US 20160066634A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2016/0066634 A1

(43) Pub. Date: Mar. 10, 2016

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(54) SHEAR MANAGEMENT GLOVES

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(21) Appl. No.: **14/935,232**

(22) Filed: **Nov. 6, 2015**

Related U.S. Application Data

(63) Continuation-in-part of application No. 13/683,058, filed on Nov. 21, 2012, now abandoned.

Publication Classification

(51) **Int. Cl.**

A41D 19/015 (2006.01)

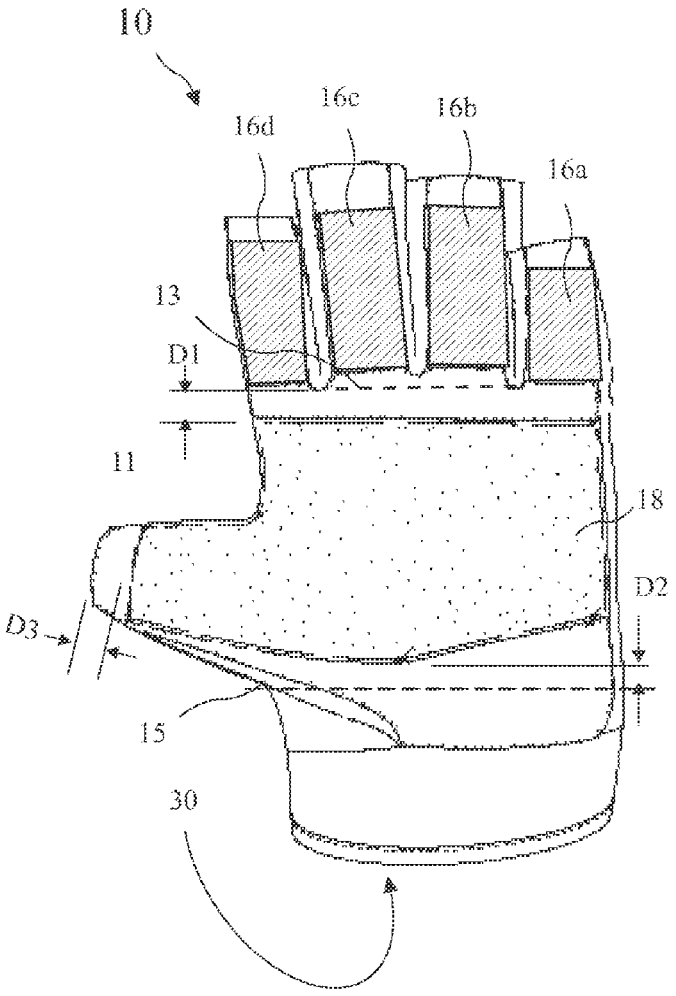
A41D 19/00 (2006.01)

(52) **U.S. Cl.**

CPC ***A41D 19/01558*** (2013.01); ***A41D 19/0013*** (2013.01); ***A41D 19/01576*** (2013.01); ***A41D 19/01505*** (2013.01)

(57) **ABSTRACT**

A glove provides high palm shear force and reduced finger shear force when pulling elongated articles such as a rope, a rod, and the like. A high COF material is applied to palm and a low COF material is applied to inner finger surfaces. The fingers are still used to grasp the elongated article, but the shear pulling force on the fingers is reduced and the shear pulling force on the palm is increased. In one embodiment, the underlying glove material on the palm and finger grasping surfaces is a synthetic leather material, the high COF material on the palm is a silicone rubber material deposited on the synthetic leather material and the low COF material on the inner finger surfaces is a ballistic material sewn onto the synthetic leather material, for example, an aramid fiber material sold under the trademark Kevlar®.



