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J. DE GRAZIA  
GLOVE WRIST STRUCTURE

2,686,916

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2 Sheets-Sheet 1

FIG. 1.

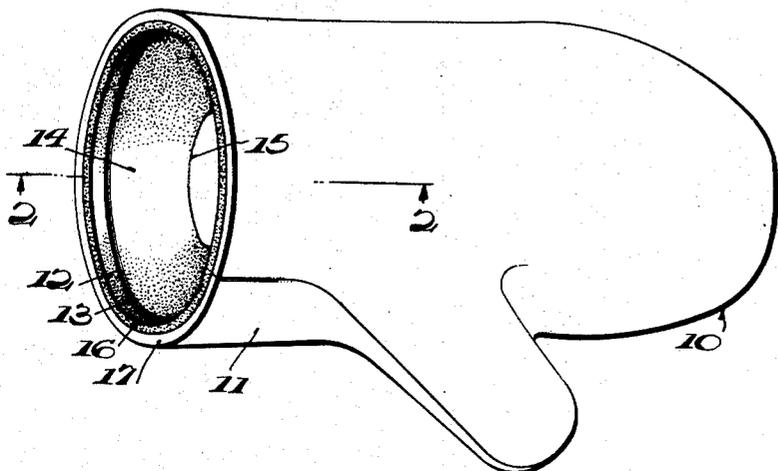


FIG. 2.

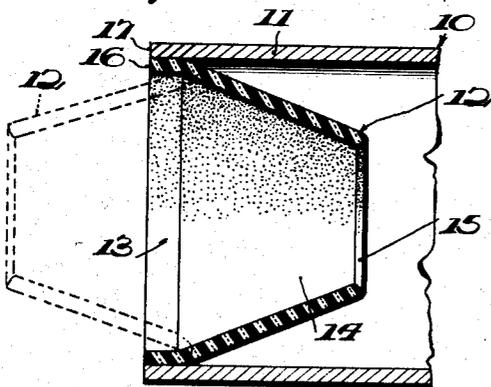


FIG. 3.

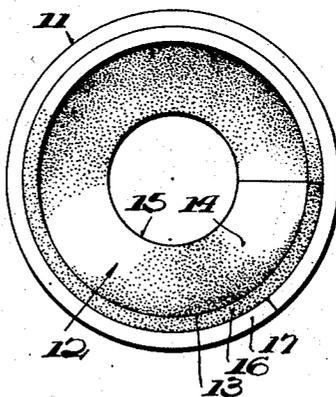
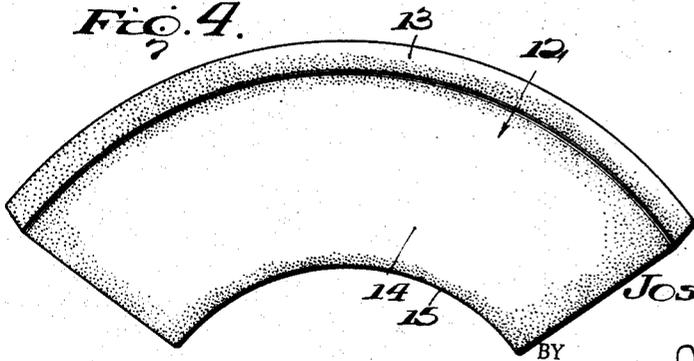


FIG. 4.



