

- [54] **DUAL FINISH SURGEON'S GLOVE**
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Related U.S. Application Data

- [63] Continuation of Ser. No. 720,854, Apr. 12, 1968, abandoned.

- [52] **U.S. Cl.**.....117/18, 2/168, 117/16, 117/66, 117/94, 117/118, 117/139, 264/307, 264/340
 [51] **Int. Cl.**.....**B44d 1/094**, A61b 19/04
 [58] **Field of Search**2/167, 168; 117/9, 10, 16, 117/18, 19, 29, 33, 47, 66, 94, 139, 118; 264/83, 232, 340, 307; 260/96 HA

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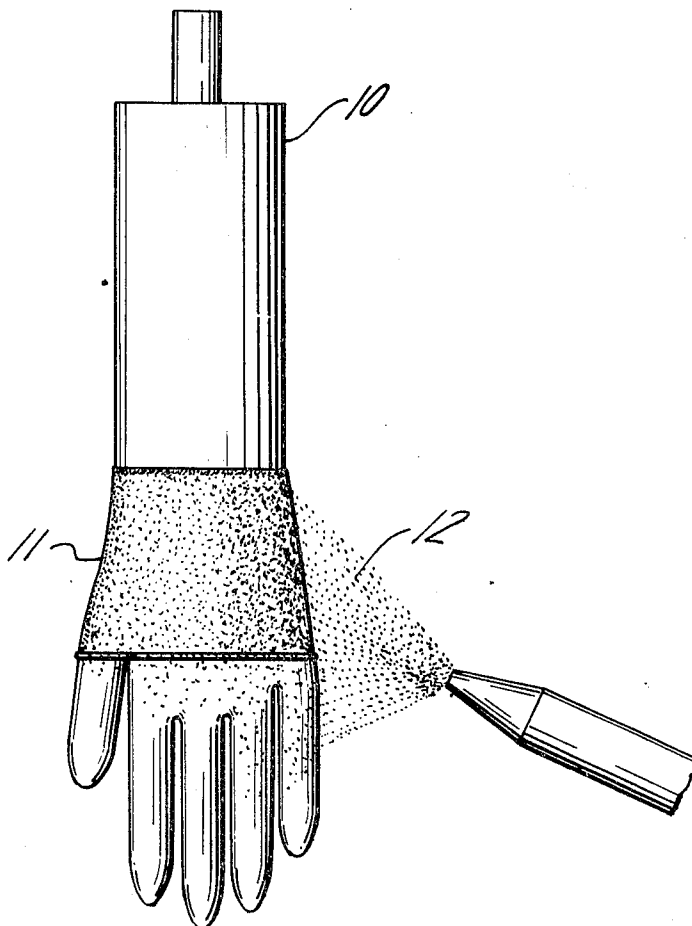
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[57] **ABSTRACT**

A dual-finished rubber surgeon's glove having an external surface that is nonadherent to antifriction powders and an adherent powdered inside surface. Sufficient dust or powder is present on the inside to facilitate donning, while the absence of dust on the outside minimizes the possibility of introducing dust particles into surgical openings and causing infections or post operative adhesions.

