Jan. 20, 1942. P. WEEBER 2,270,363

GLOVE

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Fig. 1

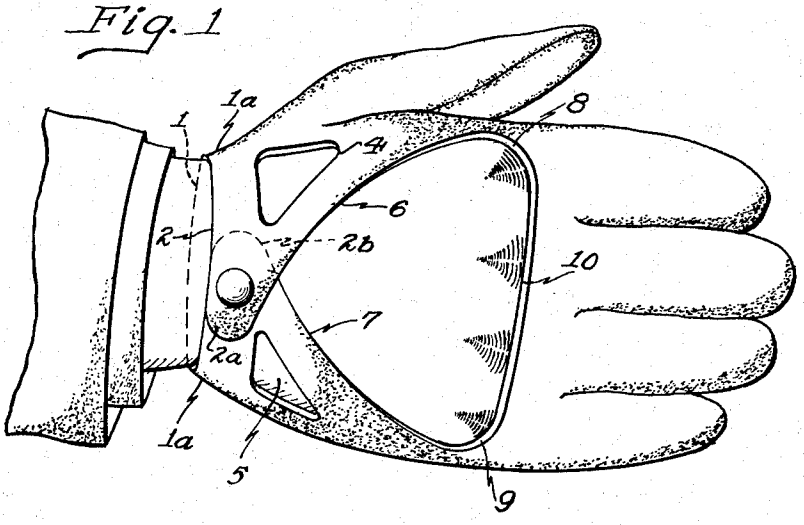
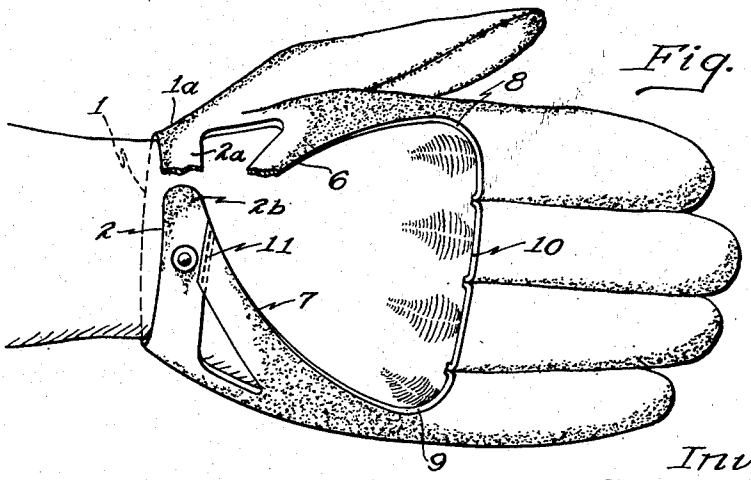


Fig. 2



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GLOVE

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Application February 13, 1939, Serial No. 256,105

1 Claim. (Cl. 2—159)

This invention is an improvement in a glove or the like. Gloves made in accordance with my invention may be made of leather, rubber or fabric and they may be used as the sole protective covering for the hand or they may be used in conjunction with an enclosed or primary glove of any conventional type, serving as a protecting covering for the enclosed or primary glove. The improvement herein disclosed may also be used on, for instance, shooting gloves having a single finger stall for the index finger or on mittens.

The principal object of my invention is to provide an article of the general class aforementioned which, whether used as a sole protective covering for the hands or which, when used in conjunction with an enclosed or primary glove, permits free movement of all the movable portions of the wrists and all portions of the hands so that their movement is relatively unrestricted, thus permitting easier, more accurate work and absence of fatigue to the wearer as well as avoiding the cause of many avoidable accidents.

A still further object of my invention is the provision of an article of the above described general class which permits extreme freedom of movement of all the parts of the hands and wrists, but which also fits so well throughout its various parts by reason of its novel structure, as herein set forth, that the portions thereof will not readily collect loose material or easily catch upon protrusions and the like, resulting in inconvenience and possible accidents.

