

Nov. 6, 1962

G. MORIN

3,062,370

CORE FOR ORTHOPEDIC BANDAGES

Filed Feb. 14, 1957

FIG. 1.

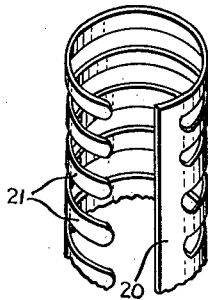


FIG. 5.

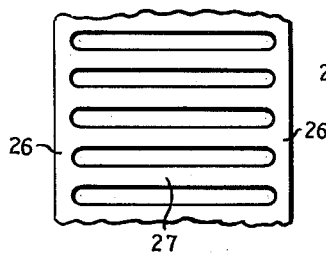


FIG. 6.

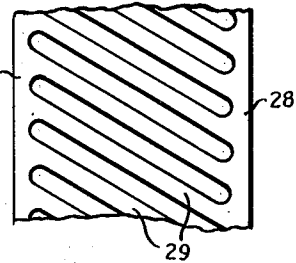


FIG. 2.

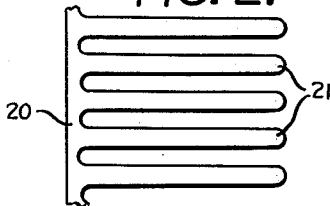


FIG. 7.

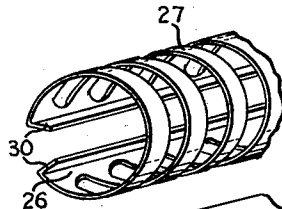


FIG. 8.

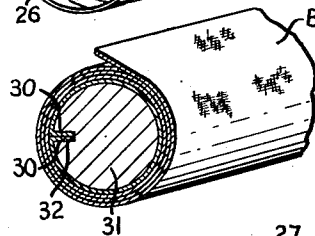


FIG. 3.

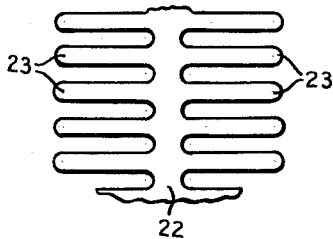


FIG. 9.

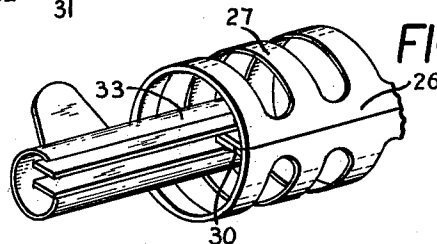


FIG. 4.

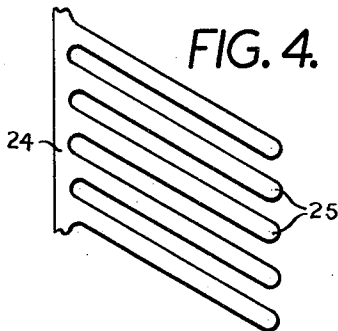


FIG. 10.

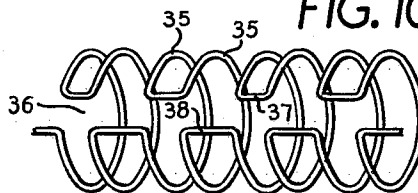
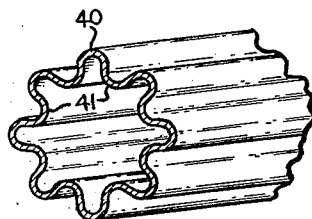


FIG. 11.



INVENTOR

George Morin

BY

James J. H. [Signature]
ATTORNEY

1

3,062,370

CORE FOR ORTHOPEDIC BANDAGES

George Morin, Westfield, N.J., assignor to Johnson & Johnson, a corporation of New Jersey

Filed Feb. 14, 1957, Ser. No. 640,180

14 Claims. (Cl. 206—63.2)

This invention relates to orthopedic or plaster of Paris bandages, and more particularly to the cores of such bandages.

Orthopedic bandages are now supplied in the form of convenient lengths of cotton gauze prepared or filled with a settable dry plaster of Paris (calcium sulfate hemi hydrate) composition, or other cast-forming material and wound or rolled up for convenient packaging, shipping and handling. The rolled up bandage is immersed in water to wet the plaster and is then applied so as to build up a cast as the plaster sets or hardens. In some cases, the plaster carrying gauze is wound or rolled up without a core, but this type of bandage presents a certain amount of difficulty in use. Immersion in water or other set-activating liquid causes the rolled bandage to become completely limp. This limp bandage must then be unrolled and wound or applied to the area requiring a cast in a smooth, even layer, sometimes under light tension, which is especially difficult when the bandage is wide or the cast complicated in shape. For this reason, it has been proposed to provide a core for the bandage, generally in the form of a perforated tube or cruciform rod so as to leave space for wetting of the bandage from the inside of the package. The present invention is concerned with orthopedic bandages of the cored type and with improvements in the core construction and method of winding the bandage or inserting the core.

