March 23, 1948. J. T. CALLAHAN ET AL 2,438,429

WATERPROOF OUTER GARMENT

Filed March 1, 1946 3 Sheets-Sheet 1

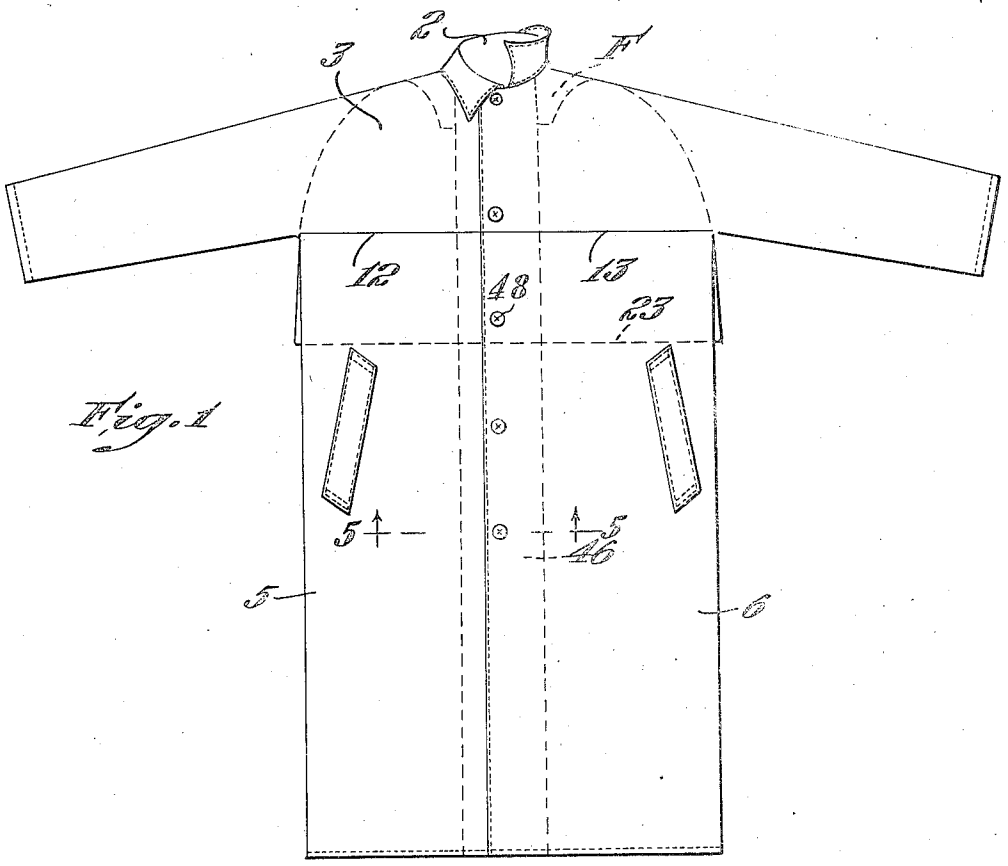
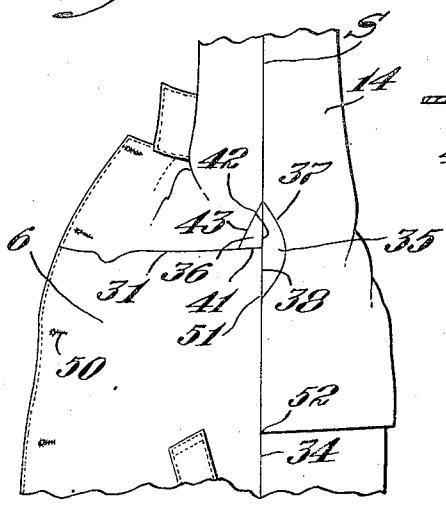