My invention is adaptable for use in gloves cut upon either the so-called Gunn or Clute patterns or any of the various modifications generally known in the art of glove manufacture and may, as above noted, be used in conjunction with a primary glove, which primary glove may or may not be fixedly fastened in the secondary glove to serve as a lining for the enclosing glove. As will also be apparent from the drawing and from the detailed description following, my invention is adaptable for use in gloves for either dress or utility wear and may be used on gloves both with and without cuffs or gauntlets.

My invention has chiefly to do with the back portion of the glove, the wrist portion thereof and the means for retaining the glove on the hand. The width or cut of the front and back finger and main palm portions of the glove, size for size, may, if desired, be conventional in all respects. My invention concerns particularly a specially shaped and particularly located cut-out portion at the back of the glove, a particularly shaped wrist portion and a particularly shaped and peculiarly located special fastening means for retaining the glove upon the hand.

It is my belief that my invention consists of the aforementioned improvements per se as well as in limited or complete combination.

The provision of a cut-out portion in a glove back has, to my knowledge, been previously known in the art of glove manufacture. Cut-out back portions have heretofore been provided in some types of work gloves as well as in baseball and handball gloves. In these articles the cut-out portion heretofore taught has had as its principal object the provision of a better means of ventilating the hand. Easier manipulation of the hand has been only a secondary or incidental object. Easier manipulation of the hand plus perfect fit in a glove have, so far as is known, never been attempted. At any rate, perfect fit in a glove having a cut-out back portion has never heretofore been achieved. These highly desirable objects have been achieved in the glove herewith shown, described and claimed.

Except for certain disadvantages to be hereinafter set forth, almost any type of cut-out in the back of a glove permits more ready manipulation of the hand than is possible in a glove having no cut-out back portion. The conventional glove having a back is tight on and restrictive of the hand when new. When used a while the flexing of the movable portions of the hand cause stretching of the glove material, resulting in a bulky and bulging glove which mars the appearance of the glove, and is a safety hazard.

However, unless the cut-out portion of the back is substantially formed in accordance with my invention, particularly in the region of the knuckles, and also the back of that part of the hand known in anatomy as the thenar eminence at the thumb, and at the back of the hypothenar eminence on that side of the hand opposite the thumb, the edges of the cut-out portion will have a tendency to gape open in these regions, resulting in the possibility that material will collect in the open portion, thereby causing discomfort to the wearer and in the further possibility that the open portion may catch in machinery or on protrusions, with dangerous possibilities to the wearer.

Gloves conventionally have a wristlet portion and some means of holding the glove on the hand, these usually straps or the like. Gloves made in conformity to my invention are unconventional, novel and useful for the additional reason that the wrist portion in the palm area

fits smoothly over the base or heel of the palm by reason of the fact that this portion is formed to extend backward in a slight irregular curve upward and forward to the back of the hand forming a fastening means or a mounting for the fastening means which exerts a simultaneous irregularly angular pull, upon both the wrist portion and the irregularly curved edges of the cut-out back portion without permitting objectionable distortion in any of these areas, thus insuring snug but comfortable fit both at the entire back portion at all points and also at the wrist.

The essential features of my glove may possibly be better understood by an analysis of the conventional anatomy of the human wrist and hand. Beginning at the wrist, which is always more narrow than the hand, there are a plurality of oddly shaped bones arranged roughly in two rows and held together by flexible and cancellous tissue. These are called the carpal bones and when they and their surrounding tissues are normal the wrist and hand may be moved radially in all directions. Extending outwardly from the wrist, in substantially a fan shape, are the five meta-carpal bones which, together with the flesh and muscle which hold them together, form the palm and back palm portion of the hand. Four of these meta-carpals, which connect to the finger phalanges or digits are capable of only slight movement in their relation to one another, but that meta-carpal bone forming the base of the thumb is quite widely articulate in a semi-rotatable manner. Extending above the four meta-carpal bones which form the more rigid portion of the palm are the finger phalanges, three in number, which form the finger digits. The first digit of each finger is relatively flexibly connected by flexor and extensor muscles and ligaments to the outer end of the meta-carpals, permitting some slight backward movement of the phalanges, even more sidewise movement thereof and a wide arc of movement of the first phalange toward the palm. The second and third phalange of each finger are relatively restricted to movement to a right angular position with respect to the first phalange and to one another in the direction of the palm.

