

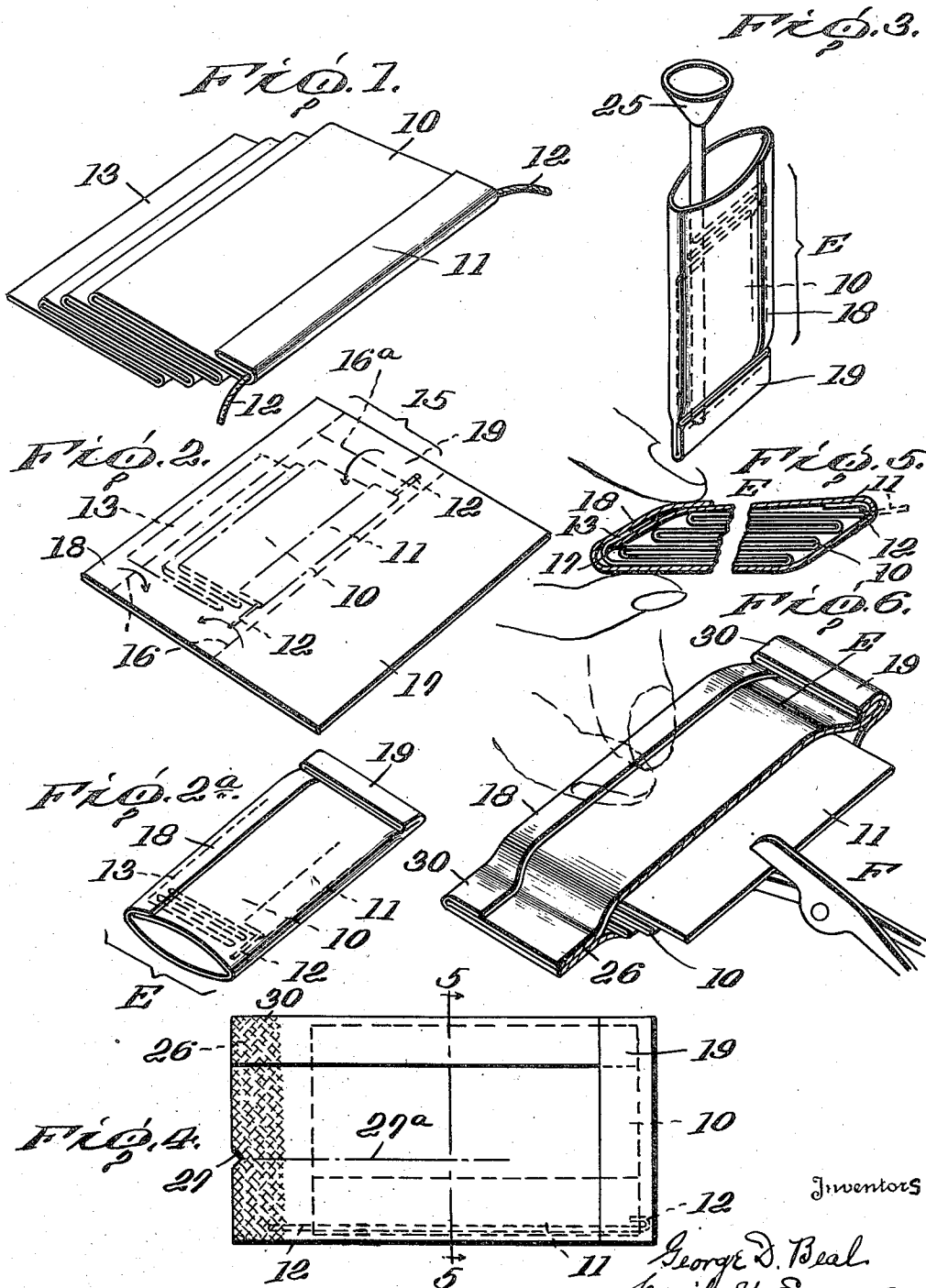
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BANDAGE PACKAGE

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BANDAGE PACKAGE

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This invention is concerned with a package of surgical dressing with inclusion of means for preventing soiling of this dressing prior to the time of use, and with the provision of means by which the dressing may be progressively withdrawn from its folded condition in the package and expanded into strip-like form for application.