7 Claims, 3 Drawing Figures



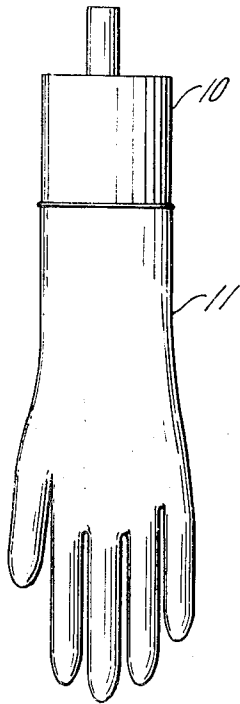


FIG. 1

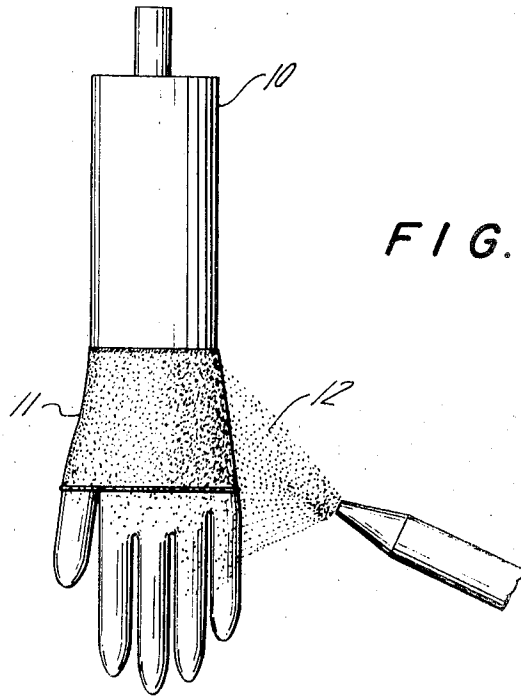


FIG. 2

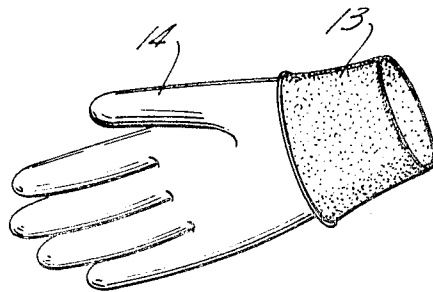


FIG. 3

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DUAL FINISH SURGEON'S GLOVE

This application is a continuation of application Ser. No. 720,854, filed Apr. 12, 1968, and now abandoned.

This invention relates generally to rubber articles and methods of making them. More specifically, it relates to rubber surgeons gloves having inside surface characteristics different from the outside, such distinguishing characteristics being imparted to the glove by a novel method of manufacture.

Surgeons gloves formed from rubber by the conventional techniques have a natural tackiness that causes clinging to the hand and fingers and making donning the gloves difficult. To overcome this problem, it is customary to "dust" the gloves with an antifriction lubricating powder or dust such as cornstarch, which serves as a surface lubricant. This antifriction lubricating powder is commonly placed upon the rubber surgeons gloves during the manufacturing process as an aid to strip the gloves from the hand-shaped form upon which they are formed by dipping and curing. Inasmuch as the gloves are turned inside out as they are stripped, the application of dust to the exterior surface eliminates binding due to cohesion as the glove is stripped.

Even though the gloves and the lubricating powder which has been applied to them are sterilized before use, nevertheless, a possibility of inducing granuloma exists if the lubricating powders are brought into contact with a surgical opening. Therefore, it is highly desirable to eliminate as much powder as possible on the external surface of a surgeons glove. To this end, gloves are customarily tumbled or vibrated after the application of lubricating powder in an attempt to remove excess powder from the external surfaces thereof. However, due to surface tackiness, a substantial amount of the powder remains and cannot be removed. Even rinsing of the outside surfaces of the gloves in sterile alcohol, water or saline solutions will not remove all of the powder accumulated on the glove surfaces.

Accordingly, it is an object of this invention to provide a surgeons glove having a lubricated internal surface and a substantially lubricant free external surface.

A still further object of the invention is the provision in the manufacturing of surgeons gloves for introducing lubricating powders to one surface of the glove only.

These and other objects of the invention will be apparent from the following detailed description thereof and the accompanying drawings wherein:

FIG. 1 is a schematic view showing a surgeons glove as initially shaped on a form therefor;

FIG. 2 is another schematic view showing the surgeons glove being stripped from a form; and,

FIG. 3 is a perspective view of the stripped surgeons glove showing a cuffed portion to expose the interior surface.

Referring now to the drawings, surgeons gloves are formed by first dipping the hand-shaped form 10 in a coagulant for natural rubber latex and then dipping the form in a rubber latex solution for a time sufficient to form a glove 11 of the desired thickness thereon.

Following the dipping procedure, various treatments such as leaching of the gloves may be conducted and then the gloves are allowed to dry.

While still on the form, the gloves are, according to the invention, halogenated to change the surface characteristics sufficiently so that lubricating dust will not adhere to the surface. Due to the deleterious effects that over-halogenation can have upon rubber articles, the step must be rather precisely controlled to halogenate the natural surface only to the extent that is necessary to produce a surface to which lubricating powders will not adhere. This is done according to the preferred method of the invention by introducing the glove on the form into a halogen containing solution. In this manner, the amount of halogenation of the surface of the formed rubber glove can be accurately controlled by the length of the dip time and the concentration of halogenating constituents. The preferred halogenating constituents are those selected from the group consisting of chlorine and bromine and when

employing a 30 second dip time 1,000-2,000 p.p.m. of these constituents may be used successfully. The preferred halogen concentration range is 1,600-1,800 p.p.m.