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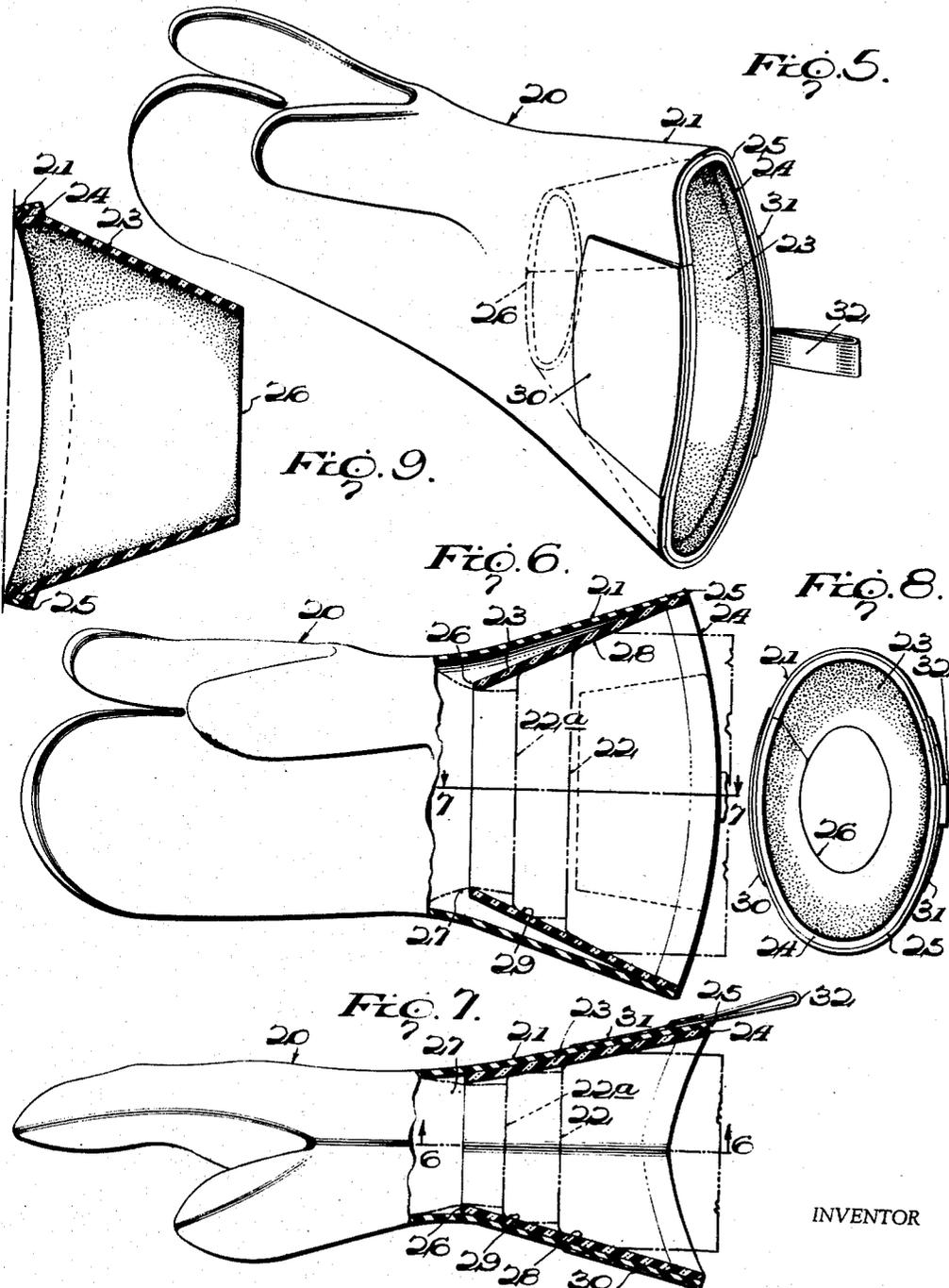
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# UNITED STATES PATENT OFFICE

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## GLOVE WRIST STRUCTURE

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

Application February 13, 1953, Serial No. 336,891

1 Claim. (Cl. 2—162)

(Granted under Title 35; U. S. Code (1952), sec. 266)

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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.

My invention relates to wrist structures of gloves, mittens or other hand coverings and more specifically to such structures as are adapted to provide a fluid-tight joint between the cuff portion of the covering and the wrist of the wearer.

In the usual hand covering for this purpose, the cuff portion of the glove is bound to the wrist by inelastic straps, elastic bands or the like or by a knitted cuff of smaller diameter than the body of the glove or mitten. In the case of the gauntlet-type of glove, a knitted skirt may be provided inwardly of the gauntlet portion for resiliently engaging the wrist. In such hand coverings, the front edge of the skirt is secured to the glove in the region of the hand covering portion thereof. From there, the skirt is rearwardly directed over the wrist and is so maintained by the action of the withdrawal of the hand therefrom. It is difficult to put such a glove on without forward distortion of the skirt which renders it difficult to return the skirt to the desired normal position, particularly if the gauntlet portion is of rigid or semi-rigid material as is usually the case.

Moreover, in gloves having gauntlets, the latter receives the sleeve cuff loosely so that extraneous matter such as dirt, snow, ice, etc., readily enters and can only be removed by removing the glove entirely and shaking it.

With the foregoing in view, it is an object of my invention to provide an improved wrist structure for hand coverings and the like.

A further object is to provide an improved closure for the wrist structure of a hand covering which comprises a skirt having a rear edge secured to the interior of the hand covering in the region of the rear edge thereof and extending forwardly therefrom. The skirt has a resilient free front edge sized to resiliently engage the wrist to provide a joint therewith. The skirt is turned inside out by a partial withdrawal of the hand from the hand covering (but not from the skirt) so that the skirt extends outwardly and rearwardly of the rear edge of the hand covering and dumps any extraneous material which has entered that portion of the covering between the front and rear edges of the skirt.