The thumb has but two phalanges above the meta-carpal bone which forms its base, these phalanges generally capable of movement only sidewise or angularly toward the palm. Due, however, to the fact that the meta-carpal bone forming the thumb is articulate in various directions, the relatively restricted movement of its two phalanges is compensated for. All in all, the human wrist and hand is rather a marvel of evolutionary development and is capable of wide range of movement, entirely sufficient for easy manipulation for almost all purposes such as grasping, etc.

But in all its various positions of movement the relative placement and rigidity of the various bony and muscular portions of the hands vary. For instance, in its normally relaxed or inactive position (such as shown in the drawing), the fingers and thumb flex slightly toward the palm due to the relatively greater tenseness natural to the flexor muscles than to the extensor muscles of these digits. With all the finger digits forcibly extended straight outward and the thumb extended as straight as may be done in conventional position, it will be obvious that less back area is presented by the hand than in any other position it may assume. When the hand is forcibly flexed as for instance when an object is grasped or picked up, this action creates a greater back area on the hand than in any of the other positions aforementioned, due to knuckle protuberance.

Conventional gloves having a back therein are cut to fit and generally shaped as near as may be done for the hand with the thumb and all fingers in most extended position. When the hand is extended and is then flexed to form a fist it will be found to be bound and restricted until the material forming the back of a conventional glove has stretched to fully accommodate the enlargement which the hand undergoes.

The stretch of material used for gloves varies a great deal, and in fact, most materials used do not stretch equally in both directions, that is, with and transversely of the normal grain usually found therein. Conventionally, the parts forming the glove are not always cut upon the same grain, nor are the parts always fabricated from the same material, with the result that the glove not only will not fit properly in all hand positions when the glove is new, but may, in fact, never stretch to perfect conformity with a flexed or clenched hand.

Even when and if a glove stretches to fit the hand in its clenched and most irregularly protuberant form, it will then not fit the extended hand smoothly and perfectly, resulting in unsightly, dangerous, and generally unsatisfactory bulges and humps in the back area of the hand due to excess of material.

For comfort and safety the fit of a glove at the wrist portion thereof is no less important than is the fit of the glove to the more movable portions of the hand. Greatest satisfaction is rendered the user of a glove, for most purposes, when the glove fits the lower palm area or heel, so called, and the wrist, snugly, but without binding.

The provision of a gauntlet type glove having good fit in the wrist portion without bulkiness or objectionable bulge of excess material has always been a problem in the manufacture of such types of gloves. This is due to the fact, noted heretofore, that normally the wrist is always smaller than the hand in any position the hand may assume. It is therefore necessary to make the wrist portion large enough to permit the hand to be inserted. Once the hand is inserted, the looseness necessary to permit insertion of the hand at the wrist is objectionable. If a strap or the like is used to draw in the wrist portion, the additional glove material will be plaited or bunched at the wrist in an objectionable manner.

It is therefore a further highly important object of my invention to provide a gauntlet type of glove which, unlike conventional gloves of this type, perfectly fits the wrist without any excess bulk of material being at the wrist when the glove is worn.

By providing a cut out portion at the back area of the glove, which back portion extends in an irregularly curved and diagonal direction at the widest part thereof, and which widest part may be located within reasonable limits parallel to a line in registry with or forward of the apex of the knuckles of the hand with fingers extended, the edges of said cut out portion extending backward angularly toward the wrist to a fastening means, and by providing a means adapted to exercise a tension at an irregular

angle to the wrist encircling portion of the glove, I have provided a glove permitting extreme flexibility of all the movable portions of the hand and wrist, without the disadvantages incident to gaping edges or other unsatisfactory form and fit at the back and wrist such as above indicated.

It is to be noted that the glove construction herein disclosed is more economical to fabricate than the conventional type by reason of easier assembly of the various parts and by reason of the fact that a substantial savings of material is effected due to the large open area provided in the back.

Other and further objects of my invention will be apparent from the drawing, the following detailed description and the claim. My invention has been developed only after wide experience and experimentation in this field and is achieving commercial recognition. In both views of the drawing, my glove invention is illustrated in the shape it assumes on a hand with digits slightly flexed, as is the position they assume when the hand is relaxed.

