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(54) **CATCHER'S GLOVE**

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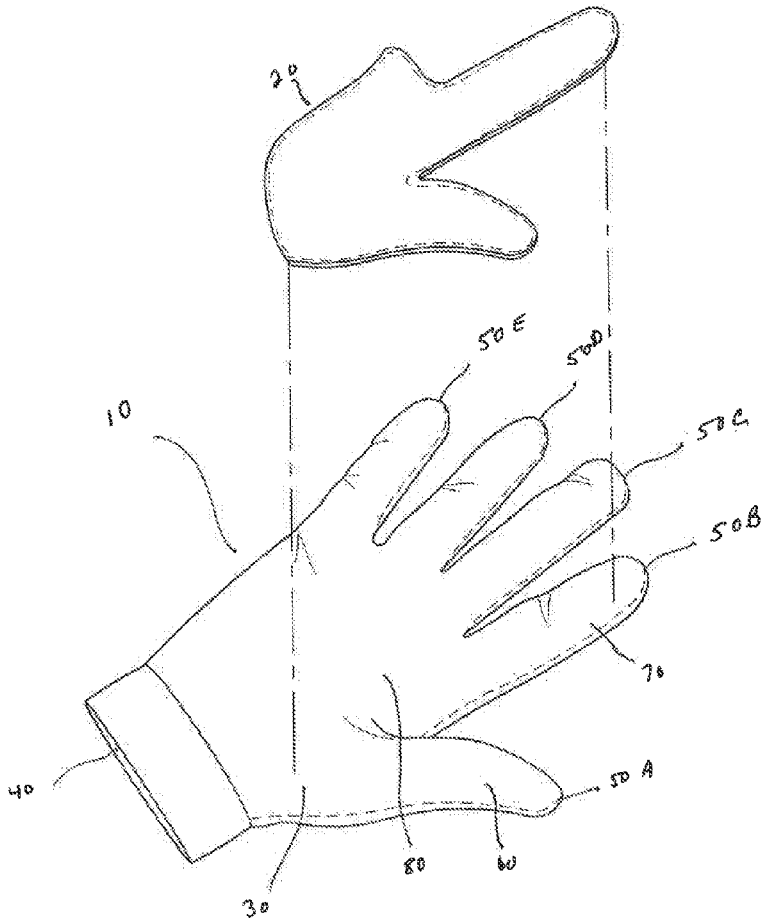
(57) **ABSTRACT**

A protective inner glove worn in conjunction with a catcher's glove, particularly in baseball or softball, the glove including a thin, flexible shock-absorbing material continuously affixed over a thumb, index-finger, and metacarpal region of a palm at a thenar eminence of the catcher's hand adjacent to the index finger providing protection to the phalanges, interphalangeal joints, metacarpal bones and underlying nerves of the thumb and index-finger from trauma caused by repetitive impact in catching a ball. The shock-absorbing material composed of a visco-elastic material affixed within the glove having liquid-like and rubber-like properties for absorbing energy and vibration isolation providing impact protection while simultaneously maintaining the catcher's tactile sensation and gripping movement freedom for effective catching.



