

Sept. 17, 1968

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3,402,323

DISPOSABLE OVERSHOES OF FLEXIBLE FILM MATERIAL

Filed Oct. 8, 1965

3 Sheets-Sheet 1

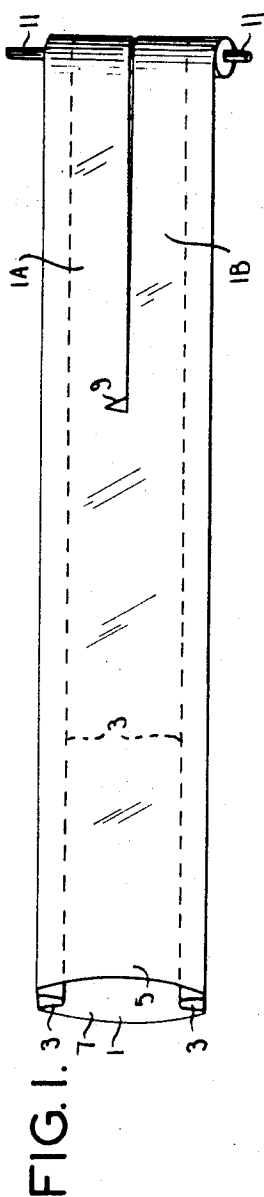


FIG. 2.

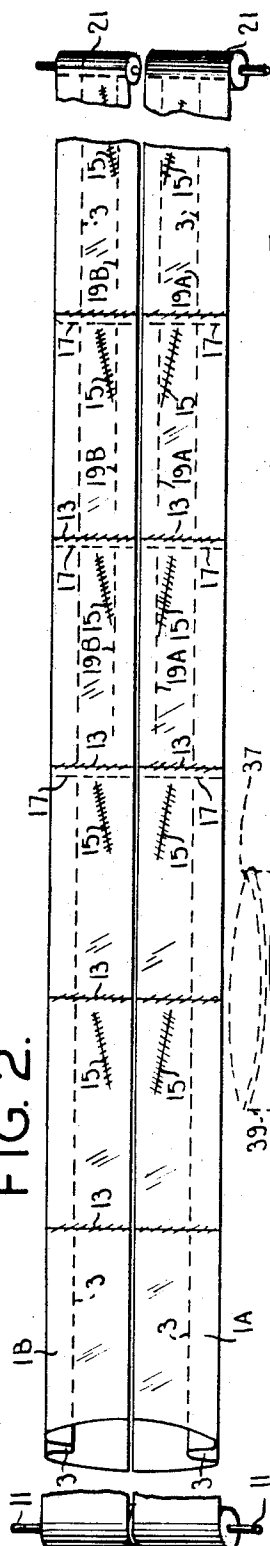
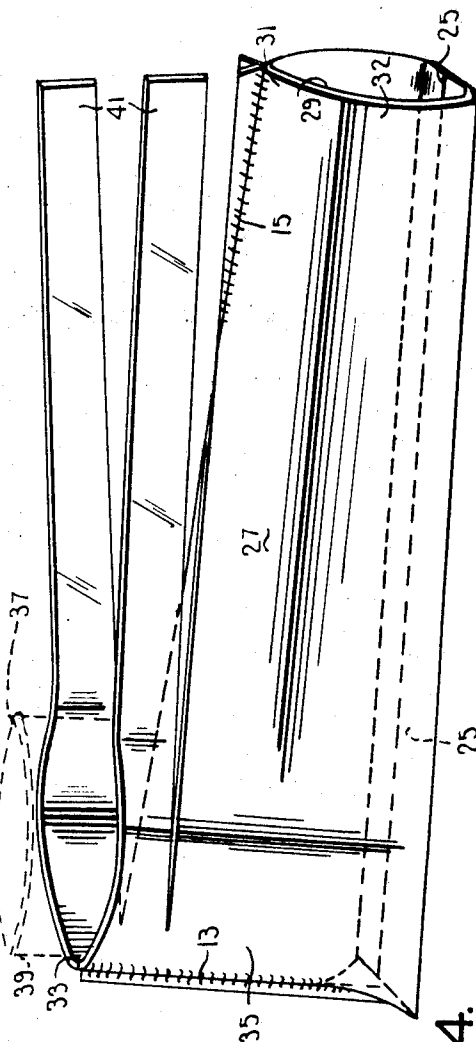


FIG. 4.