Fig. 1

Fig. 3



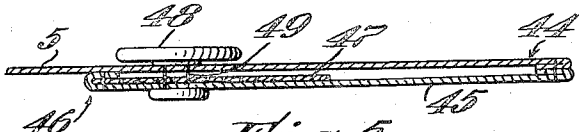


Fig. 5

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WATERPROOF OUTER GARMENT

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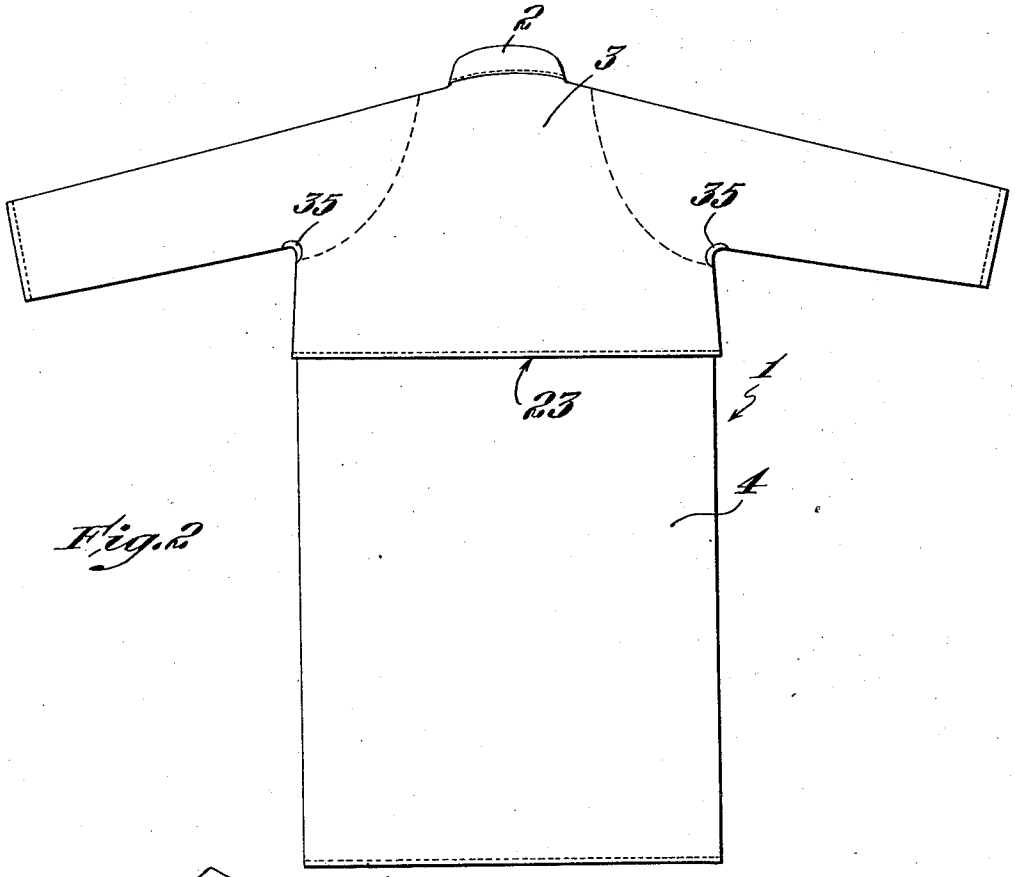


Fig. 2

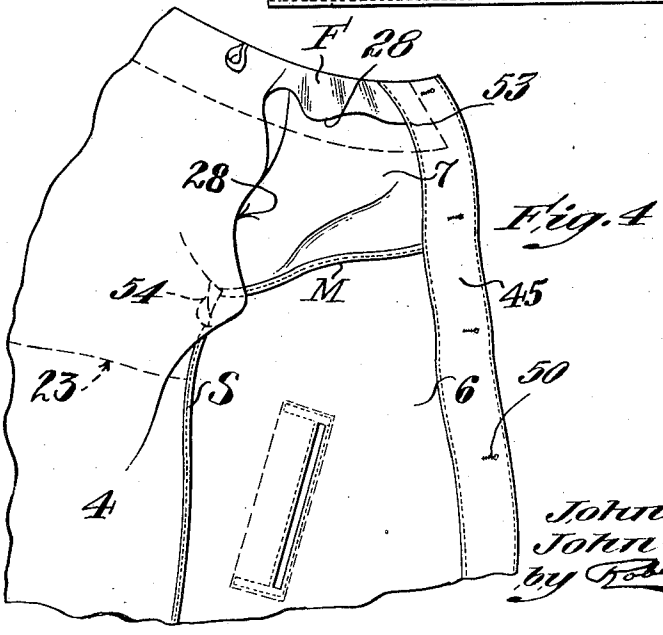
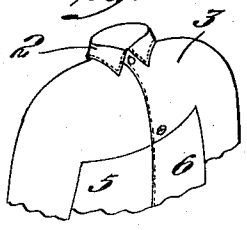