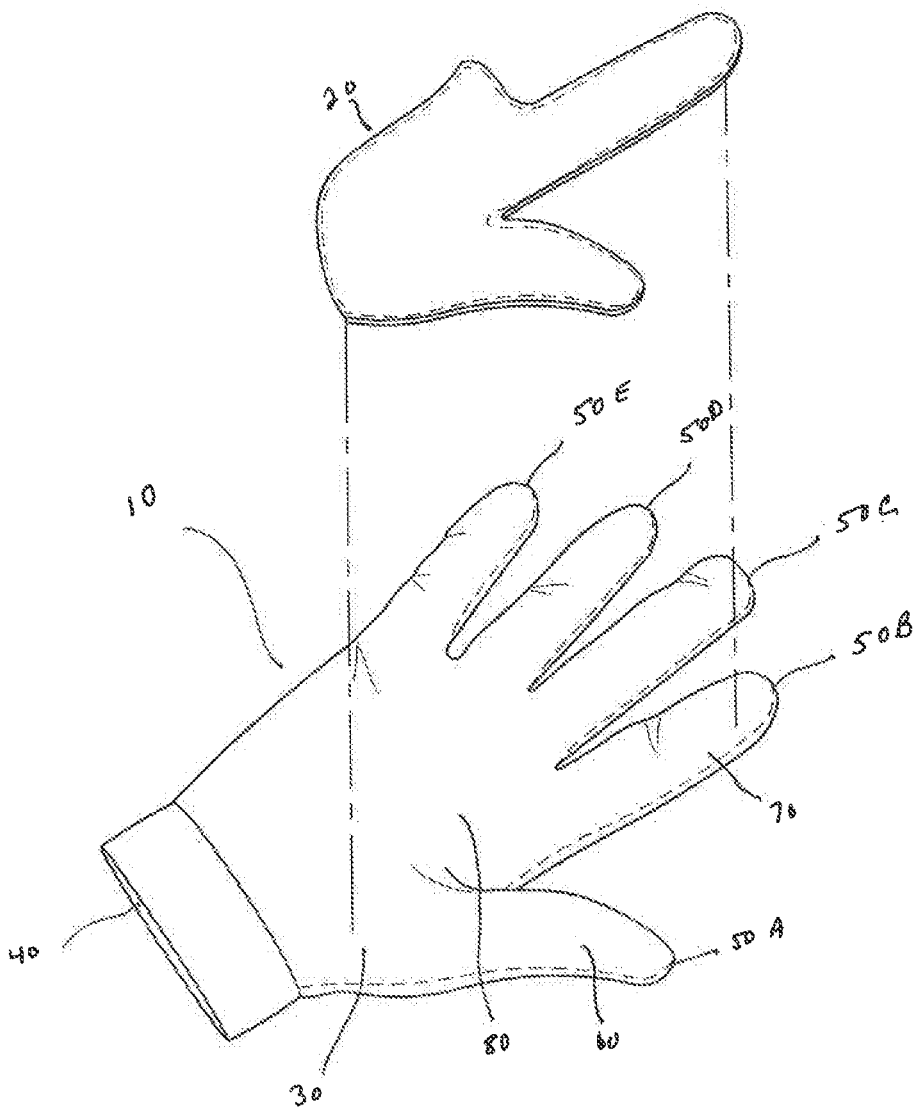


FIG. 1

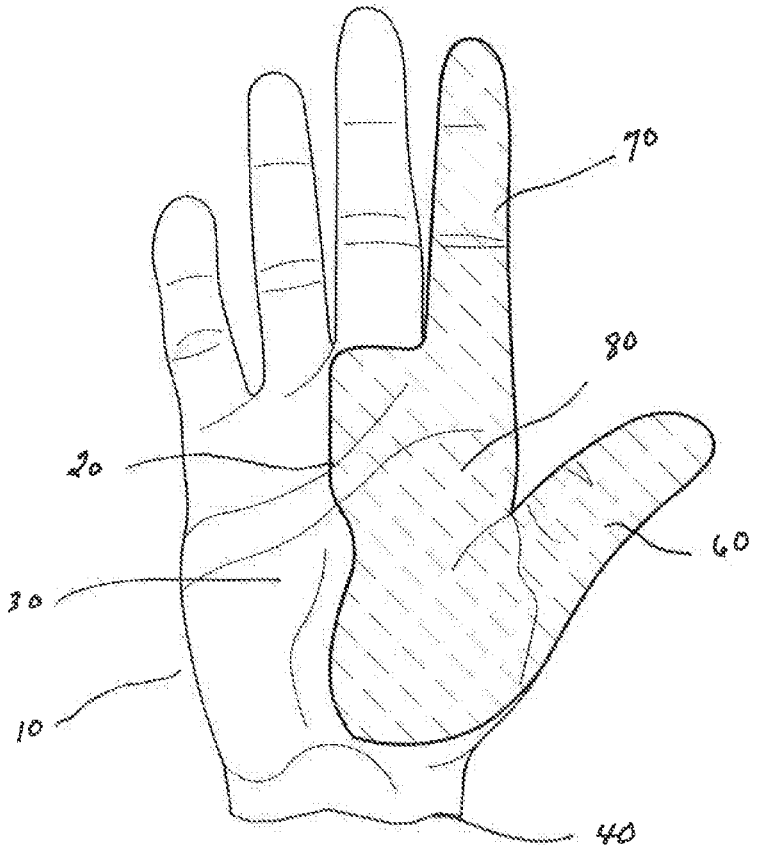


FIG. 2

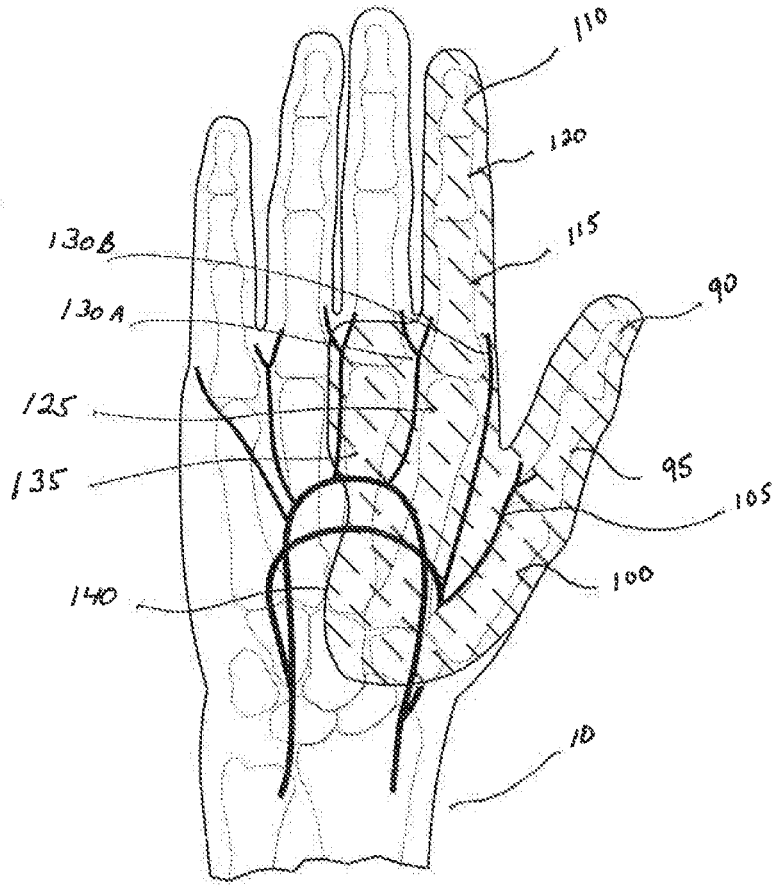


FIG. 3

CATCHER'S GLOVE

RELATED U.S. APPLICATION DATA

[0001] This application claims priority from U.S. Provisional Patent Application Ser. No. 62/420,587 entitled Catcher's Glove filed Nov. 11, 2016. The disclosure of that provisional patent application is incorporated herein by reference in its entirety.

FIELD OF THE INVENTION

[0002] The present invention relates generally to the field of protective apparel, more specifically, a glove worn in conjunction with a conventional catcher's mitt designed to minimize impact trauma to the crucial-vulnerable areas of the catcher's hand while playing sports such as baseball or softball.

BACKGROUND OF THE INVENTION

[0003] In the prior art, it has long been known of protective coverings worn over the hand in conjunction with catcher's mitts for protection from trauma by the repetitive impact of the ball, particularly in baseball and fast pitch softball. Although, the quality of the catcher's mitts have improved, with advanced strength and conditioning training methods, players are throwing baseballs and softballs at speeds more than ninety miles per hour. Injuries to catcher's hands are still a common problem. For a professional baseball catcher, it is possible to receive one hundred fifty pitches per game with speeds exceeding ninety miles per hour. If warm-up and practice pitches are added, the final number can reach three hundred pitches per day.