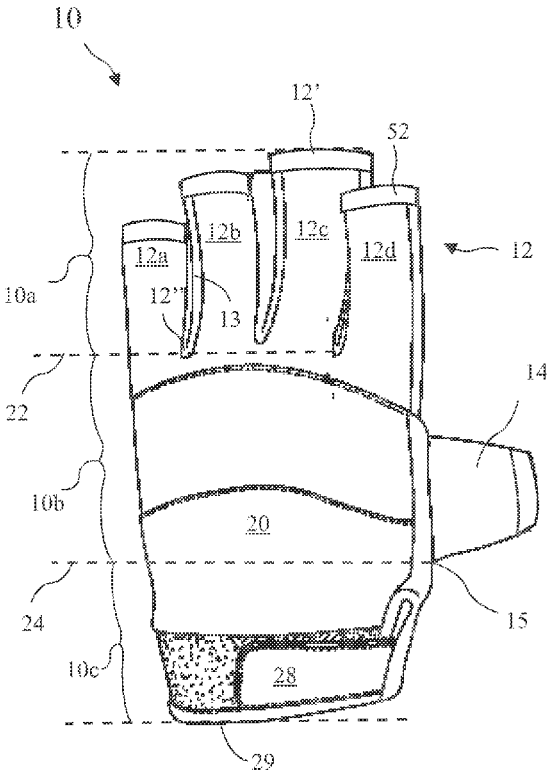

10
12'
52
12a
12b
12c
12d
12
10a
12''
13
22
14
10b
20
24
15
10c
28
29

FIG. 1

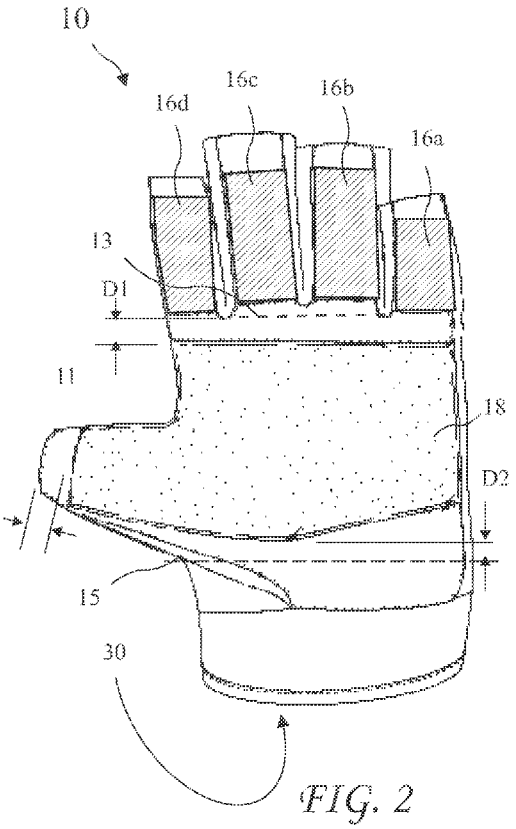

10
16d
16c
16b
16a
13
D1
11
18
D2
D3
15
30

FIG. 2

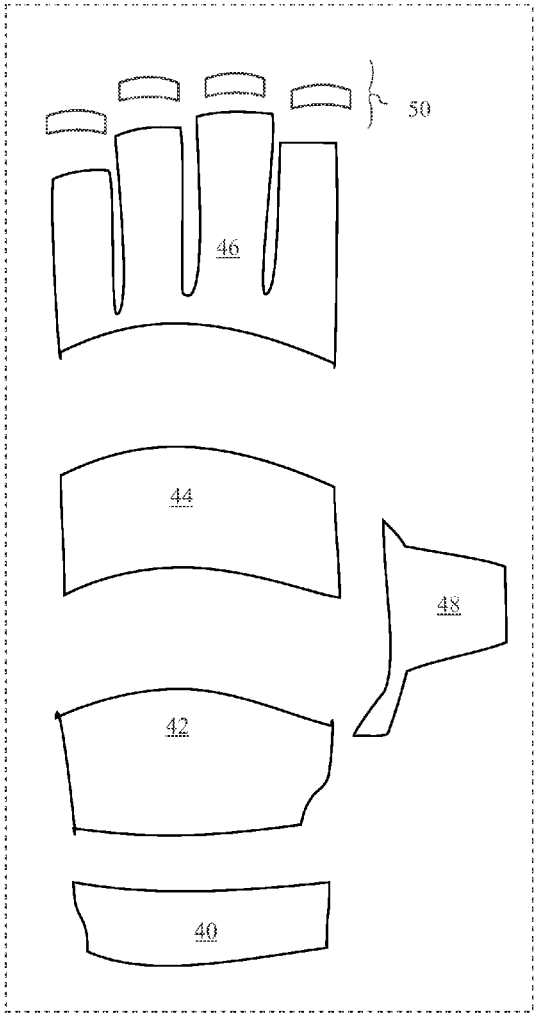


FIG. 3

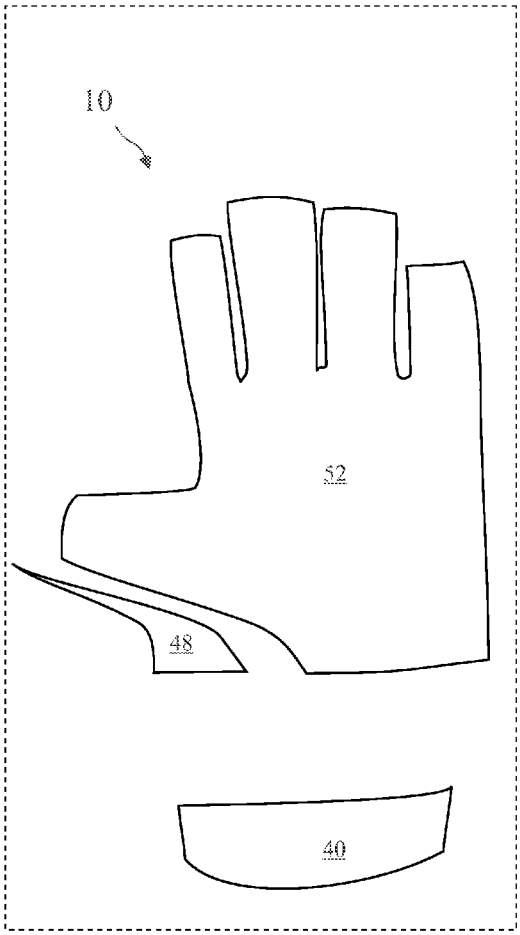


FIG. 4

SHEAR MANAGEMENT GLOVES

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a Continuation In Part of U.S. patent application Ser. No. 13/683,058 filed Nov. 21, 2012, which application is incorporated in its entirety herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to gloves and in particular to utility gloves having a high Coefficient Of Friction (COF) material attached to the palm and a low COF material attached to fingers.

[0003] Gloves are often used to grasp and pull elongated articles such as ropes, hoses, bars, and the like. Known gloves include moderate to high shear surfaces on palms and inner finger surfaces to both grasp and pull such elongated articles. The resulting shear forces on the palm and fingers is usually moderate. However, when greater pulling force is required, the grasping by the fingers necessary to provide normal force required to prevent slipping results in very high shear forces on the fingers which may weaken the wearer's grip and cause fatigue, pain, and when experienced frequently or over a long period of time, damage to finger joints.

BRIEF SUMMARY OF THE INVENTION

[0004] The present invention addresses the above and other needs by providing a glove which provides high palm shear force and reduced finger shear force when pulling elongated articles such as a rope, a rod, and the like. A high COF material is applied to palm and a low COF material is applied to inner finger surfaces. The fingers are still used to grasp the elongated article, but the shear pulling force on the fingers is reduced and the shear pulling force on the palm is increased. In one embodiment, the underlying glove material on the palm and finger grasping surfaces is a synthetic leather material, the high COF material on the palm is a silicone rubber material deposited on the synthetic leather material and the low COF material on the inner finger surfaces is a ballistic material sewn onto the synthetic leather material, for example, an aramid fiber material sold under the trademark Kevlar®.

