Nov. 24, 1959 M. B. WILCOX 2,914,060

HAND WARMER

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FIG. 1

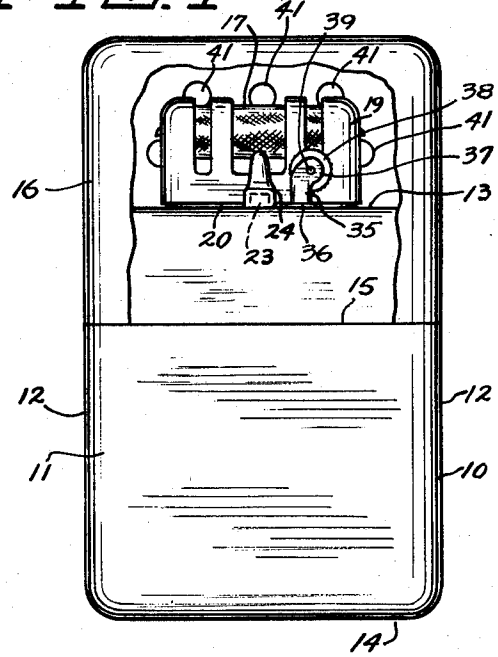


FIG. 2

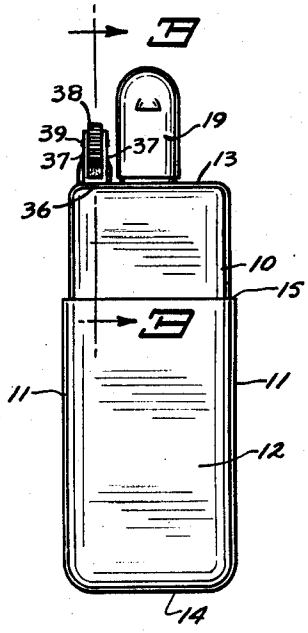


FIG. 3

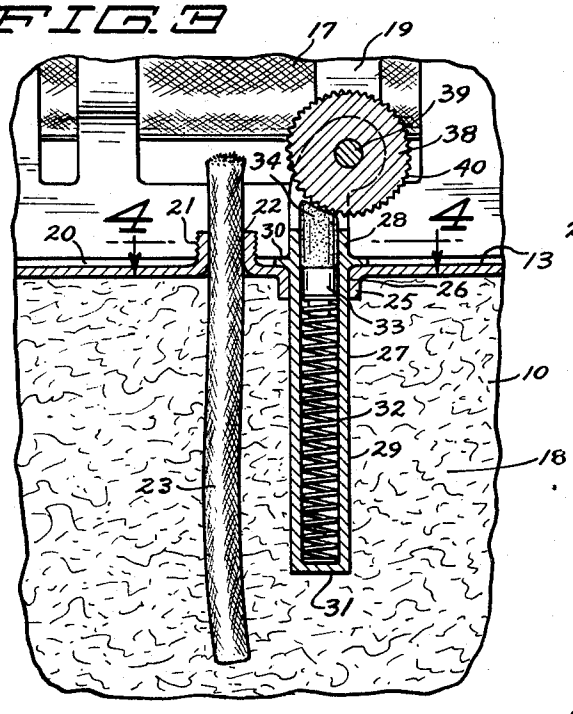
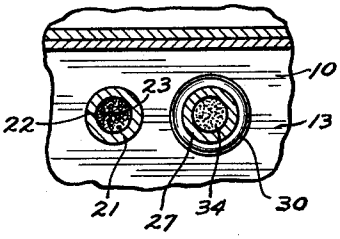