The dressing is especially adapted for employment under conditions where the carrier fabric, such as gauze, is impregnated with an unctuous, pasty, semi-liquid or jelly-like substance such as petroleum jelly, a fatty ointment, or a viscous aqueous emulsion either with or without medicaments: such impregnants or saturants will be herein termed "adherent liquids" because they remain adherent to the carrier when the latter is withdrawn for use.

The dressing package is substantially flat and flexible, and comprises the folded gauze or carrier fabric contained within a tightly sealed wrapper or envelope of flexible material, with the dressing itself protected against penetration of contamination such as infective matter; and has the advantage, in the event of employment of petroleum jelly or like fluid saturants, of preventing seepage or leakage of such saturants.

With this and other features in view, as will appear in the course of the following description and claims, an illustrative form embodying the invention is shown in the accompanying drawing, in which:

Figure 1 is a perspective view indicating the folding of the dressing fabric.

Figure 2 is a perspective view showing the fabric and a wrapper.

Figure 2a is a perspective view showing the folding and sealing of the wrapper around the fabric to provide an open-ended envelope.

Figure 3 is a perspective view conventionally illustrating the introduction of molten petrolatum into the envelope, with the pile of fabric located within the latter.

Figure 4 is an elevation of the face of the completed package.

Figure 5 is a conventionalized cross-section through the same, on a larger scale, substantially on line 5—5 of Figure 4.

Figure 6 is a perspective view showing the package after opening and indicating a manner of withdrawing the strip therefrom.

In the form of practice illustrated in the drawing a single strip is shown, although obviously the package may contain one or more such strips.

In the drawing, a strip of fabric such as surgical absorbent gauze, muslin, calico, percale, or

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the like, and composed of staple or filamentary yarns of cellulosic, proteinaceous or synthetic fibers, is folded to provide a step-wise arrangement of the doubled edges at the left in Fig. 1, by which each doubled edge at the left in this illustrated form extends farther to the left than the adjacent doubled edges above it, and the final edge 13 extends beyond the last doubled edge. In practice, it is preferred to obtain this by alternation of long and short folds to provide a pile 10 of superposed layers as shown in Figure 1, having a substantially parallelogrammic cross-section (Figs. 2 and 5) as each successive doubled edge extends farther toward the left than a corresponding doubled edge above it. The upper and right hand free edge in Figure 1 is shown as folded to provide a fold 11 in which is inserted an unfolding thread 12. The left hand or lower free edge 13 projects beyond the doubled edge immediately above it, to complete the step-wise arrangement of the left-hand edges, as illustrated.

The unfolding thread may be formed from a staple yarn, a filament yarn, a monofilament, or a strip of material; and may be of cotton, linen, silk, synthetic silk, regenerated cellulose, metal, or like material which is resistant to the saturating material, and has the tensile strength requisite for effecting withdrawal.

This pile 10 is then enclosed and tightly sealed in a protective envelope.

In the illustrative form of practice, the envelope is formed around the pile by placing the pile 10 upon a sheet 15 of flexible, tearable, foil-like material such as regenerated cellulose, varnished paper, metallic foil, etc., capable of preventing entry of contamination to the pile, which material is then folded substantially at the lines 16 indicated by dash lines and in the manner shown by the arrows, to provide a flattened tubular structure, with the panel 17 lying closely upon the pile 10 but not extending over the entire area of the fabric near the free edge 13. The panel 18 at the opposite margin of the sheet is then folded on top of the panel 17 and secured thereto throughout their lengths. One end of the tube, including the panel 19, is then tightly sealed.