A further object is to provide an improved wrist closure for hand coverings or the like, which includes a skirt having a wrist embracing free front edge and rearwardly disposed and larger rear edge secured to the hand covering,

said skirt being constructed and arranged to have a normal position providing a funnel-like entrance to the hand covering, said skirt being rearwardly distorted when the hand is removed but thereafter returning automatically to said normal position.

A further object is to provide in such a structure as that last described, means providing a reinforced area of increased thickness in the region of the rear edge of the hand covering.

Other objects and advantages reside in the particular structure of the invention, in the structure of the several elements of the same, combination and arrangement of such elements, all of which will be readily understood by those skilled in the art upon reference to the attached drawing in connection with the following specification wherein the invention is shown, described and claimed.

In the drawing:

Figure 1 is a perspective view of a hand covering showing one form of the invention applied thereto;

Figure 2 is a fragmentary, longitudinal sectional view taken substantially on the plane of the line 2—2 of Figure 1;

Figure 3 is a rear elevational view of the hand covering of Figure 1;

Figure 4 is a plan view of a blank for forming the skirt portion of this form of the invention;

Figure 5 is a perspective view of a modification;

Figure 6 is a front elevational view of the modification with parts broken away and parts shown in longitudinal section substantially on the plane of the line 6—6 of Figure 7;

Figure 7 is a side elevational view of the modification with parts broken away and parts shown in longitudinal section substantially on the plane of the line 7—7 of Figure 6;

Figure 8 is a rear elevational view of the modification; and

Figure 9 is a fragmentary longitudinal sectional view showing the position of a part when a hand is withdrawn completely or almost completely from the hand covering of the modification.

Referring specifically to the drawing, wherein like reference characters have been used throughout the several views to designate like parts, and referring at first to the form of invention of Figures 1—4, 10 designates generally a hand covering formed of any suitable material and which is provided with a substantially cylindrical cuff portion 11 sized for a loose fit about the wrist of a wearer.

The cuff portion 11 has mounted therein a

skirt 12 which is preferably formed of relatively thick and resilient rubber-like material. In the embodiment illustrated, the skirt 12 is formed of material in the nature of foam rubber.

Skirt 12 comprises a cylindrical rear portion 13 which has a snug fit within the cylindrical cuff portion 11 and which is fixedly secured in face-to-face relation with the inner periphery of such cuff portion in any suitable manner, as by adhesive. Forwardly of the rear portion 13, the skirt 12 is formed with an integral truncated conical side wall 14 which terminates forwardly in a free edge 15 adapted for resilient engagement with the wrist of the wearer to provide a fluid-tight joint therewith. The skirt wall 14 extends inwardly and forwardly from the cuff portion 11 at an acute angle. In the form illustrated, such angle is less than 45° and the structure provides a funnel-like opening into the interior of the hand covering 10 whereby to facilitate the donning of the same.

When extraneous matter gets into the area between the front and rear edges of the skirt, the wearer needs only to withdraw the hand covering enough to turn the skirt inside out, as shown in broken lines in Figure 2, to dump such matter. In such position, the free edge 15 of the skirt is still gripping the wearer's wrist so that it returns automatically to the normal position when the hand covering is replaced entirely upon the hand. Thus, the structure eliminates the time consuming delays incident to repeated removals of the gloves each time extraneous matter gets into the cuff portion.

Moreover, in at least this form of the invention, when the hand covering is removed, the wall 14 of the skirt is distorted rearwardly to the broken line position of Figure 2 as aforesaid. However, the thickness and resiliency of the wall 14 is such that the same returns automatically to its normal, full line position as soon as the wall is free of the hand. Thus, the device again presents a funnel-like opening to the hand.

By extending the skirt 12 from the inside of the cuff 11 at angle of less than 45°, a larger area of the inner periphery of the skirt will engage the wearer's wrist than would be the case were the skirt extended at an angle greater than 45°. That is, in the more acute angle disclosed, the skirt is relatively long. When a hand is inserted into the glove a substantial portion of the truncated end of the skirt is expanded by the wrist and assumes a cylindrical shape. Thus, the sealing engagement with the wrist comprises a relatively large area of the inner periphery of the skirt which insures a good seal.

On the contrary, if the skirt extended at an angle to the cuff which is greater than 45°, the skirt would not only be much shorter but would form a seal having a much smaller sealing area.

