Abstract

Baseball catcher’s protective handwear including a catcher’s mitt and an improved non-connected inner glove for wearing inside the mitt, the inner glove including (1) a tactile palm-surrounding portion which leaves at least the little finger, ring finger, middle finger and thumb substantially uncovered, (2) a supple index-finger portion that has padding affixed thereto over the phalanges, and (3) padding affixed over the metacarpal region of the palm adjacent to the index finger, thereby to provide continuous protection to the most crucially-vulnerable parts of a baseball player’s hand, while simultaneously providing properties of gripping-finger-and-thumb freedom, glove-interior surface feel and in-mitt hand adjustment closely similar to that of a naked hand inside an outer glove.
BASEBALL CATCHER’S PROTECTIVE HANDWEAR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This patent application is a continuation patent application of U.S. patent application Ser. No. 13/297,710 filed Nov. 16, 2011, which claims priority to and is a non-provisional patent application of Provisional Patent Application No. 61/414,541 filed Nov. 17, 2010. The above-referenced patent applications are incorporated herein by reference in their entireties.

FIELD OF THE INVENTION

[0002] This invention relates generally to the field of protective athletic apparel and more particularly to handwear protecting baseball players’ catching hands from injury resulting from the impact of the ball.

BACKGROUND OF THE INVENTION

[0003] In the art of catching baseballs, it has long been well known for a protective covering to be worn over the hand. The speed at which a baseball flies when either thrown or hit, combined with the ball’s weight and hardness, presents significant risks of injury to the catcher’s hand.

[0004] A standard baseball is a “sphere . . . weighing not less than five ounces nor more than 5 1/4 ounces” and made of “yarn wound around a small core of cork, rubber or similar material, covered with two stripes of white horsehide or cowhide, tightly stitched together.” (See Major League Baseball Official Rule 1.09.) Baseball pitchers commonly throw the ball at speeds of 90 miles per hour and often exceed this speed. The ball also frequently travels at similarly high and higher speeds when propelled by contact with a baseball bat swung by a batter.

[0005] A typical absorption of force by a player’s hand (in combination with whatever protective handwear is worn over the hand) upon impact with a baseball is indicated, by way of example, by the following calculation, contemplating a baseball weighing five ounces (0.01 slug) and traveling at 90 miles per hour (132 feet per second) being stopped by the rapid catching motion (0.01 seconds) of the hand:

\[ F \approx m v^2 \]

\[ F = (0.01 \text{ slug})(132 \text{ ft/sec})(0.01 \text{ sec}) = 132 \text{ lbs} \]

This calculation indicates that sudden absorption of force in excess of 100 pounds by the catching hand upon catching a baseball is typical. This force is also repeated. For example, in a typical professional game, a baseball catcher typically catches well over 100 pitches, not including practice pitches. (See http://www.baseball-reference.com/blog/archives/7533.) This repeated, sudden absorption of force is well known to take a heavy physical toll on the catching hands of baseball catchers, such that visible and often painful swelling of the catching hand is a common problem. In particular, catchers frequently experience swelling of the entire index finger and the metacarpal region of the palm adjacent to the index finger, due to the great frequency of impact by incoming baseballs on these crucial and most-vulnerable parts of the catching hand. A related problem is that some players experience substantial loss of sensation in these parts of their catching hands due to injury of the nerves as a result of repetitive impact.

[0006] Scientific studies corroborate the anecdotal experience of baseball players in this respect. For example, a Wake Forest University study published in 2005, based on examinations of minor-league professional baseball players, found that seven of nine baseball players playing in the catcher’s position suffered from index-finger hypertrophy, such that the index fingers of the players’ catching hands were typically two ring sizes larger than the index fingers of their non-catching hands; by comparison, players playing at other positions typically did not suffer from index-finger hypertrophy. T. Adam Ginn et al., “Vascular Changes of the Hand in Professional Baseball Players with Emphasis on Digital Ischemia in Catchers,” 87 J. Bone and Joint Surg. (American) 1464-69 (2005). The same study documented the presence of related abnormalities in “younger, asymptomatic individuals” and additionally found that catchers frequently suffer from related “subjective hand symptoms,” such as weakness in the catching hand. Id. See also C. W. Lowrey et al., “Digital Vessel Trauma From Repetitive Impact in Baseball Catchers,” 1 J. Hand Surg. (American) 256-8 (1976); M. Sugawara et al., “Digital Ischemia in Baseball Players,” 14 Am. J. Sports Med. 329-34 (1986).

