United States Patent [19]

Vitol

[11] **3,781,916**

[45] **Jan. 1, 1974**

[54] PROTECTIVE GARMENTS

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[22] Filed: **Nov. 2, 1972**

[21] Appl. No.: **303,019**

[52] **U.S. Cl.** **2/88,** 2/114, 2/202, 2/DIG. 7

[51] **Int. Cl.** **A41d 13/00**

[58] **Field of Search** ..... 2/2, 16, 49 R, 50, 2/69.5, 70, 74, 75, 84, 88, 105, 111, 114, 202, DIG. 1, DIG. 2, DIG. 4, DIG. 7

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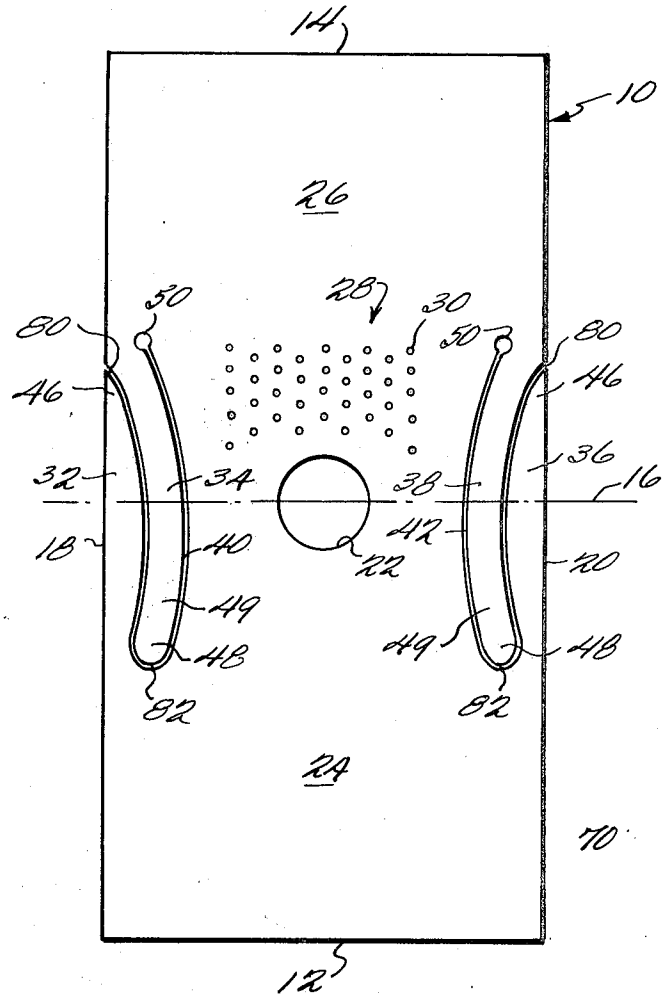
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Attorney—John W. Malley et al.

[57] **ABSTRACT**

There is disclosed a one-piece body cover having a neck opening and front and rear panels which overlap at the sides. Each panel side margin has a tie which secures with the tie on the opposite side margin of the same panel, one set tying across the wearer's back and the other across the wearer's front. The body cover is die cut, e.g., of thermoplastic film with lines designed to accommodate stress in use without tearing. An arm and shoulder cover and a head covering cowl are also shown.

