Dec. 25, 1951 J. L. REYNOLDS 2,579,964

RADIANT COVER

Filed Aug. 10, 1948 2 SHEETS—SHEET 1

Fig. 1.

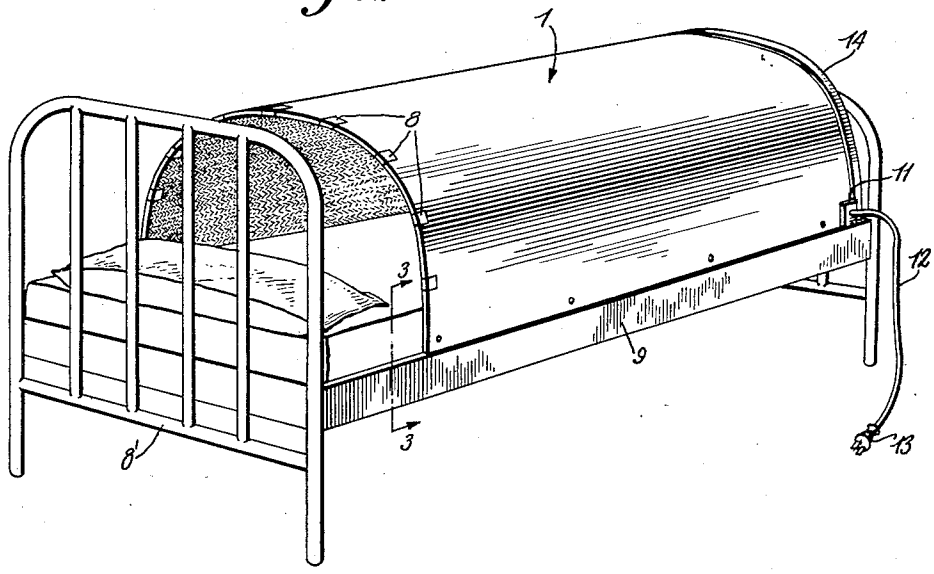


Fig. 2.

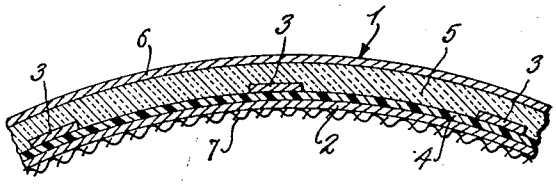
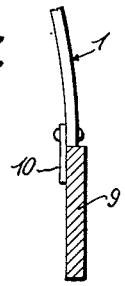


Fig. 3.



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Fig. 4.

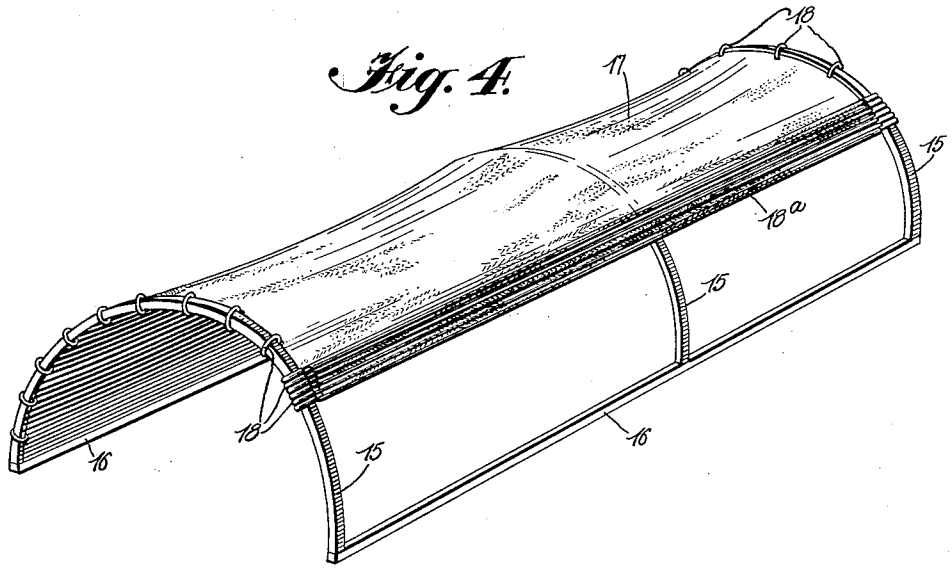


Fig. 5.