On the drawing:

Fig. 1 is a plan view of the rearward portion of a preferred form of my glove as it appears upon the hand of the wearer. In this view I have illustrated a so-called Gunn cut glove, and

Fig. 2 is a plan view of the rearward portion of the glove made in accordance with my invention in which a slightly modified form of the glove shown in Fig. 1 is illustrated, this form permitting additionally a means for still further regulating the cut-out portion at the back to insure a proper fit of the glove to the hand. In this view I have illustrated a so-called Clute cut glove.

As shown on the drawing:

In Fig. 1 a conventional form of glove having the usual finger and thumb stalls is shown. The numeral **1** is used to indicate the forwardmost portion of the wrist band in the area of the palm. As is particularly indicated on the drawing, wrist band portion **1** extends circumferentially about the wrist at a slight irregular angle toward the fingers as at *1a*, to form a back wristlet portion **2**, substantially as shown. The angularity aforementioned is of extreme importance in order that proper fit of the portion *1a* may be achieved at the wrist when a single fastening means, such as shown on the drawing, is used. The back wrist portion **2** is formed of a pair of overlapping portions, the numeral *2a* indicating the top overlapping portion and the numeral *2b* indicating the lower one. A fastener **3** provides the means for fixing the two wrist portions in their position relative to one another when the glove is placed upon the hand.

In this form of my invention a somewhat heart-shaped cut-out portion is provided in the back of the glove, substantially as shown which cut-out portion, when the glove is closed upon the hand, may be defined generally as having edges formed in an irregular curve from substantially a point mid-way of the longitudinal axis of the wrist at substantially the innermost end of the meta-carpal bones and extending in an irregular curve, as shown, substantially to the apex of the knuckle of the index finger and forming a concave edge, said edge preferably slightly encircling the apex of the index finger and extending thence in a line or in a slightly irregular curve on a line above the apex of the knuckle of each other finger and thence in an irregular curve, forming a concave edge, at substantially the apex of the fourth finger, thence extending in an irregular curve back to its beginning at substantially the middle of the wrist at the innermost end of the meta-carpal bones.

As shown on the drawing, portions *2a* and *2b* are formed somewhat in the shape of a triangle. If desired, triangular apertures **4** in the thumb region and **5** at the back of the hypothenar portion of the hand may be provided.

Formed in that area which might be taken as the hypotenuse of portions *2a* and *2b* respectively, if these portions were truly triangular and irregularly curved so that the innermost edge thereof forms a portion of the irregular curve of the main back aperture aforementioned, are the irregularly curved strips **6** and **7** which curve outwardly from one another, as shown, portion **6** outwardly to the apex of the index finger as at **8**, and portion **7** outwardly to the apex of the fourth finger as at **9**.

As shown on the drawing, the numeral **10** indicates that portion of the aperture in the back of the glove which extends above and generally coincides with the apex of each of the fingers. This portion is slightly irregularly curved both at **8** and **9**, but may be relatively straight or at any rate only slightly irregularly curved in that portion of the aperture which lies between points **8** and **9**.

In Fig. 2 I have indicated a slight variation of that form of my invention shown particularly in Fig. 1, this variation being chiefly in that portions **6** and **7** are not integral with portion *2b* as is indicated in Fig. 1, but are, instead, cut so that these portions may be drawn or pulled to coincide with portion *2b* and affixed thereto by stitching, indicated by the numeral **11**. It will be obvious that portion *2a* and portion **6**, which are shown in this figure as being cut off, may be formed identical to portions *2b* and **7**, but necessarily extending in an opposite direction. It will be obvious that the shape of the cut of the material forming the back of the glove, previous to assembly, will vary from that form shown in Fig. 1 and that additional tension may be provided on portions **6** and **7** if desired.

It is further to be noted in connection with the form of my invention shown in Fig. 2 that I have illustrated generally the application of the principles thereof to a so-called Clute-type glove and also that the forwardmost edge of the cut out portion, as from **8** to **9**, are illustrated as being slightly forward of the apex of the knuckles, differing slightly from the disclosure of Fig. 1 in which the identical portion is shown as approximately coinciding with the apex of the knuckles.