FIG. 4



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FIG. 5

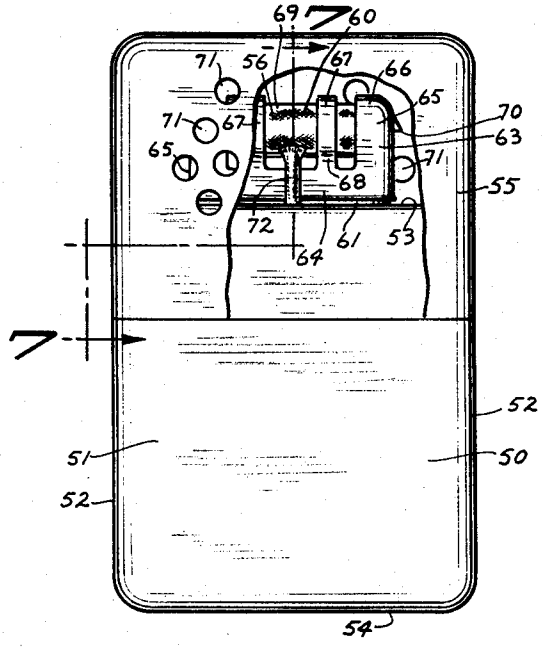


FIG. 6

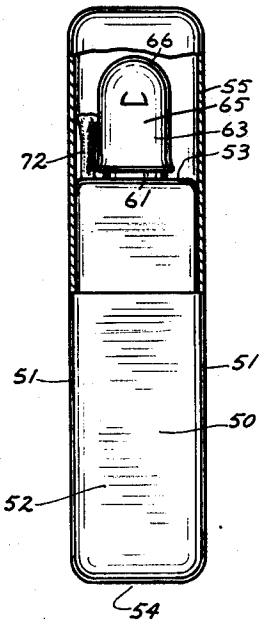


FIG. 7

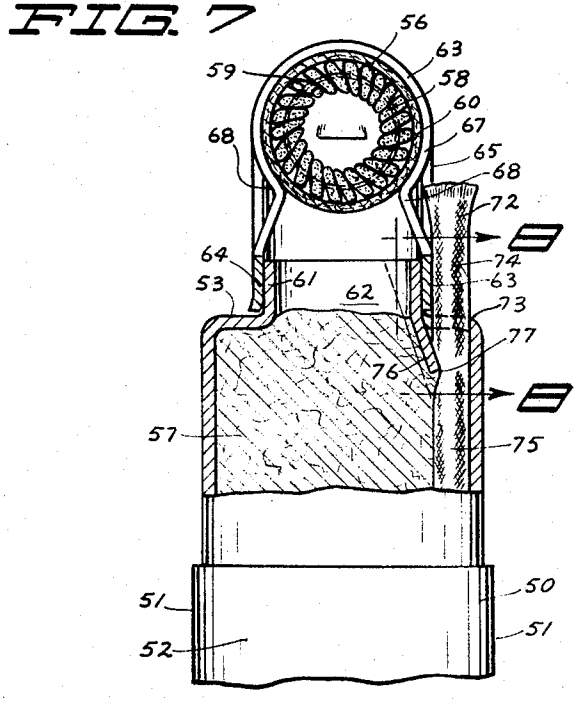
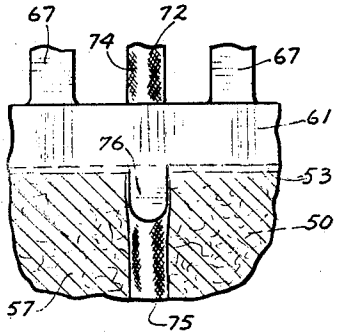


FIG. 8



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HAND WARMER

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Application April 9, 1956, Serial No. 580,692

2 Claims. (Cl. 126—208)

This application is a continuation in part of my pending application Serial No. 485,460, for Hand Warmer, filed February 1, 1955, now abandoned.

The invention herein presents a new and improved hand warmer including a receptacle containing absorbent material impregnated with liquid fuel uniformly distributed therethrough by capillary attraction, a burner unit operative by reason of combustion to cause vaporized fuel continuously to emanate from said absorbent material thus to sustain combustion at the burner unit, and a construction and arrangement for applying a flame to initiate combustion at said burner unit.

In the accompanying drawings forming a part of this specification,

Fig. 1 is a side elevational view, partially broken away, of a hand warmer made according to the invention;

Fig. 2 is an end elevational view of the hand warmer as when a cover cap for a burner unit and other elements of said hand warmer is removed from a receptacle thereof;

Fig. 3 is an enlarged longitudinal sectional view, taken on line 3—3 in Fig. 2;

Fig. 4 is a detail sectional view, taken as on line 4—4 in Fig. 3;

Fig. 5 is a side elevational view, partially broken away, of a hand warmer of modified construction incorporating features and characteristics of the invention;

Fig. 6 is an end elevational view, partially broken away and partially in section, of the hand warmer of Fig. 5;

Fig. 7 is a detail sectional view, taken on line 7—7 in Fig. 5; and

Fig. 8 is a detail sectional view, taken as on line 8—8 in Fig. 7.

