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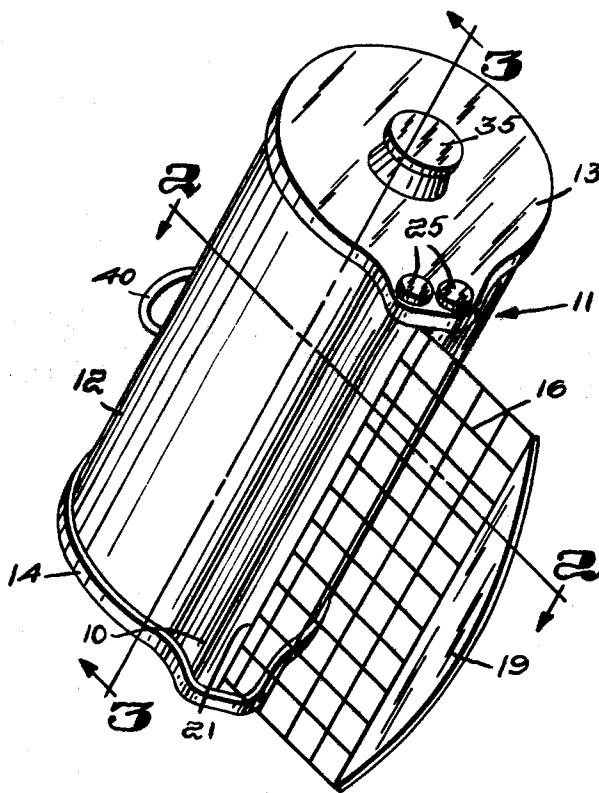
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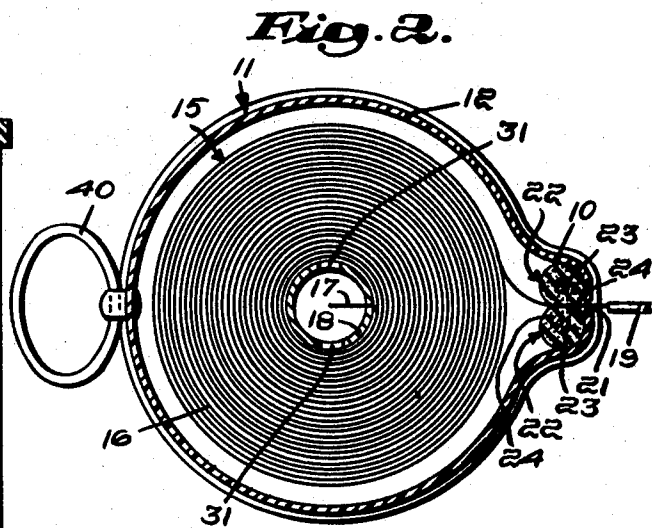
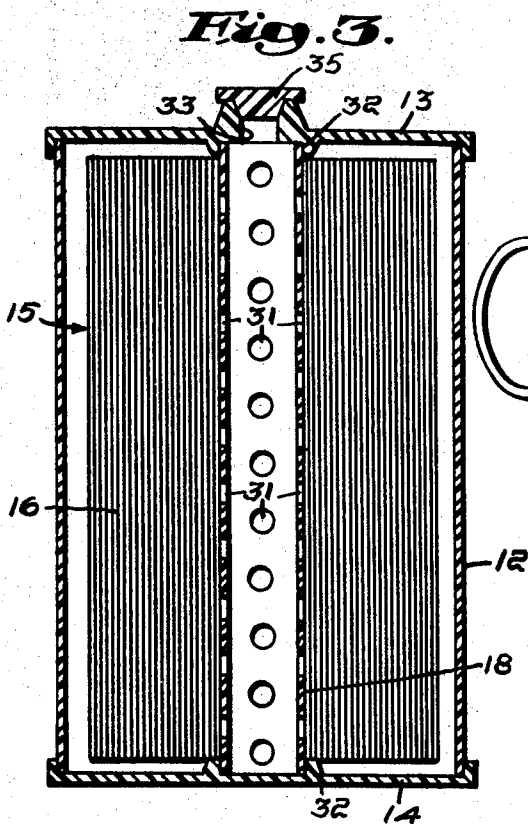
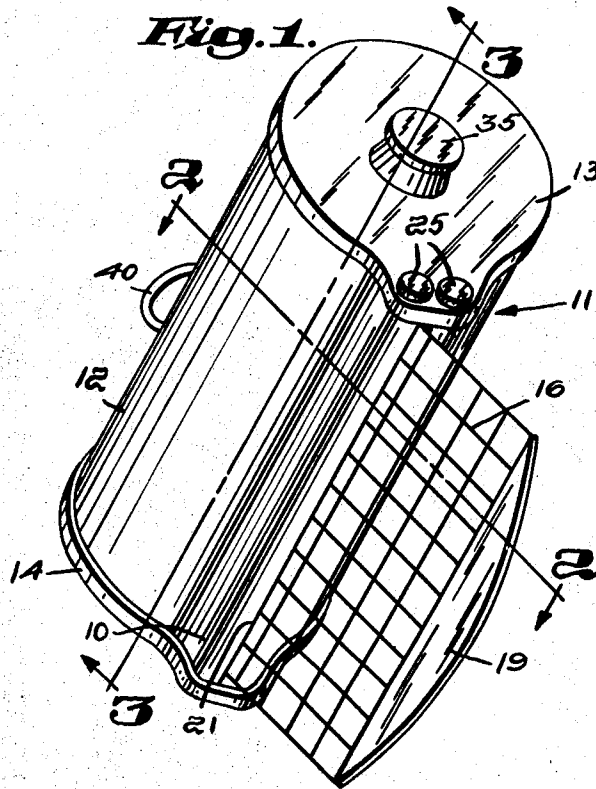
[54] **TREATED MATERIAL DISPENSER**
10 Claims, 3 Drawing Figs.

