Oct. 25, 1932. S. ROSENBLATT 1,885,007

SURGICAL WRAPPING OR DRESSING

Filed Feb. 19, 1932

Fig. 1.

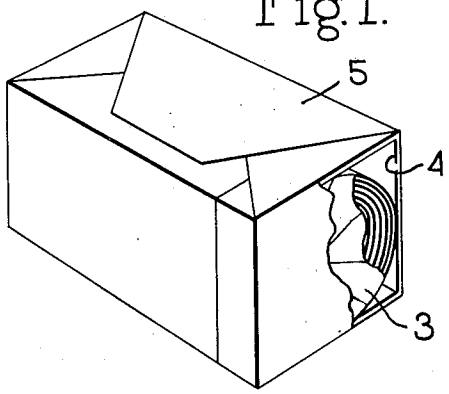


Fig. 2.

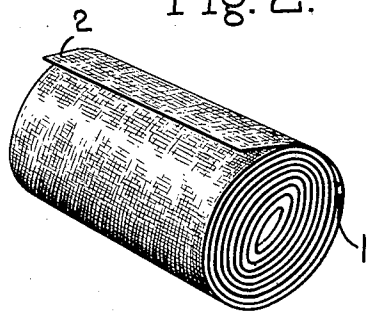


Fig. 3.

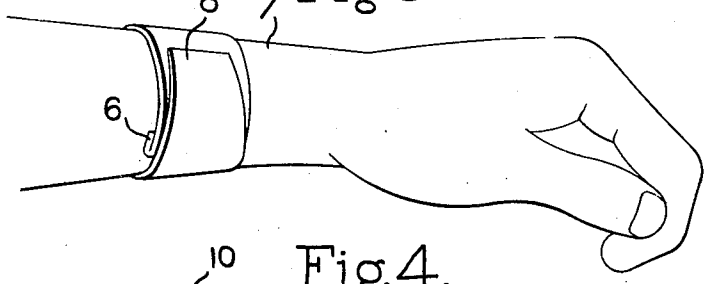


Fig. 4.

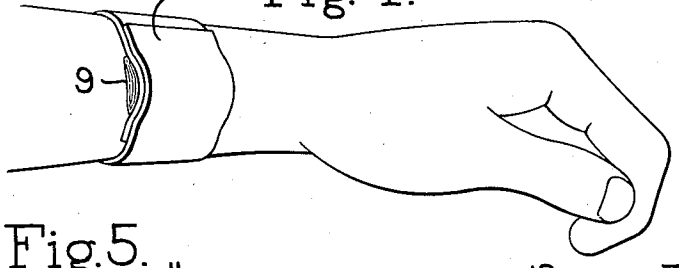


Fig. 5.

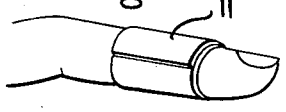


Fig. 6.

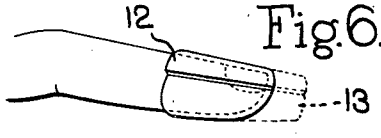


Fig. 7.

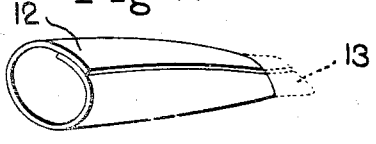
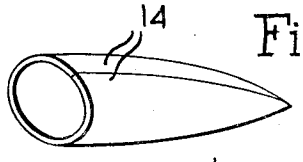


Fig. 8.



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Attys.

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UNITED STATES PATENT OFFICE

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SURGICAL WRAPPING OR DRESSING

Application filed February 19, 1932. Serial No. 593,969.

This invention involves a novel surgical wrapping or dressing and has for its object to provide such an article possessing highly retentively certain characteristics which enable it to have a wide range of use in the medical profession and in the treatment of an animal body and particularly of the human body, and which enable it to eliminate the disadvantages of wrappings and bandages heretofore in use for these purposes.

The present application is a continuation in part of a prior application, Serial No. 509,670, filed January 19, 1931.

The nature and objects of the invention will appear more in detail from the accompanying description and drawing and will be particularly pointed out in the claims.

In the drawing:

Fig. 1 is a view in perspective partially broken away of a simple and preferred form of package containing a surgical wrapping or bandage embodying the present invention and adapted to maintain its sterility.

Fig. 2 is a view in perspective of a preferred form of the wrapping or bandage itself.

Fig. 3 is a view illustrating the wrapping when applied as a tourniquet.

Fig. 4 is a view illustrating the application of the bandage for holding a surgical direct application in place.

Fig. 5 is a view showing the application of the surgical bandage directly to a member.