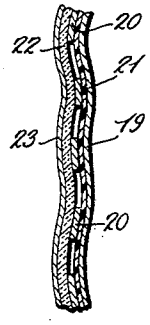
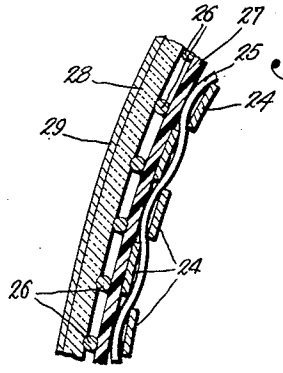


Fig. 6.



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RADIANT COVER

Julian L. Reynolds, Richmond, Va.

Application August 10, 1948, Serial No. 43,396

3 Claims. (Cl. 219—19)

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This invention relates to radiant covers and particularly to covers adapted to be supported over a bed or the like to provide radiant heating for an invalid or other occupant of the bed.

It is quite often desirable to provide local heating means for a person, especially invalids, and customarily such heat has been supplied by hot water bottles, electrically heated blankets, or the person has been kept warm by heavy clothing or blankets. It is often undesirable to limit the heating to localized areas, and it is usually undesirable to apply weighted heating blankets or even woolen blankets directly over the person, especially after serious operations. This invention contemplates a self-supporting dome or tent-like structure constituting a radiant heating means that may be supported a short distance over a bed and provide the necessary heat for the occupant without involving the application of any pressure or confining garments to the body. The invention contemplates a sheet of heat-conducting material bent to a generally semi-cylindrical shape and supported over a bed to encompass the upper surface of the bed and its occupant. Heating means, preferably electrical, produces heat and transfers that heat to the heat-conducting material from which it is radiated directly to the body of the person.

It is an object of this invention to provide a radiant heating cover to produce uniform heat and which cover may be maintained out of contact with the body being warmed.

It is a further object of this invention to provide a radiant heating cover that is simple in construction and economical to produce.

It is a further object of this invention to provide a radiant heating cover that may be manufactured and shipped in flat condition and capable of being easily curved for application to a bed or the like.

It is a still further object of this invention to provide a radiant heating cover that is readily adaptable to other purposes, such as use as an oxygen tent.

It is still a further object of this invention to provide a radiant heating cover for use in hospitals and the like, wherein the surfaces are of such nature that they may be readily cleansed and maintained in a sterile condition.

Other objects and advantages will become obvious to those skilled in the art and will be readily apparent from the following description and drawings, wherein

Fig. 1 is a perspective view of a bed having a radiant cover of the present invention applied thereto;

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Fig. 2 is a fragmentary transverse sectional view, on an enlarged scale, of the radiant cover of Fig. 1;

Fig. 3 is a sectional view taken substantially along line 3—3 of Fig. 1, looking in the direction of the arrows;

Fig. 4 is a perspective view of a modified form of radiant cover;

Fig. 5 is a fragmentary sectional view through a portion of the cover of Fig. 4; and

Fig. 6 is a fragmentary sectional view of a portion of a modified form of flexible cover.

The radiant heating cover of the present invention comprises a panel structure 1 having a sheet of thin metal 2 at one surface thereof. Any suitable metal having high heat-conducting characteristics may be employed but aluminum is preferred since it is readily available in the desired thicknesses and has a high heat-conducting characteristic. A resistance heating element 3 is adhered to one surface of the metal sheet 2 by means of an adhesive 4. The adhesive 4 may be a phenolic resin, silicone resin, asbestos cement or the like and must have electrical insulating properties. The element 3 could, of course, be attached to the sheet 2 by other suitable means such as sewing, riveting, or the like.

