April 2, 1935. R. G. ASHBY 1,996,228

METHOD OF MAKING SURGICAL CASTS

Filed June 30, 1934

FIG. 1.

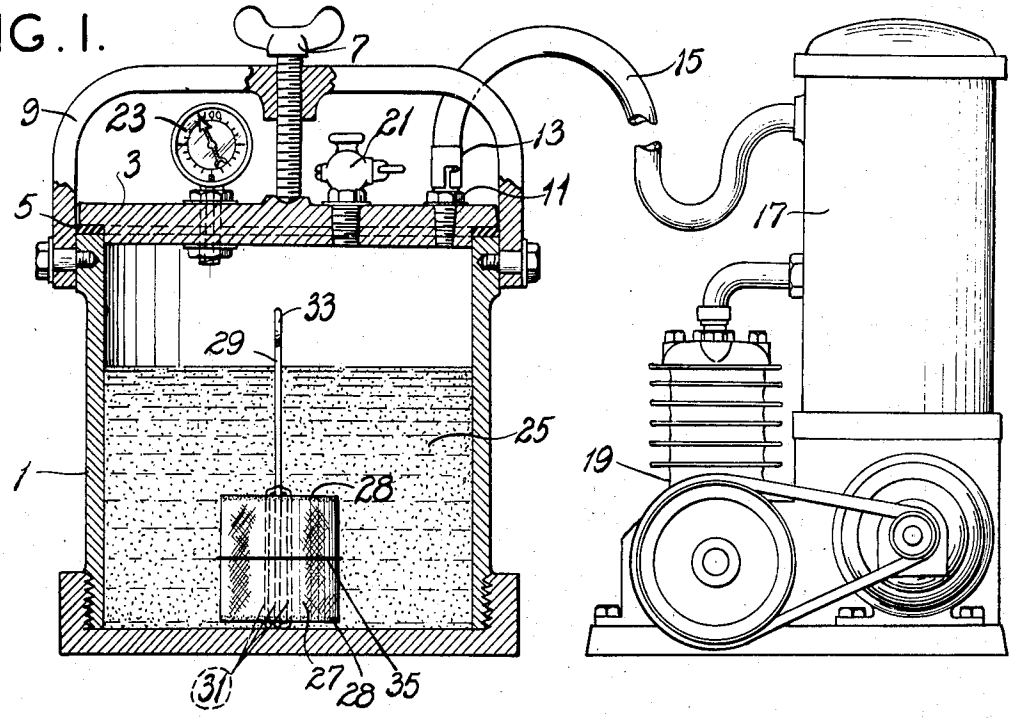


FIG. 2.

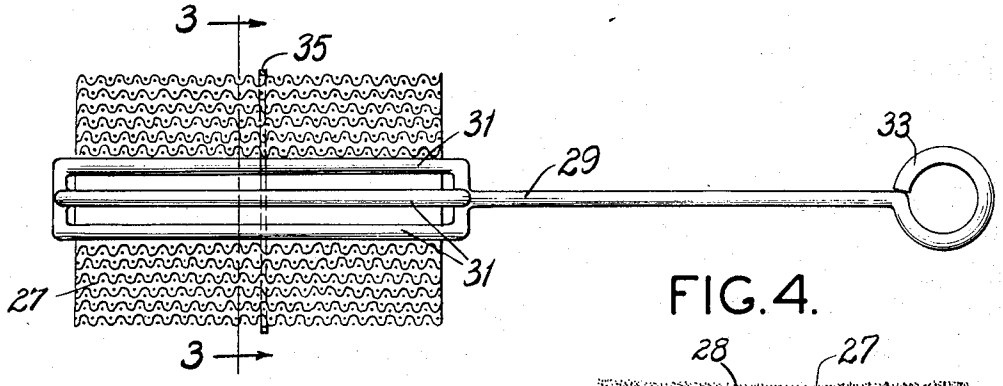


FIG. 3.

