

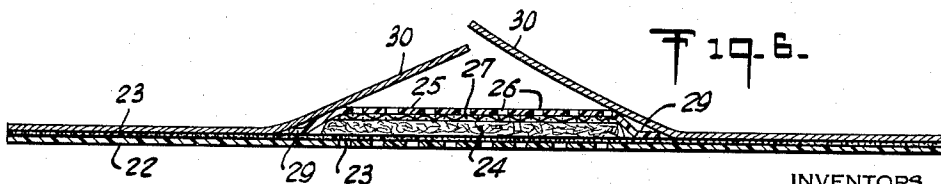
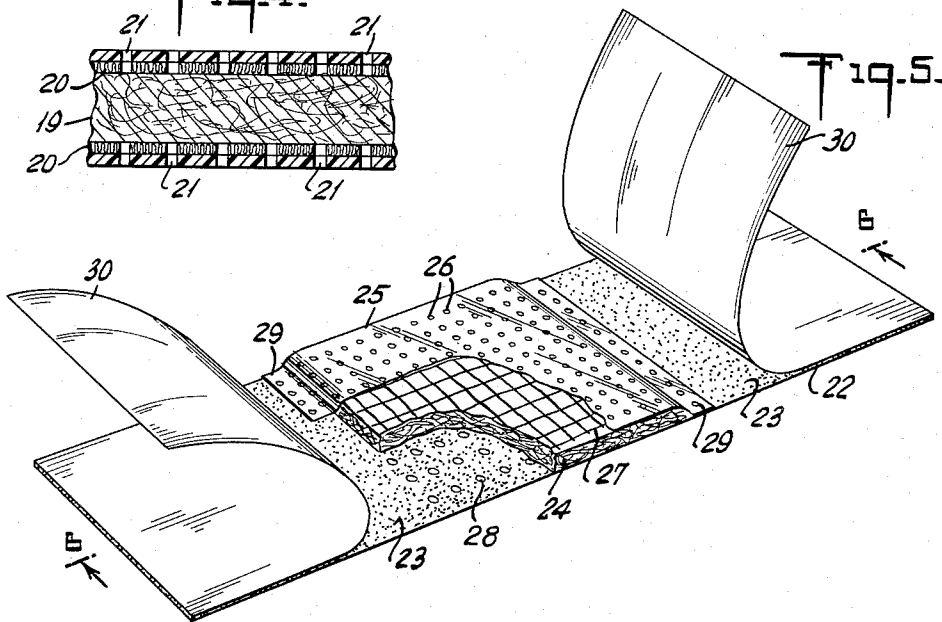
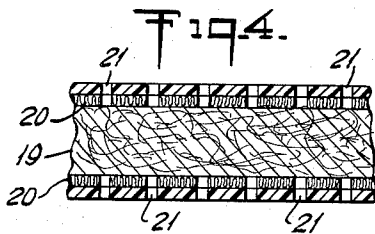
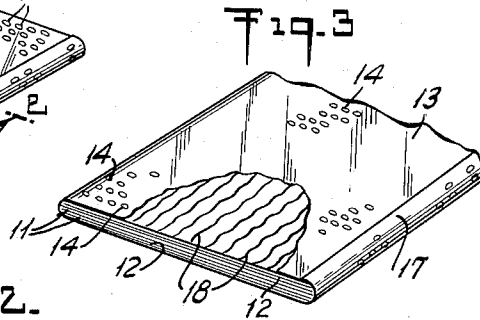
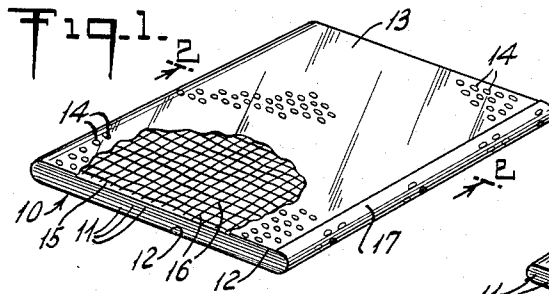
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DRESSING

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DRESSING

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19 Claims. (Cl. 128—156)

The present invention relates to surgical dressings and more particularly to dressings wherein the surface adapted to face the wound is formed of a perforated smooth flexible film.