Orthopedic bandage constructions embodying the invention in preferred forms will now first be described in detail with reference to the accompanying drawing and the features forming the invention will then be pointed out in the appended claims.

In the drawing:

FIG. 1 is an isometric view of a bandage core embodying the invention in a preferred form;

FIG. 2 is a fragmentary flat view of a blank from which the core of FIG. 1 is formed;

FIGS. 3-6 are views similar to FIG. 2, but showing modifications;

FIG. 7 is an isometric view showing another form of core;

FIG. 8 is an isometric view showing a method of winding a bandage on the core of FIG. 7;

FIG. 9 is an isometric view showing a method of inserting the core of FIG. 7; and

FIGS. 10 and 11 are isometric views showing still other forms of core.

Referring first to FIG. 2, the core may be formed from a blank having the shape of a fishbone or comb, with a spine or back 20 along one edge and ribs or teeth 21 protruding therefrom at regular intervals. The blanks for forming the individual cores may be stamped out or molded in one operation, or they may be cut to length from a long strip having the form shown in FIG. 2. In any event, the blank is then bent into a substantially cylindrical shape, as shown in FIG. 1, and may be set by heat or, in some cases, simply by bending with due allowance for spring-back.

The core may be made of any of a variety of materials having suitable properties as to flexibility, stiffness, chemical inertness and water resistance. Thermoplastics of various types are generally preferred by reason of their cheapness and ease of manufacture, and polystyrene is suitable for most applications. The radial resilience of

2

the core may be controlled without difficulty by suitable dimensioning of the tongues or ribs 21 as to width and thickness and the axial flexibility may likewise be controlled by suitably selecting the width and thickness of the spine or back 20.

The core may be set in flat form as indicated in FIG. 2 and bent to the form of FIG. 1, being held in cylindrical shape by the bandage wrapped about it. Alternatively, the core may be set to the form of FIG. 1 and compressed as the bandage is wound on it, or as it is inserted in the previously rolled bandage.

Where somewhat greater stiffness or resistance to radial compression is wanted, with the same thickness of rib, a double comb construction as shown in FIG. 3 may be employed. In this case, the ribs 23 extend out from both edges of the spine 22 and hence may have only about half the length for the same diameter core. In consequence, the radial stiffness will be about doubled.

Greater radial resilience or compressibility may be obtained by the construction shown in FIG. 4, in which the ribs 25 are set diagonally with respect to the back 24. This construction also permits readier insertion of the core, by reason of the swept-back setting of the ribs.

Double spine constructions as shown in FIGS. 5 and 6 may be employed, utilizing either straight ribs 27 attached at both ends to spines 26 (as shown in FIG. 5) or diagonal ribs 29 similarly attached to spines 28 (as shown in FIG. 6).

The width and length of the bandage, and the type of cast being made, will all affect the radial and axial stiffness most desired in the core. Wider bandages require greater axial stiffness because of the increased difficulty of handling a limp, wet bandage. Longer bandages are heavier and take more handling to unwind, consequently need firmer core support. Casts with sharp contour changes, as foot, hand, elbow, must be made with a narrower bandage rigidly supported on a core to permit precise placing of the cast material. It can readily be seen that the core constructions shown have the great advantage over constructions used previously that they may be readily made to have the most advantageous axial and radial rigidity for the particular bandage wound on them.

Orthopedic bandages are commonly made by preparing commercial widths of cotton gauze, such as 36" or 45", in large rolls of hundreds or thousands of yards long. These large pieces of material are subsequently cut into the commonly used bandage sizes of 2", 3", 4", 5", 6" and similar widths, and lengths of 3 or 5 yards or other convenient short lengths. For reasons of economy and efficiency, the slitting and cutting of the large rolls into the orthopedic bandage sizes is generally combined with the operation of winding the bandages into the roll form in which they are packaged, distributed and used.

In all cases, it will be apparent that ample space is left for flow of water from the inside of the core into the bandage upon immersion of a bandage wound upon the core. Moreover, the flow area is divided up into a number of slots or channels between ribs 21, or the similar ribs of other figures, assuring even distribution of the water through the inner layers of the bandage. The number of these channels may be varied as desired, within wide limits, by varying the width and number of the ribs and the ratio of open space to rib area may also be varied by correspondingly varying the ratio between the distance or spacing between ribs and the width of the ribs themselves.