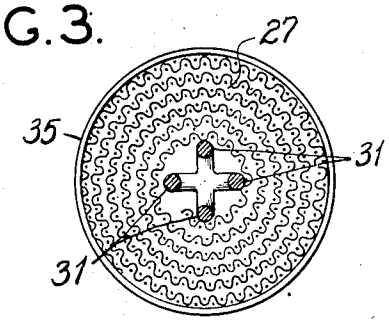
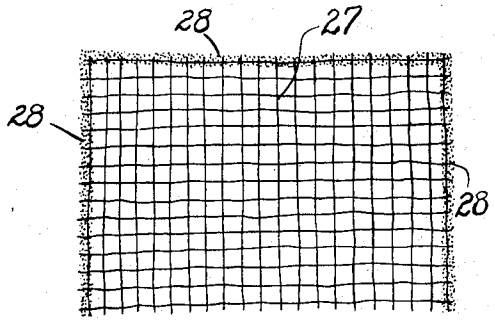


FIG. 4.



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Patented Apr. 2, 1935 1,996,228

UNITED STATES PATENT OFFICE

1,996,228

METHOD OF MAKING SURGICAL CASTS

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Application June 30, 1934, Serial No. 733,159

2 Claims. (Cl. 128—156)

This invention relates to a method of making bandages, and with regard to certain more specific features, to a method for making bandages or the like, for use in making surgical casts of plaster of Paris or like hydraulic cements.

Among the several objects of the invention may be noted the provision of a plaster-of-Paris-impregnated bandage for use in making plaster of Paris casts and the like which shall carry a more uniform charge of thoroughly wet plaster of Paris; the provision of a bandage of the class described which, for a given area of fabric, retains for ultimate use in the cast a greater percentage of the plaster of Paris originally applied; and the provision of a bandage of this class which may, with less difficulty than heretofore, be more quickly and cheaply made. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing, in which is illustrated one of various possible embodiments of the invention,

Fig. 1 is a diagrammatic layout of the invention, shown partly in section and partly in elevation;

Fig. 2 is a longitudinal section taken through a strip of bandage wound on a support, the latter being shown in elevation;

Fig. 3 is a cross section taken on line 3—3 of Fig. 2; and,

Fig. 4 is a plan view of a fragmentary portion of fabric showing an improved integumentary edge thereon.

Similar reference characters indicate corresponding parts throughout the several views of the drawing.

Heretofore plaster of Paris casts have been made substantially as follows:

A strip of crinoline or like fabric has been either cut or torn into a strip of suitable width and length. This has then been passed over a flat apron and then wound on to a winding staff or drum. While passing over the apron, the fabric has had powdered plaster of Paris applied thereto and rubbed into the fabric surface so as to force the powdered plaster of Paris into the reticulations between threads. These reticulations retained the plaster of Paris in position between layers of fabric as the same was rolled up on the staff or drum. After the length had been completely wound up, a fastener, such as a rubber band was applied around the same and a protecting paper or like wrapper placed thereabout.

To prepare the bandage for use, it was immersed in a vessel of water. The water found its way through the reticulations and to the plaster of Paris under the effect of gravity. After a suitable time, the wet bandage was removed and applied by wrapping on the limb or that which was to be placed in the cast.

The disadvantages of this method of preparing a bandage for a cast were that, in the first place, an even layer of powdered plaster of Paris in the original strip was not assured, because of the irregularities in the cloth surface and reticulations. Secondly, the powdered plaster of Paris after application to the bandage absorbed water of hydration hygroscopically, thus effecting a partial pre-setting of more or less of the plaster of Paris. Thirdly, the water, after immersion did not find its way into the cloth in a consistent manner, thus leaving more or less dry spots of plaster of Paris and presenting a heterogeneous layer of plaster of Paris in the ultimate cast. Fourthly, a large percentage of the plaster of Paris was lost from the bandage in the immersion, because gravity tends to cause this to settle out, as well as to force the water into the fabric.

