

[72] Inventor **Alfred Pohler**
Reutte, Austria
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[73] Assignee **Schwarzkopf Development Corporation**
New York, N.Y.
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[54] **ELECTRICALLY HEATED CHAIR**
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219/549, 297/56, 297/180
[51] Int. Cl. **H05b 1/00**
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19.17, 214, 218, 386, 532-533, 536, 544, 542,
545, 552; 297/180.56, 453; 5/284, 347;
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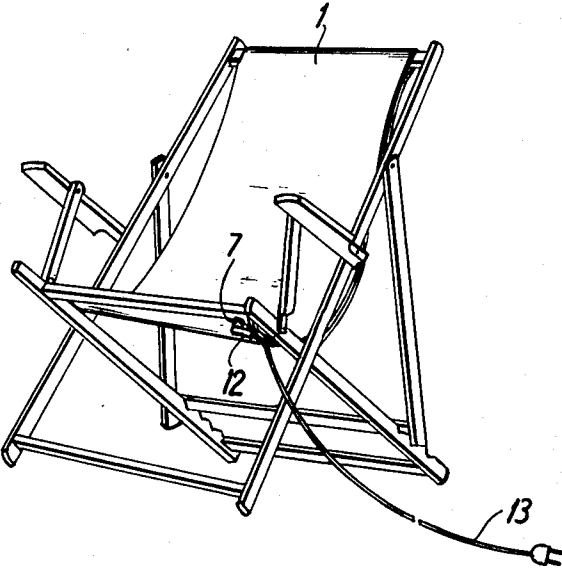
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Primary Examiner—Volodymyr Y. Mayewsky
Attorney—Morgan, Finnegan, Durham & Pine

ABSTRACT: An article of body-supporting furniture having an open frame and a receiving section connected to said frame to provide a seating area within the frame. The reclining section including a reclining, flexible heating surface having a layer of electrically conductive heating material, insulating layers enclosing said electrically conductive layer, and electrical contacts connected to said heating material for electrical connection to live voltage or a battery. The heating material having a positive temperature coefficient of electrical resistance to minimize voltage supply requirements and to provide current limitations.



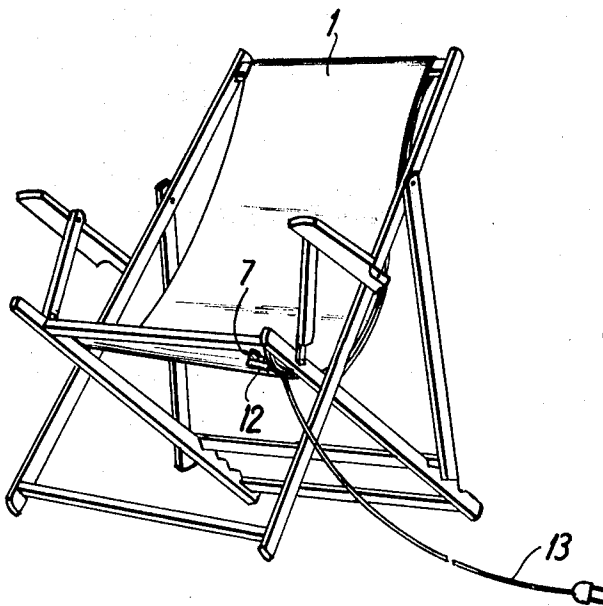


FIG. 1

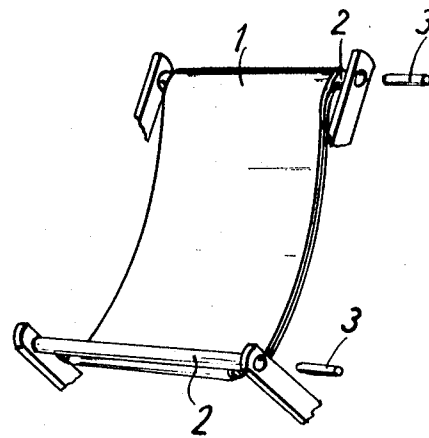


FIG. 2

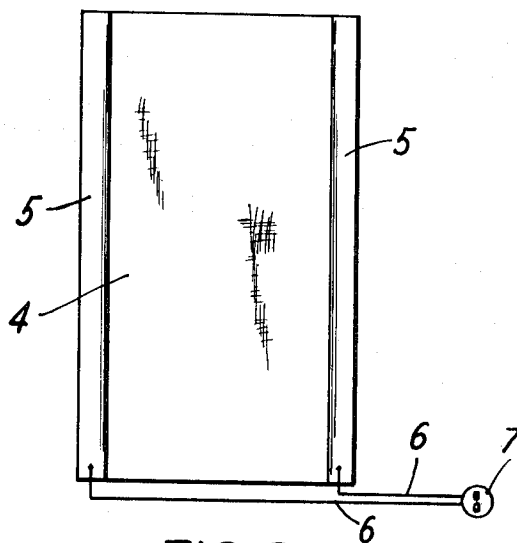


FIG. 3

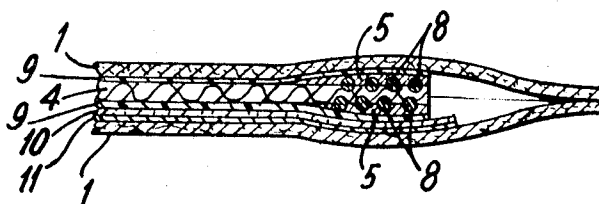


FIG. 4

INVENTOR.
ALFRED POHLER

BY

Morgan, Finnegan, Durham & Pine
ATTORNEYS

ELECTRICALLY HEATED CHAIR

This invention relates to electrically heated furniture and is described in terms of a chair structure, more specifically a heated reclining chair.