Fig. 4

Fig. 14



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WATERPROOF OUTER GARMENT

Filed March 1, 1946 3 Sheets-Sheet 3

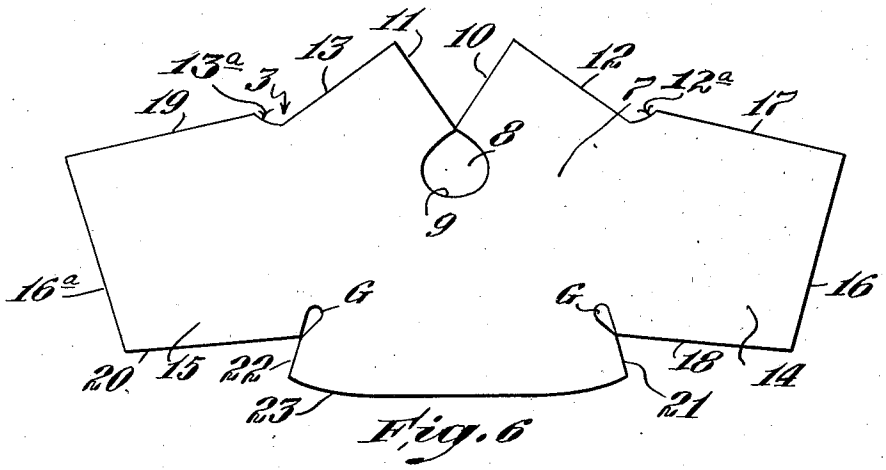


Fig. 6

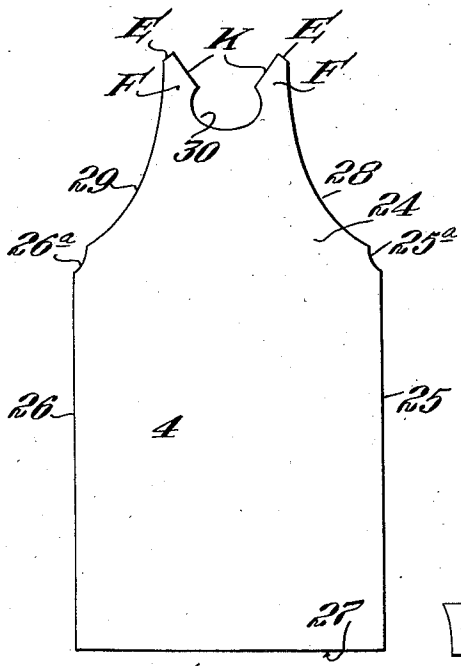


Fig. 7

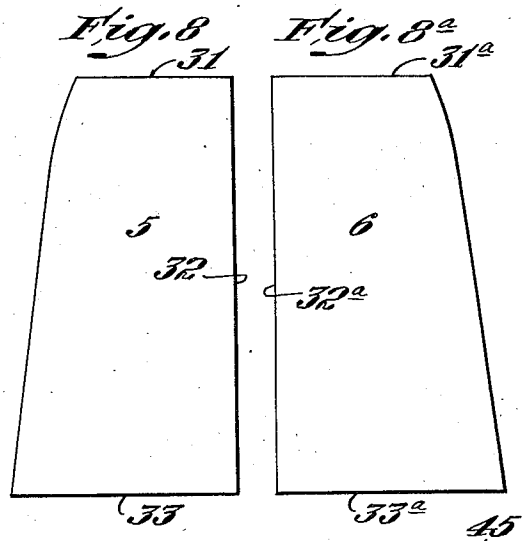


Fig. 8

Fig. 8a

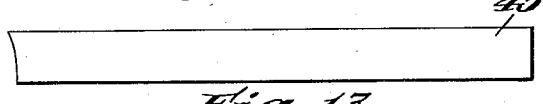


Fig. 13

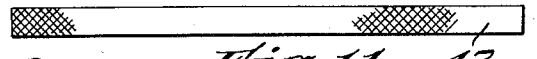


Fig. 11

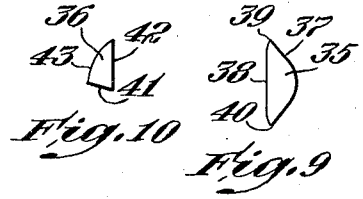


Fig. 10 Fig. 9

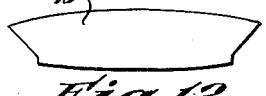


Fig. 12

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UNITED STATES PATENT OFFICE

2,438,429

WATERPROOF OUTER GARMENT

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Application March 1, 1946, Serial No. 651,078

5 Claims. (Cl. 2—87)

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This invention relates to apparel and more especially to waterproof outer garments, for instance raincoats, golf jackets, etc. Such garments are usually made of textile fabric coated or impregnated with a rubber compound or an oxidized oil, and, being substantially impervious, retain the heat of the wearer's body and are thus uncomfortable when worn in warm weather. The present invention concerns improvements in garments of the kind more specifically disclosed in the patent to Callahan et al., No. 2,361,380, dated October 31, 1944, which describes one mode of making such a garment so as to provide adequate ventilation without admitting moisture.