8 Claims, 7 Drawing Figures



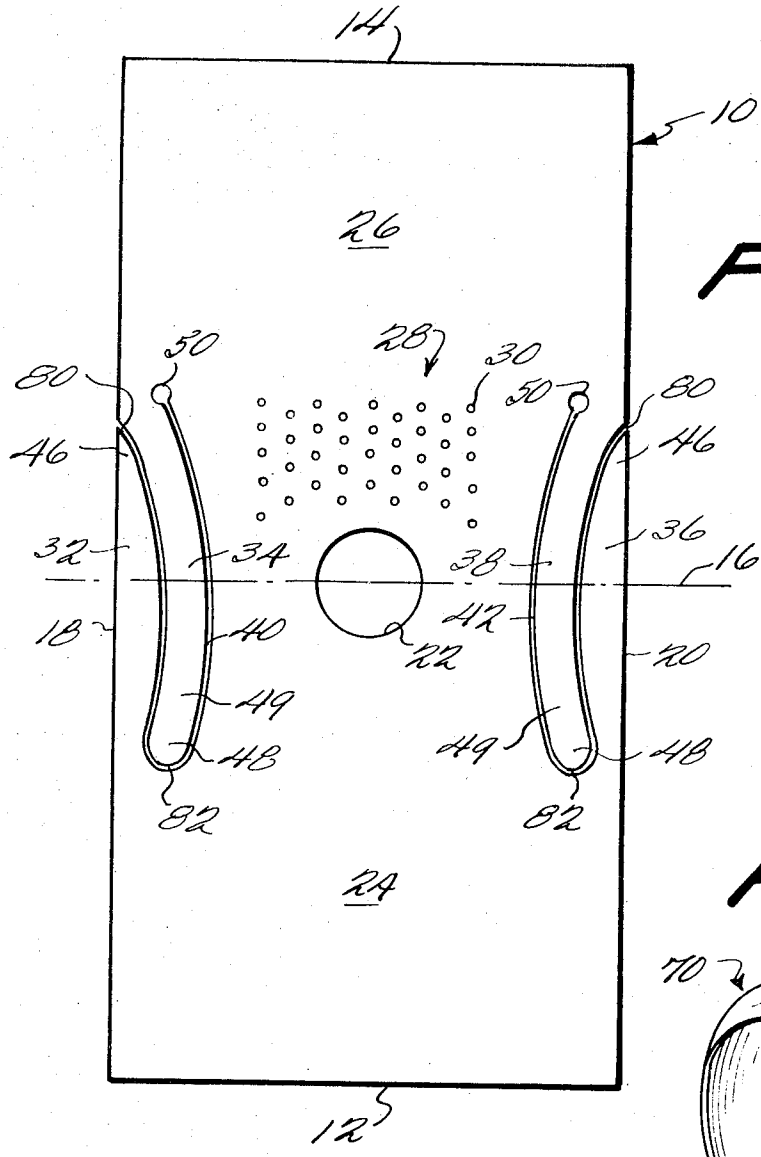


Fig. 1

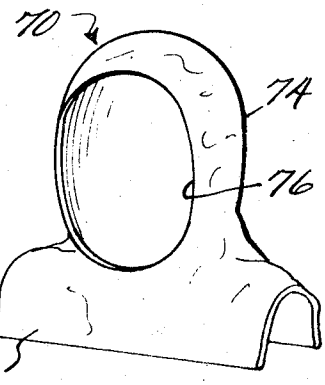


Fig. 3

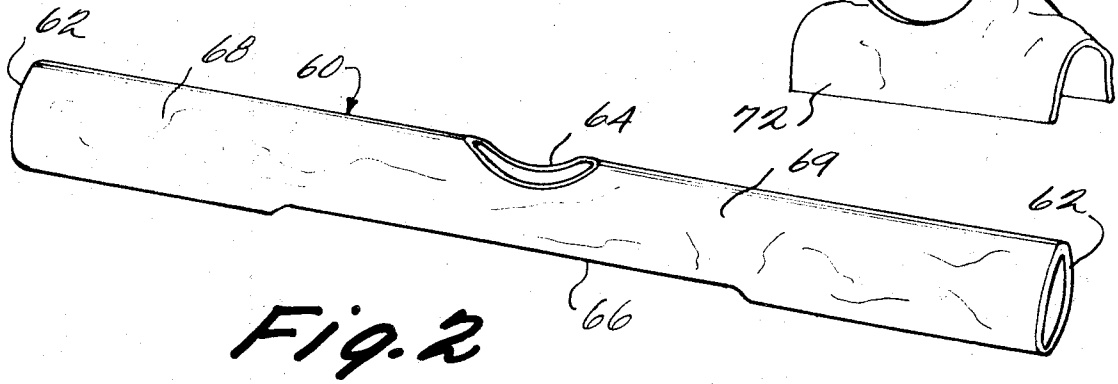


Fig. 2

Fig. 4A 

Fig. 4B 

Fig. 4C 

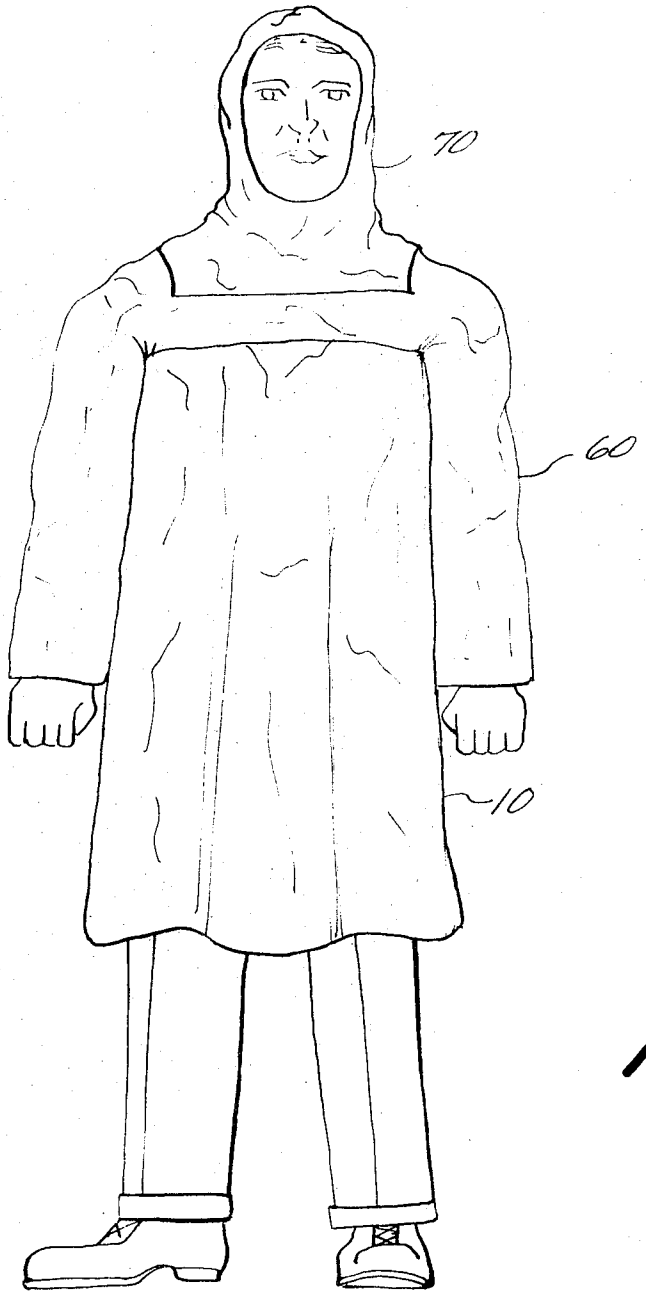


Fig. 5

PROTECTIVE GARMENTS

BACKGROUND OF THE INVENTION

Workers in many industrial occupations have become accustomed to the wearing of protective garments, either to prevent their own clothing from becoming soiled or to prevent their contamination of the products they work on, or both. A prime example is the food processing industry where, in addition, care must be taken to ensure that microorganisms do not grow in crevices of such protective garments, then become accidentally placed in contact with the food being processed, resulting in contamination of the food. Experience has shown that such contamination can be the product of reuse of protective garments which include germ-harboring seams.

During recent years the public demand for convenience foods has grown beyond all expert forecasts. Travel, working mothers and wives, school lunch programs, child care and elderly care centers, freezing techniques, packaging improvements and urban and rural food storage and displays have all advanced the desires of the consuming public and accelerated the food producing industries to satisfy the consumer demands.

In varying extent, the comestibles processing businesses, whether meats, fruits, sea products, dairy items, poultry or vegetables have in common a necessity to be constantly on guard against contamination. Also shared by such enterprises are varying extents of pulp, blood, grease, fats, water, stains and other matter that plagues plant machinery, premises and personnel.

Such processing personnel work in heat, extreme cold and drafts on slippery floors, and with dangerous equipment and tools. Many categories are highly seasonal and employ workers for only brief periods of time.

Excepting some individuals who have a liking for such work, food processing personnel in general are those unqualified or unable to find other employment. A high percentage of food processing labor has a poorly developed sense of responsibility. There results a need for steady supervision by qualified management of the operating personnel, its tools, apparel, gloves, etc., and of the vats, slicers, mixers and other equipment and machines. To reduce the danger of food contamination and the disastrous consequences thereof, plant managements and supervisors use every possible aid to such stewardship over capital equipment and workers.

