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2,714,771

MULTI-PLY PAPER FOOT COVERING

Filed May 16, 1951

2 Sheets-Sheet 1

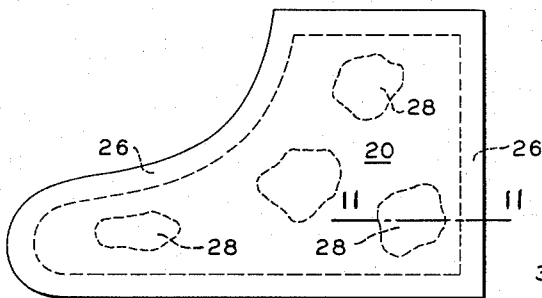


FIG. 1

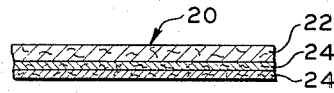


FIG. 2

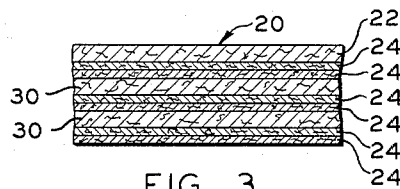


FIG. 3

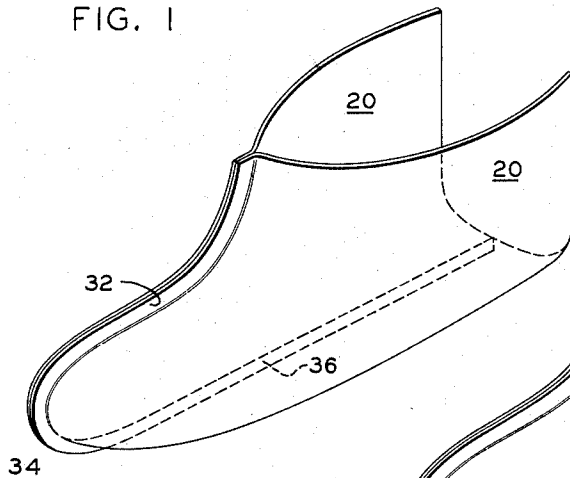


FIG. 4

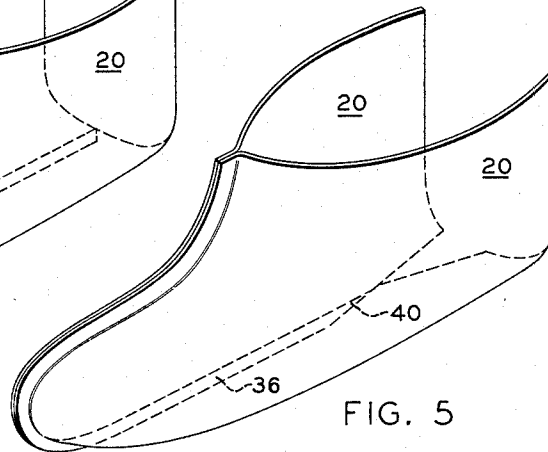


FIG. 5

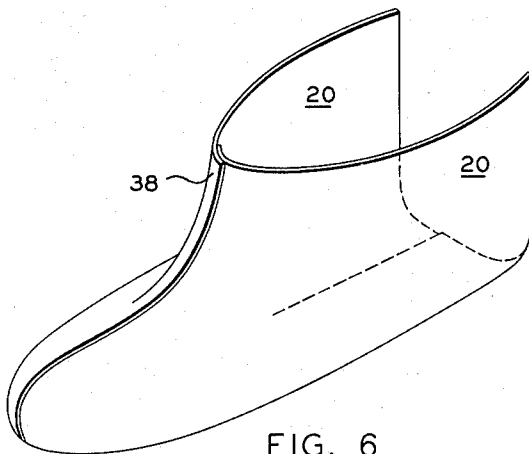


FIG. 6

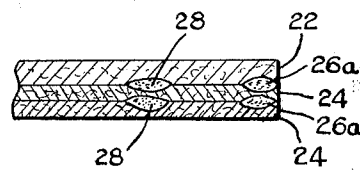


FIG. 11

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2 Sheets-Sheet 2

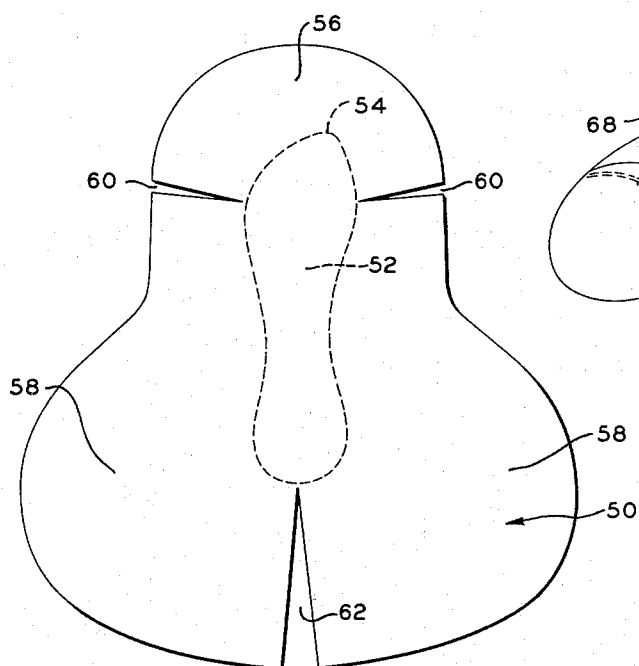


FIG. 7

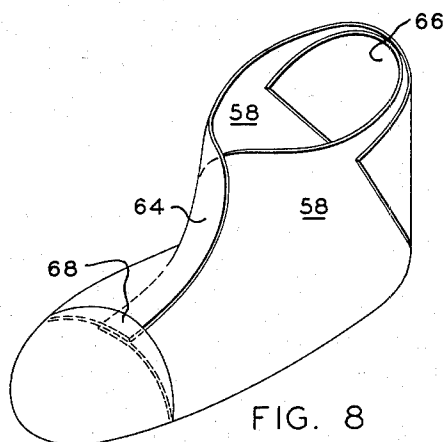


FIG. 8

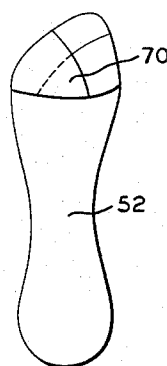


FIG. 9

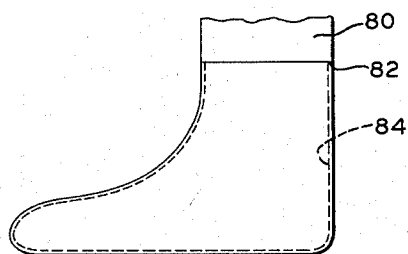


FIG. 10

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MULTI-PLY PAPER FOOT COVERING

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4 Claims. (Cl. 36—9)

This invention relates to improvements in paper socks, stockings and the like.

An object of the invention is to provide an improved paper sock or stocking which will be warm, comfortable, moisture absorbent and reasonably durable and which is formed of a multiplicity of overlying paper plies at least the outermost of which is relatively extensible, resilient and wear resistant, the inner ply or plies being relatively softer, more porous and more absorbent and somewhat less resilient and wear resistant.

Other objects of the invention are to provide socks, stockings and the like of the character described comprised of an outer ply of creped paper superimposed on a plurality of plies of multicellulose stock paper of the character, for example, of facial tissues; to provide such socks, stockings and the like comprised of a multiplicity of paper plies of the character described with plies of creped paper interposed between successive pluralities of plies of facial tissue; and to provide such socks, stockings and the like of any desired color, size and shape and in the form either of completed articles of footwear, i. e. with all final seams adhesively preformed, or as partially completed articles of footwear, i. e. with only some of the final seams preformed, or as blanks to be wrapped around the foot of a user and essentially free from preformed seams.