The use of deck chairs in open air on sunny but cool days has the disadvantage of exposing the body of the user to markedly different temperatures. It is an object of this invention to eliminate that disadvantage.

According to a further characteristic of the invention the heating of the reclining section is accomplished with a surface heat conducting unit which reduces only slightly the flexibility of the body supporting or reclining structure. The heating unit can be built integrally in the reclining surface, or the reclining surface can be treated to serve as a heat conductor.

Serving to illustrate the exemplary embodiments are the drawings of which:

FIGS. 1 and 2 are isometric views which illustrate line- and battery-energized embodiments;

FIG. 3 is a plan schematic view of the surface heating unit; and

FIG. 4 is a sectional schematic view through the reclining section on an enlarged scale.

FIG. 1 shows a deck chair which except as noted hereinafter is of customary construction. Assembled in the reclining section 1 is an electrically heatable surface heating unit. On the bottom of the deck chair a socket 7 (FIG. 3) is attached, the socket being connected with the surface heating unit by electric wiring as described hereinafter. In the socket a plug 12 with a flexible extension cable 13 has been inserted, the latter serving as a connection to a source of electric current.

FIG. 2 illustrates a battery-powered embodiment of the invention. The transverse rods 2 of the chair are of hollow cylindrical shape and serve to receive the battery, e.g., the cell 3.

The principal component of the heating arrangement is the surface heating unit 4, which is shown in FIG. 3. It can advantageously consist of a carrier material consisting of a synthetic material, e.g. Teflon, which has been treated to be heat conductive. Suitable techniques and compositions for this purpose have been reported in the literature and published patents. See for example, Swiss Pat. No. 456,741 as shown therein, the resistance material can preferably be made from nonpolar plastic materials including polyolefins, e.g., polypropylene, polyethylene, polybutene or mixtures thereof. Polyvinylchloride and lupolen can also be used. Dispersed in the nonconductive component may be graphite or carbon black. The surface heating unit is flexible and preferably substantially coextensive with the entire reclining surface or actually constitutes the reclining surface.

As current conducting materials one can use in addition to glass fibers, jute or muslin weavings, also sheets or weavings of artificial materials such as Diolen or Nylon. These conductive cloths and sheets generally exhibit a strong positive temperature coefficient of electrical resistance, so that current limiting occurs with increased heat and there is no primary dependence on external heat controls such as thermostats and the like. With the use of such surface heating units the danger of overheating is therefore avoided. In addition, they are insensitive to humidity and water.

The resistance value of these conductive layers may be selected such that the heating can be carried out with voltages not exceeding lethal values, e.g., voltages less than 65 volts. In this case the special precautions required to avoid shock are not necessary. For energizing the heater, one can employ alternating current via stepdown transformers (e.g., one which reduces the mains voltage to say 42 volts), or direct current, from batteries e.g. cells supplying 6, 12 or 24 volts. To simplify electric connection with the surface heating unit 4, one can

deposit the contact strips 5, as shown in FIG. 3, alongside the surface heating unit. This may be done for example by spraying copper to form the contacts. With these contact strips one can achieve an even distribution of current over the complete surface. Alternatively, the contact strips can be disposed over the broadside of the surface.

The current conductor wires 6 are welded or soldered to the contact strips 5 or connected thereto by using appropriate connectors. The wires 6 are connected in turn to the socket 7. Should a low voltage be required (preferably no more than 65 volts) a suitable socket of special configuration must be provided which will not receive the customary line voltage plugs. If batteries are used, they can be placed on the underside of the chair, e.g., in the hollow transverse rod 2.

FIG. 4 illustrates a cross section of the finished reclining structure. Woven into the surface heating unit 4, which in this case is constructed from fabric, are copper wires 8 disposed in the selvage to improve conductivity to the contact strips 5. If the deck chair requires a voltage over say 65 volts (e.g. line voltages) then the surface heating unit is covered with insulating material 9.

To reduce the heat loss at the underside of the reclining section as much as possible, the heat-insulating layer 10 is provided. In this case it consists of a synthetic material e.g., a coating of PVC or epoxy resin affixed to a rough aluminum foil heat reflector 11. The insulator 10 and the foil 11, the surface heating unit 4, and insulating layers 9, are encapsulated in the fabric sections 1, which forms the actual reclining surface of the deck chair.

It has been established that chairs according to the invention require very little electric power. Generally one needs less than 30 watts of power. The chair is particularly effective for use on cold, sunny winter days. The user of the deck chair is exposed in this event to the warm sun energy on one side and the warmth of the reclining section of the deck chair on the other.

The invention is not to be limited to the specific examples shown and is adaptable to other seats as well including garden chairs or benches, Hollywood swings, hammocks, car seats, chair lifts and the like.

What is claimed is:

1. An article of furniture comprising a body support having a plurality of longitudinal members arranged to form an open frame, and a reclining section connected to said frame to provide a seating area within the frame, said reclining section including a reclining surface having a flexible heating section which includes a layer of electrically conductive heating material with integral temperature-responsive distributed current-limiting means, insulation means for electrically insulating said layer of heating material, and electrical contact means connected to said heating material for supplying a voltage to said material whereby said reclining section is electrically heated, said current-limiting means comprise a material having a positive temperature coefficient of electrical resistance.

2. An article of furniture as defined in claim 1, in which said heating surface has a value of resistivity selected to provide a suitable heat output when energized by voltages of less than lethal value.

3. An article of furniture as defined in claim 1, in which said heating surface includes a layer of spray-deposited electrical contact material connected to said heating material.

4. An article of furniture as defined in claim 1, in which said layer of heating material comprises a unitary flexible plastic sheet occupying a substantial part of said reclining section.

5. An article of furniture as defined in claim 1, in which said layer of heating material constitutes a principal load-supporting component of said reclining flexible section.

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