Numerous attempts have been made to mitigate these risks of injury to the catching hand, but none are deemed fully satisfactory. Dr. T. Adam Ginn, an author of the Wake Forest University study referred to above, stated the following in July 2005: “Despite well-padded catchers’ mitts and the use of additional padding, the catchers examined in this study continue to demonstrate changes to the gloved index finger consistent with trauma. There should be further study into glove design.” Press release, Wake Forest University Baptist Medical Center (Jul. 1, 2005) http://www.wfibmc.edu/News-Releases/2005/Catchers_Mitts_Don%EF%82%80%99sProvide_Enough_Protection.htm). Another author of the study, Dr. Andrew Koman, stated the following: “I’m hopeful that now that this has been pointed out that the glove manufacturers will make whatever adjustments are practical to better protect the players.” Transcript, “Building a Better Catcher’s Mitt,” National Public Radio, Jul. 3, 2005 (http://www.npr.org/templates/story/story.php?storyid=47283554kps=rs). See also Allison Rupp, “Study: Catcher’s Mitts Fit For Fixing,” USA Today (Aug. 9, 2005) (http://www.usatoday.com/sports/baseball/2005-08-09-catchers-mitts_x.htm); Emily Singer, “Painful Game of Catch,” Los Angeles Times, p. 2 (Jul. 4, 2005).

The prior art includes numerous devices that pad the catcher’s hand. Such padding is provided in gloves and other forms of handwear intended to be worn or otherwise placed inside a traditional baseball catcher’s mitt or fielder’s glove (the “outer glove,” which is typically made of very thick leather).

[0009] It has long been known for a baseball player to wear a batting glove (a glove designed for gripping a baseball bat) or even a golf glove inside the outer glove. Such batting and golf gloves, when used as inner gloves for catching, provide a very marginal amount of protective padding simply by interposing an additional layer of material (typically leather) between the catching hand and the incoming baseball. However, such gloves are disadvantageous in a number of ways.

[0010] First, such gloves fail to provide more than an extremely marginal amount of protective padding over the
parts of the hand that most directly absorb the force of incoming baseballs—the index finger and the metacarpal region of the palm adjacent to the index finger. Second, because such gloves cover the entire catching hand, they reduce “feel” and restrict freedom of movement for the entire catching hand, including all five fingers. This is disadvantageous because a catcher’s ability to substantially and precisely feel the inner surfaces and movements of the outer glove is vital to his ability to successfully catch a fast-moving baseball, which requires high degrees of dexterity, skill and precision while also requiring speed and strength. Thus, such inner gloves disadvantageously reduce the desired element of “feel,” disadvantageously restrict the desired element of hand freedom, while also failing to provide any significant protective padding to any part of the catching hand, including the most crucially-vulnerable parts.

[0011] Other prior art includes numerous devices that mitigate one, and sometimes two, of the three major disadvantages noted above—lack of “feel,” lack of freedom of movement and lack of ideally-located and sufficient protective padding. However, as will be shown below, no prior art succeeds in substantially mitigating all three of these major disadvantages. At the same time, some prior art presents additional major disadvantages. A brief discussion of certain of this prior art follows.

[0012] The silicone-layered inner glove of C. W. Lowery publicized in 1976 (see Associated Press article, “Constant Pounding of Baseballs Hurt Catchers’ Hands,” The Ledger (Lakeland, Fla.) (Feb. 1, 1976)) is inadequate to mitigate the “feel” and hand-freedom disadvantages associated with the above-described inner gloves. It also teaches neither distribution of protective padding in a thickness or manner that specially protects the most crucially-vulnerable parts of the catching hand nor the targeting of protective padding in locations to particularly protect the most-crucially-vulnerable parts of the catching hand. The 1976 Lowery device is composed of three layers of material—an outer layer, a silicone layer, and an inner layer. The device’s interposition of these layers of material between the surfaces of the hand and the inner surfaces of the outer glove carries dual disadvantages of both substantially reducing “feel” and substantially restricting hand freedom of inner-glove-covered parts of the hand. Rather than providing substantial protective padding especially to the most crucially-vulnerable parts of the catching hand, the 1976 Lowery device’s three-layer padding uniformly covers all parts of the hand that are covered by the glove; this includes large parts of the hand that are not among the most crucially-vulnerable parts, including most of the palm, half of the middle finger, and the dorsal side of the hand. While excessively padding these parts of the hand, the 1976 Lowery device leaves half of the index finger entirely uncoved and thus fails to provide any protective padding to a most crucially-vulnerable part of the catching hand.

