SAFETY GLOVE AND INTERNAL FINGER PROTECTOR

Filed April 18, 1967
SAFETY GLOVE AND INTERNAL FINGER PROTECTOR

John A. Casey, Westwood, Mass.,
(25 Loring Drive, Framingham, Mass. 01702)

Filed Apr. 16, 1967, Ser. No. 631,724

10 Claims. (Cl. 2—161)

ABSTRACT OF THE DISCLOSURE

A finger protector comprises a rigid, impact-resistant cap which is inserted into a glove stall. The cap is shaped to engage over the distal portion of the wearer's fingers. A retainer secured to the outside of the cap is adapted to adjustably attach to the inside of the glove stall to permit the cap to be positioned in the stall at different depths so that it can accommodate fingers therein of different lengths, yet it prevents the cap from falling out of the finger stall.

A retainer having internal reusable finger protectors positioned in the glove stalls. The protectors comprise impact-resistant caps having retainers extending between the caps and the inside walls of the corresponding stalls so that the positions of the caps in their stalls can shift to suit the particular wearer's fingers, yet these retainers prevent the caps from falling out of the glove.

Background of the invention

(a) Field of the invention.—This invention relates to a safety glove and to a protective insert therefor. It relates more particularly to a finger protector for insertion into a safety glove to shield the end of the finger from damage due to blows and pinch points.

A large proportion of industrial accidents involve loss or injury to the distal portion of a finger, that is, the finger segment above the second joint. For years, industry has been seeking ways to reduce the incidence of this sort of injury. To this end, some companies have required employees working around machinery, heavy equipment and the like to wear safety gloves to protect their hands.

(b) Description of the prior art.—In some conventional gloves, rigid armor-like finger protectors are installed in the glove stalls to protect the wearer's fingers from being pinched or mashed. Usually, these protectors are permanently sewed or cemented into the stalls to keep them in the proper position to best shield the wearer's fingers and also to prevent the protectors from accidentally falling out of the glove.

When used correctly, these prior armored safety gloves do protect the wearer's fingers from injury. They have certain drawbacks, however, which seriously limit their application. More particularly, prior safety gloves employing finger protectors permanently stitched into the stalls are quite expensive to manufacture. Furthermore, in many occupations, a pair of such gloves wears out after only a few days' use. When the gloves are discarded, so are the finger protectors, even though there may be nothing wrong with the latter and even though they are relatively costly items. Therefore, it is apparent that a safety program involving the use of gloves with stitched-in protectors is expensive for the average manufacturer. As a practical matter, even the glove makers themselves are not wholly satisfied with conventional gloves having built-in finger protectors because of the increased risk associated with them. More particularly, a glove may be allowed inadvertently out of the plant missing one finger protector. If an accident should occur to the correspondingly unprotected finger of the wearer of that glove, the glove manufacturer may become liable for the injury. Consequently, the manufacturer would much prefer that the users themselves install the finger protectors to avoid the omission of a protector.

Accordingly, some employees, unions and the like do not promote the use of such safety gloves as aggressively as they might.

Of paramount importance from the viewpoint of safety, prior safety gloves employing finger protectors are also disadvantaged because they fail to take into account the fact that some people's fingers are longer than others and also the relative lengths of fingers on a hand vary from person to person. Invariably, the protectors in these gloves are situated at the very ends of the glove stalls. As a practical matter, the glove manufacturers could not supply the extremely large variety of glove sizes that would be required to properly fit all hands. Consequently, not all stalls in a given glove may correctly fit all fingers of a particular wearer, so that the protectors at the ends thereof all engage correctly over the distal portions of his fingers. That is, one or more stalls may be appreciably longer than the corresponding finger, with the result that the protector is displaced away from the finger to the extent that it exposes part or all of the distal finger portion to blows and pinches. Yet, the wearer may not be able to shift to an available smaller glove because other stalls in that glove may be too short for his other fingers.

Summary of the invention

Accordingly, this invention aims to provide a safety glove which gives maximum protection to the wearer's fingers.

Another object of the invention is to provide a safety glove having internal finger protectors which are positioned in the glove according to the lengths of the wearer's fingers.

Another object of the invention is to provide a finger protector for use in a safety glove which can be adjustably positioned in the glove stall by the wearer to properly engage over his finger.

