A glove and digit protective system has a glove with pockets at the distal ends of one or more of the glove digits into which a magnet may be positioned and yet relatively easily extracted. The glove with the magnets retained within the pockets interfaces with and retains a protective cover which incorporates a magnet to attach the protective cover to one of the magnets held in the pockets of the glove digits. The cover may have an extension including a pivotal extension which incorporates a magnet for positioning small objects. A plate which is wider than the digit to be protected may form part of the cover. The cover may have an articulating extension with a magnet or an extension with a layer of pressure-sensitive adhesive. The protective cover may incorporate a ratchet mechanism and a handle to prevent rotation of the cover.
IMPACT PROTECTIVE GLOVE ASSEMBLY

CROSS REFERENCES TO RELATED APPLICATIONS

[0001] Not applicable.

STATEMENT AS TO RIGHTS TO INVENTIONS MADE UNDER FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

[0002] Not applicable.

BACKGROUND OF THE INVENTION

[0003] The present invention relates to protective gloves in general and to finger and thumb protective devices in particular.

[0004] Perhaps the most valuable and yet vulnerable part of the human body, aside from our eyes, with respect to performing in the modern workplace are our fingers and thumbs. The fingers and thumbs are not only of high utility in performing dexterous manual activities but also exquisitely sensitive with respect to touch and pain. While gloves generally protect the hands and fingers from dirt and chemical or biological contamination, from abrasion, and from laceration, they are limited in the ability to protect against striking blows such as result from hammer impacts, or to protect against puncture wounds from driven tools such as chisels and punches. Further, the index finger and thumb are often used to position small fasteners such as nails, screws, and bolts. In the case of nails or other tools e.g., punches and chisels, which are struck with a hammer, there is a danger that the hammer blow may partially or completely fail to engage the nail or tool resulting in a direct or glancing blow to these most sensitive of appendages. Various coverings for protecting the fingers have been developed. The thimble is perhaps the most well-known and perhaps oldest digit protector which is used during sewing to prevent a needle when pressed against fabric or leather from inadvertently piercing the finger which supports the fabric against the pressure necessary to force the needle through the fabric or leather. It is also known to incorporate magnets in the fingers of a glove to attract small magnetic objects such as nails, screws, and bolts to the glove to in-part compensate for the loss of dexterity which normally accompanies the use of work gloves.

[0005] What is needed is a system of protective covers which fit over the fingers and thumb of a hand wearing a glove, which are readily donned and doffed as the work task changes and which protective covers also function to provide dexterous positioning of objects such as nails and screws.

SUMMARY OF THE INVENTION

[0006] The glove and digit protective system of this invention has a glove with pockets at the distal ends of one or more of the glove digits (fingers or thumb) particularly the index finger and the thumb, into which a high-intensity magnet may be positioned and yet relatively easily extracted. It is advantageous, if not strictly necessary, that the magnets be removable so that the same glove can be used where ferromagnetic particles are being generated without attracting and retaining such particles. The glove with the magnets retained within the pockets interfaces with and retains a somewhat enlarged thimble-like protective cover for one or more of the fingers or thumb. The protective cover also incorporates a ferromagnetic portion which may also be a permanent magnet suitably arranged as to polarity to attach the protective cover to the magnet held in a pocket of a glove digit. The digit protective cover generally covers one or more fingers or a thumb to the first finger joint i.e., extending over the distal phalanx, such that the mobility of the first joint is not substantially impaired. The protective covers are fabricated of a high impact-resistant material such as ABS plastic or other fiber or non-fiber reinforced plastic. The glove may be of leather or a stretch fabric with the pocket opposite the fingernail. For handling small items the protective cover may have an extension which may include a pivotal extension which incorporates a magnet for positioning small objects such as brad type nails, small screws or nuts. When used with a punch or chisel where heavy blows are struck near the fingertips a nonferrous metal plate e.g., nonmagnetic stainless steel or high-strength material such as a carbon-fiber-reinforced composite which is wider than the digit to be protected can be inserted or made integral with the digit protective cover. Where heavy blows are to be protected against, the digit protective cover may extend at least partly to cover the first joint and even to cover some or all of the middle phalanx. The protective covers may have an articulating extension which also includes a magnet for positioning small objects, or an extension with a layer of pressure-sensitive adhesive.