Overlying the electrical resistance element 3 and the exposed portions of the layer 4 is a layer of heat insulating material 5. The heat insulating material may be of any suitable material such as rock wool, glass wool, asbestos fibers or the like. Exteriorly of the heat insulating material 5 a sheet or layer 6 of a smooth non-porous material is applied and which constitutes the outermost surface of the radiant cover. Radiant heating panels of this general type are more fully shown and described in my copending application, Serial No. 40,373, filed on July 23, 1943, which application has now become abandoned, and it is to be understood that any of the modifications and arrangements disclosed therein may be employed to provide the heating and heat insulation for the radiant cover of this invention.

In many instances, it may be desirable to provide the inner surface of the radiant heating cover with a soft surfacing material. In such an event, a layer of suitable fabric 7, such as flannel, may be provided to cover the inner or concave surface of the cover. Such a fabric covering will preferably be removable for laundering and disinfecting and may be retained in position by such means as indicated at 8 which are U-shaped spring clips acting to hold the fabric cover taut and in close engagement with the end edges of the cover. The fabric cover 7 is not

necessary and the radiant cover may be employed without it. If the fabric 7 is employed it may, instead of being removable, be permanently adhered to the inner surface of the sheet 2, in which case it will be desirable that it be partially impregnated with a suitable resin or the like whereby it may be easily cleansed and disinfected and have no minute porosities to trap undesirable matter. If desired, the inner surface of the sheet 2 may have a coating of resin or lacquer applied thereto instead of a fabric cover.

Fig. 3 illustrates one manner of supporting the cover in place on the bed. The bed 8 of Fig. 1 will have side rails 9 extending longitudinally thereof and constituting the outermost structure at the mid-portion of the bed. The rail 9 may be employed to support the radiant heating cover in the manner indicated in Fig. 3 wherein a plurality of clips 10 are riveted, or otherwise secured to the inner face of the radiant cover and extend beyond the longitudinal edges thereof. Fig. 3 illustrates the manner in which the clips 10 properly locate and retain the cover 1 on the bed. The radiant cover shown in Fig. 1 will, preferably, be somewhat resilient so that the lateral edges thereof may be adjusted to beds of different sizes and wherein the resilience tending to cause the cover to assume a flat shape will be effective to urge the clips 10 into snug engagement with the inner side faces of the rail 9.

The resistance element 3 may be any suitable or desirable material such as iron wire or nichrome wire but is preferably an aluminum ribbon, as more fully described in the copending application previously referred to. The terminal ends of the resistance element are connected, in a suitable box 11, to an insulated conductor 12 having a conventional pronged plug 13 thereon for connection to the usual electrical outlet. If desired, a variable resistance control unit may be connected in circuit with the resistance element 3 to enable variation in the temperature produced by the radiant heating cover.

In most instances, it will be preferable to enclose the rearmost, or "foot" end of the arched cover with a suitable closure 14 to prevent undesirable drafts of cool air from passing over the body of the person being warmed. The cover 14 may be of rigid material or flexible fabric. If desired, both ends of the cover may be enclosed by draped material, glass, or plastic structures, whereby the cover may also be employed as an oxygen tent. The end structures may be provided with windows and also may be provided with openings for the patient's neck and/or arms. Likewise, the end closures could be provided with resistance elements to aid in heating.

The material employed in the panels, that is in the layers 4, 5 and 6 will preferably be somewhat flexible so that the radiant heating cover may be fabricated as a flat structure and shipped or stored in that condition but can be readily flexed to the curved shape shown in Fig. 1 for ready application to a bed or the like.

If desired, the exposed exterior surface of the radiant cover may also be of aluminum, in order to act as an insulating medium in itself by reflecting heat back into the structure. In cases where the external temperature in greater than that to be maintained inside the cover, an external aluminum surface would act to reflect external heat. Such a cover could well be used as an insulator alone, with the heating means inoperative, in cases where a patient is to be kept in an ice pack.