[0013] U.S. Pat. Nos. D243,132 and D243,133 (the inventor of which may be the same developer of the 1976 Lowery device, but with a differently spelled name) also fail to provide any protective padding to a most crucially-vulnerable part of the catching hand—a large portion of the index finger. Additionally, both Lowrey designs fail to teach distribution of protective padding especially to the most crucially-vulnerable parts of the catching hand; they also fail to teach targeting of protective padding over particular most-crucially-vulnerable parts of the catching hand.

[0014] Additionally, these designs fail to provide adequate “feel” and hand-freedom. U.S. Pat. No. D243,132, which is not a glove, includes no means to secure its palm-covering portion to the catching hand; consequently, such palm-covering portion is able to wrinkle, fold, “bunch up” and otherwise move relative to the catching hand and the inner surfaces of the outer glove, thereby significantly interfering with “feel” and restricting hand freedom while also causing additional major disadvantages of discomfort and recurring need for manual adjustment of the device relative to the hand and outer glove. Both Lowrey designs require coverage of half the middle finger, thereby reducing “feel” and freedom with respect to that finger and its movement. U.S. Pat. No. D243,133 further requires coverage of half the ring finger and half the little fingers, thereby reducing “feel” and freedom with respect to those fingers and their movement. Furthermore, neither Lowrey design teaches incorporation of materials having properties that facilitate catching hand “feel” and freedom.

[0015] U.S. Pat. No. 4,748,690 teaches some targeted protective padding of most-crucially-vulnerable parts of the hand; however, it retains all the disadvantages of lack of “feel” and freedom present in the above-described use of a “batting glove” or golf glove as an inner glove. Adding to such disadvantages, satisfactory feel and freedom are lacking when using this device for large parts of the hand for which feel and freedom are important yet which are not crucially vulnerable to impact injury (e.g., the thumb, middle, ring and little fingers and large portions of the palm).

[0016] The device of U.S. Pat. No. 5,285,529, like the device of U.S. Pat. No. D243,132, is not a glove and therefore is not secured in a satisfactory manner with respect to the catching hand. This common disadvantage is even more pronounced in the ’529 patent than in the earlier design. Also like earlier prior art, the ’529 patent fails to teach targeting of protective padding over particular most-crucially-vulnerable parts of the catching hand. It also fails to teach incorporation of materials having properties that facilitate “feel” and freedom.

[0017] U.S. Pat. No. 5,528,772 partly but inadequately mitigates the disadvantages of lack of “feel” and freedom in earlier art, by teaching full freedom for the middle, ring and little fingers. It does this by having a single-margin finger-adjacent edge through which these three fingers extend. However, due to the nature of the structure of such device, there is a tendency for the material over the palm to gather rather than remaining in place. The structural nature of the device and the substantial thickness caused by the material requirement that the entire palmar surface be made of “padding material,” substantially reduces “feel,” including the all-important feel of hand movement relative to inner surfaces of the outer glove which are so important to baseball catching performance. Furthermore, the requirement that the device cover the thumb is disadvantageous to both “feel” and freedom. As to padding, the patent does not target protective padding in any of the most-crucially-vulnerable parts of the catching hand but, rather, provides excessive padding to parts of the hand that are not the most crucially-vulnerable, including the thumb and most of the palm. The absence of an intention on the part of the patentee to provide targeted protective padding over the most-crucially-vulnerable parts of the hand is evident in the patent, including in FIG. 1, which shows five highly-disadvantageous holes (“vents”) in the palmar surface of the
device, directly over the distal, middle and proximal phalanges of the index finger and the metacarpal region of the palm adjacent to the index finger.

U.S. Pat. No. 5,557,803 teaches an inner glove with some more-targeted protective padding of most-crucially-vulnerable parts of the hand than seen in U.S. Pat. No. 4,748,690. However, as in that earlier art, the targeted protective padding of U.S. Pat. No. 5,557,803 is excessive in that it extends also to parts of the anatomy that are not among the most crucially-vulnerable, including large portions of the palm, wrist and inner forearm. By fully enveloping the hand, wrist and a large wrist-adjacent portion of the forearm, the device severely restricts “feel” and freedom of the catching hand and arm.

