July 26, 1949. D. R. BRADY 2,477,403

SURGICAL BANDAGE

Filed Nov. 24, 1944

FIG-1-

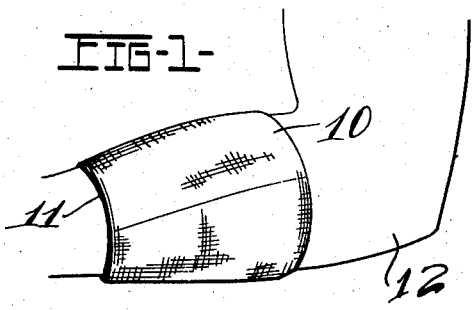


FIG-2-

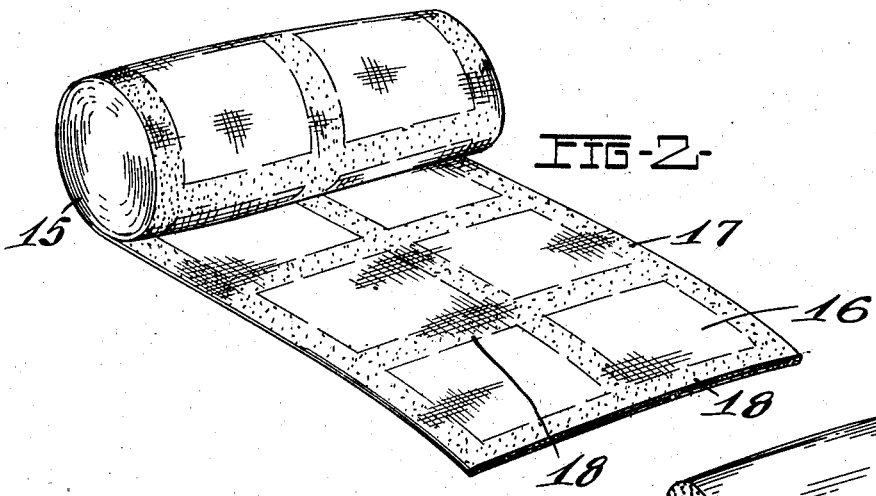
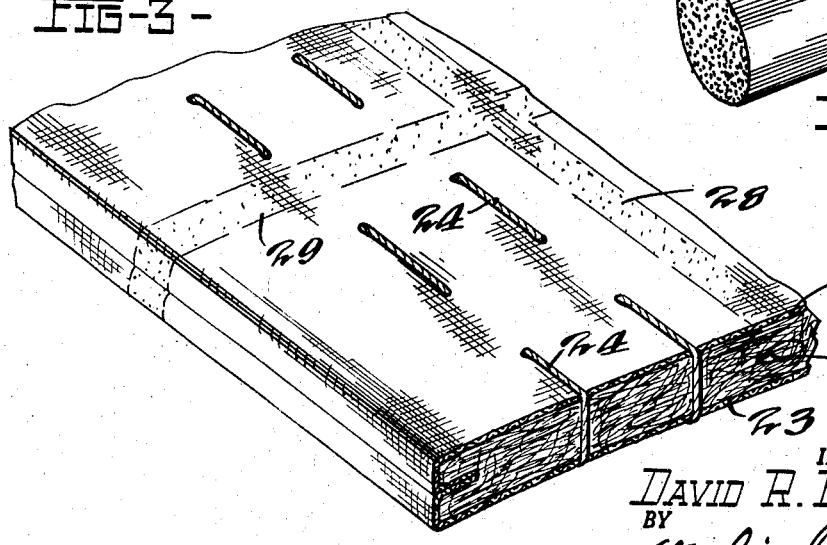


FIG-3-



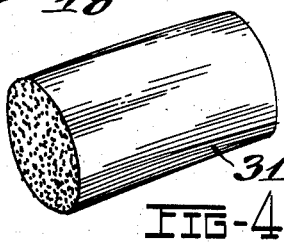


FIG-4-

INVENTOR.
DAVID R. BRADY
BY
Stachin & Overman
ATTORNEYS

Patented July 26, 1949 2,477,403

UNITED STATES PATENT OFFICE

2,477,403

SURGICAL BANDAGE

David R. Brady, Detroit, Mich., assignor to Owens-Corning Fiberglas Corporation, a corporation of Delaware

Application November 24, 1944, Serial No. 564,986

2 Claims. (Cl. 128—156)

1

My invention relates to surgical bandages, dressings, wound packs, and the like.