Fig. 6 is a view showing the surgical bandage applied in the form of a finger cot.

Fig. 7 is a view in perspective of a cot formed from the surgical bandage.

Fig. 8 is a view similar to Fig. 7 of a slightly different form of cot.

The basis of the article embodying this invention is a sheet or strip of relatively thin pure crude rubber. By the term crude is meant that the rubber as it occurs in nature has not had added to or mixed with it any ingredients such as required for compounding or vulcanizing or for other purposes which would adulterate the rubber or tend to render it unfit for use where surgical or other morbid conditions prevail, and by pure is meant that the rubber has been produced as free from foreign matter as ordinary commercial conditions permit. A high quality of natural commercial coagulated latex in the crêped form which is well known on the market as "thin pale crêpe" is the best example at present known of the pure crude rubber which may be utilized as the basis for the article of this invention.

This pure crude rubber is treated to insure that it shall possess and retain to a high degree the following characteristics, first, non-adherence to hair or skin, second, great elastic extensibility, third, sufficient porosity to permit the passage of air therethrough. As a further feature of the invention this pure crude rubber is treated to insure that it shall possess and retain to a high degree the characteristic of, fourth, tenacious cohesion when pressed together. Preferably also as a still further feature of the invention, this pure crude rubber is treated to insure that it possess and retain to a high degree the characteristic of, fifth, sterility.

No other surgical wrapping or bandage is known highly retentively to possess these characteristics. By "highly retentively" is meant that these essential characteristics shall be continued to be possessed by the wrapping or bandage throughout any reasonable period required for commercially supplying the wrappings and bandages and their application and use. Tests have demonstrated that the required characteristics are retained for a period of two years, which is ample for this purpose.

The characteristic of non-adherence to hair or skin is self-explanatory. While pure crude rubber usually possesses this characteristic, it is retained and insured in this invention. A wrapping or bandage of this invention may be applied to and held under tension or pressure against the hair or skin of the body for an indefinite period without adhering thereto. This is of great importance as it enables the article to be applied and removed without the difficulty and pain which characterized the use of adhesive tapes and bandages generally employed and as it enables the article to be applied and removed without first removing hair from the afflicted

part of the body. The article of this invention, unlike the old adhesive tapes and bandages, does not when removed tear or displace scar tissue which has formed, nor open a wound, nor otherwise act detrimentally to the healing period that has started.

The characteristic of great elastic extensibility is of great importance because it enables the wrapping or bandage to be applied under an abnormal or desired degree of tension and consequently of pressure on the afflicted part of the body and because it enables it to be molded or fitted to the part of the body or to any dressing or device employed in connection therewith. By "great elastic extensibility" is meant that the wrapping or bandage shall be capable of extension to at least three times its length and when its use is terminated, that it shall return approximately to its normal length. Thus any desired degree of tension and subsequently of pressure on the afflicted part or the dressing is readily secured and retained throughout any required treatment period. In practice it is found that the wrapping or bandage of this invention may be stretched to six times its length and still retain a high degree of elasticity during normal treatment periods. This characteristic enables the article not only to be employed as an ordinary surgical wrapping or bandage, but also to be employed as a tourniquet without danger of rupturing the skin where a high degree of tension must be maintained in order so to constrict a member of the body as to prevent the flow of blood therethrough. But it will be understood that for a large range of uses it will be sufficient for the article to possess only a sufficient degree of elastic extensibility to perform its function as a wrapping, dressing, or other article.

The characteristic of "sufficient porosity to permit the passage of air" through the wrapping or bandage is an important one. The pure crude rubber employed, especially in the preferable crêped form, possesses this characteristic to a substantial degree and this characteristic is enhanced by the treatment given and still further by the extension of the article when applied in use. The article therefore affords the skin an opportunity to "breathe" and hence does not "draw" when applied, all of which is highly desirable in such an article.

The characteristic of "tenacious cohesion when pressed together" is highly important. While the surfaces of freshly cut crude rubber cohere when pressed together, this characteristic in this invention, as the result of the treatment, is materially augmented with the result that when overlapping portions of the wrapping or bandage are pressed together, the cohesion is a tenacious one and sufficient to hold the wrapping or bandage in position under the tension imposed by great extensibility and without the aid of any additional appliances. In its preferred form the condition is such that when the surfaces are pressed together and maintained at body temperature, a practically inseparable cohesion takes place. Thus the article is distinguished from the surgical wrappings and bandages in common use where additional appliances such as adhesive tape or other special securing and fastening devices are required. This also enables the bandage readily to be made into special unitary self-contained articles, such, for example, as finger cots.