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises an article of manufacture possessing the features, properties and the relation of elements which will be exemplified in the article hereinafter described and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 represents a view in plan of one of a pair of substantially identical elements from which the sock embodying the present invention may be constructed;

Fig. 2 is a sectional view, greatly enlarged, of a portion of the element shown in Fig. 1;

Fig. 3 is a similar view of a further modification of the invention showing a construction in which the structure of Fig. 2 is employed repetitively;

Fig. 4 is a perspective view of a sock or other foot covering embodying the invention and comprising a pair of elements, such as are shown in Fig. 1, adhesively united along the instep, toe and sole portions of the sock;

Fig. 5 is a similar view of a modification of the structure shown in Fig. 4;

Fig. 6 is a view, similar to Figs. 4 and 5, showing the two elements forming the sock or other foot covering seamed in overlapping relation rather than in abutting relation;

Fig. 7 is a plan view of a blank embodying the invention and which is adapted to be folded about the wearer's

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foot and ankle to produce a sock, stocking or like foot covering;

Fig. 8 is a perspective view of the blank shown in Fig. 7 as folded about the wearer's foot;

Fig. 9 is a view of the sole of the sock formed from the blank of Fig. 7 as positioned on the foot of the wearer;

Fig. 10 is a diagrammatic view illustrative of a mold and a sock or other foot covering embodying the invention formed thereon as by successive spraying or dipping of the mold in suitable paper stock; and

Fig. 11 is a sectional view, greatly enlarged, taken on the line 11—11 of Fig. 1.

