Sept. 28, 1954 F. A. SHULER 2,690,415

FLEXIBLE SHEETLIKE ODOR-ADSORBENT BODIES AND METHOD OF PRODUCING SAME

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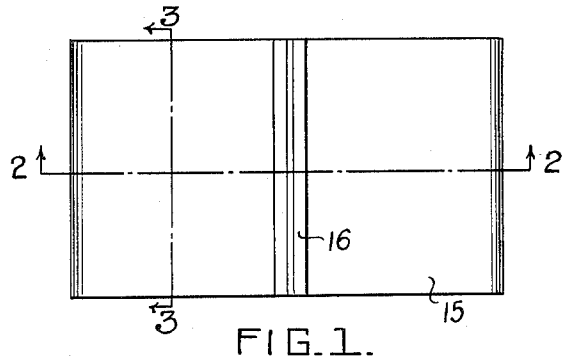


FIG. 1.

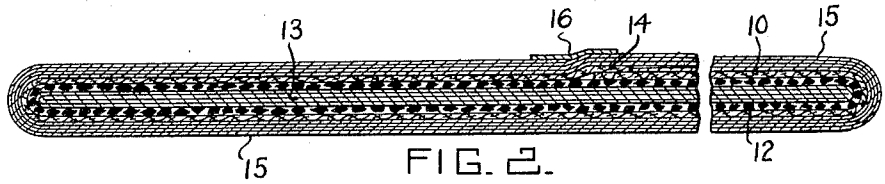


FIG. 2.

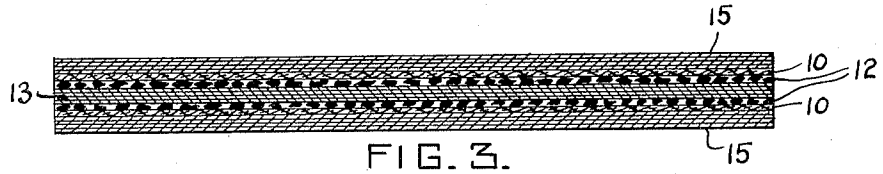


FIG. 3.

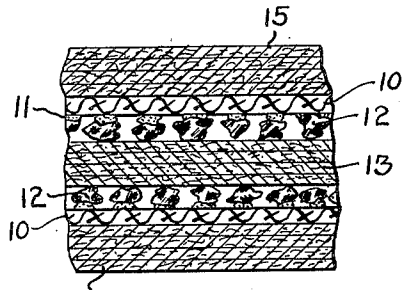


FIG. 4.

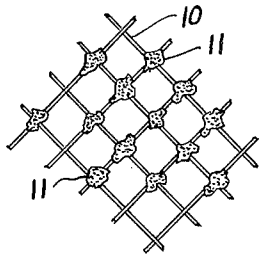


FIG. 5.

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FLEXIBLE SHEETLIKE ODOR-ADSORBENT BODIES AND METHOD OF PRODUCING SAME

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3 Claims. (Cl. 167—84)

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The present invention relates generally to deodorant or odor-adsorbent mediums, and more particularly to an improved flexible sheet-like body for use as an odor-adsorbent medium, such as a bandage, surgical dressing, blanket, or the like, employed in covering odoriferous wounds, decayed corpses, or other noxious bodies, and as catamenial bandages.

The present application is a continuation-in-part of my co-pending patent application Serial Number 732,837 filed March 6, 1947, entitled "Filtering Media," now United States Patent No. 2,544,733 issued March 13, 1951.

I am aware that the prior art discloses catamenial bandages comprising a plurality of layers of soft, pliable, fibrous material between which is interposed a mass or layer of deodorizing material, such as calcium hypochlorite and the like. A specific example of such type of bandage is disclosed in United States Patent No. 2,066,946 to Reiman, dated January 5, 1937. However, prior bandages of this type have met with little commercial success due to several marked disadvantages. The primary objection and undesirable feature of bandages which contain powdered or relatively finely divided chemical compositions stems from the inability of such bandages to maintain the odor-adsorbent medium in permanently dispersed position throughout the effective area of the bandage or dressing. Further, bandages of this type are generally characterized by undesirable bulges and relatively thick regions created by the sifting of the odor-adsorbent medium carried therein into localized areas of the bandage, or, alternatively, by a permanent confinement of such chemicals in a bulky mass within the bandage.