Coming now to the present invention, and referring more particularly to Fig. 1, there is shown at numeral 1 a vessel adapted to withstand a super-atmospheric pressure of a substantial amount, for example, several atmospheres or more. This vessel is provided with a cap 3 having a sealing gasket 5 between it and the vessel 1 and adapted to be held down by means of a thumb screw 7 threaded through a bail 9. The cap 3 is thus removable.

An inlet nipple 11 is adapted to have a quick detachable coupler 13 applied thereto, the latter being on the end of a flexible hose 15 leading from a pressure tank 17. The tank 17 is maintained under pressure by any known compressor system 19.

A relief cock 21 is also provided in the cover 3, as well as a suitable pressure gauge 23.

The vessel 1 is filled with a mixture 25 of water and plaster of Paris of the consistency required in bandages of this class. It may be thick or thin, depending upon the particular requirements.

The bandage fabric is preferably composed of crinoline 27 illustrated in Fig. 4. This is rather

coarse material, and when cut or torn presents a ravelled edge which interferes with subsequent proper manipulation. In order to prevent the ravelling from being deleterious, I apply a waterproof but subsequently flexible integumentary material to the edges, such as collodion **28**. This quickly dries and does not interfere with the subsequent bandaging operation. This feature of the integumentary edge I consider also to be new. It is to be understood that the collodion is a class example of an integument for preventing unravelling which has the qualifications desired.

The fabric strip is then wound upon a support **29** which has spaced fingers **31** and a holding ring **33**. A retaining band **35**, such as an ordinary rubber band, is provided about the bandage after it has been wound.

The wound and supported bandage is then immersed in the liquid **25**. Immediately the cover **3** is applied to the vessel **1** and clamped down, the cock **21** being shut. Next, the quick-detachable coupler **13** is applied to the nipple **11**. It is to be understood that this connection carries an automatic valve which opens upon application of the coupler **13**, the hose **15** being normally under pressure. Quick-detachable couplers and automatically opening valves of this class are well known.

The above operation, it will be seen, immediately places super-atmospheric pressure upon the liquid **25** which is instantaneously forced into all of the reticulations of the bandage. The hydrostatic pressure is effected on the outside of the roll, as well as on the inside within the fingers **31** and thus quickly reaches all regions of the fabric, carrying into the same the suspended charge of plaster of Paris.

The purpose of the spaced fingers **31** is not only to provide means for wrapping the roll but also to prevent incipient collapse thereof under the initial application of pressure. It will be understood that incipient collapse is prevented, thereafter collapse does not progress, because of the core of liquid between the fingers **31** under hydrostatic pressure equal to that of the liquid outside of the roll.

The advantage of the super-atmospheric pressure is the quick and thorough action in impregnating the cloth with the plaster of Paris solution. Under atmospheric pressure this does not occur as satisfactorily. Also, there is no loss of material from the bandage, as when water works into a dry charged bandage under the old procedure.

The immersion under pressure is short. A disconnection of the coupler **13** is quickly made and the blow-off cock **21** opened. This relieves the pressure and the tank may be opened to remove the bandage for unwrapping and application.

It will be understood that the degree of pressure in the tank may be varied, but I have found that the pressure of the order of eighty pounds per square inch is satisfactory.

It is to be understood that as many rolls may be placed in a given container **1** as the operator may desire, or a battery of containers may be employed. In fact, many refinements of design may be likewise accomplished without departing from the scope of the invention.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As many changes could be made in carrying out the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. The method of making a surgical cast comprising rolling a strip of fabric, immersing said rolled fabric in a mixture of water and cement, applying super-atmosphere pressure to said mixture while said fabric is immersed, removing the pressure, removing the fabric from the mixture, and immediately unrolling the same and applying it.

2. The method of making a surgical cast comprising rolling a strip of fabric, immersing said rolled fabric in a mixture of water and plaster of Paris, applying super-atmospheric pressure to said mixture while said fabric is immersed, removing the pressure, removing the fabric from the mixture, and immediately unrolling the same and applying it, said pressure being of the order of several atmospheres or more.

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