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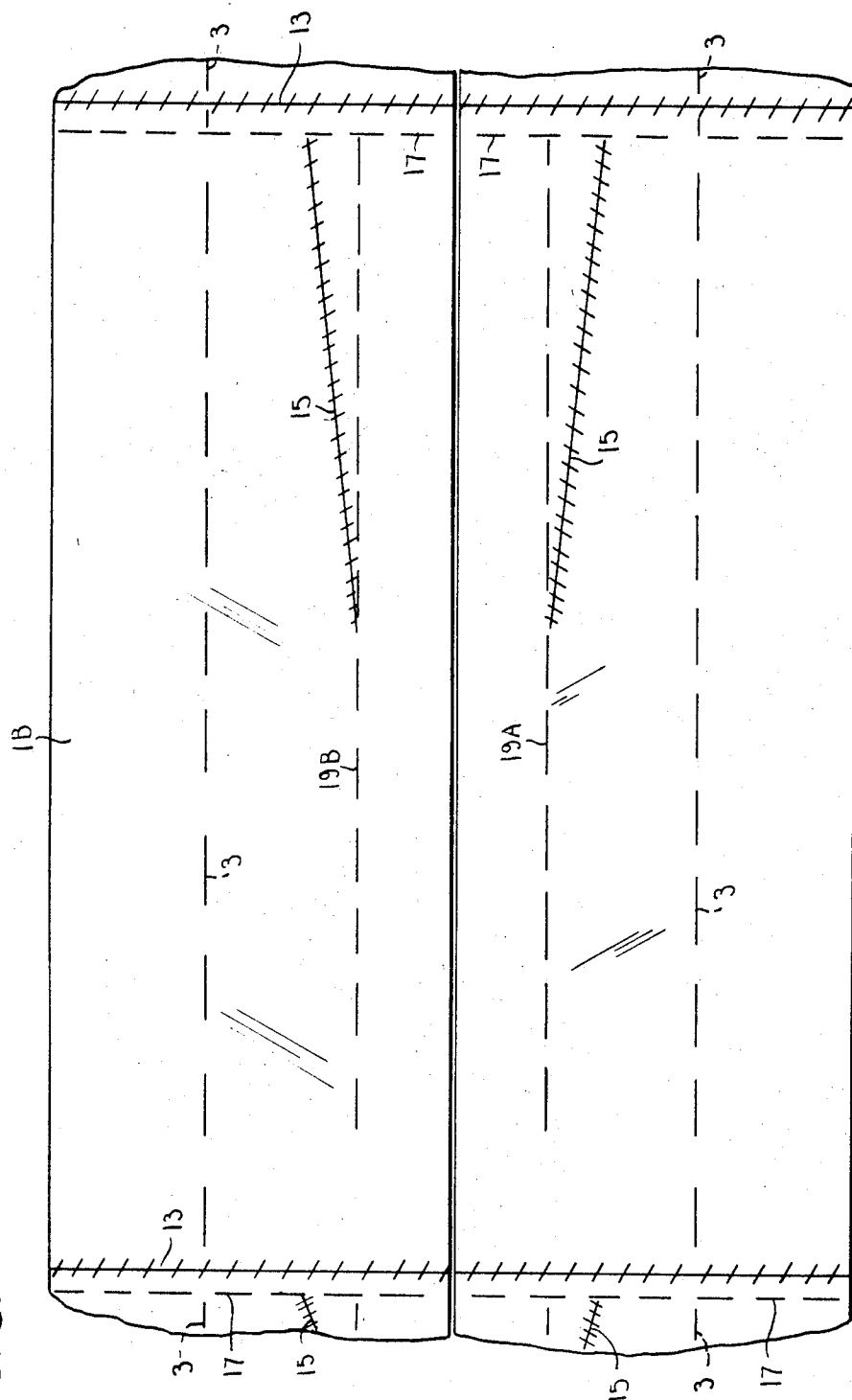
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3 Sheets-Sheet 2

FIG. 3.



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DISPOSABLE OVERSHOES OF FLEXIBLE FILM MATERIAL

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ABSTRACT OF THE DISCLOSURE

Economically disposable overshoes of heat-sealable flexible film material are described which have an integral sole, upper and straps all formed from the same material. The upper has a leg opening at the top adapted to receive the foot and shoe of the wearer and a heel end, a toe end which is closed at the top between the toe and leg opening. A strap portion of the overshoe is provided which may be placed in contact with the skin of the wearer. When formed of electrically conductive material these overshoes are particularly useful as static-eliminating operating room overshoes, the straps being placed in contact with the skin of the wearer to provide a conductive path from wearer to ground. A method of making such overshoes comprises generally slitting lengths of gusseted tubing, and perforating and heat-sealing at successive intervals so as to form lengths of successive pairs of overshoes which may be separated into overshoe lengths or coiled into rolls.

