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PROCESS FOR MAKING BOOTS, SPORTS EQUIPMENT AND HATS

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No Drawing. Continuation-in-part of application Ser. No. 380,975, June 22, 1964. This application Jan. 12, 1966, Ser. No. 535,257

15 Claims. (Cl. 12—142)

The present invention relates to ski boots and similar sports shoes wherein rigid encasement of the ankle part of the foot is accomplished by the use of a thixotropic material to encircle the ankle portion thereof. Additionally, the present invention relates to an improved grip for sports equipment and the like, as well as improved bands for hard hats and football helmets.

This application is a continuation-in-part of a prior-filed application Ser. No. 380,975 filed June 22, 1964 now U.S. Patent 3,237,319, which in turn was a continuation-in-part of a prior-filed application Ser. No. 249,062, filed Jan. 2, 1963 and now abandoned.

In my patent application Ser. No. 380,975 filed June 22, 1964, there is described the use of a high-viscosity flowable material resistant to rapid deformation material as an ankle encasement for ski boots and similar sport shoes. However, the use of these materials has the disadvantage that upon storing the ski boot or similar sport shoe, the material tends to deform or sag, with the result that the next time the shoe or boot is worn, some time is involved in again molding the material to a comfortable fit.

It has now been found that the use of a material having

(a) a minimum yield point of at least 4 grams per square centimeter,
(b) a viscosity between about 100,000 and about 40,000,000 poises at 0° F. and at 80° F.
(c) is formable by finger pressure,
(d) is substantially inert to leather or polyvinylchloride,
(e) not significantly changing in volume in response to ambient temperatures and
(f) has a nominal thickness between about 0.04 inch to 0.6 inch (hereinafter called "formable stable material")

in the ankle encasement portion of a ski boot or similar sport shoe will conform to the shape of the ankle encased upon continuously applied pressure, but will not deform upon instantaneously applied pressure, and will not noticeably "sag" upon storing. "Formable stable material" may also be characterized by retaining its shape for several days when formed into an arch about 3 inches wide and 2 inches high the material being cylindrical approximately ½ inch in diameter. "Formable stable material" responds to instantaneous pressure in the same manner as a solid, but responds to continuously applied pressure as a liquid. "Yield point" is a characteristic of a Bingham plastic, that is, resisting flow until the shear stress applied has exceeded some minimum. After the yield point is reached, the "formable stable materials" utilized in the present invention flow under shear stress in a Newtonian, dilatant or thixotropic manner, within the viscosity ranges above set forth.

The "formable stable materials" when employed in the same manner of Ser. No. 380,975 filed June 22, 1964, which specification is hereby specifically incorporated herein, have all of the advantages of that invention with the additional advantage of not significantly changing shape upon storage.

A preferred "formable stable material" contains—

(a) 25% by weight polyisobutylene having a molecular weight range between 8,000 and 200,000 (Staudinger method in diisobutylene at 20° C.).

(b) 25% by weight of an inert oil, e.g., mineral oil or a saturated ester oil or a mixture thereof.
(c) 50% by weight of inorganic filler, primarily calcium carbonate and titanium dioxide. Any conventional inorganic filler for plastics can be used, however a mixture of calcium carbonate and titanium dixode is preferred.

This material is available today as "Plasti-tak" manufactured by Brooks Manufacturing Company, Incorporated, 1051 Meredith Drive, Cincinnati, Ohio. A desired form is Plasti-tak Flofit H7A.

Another preferred material will contain 20% by weight polyisobutylene, 37.5% by weight inert oil and 42.5% by weight inorganic filler. Of course, other ranges of ingredients can be utilized provided they meet the definition requirements of "formable stable materials." An increase in the amount of oil will further reduce the yield point and viscosity while an increase in the inorganic material will increase the viscosity and yield point.

Even when boots utilizing such "formable stable materials" are stored over the summer no sagging will occur. This is in direct contrast to the polydimethylsiloxane, or the stereospecific polybutadiene specifically disclosed in Ser. No. 380,975 which will usually sag when stored only one week.

While a minimum yield point of at least about 4 grams per square centimeter has been presented, it is to be understood that a minimum yield point of at least about 20 grams per square centimeter is preferred. Similarly, a viscosity between about 500,000 and about 3,000,000 poises at 0° F. and 80° F. is preferred.