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118/419
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ABSTRACT: A portable container for dispensing a fluid-saturated web material between engaging compressible rollers and through an elongated exit slit. The rollers remove excess fluid from the web interstices to provide a withdrawn fluid-saturated web of high porosity.





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TREATED MATERIAL DISPENSER

This invention relates generally to an apparatus for handling hard setting strengthening materials and is particularly directed to a novel portable dispenser for such materials. Although having other applications, the invention is especially suited for forming the rigid surgical dressing used for bone fractures and commonly known as casts.

According to the well-known practice, fractured bones after being properly set are retained in position by rigid casts. Typically, these casts are formed by wrapping around the bone fracture several overlapping layers of a continuous bandage strip which has been soaked with plaster of paris paste. After hardening of the plaster of paris, the wrapping forms a rigid support which prevents dislocation of the fractured bone.

In addition to the disagreeable sloppiness associated with their formation, plaster casts possess other undesirable features. For example, because of their substantial weight, they can be carried by many users and in many applications only with great difficulty. Also, the imperviousness of plaster casts can create substantial discomfort for a user by limiting the accessibility of the covered body portion to water and air. These factors prevent washing, induce excessive perspiration promote itching, etc.

A substantially improved method and apparatus for molding surgical casts are described in the applicants' copending U.S. application Ser. No. 594,525 entitled "Dispensing Method and Apparatus," filed Nov. 15, 1966 and now abandoned. According to that invention, a cylindrically wound roll of loosely woven glass fibers is rotatably mounted in a hollow cylindrical container having a longitudinal disposed exit slit. After charging the hollow container with an activated epoxy resin fluid, the impregnated fiber glass strip is gradually withdrawn through the exit slit and wrapped around a limb containing a fractured bone. After subsequent setting of the epoxy resin, the fiber glass strip forms an extremely strong, fluid permeable surgical dressing which prevents dislocation of the fractured bone and alleviates many of the above problems. Although providing a substantial improvement over the prior art, the dispenser described in the above U.S. application has not been completely satisfactory because of a tendency to permit some fluid leakage and to allow covering of some of the withdrawn fiber glass web interstices with fluid resin. The covering of web interstices with epoxy undesirably reduced the overall porosity of the completed cast.

A primary object of this invention, therefore, is to provide an improved apparatus for creating rigid surgical dressings for fractured bones and the like.

An additional and more generic object of the invention is to provide an improved apparatus for molding support surfaces of general application.

One feature of this invention is the provision of a portable treated material dispenser including a cylindrically wound roll of sheet material enclosed within a hollow container adapted for charging with a treated fluid substance and having an exit slit for permitting gradual withdrawal of the sheet material. The hollow container also encloses a roller mechanism disposed adjacent the exit slit and adapted to exert continuous pressure upon the sheet material during withdrawal from the container. The roller mechanism wipes excess treating fluid from the egressing sheet material but does not substantially retard its motion.

Another feature of this invention is the provision of a portable treated material dispenser of the above-featured type wherein the sheet material is a relatively coarse web and the roller mechanism comprises a compressible surface which is deformed by contact with the egressing sheet material. With this arrangement, the compressible roller surface fills the interstices in the web thereby completely removing treating fluid therefrom. Because of this feature, the withdrawn sheet material exhibits a high degree of porosity which is desirable for many applications.