[0005] In accordance with one aspect of the invention, there is provided a glove with a low COF material on inner finger grasping surfaces. When exerting high pulling forces on an elongated article, shear forces on the fingers may weaken the wearer's grip and cause fatigue, pain, and when experienced frequently or over a long period of time, damage to finger joints. Providing a low COF material on the inner finger surfaces allows a strong grip while reducing the harmful shear forces on the fingers.

[0006] In accordance with another aspect of the invention, there is provided a glove with a high COF material on a glove palm. A combination of a low COF material on the inner finger surfaces, and the high COF material on the glove palm, allows the wearer to tightly grasp the elongated article using the fingers and generate significant shear force through the palm without producing harmful shear forces on the fingers. A preferred low COF material on the fingers has one fourth the COF (e.g., transmits about one fourth of the shear force) of the high COF material on the palm. One example of the high COF material includes a silicone material and preferably a silicone rubber material or a polyurethane silicone blend.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0007] The above and other aspects, features and advantages of the present invention will be more apparent from the following more particular description thereof, presented in conjunction with the following drawings wherein:

[0008] FIG. **1** shows a back of hand view of a shear management glove according to the present invention.

[0009] FIG. **2** shows a palm of hand view of the shear management glove according to the present invention.

[0010] FIG. **3** shows parts forming the back of the hand of the shear management glove according to the present invention.

[0011] FIG. **4** shows parts forming the palm of the hand of the shear management glove according to the present invention.

[0012] Corresponding reference characters indicate corresponding components throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The following description is of the best mode presently contemplated for carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of describing one or more preferred embodiments of the invention. The scope of the invention should be determined with reference to the claims.

[0014] Where the term "generally" is associated with an element of the invention or dimension of an element, it is intended to describe a feature's appearance to the human perception, and not a precise measurement.

[0015] In the description the terms up and down correspond to towards the fingers and away from the fingers respectively. Where a material is described as reaching nearly to a point or boundary, nearly is intended to describe typical precision of fabrics subject to moment of sewn seems, stretching and the like.

[0016] A back of hand view of a shear management glove **10** according to the present invention is shown in FIG. **1** and view showing a palm of hand (or grasping) surface of the shear management glove **10** is shown in FIG. **2**. The glove **10** includes a finger portion **10***a*, a palm portion **10***b*, and a wrist portion **10***c*. The finger portion **10***a* is defined to be between a finger end **12'** of the farthest reaching finger, and a finger base **12"** of the deepest reaching finger slot **13** (e.g., to bases of the fingers **12***a*-**12***d*). End pieces **50** reside at ends of each finger **12**, sewn along sides and ends. The wrist portion **10***c* is defined to be between a thumb base **15** and the base of the glove **29**. The palm portion **10***b* is defined to be the portion of the glove between the finger portion **10***a* and the wrist portion **10***c*.

[0017] The shear management glove **10** addresses issues present in known gloves by providing a high Coefficient Of Friction (COF) material **18** fixed to a palm surface of the palm portion **10***b* of the glove **10** which increases the share of shear force communicated between the palm portion **10***b* and an elongated article held in the glove **10**. Low COF material **16***a*-**16***d* on the finger portion **10***a* of the glove **10** decreases the amount of shear force communicated between the fingers and the elongated article. High shear force communicated

between the fingers and the elongated article may weaken the wearer's grip and cause fatigue, pain, and when experienced frequently or over a long period of time, damage to finger joints.

[0018] The shear management glove **10** includes a glove body **20** which preferably is an open finger and thumb design allowing a wearer's fingers to extend through ends of glove fingers **12***a*-**12***d* and the wearer's thumb to extend through an end of the glove thumb **14**. The high COF material **18** and low COF material **16***a*-**16***d* is fixed to the glove body **20**. The shear management glove **10** further preferably includes a wrist strap **28** for tightening the shear management glove **10** on the wearer's hand. The shear management glove **10** is preferably a tight skin-like fit minimize or prevent an inner surface **30** of the shear management glove **10** from sliding on the wearer's hand.