Garments made of textile material, if coated or impregnated with waterproofing compound in sufficient amount to make them really waterproof, are customarily quite heavy and stiff and lack the draping qualities desirable in an article of apparel. Moreover, such garments are often worn over usual outer garments and thus, unless the rain garment be very loose and in particular free at the arm scyes, the wearer feels confined and uncomfortable and may even find it impossible to move his arms freely.

One object of the present invention is to provide an outer rain protective garment which is very light in weight, soft, flexible and with good draping qualities, and which at the same time is leakproof and embodies the ventilating features of the garment disclosed in the aforesaid patent. A further object is to provide a garment of this type whose principal parts, at least, consist of single thickness, thin and pliable sheeted synthetic resin, although having adequate strength at all points. A further object is to provide a rainproof garment of the general type disclosed in the aforesaid patent and thus comprising but four principal parts, but having so much fullness and strength at the arm scyes that the wearer is free to move his arms in any direction, and without danger of breaking out or tearing the material at the armpit portion.

Wearers of such garments sometimes find difficulty, when donning such a garment (if provided with a large ventilating opening in the back) because the arm may be inadvertently projected out through the ventilating opening instead of into the sleeve. A further object of the invention is to provide a ventilated coat so designed as to facilitate the entry of the arm into the sleeve when donning the coat, and incidentally to reinforce the coat at that portion at which the weight of the coat is supported by the wearer. Other and further objects and advantages of the

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invention will be pointed out in the following more detailed description and by reference to the accompanying drawings wherein

Fig. 1 is a diagrammatic front elevation of a rain garment embodying the present invention, but without any attempt to illustrate the natural draping of the fabric or usual and minor details of construction;

Fig. 2 is a rear elevation of the garment shown in Fig. 1;

Fig. 3 is a fragmentary, diagrammatic side elevation of the garment showing the sleeve extended vertically upward to illustrate the underarm construction;

Fig. 4 is a diagrammatic, fragmentary view of the interior of the garment illustrating the flap which automatically closes the ventilating opening when the garment is being donned;

Fig. 5 is a diagrammatic section, to large scale, on the line 5—5 of Fig. 1;

Fig. 6 is a plan view of a blank for use in making the yoke portion of the garment;

Fig. 7 is a plan view of a blank for making the back of the garment;

Figs. 8 and 8a are plan views of the left and right front members of the garment respectively;

Fig. 9 is a plan view of a blank for making one of the gusset parts;

Fig. 10 is a plan view of a blank for making a second gusset part;

Fig. 11 is a plan view of a reinforce blank;

Fig. 12 is a plan view of a collar blank;

Fig. 13 is a plan view of a blank for forming a button fly; and

Fig. 14 is a diagrammatic perspective view showing the yoke portion of the garment, to illustrate the seamless character of the shoulder portions of the garment.

Referring to the drawings, in particular to Figs. 1 and 2, in which the numeral 1 designates the completed garment, it may be noted that except for the collar 2 and elements of trim, for example pockets and pocket stays, buttons, etc., the garment consists of but four major parts, to wit, the yoke 3, the back 4, and the two front members 5 and 6. Preferably, as shown, the back is of unitary construction like the other major pieces, although it is within the scope of the invention to make the back in right and left halves seamed together at the mid-line of the back, if desired. The yoke 3 (Fig. 6) consists of a single integral piece of material. While it is contemplated that the material used in making the principal parts of the garment may be of any usual waterproof or water-repellent type, it is preferred, in accord-

ance with the present invention, to make these parts from a thin, tough, pliable, waterproof, sheeted, synthetic resin, for instance vinyl chloride, which may be obtained in substantially transparent or translucent form and in any desired colors, and which is not injuriously affected by oil or grease or by exposure to the air or normal climatic conditions. A material of this kind, sold under the trade name "Koroseal," is readily available and by the incorporation of plasticizers in suitable amount, may be made as pliable as desired, but without showing any tackiness or tendency to deteriorate during use. While the parts of the garment made of such material may be united by sewed seams in the same way as garments made of textile material, it is readily possible, when using this sheeted synthetic resin, to form the joints by a heat sealing operation so that no stitching is necessary and the joints are absolutely leak-tight. However, the particular mode of uniting the parts of the garment is not an essential feature of the invention.