It has been discovered that the foam rubber-like material herein disclosed inherently has sufficient resiliency for its thickness to return to its normal position as soon as the wearer removes his hand therefrom. At the same time it yields readily when the hand is reinserted to provide the large area seal aforesaid. Also, the material does not grip the wrist so tightly as to stop blood circulation through the wrist.

On the contrary, were the skirt formed of the usual, non-cellular rubber, and if it were to have a resiliency corresponding to the foam rubber-like material herein disclosed, it would have to be so much thinner that it would not return to

its normal position when rearwardly distorted as the hand is withdrawn unless it extended from the cuff at an angle greater than 45°. As aforesaid, such an arrangement provides an inferior seal. Moreover, if such a skirt were made thick enough to return automatically to a normal position of less than a 45° angle, its resiliency would be so great as to stop the circulation in the wearer's wrist and render the donning and removal of the glove extremely difficult.

It should be noted also, that in the arrangement disclosed, the rear portion 13 of the skirt and 14 of the cuff portion have coincident free rear edges 16 and 17, respectively, whereby to provide an annular area of double thickness at the rear of the hand covering. This reinforced area strengthens the cuff at this point and resists tearing strains incident to the donning of the glove. This is regarded as an important feature where the hand covering itself is made of relatively weak material such as foam rubber or the like.

In the form of invention of Figures 5-9, there is disclosed a hand covering 20 which includes a gauntlet 21 which is sized to receive sleeve cuffs 22 and 22a loosely therein. A hollow skirt 23 is fitted within the gauntlet 22 and has an enlarged rear opening defined by a rear edge 24 secured to the gauntlet 21 in the region of the rear edge 25 of the latter. The skirt 23 includes a restricted front opening, defined by a front edge 26 which is disposed normally forwardly of the sleeve cuffs 22 and 22a. The skirt 23 is formed preferably of resilient, fluid impervious material and the front opening defined by the front edge 26 is sized to engage the wrist 27 resiliently and provide a fluid-tight joint therewith.

It should be noted also, that annular portions 28 and 29 of the skirt which are located between the front and rear edges 26 and 24 thereof resiliently engage the free edges of the sleeve cuffs 22 and 22a to provide secondary joints therewith. Such secondary joints are not as tight as the joint of the front edge 26 with the wrist 27 but, nevertheless, are operative to retard the passage of extraneous matter from the rear of the gauntlet 21 to the front edge 26 of the skirt 23. It should be noted that in this form of the invention, the skirt 23 is shaped to conform generally to the shape of the gauntlet and apart from the wrist and sleeve-cuff engaging portions need not have the hollow, truncated, conical conformation of the form of Figs. 1-4. The operation of this form of the invention is the same as in the form of Figures 1-4 except that the greater length of the skirt in the second form is such that the skirt will not return necessarily and automatically to the normal position after the hand is withdrawn. However, if this feature is desired, it can be obtained by increasing the thickness or resiliency of the skirt material. Thus, Figure 9 shows the position assumed by the skirt 23 when the hand is sufficiently withdrawn to turn the skirt inside or when the hand is entirely withdrawn. In the first instance, of course, the front edge 26 of the skirt still forms a tight joint with the wrist.

If desired, and especially where the gauntlet and skirt are made of relatively thin material, reinforcing patches 30 and 31 may be applied to opposite sides of the gauntlet 21 in the region of the rear edge 25. Likewise, if desired, a loop 32 may be added to the gauntlet.

It is apparent that both forms of the invention include the feature of dumping extraneous matter entering the cuff or gauntlet portion of the glove

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and that in each the rear portion of the skirt provides a reinforcement for the rear edge of the glove. In both forms, a fluid-tight joint with the wrist is maintained at all times. In at least the form of Figures 1-4, the skirt returns automatically to the normal position so as to present always a funnel-like entrance to the glove. In the form of Figures 5-9, the skirt not only provides a primary joint with the wrist but provides also secondary joints with the sleeve cuffs.

Moreover, while I have shown and described what is now thought to be the preferred forms of the invention, it is to be understood that the same is susceptible of still other forms and expressions. Consequently, I do not limit myself to the precise structures shown and described.

I claim:

In a glove or the like, a hand covering portion, a gauntlet portion integral with said hand portion and extending rearwardly thereof, said gauntlet portion being sized to receive a sleeve cuff loosely therein, a tubular skirt within said

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gauntlet portion, the latter and said skirt having coincident rear edges, means securing said rear edges together, said skirt being substantially frustro-conical in form, said skirt being longer than said gauntlet portion and having a free front edge sized to embrace a wearer's wrist and provide a tight joint therewith, and an intermediate portion of said skirt being sized to embrace said sleeve cuff and provide a joint therewith.

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