Jan. 13, 1959 A. E. MURRAY 2,868,197

FORM-FITTING FOOTWEAR

Filed Sept. 11, 1956

2 Sheets-Sheet 1

Fig. 1.

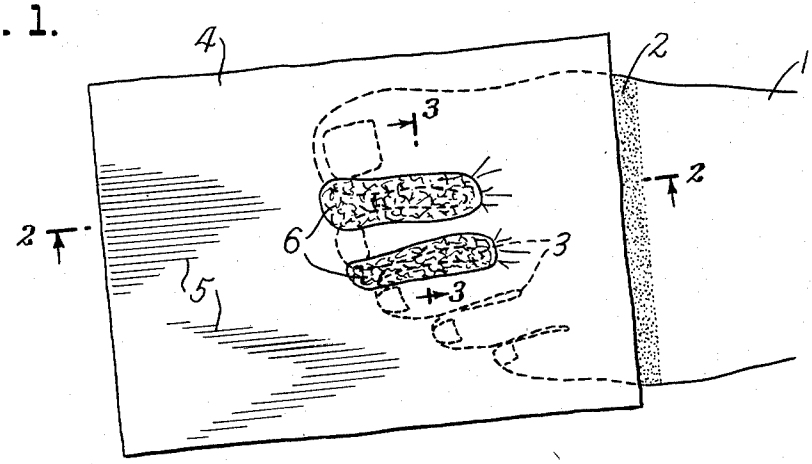


Fig. 2.

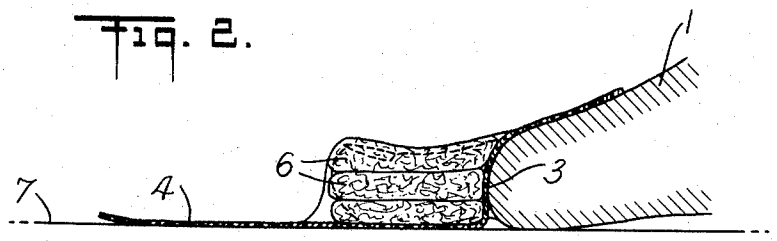


Fig. 3.

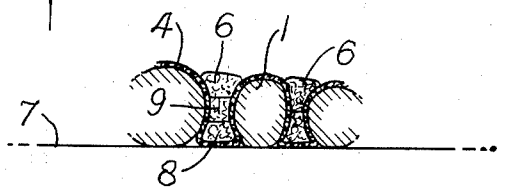
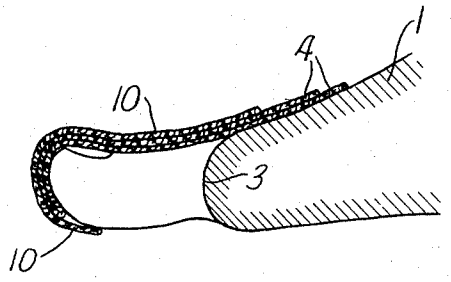


Fig. 4.



INVENTOR

Alan E. Murray

BY

Eyre Mann & Burrows

ATTORNEY

Jan. 13, 1959 A. E. MURRAY 2,868,197

FORM-FITTING FOOTWEAR

Filed Sept. 11, 1956

2 Sheets-Sheet 2

Fig. 5.

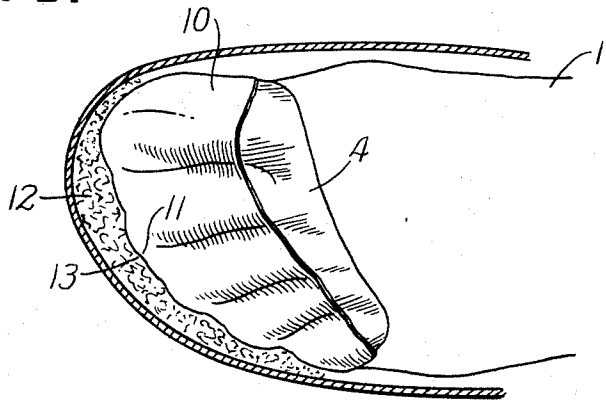


Fig. 6.

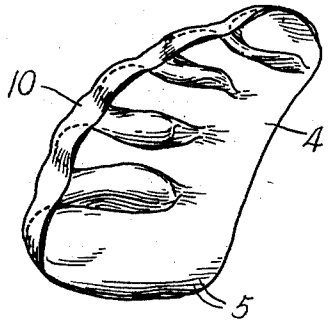


Fig. 7.