When the garment is made from material such as just suggested, it is extremely light, weighing but a few ounces, so that it is not burdensome to wear, even outside of usual winter garments. Moreover, it is so pliable and may be made of such thin material, that when not in use it may be folded or rolled into a small package, easily stored away in an ordinary traveling bag, but when unfolded its draping qualities are such that any wrinkles formed by folding quickly disappear.

The yoke 3 (Fig. 6) comprises a central or shoulder portion 7 having in its forward part a neck opening 8 bounded by a curved edge 9 which intersects forwardly divergent straight edges 10 and 11, respectively, the latter edges in the completed garment constituting upper portions of the front closure. These edges 10 and 11 intersect at substantially right angles the edge portions 12 and 13, respectively, which in the completed garment extend substantially horizontally at about the level of the armpits, and to which are secured the upper edges of the right and left front members 5 and 6 (Fig. 1), respectively. The yoke blank 3, also comprises the sleeve portions 14 and 15, these sleeve portions being integral with the central part 7 of the blank and terminating at edges 16 and 16*a*, which may be hemmed or otherwise finished, designed to form the wristband ends of the sleeves. The sleeve members 14 and 15 have longitudinal edges 17 and 18, and 19 and 20, respectively, the edges 17 and 19 being joined to the edges 12 and 13 respectively by concavely curved portions 12*a* and 13*a* respectively, and in the completed garment the edges 17 and 18 are united by an underarm seam S (Fig. 3) which extends from the wrist edge 16, for instance, along the under side of the sleeve to the armpit portion. The edges 19 and 20 of the sleeve 15 are united by a similar underarm seam. Since the sleeve members are integral with the central or shoulder portion 7 of the yoke 3, and since the only longitudinal seams in the sleeves are these underarm seams which unite the edges 17 and 18 and the edges 19 and 20, respectively, the exposed shoulder portions of the completed garment are wholly devoid of seams as illustrated in Fig. 14. Thus regardless of the type of material which may be employed, there are no exposed seams at the shoulder portions so that there is no danger of leakage of water into the upper part of the garment by reason of any insecure seams or joints.

The yoke 3 also comprises the rearwardly extending divergent edge portions 21 and 22, respectively, at opposite sides, which in the completed garment are permanently united to the upper portions of the back member, the edges 21 and 22 terminating at the slightly curved lower edge 23 of the yoke, the edge 23 being hemmed or otherwise finished before the garment is completed. At the point where the edge 18 would normally intersect the edge 21, and likewise at the point where the edge 20 would normally intersect the edge 22, the yoke is provided with deep notches G preferably of oval contour with their smaller ends open at the edge of the material.

The back 4 of the garment (Fig. 7) comprises a substantially rectangular lower portion having the parallel side edges 25 and 26 and the lower edge 27, the latter being hemmed or otherwise finished in the completed garment. This back member also includes an upper portion 24 of a generally truncated triangular form, having the upwardly convergent slightly concave curved edges 28 and 29 which are connected to the side edges 25 and 26, by short concave arcs 25*a* and 26*a* which, in the completed garment, form parts of the arm scyes. The upper end of this portion 24 is provided with a deep notch 30 of generally elliptical contour with its major axis horizontal, but open at the top where its edge intersects upwardly and outwardly divergent substantially straight edges K. These edges K, in turn, intersect (substantially at right angles) short downwardly and outwardly divergent edges E which intersect the edges 28 and 29 respectively. By this construction there are formed two upwardly directed extensions or flaps F, one at either side of the notch 30.

The front members 5 and 6 are substantially identical in shape, except that one is the reverse of the other, the member 5 comprising the top edge 31 which in the completed garment is united to the edge 12 of the yoke, while the front member 6 has the top edge 31*a* which is united to the edge 13 of the yoke. The member 5 has the longitudinal edge 32 which forms a downward continuation of the edge 10 of the yoke, thus completing one side of the front closure of the garment, while the member 6 has the edge 32*a* which forms a downward continuation of the edge 11 of the yoke, thus completing the other side of the front closure. The parts 5 and 6 have the lower edges 33 and 33*a*, respectively, which in the finished garment are hemmed.