It is an object of the invention to provide substantially non-absorbent surgical bandages of non-toxic material. The non-absorbent nature of the bandages aids in the healing of wounds, burns and ulcerated conditions since it does not disturb or remove from the injured surface the exudate which naturally coagulates and forms the aschar. While being substantially non-absorbent the bandage of the present invention is sufficiently porous to act similar to previous bandages in holding the said exudate in the neighborhood of the surface of the wound, permitting coagulation and healing to take place.

It is a further object of the invention to provide surgical bandages devoid of projecting fiber ends and fuzz that would permit the healing tissues or granulating surface of a wound or burn to mesh with the fiber ends, creating pain and discomfort to the patient and making removal of prior fibrous bandages difficult.

It is a further object of the invention to provide bandages of materials capable of resisting high temperatures and moisture so that they may be sterilized at temperatures in excess of those permissible with present day bandages, and to provide bandages that will not shrink when subjected to moisture at elevated temperatures. These properties permit the bandages to be reused.

It is another object of the invention to provide bandages having these properties and made of materials that are inert and will not affect nor be affected by the usual medicinal substances employed in conjunction with the bandages.

Referring to the drawing:

Figure 1 is a perspective view of a bandage of the present invention in use;

Figure 2 is a perspective view of a roll of bandage embodying the present invention;

Figure 3 is a fragmentary perspective view of a compression bandage made in accordance with the present invention; and

Figure 4 is a perspective elevational view of a bandage in the form of a pad to be used as a drain wick or pad.

The invention is applicable to all of the types of bandages, dressings, and wound packs as presently used. It may be employed for dressing and treating most of the types of wounds, burns and ulcers requiring bandages, dressings, and packs, and may be used with superior results in conjunction with all of the present medicaments and drugs now applied with cotton bandages.

2

The present invention provides a bandage in the form of a fabric of interwoven fibrous glass. The weave may be of any desired type and is preferably moderately tight, and the cloth may be of any desired thickness although for ease of application relatively thin cloths of about 1 to 2 mils thickness are usually preferable.

The fibrous glass is most desirably of the type sold as continuous filament glass fibers. These fibers are made by continuously drawing out small streams of molten glass by means of a rotating drum to form filaments which are collected in strands on the drum, with the filaments extending substantially continuously throughout the length of the strand. The strands are twisted and plied to form yarns and the yarns woven into cloths in the conventional way. The individual filaments extend substantially throughout the major dimensions of the cloth so that cloths made from this type of fibrous glass are smooth and free from fuzz and projecting fiber ends. Bandages made from this cloth exhibit little tendency for the healing tissues of the granulating surface to mesh with the fibers of the cloth.

The smooth glass fibers and the smooth yarns resulting from the intertwisting of these fibers of continuous lengths provide a fabric which will deform readily under biasing tension to conform to body contours and closely overlie injured areas.

The non-hygroscopic nature of the glass fibers provides a bandage that is substantially non-absorbent so that the exudate from a wound or burn is not absorbed by the bandages and removed from the surface of the wound. At the same time the pores of the cloth and the tiny interstices between the fibers in the yarns and the spaces between the yarns making up the cloth act to hold the exudate at the surface of a wound or burn to permit coagulation and thus facilitate healing.

The same property of the glass fiber bandage prevents the soaking up of medications and drugs in such large proportions as to be a substantial loss. Only small amounts of medicaments are taken up in the interstices of the glass fiber bandage, and even these are quickly released, so that the major proportion by far of the substances applied with the bandage are readily available to the wound.