Readers of newspapers and television news viewers and listeners are aware of recent deaths caused by botulism and the condemnation of millions of dollars in unsafe processed foods found in warehouses and in stores. Gloves and aprons with fractured coatings, or constructions entailing sewed or sealed hems, folds, stitches, and the assembly of various parts by means of closures are all sites for harboring potentially deadly bacteria. These impurity perils may be reduced by proper cleaning and laundering of processing equipment and garments worn by the workers. However, the simple is here made complex by a series of socio-economic factors.

As relates to uniforms, aprons, protective sleeves and other types of protective items, some companies buy and supply them to appropriate employees gratis; others sell them at cost or at a profit; many firms, especially those located in cities, rent needed articles from commercial linen services, and still others permit each employee to purchase and maintain his or her shirt and trousers, or uniform type dresses, aprons, etc.

Industrial apparel rental and laundry costs are high, and the services often unreliable. Dishonesty is common, i.e., charges made for items not furnished, and claims for shortages, i.e., allegations by such commercial rentals that the number of total units gathered were fewer than those previous asserted to have been delivered. To counter such fraud, renters assign one or more persons to check such rentals on arrival by actual count, and again at the time of pickup by the rental service. The foregoing adds to costs, which, understandably, are borne by the ultimate consumer.

Compounding the overall muddle of food processing work, garments are the subject of sizes, styles, types, colors, materials and price categories, particularly as such relate to female workers. Hence, the basic logistics of supply, maintenance, distribution and sanitary control within a plant become quite involved, costly and conducive to disputes because of varying individual preferences, physical variations and job requirements.

Once the problems of worker protective garment selection are dispensed with, the sanitary maintenance of such items are a daily and endless task. Because of the general lower level of intelligence quotient of the personnel wearing such apparel, gloves, etc., the problems are further intensified. There are reports from food production executives and supervisors of rubber gloves being flung on the floor and then trod upon at quitting time, and of head pieces and aprons being similarly abused.

Uniforms are very frequently worn by employees to their homes and laundered there. Many live where it is difficult to keep things clean. Especially under such conditions do seams, folds, tucks, hems, snaps, zippers, buttons, cuffs and stitches become havens for deadly and venomous organisms. Simply, there exists no practical control of personal on-the-job attire when states of affairs as the foregoing prevail.

As a protection from fluids, greases, water, etc., nonporous aprons, sleeves, etc., are required. It is basic that any material that will exclude fluids will also be substantially air-tight, and, whether the barrier material be only one mil in thickness or one-eighth of an inch thick, the wearer will find such protective items of wear hot. Discomfort, however, can be alleviated by fullness in size, as opposed to close fit, and a design permitting maximum air circulation and dissemination.

Each of the following United States patents does disclose a one-piece garment with four ties, one originating at each side margin of each panel, there also being a neck opening centrally of the sheet.

2,173,344 Spanel 2,701,368 Swartz 3,665,518 Leadford

Of particular interest is Leadford, which would more closely resemble the body cover disclosed herein if the tabs **18** were longer and thus had to pass one another and were appropriately curved.

Also of interest in the U.S. Pat. No. to Ruhl 3,496,815 which discloses a method for die cutting several aprons at once from plastic sheets first flexed (as at **28, 34**) to cause static electricity to temporarily connect the layers. The particular apron shown is obvi-

ously of dissimilar configuration from the body cover disclosed herein.

SUMMARY OF THE INVENTION

There is disclosed a one-piece body cover having a neck opening and front and rear panels which overlap at the sides. Each panel side margin has a tie which secures with the tie on the opposite side margin of the same panel, one set tying across the wearer's back and the other across the wearer's front. The body cover is die-cut, e.g., of thermoplastic film with lines designed to accommodate stress in use without tearing. An arm and shoulder cover and a head covering cowl are also shown.

The body cover is seamless and of one-piece construction. When cut from a rectangular blank, the body cover leaves as scrap only disks preferably cut-out to provide ventilation in the back and one disk at the base of each of two of the ties to avoid stress concentration.

What is disclosed is a related group of protective wear intended to shield the individual employed in the food and allied industries, while at the same time safeguarding the consuming public from common food-related bacteria, falling human hairs, dandruff, other torso scurf that becomes detached from the epidermis, human perspiration, etc., the safeguarding being at lower costs than with existing conventional protective wear.