The characteristic of sterility must essentially be somewhat relative. But the article of this invention is so constructed and treated as to have a very high degree of sterility enabling it, if applied directly from the original package, to be used with the same degree of safety as packaged sterile bandages and dressings are now used.

The invention therefore presents an entirely novel article presenting the characteristics hereinbefore set forth which give it a wide range of utility and render it unique in the field to which it relates.

In the best known and preferred process of producing the article of this invention, the required results are developed by properly correlating the temperature of the application of heat to the sheet or strip of crude rubber, the time period of the application of this heat, and the thickness or penetrability to heat of the rubber. With thin crêped rubber such as the ordinary "thin pale crêpe" of commerce in separated form, if the sheet or strip be subjected to hot air, it is found that the most satisfactory results are obtained at a temperature of 212° F. for a period of about thirty minutes, although satisfactory results have been obtained at this temperature for a period of about ten minutes. Quite satisfactory results are also obtained at a temperature as low as 150° F. if the period is at least thirty minutes. The heat may also be conducted directly to the rubber from a hot surface where the conditions are somewhat similar to the dry heat treatment. If the rubber is immersed in water, satisfactory results are obtained at a temperature as low as 150° F. for a period of thirty minutes and at higher temperatures the period may be reduced. If the water be maintained at the boiling point, a period as low as a minute or two produces satisfactory results, while prolonged boiling is not so satisfactory. The best results are secured if the rubber be subjected to steam at substantially 212° F. or under the conditions such as obtain in an ordinary surgeon's instrument sterilizing outfit. In this case the characteristics are developed in a very short period of time, good results being obtained in five minutes, but as the ordinary practice of sterilization requires the

subjection of the article to be sterilized to about 212° F. in the presence of moisture for thirty minutes, it is desirable to maintain the rubber subject to the steam for that period and highly satisfactory results are developed under these conditions. This data will be sufficient to enable the desired treatment to be effected. When the desired qualities have been secured in the rubber, further prolonged treatment tends to destroy the desired qualities and if carried too far will result in ruining the product. When the rubber is treated in the roll form or in the package a suitable increase in time must be allowed to enable the heat thoroughly to penetrate the mass.

This treatment of the sheet or strip of rubber by correlating the temperature of the applied heat, the period of time during which it is applied, and the thickness or character of the rubber effects what is generally known as a partial depolymerization of the rubber, or, in other words, controls the degree of depolymerization to retain and develop the required characteristics of non-adherence to hair or skin, great elastic extensibility, sufficient porosity to permit the passage of air therethrough, and tenacious cohesion when pressed together, as well as sterility when required, without developing the adhesive or sticky characteristics which further depolymerization would produce and would render the rubber unfit for the desired use.

If a number of sheets or strips are treated together, soap may be employed to prevent the sheets from cohering and, when this is done, the sheets when removed from the bath of water or steam are placed in a second bath of clean water maintained at about the boiling point and in and by which the soap is removed. If it is desired further to treat or medicate the sheets or strips, they may be passed from the second bath to a third bath containing a liquid solution of the desired medicating ingredient, such, for example, as glycerin or eucalyptol. The use of glycerin has the further beneficial advantage that the wrapping or bandage may be used in a cold climate or its characteristics maintained where the temperature goes below freezing because the glycerin acts to maintain the article soft and pliable and enable it to be applied without preheating.

In order that the wrapping or bandage may be packaged, stored and furnished without premature self-coherence, it is desirable and usually necessary to provide the article in the form of a plurality of alternating layers of the rubber and of a suitable fabric. In the broadest use of the invention as merely for a wrapping or tourniquet under certain conditions and where sterility is not important, the strip of pure crude rubber embodying the invention may be coated with talc or similar material to prevent cohesion, although the end portions of the strip should be left uncoated so as to enable the ends to be pressed together and to cohere when the strip is applied in use. Under ordinary circumstances, however, the interposed strips or layers of fabric are employed. This fabric may be of paper, cloth or other suitable material, but is preferably of the nature of a gauze fabric commonly employed for surgical dressings.

The wrapping or bandage is preferably furnished in roll form comprising a strip of the fabric and a strip of the rubber rolled up so that the fabric serves to prevent the layers of rubber from cohering, so that the fabric covers the entire roll, and so that the fabric itself may be separately used as a direct application or for other purposes. In the most desirable form the entire package or roll is rendered sterile. This enables the fabric to be used as an application applied directly to the wound, for example, and then the rubber strip to be applied thereover and secured by cohesion in place on the afflicted part.

In the drawing, in Fig. 2 there is shown a surgical bandage in roll form comprising the strip of pure crude rubber 1 and the strip of fabric 2 wound in concentric layers and with the fabric 2 overlapping the rubber. In Fig. 1 is shown a complete package ready for sale. The article of Fig. 2 is here enclosed in a paper wrapping 3, then in a pasteboard container 4 and the whole enveloped by a paper wrapping 5.