The package, thus far prepared, has the pile 10 within the open-ended envelope as shown in Figure 2a. It will be noted that one end of the thread 12 projects beyond the pile 10 and is received between the panels 17 and 19, and is detained in such position by the adhesive which is employed for closing and sealing the envelope at such end thereof; but preferably does not ex-

tend to the margin of the original sheet (see Fig. 2).

The assembly of the pile 10, in its open-ended envelope, is then subjected to a sterilizing operation, for example by hot steam in an autoclave.

The envelope thus prepared is represented by E in Figure 3, and is then positioned with its open end upward and molten petroleum jelly is introduced as by a funnel 25, using a predetermined quantity of this petroleum jelly corresponding, for example, to 250 to 400 percent of the weight of the fabric. It is preferred in practice to accomplish this operation in a chamber for maintaining sterility of the partly formed package E and of the petroleum jelly.

The funnel 25 is withdrawn and the lips at the open end of the envelope are brought together and sealed, whereby a package is obtained as shown in Figure 4, in which this seal is indicated by the dotted cross-hatching 26. The pile 10 of folded fabric, now saturated with petroleum jelly and the edge of the fold 11 are shown by dash lines. The thread 12 is shown by dotted lines, and it will be noted that, as in Figure 4, the right hand end of this thread may be caught within the refolded portion of the envelope at the panel 19, while the left hand end extends into the cemented area 26 but does not extend to the outside of the package, whereby wicking is prevented but the ends of this thread are securely held in position. It is preferred to provide a nick or notch 27 for initiating the tearing operation at the opening, this notch being formed at the margins of the sealed lips at a point relatively inward from the position of the thread 12, and having its end within the area 26 of the sealed lips of this package.

The securing of parts of the envelope together may be accomplished in various ways. Thus, the entire surface of the wrapper sheet may be originally supplied with a heat-sealing coating, and the securing of panels 17, 18 to form the tube, the sealing at the panel 19 and the securing of the refolding end, as well as the final closing of the open end, may all be accomplished by appropriate heating means for temporarily softening the coating to a tacky adhesive condition while exerting pressure upon the contacting parts. It will be noted that when the refolding of the panel 19 is omitted, the wrapper material need only be coated at the inner side.

Further, it is included within this invention to employ a wrapper material which does not become adhesive upon heating and to accomplish the securing of the parts by application of an adhesive material directly to the sheet as an incident to the shaping and assembly. Suitable adhesives are those of types presently employed in securing together sheets of regenerated cellulose, metallic foil, etc., and should be selected as providing a flexible joint, with exclusion of substances which may weaken under atmospheric conditions or water-immersion, or which provide a nutrient substrate for organisms. Thus dissolved, hot-fluid or hot-tacky organic bodies such as cellulose ethers and esters, phenolic and other resins, and the like may be used; and these have been found effective even when petroleum jelly is used as a saturant, as they form tight seals against leakage thereof. When metal foil is used, it may also be secured by welding or soldering.

Further, the invention includes the employment of an envelope of flexible sheet material which becomes cohesive upon heating, so that the envelope may be formed and sealed by heating

and pressing portions of the material together. Suitable substances of this class are organic plastics of high molecular weight which form flexible sheets and become thermoplastic, pressure-sensitive and self-adherent upon heating to a temperature of say 250 degrees F. and have satisfactory strength and resistance characteristics, such as vinyl, acrylate and halo-acrylate resins, and the hydrocarbon-resistant synthetic elastomers of butadiene condensation. High molecular weight vinyl resins may be formed into flexible sheets, and used for envelopes to contain petroleum jelly or other greases. With such materials, the parts to be joined are heated to the pressure-sensitive condition, and then pressed together and allowed to cool.