This invention relates to disposable overshoes, and to such overshoes which may be used for street wear or by physicians and other operating room personnel.

Due to the presence of highly volatile substances (e.g., ether) in operating rooms, it is important to avoid sparks caused by discharge of static electricity from the body or clothing of operating room personnel since such sparks in the presence of a volatile substance could result in an explosion and/or fire. Therefore, it is common practice to construct operating rooms with electrically conductive floors and to require operating room personnel to wear conductive devices, such as special overshoes, for electrically grounding them and their clothing. It is also desirable that overshoes worn in the operating room be clean. The cost of prior art overshoes makes it necessary that they be manufactured so that they can be laundered and sterilized for reuse. This is expensive and requires the use of special materials in the overshoes which can withstand repeated laundering.

Overshoes used for street wear need not be conductive nor do they ordinarily need to be laundered, but normally they are too expensive to be economically disposed of after only a short period of use. Experience indicates that the usual overshoe for street wear is frequently misplaced, left at the office after the previous use, or for other reasons may not be available at the time or the place where they are needed. An inexpensive disposable overshoe for street wear which could be carried in a pocket or purse or stored in the office desk and which is so inexpensive that it can be economically disposed of after it is worn only once could significantly reduce the occasions when one needs an overshoe and finds it is unavailable.

Accordingly among the several objects of the invention may be noted the provision of a flexible overshoe which is so inexpensive that it may be economically disposed of after a short period of use; the provision of a disposable overshoe which may be provided in packages containing many pairs of overshoes and stored at home, office, hospital or other locations where they might be needed;

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the provision of an overshoe for operating room personnel which is disposable after a single use and which provides a conductive path for static electricity from the operating room personnel to the floor; the provision of a static eliminating overshoe of the type described which may be manufactured from a heat-sealable film material; the provision of an overshoe construction which can be worn over street shoes of varying sizes; the provision of an overshoe construction which permits a plurality of the overshoes to be joined to each other during manufacture of the overshoes; the provision of a length of conductive material containing a plurality of overshoes each of which is easily separable from adjacent overshoes; the provision of a method of manufacturing a disposable overshoe from a length of heat-sealable material; the provision of a method for manufacturing overshoes wherein all sewing steps are eliminated; and the provision of a method for inexpensively manufacturing overshoes in large quantities. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions and methods hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated:

FIGS. 1 and 2 are views illustrating steps in the method of manufacturing an overshoe in accordance with the invention;

FIG. 3 is an enlarged view of a portion of FIG. 2; FIG. 4 is a view of an overshoe manufactured in accordance with the method of the invention;

FIG. 5 is a view similar to FIG. 3 showing a modification; and

FIG. 6 is a view of an overshoe manufactured according to FIG. 5.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now to FIG. 1 of the drawings, an overshoe of the invention is preferably manufactured from an elongate seamless tube 1 of a heat-sealable film material. A film material suitable for use in manufacturing an overshoe according to this invention may be made from a resin composition sold under the trade designation No. DQOA-1808BK55 by the Union Carbide Plastic Company, a division of Union Carbide Company. This resin composition comprises 30-33% carbon black, 47-55% polyethylene and 15-20% polyvinyl acrylate copolymer. A similar resin material is available from the U.S. Industrial Chemical Company, a division of National Distillery and Chemical Corporation and comprises the same relative amounts of carbon black and polyethylene but includes polyvinyl acetate instead of the polyvinyl acrylate in the Union Carbide material. Film made from both of these materials are flexible and elastic. It is to be understood that other resin compositions may be used to make film material of desired physical and electrical properties.

It is important that overshoes for hospital use have a fairly high conductivity and therefore the resistance of the material used should be as low as possible. The resistance of the material set forth above has been found to vary from approximately 100,000 ohms when using 30% carbon black to approximately 4,000 ohms when using 33% carbon black. Resistances within this range are suitable for hospital use. Of course, where the overshoe is used for street wear and conductivity is not important, then the carbon black may be eliminated and a film material used which is suitable for protecting the street shoes. A resin material containing polyvinyl acrylate is desirable for this use since this material has a surface friction quality that reduces the possibility of the wearer sliding on wet pavement.