Referring to Figs. 1 to 4 of the drawings, a receptacle 10 of the hand warmer there shown is constituted as spaced, parallel side walls 11, spaced, parallel end walls 12, and spaced, parallel top and bottom walls, denoted 13 and 14, respectively. Upper end portions of the side and end walls 11 and 12 are offset inwardly, as at 15, and a cover cap 16 for a burner unit 17 and other elements of the hand warmer is removably fitted upon said upper end portions of said side and end walls.

The receptacle 10 is loaded with absorbent material 18, which can be of any character suitable to its purpose, and said absorbent material is impregnated with liquid fuel uniformly distributed throughout the whole of the absorbent material by capillary attraction.

The burner unit 17 can be of any character suitable to its purpose. By way of example, a burner unit of construction as disclosed in U.S. Patent No. 2,670,728, granted to John W. Smith on March 2, 1954 can be employed. As disclosed, said burner unit is mounted upon an open frame 19 itself supported, as at 20, upon the top wall 13 of the receptacle. The burner unit is above the impregnated absorbent material 18 and in adjacent, contiguous relation thereto. Said burner unit will be operative by reason of combustion to cause vaporized fuel continuously to emanate from said absorbent material, and the burner unit will utilize the fuel which it vaporizes to sustain combustion.

The top wall 13 of the receptacle 10 is struck upwardly at a location midway between the end walls 12 of said receptacle and adjacent to the midlength of the burner unit 17, at a side thereof as disclosed, to provide an upwardly extending annular flange 21 bounding a circular opening 22 through said top wall and upwardly extending annular flange. An elongated circular wick 23 adjustably fitted in the opening 22 includes a relatively short upper end portion above the annular flange 21 in adjacent relation to said burner unit and a comparatively long lower end portion below the top wall 13 imbedded in the impregnated absorbent material 18. A cup shape cover 24, removably assembled with the upper end of the wick 23, in the manner as disclosed in Fig. 1 of the drawings, desirably may be employed to preclude evaporation of combustible fuel from said wick.

The top wall 13 of the receptacle 10 is struck downwardly at a location adjacent the wick 23, in alinement with said wick parallelly of the burner unit 17 as shown, to provide a downwardly extending annular flange 25 bounding a circular opening 26 through said top wall and downwardly extending annular flange. An elongated tubular element 27, fitted in the opening 26, includes a relatively short upper end portion 28 above the top wall 13 and a comparatively long lower end portion 29 below the annular flange 25. A collar 30 integrally surrounding the upper end portion 28 of said tubular element rests upon said top wall to limit downward movement of the tubular element. The lower end portion 29 of said tubular element is situated in the impregnated absorbent material 18, and the lower end of the tubular element is closed by a transverse wall 31. A compression coil spring 32 within the lower end portion 29 of the tubular element 27 has a lower end thereof seated upon the transverse wall 31 and an upper end thereof engaged beneath a stud 33 supporting a length of flint 34 for slidable movement in said tubular element longitudinally thereof. An upper end portion of the length of flint 34 projects upwardly beyond the upper end of the tubular element 27.

A bracket 35 supported, as at 36, upon the top wall 13 of the receptacle 10 and extending upwardly therefrom, provides a pair of spaced ears, each denoted 37. A wheel 38, desirably of steel, is situated between the spaced ears 37 and rotatably mounted upon a shaft 39 itself supported in said spaced ears. As disclosed, the shaft 39 is in perpendicular relation to the burner unit 17, as well as in perpendicular relation to the elongated tubular element 27, and the wheel 38 is in a plane also including the wick 23 and said tubular element. A peripheral surface of said wheel is roughened, as at 40.

The compression coil spring 32 constantly urges the upper, outer end of the length of flint 34 into engagement with the roughened periphery 40 of the wheel 38 so that sparks for igniting the wick 23 will be produced in response to manual rotation of said wheel. By reason of capillary attraction, the wick will at all times be impregnated with liquid fuel. The cup shape cover 24 normally will be situated upon the upper end of the wick. When the wick is to be ignited, said cup shape cover will be removed and the wheel 38 will be manually rotated. Flame produced at the wick will cause combustion at the burner unit to be initiated, and upon establishment of such combustion the cup shape cover can be replaced upon the wick.

The cover cap 16 when upon the receptacle 10 in covering relation to the burner unit 17 also will enclose the wick 23, the length of flint 34, the wheel 38 and associated parts. Of course, said cover cap will be removed from the receptacle while the burner unit is being

lighted and replaced upon said receptacle after combustion is established.

Apertures 41 in the cover cap 16 are for passage of combustion sustaining atmospheric air to the burner unit 17.