In employing the package, the thin, protective, tearable and flexible material of the envelope can be torn by starting at the notch 27 and pulling the material so that it begins to rip in the general direction designated by the dash-dotted line 27a extending from the notch 27 in Figure 4. The tearing of the envelope is continued until the entire edge has been torn away, being the bottom edge in Figure 4. This tearing is illustrated as occurring through both sides of the envelope, being essentially along the straight line 27a; and the notch 27 prepares the envelope for such rupture essentially parallel to the doubled folds and remote from the step-wise offset doubled folds at the left in Figure 5, so that tension may be exerted along the partly-withdrawn strip as described hereafter, while employing the envelope to prevent contact with parts of the carrier which have not yet been withdrawn.

As the thread 12 is fixed in the material of the envelope, it acts to draw or to unfold the fold 11 and pull it out of the package, from the position shown in full lines in Figure 5 into the position shown by dotted lines in this figure, and thus into the position indicated in Figure 6.

This removal of the edge of the envelope therefore permits the user to seize the fold 11 with sterile forceps F and pull the fabric, with its saturation of the petroleum jelly therein and thereon, out of the residue of the envelope E.

It will be understood that the thickness and separation of the materials of the carrier strip and envelope of the preferred package have been exaggerated in the drawings for clearness of description; and that in the preferred practice the materials may be very thin so that a flat package is produced. Thus, the employment of flexible wrapping material for the envelope permits the latter to conform closely to the carrier strip in its folded condition.

By reason of offsetting or step-wise sloping arrangement of the successive folds or double layers, the operator can press upon the flexible wrapper with his finger, as shown in Figures 5 and 6, thereby exerting sufficient detaining pressure upon the successive folds so that the fabric is detained while the envelope margin is being torn away, and then the fabric is drawn out successively and the desired end-wise tension can be exerted for assuring that the strip is fully extended as it is applied; and it will be noted that the strip can be drawn forth by one or more double layers at a time and the tensioned length thus obtained is engaged with the patient's arm, for example, and the residue of the package passed around the arm successively as further folds are withdrawn, thus avoiding possible contact of the sticky strip with external objects during the course of application. By slipping the

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upper finger (Figs. 5 and 6) successively toward the left, the double folds are successively released so that they may be drawn out and expanded.

It will be noted that if the other free end 13 be engaged between the panels 17, 18 this will permit a further tension to be exerted upon the bandage when all of the straightened folds have been withdrawn from the envelope, and this free edge 13 will be released when the pressure by the finger is removed and the extreme edge 30 of the envelope employed for pulling the residue of the envelope E from the end 13 of the bandage.

As shown in Figures 1 and 5, the pile 10 is of substantially parallelogrammic cross-section and hence a compact, flat package is provided, which in an illustrative case contains about 30 inches of absorbent gauze of a width of 3 inches and formed with successive folds which are offset about $\frac{1}{4}$ of an inch and have an average width of about $1\frac{1}{2}$ of an inch. With this, the flat form of the package is a rectangle of 2 inches by $3\frac{3}{4}$ inches, with a maximum thickness of about $\frac{1}{8}$ of an inch. The wrapper material used for the envelope was a regenerated cellulose film having a thickness of about 0.001 inch, and this has been found to be easily tearable for use of the bandage strip but, due to its flexibility, it is substantially free from accidental damage by which the petroleum jelly may leak out or by which any infective matter may gain access to the interior of the envelope.

In preparing this package, an essentially sterilized gauze was employed of the type known in the U. S. Pharmacopoeia, twelfth revision, as Type I. Absorbent gauze, of cotton staple and having 44 warp threads per inch of width and either 36 or 40 filling threads per linear inch, as the interstices between threads of such a gauze have been found excellently adapted for remaining substantially filled with petrolatum upon withdrawal from the package.