The resin materials specified are normally provided in pellet or particle form and are formed into a tube 1 by a conventional tuber. Tube 1 has gussets 3 formed in its side edges and this is conventionally accomplished by the same apparatus which forms the tube. Tube 1 comprises an upper panel 5 and a lower panel 7 in inside-face-to-inside-face relation. The panels are integrally joined together by the gussets 3 at longitudinal side edges of the tubing. Tube 1 is slit in half longitudinally by a cutter designated 9 to form two lengths 1A and 1B of heat-sealable material which are open along their longitudinal edges opposite from gussets 3. These lengths of heat-sealable material are then wound on a reel or mandrel 11 in side-by-side relation.

The lengths of material 1A and 1B are simultaneously unrolled from reel 11 and feed through apparatus somewhat similar to a conventional bag machine for manufacturing the overshoes. As illustrated in FIG. 2, the upper and lower panels 5 and 7 are then heat sealed together at overshoe lengths along lines 13 which are transverse to the lengths 1A, 1B of the tube. The lines of sealing 13 extend throughout the width of both lengths of the tubing and also heat seal together the facing surfaces of the gussets 3. This seal closes the heel portion of the resulting overshoe.

Next panels 5 and 7 of each of the lengths 1A and 1B are heat sealed together along lines designated 15 located between the gussets 3 and the open longitudinal edges of the length of tubes 1A and 1B. The heat seals 15 are interrupted and terminate short of the transverse heat seals 13. Heat seal lines 15 on tube portions 1A, 1B are at an angle relative to each other and to the seal lines 13. Lines 15 are closer to one of the lines of sealing 13 than they are to the next adjacent line of sealing. These seal lines close the vamp portion of the resulting overshoe.

Then the panels 5 and 7 of each of the lengths 1A, 1B of the tubing are perforated at overshoe lengths along lines designated 17 which are transverse to the lengths of the tubing and generally parallel to the transverse heat seal lines 13. The rows of perforations 17 are adjacent the heat seals 13 and provide weakened lines between adjacent heat seal lines 13 along which the tube may be segmented into overshoe lengths. The rows 17 of perforations are at the toe end of the resulting overshoe and they intersect the ends of the lines 15 of heat sealing that are closest to gussets 3 and seal lines 13.

The tubing is then perforated along a pair of lines 19A and 19B. The lines 19A and 19B are generally parallel to each other and they are parallel to and spaced slightly from the open longitudinal edges of the lengths of tubing. The rows of perforations 19A, 19B intersect the transverse rows of perforations 17 above seal lines 15 and they extend from the left side only of perforations 17 of one overshoe to a point spaced from the seal line 13 of the same overshoe. Thus the lines of perforations 19A, 19B are interrupted on both sides of the transverse lines 13 of heat sealing.

The lengths 1A, 1B of the tubing are then coiled into rolls as shown at 21 in FIG. 2 or they may be separated into overshoe lengths by tearing the lengths of the film material apart along the perforations 17.

An overshoe manufactured in the manner explained hereinbefore is illustrated in FIG. 4 of the drawings. The overshoe comprises a sole 25 integrally formed with an upper 27. Gusset 3 unfolds to form the sole 25. The vamp portion 31 of the overshoe upper is closed by the line 15 of sealing. There is a hole or opening 29 at the toe end 32 of the overshoe which results from tearing the tube material along the rows 17 of perforations. The overshoe has a leg opening 33 at the top of the overshoe between the vamp 31 and the heel portion 35 of the overshoe. Heel 35 is formed by the heat seal lines 13. The leg opening 33 provides means for placing the foot and street shoe of the

wearer into the overshoe. The leg of the wearer is designated 37 in FIG. 4 and his sock is illustrated at 39.

The overshoe has two straps 41 extending forward from the leg opening 33 of the overshoe above vamp 31. These straps are formed by tearing along the rows of perforations 19A and 19B to separate the straps from the uppers 27 above vamp 31. Straps 41 are integral with the uppers 27 at the leg opening 33. One or both of the straps are placed within sock 39 in contact with the skin on the leg 37. This provides a path for conducting static electricity from the leg to the overshoe and then through the conductive material of the overshoe to the floor of the operating room.

The gussets 3 and seal lines 13 extending through them result in a generally square heel which roughly conforms to the shape of the heel of a street shoe. While the toe 32 of the overshoe could be closed by providing another line of heat sealing, there is normally no need to close it for operating room or other indoor use, and by having it open shoes of various sizes and shapes are more easily accommodated within the overshoe. Also, by forming the tube 1 from an elastic or stretchable thin film material, the overshoe can be stretched over street shoes of various sizes.