It has generally been recognized that in the natural healing of animal wounds, the dressing serves primarily as a protection for the wound during the healing process. The problem with generally used dressings is that during the healing process the eschar tends to form or grow around parts of the dressing, thus making it difficult to later remove the dressing without tearing the eschar or scab and thus delaying the healing. In order to overcome this, it has heretofore been proposed to use a smooth, thin, flexible, non-water soluble film in direct contact with the wound. The film, which may be made of any smooth flexible material, is perforated or cut to permit passage of fluids through the film to an absorbent backing. Dressings have been proposed wherein the flexible, non-water soluble, perforated film is bonded to or wrapped around an absorbent pad. Dressings of this type are described, for example, in the British patent to Gellinsky, 439,085, specification acceptance date November 28, 1935 and the French patent to Weber, 947,609, published July 7, 1949.

Although these film-faced dressings are a substantial improvement, insofar as preventing adherence of the dressing to the wound during the healing process, the size of the holes or perforations in the film must be quite small in order to prevent the eschar from adhering to the absorbent material in the immediate vicinity of the perforations. Also, there is a substantial tendency for the perforations to become plugged or coked, thus decreasing the effectiveness of the absorbent backing, this tendency being greater the smaller the perforations.

It is an object of the present invention to prepare film-faced dressings in which there is substantially less tendency for the eschar to adhere to the absorbent backing. It is a further object of the present invention to form perforated film-faced dressings having improved absorbent properties. A still further object is to form film-faced dressings in which the perforations can be larger while avoiding adherence to the absorbent backing, thus permitting more rapid and complete drainage from the wound.

It has been discovered that the heretofore mentioned problems encountered with perforated film-faced dressings are substantially overcome, and the above and other objects and advantages realized if the perforated film is spaced from the absorbent pad or backing used in combination with the film by placing a spacer or spacers, relatively non-adherent to healing wound tissues, between the film and absorbent. Various types of spacing elements may be used. They may take the form of perforated tissues and nonwoven fabrics water-repellent in nature, of single threads or woven or knitted fabrics where the threads or the yarns from which the fabrics are prepared are formed of either a single or a plurality of continuous synthetic filaments, or any other flexible material substantially less adherent to healing wound tissue than the absorbent backing which will not tend to stiffen the dressing when placed between the absorbent and film and will space the film from the main body of absorbent material.

By continuous filament yarn is meant those synthetic

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yarns formed of substantially continuous filaments as opposed to yarns formed of natural fibers wherein the fibers are relatively short. These synthetic yarns, such as nylon, rayon, cellulose acetate, etc., offer a smooth continuous surface, free of protruding fiber ends. Because of their relatively smooth surface and freedom from fiber ends, these synthetic yarns have substantially less tendency to become attached to the healing wound surface than does a yarn formed of natural fibers. The yarn may be a mono-filament yarn formed of a single continuous filament or a multifilament yarn formed of several continuous filaments twisted together.

It is surprising that spacing elements, no thicker than a yarn having a diameter of about 0.005" or creped cellulose tissue which is about 0.005" thick, so effectively reduce any tendency for the wound to adhere to the absorbent material backing the perforated film. Probably one reason for this is the extreme thinness of these films. It is generally necessary to use films having thicknesses of less than 0.002" to have films of the desired flexibility. With films no thicker than this, the absorbent, back of the perforations in the film, is extremely close to the wound surface, and it takes very little growth into the perforations or extension of absorbent fibers through the perforations to cause sticking at this point. However, whatever the cause, wound release is substantially improved by the use of spacing elements in accordance with the present invention.

It is not necessary that the spacing elements, such as the threads where individual threads of continuous mono- or multi-filament synthetic yarn is used or a loose weave fabric formed of the same is employed, fall between the perforations in the film, but these threads can fall across the perforations without appreciably affecting the wound release characteristics of the dressing. The threads, however, should be of such diameter as related to the size of the perforations that blocking of the perforations does not result. It is generally preferred, however, that where practical, the spacing elements fall between the perforations in the film.

Although it is preferred that the spacing element lie between the perforations in the film, it is extremely difficult, particularly where a loose weave or knitted fabric of continuous filament yarn is used, to accurately align the openings in the fabric with the openings in the perforated film. As a result, many of the spacing threads will lie across the perforations in the film. However, there seems to be no tendency for the threads, even when placed in a haphazard manner, to block the perforation and interfere with proper drainage of the wound. This is probably due to the relatively small diameter of the threads as compared to that of the perforations and the large number of perforations in the film. Actually, drainage from the wound area can be improved over that heretofore obtained with film-faced non-adherent dressings because of the somewhat larger perforations that can be used due to the presence of the spacing elements.