There is a demand for a cheap, soft, warm, comfortable, thin, readily disposable sock or other foot covering which can be used in direct contact with the foot and either alone or as a supplement to the standard cotton or woolen socks by persons engaged in outdoor, winter work, or sports activity, for example by skiers, sportsmen, farmers, members of the armed forces, children, outdoor workers, etc. There is also a need for a comfortable, highly absorbent, disposable sweat sock or like foot covering for use by athletes and others engaged in extensive outdoor activity during the warm weather.

Paper has heretofore been suggested as a material suitable for use in the manufacture of slippers, socks and other foot coverings, but apparently primarily as a cheap substitute for a cloth sock, and usually efforts to make these paper foot coverings durable have resulted in the use of stiff, hard kraft papers or heavily waxed or sized and non-absorbent papers or combinations of paper with cloth, felt or other like supporting materials. This invention, on the contrary, contemplates the provision of a disposable, single-use sock formed essentially of soft porous, moisture-absorbent, multi-ply paper tissue with an outer ply, and if desired with intermediate plies, of a creped or double creped paper which, while soft and relatively porous, is resilient, extensible, deformable and of greater tensile strength than the inner layers or plies of tissue.

In Fig. 1 there is shown at 20 one of a pair of essentially similar multi-ply paper blanks or elements which, when adhesively united along portions of their adjacent peripheries, in the manner shown for example in Figs. 4, 5 and 6, form a sock or foot covering embodying the present invention. In the form of the invention shown in Fig. 2, the blank or element 20 comprises three overlying plies of paper, an outer ply 22 of a relatively heavy and resilient paper stock and two substantially identical inner plies 24 of a relatively lighter weight, softer, more porous, less resilient paper stock. These plies are preferably adhesively united around the periphery of the blank 20 as at 26 by any suitable adhesive 26a and they may also, if desired, be bonded together over small adjacent areas at various places in the body of the blank, as shown for example in Fig. 1 at 28. Preferably, however, the plies 22, 24 should be free to move with respect to one another over most of their contiguous area.

The outermost ply 22 may be formed of any suitable paper stock which is resilient, extensible, reasonably absorbent and which possesses adequate tensile strength. For example, a suitable paper for use as ply 22 may be either a one-way or a two-way creped paper which meets the strength requirements for the outer layer. A creped kraft paper weighing forty pounds to the ream (sheets 24" by 36") is illustrative of papers possessing adequate tensile strength and other suitable properties for use as the outer ply.

The inner plies 24 are preferably soft, absorbent and tissue-like and may be less extensible and not as strong as the outer ply. A suitable paper stock for use as the

inner plies 24 may be a multicellulose stock weighing ten pounds per ream (sheets 24" by 36") and two or more of such plies may be employed. Where these tissue-like plies show a tendency to tear more in one direction than in another—and this is typical of most commercial, thin, soft paper sheets of this character—it is preferred that the plies 24 be superimposed with their directions of maximum tensile strength crossed.

It is to be understood that while Fig. 2 shows the element 20 as comprising three plies—one heavy outer ply 22 and two substantially thinner inner plies 24—the blank 20 may, if desired, comprise any additional number of plies. A structure is shown in Fig. 3, for example, where the blank 20 comprises an outer ply 22 of the character described, six plies 24 of the character heretofore described as forming the two innermost plies, and two additional, interleaving plies 30. These plies may be substantial duplicates of outer ply 22 or preferably may be formed of a paper stock intermediate in strength and thickness between that forming ply 22 and that forming plies 24. A suitable stock for use in the formation of the interleaving plies 30 may comprise a full bleach semicreped sulphite tissue weighing twenty pounds to the ream (24" by 36" sheets).