Another feature of this invention is the provision of a portable treated material dispenser of the above-featured type wherein the roller mechanism includes a pair of parallel, en-

gaged roller members which straddle the egressing sheet material and are substantially parallel to both the cylindrically wound roll of sheet material and the exit slit. The engaging parallel rollers provide extremely effective wiping of the withdrawn sheet material thereby preventing escape of excessive treating fluid.

Another feature of this invention is the provision of a portable treated material dispenser of the above featured type wherein the treating fluid comprises an activated fluid substance which assumes a hard set upon curing. The dispenser according to this feature is specifically suited for use in forming rigid support structures for various applications.

Another feature of this invention is the provision of a portable treated material dispenser of the above-featured type wherein the container is a hollow cylinder having a longitudinally disposed hollow distended portion which encloses the roller members and defines the exit slit. By mounting the roller members in a distended portion, the internal dimensions of the cylindrical container can be made substantially equal to the outer dimensions of the cylindrically wound roll of sheet material thereby optimizing the utilization of space.

Another feature of this invention is the provision of a portable treated material dispenser of the above-featured type wherein the roller members contact the inner surfaces of the hollow distended portion so as to form therewith fluid seals which isolate the exit slit from the internal portion of the cylindrical container. In this arrangement, the roller members function as fluid seals in addition to providing the desirable wiping function described above.

These and other objects and features of the present invention will become more apparent upon a perusal of the following specification taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a perspective view of a preferred dispenser embodiment of the invention;

FIG. 2 is a cross-sectional view taken along the lines 2-2 of FIG. 1; and

FIG. 3 is a partial cross section taken along the lines 3-3 of FIG. 1.

Referring now to the FIGS., there is shown the fluid-tight container 11 formed by the hollow circular cylinder 12 with the longitudinally disposed distended portion 10. The ends of the cylinder 12 are closed by the end plugs 13 and 14. Positioned within and axially aligned with the cylinder 11 is the roll 15 formed by the cylindrically wound sheet material 16.

As shown in FIG. 2, the inside edge of the sheet material 16 is attached, for example by bonding, to the plastic strip 17 which is retained by a longitudinal slot in the hollow cylindrical spindle 18. Attached to the outside edge of the sheet material 16 is a similar plastic strip 19 which projects through the elongated exit slit in the distended portion 10. The parallel rollers 22 are rotatably mounted from the end plugs 13 and 14 and enclosed by the distended portion 10. Embodied in the parallel rollers 22 are the center shafts 23 supported in journal boxes 25 on the end plugs 13 and 14. The shafts 23 are covered with layers 24 of a relatively soft compressible material such as foam rubber. As shown, the foam rubber roller surfaces 24 straddle and compressibly engage the sheet material 16. Also, both the faces and ends of the roller surfaces 24 contact the inner walls of the distended portion 10 so as to form fluid seals therewith.

As shown in FIG. 3, the cylindrical spindle 18 contains a plurality of apertures 31 and is rotatably retained within centrally located bearing recesses 32 in the end plugs 13 and 14. The end plug 13 contains the fluid feed aperture 33 aligned with the hollow interior of the spindle 18 and closed by the removable plug 35.

The use of the invention will be described in connection with the formation of surgical casts, an application for which the invention is particularly well suited. Typically an attendant to a fractured bone will premix in a suitable container (not shown) a conventional hard setting fluid substance such as an epoxy resin with an activator. The mixing container can be,

for example, of the general type disclosed in the joint applicant's U.S. Pat. No. 3,343,664 or of the type disclosed in the joint applicant's copending U.S. application Ser. Nos. b 595,83 filed Nov. 21, 1966, now Pat. No. 3,437,242, and 653,798 filed Jul. 17, 1967 now U.S. Pat. No. 3,429,429. However, for use with the dispenser embodiment shown herein, it is desirable that the mixing container used have a tubular discharge spout adapted for receipt by the fluid feed aperture 33. Thus, after removal of the plug 35 and insertion of such a spout, the activated fluid epoxy resin can be discharged into the hollow spindle 18 and through the apertures 31 to substantially fill the container 11 and saturate the sheet material 16. After replacing the plug 35, the attendant grasps the plastic leader 19 and begins unwinding and withdrawal of the sheet material 16 through the slit 21. The attendant then proceeds to wrap the sheet material 16 around the fractured bone in several overlapping layers and over a previously positioned porous, flexible inner layer of, for example, plastic foam material. After securing the plastic leader 19, for example, applying a strip of adhesive tape, this wrapping operation is performed quite easily by merely passing the holding ring 40 from hand to hand and passing the container 11 around the fractured bone as the sheet material 16 is withdrawn.