Another object of the invention is to provide a finger protector for use in a safety glove which cannot readily fall out of the glove and be lost.

A further object of the invention is to provide a finger protector for use in a safety glove which can be reused after the associated glove has worn out.

A still further object of the invention is to provide a finger protector which is relatively easy and inexpensive to manufacture.

Another object of the invention is to provide a finger protector which can be installed readily in a conventional glove by the wearer himself.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention according to comprises the features of construction, combination of elements and arrangements of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

Briefly, the safety glove has the usual main body, thumb and finger stalls made of a conventional flexible, wear-resistant material. Finger protectors are adjustably positioned in the stalls. Each protector comprises a thimble-like finger cap made of a rigid, impact-resistant material. The cap is dimensioned to fit within the glove stall and to loosely engage over and cover the distal portion of the wearer's finger.

A retainer between the cap and the inside wall of its glove stall permits adjustably positioning the cap in its stall to engage properly over fingers of different lengths.

At the same time, the retainer prevents the cap from falling out of the glove.

In a preferred embodiment of the invention, the retainer is in the form of a multiplicity of relatively stiff, resilient
3,386,104

3 gripping fingers projecting out from the cap. The fingers engage the inside wall of the corresponding finger stall to retain the cap at a selected position inside the stall. The aforesaid engagement is such as to permit the wearer to forcibly push all the caps with his fingers to locations in the corresponding stalls where they will comfortably engage over the ends of his fingers when the glove is on his hand. Yet, the same engagement prevents the caps from moving from these locations when the hand is removed from the glove, even if the glove is dropped or crumpled. Thus, when the wearer again puts the glove on his hand, the finger protectors therein will still be in just the right position to protect the ends of his fingers from being pinched or mashed. Another useful protector embodiment employs a retainer in the form of a folded tape, secured between the cap and the end of the stall, which allows the cap to "float" within the stall so as to engage properly over the wearer's fingers. In both of these embodiments, the rounded finger protectors are free to turn with the wearer's fingers at their locations of adjustment in the stalls. A further embodiment uses a retainer in the form of an adhesive filled sac on the outside of the cap. When the user positions the cap at the proper depth in the stall, the sac is broken and the adhesive holds the cap at that location. Thus, the finger protectors can be made and sold separately and can be installed easily by the user himself in conventional gloves in a manner to fit his particular hand. When a glove wears out, the wearer simply removes them and re-inserts them into a new glove.

Brief description of the drawing

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawing, in which:

FIG. 1 is a perspective view with parts cut away of a safety glove having internal finger protectors;
FIG. 2 is an enlarged perspective view with parts cut away of the protector in FIG. 1;
FIG. 3 is a vertical section of a modified form of finger protector; and
FIG. 4 is a perspective view of another modified form of finger protector; and
FIG. 5 is a fragmentary perspective view of another modified form of finger protector.

Description of the preferred embodiments

Referring now to FIG. 1 of the drawing, the safety glove indicated at 10 comprises a palm-shaped main body 12 and thumb and finger stalls 14. The glove is made of any suitable material such as leather, plastic, rubber, or a fabric which may or may not be impregnated or coated with plastic or elastomer.

In a preferred embodiment of the invention, finger protectors indicated generally at 20 are positioned in stalls 14 and held there by retainers in the form of stiff, brush-like bodies 22 on the outsides of protectors 20 which engage over the inside of stalls 14. In practice, it may not be necessary to install protectors 20 in all stalls 14 of glove 10. In most cases, three such protectors 20 placed as illustrated in stalls corresponding to the first three fingers give adequate protection.

Referring now to FIG. 2, each finger protector 20 comprises a rounded thimble-like cap 24 made of a relatively rigid, impact-resistant material such as metal or plastic. Polyethylene or polycarbonate plastics are particularly good materials from which to fabricate caps 24. Each cap 24 is dimensioned to engage relatively loosely over the end of the wearer's finger 26 indicated by dotted lines. This minimizes finger discomfort and permits a certain amount of finger movement. The length of cap 24 is selected to give all around protection to the distal portion of the wearer's finger. However, the cap should terminate just short of the second finger joint indicated at 26 in FIG. 2 so as not to impede the flexing of the finger. If desired, the inside of cap 24 may be lined or flocked with a soft material (not shown) to improve the "feel" of the cap and make it more comfortable to wear.