It is to be understood that other combinations of resilient, relatively strong plies and soft, porous, absorbent, relatively weak and thin plies may be employed in the formation of the sock blank embodying the present invention. Where the sock is to be subjected to relatively heavy usage or is to be worn in extremely cold weather, a heavier sock may be required than that normally preferred for less severe usage. Speaking generally, the sock of the present invention will comprise at least three paper plies (Fig. 2), and where it comprises a considerable number of such plies (Fig. 3) resilient plies will be interspersed or interleaved between less resilient and thinner plies.

Figs. 4, 5 and 6 illustrate various forms of the sock of the present invention. In Fig. 4, two blanks 20 are shown as adhesively united along the instep (32), toe (34) and sole (36) portions of the blanks. The foot may be easily inserted into this sock and the heel portions of the blanks 20 folded over one another to complete the foot covering. These portions may, if desired, be provided with self-adherent adhesive material so that they engage and adhere under pressure only. It will be noted that in the structure shown in Fig. 4, the seam along the instep, toe and sole portions of the sock is formed by adhering the two elements 20 in abutting face-to-face relation. In Fig. 6 there is illustrated a similar sock in which the two elements 20 are adhesively united as at 38 in overlapping relation, the seam again extending over the instep, toe and sole portions of the sock. In Fig. 5 there is shown a modified structure in which the blanks 20 are adhesively united as in the sock shown in Fig. 4 except that the seam 36 along the sole portion of the sock terminates at 40, substantially at the front portion of the heel. Such a structure may provide a more comfortable foot covering under certain circumstances than the structure shown in Fig. 4. It is to be understood, moreover, that if desired the blanks 20 comprising the sock of the present invention may be adhesively united not only along the instep, toe and sole portions, as shown in Figs. 4, 5 and 6, but also along the rear or heel portion, leaving a structure which provides a foot opening only at the upper edge or, alternatively, the sock may be open along the upper edge and instep and sealed along the toe, sole and heel portions, or may be open along the instep, toe and heel portions and sealed only along the sole. All such structures are to be deemed to fall within the scope of the invention.

In Figs. 7, 8 and 9 there is illustrated a unitary blank free from preformed seams from which a sock or other foot covering may be formed. This blank 50 comprises a sole portion 52 shown within the dotted line 54 of Fig. 7 representing the outline of a foot. Integral with the

sole portion 52 there is a toe portion 56 and two instep and heel covering portions 58. Toe portion 56 is separated from the two portions 58 by notches 60 extending inwardly from the periphery of the blank substantially to the edge 54 of the sole portion 52, and the two portions 58 are separated by a similar notch 62, also extending inwardly from the periphery of the blank to the edge 54 of the sole portion. As shown, the blank is generally roughly pear-shaped. It may be formed of any combination of paper plies such as has been described in connection with the other embodiments of the invention. In forming the sock from the blank 50, the wearer places his foot within the outline 54 and upon the sole portion 52. He then folds the two instep and heel portions 58 up about his foot, overlapping the instep portions as shown in Fig. 8 at 64, thus covering the instep. The free heel ends of the portions 58 are then overlapped, as shown at 66 in Fig. 8, and these portions and the overlapped instep portions may, if desired, be adhesively united by precoating with self-adherent adhesive so that a bond is obtained simply by pressure. The toe portion 56 is then folded up around the toes of the wearer. Its outer edge overlaps the overlapped front edges of the portions 58, as shown at 68 in Fig. 8, and its free side ends are then carried under the wearer's foot and overlapped against the sole portion 52, as shown at 70 in Fig. 9. The overlapped portions of the member 56 may also be provided with self-adherent adhesive so as to cause them to adhere under pressure alone.

The embodiment of the invention shown in Figs. 7, 8 and 9 is to be understood as but one of many possible forms of unitary blanks from which foot coverings embodying the invention may be made, and in this respect it differs from the embodiment of the invention shown in Figs. 1, 4, 5 and 6, which disclose foot coverings formed of two separate blanks adhesively united. In either event, however, it is to be understood that because of the soft pliable nature of the paper plies forming the foot coverings, the product of the invention is comfortable despite the presence of preformed seams or of overlapped and adhesively bonded segments.

It is to be understood, moreover, that where desired the sock or foot covering of the invention may be reinforced over those areas subject to greatest wear, for example over the toe and heel portions, by adding supplemental plies to these portions of the blank or blanks forming the sock.