[0019] The low COF material **16***a*-**16***d* resides on the glove fingers **12***a*-**12***d* facing the palm surface when the fingers **12***a*-**12***d* are closed to grasp the elongated article. The low COF material **16***a*-**16***d* preferably reaches along the glove fingers **12***a*-**12***d* from ends **12'** of the fingers **12***a*-**12***d* and to or nearly to the bases **12"** of slots **13** between adjacent one of the fingers, and the inner finger surface material **16***a*-**16***d* is the width or nearly the widths of the glove fingers **12***a*-**12***d*. The inner finger surface material **16***a*-**16***d* is preferably a strong low friction material, for example a ballistic material or Kevlar® fiber material, minimizing the shear forces on the wearer's fingers. A suitable material is sold under the name Ballistic Material by Zhongshan Hongxu Daily Products Co., Ltd in Zhongshan City, China.

[0020] The high COF material **18** preferably reaches up to within a distance D**1** of between ¼ and ½ inches from the finger portion **10***a* and down to within a distance D**2** of between ¼ and ½ inches from the wrist portion **10***c*, and across the shear management glove **10** to within a distance D**3** between ¼ and ½ inches from the end of the thumb **14**, and to the opposite side of the palm region **10***b*, and high COF material **18** more preferably reaches up to within a distance D**1** of ⅜ inches from the finger portion **10***a* and down to within a distance D**2** of ⅜ inches from the wrist portion **10***c*, and across the shear management glove **10** to within a distance D**3** of ⅜ inches from the end of the thumb **14**, and to the opposite side of the palm region **10***b*. The high COF material **18** is preferably a silicone rubber material or a polyurethane silicone blend deposited on a synthetic leather material, communicating the shear forces to the wearer's palm. A suitable material is Silicone PU manufactured by Zhongshan Hongxu Daily Products Co., Ltd in Zhongshan City, China. The high COF material preferably has a coefficient of friction COF**1** at least three times a coefficient of friction COF**2** of the low friction material on the fingers, and more preferably has a coefficient of friction COF**1** of between three and five times a coefficient of friction COF**2** of the low friction material on the fingers, and the high COF material most preferably has a coefficient of friction COF**1** of four times a coefficient of friction COF**2** of the low COF material.

[0021] Parts forming the back of the hand of the shear management glove **10** are shown in FIG. **3**. The parts include a wrist band **40** preferably made from neoprene (or polychloroprene, a family of synthetic rubbers), a lower portion **42** preferably a four way stretch fabric, a center portion **44** over the knuckles is preferably neoprene (or polychloroprene, a family of synthetic rubbers), a finger portion **46** reaching from the knuckles to ends of the fingers preferably made from the four way stretch fabric, aq thumb portion **48** preferably made from the four way stretch fabric, and end pieces **50** over end of the finger, preferably made from synthetic leather.

[0022] Parts forming the palm of the hand of the shear management glove **10** are shown in FIG. **4**. The palm includes a continuation of the wrist portion **40**, a continuation of the thumb portion **48**, and a palm and finger grasping panel **52** made from synthetic leather.

[0023] While the invention herein disclosed has been described by means of specific embodiments and applications thereof, numerous modifications and variations could be made thereto by those skilled in the art without departing from the scope of the invention set forth in the claims.

I claim:

1. A shear management glove comprising:

a glove body comprising:

a finger portion including glove fingers;

a palm portion;

a wrist portion; and

grasping surfaces facing articles grasped by the glove body;

a low Coefficient Of Friction (COF) material attached to the grasping surfaces of the finger portion, the low COF material configured to cover nearly all of the grasping surfaces of the finger portion making contact with an elongated article when the glove is worn while grasping the elongated article, the low COF material reducing shear forces communicated between the glove finger portion and the elongated article; and

a high COF material attached to a glove palm of the glove, the high friction material having a higher COF than the low COF material.