The brush-like body 22 comprises a multiplicity of relatively stiff, resilient, bristle-like gripping fingers in the form of flock fibers 30 secured on end by cement or adhesive 32 to the outside of cap 24, to wit: an outside circumferential wall portion 34 thereof. In some applications, body 22 may even consist of fiber-like protruding points or fingers molded integrally with cap 24. However, fibers 30 are preferable and may be composed of any suitable natural or synthetic material such as nylon, or even small wires. They are applied directly to wall portion 34 of cap 24 or they are flocked or adhered onto a pressure-sensitive adhesive or contact tape (not shown) which is, in turn, wrapped around and adhered to wall portion 34.

Referring to FIGS. 1 and 2, protectors 20 are installed in glove 10 by the wearer himself so that they are positioned at the proper locations or depths in stalls 14 to give maximum protection to his fingers 26. The preferable mode of installing them is for the wearer to place them over the ends of his fingers and then to insert his hand into glove 10. In this way, he will forcibly push protectors 20 into the various stalls 14 to snugly fit upon the lengths of his corresponding fingers 26. In other words, protectors 20 are not necessarily pushed to the ends of their respective stalls 14. Rather, each is positioned in its stall at the location at which it loosely engages over the associated finger 26 when that is fully extended in the glove. It thus engages over and protects the entire distal portion of the associated finger without cramping the finger.

When each protector has been properly positioned as aforesaid, the resilient gripping fibers 30 making up its brush-like body 22 engage the inside wall of stall 14 and retain it at the desired location in the stall. The length, stiffness and resilience of fibers 30 and the area occupied by body 22 (i.e. the size of wall portion 34) are selected so that the aforesaid engagement permits each protector 20 to be forcibly pushed into position as described above.

Yet, it also prevents the protectors from moving of its own accord from this position, even though glove 10 may be crumpled, flexed or dropped. Thus, glove 10 and its internal finger protectors 20 will always correctly fit a particular wearer whenever he puts on the glove.

Also, as best seen in FIG. 1, when glove 10 is flexed, pulled and twisted due to the hand manipulations of the wearer, the protectors 20 engaging over his fingers 26 are free to move with the fingers and to twist relative to the walls of stalls 14 at their selected locations or depths in the stalls without reducing the effectiveness of the glove. Also, caps 24 are rounded and symmetric so that when they do twist, there is no likelihood of their pinching or squeezing the wearer's fingers as sometimes happens with prior fingers protectors installed in such a glove.

If the present glove is worn by different people having different finger lengths, it still gives maximum protection to each of them. More particularly, if a person having longer fingers puts on glove 10, after it has been adjusted for a smaller hand, his fingers engage protectors 20 and forcibly push them to exactly the proper depths in stalls 14 to suit his particular hand. This is indicated in FIG. 1 by the illustrated displacement of protector 20 in the fourth stall 14 of glove 10 to its dotted line position 20a.

Also, if a person having shorter fingers wants to wear glove 10, he pinches the ends of stalls 14 containing protectors 20 to forcibly work the protectors an appreciable distance toward the main body of the glove. Then he simply inserts his hand into glove 10 as described above to forcibly push the protectors to the proper depths in their respective stalls to suit his hand.
Protectors 20 also have a long, useful life. They can be used over and over long after the associated glove 10 has worn out. They are removed from glove 10 by pinching the back portion of stall 14, just as described to work them out of the stalls. They can then be inserted easily by the user himself into a new glove 10 in the manner described above.

FIG. 3 shows a modified form of finger protector. It comprises a cap 40 made of the same impact-resistant material as cap 24. It is also shaped to engage over and cover the distal portion of the wearer's finger. The retainer takes the form of a fabric sock or cover 42 slid over cap 40. A multiplicity of relatively stiff, resilient fibers 46 are secured on end to sock 42 forming a brush-like fiber body 48 on the outside of cap 40. An elastic band 50 fastened to sock 42 draws the end of the sock in over the end 44 of cap 40 to hold cap 40 inside sock 42. The entire protector is then inserted into a glove stall 14 exactly as described above in connection with protector 20.

