

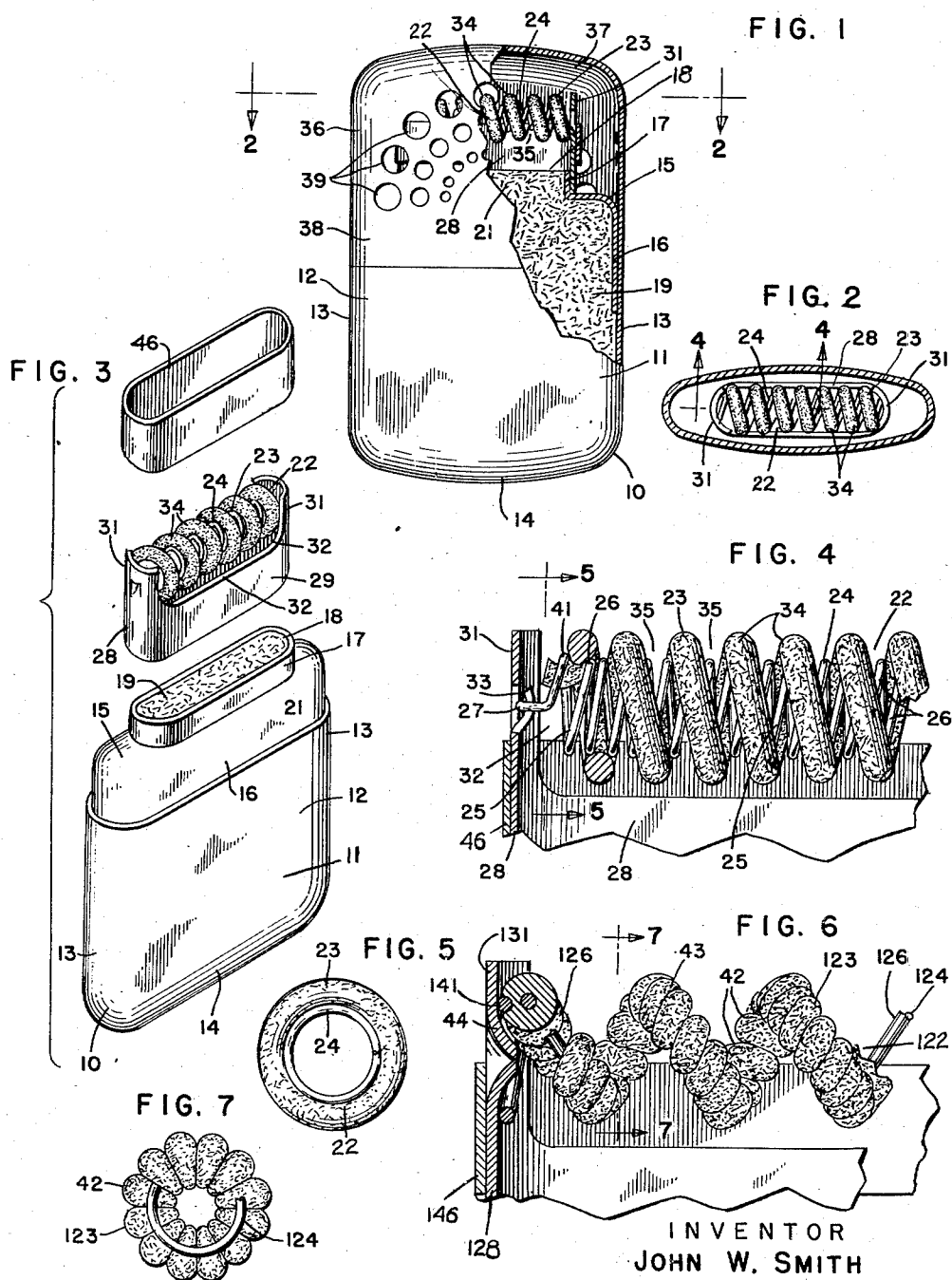
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HAND WARMER

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HAND WARMER

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My invention relates to hand warmers and has for an object to provide a warmer adapted to produce heat at a moderate temperature.

Another object of the invention resides in providing a warmer in which the amount of heat produced may be readily controlled.

A still further object of the invention resides in providing a warmer which is easy to start and which will continue to function without interruption.

A still further object of the invention resides in providing a hand warmer having a receptacle for a liquid fuel and in employing a burner utilizing a flexible fibrous combustion member containing a catalytic agent and disposed in the path of the fumes emanating from the fuel in said receptacle.

An object of the invention resides in providing the burner with a core and in winding the combustion member upon said core.

A feature of the invention resides in constructing the core helical in form with the convolutions thereof spaced from one another.

An object of the invention resides in winding the combustion element upon the exterior of the convolutions of the core and in a manner to cause the convolutions of the combustion element to cross the convolutions of the core.

A still further object of the invention resides in winding the combustion element in one form of the invention directly about the convolutions of the core and in a manner so that the core is completely or partly covered.

Another object of the invention resides in attaching the ends of the combustion element to the core by pinching the same in between certain of the convolutions of the core at the ends of the same.