Existing head protection for females consists of a hair net only, at the front of which is attached an arc-shaped piece of paper board or plastic. This protects neither the worker from volatile fluids, offal, and other flung and airborne matter, nor the public from dandruff or shorter hairs. The present hair nets prevent only longer hairs from falling into the foods being processed. The problem is currently being accentuated by the continuing popularity of wigs, so-called Afro hair styles, and hair sprays which, while keeping hair in place, tend to promote dandruff and scalp flaking. Male employees in food plants wear paper "beanies" on their heads. Such headwear is no protection from dandruff, shorter hairs, or sideburn and beard hairs.

Another of the group of protective wear items is a sheathlike robe or coat overlapped at the sides, and with a cutout for the head, resting on both shoulders, holes punched in the area of the small of the back for ventilation, and fastened front and back by self ties. The entire article is die cut at one time from a single rectangular length of material with nothing to be sewed or assembled, or with perforations to be broken. The garment, when removed from its package and unfolded, is ready for immediate use by the wearer.

The overlapped sides and the open bottom, together with the air holes in the area of the small of the back, plus the head and neck opening, provide needed air for body comfort, while giving complete protection to the torso from the head down. Because of the design which gives the user both protection and body coverage, this single article of wear can be worn directly over the usual undergarments and thus combine the conventional uniform with the aprons used to serve as a barrier against processing fluids, blood, grease, etc.

The body covering garment is preferably made from a nonporous material, waterproof by its nature, the non-woven or, perhaps, a coated or impregnated woven fabric. Thus, this product's design, in conjunction with a waterproof, non-fraying material emerges when die-cut, in an article with clean, seamless periphery and devoid of any harboring points for bacteria or bacteria-producing substances.

A feature of the design from a cost and manufacturing vantage is that the factor of material waste, i.e., scrap, is minimal, with every square inch of material, excepting for the head cutout, back vent and back panel tie hinge holes, is utilitarian and wholly functional. Once die-cut the products need only to be folded to a size practical for packaging, and then placed in a suitable container for shipment.

Die cutting to the shape designed is very important. The only alternative means of cutting would be to mark in the outline of the product on the material, or on a length of paper attached to the material, and to then cut with scissors or a hand knife, one by one, which would be prohibitive cost-wise and wholly impractical with regard to meeting sales demands, and also as regards the surface space needed if the cutting was accomplished in such a manner. Cutting with a power knife as employed in the manufacture of apparel would be costly and also impractical. For example, the head opening could be cut out only by a slit first cut to the perimeter so that after the head opening had been completed with a vertical, conventional reciprocating blade knife, the slit would have to be sewn, sealed or otherwise closed again. That last step would not only add to cost but create a bacterial lodging area.

Furthermore, conventional garment type cutting machines, whether vertical blade or rotary blade, generate much heat, and thus fuse the edges of the material being cut. Such fused edges, upon being parted, are fuzzy and irregular, and bring into being havens for microbes and subsequent contamination. Also, edges so cut are sharp and hard and uncomfortable to the wearer. Cutting out the two circular hinge points by means other than a powerdriven die is impossible excepting with a hand punch and maul, and then one-by-one, and not en masse.

For use, the body cover coat is simply placed over the head with the air vents to the back and the two ties attached to the back panel are tied at the front of the body by means of crossing as in a common knot and then, with the slack taken up, the one tie next to the crossover is wrapped around the other tie in a continuing direction while the other tie next to the crossover is wrapped in the opposite direction. The foregoing method of tying is faster than the customary bow tie, and a virtual necessity in the instance of a elastomeric and elongatable film and sheeting materials, i.e., rubber, polyvinyl chloride, polycarbonate, polyethylene, etc. In connection with the forementioned method of tying, the design of the one piece protective coat ties is such that their shapes and lengths permit fastening securely.

After fastening the back panel by means of the right side and left side ties as outlined above, the front panel is then tied across the back of the body using the same means as the back panel ties. Simply, there are a total of four ties, two of them a part of the back panel of the coat, and which ties are tied at the front of the body, and two ties that are part of the front panel, and which are tied at the back of the body, at about the waist.

With the weight of this design of protective wear distributed evenly on the shoulders and upper body, and without the binding encumbrance of seams or armholes, the wearer benefits from a maximum of comfort

and bodily protection. The construction and configuration permit air passage from the bottom, the two sides, both underarm areas, the neck and from a point below the collar bone across the back between the shoulder blades from the air holes punched out by the cutting die. The holes are preferably 0.125 in diameter. There are, e.g., a total of 38 holes.