Also, if desired, sock 42 can be extended beyond the cap end 40a and folded inside the cap, as indicated by dotted lines 42a in FIG. 3. If desired, extension 42a may be free of fibers. The sock extensions 42a not only holds cap 40 inside the sock but also lines the inside of the cap to make it more comfortable. If this construction is used, elastic band 50 may, of course, be omitted.

FIG. 4 shows another finger protector embodiment which can also be installed easily in glove 10 by the wearer himself. It comprises a finger cap 60 which is identical to cap 24 or 42. The retainer for cap 60 takes the form of a flat, folded tape 62. One end 62a of the tape is secured to the top of cap 60 by cement or other suitable means. The free end 62b of tape 62 carries a conventional contact cement 64. The unit is supplied with tape 62 folded flat against cap 60, the cement 64 facing outward. Preferably, a waxed cover sheet 66 covers and protects the cement.

To install this finger protector in glove 10, the wearer first places a set of caps 60 over his fingers and strips sheets 66 from tapes 62. He then inserts his hand into glove 10, pushing caps 60 to the ends of their respective glove stalls. The tape ends 62b are pressed against the ends of the glove stalls and are adhered thereto by cement 64. Tapes 62 then unfold as indicated in FIG. 4 to retain caps 60 in their respective stalls. However, they also permit the caps to "ride" or "float" on the fingers in the glove stalls so that they readily protect these fingers.

As with the FIGS. 1-3 embodiments of this invention, when glove 10 wears out, the wearer can remove the protectors from the glove and reuse them by refolding tape 62 and applying more cement 64 thereto or, more preferably, by replacing tape 62 with a new tape.

Also, it will be appreciated that there are other equivalent modes of securing the tape end 62b to the end of the glove stalls. For example, the cap 60 may be pushed to the end of a finger stall and a stitch applied through the end of the stall and tape end 62b to anchor the free end of the tape.

There are also other equivalent means for retaining the finger caps at their selected positions in the stalls. For example, in FIG. 5 a cap 79 has sacs 72 secured to its outside wall. Each sac is filled with adhesive 74. After the cap 79 is properly inserted into stall 14 as described above, the sacs 72 are broken by squeezing the stall. Thereupon, the adhesive 74 is free to contact the inside 65 of the stall and anchors the cap at that selected location in the stall.

It is apparent from the foregoing description that the present safety glove and internal finger protector therefore offer distinct advantages over conventional safety gloves. The gloves are much less expensive to make because the finger protectors do not have to be built into them; they can be in stalled easily by the wearer himself. Also, when the glove wears out, the protectors can be reused. At the same time, the instant glove is also more comfortable to wear. But, most importantly, it provides maximum protection because its finger protectors are always positioned at just the right locations in the glove to shield the ends of the particular wearer's fingers from blows and pinch points.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described the invention, what is claimed as new and secured by Letters Patent is:

1. A safety glove to protect the wearer's fingers comprising:
   (A) a main body (12);
   (B) one or more stalls (14);
   (C) a rigid impact-resistant cap (24, 60) positioned in one or more of said stalls, said cap being shaped to engage over the distal portion of the wearer's finger; and
   (D) a retainer (34, 62), said retainer (1) being secured to said cap; and (2) engaging the inside of said one stall so as to:
     (a) permit said cap to be secured in said one stall at the proper depth to fit over the particular finger in said one stall;
     (b) prevent said cap from falling out of said one stall; and
     (c) yet permit said cap to shift its position in said stall to different depths where it can engage over fingers wherein of different lengths.

2. A finger protector for insertion into a glove stall (14) comprising:
   (A) a rigid impact-resistant cap (24, 60), said cap being shaped to engage over the distal portion of a finger (26); and
   (B) a retainer (34, 62), said retainer (1) being secured to said cap; and (2) being adapted to attach to the inside of the stall so as to:
     (a) permit said cap to shift its position in its stall to different depths where it can engage over fingers wherein of different lengths; and
     (b) prevent said cap from falling out of the stall.

3. A finger protector for insertion into a glove stall as claimed in claim 2 wherein said retainer comprises:
   (A) a length of folded tape (62) having one end (62a) secured to said cap;
   (B) means (64) on the other end (62b) of said tape for securing said other tape end to the end of the glove stall when said cap is pushed to the end of the stall; said cap then being free to "float" in the stall to accommodate fingers of different lengths therein.