The efficiency of such materials as activated carbon, silica gel, and activated alumina in the capacity of odor-adsorbent mediums has long been recognized, but the primary difficulty encountered in using such materials stems from the difficulty in uniformly dispersing such materials in order to obtain efficient results from the odor-adsorbent characteristics of the material. It will be understood that bandages or dressings intended for use in connection with the human body must possess light weight characteristics, be soft and pliable to prevent chafing of affected areas, and must, at the same time, be porous or fluid-pervious.

It follows, therefore, that the primary object of the present invention is to provide an improved and efficient odor-adsorbent flexible sheet-like body which may be used in the capacity of

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a bandage, dressing, blanket, or the like to adsorb odors emanating from gangrenous wounds, decayed flesh, or glandular excretions, and wherein such body contains one or more layers of granular odor-adsorbent material uniformly dispersed throughout the body and secured therein against displacement by means of a permanently pliable adhesive.

Another object of the invention is to provide an odor-adsorbent sheet-like body which is constructed so as to be soft and pliable to the touch, and in a manner to prevent abrading of the odor-adsorbent medium carried within the sheet-like body when the body is folded or flexed.

Yet another object of the invention is to provide an efficient and economical method of producing odor-adsorbent bandages, dressings, blankets, and the like containing one or more layers of dispersed granular odor-adsorbent material adhesively secured therein, and wherein steps are taken to prevent substantial impairment to the over-all fluid-pervious and porous characteristics of the sheet-like body.

For a further and more detailed understanding of the present invention and the various additional objects and advantages realized therefrom, reference is made to the following description and the accompanying drawing, wherein:

Fig. 1 is a top plan view of an odor-adsorbent surgical dressing or bandage formed in accordance with the present invention;

Fig. 2 is an enlarged longitudinal vertical sectional view taken along a plane indicated by the line 2—2 of Fig. 1;

Fig. 3 is a transverse vertical sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a detailed vertical sectional view on a still larger scale taken through an intermediate sector of the bandage;

Fig. 5 is a top plan view showing in detail the discreet disposition of the adhesive upon the open-mesh supporting web of the bandage.

Referring now to the drawing, which is illustrative of but a single preferred form of the invention, constituting an odor-adsorbent surgical dressing or bandage, the numeral 10 designates a single web of open-mesh flexible woven material, such as is commonly referred to as surgical gauze, and which is formed from cotton fibers or other suitable fibrous material. As shown particularly in Fig. 5 of the drawing, the web 10 of gauze is of open-mesh construction provided by relatively wide spacing between the individual weft and warp strands, and is provided in the regions thereof where the weft and warp

strands overlap one another with discreet particles or masses of a permanently pliable adhesive 11. The adhesive 11 may be applied to the gauze web 10 in any suitable manner, such as by spraying, brushing, or rolling the adhesive onto the web, or by dipping the web 10 in the adhesive when the latter is in a liquid or plastic state, and thereafter permitting the adhesive to partially dry or cure to a relatively tacky state and accumulate only at the juncture areas of the weft and warp cords of the gauze web 10. Alternatively, after immersing the gauze web 10 within a liquid form of adhesive, the web may be disposed in the path of a forced air jet to expedite the partial evaporation of the solvent contained in the adhesive, and to forcibly blow that portion of the adhesive occupying the interstices of the gauze web 10 from between the individual weft and warp strands of the gauze and into adherence with the overlying areas of the strands only. In this manner, the disposition of the adhesive upon the gauze web 10 does not substantially impair the over-all porosity or fluid-pervious nature of the gauze, and permits the free flow of fluids through the gauze containing the particles of the adhesive only in the overlapping regions of the weft and warp strands thereof. It will here be understood that the adhesive 11 must be of a non-toxic type which is permanently pliable or flexible to some degree, in order that the gauze web 10 will retain its natural flexibility. In this respect, I have found it advantageous to employ a water-emulsion asphaltic type of adhesive, or one of the synthetic resinous or latex base adhesives using solvents or plasticizers that may be easily evaporated or driven off by heat treatment of the adhesive after application to the gauze web 10. As will be hereinafter more fully explained, the adhesive 11 must be of a character or type which is devoid of solvents or plasticizers constituting relatively non-volatile oils for which the odor-adsorbent material, such as activated carbon, silica gel, or alumina, has a high affinity. In this connection, I have found that a water-emulsion asphaltic cement or adhesive is best suited for the purposes of this invention, in view of the fact that water carried within the cement as an emulsifying or plasticizing agent may be readily driven off by evaporation under normal or relatively elevated temperature conditions from the adhesive, leaving the same in a substantially permanently pliable and tacky condition and disposed upon the overlying areas of the weft and warp strands of gauze web 10. Also, water carried by the adhesive, while being initially absorbed by the odor-adsorbent medium, will be readily given up by such medium in the presence of other liquids or gases for which the medium has a high preferential affinity.