The invention is further illustrated by the drawings in which:

FIG. 1 is a perspective view of a dressing in which a portion of the film is removed to show a woven fabric spacer;

FIG. 2 is a view taken along line 2—2 of FIG. 1;

FIG. 3 is a dressing in which individual threads have been used as spacers;

FIG. 4 is an enlarged view of a section of a dressing in which a water-repellent crepe tissue is the spacing element;

FIG. 5 is a bandage of the adhesive type made in accordance with the present invention; and

FIG. 6 is a cross-sectional view taken along line 6—6 of FIG. 5.

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Referring to the drawings, the dressing of FIG. 1 contains an absorbent pad or backing 10 formed of several layers of absorbent surgical crepe tissue 11 wrapped in a layer of carded absorbent cotton 12. The absorbent pad thus formed is enclosed in a thin lubricous film 13 having perforations 14, the film 13 being separated from the dressing by a low count woven fabric 15 formed of a continuous filament yarn made up of a plurality of continuous rayon filaments. The individual threads 16 of the fabric 15 serve to separate and space the carded cotton 12 from the film 13 and particularly to prevent fibers of the absorbent cotton from extending through the perforations 14.

In assembling the dressing, the film is first preferably perforated and the low count continuous filament fabric then cemented to the film. A layer of carded cotton is then placed on the fabric followed by a layer of absorbent surgical cellulose crepe tissue. The film is then folded over and bonded to itself, as shown at 17, either by cement or through a heat seal where the film is thermoplastic, to complete the dressing.

Although there is little chance of the spacing thread contacting the wound surface, there is always the possibility that this may occur. Continuous filament threads or yarns should therefore be used. Fabrics having a count of 14 x 10 to 44 x 36 threads per square inch are quite suitable. It is also generally preferred that the diameter of the individual threads be within the range of about 0.004" to 0.007".

In the modification disclosed in FIG. 3, instead of a low count fabric, individual continuous filament threads 18 are cemented to the perforated film. These serve to space the film 13 from the absorbent cotton 12 in the same manner as does the fabric 15 of FIG. 1.

In FIG. 4, a section of a dressing similar to that of FIG. 1 is illustrated, the dressing differing only in the form of absorbent backing and spacing element used. In this particular modification, the absorbent 19 is of the conventional absorbent cotton type. The spacing element 20 is formed of a thin sheet of water-repellent crepe tissue having a thickness of about 0.005". In preparing the dressing of this particular embodiment, the water-repellent crepe tissue was first bonded to the film 13 with a water-insoluble cement and the composite of film and water-repellent crepe tissue then perforated, as by punching, to form holes 21. The punched film and crepe tissue were then wrapped around a pad of absorbent and the ends sealed to give a dressing having the general appearance of that of FIG. 1.

The embodiment shown in FIGS. 5 and 6 is a dressing of the adhesive bandage type wherein 22 is a backing strip either of fabric or film coated with a pressure-sensitive adhesive 23. Secured to the strip 22 is a pad 24 of absorbent material covered by a thin, smooth, flexible film 25 containing perforations 26. Between the film and the absorbent backing 24 is a layer of low count fabric 27 woven of continuous filament yarn. In the embodiment shown, the fabric 27 is cemented to the under surface of the film 25. The adhesive-coated backing strip 22 is also provided with perforations 28 in the area over the absorbent pad to permit breathing of the dressing and evaporation from the absorbent 24. In the particular embodiment illustrated, the film facing 25 extends beyond the pad area and is bonded to the adhesive-coated backing at 29. The adhesive 23 of the backing is protected by cover strips 30, which are removed prior to application of the bandage.

The perforations in the lubricous film should be present in sufficient number to permit ready passage of excretions from the wound surface into the absorbent backing. It is generally preferred that these perforations have an open area equivalent to a circle having a diameter of 0.01" to 0.2" and be present in sufficient number and so dispersed as to provide, for each square inch of film surface, an open area of at least 0.0075 sq. in., the open area gener-

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ally varying within the range of 0.1 to 0.4 square inch per square inch of film.