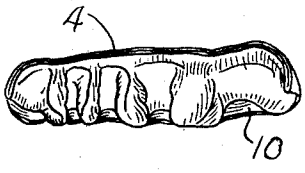


Fig. 8.

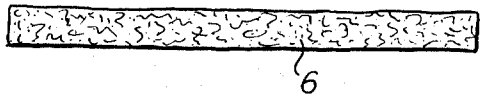
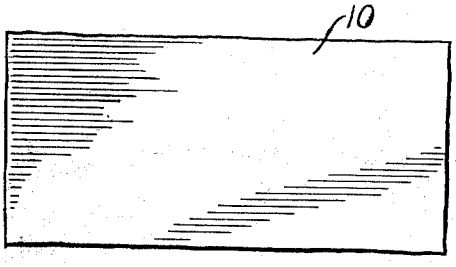


Fig. 9.



INVENTOR

Alan E. Murray

BY

Egbert Mann & Burrows

ATTORNEY

United States Patent Office

2,868,197

Patented Jan. 13, 1959

2,868,197

FORM-FITTING FOOTWEAR

Alan E. Murray, New York, N. Y.

Application September 11, 1956, Serial No. 609,292

8 Claims. (Cl. 128—153)

My invention relates to a process and the product thereof which provides footwear such as to adequately conform to the foot of the wearer, including a toe protector which may be enclosed within and form a part of the enclosure worn by the foot.

An object of my invention is to provide footwear which may be of any usual type, which protects and supports the foot from deformation or injury due to non-fitting or poorly fitting internal surfaces of the foot enclosure. Another object is to provide shoes of any desired type, including even standard shapes and sizes, which, nevertheless, are equipped so as to provide an intimate and accurate, as well as adequate, fit for the particular foot on which it is worn. A further object is to provide an expeditious adaptation of usual types of shoes so as to eliminate customary non-fitting or ill-fitting characteristics thereof. Still another object is to provide a protector for the toes or forward part of the foot which intimately and accurately fits the foot on which it is worn, such as to be capable of being worn within the ordinary shoe without resultant damage to the soft tissues of the foot. Again, another object is to provide means, including a toe protector, such as to be adapted to be worn within shoes of the ordinary type without longitudinal and lateral movement of the foot therein. Another object is to provide a support within the shoe such as to act as a buttress and interlock with the lateral edges of the toe protector, with or without locking into the intervening toe indentations located between the respective sides of the protector and in the buttress, such as to prevent lateral as well as longitudinal movement of the foot and protector within the enclosure. A further object is to provide means of this character which may be expeditiously produced from the foot of the wearer and inserted without undue waiting or lapse of time between the making thereof and the wearing of the same on the foot within the foot enclosure.

Further objects of my invention will appear from the detailed description of the same hereinafter.

While my invention is capable of embodiment in various different forms, I have shown only one form thereof in the accompanying drawings, in which—

Fig. 1 is a plan view showing the forward part of a foot having thereon the cover piece before being folded back over the toe portion of the foot but after the filling pieces have been inserted between the toes;

Fig. 2 is a longitudinal section of the same taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse section of the same taken on line 3—3 of Fig. 1;

Fig. 4 is a longitudinal section of the same showing the cover piece after being folded back and showing the reinforcing piece placed thereover;

Fig. 5 is a plan view of the completed toe protector in its position when inserted in a shoe;

Fig. 6 is an underneath view of the toe protector;

Fig. 7 is a rear elevation of the toe protector;

Fig. 8 is a plan view of one of the filling pieces to be inserted between the toes; and

Fig. 9 is a plan view of a reinforcing piece to be placed around the forward ends of the toes.

In accordance with my process, I first apply in an area, about 1" high, across the top of a foot 1, a coating of latex 2, by means of a brush, to act as a temporary adhesive over the foot for the material of the protector described hereinafter. The front edge of the coated area will be, preferably, located about 1½" to the rear of toe recesses 3 of the foot.

The latex which I use for this purpose and throughout the present application, is a water suspension of rubber or artificial rubber substitute which is self vulcanizable or prevulcanized, and which is widely known as latex. Preferably, for this purpose I use a thickened latex, such as described in my Patent No. 2,568,291, granted September 18, 1951.