Pads of "formable stable material" have also been found to have advantageous utility as the grip or body contacting portion of sports equipment such as golf clubs, pistol grips, baseball bats, camera grips, tennis racquets, ski poles, gun stocks, and the like. Such use of the pad of "formable stable material" replaces the sponge rubber or other flexible material normally employed in the handles of golf clubs. The pad of "formable stable material" is wrapped around the shaft and covered with polyvinyl chloride, leather, buckskin or like sheet material in a manner so as to look like a conventional golf club. When the player grips the handle of the club and holds it securely for a few minutes, it will be found to conform exactly to the shape of his personal grip. Excellent comfort and control are thereby achieved. And, the grip will maintain its configuration between shots. Yet, if the hand swells, or another player desires to use the clubs, just a few minutes of holding the club in a player's grip will modify the grip to fit the new conditions. Similarly, the "formable stable material" can be used in the other applications mentioned above.

Another application for the "formable stable material" utilized in the present invention is in the bands of hard hats (safety hats), or football helmets. These hats have a hard outside and an inside support band designed to keep the hard outside away from the head while at the same time supporting the hard outside.

In this application the interior (head-contacting) bands of such hats are made from leather or vinyl or other support material covering a strip of "formable stable material." With such a construction, a better "fit" is achieved and the hat will stay in place easily.

Various modifications may be made in the present invention without departing from the spirit or scope thereof, and it is to be understood that I limit myself only as defined in the appended claims.

I claim:

1. In a process of making a boot having a pressure compensating ankle support that covers the sides and back of the ankle of the wearer including the steps of providing a

flexible protective ankle support shaped envelope, sealing a high viscosity material in said envelope and assembling said sealed envelope and boot, said high viscosity material not substantially changing in volume responsive to ambient temperature changes, having a nominal thickness of about 0.04 inch to about 0.6 inch, being resistant to flow in response to intantaneously applied pressure but responding to continuously applied pressure to provide pressure on those portions of the ankle that can best withstand it and to allow portions of the ankle momentarily to move away from pressure, and having

(a) a minimum yield point of at least 4 grams per square centimeter and

(b) a viscosity between about 100,000 and about 40,000,000 poises at 0° F. and 80° F.

2. The improved process of claim **1**, wherein such high viscosity material has a minimum yield point of about 50 grams per square centimeter and a viscosity between about 500,000 and about 3,000,000 poises at 0° F. and 80° F.

3. The improved process of claim **1** wherein such high viscosity material is a mixture of polyisobutylene, mineral oil and inorganic filler.

4. The improved process of claim **1** wherein such high viscosity material is a mixture of about 25% by weight polyisobutylene, about 25% by weight mineral oil and about 50% by weight inorganic filler.

5. The improved process of claim **1** wherein such high viscosity material is a mixture of about 20% by weight polyisobutylene, about 37.5% by weight inert oil and about 42.5% by weight inorganic filler.

6. In a process of making sports equipment having a handle adapted to be encircled by a player's hand, including the steps of providing a formable stable material having a nominal thickness of about 0.04 inch to about 0.6 inch, having a minimum yield point of at least about 4 grams per square centimeter, and a viscosity between about 100,000 and about 40,000,000 poises at 0° F. and 80° F., encasing said formable stable material within a flexible non-porous sheet material and assembling said handle and encased material.

7. The improved process of claim **6** wherein the formable stable material has a minimum yield point of about 5 grams per square centimeter and a viscosity between about 500,000 and about 3,000,000 poises at 0° F. and 80° F.

8. The improved process of claim **6**, wherein the formable stable material is a mixture of polyisobutylene, mineral oil and inorganic filler.

9. The improved process of claim **6** wherein the formable stable material is a mixture of about 25% by weight polyisobutylene, about 25% by weight mineral oil and about 50% by weight inorganic filler.

10. The improved process of claim **6** wherein the formable stable material is a mixture of about 20% by weight polyisobutylene, about 37.5 percent by weight inert oil and about 42.5% by weight inorganic filler.

11. In a process of making a hat having a hard outside member and an inside support band, providing a formable stable plastic material having a nominal thickness of about 0.04 to about 0.6 inch, having a minimum yield point of at least about 4 grams per square centimeter, and a viscosity between about 100,000 and about 40,000,000 poises at 0° F. and 80° F., covering said formable material with a support band, and assembling into a hat said support band with said outside member.

12. The improved process of claim **11** wherein the formable stable material has a minimum yield point of about 50 grams per square centimeter and a viscosity between about 500,000 and about 3,000,000 poises at 0° F. and 80° F.

13. The improved process of claim **11** wherein the formable stable material is a mixture of polyisobutylene, mineral oil and inorganic filler.

14. The improved process of claim **11** wherein the formable stable material is a mixture of about 25% by weight polyisobutylene, about 25% by weight mineral oil and about 50% by weight inorganic filler.

15. The improved process of claim **11** wherein the formable stable material is a mixture of about 50% by weight polyisobutylene, about 37.5% by weight inert oil and about 42.5% by weight inorganic filler.

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