[0004] Baseball and softball catcher's face higher risks of injuries, but not limited to blood vessel damage, impaired blood circulation or abnormal blood flow, enlarged fingers, nerve damage, and potential damage to the bones and joints of the hand. The symptoms associated with these injuries include hand weakness, tingling, numbness, and pain with potential for stiffness, cold sensitivity, and/or the onset of arthritis. Catchers suffer from repetitive impact at the base of the index finger and into the thumb, and can suffer from "vibration white finger", where the fingers become white caused by vasospasm, or the blood vessels in the fingers shrink reducing blood flow.

[0005] Mallet injuries, including tendon and fracture injuries are also common injuries suffered by catchers. These occur when the ball hits the tip of the finger causing the tip to buckle down. "Where the ball impacts the finger, there can be a chip fracture at the top of that joint attached to the tendon." (T. Greg Sommerkamp, MD, TriHealth Hand Surgery Specialists)

[0006] In baseball, the art of catching involves rotating the catching hand so that the hand is lower than the wrist exposing the webbed portion of the catcher's mitt. Most pitches land in the base of the webbed portion if the player is using the proper technique. However, interruption of the ball by the bat, known as a foul tip or improper placement of the catcher's mitt can cause impact with the catcher's thumb causing injuries.

[0007] Thumb injuries for catchers are particularly debilitating since the thumb plays a major rule in gripping, enabling efficient catching. One of the most common injuries is called "catcher's thumb". This involves the ligaments surrounding the thumb and affects the ability to catch. The known cause of this injury to the thumb occurs when a force causes hyperextension of the upper interphalangeal joint of the thumb. This occurs most frequently when a catcher is "thumbed" by a foul ball tipped directly back into your thumb, either causing a hyper-extension or bruise. Prior art protective gloves do not include adequate padding or completely expose the thumb causing a high risk of this injury.

[0008] In addition to thumb injuries, catchers have significantly higher prevalence of subjective hand symptoms, specifically weakness in the gloved hand. It is demonstrated that they incur a higher incidence of index finger hypertrophy at the proximal phalanx and proximal interphalangeal joint of the gloved hand from repetitive trauma resulting from the impact of the baseball. (Vascular Changes of the Hand in Professional Baseball Players with Emphasis on Digital Ischemia in Catchers, J Bone Joint Surg AM, 2005 July; 1464-1469). "We think that the repetitive impact over time causes scarring around the digital nerves and arteries, and some of the microvessels." (Andrew Koman, MD Wake Forest University School of Medicine, professor of orthopedic surgery, Journal of Bone & Joint Surgery) Complaints of weakness, tingling or pain in the index finger are frequent symptoms. Index fingers were found to be significantly enlarged, a sign of chronic damage to circulation. "Anyone who's doing this professionally will tell you they'll keep on playing till their finger practically falls off" (Dr. Terry Light, professor of orthopedic surgery at Loyola University Health System; July 2005 Journal of Bone & Joint Surgery) "We found signs of early blood vessel damage that could lead to significant symptoms and could end a player's career. (T. Adam Ginn, MD, chief resident in orthopaedics at Wake Forest University Baptist Medical Center in Winston-Salem, N.C.)

[0009] "In the past, the real threat for catchers was clots in the big artery in the palm. But with the newer, better-padded gloves, the palm appears to be protected relatively well." (Andrew Koman, MD, July 2005, Journal of Bone & Joint Surgery). It was found that trauma to catcher's hands was no longer commonly seen in the entire palm region but rather was commonly found to the index-finger and into the thumb. Therefore, a need exists for a protective glove that targets the crucial-vulnerable areas of the thumb and index-finger. The present invention addresses this need.

