May 21, 1963 J. DE GRAZIA 3,090,047

WATERPROOF SEAM

Filed July 12, 1961

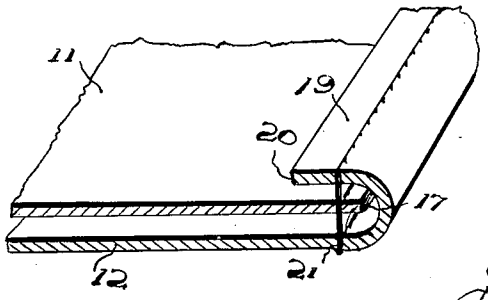


Fig. 1.

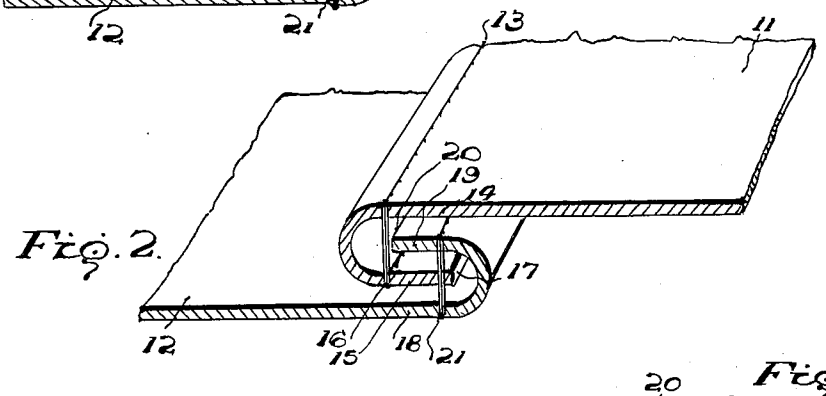


Fig. 2.

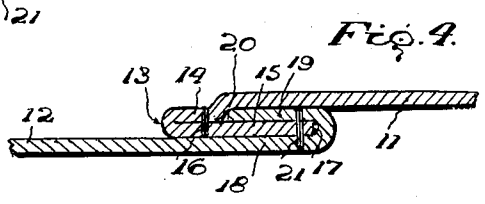


Fig. 4.

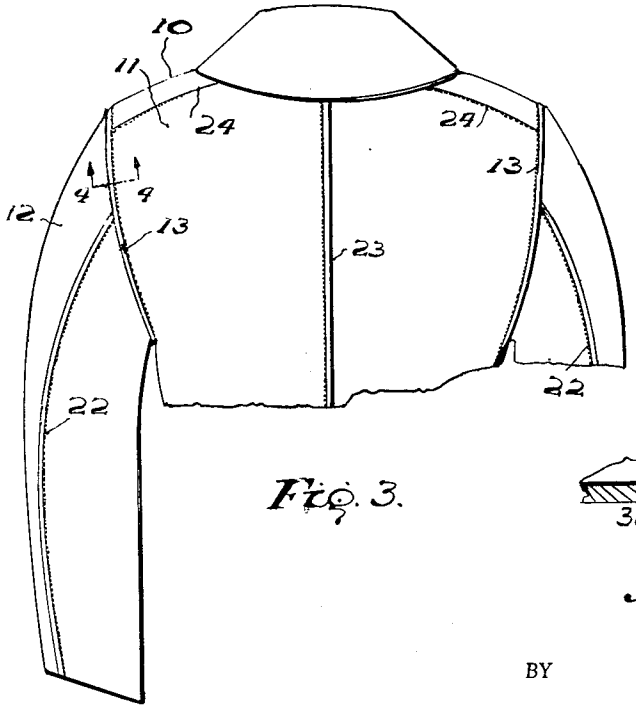


Fig. 3.

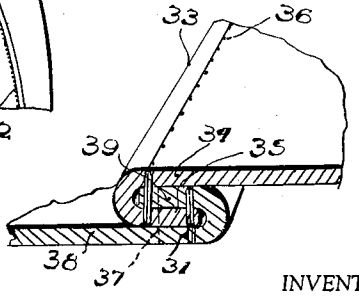


Fig. 5.