Thereupon, I provide a rectangular cover piece 4 of any desired stretchable woven material, such for example as jersey cloth, which is generally made by being woven in the form of a cylinder and which may have small longitudinal ridges 5 in the weave thereof. The cover piece 4 is now placed over the front portion of the foot so as to extend at least to the rear edge of the adhesive coating 2 on the foot. This will leave a forward portion of the cloth 4 extending beyond the foot which is somewhat more than half the area of the cloth, so that when the extreme end or tips of the toes are covered thereby and the cloth folded back, as hereinafter described, it will extend at least as far as the rear edge of the adhesive coating 2. Also, the said fabric 4 covers and extends laterally beyond the side margins of the foot a distance of approximately ¾". Thereupon, I dust all over the top of the piece 4, where it overlies the foot, some plaster of Paris. Next, I apply all over the portion of the cover piece 4, extending beyond the ends of the toes, some of the latex and sponge off the excess of the latex therefrom. Thereupon, I provide a number of, preferably unimpregnated, narrow filling strips 6 of the same kind of cloth as above, and tuck one or more, or fraction thereof, of these strips 6, with the pointed end of the scissors, into each of the toe recesses 3 onto the top of the cover piece 4 which overlies said individual recesses 3. In other words, beginning with the big toe recess there will usually be required about two of these filling strips 6 tucked therein. Each of said toe recesses 3 is filled in this way by one or more of said filling pieces 6 until the level of the filling pieces is about even with the top of the toes. When tucking these pieces 6 into the toe recesses 3, one or more of them is preferably, but not necessarily, pressed all the way down to the level of, for example, a table 7 upon which the foot 1 is being rested. However, it will be understood that, preferably, the filling material 6 is pressed down in all of said toe recesses 3, beginning with the big toe recess. The material 6 in the toe recesses 3 provides a springy packing which is yieldably interposed between the adjacent toes and usually has enlargements 8 at the lower ends thereof, which, because of the springy character thereof, enables partitions 9 thus formed to be more readily removed from and retained between the toes when being used. Then, within about five minutes, before the latex on the piece 4 has had time to set, it is folded back over the foot with the fold beginning at the level of the table 7, at the front lower edges of the toes so that the latex, aided by the presence of the plaster of Paris powder, will set owing to the evaporation or withdrawal of water therefrom. In this manner, the forward portion of the fabric 4 will overlie the rearward portion of the fabric at least as far back as the rear ends of the toe recesses. While the latex in the piece 4 is being allowed to set it is pressed all over the top thereof, first

with the fingers and then with a dry cloth, to remove the excess of the liquid and to press it down uniformly all over the upper contours of the foot and toes and also into the forward ends of the front toe recesses, in a horizontal direction. Thereupon, I provide a rectangular reinforcing piece 10 and put latex all over one surface thereof, which is to be put next to the upper surface of the folded-back cover piece 4. Also, I put powdered plaster of Paris on the ends and tops of the fabric on the toes. Now, the reinforcing piece is applied so that the coated surface thereof overlies and contacts with the powdered surface of the piece 4 so that it extends all over the tops of the toes back to the rear ends of the toe recesses, as well as over the ends of the toes and about ½" underneath the toes measured from the ends thereof. This is done by gently lifting the ends of the toes to insert the lower margin of the reinforcing piece 10 below the same so that, as a result, the lowermost margin extends somewhat in the rear of the lower folded edges of the piece 4. The reinforcing piece 10 is then pressed downwardly and inwardly all over the tops and ends of the toes so as to leave marginal recesses pressed in, corresponding to the indentations at the separation points 11 of the respective toes.

Thereupon, any excess fabric of the reinforcing piece 10 extending rearwardly beyond the said ½" at the lowermost edge thereof beneath the tips or ends of the toes, is trimmed off, leaving the lowermost resulting margin of the reinforcing piece 10 just completely covering over the toe ends. Then latex is applied all over the reinforcing piece 10 and the excessive latex is removed therefrom by the application, at different points all over the same, of a dry cloth. A little plaster of Paris powder is now applied all over the surface of the reinforcing piece 10 and the cover piece 4. Thereafter, the whole toe protector is thus allowed to set about ten minutes. After this the upper rear portion of the piece 4 is trimmed back to a point about ½" at the rear of the ends of the toe recesses 3 and at the two sides of the protector beyond the big toe and the little toe, it being understood that the upper rear margin of the piece 4 is tapered down towards the lowermost side margins of the reinforcing piece 10 in a downwardly curved line so that the sides of the protector overlie and cover the entire sides of the big toe and little toe.

