealong are burners **4**. Each burner contains a deposit of platinum asbestos which is separated from the wick by a narrow air space. Just below the air space and separating it from the wick is a perforated plate which permits the fuel vapor to pass to the burner and at the same time keeps the wet wick separated from the platinumized asbestos. Running through the burners and in direct contact with the platinum asbestos is a wire **5** of the type which is used in electric heaters (for example Nichrome wire) which may be quickly heated red hot by the application of electric current. The wire, except the portions which pass through the burners, is non-resistant and should be covered with asbestos or other heat-resistant material.

This continuous wick, with its plurality of burners, may be wound back and forth throughout the clothing and stitched in or otherwise fastened to the inside of the clothing, thus distributing the burners over the different areas of the body. When it is desired to light up the burners, all of them may be ignited at the same time by connecting the terminals **6** and **7** of the wire **5** to the positive and negative poles of a small storage battery or other electrical output until the sections of the wire **5** which are in contact with the burners **4** burn hot for a very short length of time. One quarter of a minute should be sufficient to ignite the burners. (This may be done either before or after the clothing is put on.) Fuel may be put into the tank through the capped opening **1***a*. The exact amount of fuel required to run the burners for a given period of time may be determined by calculation, and will depend upon the number of burners, size of wick, size of burners, and the amount of oxygen which is supplied to the burners. Twenty four hours of heat from all of the burners without refueling is a conservative possibility. It is believed that actual use will prove possible a much longer duration of heat. The tank or pouch may be refueled with safety while the burners are still on, provided caution is taken not to run the tank over.

Figs. 2 and 3 show details of the burners and their connections to the plastic material containing the wick. Fig. 2 shows a plan view of three representative burners of the system and their relationship to the wick, also air and waste tubes. The three burners shown are the first **4***a*, the last **4***b*, and an intermediate burner **4***c*, of the system. In this figure the burners are shown comparatively large, for example about four times the preferred size. However the invention is not limited to any particular size of burner.

In Fig. 2 the wick **3** is shown contained within the plastic covering **8**. This covering **8** is shown on each side of each burner and is shown broken (with the wick) between the burners. This covering **8** is attached on each side of each burner, to a metal pipe **13** which protrudes from the burners and through which the wick **3** also passes underneath the burner. The direction of the fuel flow in the wick is indicated by the arrows, the wick, as shown, ending at the point Z. The large mesh wire screens **12** (circular in shape like the burners) contain the platinumized asbestos **11** through which the Nichrome wire **5** passes, as shown. The tube **15**, through which air is supplied to the burners for heat regulation, like the wick tube **13**, passes through the outer cylindrical walls **28** of the burners **4***a*—**4***c*, terminating in the burner **4***b* at the point Y. Tiny holes **17** permit air flow to all parts of the air space **40** surrounding the burner element **11** and **12**. The tube **15** comprises metal sections in the vicinity of the burner connected to plastic tube sections **18** between burners and a plastic end section B which extends to the air source. Similarly the waste tube **19** and **20** for removing CO_2 gas and other impurities from the burners begins at the point W in burner **4***a* and continues through all burners, passing ultimately to some point outside of the clothing for removal of waste and moisture from the burners. Air from tube **15** and **18**, after passing through holes **17** and surrounding the burner, is forced through the air and water-tight burner into the holes **21** in the tube **19** and **20**. It is assumed here that the system is to operate under water in an emergency. However if the system is not required to be operable under water, then waste tube **19** and **20** may be eliminated. And if

only mild heat intensity is required, air tube **15** and **18** may be eliminated. In either of the latter cases, the burners are left open (uncapped).

