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[54] **NEOPRENE SURGICAL BANDAGE FOR MAKING
 BODY IMMOBILIZING CASTS**
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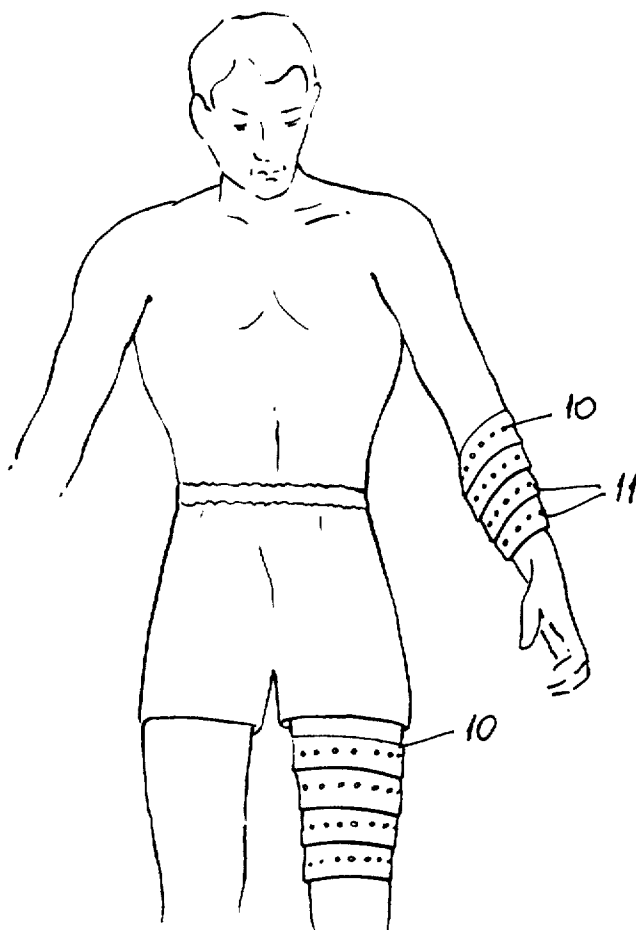
[50] Field of Search 128/90, 89

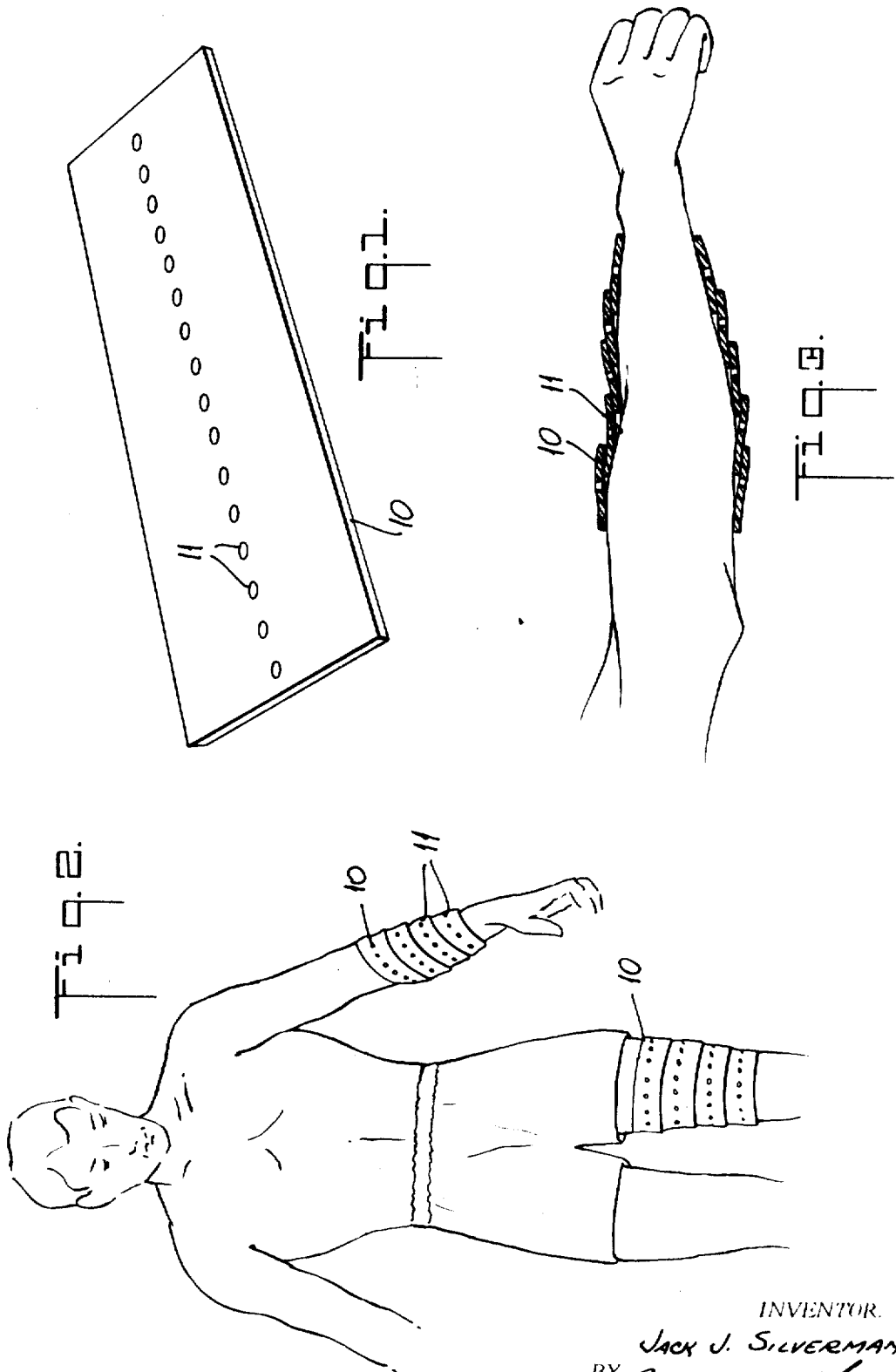
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ABSTRACT: A surgical dressing in the form of a plastic, foraminated bandage which may be wound about a diseased, deformed or broken part to produce a helix thereabout, and thereafter rendered rigid or semirigid to produce a cast immobilizing the part. The bandage is constituted by a strip of thermoplastic material which is moldable, when heated, to permit the strip to be wound about the part, the strip being rendered semirigid or rigid when cooled to room temperature.