For the above described application, it is preferable that the sheet material 16 be composed of glass fibers coarsely woven to provide a fabric with large interstices of, for example only, three-sixteenth inches square. The substantial mechanical strength of the glass fibers combines with the hardened resin to provide a cast of great strength while the relatively large interstices insure the creation of a porous cast. In addition to allowing desirable air circulation the resultant porosity will permit bathing of the body surface covered by the cast.

It will be appreciated that, because of their rotatability the rollers 22 will not materially impede withdrawal of the sheet material 16. However, as the sheet 16 passes between the rollers 22, the engaging foam rubber covers 24 will fill the web interstices thereby removing therefrom any retained epoxy fluid. Thus, the individual fibers of the withdrawn sheet 16 will be fully coated with epoxy fluid while the web interstices will be void. For this reason, the completed cast will exhibit the desired degree of fluid porosity. It will also be obvious that location of the rollers 22 in the distended portion 10 permits the cylindrically wound roll 15 to initially occupy substantially the entire volume within the cylinder 12. The space utilization of the dispenser 11 can therefore be optimized.

To promote handling ease, preferred embodiments of the dispensing container 11 possesses a length of about 2-8 inches and a diameter of about 2-4 inches. Also, it is desirable that the hollow cylinder 12 be formed of a transparent plastic material which will enable a user to view the degree to which the container has been filled with the fluid-treating substance.

Although the above represents a preferred application for the invention it will be obvious that the dispensing container 11 can be used in other ways and with other suitable materials. For example, only sheet materials other than coarsely woven glass fibers and fluid-treating substances other than epoxy resins can be utilized. Also, the container 11 can be filled initially with for example, a suitable aerobic fluid or with an air-drying fluid cement and then sealed to prevent access of air.

Subsequently at a time of desired use the sheet material 16 can be withdrawn and utilized prior to curing of the fluid coating in the presence of air.

Thus, many modifications and variation of the present invention are possible in light of the above teachings. It is, therefore, to be understood that within the scope of the appended claims the invention can be practiced otherwise than as specifically described.

We claim:

1. A portable treated material dispenser comprising a portable fluid-tight container, a cylindrically wound roll of sheet material positioned within said portable container and adapted to be impregnated therein with a treating fluid substance, said portable container defining an exit slit adapted to permit gradual withdrawal of said treated sheet material, roller means disposed adjacent said exit slit within said container and adapted to exert pressure upon said sheet material during withdrawal thereof from said container, said sheet material being a web material with relatively large interstices and said roll means comprising a compressible surface adapted to be deformed by contact with said sheet material during withdrawal thereof.

2. A portable treated material dispenser according to claim 1 wherein said roller means comprises a pair of parallel engaged roller members adapted to straddle said sheet material during withdrawal thereof.

3. A portable treated material dispenser according to claim 2 wherein said cylindrically wound roll of sheet material is rotatably mounted within said container and said roller members and exit slit are substantially parallel to the rotational axis of said cylindrically wound roll.

4. A portable treated material dispenser according to claim 3 wherein the treating fluid substance comprises an activate fluid which assumes a hard set upon curing.

5. A portable treated material dispenser according to claim 1 wherein said container is a hollow cylinder substantially filled by said roll of sheet material and having a longitudinally disposed hollow distended portion which encloses said roller means and defines said exit slit.

6. A portable treated material dispenser according to claim 5 wherein said roller means comprises a compressible surface adapted to be deformed by contact with said sheet material during withdrawal thereof.

7. A portable treated material dispenser according to claim 6, wherein said roller means comprises a pair of parallel engaged roller members adapted to straddle said sheet material during withdrawal thereof.

8. A portable treated material dispenser according to claim 7 wherein said cylindrically wound roll of sheet material is rotatably mounted within said container and said roller members and exit slit are substantially parallel to the rotational axis of said cylindrically wound roll.

9. A portable treated material dispenser according to claim 8 wherein said roller members contact the inner surfaces of said hollow distended portion so as to form therewith fluid seals which isolate said exit slit from the internal portion of said container.

10. A portable treated material dispenser according to claim 9 wherein the treating fluid substance comprises an activated fluid which assumes a hard set upon curing.