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S. D. PERLMAN

2,530,721

HEATER OR STOVE

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Fig. 1.

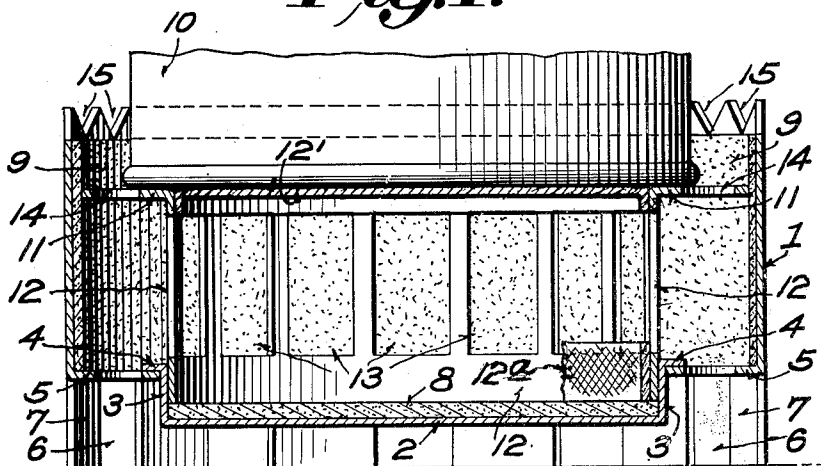


Fig. 5.

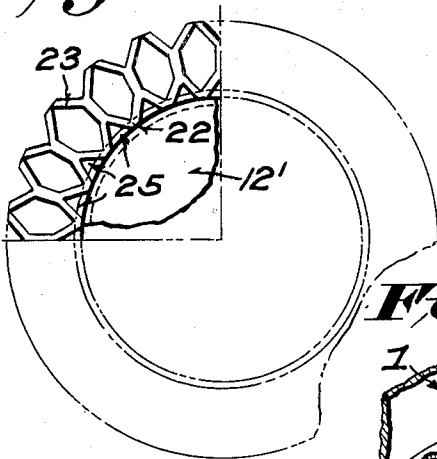


Fig. 4.

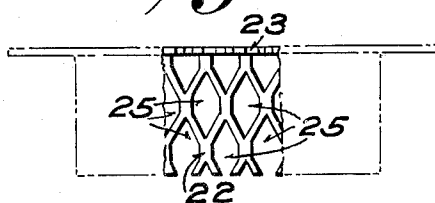


Fig. 3.

Fig. 2.

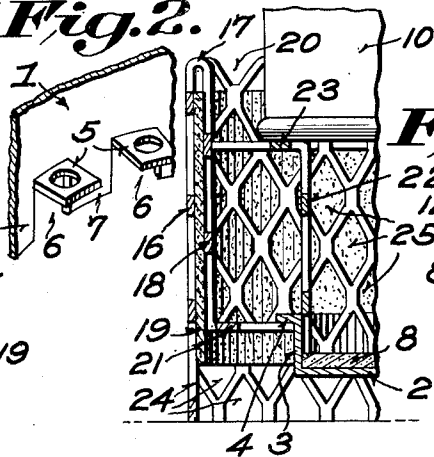


Fig. 2a.

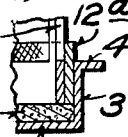
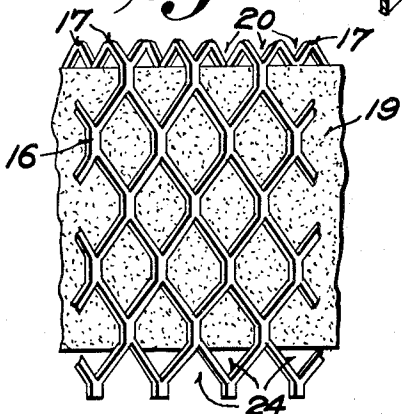


Fig. 6.