To give fullness at the armpit portion of the garment so as to insure freedom of arm movement and to avoid overstressing the garment material, the gusset members 35 and 36 (Figs. 3, 9 and 10) are provided. In the garment disclosed in the aforesaid patent, gusset means integral with the front member of the garment is disclosed, but it is found in practice, and particularly when using sheeted synthetic resin as the garment material, that it is difficult to obtain the requisite fullness at the armpit portion by means of an integral gusset element, and that the material of such an integral gusset element is overstressed during use so that when thin light materials are used there is danger of breaking out at the armpit portion after an extended period of use. As herein illustrated (Figs. 3, 9 and 10), the gusset piece 35 is generally segmental in contour, having the curved edge 37 of

large radius, that is to say, a radius at its central part substantially greater than and for instance four times the radius of the inner end of the notch G (Fig. 6) in the yoke blank. The gusset part 35 also has a substantially straight or slightly convex edge 38 which intersects the edge 37 at the points 39 and 40.

The gusset part 36 is of generally triangular shape, or more accurately stated, semi-segmental, having a substantially straight base 41 and substantially vertical side 42, and the sloping and preferably convex edge 43. The length of the side 42 is approximately one-half the length of the side 38 of the gusset part 35.

The front member 5 of the garment (Fig. 5) is preferably finished at its vertical edge, at the front opening, by turning it in and attaching it by stitches or other form of seam to a button fly strip 45, preferably of the same material as the part 5. This fly strip 45 is preferably of substantial width, for instance four inches, and its inner edge is preferably secured, as by stitches or other connecting means 46, to the edge of a reinforce strip 47. This reinforce strip is of flexible material which is tough and strong, for instance a closely woven textile fabric, and is preferably narrower than the fly strip, for instance approximately half as wide. Desirably this reinforce strip is of a color which does not contrast greatly with that of the material of the part 5. The reinforce strip is interposed between the front member 5 and the button fly, and the buttons 48 are secured by stitches 49 passing through all of the parts 5, 47 and 45. At the other side of the front opening a similar fly and reinforce strip are assembled with and united to the front member 6, and the buttonholes 50 (Fig. 4) are formed in these superposed plies.

In assembling the parts, the curved edge of the notch 30 (Fig. 7) at the upper part of the back 4 is seamed to the curved edge 9 which defines the neck opening 8 in the yoke, the seams which unite these parts extending vertically down at each side to unite the respective edges K of the flaps F of the back to the upper portions of the edges 10 and 11 of the yoke, the flaps on extensions F now extending laterally with their edges K substantially vertical, and with the outer portions of the curved edges 28 and 29 substantially horizontal (Fig. 4). The seams employed for uniting the several parts of the garment may, as above suggested, be sewed seams, cemented seams or seams formed by heat sealing, as desired, and in accordance with the material employed.

The edges 21 and 22 of the yoke are brought into registry with the upper portions of the edges 25 and 26 of the back and are united thereto. It may be noted that the yoke is connected to the back only along the edges 30 and K of the latter, and between the points 51 and 52 (Fig. 3) at each side of the garment, leaving the lower edge 23 of the yoke wholly free from the back and so as to give a cape-like effect, and also leaving the edges 28 and 29 of the back wholly free from the yoke between the points 53 and 54 (Figs. 4 and 7). As thus arranged the flaps F extend outwardly beneath the shoulder portions of the yoke, thus reinforcing the shoulder portions which carry the weight of the garment during use. Since the lengths of the edges 28 and 29 of the flaps F are substantially greater than the straight line distance between the points 53 and 54 (Fig. 4), these edges form loose

flaps which, when the garment is being donned, tend to overlap the rear edge portion of the arm scye and thus to guide the hand into the sleeve and to prevent the hand from inadvertently projecting out through the ventilating opening between the cape portion of the yoke and the back of the garment.

The curved edges 37 of the respective gusset pieces 35 are seamed to the edges defining the notches G of the yoke. The lower portions of the edges 37 are also secured to the back along the edges 25a and 26a, respectively, of the latter. The curved edges 43 of the triangular gore pieces 36 are then seamed to the concavely curved edges 12a and 13a respectively.