With respect to Figs. 5 to 8 of the drawings, a receptacle 50 of the hand warmer there shown, constituted as spaced side walls 51, spaced end walls 52, and spaced top and bottom walls 53 and 54, is equivalent to the receptacle 10 of Figs. 1 to 4. A cover cap 55, for a burner unit 56 and other elements of the hand warmer, is equivalent to the cover cap 16 and is removably fitted upon the receptacle 50 in the same manner said cover cap 16 is removably fitted upon the receptacle 10. When the cover cap 55 is in position upon the receptacle 50, the side and end walls of said cover cap are in longitudinal alinement with lower portions of the side and end walls, respectively, providing said receptacle.

The receptacle 50 is loaded with absorbent material 57 impregnated with liquid fuel uniformly distributed by capillary attraction.

The burner unit 56 is equivalent to the burner unit 17 and consists of an elongated combustion member 58, an elongated support 59 for the combustion member and a tubular combustion element 60 housing said combustion member and support. The elongated combustion member 58 is of asbestos or other suitable fibrous material impregnated with a catalytic agent which aids in oxidation of fumes from the liquid fuel and causes combustion at relatively slow rate. The tubular combustion element 60 desirably may be of spun glass. It, also, is impregnated and with a catalytic agent which aids in oxidation of fumes and causes relatively slow combustion. The elongated support 59 is a length of wire coiled to form spaced convolutions upon which the elongated combustion member is wound. As shown, said elongated support is a compression coil spring. The tubular combustion element is in free surrounding relation to the elongated support and the elongated combustion member wound thereon, and said elongated support and tubular combustion element are of substantially equal length.

The top wall 53 of the receptacle 50 is struck upwardly at the center thereof to provide an upwardly extending, substantially elliptical flange 61 bounding an elliptical opening 62 through said top wall and upwardly extending, elliptical flange.

A holder 63 for the burner unit 56 is constituted as an elongated hood providing an elliptical skirt 64 removably fitted upon the upwardly extending, elliptical flange 61 and oppositely disposed, inwardly facing arms 65 extending upwardly from said elongated skirt in perpendicular relation thereto. Each of the upwardly extending arms 65 is of curvilinear configuration transversely thereof and merges at its upper end in an inwardly extending curved flange 66. Spaced, parallel retainer elements 67, each of part-circular configuration, are integral with the elliptical skirt 64 and disposed between the upwardly extending arms 65 in parallel relation thereto. Upper portions of the retainer elements 67 extend across the upper portion of the burner unit 56 in the plane of the curved flanges 66, and said retainer elements and flanges, as well as the curvilinear portions of the upwardly extending arms 65, are in adjacent relation to said burner unit. The retainer elements 67 are equidistantly spaced from said upwardly extending arms 65 and inwardly extending flanges 66, and also spaced at considerable distance apart. Each retainer element is bent or shaped inwardly at a lower portion thereof, adjacent the elliptical skirt 64, to provide oppositely disposed ledges, each denoted 68, for supporting the tubular combustion element 60. A gap between the retainer elements 67 is indicated at 69.

The burner unit 56 is disposed interiorly of the holder 63 and is assembled with said holder before the latter is assembled with the upwardly extending flange 61. When said burner unit is assembled with the holder, the burner unit and the tubular combustion element thereof are in adjacent relation to the curved flanges 66 and the upper portions of the retainer elements 67 and rested upon the ledges 68. The coil spring which constitutes the elongated support 59 will be under compression between the parallel arms 65 when the burner unit is in position within the holder. Said parallel arms 65, the curved flanges 66, the supporting ledges 68 and the retainer elements 67 retain the burner unit 56 in intended and proper position in the holder.

An aperture 70 in each of the parallel arms 65 and apertures 71 in the cover cap 55 are for passage of combustion sustaining atmospheric air to the burner unit.

An elongated wick 72, fixedly situated in an opening 73 through the top wall 53 of the receptacle 50, includes a relatively short upper end portion 74 above and a comparatively long lower end portion 75 below said top wall imbedded in the impregnated absorbent material 57. The wick 72 is secured in fixed position in the receptacle through the medium of a lug 76 struck downwardly from said top wall and engaged, as at 77, against the lower end portion 75 of said wick to clamp it between said lug and a side wall 51 of said receptacle.