[0007] The protective cover can incorporate a ratchet mechanism for driving rotatably driven fasteners such as screws in which an anti-rotation handle extends away from the ratchet mechanism so as to be gripped by the hand to which the protective cover is attached.

[0008] It is an object of the present invention to provide protection to one or more of the distal phalanges of at least one hand covered by a glove.

[0009] It is another object of the present invention to provide a digit protective cover which incorporates a permanent magnet which connects the digit protective cover to at least one of the digits of a glove having corresponding magnets localized on said digits.

[0010] It is a further object of the present invention to provide a digit protective cover releasably mounted to a glove which can withstand heavy blows.

[0011] It is a yet further object of the present invention to provide a digit protective cover with an articulated extension mounted to a glove.

[0012] It is yet another object of the present invention to provide a digit protective cover with or without an extension, and a sticky pad on the digit protective cover or the extension for holding nonmagnetic parts.

[0013] It is a yet further object of the present invention to provide a digit protective cover incorporating a ratchet mechanism for driving rotatably driven fasteners such as screws.

[0014] Further objects, features and advantages of the invention will be apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. 1 is a side cross-sectional view of a digit protective cover of this invention, which fits a glove surrounding a finger, covered by a glove, shown in fragmentary view, and showing a fastener magnetically engaged with the cover.

[0016] FIG. 2 is a side cross-sectional view of an alternative embodiment of the digit protective cover of FIG. 1 which
extends to cover portions of the middle phalanx of a finger and incorporates a protective shield.

[0017] FIG. 3 is a front elevational view partially cutaway in section of the alternative embodiment digit protective cover of FIG. 2 showing the protective shield.

[0018] FIG. 4 is a side cross-sectional view of a further alternative embodiment of the digit protective cover of this invention having an articulated extension incorporating a magnet, the cover positioned over a finger covered by a glove, shown in fragmentary view.

[0019] FIG. 5 is a front elevational view of an alternative embodiment digit protective cover, similar to the one of FIG. 4 but with two axes of rotation.

[0020] FIG. 6 is a side cross-sectional view of a yet further alternative embodiment of the digit protective cover of the invention having an extension with a sticky pad thereon and a fastener shown engaged therewith, the cover shown on a finger and glove in fragmentary view.

[0021] FIG. 7 is a perspective view of a gloved hand holding a chisel and employing multiple examples of the digit protective cover of FIG. 2.

[0022] FIG. 8 is a side elevational view of another alternative embodiment of the digit protector of FIG. 1 where the digit protector incorporates a ratchet mechanism and therefore requires an anti-rotation handle.

[0023] FIG. 9 is an end elevational view showing the attachment of the anti-rotation handle of the device of FIG. 8

[0024] FIG. 10 is side elevational view of the digit protector of FIG. 8 shown as mounted on a gloved hand and positioned to engage a screw.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0025] Referring more particularly to FIGS. 1-10 wherein like numbers refer to similar parts, a digit protective cover 20 incorporating a first magnet 22, is shown in FIG. 1 positioned above a finger 24 covered by a portion of a glove 26 which covers the finger. The digit protective cover 20 generally covers a finger or thumb to the first joint 25, i.e., extending over the distal phalanx 27, such that the mobility of the first joint is not substantially impaired. The protective cover 20 is generally constructed of plastic such as ABS, although other plastics which may be fiber reinforced can also be used. The glove 26 has a pocket 28 in which a second magnet 30 is removably positioned. The magnet 30 in the pocket 28 is positioned opposite the fingernail 32 and adjacent the finger’s distal phalanx pad 34. The cover 20 is positioned such that the first magnet 22 is substantially in alignment with and adjacent to the second magnet 30 in the pocket 28 of the glove 26. The pocket 28 is attached to the glove by stitching or glue on all sides except for the opening 29 where the second magnet 30 is inserted and removed from the pocket 28.