In the preferred practice of the present invention, polyethylene terephthalate films, such as sold under the trademark "Mylar," are used because of their flexibility, resistance to high temperatures, such as used in steam sterilization, their strength, and somewhat lower cost as compared to other suitable film materials. However, any film may be used as long as it is sufficiently flexible, insoluble in water, substantially inert to the wound excretions, and sufficiently thin to readily adapt itself to the surface conformity of a wound. Other film materials that have been successfully used are films made of high pressure polyethylene, low pressure polyethylene, irradiated polyethylene, polyvinyl chloride, plain parchment paper, cellulose acetate, polyvinylidene chloride and nylon.

The film should be quite thin, film thicknesses of less than 0.001" generally being preferred. There is no limit to film thinness except strength.

Where the perforated film is bonded to the spacer by an adhesive, the adhesive used should preferably be non-water soluble and one that does not interfere with the healing process or tend to stiffen the film facing. It should also maintain its bond after sterilization. The bonding may be done either by a suitable cement or by heat sealing if the film is of a thermoplastic nature.

Although various modifications of the invention have been described in order to illustrate the same, the invention is not limited to these specific modifications which are given for the purpose of illustration only. The invention is to be limited only in accordance with the appended claims.

Having thus described our invention, we claim:

1. A dressing comprising a pad formed of absorbent material having an outer facing on at least one side formed of a perforated, flexible, water insoluble, lubricous film and flexible relatively non-wound adherent spacing elements between said film and said absorbent pad.

2. A dressing of claim 1 wherein the spacing element is threads of continuous filament yarn.

3. A dressing of claim 2 wherein the spacing threads are woven into a low count fabric.

4. A dressing of claim 3 wherein the fabric has a thread count of about 14 x 10 to 44 x 36 per square inch.

5. A dressing of claim 2 wherein the threads are formed of a monofilament yarn.

6. A dressing of claim 2 wherein the substantially continuous filament yarn is knitted into a loose knit non-absorbent fabric, which acts as the spacer.

7. A dressing of claim 1 wherein the spacing element is a thin, perforated sheet of water-repellent crepe tissue.

8. A dressing comprising a perforated, flexible, water insoluble, lubricous film having bonded thereto a thin sheet of water-repellent crepe tissue paper, the perforations in said film passing through said paper and an absorbent pad in contact with said crepe tissue.

9. A dressing comprising an absorbent pad, a flexible non-absorbent perforated film on both sides of said pad, the film on at least one side being formed of a flexible, water insoluble, lubricous material relatively non-adhering to healing tissue, a relatively non-wound adherent spacing element being positioned between said absorbent pad and said lubricous film.

10. A dressing of claim 9 in which said spacing element consists of a plurality of substantially continuous filament threads extending across the face of said absorbent pad.

11. A dressing of claim 10 in which said threads are woven into a fabric having a count of 14 x 10 to 44 x 36 threads per square inch.

12. A dressing of claim 10 wherein the substantially continuous filament threads are knitted into a loose knit fabric which acts as the spacer.

13. A dressing of claim 9 in which the spacing ele-

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ment is a thin, perforated sheet of water-repellent tissue paper, the perforations in said sheet being in alignment with the perforations in said lubricous film facing.

14. A dressing comprising an outer wrapping of a perforated lubricous film, a low count fabric woven of a continuous filament yarn in contact with said film, an absorbent cotton layer in contact with said low count fabric and an absorbent crepe tissue paper in contact with said absorbent cotton.

15. An adhesive dressing comprising an adhesive-coated base of flexible material, an absorbent pad smaller than said base supported on the adhesive-coated side thereof, a perforated, flexible non-water soluble film covering said pad and a relatively non-wound adherent spacing element between said film and said pad.

16. A dressing of claim 15 wherein said spacing elements are substantially continuous filament threads.

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17. A dressing of claim 16 wherein the spacing threads are woven into a low count fabric.

18. A dressing of claim 16 wherein the substantially continuous filament threads are knitted into a loose knit fabric which acts as the spacer.

19. A dressing of claim 15 wherein the spacing element is a thin, perforated sheet of water-repellent crepe tissue, the perforations in said sheet being in alignment with the perforations in the film facing.

References Cited in the file of this patent

UNITED STATES PATENTS

2,923,298 Dockstader ----- Feb. 2, 1960

FOREIGN PATENTS

22,327 Great Britain ----- 1910

776,408 Great Britain ----- June 5, 1947

661,113 France ----- Feb. 26, 1929