To complete the group of one piece protective work wear, an arm and shoulder cover, die cut of tubular, preferably seamless (extruded or blown) material is offered. The design is very elementary and consists of an opening which permits first one arm and then the other arm to be inserted into the pliable tubing, and to then place the single piece unit through the head opening. Thus, this item gives protection to the arms, shoulders and an area below the neck, both front and back. The article may be made available in full arm length, elbow length, and quarter arm length. If sleeve closure is desired, as likely in instances where the work requires the arms to be in an elevated position, and where fluids, blood, etc. might run down the worker's arm, stoppage is made possible by the simple use of a suitable rubber band close to the end of the sleeve portion of this item.

Personal protection to the wearer aside, this arm and shoulder unit when used in food processing, guards the consumer against falling arm hairs and flaky skin (flaky skin on the elbow is very common).

Thus, with the cowl or hood, the coat and the arm and shoulder cover, a worker receives head to boot-top protection from fluids, semi-solids and solids, with the comfort of designs the enhance air circulation. Each of the three units is one piece die-cut constructions (the hood or cowl may be molded, vacuum-formed, or shaped by blow-molding) and each may be wiped clean edge-to-edge, or cleansed under showers or with hose, or laundered in conventional washing machines. There being no assembly to any of the articles, labor costs of production are at an absolute minimum, and there is virtually no waste of material.

BRIEF DESCRIPTION OF THE DRAWINGS

In The Drawings:

FIG. 1 is a plan view of the body covering garment, as die-cut.

FIG. 2 is a perspective view of the arm and shoulder covering garment.

FIG. 3 is a perspective view of the cowl.

FIGS. 4*a*, 4*b* and 4*c* are fragmentary perspective views of successive steps in the securement of a pair of the body covering ties.

FIG. 5 is a perspective view of a worker wearing the garments of FIGS. 1, 2 and 3.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENT

The body cover **10** is die-cut from a rectangular strip of flexible sheet material. The material, and the length and thickness thereof depends on what use will be made thereof, whether reuse is intended, and packaging facilities available. Workers who stand behind counters can often get by with covers of jerkin length whereas other workers need protection down to their boot or shoe tops. If the body covers are to be manually, individually packaged, the extra time consumed on harder to manage thinner material can be more costly than the material saved. Thus, the use of thicker material, less buoyant in the air, can be less expensive. Also, if the body covers are to be used for more than one half-shift or shift, they may need to be washed, in which case the use of heftier gauge material may be dictated by the subjection of the body covers to sprays of high pressure liquid cleaning solution. Currently the most preferred material is 8 mils thick polyvinylchloride film. Polyethylene and polypropylene films can also be used, as may plastic coated woven fabrics and films and non-wovens such as du Pont Tyvek non-woven polyolefin sheet material.

Typical lengths end **12** to end **14** of the body cover **10** are **36, 72, 80, 90, 100** and **110** inches (equating to apron lengths half that long, i.e., measured from imaginary shoulder line **16** to lower margins **12, 14**). The most rational width to be used when fabricating such body covers for adult humans of the average size predominanting in the United States is 36 inches, based in part on the limited range of widths of such plastic sheet material as sold in rolls by its manufacturers.

The body cover **10** is shown provided midway between its end margins **12, 14** and midway between its side margins **18, 20,** with a neck opening **22,** preferably generally circular and about **8** inches in diameter.

The imaginary shoulder line **16** divides the body cover **10** into a front panel **24** extending to the lower margin **12** and a rear panel **26** extending to the lower margin **14.** The rear panel, in a central region which will overlay the vicinity of the wearer's shoulder blades, is provided with an array **28** of vent holes **30,** preferably die-cut with the body cover. In the example, there are 38 vent holes **30,** each about 1/8th inch in diameter.

The body cover is completed by four integral ties **32, 34, 36, 38,** each having its base in a respective one of the four side margins **18, 20** of the two panels **24, 26.**

The ties **32** and **36** are minor images of one another and have their respective bases at the side margins **18, 20** of front panel **24,** the ties **34** and **38** are also minor images of one another and have their respective bases at the side margins **18, 20** of the rear panel **26.**

The ties **32** and **34** are conformed by die cutting along a single, complexly curved line **40** adjacent the side margin **18** of the body cover; the ties **36** and **38** are co-formed by die cutting along a single, complexly curved line **42** adjacent the side margin **20** of the body cover.