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HEATER OR STOVE

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This invention relates to heaters or stoves, and while of general application, is generally designed for heating the contents of a can of food or other material while in the original can in which it was packed.

It is an object of the invention to provide for bringing the contents of a can of what is generally known as "canned goods" to a boiling condition, without burning or scorching the contents of the can, within a predetermined minimum of time and with the consumption of a minimum amount of fuel.

Another object of the present invention is to provide a device for supplying only that portion of the products of combustion which have not yet burst into flame to the bottom end wall of the can to be heated so as to prevent burning or scorching of the bottom portion of the contents of the can, and subsequently to supply hotter products of combustion, such as the flame, to the lower portion of the upright walls of the can above the bottom end wall thereof, so as to heat gradually a larger area of the contents of the can and thus prevent burning or scorching of such contents.

It is a further object of the invention to provide a simple and improved heater or stove of minimum cost and minimum weight, and of maximum durability and effectiveness. These stated characteristics make the present invention highly useful for military personnel, particularly in heating individual canned rations.

The device may be used out of doors as well as within a house, and when used out of doors, will function satisfactorily without requiring that it be shielded from drafts. It is capable of repeated use, and may be of a size to be carried in a pocket of the clothing but size is not of the essence of the invention. The heater will function properly and satisfactorily even though in a wet condition.

With these and other objects in view, the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings and particularly pointed out in the appended claims, it of course being understood that changes in the form, proportion, size and minor details may be made, within the scope of the claims, without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:

Figure 1 is a vertical central longitudinal sectional view of a heater or stove showing one embodiment of the present invention.

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Figure 2 is a fragmentary perspective view of a lower portion of the body of the heater.

Figure 2a is a detail fragmentary sectional view showing a different arrangement of wick for use with a liquid fuel.

Figure 3 is a fragmentary vertical sectional view similar to Figure 1 but showing another embodiment of the invention.

Figure 4 is a fragmentary side elevation of means for supporting the can to be heated in accordance with the embodiment shown in Figure 3 of the drawings.

Figure 5 is a fragmentary top plan view of Figure 4.

Figure 6 is a fragmentary side elevation of Figure 3.

As embodied in Figure 1 of the drawings, the heater or stove of the present invention includes a body member 1 which is open at its top and at its bottom and may be of any special or preferred shape or configuration. Disposed centrally within the open bottom portion of the body 1 is a hearth 2, shown in Figure 1 as a pan having a marginal upstanding wall 3 provided at its top edge with an outwardly directed horizontal shoulder 4 resting upon the substantially horizontal support 5 projecting inwardly from the body 1 of the heater. This supporting member 5 may be of any suitable nature and may consist of an annular series of members bent upwardly and inwardly from the lower edge portion of the body as well indicated in Figure 2 of the drawings. By this manner of producing the supporting members 5, an annular series of feet 7 are provided for the body 1, and between each pair of successive feet there is an opening 6 produced by the upward displacement of the part 5. These openings 6 constitute air induction ports intended for the admission of atmospheric air into the lower portion of the stove body at the outer periphery thereof, as will hereinafter be explained. While this specific manner of producing a support for the hearth 2 is satisfactory, any other way of supporting the hearth within the body and above the lower edges of the feet 6 may, of course, be employed. By employing a pan shaped hearth, either solid fuel or liquid fuel or both may be employed, but it will, of course, be understood that the pan form of hearth is not essential to the operation of the present invention, as other forms may be employed, such as a flat plate, particularly where solid fuel is to be employed in the heater or stove. A wick 12a may be provided in the pan and within the bottom portion of the shell 12 when liquid fuel is used. As shown in

Figure 2a, the wick 12a may be positioned between the wall 3 of the pan and the bottom portion of the shell 12. Upon the top of the hearth there is a layer or lining 8 of heat insulation for the purpose of minimizing escape of heat downwardly from the bottom of the hearth. Likewise, a liner 9 of heat insulating material may be provided within the body 1 and lying snugly against the inner walls thereof to retain heat within the body and minimize radiation thereof.