[0026] The magnets 22, 30 are preferably of the high-strength rare earth type, e.g., neodymium magnets, comprised of mostly neodymium, iron and boron. The first and second magnets 22, 30 are typically about ⅛ inches in diameter and ½ to ⅜ inches in thickness. A nail 36 is shown magnetically held by the first magnet 22 in FIG. 1. The nail 36 so positioned may be tapped with a hammer into a substrate to positioning the nail, at which time the finger 24 with the attached protective cover 20 can be withdrawn, and the nail driven into the substrate.

[0027] A second embodiment 120 of the digit protective cover 20 is shown in FIG. 2. The second embodiment is employed in those situations where an object, e.g., a chisel, is held with one or more protective covers 120 which will remain in contact with the protective covers while being struck with vigorous blows of a hammer. Therefore the protective cover 120 is designed to protect the digits 24 from a missed or glancing hammer blow which engages the protective cover positioned over the finger. For this reason the protective cover 120 extends beyond the first joint 25 i.e., extending to at least partly cover the first joint 25 and even to cover some or all of the middle phalanges 31.

[0028] To further protect the digit 24 overlain by the protective cover 120 against a heavy hammer blow, a support plate 138 is incorporated into the protective cover. The support plate 138 as shown in FIG. 2 will preferably be located and mounted to a portion 139 of the protective cover 120 which is opposite the digit phalanx pad 34. As shown in FIG. 3, where the glove 26 is shown partly cutaway, the support plate 138 is wider than the finger 24 so that the support plate will protect the finger from a hammer blow coming from the direction shown by arrows 140. The support plate will preferably be constructed of a nonferrous metal such as nonmagnetic stainless steel, bronze, aluminum, or other strong tough material such as a fiber reinforced plastic.

[0029] To better engage the flat surfaces 142 of a chisel 144 or punch, such as shown in FIG. 7, the protective cover 120 has a flat surface 146 which can be aligned with the flat surface of the chisel. FIG. 7 shows how a gloved hand with protective covers 120 on the index finger and the thumb can be used to position a chisel 144 to be struck by a hammer.

[0030] A third embodiment 220 of the protective cover 20 is shown in FIGS. 4 and 5. The protective cover 220 has an articulated extension 250 formed by a first part 252 which extends from a portion 239 of the protective cover 220 which is opposite the nail 32, and a second part 254 which is pivotally mounted to the first part 252 by a pin 256. The first part 252 where it overlaps the second part 254 may have radial complementary ridges and detents (not shown) to provide stepping like ratcheting or may be a simple friction fit. If ridges and detents are used the parts 252, 254 can be arranged to provide 12° steps, or 30 steps for complete rotation. The distal end 258 on the second part 254 incorporates a magnet 260 which may be better used to position a nail 36, or other small part such as a screw or nut. FIG. 5 shows a modification of the third embodiment 220 of the protective cover 20 as shown in FIGS. 4, where an additional axis of rotation is incorporated in the protective cover between the first part 252 and the cover which is perpendicular to an axis defined by the pin 256. The additional axis is formed between the first part 252 and an intermediate part 253 and also incorporates a pin and radial complementary ridges and detents (not shown) to provide stepping like ratcheting or may be a simple friction fit. Finally it should be understood that all rotation axes could be avoided as in the embodiment shown in FIG. 6.

[0031] A fourth embodiment 320 of the protective cover 20 is shown in FIG. 6. The protective cover 320 has an extension 350 which extends from a portion 339 on the protective cover 320 which is opposite the nail 32 which has a flat surface 362 with a layer of an adhesive thereon, which may be provided, for example, by a pressure sensitive adhesive 364 such as a urethane foam tape with adhesive on both sides. The pressure sensitive adhesive is used for positioning small fasteners 366 such as screws and nails which are not magnetic. The adhesive layer of pressure-sensitive adhesive is of the type which
allows removal of an object, so that while the fastener is held in place while it is started, it is readily separated from the cover thereafter.