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NEOPRENE SURGICAL BANDAGE FOR MAKING BODY IMMOBILIZING CASTS

This invention relates generally to surgical dressings, and more particularly to a bandage which may be wound about a part to be immobilized and which is thereafter rendered rigid or semirigid to form a cast.

In order to immobilize diseased, deformed, fractured or broken parts, it is the conventional practice to encase the part in a plaster cast. Such casts take the form of a rigid dressing, usually made from gauze or crinoline impregnated with plaster of paris. Plaster of paris is a material which is applied in a wet, plastic state, the material hardening upon drying. The resultant rigid cast, even though fairly fragile, is relatively heavy. Thus one wearing a plaster cast on the foot must not only exercise care to avoid breaking it, but he is at the same time weighed down by bulky, unsightly and uncomfortable cast.

In some instances, as in a broken joint, to facilitate the healing process and to avoid the formation of scar deposits at the joint which may result in a permanent impairment of joint action, it may be desirable in the course of healing to flex and thereby exercise the joint. With a rigid plaster cast, such movement is precluded.

In view of the foregoing, it is the main object of this invention to provide a surgical dressing in the form of a plastic bandage which may wound about a part to be immobilized and which may thereafter be rendered rigid or semirigid to create a suitable cast which though light in weight is of high strength.

A significant feature of the invention is that the bandage is in the form of a strip which is foraminated to provide for air circulation. Such ventilation is desirable, for a flow of air in the environment of the wound is beneficial in connection with the healing process and also permits the evaporation of moisture from skin. In a conventional plaster cast, the part is encased and air circulation is inhibited.

Also an object of the invention is to provide a cast-forming bandage of the above-identified type which is inexpensive, and which may be quickly and effectively applied, removed and reused. It is not necessary with the present invention to break the cast, and the cast may be either unwound or cut off by a pair of scissors.

Progressive splinting may be indicated in some cases. In progressed splinting, the position of the cast must, on occasion, be shifted in the course of the healing process. When using plaster casts, every time the cast position is to be altered, one must break the cast and reform it at the new position. A salient advantage of the present invention is that in progressive splinting one need not destroy the existing helical cast, but merely heat and soften the cast, after which the cast may be shifted to a new position and again rendered rigid.

Briefly stated, these objects are attained in a bandage formed of a foraminated strip of thermoplastic material of a neoprene composition which is moldable when heated to permit the strip to be wound about the part to be immobilized, the resultant bandage being rendered rigid or semirigid when cooled to room temperature.

For a better understanding of the invention, as well as other objects and further features thereof, reference is made to the following detailed specification to be read in conjunction with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a bandage strip in accordance with the invention;

FIG. 2 shows the bandage strip after it is wound about a body part and rigidified to form a cast; and

FIG. 3 is a section taken through the cast.

Referring now to the drawings, and more particularly to FIG. 1, there is shown a bandage in accordance with the invention, the bandage being formed of a strip 10 having a width and thickness appropriate to use to which the bandage is to be put. Thus if a cast is to be formed about a finger, its width and thickness will be small, whereas larger dimensions will be used

for casts intended for legs and arms. The strip is provided with a row of perforation 11 which runs longitudinally along the center of the strip. In practice, the strip may be foraminated by means of several rows of such perforations.