It is obviously advantageous to wind the bandages directly on the core in such a manner that the core is firmly retained within the bandage through all subsequent handling and in use of the bandage to make a cast. With the cylindrical cores previously used, this may be attempted by slipping the core over a winding mandrel, but it is

3

not possible to wind the bandage tightly enough to prevent the core slipping out on handling. Provision of a rough or sharp exterior to the cylindrical core is not satisfactory, for if it is rough enough to hold the bandage, it is annoying or dangerous to the hand of the user when he must grip the bandage firmly in unwinding the bandage to form a cast.

The commonly used cruciform core cannot be used on a winding mandrel because it has no axial hole, and when inserted in the bandage as an additional operation after winding, cannot be made to stay surely in the bandage. Consequently what value the cruciform core may have is usually lost when the core falls out of the bandage while handling or immersing in water.

The cores of the invention may be used on a winding mandrel, for the greatest economy of bandage manufacture, or they may be inserted in a previously wound bandage if desirable.

In either case, a suitable fixture for holding the core in compressed condition may be employed. To facilitate gripping by such a fixture, any of the construction shown may be formed with generally radial flanges, located along the two edges of the core (as viewed in the flat in FIGS. 2 to 6). Taking the core of FIG. 5, by way of example, and referring to FIG. 7, it will be observed that the spines 26 may be provided with edge flanges 30, to facilitate handling. Where the bandage is rolled on the core, a slotted mandrel 31 may be used (FIG. 8), or a mandrel with a clamping or compressing device to draw the edges 30 together. The core is placed around the mandrel with the flanges 30 tucked into the slot or channel 32 and the bandage B is wound around the core, generally by turning the mandrel for this purpose. Thereafter, the bandage and core are slid off the mandrel by an axial movement, and the core will expand to an extent determined by the rigidity of the ribs 27 and the give of the bandage, so that the core fits and holds snugly at all times without exerting undue pressure on the bandage. Alternately, the core may be slipped on or placed around the mandrel, then radially contracted by activating the clamping or compressing device, and the bandage wound around the core. When winding is completed the clamping or compressing device is released, allowing flanges 30 to separate and the core to expand against the bandage. Also, as shown in FIG. 9, if the bandage is rolled without a core, the flanges 30 may be held by a clamp 33 while inserting in the rolled bandage, and the clamp 33 may then be removed, permitting the core to expand, as before.

Cores may also be formed by bending a wire or rod of plastic or metal, as shown, for example, in FIG. 10. In this case, a spineless construction is provided by bending a wire into a series or succession of reversed loops. The construction thus formed consists of a number of split rings 35 separated by a gap 36 and joined by generally axial sections 37 and 38 positioned alternately on opposite sides of the gap 36. The manner of use of this core is the same as previously described.

Cores as shown in FIGS. 1, 2, 3, 4, 5, 6 and 10 may also be used on a winding mandrel which has a smaller outside diameter than the inside diameter of the core if the core is preshaped into a cylindrical form, by engaging the spine 20, 22, 24, 26 or a loop 37 or 38 on a retractible lug on the mandrel, then winding the bandage on the core with sufficient tension to compress the core against the mandrel. When the winding is completed, the lug holding the spine or loop is withdrawn into the mandrel, and the bandage and core removed. The core will maintain pressure against the bandage and so ensure its remaining in place.

A core may also be formed by extension or drawing of a tube into corrugated form as shown in FIG. 11. In this case, the tube is generally polygonal, comprising alternating convex and concave sections 40 and 41, respectively. The convex sections or ridges 40 support the bandage and the concave sections 41 provide for flow or water

4

and also permit the partial collapse or compression of the structure, involving movement of the ridges 40 radially inwardly and circumferentially toward each other. The radial resilience or stiffness of this structure is, again, easily controlled by selection of type and thickness of material. In a manner similar to that shown above, this core may be compressed radially before winding the bandage on it, or it may be compressed by the tension of the winding bandage. It also may be compressed and inserted into a previously wound bandage. By any means obtained, the resultant pressure of core against bandage will serve to secure it from loss in handling or immersion.

What is claimed is:

1. As a new article of manufacture, an orthopedic bandage comprising a radially resilient liquid permeable core and a flat wound gauze bandage impregnated with settable cast-forming material, surrounding the core and holding the same in compressed condition, the core comprising a generally tubular thin walled cylinder having a longitudinal spine and circumferentially extending ribs supporting the bandage and spaced apart to provide apertures for flow of liquid from the inside of the core into the bandage.