[0032] Visibility may at times be limited when inserting screw fasteners, making fasterner insertion difficult. A fifth embodiment 420 of the protective cover 20, shown in

[0033] FIGS. 8-10, takes advantage of an ability to confidently point to a particular area where a fastener is to be inserted, to make visibility of the work surface while inserting the fastener less critical. The protective cover 420 has an opening 468 where a digit of the hand is inserted defining a first end 469, and a second end 470 opposite the first end to which is mounted a ratchet mechanism 472 for driving rotatably driven fasteners such as the screw 474 shown in FIG. 10. An anti-rotation handle 476 extends from the second end to prevent rotation of the protective cover 420. The anti-rotation handle 476 extends from the outer perimeter 478 of the protective cover 420 at an angle α of about 10° with respect to the axis 480 about which the ratchet mechanism 472 rotates as shown in FIG. 8. The handle may be fixed as shown in FIG. 9 or can be arranged with a hinge 477 between the handle 476 and the protective cover 420 as shown in FIGS. 8 and 10. The folding of the handle makes the protective cover 420 more compact for easier storage. The protective cover 420 and the ratchet mechanism 472 has the advantage over a conventional screw driver in that when you operator holds a regular screwdriver, the operator’s wrist must be turned to the side to align the screwdriver shaft with the screw. This throws off wrist and forearm alignment and causes the screwdriver shaft to rotate in an arc when the forearm is twisted to rotate the screwdriver. That is why oftentimes the screw sits to the side and causes the tip of the driver to be jammed into the fingers holding the screw. The finger-held screwdriver of this invention keeps the rotational plane of the screwdriver shaft in line with the forearm giving the operator better control of the screwdriver as well as a better view. The protective cover 420 incorporates a magnet 30 when used with the glove 26, holding it to the hand to prevent it from falling off if the anti rotation handle is not held. On the other hand, the protective cover 420 and ratchet mechanism 472 can be without a magnet 30 and then the glove will be optional.

[0034] It will be observed that the various embodiments of the digit protective cover of this invention may be supplied to a craftsman as a kit, and each may readily be exchanged to work with the same glove to provide protection during various activities. The magnets on the protective covers readily position and connect the covers to the glove, yet are speedily put in place and removed. Digit protective covers which incorporate a support plate 138 or are simply made stronger to take a glancing or direct hit of a hammer may be marked with indicia such as by being marked by a different color, e.g., red to indicate the cover of greater strength.

[0035] It should be understood that, with respect to the protective cover 120, if the cover is of sufficient strength it may not be necessary to have a support plate 138 incorporated therein.

[0036] It is understood that the invention is not limited to the particular construction and arrangement of parts herein illustrated and described, but embraces all such modified forms thereof as come within the scope of the following claims.

1 claim:
1. An article for protecting one or more digits of a human hand, the digits having a nail, a distal phalanx, and a distal phalanx pad opposite the nail, the article comprising:
   a glove having portions arranged to overlie at least one digit of a hand, said portions forming a pocket or receptacle having a first magnet therein, wherein the pocket positions the magnet over a digit such that the magnet is spaced from a nail and adjacent to a distal phalanx pad; at least one digit protective cover covering a substantial portion of a distal phalanx when the glove is worn on a hand; and
   wherein the digit protective cover incorporates a second magnet so as to hold the digit protective cover magnet in juxtaposition to the first magnet held in said portions forming the pocket or receptacle.

2. The article of claim 1 wherein the digit protective cover has an outer surface and a portion of the outer surface overlying a distal phalanx pad when the glove is worn on a hand forms a planar surface.

3. The article of claim 1 wherein the digit protective cover is formed of a rigid or semirigid plastic into which the second magnet is incorporated.