4. A safety glove to protect the wearer's fingers comprising:
   (A) a main body (12);
   (B) one or more stalls (14);
   (C) a rigid impact-resistant thimble-like cap (24) positioned in one or more of said stalls, said cap being shaped to engage loosely over the distal portion of the wearer's finger; and
   (D) relatively stiff resilient gripping fingers (30) projecting out sideways from said cap, said fingers en-
gaging the inside of said one stall, said engagement being such as to:
(1) permit said cap to be forcibly positioned by said wearer’s finger (26) at a selected location in said one stall; and
(2) prevent said cap from moving by itself from said selected location, yet permit said cap to shift its position in said stall to different depths where it can engage over fingers therein of different lengths.

5. A safety glove to protect the wearer’s fingers as defined in claim 4 wherein said gripping fingers comprise a raised body (22) of relatively stiff fibers secured to an outside wall portion (34) of said cap.

6. A safety glove to protect the wearer’s fingers as defined in claim 5 wherein said raised body extends all around said cap.

7. A finger protector for insertion into a glove stall (14) comprising
(A) a rigid, impact-resistant cap (24, 40), said cap being shaped to engage over the distal portion of a finger (26); and
(B) an array of relatively stiff resilient gripping fingers (30, 46) projecting out sideways from said cap for retaining said cap in said stall, said gripping fingers being adapted to compressively engage the inside of said stall to
(1) permit the user’s finger to forcibly push said cap to a selected depth in said stall;
(2) retain said cap at a selected location in said stall; and
(3) permit said cap to shift its position in said stall to different depths where it can engage over fingers therein of different lengths.

8. A finger protector for insertion into a glove stall as defined in claim 7 wherein said gripping fingers comprise a brush-like body (22) applied to the outside of said cap.

9. A finger protector for insertion into a glove stall as defined in claim 8 wherein said body comprises a multiplicity of relatively stiff fibers (30) flocked onto the outside of said cap.

10. A finger protector for insertion into a glove stall as defined in claim 8 wherein said body extends all around said cap.

11. A finger protector for insertion into a glove stall as defined in claim 8 wherein said body comprises a flocked adhesive tape.

12. A safety glove to protect the wearer’s fingers comprising
(A) a main body (12);
(B) one or more stalls (14);
(C) a rigid, impact-resistant cap (24, 60) positioned in one or more of said stalls; and
(D) a retainer in the form of a length of tape (62) having one end (62a) secured to said cap and the other end (62b) secured to the end of the stall containing the cap, so that said cap is adjustable supported within the stall by said tape.

13. A finger protector for insertion into a glove stall (14), said protector comprising
(A) a rigid, impact-resistant cap (24, 40), said cap being shaped to engage over the distal portion of a finger (26); and
(B) a brush-like body (22) on the outside of said cap, said body comprising
(1) a sock (42) engaging over said cap;
(2) a multiplicity of relatively stiff fibers (46) projecting out from said sock; and
(3) means (50, 42a) for retaining said cap inside said sock.

14. A finger protector as defined in claim 13 wherein said retaining means comprises an elastic band (50) disposed in the edge of said sock, thereby drawing said edge in over the end (40a) of said cap.

15. A finger protector as defined in claim 13 wherein said retaining means comprises a sock extension (42a) folded into said cap.

16. A finger protector for insertion into a glove stall, said protector comprising
(A) a rigid, impact-resistant, thimble-like cap for engaging over a finger; and
(B) retaining means secured to the outside of said cap, said retaining means comprising one or more adhesive filled sacs (72) secured to the outside of said cap, said sacs being breakable under pressure so as to
(1) permit said cap to be positioned by the wearer’s finger at a selected location in the glove stall; and
(2) adhere said cap to the stall at said location therein.

References Cited

UNITED STATES PATENTS
2,686,316 8/1954 Linn ------------- 2-161
2,737,663 5/1956 Harris -------------- 2-161
2,923,946 2/1960 Nielsen -------------- 2-161
3,184,756 5/1965 De Luca ------------- 2-161
3,221,344 12/1965 Rokus ------------- 2-161

JORDAN FRANKLIN, Primary Examiner.
GEORGE V. LARKIN, Examiner.