The overshoe of the invention may be provided in roll form as illustrated at the right in FIG. 2 and the user need simply roll off a pair of the overshoes, tear them from the roll and from each other along the rows of perforations 17, and the overshoes are then ready to be placed over street shoes. This is accomplished by separating straps 41 and opening the leg hole 33 at the top of the overshoe, placing the street shoe and foot of the wearer into the overshoe, and then pulling upwardly on the uppers from the sides of leg opening 33, stretching the overshoe (if necessary) as it is pulled over the street shoe. Straps 41 are then tucked into the socks 39 so they are in contact with the skin of the leg 37. Then static electricity from the body will be conducted from the leg through straps 41 and the uppers 27 to the sole 25 of the overshoe.

FIGS. 5 and 6 illustrate a modified form of the overshoe of the invention suitable for use over street shoes, either out of doors or in other environments where a closed-toe overshoe is desired. FIG. 5 illustrates a segment of a tube similar to that illustrated in FIG. 3 except that the facing surfaces of the tubing part 1A, 1B are secured together by a line of heat sealing designated 43 which extends from the heat seals 15 adjacent the rows of perforations 17 through the gussets 3 of the tubing. Heat seal lines 43 are on the side of the rows of perforations 17 opposite from the heat seal 13 and closes the toe end of the resulting overshoes. When the overshoes are to be used for street wear only, straps 41 may be used for tying the overshoe over the street shoe or they may be eliminated. FIG. 6 illustrates the completed closed-toe overshoe.

It will be understood that the style or design of the overshoe may be varied by curving or shaping the seal lines so that the overshoe rather closely conforms to the configuration of the street shoes. In this respect, it will be understood that the heel of the overshoe can be shaped, particularly for women's shoes, by the addition of heat seal lines (not shown) closing the front of the heel portion. While the carbon black in the film materials previously described may be omitted from the material used for forming overshoes for street wear, it is preferred to retain a high percentage of polyvinyl acrylate in the film material since this provides a high surface friction quality to the film material and there is less tendency to slip on wet surfaces.

While the overshoes have been described as being manufactured from gusseted tubing, it will be understood that they may be manufactured from so-called flat tubing, that is, tubing without gussets. The gussets 3 are desirable since they provide a generally square heel in the resulting overshoe which provides a better fit on the street shoe at the

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heel. Also, it will be understood that the overshoe can be manufactured from a flat web of heat-sealable sheet material which has side portions folded over each other to form facing side panels similar to either of the halves 1A, 1B of the split tubing.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions and methods without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. A disposable static-eliminating operating room overshoe comprising a sole integral with an upper and formed from an electrically conductive flexible heat-sealable film material, the upper having a leg opening at the top adapted to receive the foot and shoe of the wearer, the upper having a heel end, a toe end and being closed at the top between the toe end and the leg opening, and a conductive portion of the overshoe integral with the sole and upper, said conductive portion comprising a strap adjacent the leg opening adapted to be placed in contact with the skin of the wearer to provide means for conducting electricity from the wearer's body to the overshoe.

2. A disposable overshoe as set forth in claim 1 wherein the overshoe is open at the toe end and the film material from which the overshoe is formed is elastic whereby the overshoe is adapted to be worn over street shoes of more than one size.

3. A disposable overshoe as set forth in claim 1 wherein the toe end of the overshoe is closed by a line of heat sealing.

4. A disposable operating room overshoe comprising a sole and an upper integrally formed from one piece of an electrically conductive flexible heat sealable film material, the upper having a leg opening at the top adapted to receive the foot and shoe of the wearer, the overshoe having a pair of electrically conductive straps attached to the upper at the leg opening and adapted to be placed in contact with the skin of the wearer to provide means for conducting electricity from the wearer's body to the overshoe, and the upper having a heel portion closed by a line of heat sealing extending from the sole to the leg opening.

5. A disposable overshoe as set forth in claim 4 wherein the vamp portion of the upper extending between the leg opening and the toe end of the overshoe is closed by a line of heat sealing.

6. A disposable overshoe as set forth in claim 4 wherein the overshoe is open at its toe end.

7. An overshoe comprising a sole and an upper joined to each other and formed from a flexible heat-sealable film material, the upper having a leg opening at the top, the upper being closed at its toe end and its heel end, the overshoe further having a vamp portion between its toe end and its leg opening, the vamp portion being closed by a line of heat sealing extending from the toe portion to the leg opening.