Underarm seams S are now formed, starting from the wrist end of each sleeve and uniting the edges 17, 18; and 19, 20 of the respective sleeves. These seams S are continued uninterruptedly across the armpit area so as to unite and reinforce the edges 38 and 42 of the corresponding gusset pieces. These seams S then continue downwardly uniting the lower portions of the edges 38 of the gusset pieces 35 to the rear edges of the respective front members 5 and 6 and then continue on down to the bottom of the garment, uniting the rear edges of the front members to the forward edges of the back member.

The upper edges of the front members 5 and 6 are united by substantially horizontal seams M extending along the edges 12 and 13 of the yoke, said seams also uniting the lower edges 41 of the triangular gore pieces 36 to the front members.

The fly strips 45 with their reinforce members 47 are assembled and united to the respective front members and the buttons are attached and the butonholes formed. The lower edge of the garment is hemmed or otherwise finished, the collar is attached, the pockets, if any, are formed and finished and the garment is otherwise completed in generally customary fashion.

During use, the flaps F are free to swing away from the yoke member in response to movements of the wearer, and thus a very large aperture is provided for ventilation, the air space between the cape-like lower portion of the yoke member and the back normally communicating freely with the interior of the garment between the points 53 and 54 at each side. Thus although the garment may be made of completely impervious material, it is cool and comfortable while at the same time, by reason of the seamless character of the shoulders and the material employed, it is completely rainproof.

While one desirable embodiment of the invention has been illustrated by way of example, it is to be understood that the invention is broadly inclusive of all such modifications as fall within the scope of the appended claims.

We claim:

1. A ventilated rain garment of the kind which, except for collar and trim, consists of but four major parts, to wit, a yoke having sleeves integral therewith, a back, and two front members, the back being joined to the yoke at and adjacent to the collar line and adjacent to each arm scye respectively, but being otherwise unattached to the yoke, thereby provided ventilating openings of large area, and wherein each front member is joined to the yoke along a line extending from the front closure to one of the arm scyes respectively, each front member being joined to the back along a substantially vertical line extending

downwardly from the respective armpit, each sleeve having a single longitudinally extending underarm seam reaching from the wrist line to the armpit, and gusset means providing fullness at the armpit, characterized in that the rear edge of each sleeve terminates at a deep, substantially oval notch in the yoke material, and the forward edge of each sleeve terminates in a concavely curved portion which merges with the corresponding horizontal front lower edge of the yoke, the gusset means at each armpit comprising a segmental piece having a substantially straight edge and a curved edge, the latter having a radius of curvature substantially greater than the radius of curvature of the larger end of the notch in the yoke, the gusset means also comprising a semi-segmental part having a curved edge, a substantially straight base and a substantially straight vertical edge, a seam uniting the curved edge of the segmental gusset part to the margin of the oval notch in the yoke, a seam uniting the curved edge of the semi-segmental gusset part to the concavely curved portion of the front edge of the sleeve, and a seam uniting the straight base edge of the latter gusset part to the upper edge of the corresponding front member of the garment, the underarm seam extending uninterruptedly across the armpit and uniting the lower portion of the straight edge of the segmental gusset part to the vertical straight edge of the semi-segmental gusset part, the underarm seam also uniting the lower portion of the straight edge of the segmental gusset part to the rear edge of the corresponding front member and then continuing on down beyond the gusset means and uniting the corresponding front member to the back.

2. A ventilated rain garment of the kind which, except for collar and trim, consists of but four parts, to wit, a yoke having sleeves integral therewith, a back, and two front members, the back being joined to the yoke at and adjacent to the collar line and adjacent to each arm scye respectively, but being otherwise unattached to the yoke, thereby providing ventilating openings of large area, and wherein each front member is joined to the yoke along a line extending from the front closure to one of the arm scyes respectively, each front member being joined to the back along a substantially vertical line extending downwardly from the respective armpit, each sleeve having a single longitudinally extending underarm seam reaching from the wrist line to the armpit, and gusset means providing fullness at the armpit, characterized in that the rear edge of each sleeve terminates at a deep, substantially oval notch whose smaller end is open at the edge of the material, the forward edge of each sleeve terminating in a concavely curved portion which merges with the corresponding horizontal front lower edge of the yoke, the gusset means at each armpit comprising a segmental piece having a substantially straight edge and a curved edge, the radius of curvature of said curved edge being approximately four times the radius of curvature of the larger end of the oval notch in the yoke material, the gusset means also comprising a semi-segmental part having a curved edge, a substantially straight base and a substantially straight vertical edge, a seam uniting the curved edge of the segmental gusset part to the margin of the oval notch in the yoke, a seam uniting the curved edge of the semi-segmental gusset part to the concavely curved portion of the front edge of the sleeve, and a seam uniting the straight base edge of the latter gusset part to the upper edge of the corresponding front member of the garment, the underarm seam extending uninterruptedly across the armpit and uniting the lower portion of the straight edge of the segmental gusset part to the vertical straight edge of the semi-segmental gusset part, the underarm seam also uniting the lower portion of the straight edge of the segmental gusset part to the rear edge of the corresponding front member and then continuing on down beyond the gusset means and uniting the corresponding front member to the back.