After applying the adhesive 11, and insuring that the same does not fill the interstices of the gauze web 10, I then apply a layer of granulated odor-adsorbent material 12 to the adhesive-coated areas of the gauze, preferably in the form of granulated activated carbon. The size of the granules of odor-adsorbent material may vary within limits, but I have found it preferable to use granules of the order of 30 to 50 mesh size. The odor-adsorbent material in its granular form may be sprayed or sprinkled upon the adhesive-containing areas of the inner gauze web 10 on one or both sides thereof, or the adhesive-containing web may be passed through a mass of the granular material to cause adherence between the individual granules of odor-adsorbent material and the discreet particles of adhesive. Following the initial application of the granular odor-adsorbent material to the gauze web 10, excess granules of the odor-adsorbent material which are not adhered to the adhesive are removed from the web 10 by agitating, shaking, or brushing the same, leaving only a relatively thin but dense layer of the odor-adsorbent material covering the web 10. Due to the granular form of the odor-adsorbent material, the same does not completely close the interstices of the web 10, but permits fluid circulation through the web and through and between the individual granules of the material.

Following application of the adhesive and the layer of odor-adsorbent material to the inner gauze web 10, which has preferably been maintained in a flat condition, the web 10 is folded transversely around a plurality of plies or layers of adsorbent and fluid-pervious fibrous material 13 which provides a soft and pliable cushioning layer between the separate folded layers of the web 10 to prevent undesired abrading of the granules or particles of odor-adsorbent material carried upon the outer surfaces of the web 10. If desired, the mating marginal edge portions of the web 10 may be overlapped and joined, as at 14, to provide a double layer envelope within the bandage, with the individual layers being maintained in spaced relation by the intermediate plies 13 folded between the layers of the web 10. In this manner, it will be seen that the plurality of separate layers of odor-adsorbent material may be positioned within the bandage, in vertically spaced order throughout substantially the entire area thereof, while at the same time preventing the possibility of undesired abrading of the granular particles disposed on the web 10 and the consequent detachment thereof from the supporting web.

After the folding of the gauze web 10 containing the granular odor-adsorbent material and the interpositioning of the cushioning plies 13 to form a core section, the same is preferably wrapped into several plies of soft adsorbent fibrous material, such as unglazed tissue paper or fibrous gauze 15, to provide an outer covering for the web 10, the layers of granular odor-adsorbent material 12, and the cushioning plies 13. This may easily be accomplished by employing a single sheet of adsorbent paper material or gauze, and by loosely winding such single sheet in successive layers about the folded gauze web 10, maintaining a substantially flat and rectangular configuration within the bandage. The free end portion of the sheet or web 15 constituting the outer covering material may, if desired, be united with an underlying layer of the sheet by means of a relatively narrow strip of adhesive tape, such as is shown at 16. Also, if desired, the open end portions of the bandage may be closed in any suitable manner, such as by applying other strips of adhesive tape similar to that shown at 16 over the respective open ends of the bandage. However, due to the adherence of the individual granules of odor-adsorbent material to the inner web 10, the same are prevented from spilling outwardly through the ends of the bandage, and I have found that it is possible to cut a relatively large sheet-like body into smaller segments both transversely and longitudinally without fear of disassembling the separate plies comprising the bandage.