The protector thus formed can now be dried, with or without the aid of an electric fan and warm air. The protector can now be taken off the foot. This can be readily done by peeling it off, from the top, from the adhesive 2 which has initially been placed on the top of the foot, and by lifting the partitions 9 and enlargements 8 from between the toes. The toe protector can then be coated all over the top and bottom thereof with the latex and allowed to dry for, preferably, about 2 hours, after which the surface can be brushed off with a motor-driven rotary brush. The protector can now be replaced on the foot, and covered with a sock or not if desired, and worn in a shoe of any desired character, such for instance as a standard shoe. However, a soft tennis shoe or moccasin is more desirable for this purpose. It will also be understood that upon wearing the shoe with the protector in it, the protector will gradually accommodate itself to any inner surface in the shoe with which it comes in contact.

Alternatively, it will be understood, however, that the protector may be allowed to dry while still remaining on the foot, and that the protector need not be taken off the foot initially but can be then covered with a sock and introduced into the shoe with which it is to be worn.

The shoe with which the protector is to be worn may be any shoe fitting comfortably thereover but should have adequate width to receive the foot with the toe protector and sock extending over the sides of the big and little toes. Furthermore, inasmuch as standard and usual types of shoes are not fitted to the toe ends there is introduced into the residual space which is at the front of such shoe, a buttress to prevent longitudinal, as well as lateral, movement when deemed desirable, such as a wad of cotton flock 12, which may be substantially pure cellulose, or other formable material, in just sufficient quantity or volume so that the ends of the toes will be supported and form pockets therein, thus producing ridges 13 in the compacted resistant cotton which fits into the toe end recesses 11, thus buttressing the ends of the toes so as to be supported from the inner ends of the shoe effectively longitudinally as well as laterally, so that the foot 1 is effectively located and prevented from moving longitudinally and laterally within the shoe. In this way the foot and protector are prevented from rubbing against the inner surface of the shoe, particularly at the forward portion thereof, with the possible formation of blisters and various other foot ailments. Also, in this way, the length of the foot is controlled and protected so as to maintain and preserve the arch of the foot. This also eliminates the necessity of any counters or strengtheners at the rear of the shoe. It also provides a means for adjusting the length of foot space within the shoe. In other words, this makes the foot really a part of the shoe in effect, and avoids any necessity of utilizing unduly tight shoes, which can only have the effect of pinching the feet. A more normal sized shoe can thus be used. Furthermore, the enlargement on the partition 9 between the toes serves to retain the protector in position vertically with regard to the foot.

In this way it will be understood that the shoes utilized may be shoes made of any desired material, such as canvas, leather, etc.

It will be evident, therefore, that the protector not only intimately and accurately fits the toes and forward part of the foot, but the buttress 12, which becomes compact and resistant when inserted and worn in the foot enclosure, will extend, somewhat in the form of a crescent, around the sides of the big and little toes, and may, by contacting with the protector, be formed with forward projections into the interstices 11 opposite to the toe recesses, while definitely and permanently locating the foot and protector within the enclosure so as to prevent longitudinal as well as lateral movement of the toes and foot and protector with regard to the shoe which is worn over the protector and foot, with or without a sock thereon. In other words, while the enclosure may comprise a shoe of the ordinary standard type, the toes and foot are made to fit therein with or without the aid of any pyramid being provided beneath in the recess formed between the toes and the plantar part of the foot. This is clearly contradistinguished from previous footwear which avoided fitting the foot within the enclosure at the toe ends, inasmuch as standard shoes were always spaced from the forward ends of the toes.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

What I claim is:

1. The method of forming a toe protector which comprises the steps of applying a fabric material impregnated with liquid rubber latex in uncured form as a first layer over the top of the toes and front portion of the foot with a margin of material being extended out in front of the tips of the toes which margin is long enough to be folded back over the toes to cover them, pressing the fabric material down into a plurality of recesses between the toes to form an open loop of material in such recesses, pressing separate strips of a woven fabric material down into the open loops to fill them and force the fabric material of the loop out against the sides of the toes to conform to the shape thereof, folding the margin of fabric material back over on top of the foot before the liquid rubber latex has completely cured to provide a top cover which overlies the separate strips of fabric material in said recesses, pressing the top cover of fabric material down against the first layer of material,

and then maintaining the resulting toe protector in position on the toes until the liquid rubber latex has cured to the extent that it retains a permanent impression of the shape of the sides of the toes therein.