Figure 1 shows a bandage 10 in use. The bandage shown comprises woven glass fiber cloth 11 wrapped several times about an injured member 12. Suitable means such as gauze, tape or ad-

hesive tape (not shown) may be used in the ordinary way to secure the bandage in place.

The bandages of the present invention may be supplied in rolls of woven material from which are cut pieces of required size at the time of dressing a wound. It has been found desirable to provide means for limiting the fraying and unraveling of the cut edges of the bandage. For this purpose the cloth is impregnated with a suitable material along bands coinciding with the lines on which the bandage is to be cut. The impregnating material should, of course, be pliable and non-toxic and have a fairly high resistance to temperature although the fact that it may soften under elevated temperatures is not a serious objection since the softened or liquified impregnant will be held in place by the meshes of the cloth. Substances such as latex, silica cement compound, plasticized vinyl acetate and vinyl chloride polymers and copolymers, vinylidene chloride, and various other materials available as synthetic rubber, may be employed to impregnate the fabric by brushing, spraying, or rolling a solution of the substance onto the fabric in the regions desired.

A roll **15** of bandage **16** made in this way is illustrated in Figure 2. The bandage **16** of interwoven glass fiber yarns is impregnated along bands **17** extending lengthwise of the bandage and along bands **18** extending crosswise of the bandage. The bands may be spaced as desired depending on the kinds of bandages intended and ordinarily are spaced apart about six inches so that the bandage may be cut along the impregnated regions to form a piece six inches square as the smallest bandage or to form pieces that are multiples of this smallest piece. The bands usually need be only about one-half inch in width.

The bandage of the present invention may be used alone, or in combination with cotton gauze by applying the fibrous glass bandage directly over the wound with or without the application of a medicament thereto and then binding the fibrous glass bandage in place with a wrapping of gauze or other cotton material. In this application the advantages flowing from the smooth fibrous glass cloth are realized and there is also a substantial decrease in the absorbency of the entire bandage due to the spacing of the cotton material from the wound by the interjacent fibrous glass. In certain cases where a still lower absorbency is required or where for other reasons it is preferable to dispense with all cotton, the entire bandage may consist of several wrappings of fibrous glass held in place with tapes of woven glass fibers or by means of adhesive tape in the ordinary way. If desired the adhesive tape, too, may be formed of a ribbon of interwoven fibrous glass coated with the conventional pressure-sensitive adhesive.

The invention is also applicable to compression type bandages or dressings of the kind that are ordinarily used for skin grafting compression cushions, or where various medicaments are applied topically, as for the application of saline or Dakin's solution. It is also applicable to compression dressings used for preventing or retarding pain by exerting pressure on the injured area, to allay shock, and to aid healing of the epithelium.

In such use of the invention, the glass fiber cloth is applied directly to the wound surface and an absorbent material such as cotton or cellulose sheets is applied over the cloth to absorb exudate from the injured area where the exudate contains toxic substances or where it is desired to collect the exudate for analysis. In this application the absorbing material is separated from the surface of the wound by the glass cloth so that there is little opportunity for the healing tissues to contact the fuzzy absorbing material and intermesh therewith.

This same arrangement of dressing is useful where it is desired to apply saline or other solutions to the surface of the injured area. In such a case the solution or other medicament is applied to the absorbent material which acts as a reservoir to retain the solution and feed it to the surface of the injured area through the glass cloth, the glass cloth acting as a filter or screen and preventing engagement between the absorbent fibrous material and the surface of the injured area.

Figure 3 illustrates a compression bandage or dressing made by enclosing loosely felted fibrous material **21** between two layers **22**, **23** of fibrous glass cloth. The fibrous material may be held in place by quilting stitches **24** passing either through both layers of the cloth or through one layer of the cloth and the fibrous material where it is desired to maintain a perfectly smooth surface on one face of the bandage. The quilting is done preferably by employing a thread of fibrous glass but cotton, silk or other threads may be used if desired. The fibrous filler **21** of the bandage may consist of cellulose such as that sold as Cellucotton, cotton fibers, mechanics waste, or the like, or may be formed from mats of haphazardly arranged fine glass fibers loosely felted to provide a flexible highly resilient fibrous body. In the latter case the all glass compression bandage has the advantage of inertness of inorganic substances.