INVENTOR

Joseph DeGrazia

BY

ATTORNEY

United States Patent Office

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3,090,047

# WATERPROOF SEAM

Joseph De Grazia, Washington, D.C., assignor to the United States of America as represented by the Secretary of the Army

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3 Claims. (Cl. 2—275)
(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The invention relates to seams for garments and more particularly to waterproof seams for waterproof garments. Such garments, usually are formed from textile material which has been treated to be either moisture proof or moisture resistant, have the inherent weakness that water seeps through the holes made by the stitches when the pieces of the garment are sewed together. Efforts have been made to eliminate this weakness by applying tapes of waterproof material over the stitches and/or by impregnating the stitching area of the garment with substantial amounts of waterproof plastic material. The first method is expensive, while the second method has the weakness that the plastic material frequently deteriorates with time and permits seepage of water through the stitches as in the case of an untreated seam.

With the foregoing in view, it is an object of the invention to provide an improved waterproof seam.

A further object is to provide such a waterproof seam wherein the stitches which connect the several pieces of the garment together do not penetrate all plies in the garment whereby none of the holes formed by the stitches extend entirely through the garment.

Other objects and advantages reside in the particular structure of the seam and or to the novel methods of making the same, as will be readily understood by those skilled in the art upon reference to the attached drawing illustrating two embodiments of the invention and to the following specification wherein the invention is described and claimed.

In the drawing:

FIGURE 1 is a diagrammatic fragmentary perspective view of two pieces of garment material illustrating a preliminary step in the formation of the improved seam;

FIGURE 2 is a like view showing the complete seam;

FIGURE 3 is a fragmentary rear elevational view of a garment embodying seams according to the invention;

FIGURE 4 is an enlarged vertical sectional view taken substantially on the plane of line 4—4 of FIGURE 3; and

FIGURE 5 is a view like FIGURE 2 but showing a modified species of the seam.

Referring specifically to the drawing, wherein like reference characters represent like parts in all views and referring at first to the species of invention illustrated in FIGURES 1 to 4, inclusive, 10 designates generally a body garment such as a raincoat having a back panel 11 which is sewed to a sleeve 12 by a shoulder seam 13. As best seen in FIGURE 4, the panel 11 or outer sheet has a marginal portion which is downwardly, laterally and inwardly directed to provide an upper hem comprising an upper ply 14 and a relatively narrow lower ply 15. Such plies are secured together by a line of stitching 16 laterally outwardly of the free edge 17 of the lower ply. The function of the line of stitching 16 is to provide a permanent crease in the upper hem and to enhance the appearance of the garment by giving the illusion that the seam is conventional. In like manner the marginal portion of the sleeve panel 12 or lower sheet is upwardly and



reversely directed to provide a lower hem composed of a lower ply 18 and a narrow upper ply 19. The lower ply 15 of the upper hem is interposed between the plies 18 and 19 of the lower hem. In like manner the upper ply 19 of the lower hem is interposed between the upper ply 14 and the lower ply 15 of the upper hem, with the free edge 20 of the lower hem laterally inwardly of the line of stitching 16. A line of stitching 21 connects both plies 18 and 19 of the lower hem to the lower ply 15 only of the upper hem. It is this line of stitching 21 which actually connects the sleeve 12 to the panel 11. As this line of stitching 21 does not penetrate the upper ply 14 of the panel 12 there are no holes through which moisture can seep through the garment. In like manner the line of stitching 16 does not penetrate the lower ply 18 of the sleeve 12 so no moisture penetrates to the interior of the garment through the holes formed by the stitches of this seam.

FIGURES 1 and 2 illustrate one method of forming the improved seam. Here the back panel 11 is placed on top of the sleeve 12 with the free edge 20 of the sleeve 12 extending beyond and turned to overlap the free edge 17 of the panel 11. The line of stitching 21 is now made through the three plies thus produced. Thereafter the panel 11 is reversely extended to overlie the upper ply 19 of the lower hem, FIGURE 2. The line of stitching 16 may now be made through the upper and lower plies 14 and 15 only of the upper hem.