The can to be heated, shown at 10, may be supported on the top of the shell 12, or on an annular shelf-like part 11, carried by the body 1 or by the shell 12 and located at or about the level of the top of the shell. Disposed concentrically within the body 1 is the cylindrical shell 12, the bottom edge of which rests within and upon the hearth member 2. This shell or drum is open at its bottom, although it could be closed at its bottom and such closed bottom could provide a hearth for the present heater or stove. A top plate 12' closes the top of the shell or drum 12 and constitutes a horizontal baffle as will hereinafter appear. The body walls of this shell 12 are provided with an annular series of openings 13 of suitable size and shape for the passage therethrough of products of combustion as will hereinafter appear. The body 1 of the stove and the upright walls of the shell 12 define an annular combustion chamber, and therefore the horizontal member 11 should not seal or close the top of the combustion chamber. It may be provided with openings, one of which has been shown at 14, for upward passage of heated products of combustion. If the part 11 is carried by the shell 12 then said part 11 could terminate short of the wall 1, so as to provide an opening or port for the upward passage of products of combustion.

In the operation of the present heater or stove, any suitable fuel is placed on the hearth 2 and then the fuel is ignited in any preferred manner, after which the can 10 is placed upon the top of the shell 12 or the support 11. The internal diameter of the body 1 of the heater should, of course, be slightly greater than the external diameter of the can to be heated. Primary air passes inwardly through the openings or ports 6 in the lower marginal portion of the body 1, and then upwardly between successive supports 5 and thence inwardly through the bottom portions of the ports or openings 12 so as to supply primary air for the purpose of combustion of the fuel on the hearth 2. If desired the parts 5 may have openings therein, as best shown in Figure 2 of the drawings, through which openings primary air may also pass. The heated products of combustion and flame rising from the fuel pass outwardly through the openings or ports 13 into the annular combustion chamber, defined by the body 1 and the shell 12, from which they pass upwardly through the openings 14 in the shelf or support member 11 and thence out of the top of the body and along the upright walls of the can. The top edge portion of the body 1 is provided with openings or ports 15 for the inflow of secondary air to promote combustion of the unconsumed products of combustion rising through the body of the heater.

From the foregoing explanation, it will be seen that the maximum combustion of the fuel will be around the outer peripheral edge thereof within and close to the shell 12, and that the hottest portion of the flame will be in the annular space between the body 1 of the heater and the bottom

peripheral edge and the lower portion of the upright walls of the can.

The distance between the hearth 2 and the bottom of the baffle 12' or the can 10 is such that before the heated products of combustion rising from the central portion of the fuel can break into a flame with its hottest portion at the center of the baffle and the center of the bottom of the can, such baffle will cause the heated products of the combustion to spread radially outward and through the ports or openings 13 into the annular combustion chamber around the shell 12 and then break into an annular flame at or slightly above the annular support 11 and around the bottom edge of the can 10 and the lower portions of the upright walls of the can. Due to this handling of the heated products of combustion, there will be only a small amount of heat applied to the bottom of the can 10, for the reason that the hottest portion of the flame is in the form of a circular band around the lower outside walls of the can upwardly from the bottom edge thereof, wherefor the maximum heat generated by the device will be spread around the exterior walls of the can instead of being applied directly to the center of the bottom end wall of the can. Burning or scorching of the contents of the lower portion of the can along the bottom thereof will not occur for the reason that only a very small portion of the heat from the burning fuel will contact the bottom end wall of the can. Moreover, as the flame is spread out and its hottest portion applied in a circular band to the upright cylindrical walls of the can, that portion of the can to which the heat is applied is of materially greater area than the bottom end wall of the can, yet it is sufficient to heat the contents of the can, without burning the same, within a minimum predetermined period of time with a minimum consumption of fuel.