It will be understood that the outer covering

may be formed from any suitable fibrous material, and may constitute one or more layers of cotton gauze, unglazed tissue paper, or a relatively large envelope of wool fabric in cases where the body is to be used as a blanket or sheet in covering the entire human body. It is, however, prerequisite that the covering material be of a fluid-pervious nature to permit circulation of air through the successive plies or layers of material.

In making bandages and surgical dressings in accordance with this invention, I have found it preferable to employ a substantially continuous sheet as the inner gauze web 10 which may be taken from a roll and passed continuously through a vat or receptacle containing the adhesive 11 in a liquid or plastic form to apply the adhesive to the web Thereafter, the web may be subjected to forced air blasts to remove excess adhesive from the interstices of the web and to position the adhesive in discreet particles or masses at the overlying areas of the weft and warp strands of the web. Thereafter, the web 10 may be passed continuously beneath a hopper having a sifting discharge opening to disperse the granular odor-adsorbent medium over the entire area of the web for adherence with the particles of adhesive carried on the web 10. The excess of the odor-adsorbent material, which does not adhere to the adhesive, may be removed from the web by agitation, and a plurality of layers or plies of cushioning material, indicated at 13, placed upon the surface of the web containing the granular medium and the assembly folded transversely upon itself to form the inner odor-adsorbent core for disposition within the plurality of layers comprising the outer covering of the bandage or blanket, as such may be the case. In this manner, a substantially continuous operation is provided in the formation of relatively large sheet-like bodies which may be thereafter divided into smaller segments for use as individual bandages or dressings.

In view of the foregoing, it will be seen that the present invention provides an improved and efficient odor-adsorbent flexible sheet-like body in which is contained one or more layers of granular odor-adsorbent material, and through which gases may pass to contact the layers of odor-adsorbent material for the purpose of removing objectionable odors carried in, or comprising, such gases. Bandages, drawings, blankets, and the like formed in accordance with the present invention are characterized by their ability to carry the odor-adsorbent medium in a uniformly dispersed state throughout the entire area of the sheet-like body, and in view of the adherence of the individual granules of odor-adsorbent material to the supporting web, such granules are prevented from becoming displaced or sifting into relatively bulky masses in the end or corner regions of the sheet-like body, thereby preventing impairment of the odor-adsorbent characteristics of the body. A further advantage to the present construction results from the ability of the bandage to be sterilized without impairing the odor-adsorbent characteristics thereof, and where granulated activated carbon is employed as an odor-adsorbent medium, the same, through natural phenomena, readily gives up water vapor in the presence of noxious gases or other liquids for which the carbon has a higher preferential affinity.

I claim:

1. A soft, pliable, sheet-like body for use as an odor-adsorbent medium comprising an open-mesh fluid-pervious web of flexible absorbent material; a substantially permanently flexible adhesive disposed in discreet areas on at least one side of said web and arranged to prevent impairment to the fluid-pervious quality of said web; a layer of granular odor-adsorbent material substantially covering, and secured to, at least one side of said web by said adhesive, said adhesive being devoid of any material for which said odor-adsorbent material has a high preferential affinity to prevent impairment to the odor-adsorbent characteristics of said odor-adsorbent material; and an outer layer of flexible, fibrous, fluid-pervious material covering said layer of odor-adsorbent material.

2. The method of making a soft, pliable, odor-adsorbent, sheet-like body which comprises applying to at least one side of a flexible fabric sheet a permanently pliable adhesive in liquid form devoid of materials for which activated carbon has a high preferential affinity; dispersing said adhesive over said sheet in relatively closely spaced but discreet areas; dispersing over at least one side of said sheet granulated activated carbon to cause individual granules of carbon to adhere to the areas of adhesive; and thereafter folding said sheet and carbon and placing the same in an outer covering of soft, pliable, fluid-pervious, fibrous material.

3. A soft, pliable, sheet-like body for use as an odor-adsorbent medium comprising a flexible fluid-pervious woven sheet; a permanently pliable adhesive positioned in discreet areas on at least one side of said sheet; a layer of granular activated carbon secured to said sheet by said adhesive, said sheet and layer of carbon being folded to provide a plurality of plies, said adhesive being free of materials for which said carbon has a high preferential affinity to prevent impairment to the odor-adsorbent characteristics of said carbon; and an outer covering for said sheet and layer of carbon comprising a soft, pliable, fluid-pervious, fibrous material.

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