An alternate method of forming the seam is to first fold the upper hem on the panel 11 and then connect the upper and lower plies 14 and 15 by the line of stitching 16. Thereafter, the lower hem may interfit with the upper hem and the line of stitches 21 made through the three lowermost plies only.

FIGURE 5 shows a slightly modified seam 33 wherein the hems are interengaged as before but wherein an outer line of stitching 36 passes through not only the two plies 34 and 35 of the upper hem but also through the upper ply 39 of the lower hem. A line of stitching 31 connects both plies of the lower hem to the lower ply 35 only of the upper hem as before. If desired, a second line of stitching 37, indicated in broken lines, may be applied through the three innermost plies only in close relationship to the outer line of stitching 36. Indeed, it is preferable that this additional line of stitching be utilized or that it be substituted for the more widely spaced line of stitching 31, as this prevents separation of the seam between the lines of stitching 31 and 36 or 21 and 16 of the first species of the invention.

It is apparent from the foregoing that the moisture or waterproof seams described hereinabove do not provide any direct passageway of moisture to seep through the garment through the holes made by the stitching. Also, although, the invention has been shown applied only to the shoulder seams 13, it is understood that the same seam would be utilized throughout the other seams of the garment such as sleeve seams 22, the back seam 23 and the shoulder strap seams 24, as well as others; not shown, if desired.

Also, while there has been shown and described what is now thought to be the preferred embodiments of the invention, it is to be understood that the same is susceptible of still other forms and expressions. Consequently, the invention is not considered to be limited to the two species and methods described and shown hereinabove but only as hereinafter claimed.

I claim:

1. A lap seam for joining together the overlapped edge portions of inner and outer sheets of flexible moisture resistant material, said edge portion of said outer sheet having a narrow marginal portion downwardly and later-

ally inwardly directed to provide a narrow upper hem comprising a bight and upper and lower plies, a row of stitching connecting said plies together laterally inwardly of said bight and providing a free edge on said lower ply laterally inwardly of said row of stitching, said inner sheet having a narrow marginal portion upwardly and reversely directed to provide a narrow lower hem comprising upper and lower plies, said upper ply of said lower hem being disposed above said lower ply of said upper hem laterally inwardly of said row of stitches, a second row of stitches extending through both of said plies of said lower hem and through said lower ply only of said upper hem, and said second row of stitching being located laterally inwardly of said first row of stitching in parallel relation thereto.

2. A lap seam for joining together the overlapped edge portions of inner and outer sheets of flexible moisture resistant material, said edge portion of said outer sheet having a narrow marginal portion downwardly and laterally inwardly directed to provide an upper hem comprising a bight and upper and lower plies, said inner sheet having a narrow marginal portion upwardly and reversely directed to provide a lower hem comprising upper and lower plies, said upper ply of said lower hem being disposed between said plies of said upper hem, said lower ply of said upper hem being disposed between said plies of said lower hem, a row of stitching connecting said lower ply only of said upper hem to both of said plies of said lower hem, a second row of stitching connecting only said plies of said upper hem together, and said last named row of stitching being parallel to said first named row of stitching between the same and said bight.



3. A lap seam for joining together the overlapped edge portions of inner and outer sheets of flexible moisture resistant material, said edge portion of said outer sheet having a narrow marginal portion downwardly and laterally inwardly directed to provide an upper hem comprising a bight and upper and lower plies, said inner sheet having a narrow marginal portion upwardly and reversely directed to provide a lower hem comprising upper and lower plies, said upper ply of said lower hem being disposed between said plies of said upper hem, said lower ply of said upper hem being disposed between said plies of said lower hem, a row of stitching connecting said lower ply only of said upper hem to both of said plies of said lower hem, a second row of stitching connecting both of said plies of said upper hem to said upper ply only of said lower hem, and said second row of stitching being disposed in parallel relation to said first named row of stitching between the same and said bight.

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