2. The shear management glove of claim **1**, wherein the low friction material reaches down nearly to bases of the glove fingers.

3. The shear management glove of claim **2**, wherein:

the glove is an open finger glove; and

the low COF material reaches up proximal to but not beyond ends of the glove fingers.

4. The shear management glove of claim **3**, wherein the low COF material reaches down proximal to the bases of the glove fingers.

5. The shear management glove of claim **4**, wherein the low COF material reaches nearly the widths of the glove fingers on palm facing surfaces of each of the four fingers.

6. The shear management glove of claim **5**, wherein the low COF material is a ballistic material.

7. The shear management glove of claim **6**, wherein the four fingers are open ended fingers.

8. The shear management glove of claim **9**, wherein the high COF material reaches up generally to within ¼ to ½ inches from the bases of the fingers and no farther.

9. The shear management glove of claim **8**, wherein:

the wrist portion is defined to be a portion of the glove below a glove thumb base; and

the high COF material reaches down generally within ¼ to ½ inches of the wrist portion and no closer.

10. The shear management glove of claim **9**, wherein the high COF material reaches to between ¼ and ½ inches from an end of the glove thumb.

11. The shear management glove of claim **10**, wherein the high COF material reaches across the glove palm proximal to a side opposite to the glove thumb.

12. The shear management glove of claim **1**, wherein the high COF material is a silicone material.

13. The shear management glove of claim **1**, wherein the high COF material is a silicone rubber material.

14. The shear management glove of claim **13**, wherein the glove palm is made from a synthetic leather material and the silicone rubber material is deposited on the synthetic leather material.

15. The shear management glove of claim **1**, wherein the high COF material on the palm has a first coefficient of friction COF**1** between three and five times greater than a second coefficient of friction COF**2** of the low COF material on the fingers.

16. The shear management glove of claim **1**, wherein the low COF material is an aramid fiber material and the high COF material is a silicone material.

17. The shear management glove of claim **1**, wherein the low COF material is an aramid fiber material and the high COF material is a silicone rubber material.

18. The shear management glove of claim **1**, wherein the low COF material is a ballistic material and the high COF material is a polyurethane silicone blend.

19. A shear management glove comprising:

a glove body having inner surfaces facing articles grasped by the glove body;

glove fingers extending from the glove body;

low Coefficient Of Friction (COF) aramid fiber material sewn to inner palm facing surfaces of the glove fingers, the low COF material configured to cover nearly all of a surface of the glove fingers making contact with an elongated article when the glove is worn while grasping the elongated article and reducing shear forces between the glove fingers and the elongated article; and

high COF silicone rubber material deposited to a glove palm of the glove, the high COF material configured to cover nearly all the glove palm making contact with the elongated article when the glove is worn while grasping the elongated article and increasing shear forces between the glove palm and the elongated article, the high COF material has a coefficient of friction COF**1** of at least three times the coefficient of friction COF**2** of the low COF material.

20. A shear management glove comprising:

a glove body;

a finger portion of the glove body reaching up from a base of finger slots between glove fingers;

a wrist portion of the glove body reaching down from a base of the glove thumb;

a palm region of the glove between the finger portion and the wrist portion;

open finger ends of the glove fingers;

an open thumb end;

a palm and finger grasping panel of a glove body made from synthetic leather;

low COF aramid fiber material sewn to inner palm facing surfaces of the finger portion of the palm and finger grasping panel and reaching:

up proximal to ends of the glove fingers;

down proximal to bases of the glove fingers; and

the widths of the glove fingers; and

high friction silicone rubber material deposited on the palm portion of the palm and finger grasping panel, the high friction silicone rubber material having a COF**1** between three and five times a COF**2** of the low friction material, the high friction silicone material reaching:

up to between ¼ to ½ inch from the bases of the finger portion;

down to between ¼ to ½ inch from the wrist portion;

proximal to the open thumb end of the glove thumb; and

across the glove palm proximal to a side opposite to the glove thumb.

* * * * *