Fig. 10 represents diagrammatically a still further embodiment of the invention. Here, a mold or form 80 roughly approximating the desired shape of the finished sock has the sock molded upon it, for example by dipping the mold repeatedly in a suitable paper stock, to build up thereon successive layers of soft, porous, absorbent paper and a somewhat stronger and less absorbent outer layer. Alternatively, the paper sock may be formed by spraying suitable stock material onto the mold or by winding onto the mold, for example, as a spiral winding, a long strip of such multi-ply paper sheeting as has already been described. The mold 80 may be provided with a shoulder 82 defining the upper edge of the sock to be formed thereon and the sock 84 may be molded about the mold below this shoulder. When formed, the sock 84 may be removed from the mold by cutting along either the instep or the heel portion, or both, and stripping from the mold, thus producing a unitary structure analogous in form and shape to the structure described in connection with Figs. 4 through 6, inclusive.

It is to be understood that the paper sock or other foot covering of the present invention may be of any desired color. For example, the outer layers may be colored and the inner plies left white, or all plies may be colored. Moreover, the innermost plies may be impregnated, if desired, with deodorants, antiseptics or other materials useful in the treatment of foot diseases. While the structures shown in the drawings and heretofore described have

included ankle covering portions, it is to be understood that these are not essential to the invention and a simple foot covering may frequently be considered adequate. On the other hand, if desired, the sock or stocking of the invention may extend appreciably up the leg of the wearer.

It will be understood that the product of the present invention is admirably adapted for compact packaging and may be supplied in folded and compressed condition without loss of subsequent efficiency. It is intended that the product of the present invention will be worn but once and, if made in the manner heretofore described, it should prove adequate for at least many hours of hard wear under rigorous conditions. It is warm; its insulating properties are excellent and it is thus admirably useful as a cold weather foot covering. It is, moreover, highly absorbent and is thus especially useful as a sweat sock for short periods of intense athletic utility. It is sufficiently durable to be employed by farm laborers, by workmen and others who ordinarily subject their footwear to severe use, and where desired it may be so pretreated and colored with attractive designs as to simulate cotton and woolen footwear and thus be suitable for use by office workers and the like.

While the description of the preferred embodiment of the invention has specified papers of definite weights and properties for use in the various plies forming the product of the invention, it is to be understood that the papers so specified are merely illustrative of those which may be satisfactorily employed, and the description of these specific papers is not to be taken as limiting the scope of the invention to multi-ply elements formed therefrom.

The materials from which the socks and sock blanks of the present invention are formed are cheap, easily handled, easily assembled and easily fabricated. The product of the present invention is of low cost; it may be made rapidly on standard equipment with very little modification thereof; it is compact, cheap not only to manufacture but to package, ship and merchandise; and it is highly effective as a single-use foot covering which is warm, soft, comfortable, moisture-absorbent, remarkably adaptable and unexpectedly durable.

Since certain changes may be made in the above article, and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the foregoing description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A sock-like article comprising a portion adapted to engage the foot of a wearer and consisting of a plurality of superimposed, substantially coextensive, thin plies of soft, porous, moisture-absorbent paper, the outermost ply and at least one intermediate ply, spaced from said outer-

most ply by another ply, being substantially stronger, more extensible and more resilient than other plies, including the innermost ply, of said plurality, said plies being affixed to one another only over restricted portions of their contiguous surfaces and otherwise being free to move relatively to one another.

2. A sock-like article comprising a portion adapted to engage the foot of a wearer and consisting of a plurality of superimposed, substantially coextensive, thin plies of soft, porous, moisture-absorbent paper, the outermost ply being substantially stronger, more extensible and more resilient than other plies of said plurality, said plies being affixed to one another only over restricted portions of their contiguous surfaces and otherwise being free to move relatively to one another, at least two of said other plies being positioned with the directions of their maximum tensile strength substantially perpendicular.

3. A paper foot covering consisting of a multiplicity of superimposed, substantially coextensive, thin paper plies, the majority of said plies, including the innermost ply, being soft, porous, relatively weak and moisture-absorbent and having all the physical properties characteristic of facial tissues, the remainder of said plies, including the outermost ply, being relatively stronger, more extensible and more resilient and having all the physical properties characteristic of creped paper, said plies being adhesively united adjacent their peripheries.

4. A paper foot covering consisting of a multiplicity of superimposed, substantially coextensive, thin paper plies, the majority of said plies, including the innermost ply, being soft, porous, relatively weak and moisture-absorbent, the remainder of said plies, including the outermost ply, being relatively stronger, more extensible and more resilient, each of said stronger plies weighing approximately four times each of said weaker plies, said plies being adhesively united adjacent their peripheries and at least two of said weaker plies being interposed between each two of said relatively stronger plies.

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