4. The article of claim 3 wherein the digit protective cover is formed of ABS plastic.

5. The article of claim 1 wherein the digit protective cover has a rigid plate incorporated therein which extends over and is wider than a distal phalanx of a digit when the glove overlies said least one digit of a hand such that a hammer blow to the digit protective cover in a plane parallel to a distal phalanx pad of the digit supports the hammer blow so as to prevent injury to the digit.

6. The article of claim 1 wherein the digit protective cover has portions forming an articulated extension which extends outwardly of the digit, the articulated extension having an articulated member which is mounted to pivot with respect to the digit protective cover, and wherein said articulated member incorporates a third magnet.

7. The article of claim 1 wherein the first magnet and the second magnet are of the rare earth type.

8. The article of claim 5 wherein the first magnet, the second magnet and the third magnet are of the rare earth type.

9. The article of claim 1 wherein the digit protective cover has portions forming an extension which extends outwardly of the digit, the extension having a surface on which is a layer of pressure-sensitive adhesive of the type which allows attachment and subsequent removal of an object.

10. The article of claim 1 wherein the digit protective cover has an opening for a digit, defining a first end and a second end opposite the first end;
   a ratchet for driving rotatably driven fasteners mounted to said second end; and
   an anti-rotation handle extending from the first end away from the second end.

11. A protective digit cover comprising:
   a glove having portions arranged to overlie at least one digit of a hand, said portions having a first magnet attached thereto;
   at least one digit protective cover covering a substantial portion of a distal phalanx when the glove is worn on a hand;
   wherein the first magnet is beneath the digit protective cover; and
wherein the digit protective cover incorporates a second magnet so as to hold the digit protective cover second magnet to the first magnet held to the glove.

12. The protective digit cover of claim 11 wherein the digit protective cover has an outer surface and a portion of the outer surface which defines a planar surface which overlies a distal phalanx pad when the glove is worn on a hand.

13. The protective digit cover of claim 11 wherein the digit protective cover is formed of a rigid or semirigid plastic into which the second magnet is incorporated.

14. The protective digit cover of claim 11 wherein the digit protective cover has a rigid plate incorporated therein which extends over and which is wider than the distal phalanx of a digit when the glove overlies said at least one digit of a hand such that a hammer blow to the digit protective cover in a plane parallel to a distal phalanx pad of the digit supports the hammer blow so as to prevent injury to the digit.

15. The protective digit cover of claim 11 wherein the digit protective cover has portions forming an articulated extension which extends outwardly of the glove and the digit, the articulated extension having an articulated member which is mounted to pivot with respect to the digit protective cover, and wherein said articulated member incorporates a third magnet.

16. The protective digit cover of claim 11 wherein the digit protective cover has portions forming an articulated extension which extends outwardly of the glove and the digit, the articulated extension having an articulated member which is mounted to pivot with respect to the digit protective cover in two nonparallel axes, and wherein said articulated member incorporates a third magnet.

17. The protective digit cover of claim 11 wherein the digit protective cover has portions forming an extension which extends outwardly of the glove and the digit, the extension having a surface on which is a layer of pressure-sensitive adhesive of the type which allows attachment and subsequent removal of an object.

18. The protective digit cover of claim 11 wherein the digit protective cover has an opening for a digit, defining a first end and a second end opposite the first end; and further comprising:

   a ratchet for driving rotatably driven fasteners mounted to said second end; and

   an anti-rotation handle extending from the first end away from the second end.

19. A protective digit cover assembly comprising:

   at least one digit protective cover covering a substantial portion of a distal phalanx;

   wherein the digit protective cover has an opening for a digit, defining a first end and a second end opposite the first end; and further comprising:

   a ratchet for driving rotatably driven fasteners mounted to said second end; and

   an anti-rotation handle extending from the first end away from the second end.

20. The protective digit cover assembly of claim 19 wherein the anti-rotation handle is connected by a hinge to the digit protective cover to fold over the digit protective cover.

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