The embodiment of Figs. 4 to 6 comprises a framework of arched or curved members 15 and longitudinal members 16. In the form illustrated, the arched members 15 are attached at their ends to the members 16 to form a relatively rigid structure therewith. The skeleton framework comprising the members 15 and 16 may be supported in any suitable manner over a bed or the like. A flexible panel 17, to be described later, carries a plurality of rings 18 at opposed ends thereof, and the rings 18 surround the end members 15. The rings 18 are sufficiently large so that they may be readily moved along the members 15. The panel 17 is of such width that it will extend over the arched members 15 to form a canopy or tent-like structure extending from one member 16 to the other. Preferably, a rigid longitudinally extending element 18^a is attached to one edge of the panel 17 whereby the panel may be folded or collapsed to the position shown in Fig. 4 by merely lifting the member 18^a in such a manner as to cause the rings 18 to slide along elements 15. Preferably the opposite edge of the panel 17 will be fixed in some suitable manner to one of the longitudinally extending frame members 16.

A flexible blanket-like panel, such as 17, could, if desired, be supported over a bed or the like by any other suitable framework of rigid or semi-rigid members and need not necessarily be mounted for sliding movement relative to the framework.

Radiant covers according to this embodiment may also be provided with end closures, as fully described in connection with the embodiment of Figs. 1 to 3.

Fig. 5 illustrates a form of construction suitable for the flexible panel 17. As shown, a sheet of aluminum foil 19 has an electrical resistance element 20 adhered or otherwise attached to one face thereof by a layer of adhesive material 21. The adhesive material 21 will preferably be flexible and have suitable electrical insulating characteristics. A layer 22 of heat insulating material overlies the resistance elements 20 and is in turn covered by a layer 23 of a suitable nonporous covering material. The layer 23 may be of aluminum foil also. The elements 19–23, inclusive, are all united such as by means of suitable adhesives, sewing, or other means, to form a flexible blanket-like panel capable of being readily folded or curved whenever desired. When electric current is passed through the resistance element 21 heat is generated and conducted to the foil 19. The foil 19 will then radiate its heat outwardly therefrom to effect heating of adjacent bodies.

Fig. 6 illustrates a further embodiment of the flexible panel 17 in which the sheet of foil 19 of Fig. 5 is replaced by a flexible fabric made up of woven strands 24 and 25 of aluminum foil. A resistance heating element 26 is adhered to the fabric 24—25 by an adhesive 27 and is covered by heat insulating material 28 and an outer cover 29. The structure of Fig. 6 has greater flexibility than that shown in Fig. 5 since the inner surface is of a woven material having greater inherent flexibility than a continuous sheet of metal, however thin.

In both the modifications shown in Figs. 5 and 6, the resistance heating element may be either an aluminum foil ribbon, as shown in Fig.

5, or a circular resistance wire of any suitable material, as shown in Fig. 6.

If desired, the inner surface of the above-described modifications may be covered by a layer of textile fabric material as described in connection with the embodiment of Figs. 1 to 3.

Although a limited number of embodiments of radiant heating covers have been disclosed, it is to be understood that other structures are contemplated and although their use has been described principally in connection with beds for invalids they may be used for other obvious purposes. They may be used as a regular heat supplying means for normal sleeping, instead of blankets, or may be employed to keep animals warm.

It is contemplated that the invention include all modifications falling fairly within the scope of the appended claims.

I claim:

1. A radiant hospital bed cover having a semi-cylindrical shape and adapted to be fitted in spaced relationship over a patient in a bed, consisting of an inner aluminum sheet, electrical heating elements adhesively united to said sheet by a non-conducting adhesive, an outer sheet of aluminum, inorganic insulating material positioned between said outer aluminum sheet and said inner aluminum sheet, and means to frictionally engage the sideboards of a bed, whereby said convalescent patient may be radiantly

heated by the heat rays emitted from said inner aluminum sheet.

2. The apparatus of claim 1 wherein the adhesive is a phenolic resin.

3. The apparatus of claim 1, wherein the organic insulating material is glass wool.

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