Following the dipping of the glove's surface, the glove can be rinsed if necessary to remove excess materials and then dried.

During the stripping operation, as depicted in FIG. 2, a lubricating or dusting powder 12 is applied to the glove 11. The common dusting powder used is a sterilizable corn starch of the type that is biologically absorbable and suitable for the purpose of lubricating surgeons gloves. When the glove is stripped, it is turned outside in. After the stripping operation, the glove is reversed to its normal position and tumbled to remove the lubricating powder from the outside thereof. The resulting article is a surgeons glove as shown in FIG. 3 with a dusted inside surface 13 and a substantially dust free outside surface. What little dusting powder remains can be readily removed by rinsing in a sterile saline, water or alcohol solution as often are prescribed for preoperative procedures.

The following specific example illustrates the invention and specific conditions that can be used to make a dual finished surgeons glove:

SPECIFIC EXAMPLE

A number of surgeons gloves were prepared by dipping forms into a compounded natural rubber latex mixture in accordance with conventional procedures.

The mixture had the following composition:

Constituents	Parts by Weight
Latex solids	100 parts
Sulfur	1 part
Zinc oxide	½ part
Zinc salt of mercapto benzothiazole	1 part
Zinc dimethyldithiocarbamate	¼ part
4, 4'-Thiobis (6-tert-butyl-m-cresol)	¼ part
Water sufficient to bring total solids to about 45%	

The gloves were then permitted to cure on their forms. The forms with the surgeons gloves were then dipped for a period of 30 seconds in an aqueous solution containing 1,200 p.p.m. chlorine gas.

The gloves were permitted to dry. Then they were dusted and stripped, tumbled to remove excess dust and then turned right side out. The gloves were tumbled again in the presence of an air jet to remove excess dust from the outside surfaces. Inspection indicated that the inside of the glove had sufficient lubricating powder adhering thereto to facilitate donning, while the exterior surface of the glove was substantially free of dusting particles.

The gloves treated in accordance with the above procedure were found to have between 0.002 and 0.008 gram of dust on the outside and between 0.050 and 0.150 gram on the inside. Comparable gloves which were not treated in the chlorine containing solution were found to have between 0.1 to 0.15 gram on the outside and between 0.13 and 0.2 gram on the inside.

The foregoing describes a specific example according to the invention. Various other modes of carrying out the invention can be used within the scope of the following claims.

What is claimed is:

1. A latex surgeon's glove comprising an interior powder-holding surface and an exterior powder-rejecting surface, said exterior surface having been halogenated with a halogen selected from the group consisting of fluorine, chlorine, bromine, and iodine until said surface became powder rejecting, said halogenation having been terminated before said exterior surface became slippery.

2. The glove claimed in claim 1 wherein said halogen is chlorine.

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3. A latex surgeon's glove comprising an interior surface and an exterior surface, said interior surface being coated with from about 0.050 to about 0.150 gram of lubricating powder, said exterior surface holding less than about 0.050 gram of lubricating powder, said exterior surface having been halogenated with a halogen selected from the group consisting of fluorine, chlorine, bromine and iodine until said exterior surface became powder rejecting, said halogenation having been terminated near the percentage of halogenation which caused said exterior surface to become powder rejecting.

4. The glove claimed in claim 3 wherein said halogen is chlorine.

5. The glove claimed in claim 3 wherein said glove has less

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than about 0.008 gram of powder on the outside surface.

6. A rubber glove having the external surfaces thereof treated with elemental halogen so as to exhibit tackless relatively smooth slip resistant characteristics such that the amount of a powdered lubricant retained thereon is below about 0.050 gram and also having an untreated internal surface upon which is retained a sufficient quantity of powdered lubricant to facilitate easy donning of said glove.

7. A rubber surgeon's glove according to claim 6 wherein the external surface is treated with chlorine and the quantity of retained powdered lubricant on the untreated internal surface is between about 0.050 gram and 0.200 gram.

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