Strip 10 is formed of a thermoplastic material which is moldable when heated at a temperature not much higher than room temperature and which becomes rigid or semirigid at room temperature. Since the strip will be wound about a part of the body in the warm state, the temperature thereof will not cause discomfort to the patient for it is not hot to the touch. Preferably, the strip is made of an unvulcanized neoprene composition to be later described in greater detail. Neoprene is a synthetic rubber made by the polymerization of chloroprene and characterized by superior resistance to oils, gasoline, sunlight, ozone and heat and by lower permeability to gases than rubber.

In forming a cast about the arm or any other part of the body, the bandage strip is heated for a few minutes to its softening temperature, which is about 140° F. This may be done in ordinary heated tap water or by blowing heated air thereacross, using a standard hair dryer for this purpose. This renders the strip soft and pliable. The bandage is then applied to the part to be immobilized by winding it thereabout to produce a tightly wound helix in which each convolution somewhat overlaps the preceding convolution without, however, covering the perforations which allow for ventilation.

In practice, to keep the wound bandage from unwinding or slipping, the margins which are to overlap are first coated with a suitable adhesive, so that after winding, each convolution or coil will adhere to the adjacent convolution to form a closed tube. Alternatively, one may, after winding the bandage over the part to be immobilized, leave an extra length of strip which is then cut lengthwise to produce two tabs. The inner surface of these tabs are then coated with adhesive and the tabs are rewound in the opposing direction and the bandage helix to hold the winding thereof together.

After the bandage is applied in the manner described above, it is quickly rendered rigid by running cold water over it or otherwise cooling the material. The bandage will normally be set in about 20 minutes, but by cooling it can be made rigid in about 5 minutes. The resultant rigid or semirigid cast, depending on the composition of the strip, affords a lightweight cast of high strength.

The cast material is nonallergic and nontoxic and can be washed with detergents. By the use of suitable coloring agents the cast may be given a skin color so that it is cosmetically acceptable. While the cast requires no lining, in some instances, it may be desirable, instead of applying the cast directly, to first apply a gauze or soft cloth underlining to the part.

Should it be necessary thereafter to shift the position of the cast, the cast is first softened by hot water or hot air from a hair dryer or other available source until it is pliable, after which the cast is shifted to a new position and again hardened. Thus progressive splinting is made possible without the need to destroy the cast each time a shift is made.

Manufacturing Process

The following is a preferred procedure for making a thermoplastic strip in accordance with the invention.

A mixture is prepared using the following ingredients:

Ingredient	Amount by weight, parts
1. Polychloroprene.....	100
2. High styrene copolymer.....	20
3. Titanium dioxide.....	3
4. Precipitated calcium carbonate.....	20
5. Magnesium oxide.....	4
6. Polyethylene (low molecular weight).....	1
7. Red oxide of iron.....	.031
8. Polyethylene glycol.....	2

Chloroprene is a colorless liquid made from acetylene and hydrochloric acid which is used in making neoprene by polymerization. The titanium oxide and red oxide of iron serve as a coloring agent to impart a fleshlike hue to the strip. Other pigments in the darker brown family may also be used.

The calcium carbonate acts as a filler, while the magnesium oxide serves as an antioxidant. The styrene and polyethylene afford plasticity to the product, whereas the polyethylene glycol provides viscosity control.

The above listed ingredients are intermingled in a suitable mill where they are heated until the mass is softened to have a doughlike consistency. The resultant mass is removed from the mill and then reheated to render it malleable, the material being then passed through suitable calendar rolls to form sheets of the desired thickness. The sheets are thereafter cut to strip size and perforated to provide the desired product.

While there has been shown a preferred embodiment of the neoprene surgical dressing in accordance with the invention, it will be appreciated that many changes and modifications may

be made therein without, however, departing from the essential spirit of the invention as defined in the annexed claims.

What I claim is:

1. A surgical bandage capable of being wound about a part to be immobilized to form a rigid cast, said bandage being constituted by a strip of thermoplastic material formed of an unvulcanized neoprene material which is rendered soft and pliable when heated to a temperature in the order of about 140° F., and which when thereafter exposed to room temperature is rendered rigid in a matter of minutes, said neoprene material incorporating red oxide of iron in a sufficient amount to impart a fleshlike hue thereto, said strip having a row of perforation extending longitudinally along the center thereof and an adhesive coating on the margins on either side of the row of perforations, whereby when the strip is wound about the part to be immobilized to form a helix whose convolutions are marginally overlapped and adhered to each other, the helix is ventilated by said perforations.

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