As the top of the shell 12 is closed, and in order to facilitate the placing of fuel on the hearth, the shell may be removably fitted within the body of the heater. If fixed within the heater, then the baffle top 12' thereof should be displaceable so as to permit the introduction of fuel through the top of the shell and on to the hearth.

The present invention has been designed to meet certain specifications requiring the heating of the contents of the can to the boiling point, without burning or scorching the contents thereof, within a predetermined minimum of time, and with the consumption of a minimum amount of fuel.

When the heater is in operation, there is no noticeable flame in the space between the top edge portion of the body of the heater and the can, yet a very definite blue flame is noticeable within the body of the heater below the top edge thereof and at or about the lower marginal edge of the can, or in other words, at about the elevation of the support 11 for the can. Accordingly, neither smoke, flame nor haze is visible at a short distance from the heater for the reason that the present invention accomplishes perfect combustion or, in any event, combustion of such a character that neither flame, smoke nor haze is noticeable at a short distance from the heater.

By reason of the fact that the hearth 2 and the annular combustion chamber between the body 1 and the shell 12 are surrounded by a shield defined by the walls of the body, it is not necessary to provide some sort of a shield around the heater or at one side thereof nor to pro-

tect it against drafts when used in the open. Furthermore, the comparative lightness of the device is such that it cools off rapidly by radiation in a short period of time. In practice, it has been found that where the device is wet, even to the extent of where it has been plunged into a body of water, the fuel will ignite promptly, the heater will dry off quickly and function the same as where the device is dry at the outset.

While the construction shown in Figures 1 and 2 is strong, durable and light, nevertheless, its weight may be materially reduced without impairing its strength and durability, as will be seen by reference to the structure shown in Figures 3 to 6, inclusive, wherein it will be noted that the body and other parts of the device are embodied in reticulated or openwork form such as expanded metal. In this latter form of the device the body 16 is formed of a sheet of expanded metal which is folded upon itself so that the bend or fold 17 thereof constitutes the top edge of the body, whereby the body of the heater has spaced outer and inner walls 16 and 18, the latter terminating short of the bottom edge of the outer wall 16. Between the walls 16 and 18 there is a sheet of heat insulating material 19 which extends at its bottom below the lower edge of the inner wall 18 and terminates short of the top edge of the body. The expanded metal sheet is bent along a line of openings therein so as to provide open top notches 20 around the top edge of the body, comparable to the notches or openings 15 shown in Figure 1 of the drawings, for the introduction of secondary air, as hereinbefore described. The inner wall 18 has its lower portion bent inwardly and upwardly as at 21 into a horizontal position so as to provide an internal annular shelf or support for the pan 2, which constitutes the hearth of the device just as shown in Figure 1 of the drawings. The pan 2 has an upstanding marginal wall 3 at its outer edge terminating at its top in an outwardly directed horizontal shoulder 4 resting on the shelf-like support 21 whereby the pan is supported in place. A sheet of heat insulating material 8 is disposed within the pan and supported on the bottom thereof as in Figure 1.

Within the body there is a cylindrical shell 22 of expanded metal having its lower edge seated within the pan 2 and its upper portion 23 bent outwardly into a substantially horizontal position so as to provide a support for the can 10. The parts 22 and 23 of Figure 3 serve the same purpose as the parts 12 and 11 as embodied in Figure 1.

In the expanded metal form of the device, it will be seen that the sheet of heat insulating material 19 closes the openings in the inner and outer walls of the body from a point near the top of the body downwardly below the turned shelf-like support 21 on the inner wall 18. By this arrangement, the burning fuel on the hearth 2 is protected against drafts while at the same time primary air may flow inwardly through the openings 24 in the bottom portion of the wall 16 beneath the lower edge of the insulating sheet 19 and thence through the openings in the shelf-like support 21 and finally through the openings 25 in the cylindrical part 22 of the support for the can to be heated, thus admitting primary air over the top of the pan 2 and to the marginal portion of the fuel in the pan, so as to maintain combustion of the fuel around the outer

marginal portion thereof as distinguished from the central portion of the fuel, just as occurs in the embodiment shown in Figure 1 of the drawings. Secondary air flows inwardly through the notches or ports 20 at the top of the expanded metal body and over the top edge of the insulating sheet 19 as in Figure 1 of the drawings. It will, therefore, be understood that the fundamental features of the heater as illustrated in Figure 1 are also present in the expanded metal form, and the only difference resides in the physical condition of the materials. The reticulated or expanded metal form of the device materially reduces the weight of the heater while at the same time the strength thereof is preserved.