The cutting lines **38** and **40** are mirror images of one another about the longitudinal centerline of the body cover.

The ties of the illustrated example are each about 27-½ inches long from base to tip and are transversely bisected by the imaginary shoulder line **16.**

Thus, the lines **40** and **42** join the side margins of the rear panel **26** about 13-¼ inches below the imaginary shoulder line **16** and arch convexly inwardly and toward the imaginary shoulder line defining the tips **46** of the ties **32** and **36.** The arching is such that 8 inches from the tips **46,** the ties **32** and **36** are about 3 inches wide. The ties **32** and **36** curve to a width of about 3-⅞ inches about **14** inches from the tips **46,** then curve back to a width of about 3-⅛ inches about 24 inches from the tips **46.** The lines **40** and **42** then double back to head further toward the longitudinal centerline of the body cover **10** to define the tips **48** of the ties **34** and **38.** However, the inner leg of this generally parabolic portion **49** undergoes a transition about 4-½ inches from the tips **48,** becoming slightly convex away

from the longitudinal centerline of the body cover **10.** This convexity continues to the bases of the ties **34** and **38** so they generally resemble the side silhouettes of bananas. At the bases of the ties **34** (generally transversely of the junctures of the lines **38** and **40** with the side margins of the rear panel **26**) the lines **38** and **40** terminate in die-cut circular openings **50.** In the example, the openings **50** are about one inch in diameter and serve to spread stresses which would otherwise predispose the material to rip at these sites at the bases of the ties **34, 38.**

The ties **34, 38** of the example reach widths of about 3-⅞ inches about midway along their lengths.

Please understand that the dimensions given herein are of the Example, to ensure the full disclosure of the best mode currently contemplated and are not limitations on the principles of the invention.

Notice that the ties adjacent each side margin substantially fully overlap one another.

To wear the body cover **10,** the user slips the neck opening **22** over his or her head, reaches back to grasp both tie **34** and tie **38** and ties them together under the front panel across his or her front, preferably as progressively indicated in FIGS. 4a, 4b and 4c. Then the user grasps both tie **32** and tie **36** and ties them together over the rear panel across the small of his or her back, also preferably as progressively indicated in FIGS. *4a*, *4b* and *4c*.

The preferred form of tying the sets of ties, as illustrated in FIGS. *4a*, *4b* and *4c* is as follows: Do not tie a bow knot; instead, cross the ties once and pull them in opposite directions so as to take up the slack (FIG. *4a*); then, wrap one tie, next to the cross-over, around the other tie and let it hang down (FIG. *4b*); and finally, wrap the other tie, next to the cross-over, in the opposite direction around the one tie and let it hang down (FIG. *4c*). A bow knot would be difficult to untie and if tied too tight might weaken the material so that it would pass next to the knot.

With respect to FIG. **2,** the arm and shoulder cover **60** may be made of like sheet material as the body cover. It resembles a pullover sweater which terminates level with the arm pits. Actually it is preferably constituted by a tube, e.g., about 10 inches wide, when flattened, and about 5-½ feet long. A shorter-armed user may wish to cut off or roll back the ends **62.** Midway between the ends **62,** the top of the tube is provided with a generally circular cut out **64,** e.g., 8 inches in diameter. Also midway between the ends **62,** the bottom of the tube is provided with a longitudinally elongated, generally oval, slot **66,** e.g., 28 inches long and two inches wide.

The user wears the arm and shoulder cover by inserting his or her arms in the respective sleeves **68, 69** defined between the openings **64, 66** and the respective ends **62** and pulls the garment over his or her head like a sweater so that the cut-out **64** encircles his or her neck and the oval slot **66** encompasses his or her trunk, just below the arm pits.

The cowl **70** (FIG. 3) may be formed from like material as that used for the protective garments **10** or **60** and may be formed by conventional techniques, e.g., vacuum or pressure assisted thermoforming, blow molding or the like. This one-piece garment includes a radiating base flange **72,** e.g., about 6 inches wide whose inner margin merges with a balloon-like protruberance **74** that has a frontal cut-out **76** of a size to expose the wearer's face and jaw. The user wears the cowl **70** by pulling it over his or her head and down into place so his or her face and jaw are exposed through the opening **76** and the base flange **72** radiates from the base of the wearer's neck.