The generic feature of both forms of my invention disclosed lies in the provision of an aperture in the back of a glove which has its widest part located in a line from substantially above the index finger, thence extends approximately above the apex of each other finger to and substantially encircling the apex of the fourth or little finger, the edges of such aperture thence extend backwardly toward the wrist in an irregular curve toward each other and toward a wrist encircling portion, all in combination with a fastening means which is placed at such an angle with respect to all the parts of the glove as to simultaneously exert a tension or pull upon the irregularly curved sides of the aperture in the back and upon the irregularly curved rearwardly extending portions of the wrist area.

In that form of my invention, shown in the drawing, my preferred form for the aperture in the back is indicated. It should be apparent that in these forms of my invention that when the wrist band is drawn a simultaneous tension or pull will be exerted angularly along the lateral edges of the cut-out portion of the back and also angularly backward from the wrist portion. It will be further obvious, it is believed, that the form and placement of the aperture disclosed in the aforementioned figures and detailed description thereof above will achieve a perfect fit of the edges of the aperture and the wrist edges, to the hand.

It will be noted from a careful study of the drawing and above detailed description, that the form and relative positioning of the various parts achieves a uniform tension with respect to the conventionally loose portions thereof resulting in perfect fit of the glove to the hand in all positions thereof. When the hand is clenched or wilfully flexed, the area of the back of the hand increases and when thus increased, additional tension will be placed upon the lateral edges of the back aperture which tension is transmitted to the fastening means, thus insuring that no gaping edges will form in the back aperture.

The fastening means being also located in a position whereby it will exert angular tension upon the irregularly curved edges of the wrist portion simultaneously insures smooth but unbinding fit of the glove in the front, at heel of palm, and back wrist area.

The importance of the particular irregular curvature of the wrist encircling portion with respect to the fastening means, the irregular curvature of the edges in the back aperture with respect to the fastening means and the location of the forwardmost edge of the back aperture with respect to the finger knuckles must not be overlooked or minimized. These matters are the gist of the invention.

Unless the forwardmost edge of the back aperture coincides substantially with the apices of the finger knuckles when the hand is relaxed an objectionable protruding effect will be produced at this point. If the said forwardmost edge of the back aperture comes too far back from the knuckles in the direction of the wrist, then gaping is induced at this point when the hand is flexed or clenched into a fist.

If the forwardmost edge of the main aperture in the back is positioned too far forward of the apices of the knuckles on the relaxed hand, the tension exerted on that edge by the fastening means, mounted as aforementioned may be interfered with. However, the greatest difficulty is experienced when the forwardmost edge of the back aperture extends too far back in the direction of the wrist. On the drawing I have shown only gloves, but as hereinbefore indicated, the means above disclosed may be adapted, without departure from the main inventive idea, to gloves having a single finger stall for the forefinger and a single stall for the remaining three fingers, as is conventional for so-called shooting gloves, or even to mittens.

It is within my contemplation that various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claim.

I claim:

A glove comprising palm and back sections and having a thumb stall and finger stalls, the back section being cut out for the major portion of its area to form a large back opening and having its rear portion formed with symmetrical side flaps extending inwardly towards each other, and means for detachably securing the free ends of said flaps in overlapped relation to each other to form a wrist encircling portion having the portions of its rear edge formed by the rear edges of the flaps disposed forwardly of the rear edge of the palm section of the glove to establish a snug fit of the wrist portion about a person's wrist, the front edge of the back opening extending transversely of the glove rearwardly of the finger stalls and further extending substantially straight across the apices of all of the knuckles at the base of the fingers, when the fingers are extended, the said front edge having its ends terminating in rearwardly curved portions that encircle the sides of the base knuckles of the first and fourth fingers respectively, said curved portions merging with the side edges of the opening defined by the sloping forward edge portions of the flaps, the said side edges converging rearwardly and intersecting midway of the width of the wrist encircling portion of the glove when the flaps are overlapped and secured.

PAUL WEEBER.