[0010] The prior art includes numerous devices for padding a catcher's hand to prevent injury from repetitive impact. However, the noted injuries remain a common problem as a definite need for a protective glove device to provide protection in all the critical areas of the hand still exists. The present invention satisfies this need for protection in addition in allowing tactile sensation and freedom of movement for the catcher so not to inhibit the ability to catch the fast-moving baseball or softball.

[0011] A number of the prior art patents provide protection to areas not considered the crucial impact areas. U.S. Pat. No. 4,748,690 discloses padding covering all fingers and the entire palm area of the hand. Additionally, U.S. Pat. No. 5,557,803 discloses padding fully enveloping the hand, palm, wrist and inner forearm. These prior devices inhibit the tactile sensation and freedom of movement, necessary for effective catching.

[0012] Other prior art devices provide inadequate padding leaving crucial-vulnerable areas exposed. For example, U.S. Pat. No. 5,689,828, U.S. Pat. No. 5,768,704 and U.S. Pat Appl. 2015/0158302 A1 fail to protect a large portion of the

index finger leaving it exposed or fail to protect the thumb leaving the thumb exposed and only covering the metacarpal region of the palm adjacent to the index finger and index finger phalanges. These prior art devices allow for more flexibility and freedom of motion but fail to protect the crucial areas, specifically the thumb from known injuries.

[0013] Furthermore, the padding in U.S. Pat. No. 9,032,553 B2 teaches the use of discrete energy absorbing pads. Additionally, U.S. Pat. No. 8,839,462 B2 discloses an index cushion, middle cushion and first metacarpal cushion. In the preferred embodiment of the present invention, the energy absorption padding is a continuous padding integrated within the protective glove. This provides greater protection from hyperextension of the index finger and thumb in addition to injuries from repetitive impact over discrete pads or index cushions.

[0014] In the preferred embodiment of the present invention, the energy absorbing material is a visco-elastic polymer such as the product sorbothane®. The prior patents use foam, rubber, neoprene and silicone materials. A visco-elastic material is superior to these other materials. For example, sorbothane® absorbs up to 94.7% of impact shock. It is a "super soft" polyurethane that can simultaneously absorb shock and vibration making it preferable to the one-dimensional materials such as rubber. It has a high damping coefficient, meaning that the material will "bounce back" to the original shape when the load is removed. Foam materials used in padding do not have the same flexibility.

OBJECTS OF THE INVENTION

[0015] It is an object of this invention to provide an improved protective hand glove used in conjunction with a catcher's mitt used in baseball and softball which overcomes problems described in the prior art. More particularly, it is an object of this invention to include a continuous visco-elastic shock adsorbing material covering the crucial-vulnerable area of the hand including a thumb region covering the distal and proximal phalanges and outer border of the thumb, an index region covering a distal, middle and proximal phalanges and a palm region covering a thenar eminence region of the palm.

[0016] It is a further objective of the present invention is to provide a continuous visco-elastic shock- absorbing material that protects the metacarpal bones of the thumb, index and middle fingers of the hand and nerves and blood vessels underlying these areas.

[0017] It is a further objective of the present invention is to provide a continuous visco-elastic shock- absorbing material that protects the carpal bones of the palm at the thenar eminence region.

[0018] Still another objective of the invention is to include a continuous visco-elastic shock absorbing material that is flexible and elastic to provide the required tactile sensation and freedom of movement necessary in the art of catching while providing adequate protection of the crucial-vulnerable areas of the hand.

[0019] Yet another object of the invention is to provide a protective glove used in conjunction with a baseball or softball catcher's mitt that efficient and inexpensive to manufacturer.

[0020] The present invention satisfies these objectives and the deficiencies described in the prior art and provide further related advantages that will appear from the following description and appended claims, reference being had to the accompanying drawings forming a part of the specification wherein like reference characters designate corresponding parts into several views.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. **1** is a blown-up view of the shock-absorbing material and its positioning within the glove body.