Fig. 3 is a cross sectional view of a typical burner of the type shown in Fig. 2 disclosing details not shown in that figure. This burner, as shown, is water-tight. In a system not required to be operable under water, the water-tight screw cap **26***a* will be omitted. For under-water use, however, the cap **26***a* with handle **26**, by means of threads **25**, screws into the upper part of the outer burner wall **28**, making the burner water-tight. For out of water use, the cap **26***a* is removed and the circular perforated plate **24**, which is pressed into position inside the cylindrical wall **28**, permits air to circuate to the burner, while preventing contacts that might damage the burner element **11** and **12**. The air supply tube **15** passes through the burner in a plane somewhat below the burner element **11** and **12** in order to prevent the air from blowing directly on said element, while waste tube **19** is shown in a plane above (for clarity) that of the air tube **15**, but not necessarily so. The inner cylindrical wall **29** of the burner is connected to the circular plate **10***a*, forming an air-tight space **40** around the burner element **11** and **12**. This wall **29** extends upwardly half way up the burner element **11** and **12** (allowing proper air circulation); also near the top of the wall **29** are slits **27** for allowing air to reach the lower part of the burner element **11** and **12**. The burner element **11** and **12** being circular and watch-shaped with rounded edges, and of approximately the same circumferences as the cylindrical wall **29**, rests within/upon the top of the wall **29**. Flat spring strips **23** press against the burner element **11** and **12**, holding it in place. The wick **3** in the area beneath the burner broadens out into a circular shape in order to fully cover the under side of the burner element **11** and **12** (see Fig. 2). Separating the wick **3** from the air space **9** is the circular perforated metal plate **10** through which the vapor from the fuel in wick passes, and over which and above the air space is a deposite of platinumized asbestos **11** covered by the large mesh screen wire **12**. The Nichrome wire **5** for igniting the burner is shown passing through or next to the platinumized asbestos. The Nichrome wire **5** is insulated at points where it enters the outer wall **28** and the burner element **11** and **12**. This prevents unnecessary drag on the current from the electrical source. The cylindrical wall **28** connects to the circular bottom **22**, making the lower compartment of the burner externally air and water tight.

If it is desired to apply this form of the invention to the shoes of the individual, it is only necessary to extend the wick with its burners around the shoe and attach to shoe by means of suitable clips; or a small separate fuel tank or pouch may be attached to the rear of the heel of the shoe (or to the top of the shoe) with the wick and burners extended around the shoe, thus forming an independent unit from the clothing.

A flap **2***b* may be placed on the outside of the clothing over each burner, making it accessible for extinguishing or water proofing. Burners are extinguished by putting the screw cap **26***a* in place (Fig. 3) and cutting off the air supply to the burners. Burners are made water proof by putting the screw cap **26***a* in place and may be caused to keep on operating by continuing to supply air to the burners.

In all applications of the system, it will be necessary to connect the Nichrome wire **5** in circuit with a small storage battery for ignition (unless other electrical source such as the battery of an automobile or jeep is available).

Other materials than those suggested for various parts of the invention in any of its forms may be used without departing from its scope since these are disclosed merely by way of example.

Also other shapes and sizes may be given to the burners disclosed above. This is true also of the pouches for containing the fuel, such for example as having the fuel pouch to cover the entire area of the clothing instead of being ribbon like and merely distributed through the clothing. Any modification of this part may be resorted to without departing from the scope of the invention.

I claim:

1. In a personal heating system, the combination of a plurality of independently disposed serially connected burner elements for placement about the person to supply heat thereto, each of said burner elements comprising a deposit of non-inflammable porous catalytic material, a closed fuel container adapted to receive a supply of liquid evaporating fuel and provided with a wick which wick is connected serially to each of said burner elements, a flexible non-porous tube between said fuel container and the first of said burner elements and between each of the burner elements following said first burner element and adapted to encase said wick, an air conductor adapted to be connected to a source of air and serially to said burner elements, said air conductor being flexible and non-porous between said air source and the first of said burner elements and between each of the burner elements following said first burner element and adapted to permit air to feed into each of said burner elements in the region of said burner element only for regulating and supporting combustion of said fuel in each of said burners when said burners are supplied with said liquid evaporating fuel from said fuel container by means of said wick, an electrical circuit in contact only with each of said deposits of porous catalytic material and operatively associated with a source of electrical energy for placement on the person and supplying, when required, said electrical circuit with electrical energy by closing said circuit for providing heat by electrical resistance to the points of contact of said liquid evaporating fuel with the said deposits of porous catalytic material, for the purpose of starting the generation of heat simultaneously at all of the said points of contact.

2. The combination set forth in claim 1 wherein said deposits of catalytic material are platinumized material, the generation of heat being produced by the catalytic action resulting from the mixture of said vaporized fuel with said platinumized material.

3. The combination set forth in claim 1 including means for rendering said burner elements water tight, and additional means for removing moisture and impurities from said burner elements while the generation of heat is in progress.

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