In Fig. 3 is shown the article applied as a tourniquet. A strip of the wrapping of the required length is taken and preferably one end 6 is bent back and pressed into coherence with the body of the strip to form a compress to be lodged over an artery, for example. Then the strip is extended to produce the required tension and wrapped around the member, as, for example, the arm 7, and then the overlapping portion is pressed against the under portion to cause it to cohere thereto. The narrowing in width and the decrease in thickness of the end 8 of the strip indicates that the strip is applied under high tension.

In Fig. 4 the article is shown as applied to a wound on an arm. In this case an application 9 which may be a piece of the fabric 2 is shown applied directly over the wound and then a strip 10 of the rubber bandage of this invention is wrapped around the arm over the application and with its ends overlapped and cohering to hold the application in place under slight tension.

In Fig. 5 is shown an illustration of the bandage applied directly to a slight wound on a finger. The rubber strip 11 is here wrapped directly around the finger, overlapped and pressed together.

In Figs. 6 and 7 is shown a finger cot formed from the article of this invention. In this case a piece of the rubber bandage of

sufficient size is taken and wrapped around the finger and overlapped at 12 and with its end portion 13 protruding beyond the end of the finger. Then the overlapped portion is pressed together to effect coherence. The end portion 13 beyond the finger is also pressed together to effect coherence and then this end portion 13 may be trimmed off or removed, leaving a closed finger cot in place. A similar device is shown in Fig. 8, excepting that here the edges 14 of the rubber strip are directly abutted and pressed together and thereby caused to cohere. These finger cots may, of course, be applied directly to the finger or have a dressing interposed.

The entire treatment, including sterilization when the article is furnished in roll form, as shown in Fig. 2, is conveniently effected after this roll has been placed and enclosed in the wrapping 3. The roll thus wrapped, for example, may be placed in the steam bath and maintained therein at the required temperature for the required time, as hereinbefore pointed out. This eliminates any handling or contamination of the roll of fabric and rubber during its final packaging and its subsequent distribution.

If further sterilization is required when the article is applied to its use, it may be effected in the same manner as surgeons' instruments and dressings are sterilized.

While the invention is independent of the particular color of the pure crude rubber, it is usually desirable that the article shall be as light in color as possible and bleaching may be effected by raising the temperature or prolonging the time of the heat treatment provided depolymerization is kept within the limits required to maintain the desired characteristics.

The package in which the article of this invention is preferably marketed, as illustrated, is of a neat and pleasing appearance, maintaining the sterility while the interposed layers of fabric act further to maintain the sterility of each other.

There is thus presented a novel and unique article of manufacture having a wide range of use in the medical profession and in the treatment of surgical or morbid conditions of the body.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A wrapping or dressing described consisting of a partially depolymerized strip of unvulcanized crude rubber highly retentively possessing the characteristics of non-adherence to hair or skin, great elastic extensibility and sufficient porosity to permit the passage of air therethrough.

2. A wrapping or dressing described consisting of a partially depolymerized strip of unvulcanized crude rubber highly retentively possessing the characteristics of non-adherence to hair or skin, great elastic extensibility, sufficient porosity to permit the passage of air therethrough, and tenacious cohesion when pressed together.

3. A sterile surgical bandage consisting of a package of a plurality of layers of sterile fabric alternating with sterile partially depolymerized layers of unvulcanized crude rubber highly retentively possessing the characteristics of non-adherence to hair or skin, great elastic extensibility, sufficient porosity to permit the passage of air therethrough, and tenacious cohesion when pressed together, the said layers acting to maintain the sterility of each other and the fabric layers preventing premature cohesion of the rubber.

4. A wrapping or dressing described consisting of a partially depolymerized strip of unvulcanized, thin, pale crêpe rubber highly retentively possessing the characteristics of non-adherence to hair or skin, great elastic extensibility, sufficient porosity to permit the passage of air therethrough, and tenacious cohesion when pressed together.

5. A wrapping or dressing described consisting of a partially depolymerized strip of unvulcanized, crude rubber highly retentively possessing the characteristics of non-adherence to hair or skin, elastic extensibility, and sufficient porosity to permit the passage of air therethrough.

6. A wrapping or dressing described consisting of a partially depolymerized strip of unvulcanized crude rubber highly retentively possessing the characteristics of non-adherence to hair or skin, elastic extensibility, sufficient porosity to permit the passage of air therethrough, and tenacious cohesion when pressed together.

In testimony whereof, I have signed my name to this specification.

SAMUEL ROSENBLATT.