[0022] FIG. **2** is a palmar view of the preferred embodiment of the invention.

[0023] FIG. **3** is an anatomical schematic of the palmar side of a human hand illustrating the phalanges, interphalangeal joints and metacarpal bones and blood vessels of the crucial-vulnerable areas.

DETAILED DESCRIPTION OF THE DRAWINGS

[0024] FIGS. **1** through **3** illustrate the inner protective glove **10** according to the present invention for prevention of repetitive impact trauma to a catcher's hand. The inner glove **10** includes a palmar and distal side forming a glove body **30** extending from a proximal edge **40** of a wrist of a catcher's hand to distal edges of a thumb, index, middle, ring and little fingers **50***a*, **50***b*, **50***c*, **50***d* and **50***e*, respectfully, and enveloping said fingers. A continuous visco-elastic shock-absorbing material **20** is affixed within an inner surface of glove body **30** and continuously covers a thumb region **60**, an index finger region **70** and a palm region **80**.

[0025] The thumb region **60** of shock-absorbing material **20** provides coverage from repetitive impact trauma to a first distal phalanx **90**, proximal phalanx **95**, metacarpal bone **100** and blood vessel **105** of thumb **50***a*.

[0026] The index finger region **70** of shock-absorbing material **20** provides coverage from repetitive impact trauma to a second distal phalanx **110** and proximal phalanx **115** and first middle phalanx **120** of index finger **50***b*. The shock-absorbing material **20**, further provides protection to a second metacarpal bone **125** and blood vessels **130***a* and **130***b*.

[0027] The palm region **80** of shock-absorbing material **20** covers adjacent to index finger **50***b* and middle finger **50***c* and extending over a thenar eminence **140**. The palm region **80** provides protection from repetitive impact trauma to metacarpal bones **100**, **125** and **135** and blood vessels **105**, **130***a* and **130***b*.

[0028] Inner protective glove **10** according to the foregoing embodiment of the invention provides protection to the targeted crucial-vulnerable areas of the catcher's hand from repetitive impact with catching a hard baseball or fast-pitched softball. The shock-absorbing material is also thin and flexible allowing tactile sensation and freedom in gripping movement of the catcher's hand necessary for effective catching.

[0029] It is understood that the foregoing description is a preferred embodiment of the invention and that the invention is not limited to the specific form illustrated. Modifications may be made in the design and arrangement of the elements without departing from the scope of the invention as expressed in the appended claims.

We claim:

1. An improved inner glove used in conjunction with a catcher's mitt for protection of a hand from trauma caused by repetitive impact of a ball, the improved inner glove comprises:

a. a flexible glove body having an outer palmar side and a dorsal side extending from a proximal edge of the hand around a wrist crease to a little, ring, middle and index fingers and thumb distal edges, said glove body having an inner side enveloping said fingers and thumb;

b. a continuous shock-absorbing material integrated within the glove body affixed on the inner surface comprising:

1. a thumb region covering a first distal phalanx and first proximal phalanx and expanded to include an outer border of said thumb;
2. a index finger region covering a second distal phalanx and second proximal phalanx and a first middle phalanx of said index finger; and,
3. a palm region adjacent to the index finger region and extending over a thenar eminence of a palm providing protection from trauma caused by repetitive impact of said ball.

2. The improved inner glove of claim **1**, wherein the continuous shock-absorbing material is composed of a visco-elastic material.

3. The improved inner glove of claim **2**, wherein the continuous shock-absorbing material is a thickness of not more than ⅛ inches.

4. The improved inner glove of claim **2**, wherein the continuous shock-absorbing is composed of a polyether base and a polyurethane material.

5. The improved inner glove of claim **1**, wherein the glove body consists of a thin skin tight leather.

6. The improved inner glove of claim **1**, wherein the glove body consists of a spandex material between the thumb, index, middle, ring and little finger.

7. The improved inner glove of claim **1**, wherein the glove body further comprises a fastening means near said wrist crease for fastening said glove onto said hand.

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