Although a wick has not been shown in Figure 3 of the drawings, it will, of course, be understood that a wick may be employed just as is shown in Figures 1 and 2a for the purpose of burning a liquid fuel.

The shell or drum 12 of Figure 1 and the shell or drum 22 of Figure 3 perform identical functions, the most important of which is to confine the products of combustion in a ring or band within and at the interior walls of the shell or drum as distinguished from spreading radially outward in an irregular manner as would occur in the absence of the shell or drum. The products of combustion will eventually pass outwardly through the openings in the drum and in the form of a band and thence upwardly through the flue provided by the bottom side walls of the can and the top side walls of the body 1 where they will meet secondary air admitted through the openings 15 at the top of the body of the heater.

It will here be explained that it is necessary to prevent the direct upward escape of products of combustion through the top of the shell or drum, and for this purpose the latter is provided with a top 12' as shown in Figure 1 so as to form a baffle which spreads the products of combustion radially outward before they reach their highest degree of temperature, which high degree occurs in the annular space between the upright side walls of the can 10 and the body 1. It now should be understood that the shell or drum 12, together with its closed top 12' provides a baffle functioning as above described. The top member 12' of the drum could be omitted, in which event the bottom under wall of the can will constitute a horizontal baffle in place of the part 12'. In Figure 3 a baffle corresponding to the one designated 12' is not shown so as to illustrate how the bottom of the can 10 will function as a baffle closing the top of the shell or drum. However, the shell or drum 22 may be provided at its top with a horizontal baffle as indicated at 12' in Figure 5 of the drawings.

While a can supporting member 11 is shown in Figure 1 and at 23 in Figure 3, such supporting means are not essential to the operation of the present invention and may be omitted, as the can to be heated may rest upon the top member 12' of the shell or drum or upon the top edge of the shell or drum in the absence of the parts 11 and 23. These parts 11 and 23 are provided primarily to center the top portion of the shell or drum within the body 1 of the heater and may or may not be connected to said body 1.

Having thus described my invention, what I claim is:

1. A heater comprising a body having an open top, a hearth supported within the body, a mar-

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ginal baffle within and spaced from the upright walls of the body and rising from the hearth and terminating short of the top of the body, the baffle having ports disposed for the inward admission of air and for the outward escape of products of combustion, the body of the heater having air induction ports disposed for communicating with the ports of the baffle, the top of the baffle having annular spacing means engaging the inner walls of the body, and having ports for the passage of products of combustion, the top portion of the body having air induction ports located adjacent and above the top of the baffle.

2. A heater comprising a body having an open top, said body being formed of a sheet of expanded metal bent to form spaced upright walls with the bend of the material at the top of the body, the inner wall of the inner member of the expanded material terminating short of the bottom of the outer member thereof, insulating material between the walls of the body to close the openings in said walls and terminating short of the top and bottom of the outer wall, a hearth supported within the body of the heater, a marginal baffle formed of expanded metal and rising from the hearth, the top of the baffle terminating short of the top of the body and constituting a support for a receptacle to be heated, the openings in the upright walls of the baffle constituting

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ports for the inward admission of air to the hearth and for the outward escape of products of combustion, the openings in the outer wall of the body below the insulating material constituting ports for the inward admission of air to the ports of the baffle, and the openings in the walls of the body above the top of the insulating material constituting ports for the inward admission of air.

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