Similarly to the bandages previously described, the compression bandage may be supplied in rolls which may be cut into pieces of the required size at the time of use. Also as in the case of the previously described bandages, the fabric facings of the compression bandage may be impregnated along bands **28**, **29** corresponding with the desired lines of cut to avoid raveling of the cut edges of the fabric.

In the cases both of the fibrous glass bandage backed up with absorbent material and in the case of the quilted compression bandage last described, it is usual to hold these in place over the injured area by wrapping with a water-proof flexible material such as thin, wide strips of resinous materials such as plasticized vinyl acetate or vinyl chloride polymers and copolymers.

The invention also provides wicks or packs used for drainage of wounds. In this case the fibrous glass in the forms of loosely aggregated fibers, or strands or yarns loosely bundled together, are arranged as a wick to be packed into the opening of the wound to draw exudate from the opening by capillary action. The loosely aggregated fibers as well as the strands or yarns are preferably arranged in parallelism to insure the desired capillarity.

An arrangement of the fibers in this way is shown in Figure 4. Here the pad **31** is illustrated in the form of a flat pad of glass fibers all arranged in substantial parallelism and extending lengthwise of the pad. This arrangement of the fibers may result from any suitable operation such as combing or carding a mass of glass fibers to arrange them in substantial parallelism, or by winding the fibers, or yarns or strands of the fibers, on a drum or creel and then cutting the

package of fibers thus formed and unrolling it to form a flat pad.

In the latter case and when glass fibers of the continuous filament type are employed, the pad contains a multiplicity of fibers extending lengthwise of the pad throughout the full length thereof to provide an effective medical drain pack. The freedom of the pack from fuzz is of particular value in this case, where the pack is normally placed in very intimate relation with the healing tissues. The pad may be cut transversely or divided lengthwise to provide packs of any desired size.

The glass fibers to be incorporated in the packs are advantageously made from a lead-containing glass, of which there are many, so that the fibers will be opaque to X-rays. This permits an X-ray examination of a healed or partly healed wound as a check to determine whether any fibrous material has been allowed to remain in the healing wound.

I claim:

1. Surgical bandage material comprising a plurality of layers of fabric of interwoven glass fiber yarns, and an absorbent pad of intermatted fibrous glass interjacent said layers, said pad of fibrous glass being formed of loosely felted fibers and having substantial flexibility and resilience so that the bandage material may be rolled up.

2. A surgical bandage in the form of a fabric piece adapted to be supplied in rolls and applied as covering or wrapping to parts of the human body, the fabric comprising closely associated glass fibers, all of the individual fibers extending

substantially continuously throughout both major dimensions of the fabric, whereby the bandage is free of projecting fiber ends and fuzz, and an absorbent pad of intermatted fibrous material overlying said fabric.

DAVID R. BRADY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
582,926	Johnson	May 18, 1897
1,569,955	Falter	Jan. 19, 1926
2,152,012	Albion	Mar. 28, 1939
2,164,499	Coughlin	July 4, 1939
2,184,899	Shand	Dec. 26, 1939
2,190,431	Lewison	Feb. 13, 1940
2,319,019	Van Court	May 11, 1943
2,356,456	Garner	Aug. 22, 1944

FOREIGN PATENTS

Number	Country	Date
20,799	Great Britain	July 15, 1899
511,166	Great Britain	Nov. 3, 1937

OTHER REFERENCES

Fiberglas Standards, Owen-Corning Fiberglas Corp., G 9.6.1 (Sept. 3, 1943); D 5.5.1 (June 1, 1944).

Architectural Forum, Nov. 1942, p. 116.

Reprint from Surgery, St. Louis, vol. 15, No. 5, pp. 766–773, May 1944, GI Fab.