8. An overshoe comprising a sole and an upper integrally formed from one piece of a flexible heat-sealable film material, the upper having a leg opening at the top and having means adjacent the leg opening for holding the top of the overshoe around the leg, and the upper having a heel portion and a toe portion closed by lines of heat sealing extending upwardly from the sole.

9. A method of manufacturing an overshoe comprising: providing two elongate rectangular panels of heat sealable film superimposed one on the other and joined along one long edge thereof,

heat sealing the panels together on a transverse line at one end thereof to form a heel seal,

and heat sealing the panels together along a line extending generally lengthwise of the panels adjacent

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the other edge of the panels and terminating short of the heel seal to provide a leg opening.

10. A method as set forth in claim 9 further comprising heat sealing the panels together at the other end thereof to form a closed toe.

11. A method of manufacturing an overshoe as set forth in claim 9 further comprising forming a line of weakness in at least one panel between the lengthwise seal line and said other edge of the panels, the line of weakness terminating short of the heel seal line and extending to the toe end of the panel whereby the portion of the panel between the line of weakness and said other edge may be separated from the panel along the line of weakness to form a strap.

12. A method of manufacturing overshoes comprising: providing a continuous web of heat sealable film having two panels superimposed one on the other and joined along one longitudinal edge thereof,

heat sealing the panels together on transverse lines spaced at intervals along the web to form heel seals for the overshoes,

and heat sealing the panels together on lines extending generally lengthwise of the web and spaced longitudinally of the web and located adjacent the other longitudinal edge of the web with said lengthwise lines terminating short of the heel seals to provide leg openings for the overshoes,

said web so heat-sealed being separable on transverse lines into individual segments each constituting an overshoe having a heel seal at one end and a vamp where sealed by one of the lengthwise seals with a leg opening between the heat seal and the adjacent end of that longitudinal seal.

13. A method for manufacturing an overshoe as set forth in claim 12 further comprising forming spaced lines of weakness in at least one panel between the lengthwise lines of heat sealing and said other longitudinal edge with the lines of weakness terminating short of the heel seals whereby the portion of the web between the lines of weakness and said other longitudinal edge may be partially separated from the one side panel to form a strap.

14. A method as set forth in claim 12 further comprising heat sealing the panels together on transverse lines at spaced intervals along the web to form toe seals for the overshoes.

15. A method of manufacturing overshoes comprising: providing a continuous web of heat sealable film having two panels superimposed one on the other and joined along one longitudinal edge thereof,

heat sealing the panels together on transverse lines spaced at overshoe lengths along the web to form heel seals for the overshoes,

heat sealing the panels together on lines extending generally lengthwise of the web and spaced longitudinally of the web and located adjacent the other longitudinal edge of the web with said lengthwise lines being inclined relative to the length of the web and terminating short of the heel seals to close the vamps of overshoes and provide leg openings for the overshoes,

and perforating the panels on transverse line spaced at overshoe lengths for segmenting the web into individual overshoes having a heel seal at one end and a vamp where sealed by one of the lengthwise seals with a leg opening between the heat seal and the adjacent end of that longitudinal seal.

16. A method as set forth in claim 15 further comprising perforating the panels along longitudinal lines adjacent said other longitudinal edge of the web with the resulting perforations being interrupted at the heel seals to form straps.

17. A plurality of flexible overshoes joined together along lines of perforations, each overshoe comprising a sole joined to an upper, and each overshoe having a leg opening in its upper through which the foot and leg of the wearer may pass, each overshoe upper being made from a heat-sealable film material and having heat seal lines

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adjacent the lines of perforations for closing the overshoes at the heel.

18. A plurality of overshoes as set forth in claim 17 wherein there are heat seal lines adjacent the lines of perforations for closing the overshoes at the toe.

19. A plurality of overshoes joined together along lines of weakness for separating the overshoes from each other, each overshoe comprising a sole joined to an upper and having a leg opening in the upper for receiving the foot and shoe of the wearer, each overshoe further comprising a strap joined to the upper adjacent the leg opening, and the sole, upper and strap of each overshoe being formed from an electrically conductive material whereby static electricity can be conducted from the strap to the sole through the uppers.

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20. A plurality of overshoes as set forth in claim 19 wherein there are seal lines adjacent each line of weakness for closing the heel and toe portions of the overshoes.

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