2. The method specified in claim 1 which includes the step of applying a separate layer of fabric material impregnated with liquid rubber latex in uncured form as a reinforcing cover over the top of the protector and in under the bottom of the front portion of the toes.

3. The method specified in claim 1 which includes the step of pressing the separate strips of fabric material down firmly enough into the individual recesses to force the loop of fabric material to expand out under the curved portion at the bottom of the toes and form an enlargement lying under the curved portion at the bottom of the toes.

4. The method of forming a toe protector which comprises the steps of applying a fabric material impregnated with liquid rubber latex in uncured form over the top of the toes and front portion of the foot, pressing the fabric material down into a plurality of recesses between the toes to form an open loop of material in such recesses, pressing separate strips of a woven fabric material down into the open loops to fill them and force the fabric material of the loop out against the sides of the toes to conform to the shape thereof and then maintaining the resulting toe protector in position on the toes until the liquid rubber latex has cured to the extent that it retains a permanent impression of the shape of the sides of the toes therein.

5. The method of manufacturing a foot enclosure having a toe protector therein which comprises the steps of applying a fabric material impregnated with liquid rubber latex in uncured form as a first layer over the top of the toes and front portion of the foot with a margin of material being extended out in front of the tips of the toes which margin is long enough to be folded back over the toes to cover them, pressing the fabric material down into a plurality of recesses between the toes to form an open loop of material in such recesses, pressing separate strips of woven fabric material down into the open loops to fill them and force the fabric material of the loop out against the sides of the toes to conform to the shape thereof, folding the margin of fabric material back over on top of the foot before the liquid rubber latex has completely cured to provide a top cover which overlies the separate strips of fabric material in said recesses, pressing the top cover of fabric material down against the first layer of material, and then maintaining the resulting toe protector in position on the toes until the liquid rubber latex has cured to the extent that it retains a permanent impression of the shape of the sides of the toes therein, placing a moldable material in the front portion of the foot enclosure which is adapted to be molded to

maintain the shape of the front of said toe protector therein and which serves as a buttress for the toes and protector and then pressing the toes with protector thereon against such buttress to mold it to fit the general outline of the front of the foot and protector.

6. The method of forming a toe protector which comprises the steps of applying a fabric material impregnated with liquid rubber latex in uncured form as a first layer over the top of the toes and front portion of the foot with a margin of material being extended out in front of the tops of the toes, which margin is long enough to be folded back over the toes to cover them, tucking the fabric material down into a plurality of recesses between the toes to form a pocket of material in such recesses, pressing separate strips of a springy, stretchable woven fabric material down into the open pockets to fill them and force the fabric material in the pockets out against the sides of the toes by means of yielding pressure so that the fabric material in the pockets will conform to the shape of the toes adjacent the recesses, folding the margin of fabric material back over on top of the foot before the liquid rubber latex has completely cured to provide a top cover which overlies the separate springy strips of fabric material in said pockets, pressing the top cover member of fabric material down against the first layer of material to mold it in place thereon and then maintaining the resulting toe protector in position on the foot until the liquid rubber latex has cured to the extent that it retains a permanent impression of the shape of the front of the foot therein.

7. A toe protector comprising a continuous layer of latex impregnated woven fabric material having loops therein extending down into a plurality of recesses between adjacent toes, each of said loops having three dimensional form corresponding to the shape of the sides of the toes adjacent said recesses and each of said loops being filled with separate strips of a woven fabric material which assist the loops in retaining their three dimensional form.

8. A structure as specified in claim 7 in which the separate strips of fabric material are made of a springy stretchable woven fabric material which presses the loops outwardly against the toes with positive but yielding pressure.

References Cited in the file of this patent

UNITED STATES PATENTS

1,163,490	Weil	Dec. 7, 1915
1,691,440	Hodgson	Nov. 13, 1928
1,744,122	Keeling	Jan. 21, 1930
2,292,144	Meldman	Aug. 4, 1942
2,335,665	Goldmerstein	Nov. 30, 1943
2,603,212	Zeve	July 15, 1952
2,812,570	Petersili et al.	Nov. 12, 1957