It is preferred that the protective garments **10, 60** and **70** be made of like material and be worn together as a unit. For various occupations, it may prove best to don the protective garments in differing order. For instance, men who carry animal carcasses on their shoulders may wish to don the body cover **10** first, the head and neck cover **70** second and the arm and shoulder cover **60** last. Other workers may prefer a different order or have no need for one or more of the full complement of protective garments **10, 60, 70.** For occupations where one of the garments may be expected to see more severe use, or be reuseable for a longer period, differing gauges and constituencies of fabricating material may be used for the individual garments **10, 60, 70** of a set.

Obviously, where the market warrants it, a greater or different range of standard sizes for the garments may be offered.

Note that the complement of protective garments **10, 60, 70** is preferably completely seamless.

Especially when the body cover **10** is made of light gage material, easily airborne, the edges of the parts of the cutting die which form the cut lines **40, 42** may be appropriately nicked so as to fail to cut very short segments **80,** where the tips **46** adjoin the bases of the ties **34, 38,** and **82,** where the tips **48** adjoin the bases of the ties **32, 36.**

It should now be apparent that the protective garments as described hereinabove possesses each of the attributes set forth in the specification under the heading "Summary of the Invention" hereinbefore. Because the protective garments of the invention can be modified to some extent without departing from the principles of the invention as they have been outlined and explained in this specification, the present invention should be understood as encompassing all such modifications as are within the spirit and scope of the following claims.

What is claimed is:

1. A protective garment for instance for a food processing industry worker, comprising:

a body cover, constituted by a generally rectangular sheet of waterproof, flexible sheet material having means defining a generally circular, neck opening disposed centrally thereof to define an imaginary shoulder line crossing the sheet from side margin to side margin through the neck opening to divide the sheet into a front panel and a rear panel; said panels being wider than the body cover's intended wearer sufficiently to permit the left side margins of the front and rear panels to overlap one another and the right side margins of the front and rear panels to overlap one another when the panels are secured about the wearer; two curved cuts in said sheet, one adjacent each side margin thereof; each cut adjoining the respective side margin intermediate the imaginary shoulder line and the opposite end of the rear panel, curving inwardly and toward the imaginary shoulder line to define the tip of a respective first tie between the respective cut and the respective side margin; each cut then proceeding generally longitudinally of the sheet, crossing the

imaginary shoulder line and, at a site intermediate the imaginary shoulder line and the opposite end of the front panel, turning inwardly and back toward the imaginary shoulder line to define the tip of a respective second tie from a portion of said sheet disposed transversely adjacent the respective first tie; each cut then proceeding generally longitudinally of the sheet, crossing the imaginary shoulder line and, at a site generally transversally adjacent the tip of the respective first tie, terminating in a stress spreading member.

2. The protective garment of claim **1** wherein the stress spreading member is constituted by means defining a generally circular opening through the sheet.

3. The protective garment of claim **1** wherein the sheet is about 36 inches wide and said ties are about 27.5 inches long, each tie having about half the length thereof lying on each side of the imaginary shoulder line.

4. The protective garment of claim **1** further including means defining a plurality of ventilating openings through the rear panel between the neck opening and the two second ties.

5. The protective garment of claim **1** wherein the two cuts are so curved that both the outer and inner edges of the two second ties are generally convex outwardly throughout most of the lengths thereof, so that these second ties are generally banana-shaped.

6. The protective garment of claim **1** wherein the body cover is completely seamless to avoid providing sites for growth of food contaminator organisms.

7. The protective garment of claim **1** further including an arm and shoulder cover, comprising:

a tubular sheet of waterproof, flexible sheet material having two opposite open ends and, intermediate said ends, means defining a first, lower opening sized to pass over a wearer's head and encircle the wearer's torso adjacent the level of the wearer's armpits and a second, upper opening sized to pass over the wearer's head and encircle the base of the wearer's neck.

8. The protective garment of claim **1** further including a head and neck cover, comprising:

a monk's cowl-like sheet of waterproof, flexible sheet material having a generally radiating annular flange having an inner margin merging with the lower margin of a balloon-like portion; and means defining an opening through the balloon-like portion for accommodating the wearer's face and jaw.

* * * * *