3. A ventilated rain garment of the kind which, except for collar and trim, consists of but four parts, to wit, a yoke having sleeves integral therewith, a back, and two front members, the back being joined to the yoke at and adjacent to the collar line and adjacent to each arm scye respectively, but being otherwise unattached to the yoke, thereby providing ventilating openings of large area, and wherein each front member is joined to the yoke along a line extending from the front closure to one of the arm scyes respectively, each front member being joined to the back along a substantially vertical line extending downwardly from the respective armpit, each sleeve having a single longitudinally extending underarm seam reaching from the wrist line to the armpit, and gusset means providing fullness at the armpit, characterized in that the rear edge of each sleeve terminates at a deep, substantially oval notch in the yoke material and the forward edge of each sleeve terminates in a concavely curved portion which merges with the corresponding horizontal front lower edge of the yoke, the gusset means at each armpit comprising a segmental part and a triangular part, the latter being of substantially one-half the height of the segmental part, the curved edge of the segmental part being united to that edge of the yoke which defines the notch, the underarm seam extending uninterruptedly down across the armpit area and uniting the upper part of the straight edge of the segmental gusset member to one edge of the triangular gusset member, said seam then continuing down and uniting the lower part of said straight edge of the segmental gusset member to the front member of the garment, and then continuing down to the lower edge of the garment and uniting the back and front members, and seams uniting the other two edges of the triangular gusset member to the concavely curved portion of the front edge of the sleeve and to the upper edge of the front member respectively.

4. A ventilated rain garment of the kind which, except for collar and trim, consists of but four parts, to wit, a yoke having sleeves integral therewith, a back and two front members, the back being joined to the yoke at and adjacent to the collar line and adjacent to each arm scye, but being otherwise unattached thereto, so that free passage of air is provided between the interior and exterior of the garment at the back of the garment, and wherein each front member is joined to the yoke along a line extending from the front closure to one of the arm scyes, respectively, each front member being joined to the back along a substantially vertical line extending down from the respective armpit, each sleeve having a single longitudinally extending underarm seam reaching from the wrist line to the armpit, and gusset means providing fullness at the armpit, characterized in that the back has laterally directed integral extensions at the in-

terior of the garment, each extension reaching across the upper part of one of the sleeve openings respectively, and having its upper edge united to the yoke at the collar line, the lower edge of each extension being free from the yoke and merging with the lateral edge of the back to form a flexible flap reaching to the arm scye and which tends to close the ventilating opening when engaged by the wearer's hand in donning the garment.

5. A ventilated rain garment of the kind which, except for collar and trim, consists of but four parts, to wit, a yoke having sleeves integral therewith, a back and two front members, the back being joined to the yoke at and adjacent to the collar line and adjacent to each arm scye, but being otherwise unattached thereto, so that free passage of air is provided between the interior and exterior of the garment at the back of the garment, and wherein each front member is joined to the yoke along a line extending from the front closure to one of the arm scyes, respectively, each front member being joined to the back along a substantially vertical line extending down from the respective armpit, each sleeve having a single longitudinally extending underarm seam reaching from the wrist line to the armpit, and gusset means providing fullness at the armpit, characterized in that the back, before assembly with the other parts, has a deep horizontally elongate notch at its upper end, located between two upwardly directed extensions, the extensions having edges which converge toward

the notch, the edge of the notch and said edges of the extension being secured, in the completed garment, to the yoke at the collar line, the extensions then being substantially horizontal and providing a reinforcement for the shoulders of the garment, the lower edge of each extension, in the completed garment, being free and merging with the lateral edge of the back, said extensions with the adjacent portions of the back forming flexible valve flaps operative automatically to close the ventilating opening when engaged by the wearer's hand in donning the garment.

JOHN T. CALLAHAN.
JOHN ARTHUR GILBERTSON.

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