In this illustrative form of practice, the bandage was saturated or impregnated with a semi-liquid or jelly-like material, specifically petroleum jelly, or petrolatum described in the United States Pharmacopoeia, twelfth revision, having a specific gravity between 0.815 and 0.865 at 60 degrees C., with a standardized melting point substantially between 100 and 140 degrees F. This petrolatum remains soft at 30 degrees F. and below, so that it is ready for immediate use under all normal conditions of application to the flesh; and has essentially the characteristics of a soft, plastic mass of microcrystalline structures embedded in fluid hydrocarbons of high viscosity, and of forming a coherent and adherent mass on and in the individual folds of the fabric so that the operation of separating these folds from their superposed zigzag position brings the strip into an extended condition having a substantially continuous saturation and coating of petrolatum thereon.

It is preferred to establish the pile of folded fabric and then to provide the same with a wrapper, and to sterilize the semi-assembled package in this condition, as this permits the employment of relatively high steam temperatures without difficulty, and assures a definitely sterile condition. On the other hand, the procedure of manufacture of petroleum jelly, in separating it from other petroleum components or fractions, together with subsequent refining operations, effects a thorough sterilization thereof, and any infection is normally a result of condition subsequent to the preparation. Such minor possibilities of sub-

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sequent infection may be circumvented by substantial treatment of the finished petrolatum with steam under pressure and then maintaining it in a closed system until actually filled into the package.

By bringing the sterile petroleum jelly into the sterilized, partly-assembled package under sterile conditions, and then closing and sealing the lips of the envelope under sterile conditions, the bandage is thus itself freed from contamination of bacterial nature and does not require further sterilization prior to use.

It will be understood that the illustrative forms of practice are explanatory and are not limited, and that the invention may be employed in many ways within the scope of the appended claims.

What is claimed:

1. A surgical bandage package comprised of a single zigzag folded strip of fabric, one edge of each fold being positioned so that it projects a substantial distance beyond the corresponding edge of the subjacent fold, and an envelope of flexible protective material enclosing and tightly sealing the fabric against entry of contaminating material and closely conforming to the parallelogrammic cross-section of the folded fabric, said envelope having a side edge portion tearable to form an opening exposing the end fold of the strip for withdrawal while enabling the opposite folded edges of the strip to be detained by finger pressure through the envelope.

2. A surgical bandage package comprised of a single zigzag folded strip of fabric, one edge of each fold being positioned so that it projects a substantial distance beyond the corresponding edge of the subjacent fold, said fabric being saturated with an adherent and cohesive liquid substance, and an envelope of flexible protective material enclosing and tightly sealing the fabric against contaminating material and closely conforming to the cross-section of the folded fabric, said envelope having a side portion tearable to form an opening exposing the end fold of the strip for withdrawal while enabling the opposite folded edges of the strip to be detained by finger pressure through the envelope.

3. A surgical bandage package comprised of a single folded strip of fabric having the successive folded edges offset in stepwise arrangement, said strip being saturated with an adherent and cohesive liquid material, and an envelope of flexible protective material enclosing the pile of folded fabric and sealing said liquid within the package, the said envelope material being effective upon local pressure to engage and detain the folds adjacent said folded edges selectively according to the point of application of the pressure so that non-detained folds may be selectively and successively withdrawn through an opening parallel to the edges of said folds and remote therefrom, said envelope also including a weakened portion for permitting the formation of said opening along a line essentially parallel to a doubled edge of said strip of fabric and at a predetermined distance therefrom.

4. A substantially flat surgical bandage package comprised of a single zigzag folded strip of fabric having alternating long and short folds forming a pile of parallelogrammic cross-section with the successive folded edges offset in stepwise arrangement with each folded edge projecting beyond the preceding one and the strip ending in a projecting folded edge, and an envelope of flexible, grease-proof material enclosing and tightly sealing the fabric and petroleum jelly and

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closely conforming to said pile and the material of the envelope being locally yieldable under external pressure whereby external pressure may be exerted through the envelope material upon the folds of the strip on that end of the package opposite the end of the package containing the projecting folded edge to detain the pile within

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the envelope while leaving the folded end free, said envelope having means for severing the material thereof and forming an opening adjacent to and parallel with the folded end of the strip and as wide as the strip.

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