2. As a new article of manufacture, an orthopedic bandage comprising a radially resilient liquid permeable core and a flat wound gauze bandage impregnated with settable cast-forming material, surrounding the core and holding the same in compressed condition, the core comprising a generally tubular thin walled cylinder having a pair of circumferentially separated spines and a plurality of circumferentially extending ribs connecting the said spines, the said spines and ribs supporting the bandage and the ribs being axially spaced apart to provide apertures for flow of liquid from the inside of the core into the bandage.

3. As a new article of manufacture, an orthopedic bandage comprising a radially resilient liquid permeable core and a flat wound gauze bandage impregnated with settable cast-forming material, surrounding the core and holding the same in compressed condition, and in which the core comprises a generally cylindrical structure formed of a wire having a series of alternately oppositely facing bends with a gap between the convex sides of the bends and substantially circular sections connecting the other sides of the bends.

4. As a new article of manufacture, an orthopedic bandage comprising a radially resilient liquid permeable core comprising a split cylinder having opposed generally radial flanges at each side of the split, and a flat wound gauze bandage impregnated with settable cast-forming material surrounding this core and holding the same in compressed condition with a gap between the said flanges, the gap being sufficient so that pressing of the flanges together eliminates the gap and permits sliding movement of the core within the bandage.

5. An article of manufacture according to claim 4, in which the said flanges and gap extend substantially axially of the cylinder.

6. As a new article of manufacture, an orthopedic bandage package comprising a generally tubular liquid permeable resilient core element adapted to fit in a compressed condition in the center of a roll of gauze bandage impregnated with settable cast-forming material, for supporting the same, the said core being compressible beyond the said compressed condition for reducing it to a predetermined radius and having means for releasably holding it in further compressed condition for placement of the bandage around it, and a flat wound gauze bandage impregnated with settable cast-forming material surrounding this core and holding the same in the said compressed condition.

7. An orthopedic bandage package according to claim 6, in which the core element has a generally cylindrical wall having apertures providing for flow of liquid, and defining axially extending supporting sections between

5

apertures, the apertures being spaced to form such sections of predetermined width, providing a predetermined degree of axial flexibility.

8. Method of forming orthopedic bandages comprising placing a roll of gauze bandage impregnated with settable cast-forming material and having a generally cylindrical axial opening around a radially resilient liquid permeable core, the said core having an expanded size greater than that of the said opening and being compressible to a size such as to fit within the said opening, while holding the core in a compressed condition and then releasing the core to permit the same to expand into resilient pressure contact with the inside of the roll.

9. Method according to claim 8, in which the bandage is wound upon the core while the latter is in the said compressed condition and the core is thereafter released.

10. Method according to claim 8, in which the bandage is rolled separately from the core, and the core is inserted in compressed condition into the center of the bandage and thereafter released.

11. As a new article of manufacture, an orthopedic bandage package comprising a generally tubular liquid permeable resilient core element adapted to fit in a compressed condition in the center of a roll of gauze bandage impregnated with settable cast-forming material, for supporting the same, the said core being compressible beyond the said compressed condition for reducing it to a predetermined radius and having means for releasably holding it in further compressed condition for placement of the bandage around it, and a flat wound gauze bandage impregnated with settable cast-forming material surrounding this core and holding the same in the said compressed condition, the core element having a generally cylindrical wall with circumferentially extending slots providing for flow of liquid, and defining axially extending supporting sections between the slots, the slots being spaced to

6

form such sections of predetermined width, providing a predetermined degree of axial flexibility and including an unslotted axially extending spine.

12. An orthopedic bandage package according to claim 11, in which the said supporting sections between the circumferentially extending slots comprise circumferentially extending ribs connected by the said axially extending spine, in which the said apertures comprise circumferentially extending slots, defining circumferentially extending ribs between the said slots, and the said sections between apertures comprise a longitudinally extending spine connecting the said ribs.

13. An orthopedic bandage package according to claim 12, in which the said apertures are located to each side of the said spine defining ribs extending from both sides thereof.

14. An orthopedic bandage package according to claim 12, comprising a said spine at each end of the said slots.

References Cited in the file of this patent

UNITED STATES PATENTS

1,005,787	Sibley	Oct. 10, 1911
1,351,441	Pond	Aug. 31, 1920
1,356,331	Allport	Oct. 19, 1920
1,978,101	Burrows	Oct. 23, 1934
1,996,228	Ashby	Apr. 2, 1935
2,212,309	Swannson	Aug. 20, 1940
2,338,513	Helm	Jan. 4, 1944
2,491,527	Spinner	Dec. 20, 1949
2,499,890	Themak	Mar. 7, 1950

FOREIGN PATENTS

147,559	Germany	July 3, 1902
686,449	Great Britain	Jan. 28, 1953