The upper end portion 74 of the wick 72 is situated midway between the retainer elements 67, at the gap 69, in adjacent relation to the burner unit 56 at a side thereof. Said upper end portion of said wick also is in proximity to a side wall of the cover cap 55 when in position upon the receptacle as in Figs. 5 and 6. The construction and arrangement are such that positioning of said cover cap upon said receptacle while the wick is burning will cause said wick to become, and remain, extinguished.

A volatile liquid fuel will be poured into the receptacle through the elliptical opening thereof while the cover cap or wick case 55, the holder and burner unit retained thereby are removed. The absorbent material will absorb the liquid fuel and capillary attraction will cause it to be dispersed throughout the absorbent material. The holder and burner unit will be replaced upon the receptacle after it is loaded with liquid fuel, and said burner unit will be made operative through the instrumentality of heat applied thereto by a flame existent at the wick 72 for a sufficient length of time to cause combustion at the burner unit to be initiated. Once said burner unit is ignited, combustion thereat will be continuously sustained.

The cover cap or wick case 55 will be removed from the receptacle 50 while the burner unit is being ignited, and after ignition of said burner unit said cover cap will be replaced upon said receptacle, in enclosing relation to the burner unit, the holder and the wick. A flame at the wick 72 can be produced in any ordinary or preferred manner, as by striking a match, or by employment of a manually manipulated lighter.

It has been ascertained, by experiment and experience, that an ignited wick, such as 72, having its operative end portion, such as 74, situated as in Figs. 5 to 8 and as hereinbefore described, will become extinguished in response to positioning of a cover cap or wick case, such as 55, upon a receptacle, such as 50, of a hand warmer incorporating the wick as a part thereof. Situating the wick and the material of the cover cap in proximity to each other enables the cover cap material to conduct heat from the vicinity of the wick sufficient in amount to reduce temperature to a point below kindling temperature. Positioning the cover cap in enclosing relation to the wick reduces the amount of combustion sustaining atmospheric air available at the burner unit and wick to that which can pass the apertures 71 in said cover cap. The reduction of temperature due to conduction of heat by the cover cap from the vicinity of the wick, assisted by the smothering influence exerted in response to position-

ing of the cover cap upon the receptacle, functions to cause extinguishment of the wick. The wick will remain unlit after its extinguishment by reason of the fact that heat from the burner unit is at all times insufficient to bring the fuel at the wick to kindling temperature. Instead, in each of the disclosed embodiments of the invention, the conduction of heat by the cover cap from the vicinity of the burner unit is sufficient constantly to maintain the wick fuel at a temperature below its kindling temperature. Positioning of the cover cap upon the receptacle, while effective to extinguish the wick 72, will not extinguish the burner unit.

What is claimed is:

1. In a hand warmer, a receptacle, liquid fuel impregnated absorbent material in said receptacle, a burner unit situated exteriorly of the receptacle upon a wall thereof in open relation to said absorbent material, there being a space between said burner unit and the absorbent material and the burner unit being operative by reason of heat of combustion traversing said space continuously to vaporize fuel with which said absorbent material is impregnated and utilize the vaporized fuel to sustain combustion at said burner unit, a wick in said receptacle having a first end portion thereof embedded in the absorbent material and a second end portion thereof situated exteriorly of said receptacle in open adjacent relation to said space and the burner unit, a removable apertured cover cap upon said receptacle in enclosing relation to said burner unit and wick, and a manually operable lighter means upon a wall of said receptacle in adjacent relation to the second end portion of said wick and enclosed by said cover cap.

2. A hand warmer comprising a tank including a pair of spaced side walls and a top wall, said top wall of the tank having a vaporized fuel discharge opening centrally thereof and inwardly of the tank side walls, an upstanding flange surrounding said opening and including a side portion spaced inwardly of one side wall of the tank, the top wall of the tank having a small wick opening between the side portion of the flange and said one side wall of the tank and close to said side portion of the flange, a filler of fuel absorbing material within said tank and substantially filling the tank, a catalytic burner unit including a holder mounted above said top wall and engaging telescopically over the upstanding flange, said holder having a side portion disposed between said side portion of the flange and said small wick opening, an apertured cover engagable telescopically over the top of said tank and projecting above said top wall and catalytic burner and receiving the latter, said cover including a sidewall contacting said one side wall of the tank and spaced outwardly of and close to the small wick opening, and a wick of fuel absorbing material engaging through the small wick opening and having a first part arranged within the tank and embedded within said filler and a second part extending above said top wall of the tank and arranged between the side portion of said burner holder and said one side wall of the cover and close to the burner.

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