An object of the invention resides in providing the receptacle with a neck having an outlet therein and through which the fumes from the liquid fuel emanate.

A feature of the invention resides in providing the burner with a tubular housing adapted to fit over said neck and to detachably hold the burner mounted on the receptacle.

An object of the invention resides in providing said housing with an opening to permit of entry of air to said combustion element and to further provide a sleeve slidable along said housing for regulating the area of said opening.

Other objects of the invention reside in the novel combination and arrangement of parts and in the details of construction hereinafter illustrated and/or described.

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In the drawings:

Fig. 1 is a front elevational view of a hand warmer illustrating an embodiment of my invention with a portion thereof broken away.

Fig. 2 is a cross sectional view taken on line 2-2 of Fig. 1.

Fig. 3 is a perspective view of the parts of the invention detached from one another.

Fig. 4 is an enlarged elevational sectional view of a portion of the burner taken on line 4-4 of Fig. 2.

Fig. 5 is a cross sectional view taken on line 5-5 of Fig. 4.

Fig. 6 is a view similar to Fig. 4 of a modification of the invention.

Fig. 7 is a cross sectional view similar to Fig. 5 taken on line 7-7 of Fig. 6.

The instant invention comprises a receptacle 10 for liquid fuel which consists of a body 11 stamped from sheet metal and formed with sides 12, ends 13 and a bottom 14. The upper end of the body 11 is open and has attached to it a top 15 which has a flange 16 of the same configuration as the body 11 but slightly smaller in dimensions and which is pressed into the upper end of the body 11 to frictionally hold the parts attached to one another. The top 15 has formed on it a neck 17 which has an opening 18 in the same serving as an outlet for the fumes of the liquid fuel contained within the receptacle 10. The interior of the receptacle 10 is filled with absorbent such as cotton which is indicated at 19 and which holds the liquid fuel introduced into the receptacle 10 through the opening 18. The said absorbent prevents the fuel from spilling and causes the same to travel by capillary attraction to the portion 21 of the same where the fumes from the liquid fuel travel outwardly from the outlet 18 in neck 17.

The invention includes a burner 22 which consists of an elongated flexible combustion member or element 23 which is constructed of asbestos or some other similar fibrous material. This combustion member or element is provided with a catalytic agent which is incorporated therein in the following manner. The asbestos is immersed in a 5 to 10% solution of platink chlorid or palladium chlorid. After saturation the asbestos is heated to a temperature of about 1200° Fahrenheit which evaporates the water and converts the residue into a substance ordinarily known as platinum black or palladium black. This substance serves as a catalytic agent which aids in oxidation of the fumes from the liquid fuel and causes combustion at a relatively slow rate.

The combustion member or element 23 is mounted upon a core or support 24. Core 24 is constructed of wire which is coiled to form a helix 25 having spaced convolutions 26. The ends of the helix 25 are formed with hooks 27 and by means of which the core or support is supported. Core 24 is attached to a housing or frame 28. The housing 28 is tubular in form having a tubular skirt 29 which fits over and frictionally engages the neck 17 of top 15 to hold the burner detachably secured to the receptacle 10. The housing or frame 28 is formed with arms 31 at the ends of the same and which extend upwardly therefrom. These arms are spaced from one another to provide openings 32 in the housing 28 and which serve to admit air to the combustion member or element. For the purpose of attaching the core or support 24 to the housing 28, lugs 33 are struck out of the metal of the arms 31 and bent inwardly into the interior of the housing. The hooks 27 on the ends of the core or support 24 are hooked over these lugs and the core thus supported. The combustion member or element 23 is wound upon the exterior of the convolutions 26 of core or support 24. If the helix 25 is a right hand helix, the convolutions are wound in a manner to form a left hand helix whereby convolutions 34 are formed on the combustion member or element 23 and which cross the convolution 26. The convolutions 34 are also spaced from one another to provide passageways 35 therebetween and through which air may circulate about the said convolutions. The ends of the combustion member or element 23 are held attached to the core or support 24 by pinching the same between the end convolution 41 of the core 24 and the adjoining convolution 26.

For controlling the rate of combustion, a sleeve 46 is employed which is of the same shape as the housing 28 and which encircles the same. This sleeve fits snugly about said housing and may be slid longitudinally with respect to the same. The said sleeve serves to increase or decrease the size of the openings 32 and thus serves as a damper for controlling the air admitted to the combustion element. The burner 22 and associated parts are enclosed by means of a cap 36 which is of similar construction to the body 11 of receptacle 10. This cap snugly fits over the protruding portion of the flange 16 of top 15 and frictionally engages said flange to hold the cap detachably mounted on the receptacle. The said cap has a chamber 37 within the same which receives the burner 22. The parts are so proportioned that the said burner and associated parts are held in spaced relation to the walls of the cap 36, whereby undue heating of the same is prevented. The cap 36 has a front wall 38 in which a number of air inlets 39 are formed and by means of which air may be introduced into the chamber 37 for the purpose of supporting combustion at the burner 22 and by means of which the products of combustion may escape. The method of using the invention is as follows:

Cap 36 is first removed and the burner 22 subsequently removed. A volatile liquid fuel such as naphtha, high test gasoline, benzene, heptane or related compounds or alcohol is poured in the receptacle 10 through the opening 18 in the neck 17. The absorbent 19 absorbs this liquid fuel and prevents the same from spilling. At the same time capillary attraction causes the liquid fuel to be dispersed throughout the ab-

sorbent and to be maintained in the portion 21 of the absorbent at the outlet of the receptacle 10 formed by the opening 18. In starting the warmer, the combustion member or element 23 is heated with a match or cigarette lighter. The heat so produced causes the liquid at the exposed surface of the portion 21 of the absorbent 19 in neck 17 to evaporate and the fumes from the said liquid pass through the passageways 35 about the convolutions of the said combustion member. The fuel then becomes ignited and burns by combining with the oxygen of the air entering the chamber 37 through the openings 39. Combustion is assisted by means of the catalytic agent formed on the combustion member 23 and maintains combustion as long as the fuel remains in the absorbent 19. In operation, the combustion member or element 23 glows at a relatively low temperature without the production of any flame. The heat produced by said combustion element warms the cap 36 and also the receptacle 10 giving off heat at a fairly low temperature so that the device can be readily held in the hand without danger of burning or excessive discomfort. The hand warmer may be placed in the pocket or glove of the user and will produce sufficient heat to prevent numbness or discomfort to the user while out in the cold.

In Figs. 6 and 7 I have shown a modification of the invention. Due to the similarity of the construction of this form of the invention with that heretofore described, the description of the similar parts thereof will not be repeated and the same reference numerals preceded by the digit 1 will be used to designate corresponding parts. In this form of the invention the convolutions 126 of the core or support 124 are considerably spaced and the combustion member or element 123 wound directly upon these convolutions. In this manner the combustion member is formed with convolutions 42 which conjointly form a helix 43. The end convolution 141 of the core or support 124 is brought into close proximity to the adjoining convolutions 126 permitting of pinching the end of the combustion member or element 123 therebetween and holding the same attached to the core. Core 124 in this form of the invention is constructed as a compression coil spring and is held attached to the housing or frame 128 by means of nubs 44 which are pressed inwardly from the arms 131 and which engage within the end convolutions 141. Sleeve 146 is similar to sleeve 46 heretofore described.

The advantages of the invention are manifest. The device is extremely simple in construction and convenient for use. The device will operate a number of hours on one filling of liquid fuel. The temperature of the device does not become so great that discomfort is given to the user. At the same time the device may be placed within the glove or pocket of the user without burning or injuring the clothing of the user. Since no flame results in the combustion of the fuel, no danger from fire is present in the use of the device. The user may adjust the temperature by controlling the amount of air reaching the combustion member by moving the damper sleeve relative to the housing and thus regulating the size of the air opening to the combustion element.

Changes in the specific form of my invention, as herein described, may be made within the scope of what is claimed without departing from the spirit of my invention.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a support and an elongated fibrous combustion promoting element mounted on said support and formed with spaced convolutions providing passageways therebetween and through which the fumes may pass.

2. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a core and an elongated flexible fibrous combustion promoting element wound on said core to form spaced convolutions providing passageways therebetween and through which the fumes may pass.

3. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having arms extending outwardly therefrom, a helical core extending between said arms and having spaced convolutions and an elongated flexible fibrous combustion promoting element wound upon the exterior of said core and forming spaced convolutions to provide passageways therebetween through which the fumes may pass.

4. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having arms extending outwardly therefrom, a helical core extending between said arms and having spaced convolutions and an elongated flexible fibrous combustion promoting element wound upon the exterior of said core and forming spaced convolutions to provide passageways therebetween through which the fumes may pass, the ends of the combustion element being pinched in between certain of the convolutions of the core.

5. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having arms extending outwardly therefrom, a helical core extending between said arms and having spaced convolutions and an elongated flexible fibrous combustion promoting element wound about the individual convolutions of the core to form a helix encircling said con-

volutions and providing passageways therebetween through which the fumes may pass.

6. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having spaced supports extending outwardly therefrom, a helical core extending between said supports and an elongated flexible fibrous combustion promoting element wound upon said core and formed with spaced convolutions to provide passageways therebetween through which the fumes may pass.

7. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having spaced supports extending outwardly therefrom, lugs extending inwardly from said supports, a coil spring having spaced convolutions disposed between said supports, the ends of said coil spring being hooked on said lugs, and an elongated flexible fibrous combustion promoting element wound upon the coil spring and forming spaced convolutions to provide passageways therebetween through which the fumes may pass.

8. In a hand warmer, a receptacle for a volatile liquid fuel and having a discharge outlet for the fumes emanating from the fuel, a burner superimposing the outlet of said receptacle, said burner including a frame supported on said receptacle and having spaced supports extending outwardly therefrom, a helical core extending between said supports and having spaced convolutions of a predetermined hand, and an elongated flexible fibrous combustion promoting element wound upon the exterior of said core to form spaced convolutions having a hand opposite to the hand of the convolutions of said core.

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