U.S. Pat. No. 5,689,828, partly, but inadequately, mitigates the “feel” problem present in earlier prior art by leaving the thumb and two other fingers exposed. However, the requirement that the device’s entire palmar surface be made of three layers of material severely restricts “feel.” The additional “friction pad” layer located over the palm further restricts “feel.” The patent’s requirement of “two finger extensions” also provides excessive covering over one finger, resulting in loss of both “feel” and freedom of movement. Furthermore, the patent provides no protection for a large portion of the index finger and no targeted protective padding for any of the most-crucially-vulnerable parts of the hand. Additionally, the single-margin of the patent’s preferred embodiment, through which the ring and little fingers extend together, presents a major disadvantage related to folding and gathering of material on the palm, similar to that of the three-finger single margin of U.S. Pat. No. 5,528,772, given the multi-layer structure of the device’s palmar surface, thereby presenting disadvantages to hand comfort, “feel,” and, in some cases, freedom.

U.S. Pat. No. 5,768,704 is not an inner glove but rather an insert comprising a small leather “panel” minimally covering the base of the index finger and a foam rubber “panel” overlying the upper palm, together with tether-type and ring-type fasteners. The patent provides no padding for a large portion of the index finger. Additionally, its unwieldy fastening means are insufficient to guarantee lack of movement of the device relative to the hand and the inner surfaces of the glove. Such fastening means are also physically inconvenient for the wearer.

U.S. Pat. No. 6,292,946 is an “insert” that provides some improvements relative to U.S. Pat. No. 5,285,529, a similar device, but does not overcome major disadvantages of movement relative to the hand and the inner surface of the outer glove, given its lack of means to secure the device to any part of the hand.

U.S. Pat. No. 6,532,594 is a “disk” insert that provides no padding for most crucially-vulnerable parts of the index finger. Additionally, owing to its required shape and “thick” material, the device substantially reduces “feel” and restricts the wearer’s freedom of movement. Similarly, the combination disk-glove device marketed as “Shock Stop” by Markwort Sporting Goods Co. (St. Louis, Mo.) is thick, being composed of multiple layers of material, thereby substantially reducing “feel” and restricting freedom.

The substantial amount of prior art in this field is evidence of the significance of the problem. However, despite many prior attempts to provide satisfactory protective handwear for baseball catchers, the need remains for improved protective handwear which, while providing targeted index-finger protection and index-finger-adjacent metacarpal region protection, also preserves gripping-finger-and-thumb freedom, in-outer-glove hand adjustment, and glove-interior-surface feel to facilitate high-performance baseball catching.

OBJECTS OF THE INVENTION

It is the object of this invention to provide improved protective handwear for baseball catchers (and other baseball players) which overcomes the problems and shortcomings of the prior art described above.

More particularly, it is an object of the invention to provide protective handwear of the type including an inner glove used with a catcher’s mitt or other traditional catching glove, the inner glove substantially reducing risks of palm and injury to the wearer by providing targeted protective padding to the most crucially-vulnerable parts of the catching hand. Another particular object of the invention is to provide such improved protection without significantly reducing “feel,” restricting freedom of movement or causing discomfort as compared to the “feel,” freedom and comfort of the naked catching hand used in combination with an outer glove.

Still another object of the invention is to provide enhanced protection for catchers’ hands while maintaining the high degree of hand “feel” relative to inner surfaces of the catcher’s mitt and hand freedom of movement that are essential for high-performance baseball catching and related mitt control.

Yet another object of the invention is to provide these advantages where particularly needed—namely in professional and other high-caliber baseball, where the need for maximal protection, “feel” and freedom of movement is magnified by the high speed of baseball movement.

Yet another object of the invention is to provide protective handwear of the type including an inner glove used with a catcher’s mitt or other traditional catching glove that is efficient and inexpensive to manufacture.

Yet another object of the invention is to provide a protective glove that is easy for the wearer to remove from the hand without damage to the device.

How these and other objects are accomplished will become apparent from the following drawings and the description.
are the most crucially-vulnerable parts of a baseball catcher’s hand, while also providing gripping freedom for the fingers and thumb and doing so in a way that preserves both full freedom of in-mitt hand adjustment and the ability of the hand to feel inner surfaces of the catcher’s mitt itself, in order to facilitate catching baseballs.

[0033] The term “tactile” as used herein is an adjective describing a material which by virtue of its nature (e.g., its combination of thinness and suppleness) preserves the ability of underlying skin to feel and sense surfaces contacting (e.g., rubbing against) the opposite surface of the material—i.e., the surface that is not in contact with the underlying skin.

[0034] The term “supple” as used herein is an adjective describing a flexible material which by virtue of its nature bends easily with little or no perceptible resistance to bending.

[0035] Another aspect of this invention is a baseball catcher’s inner glove of the type described above for use with a catcher’s mitt.

[0036] While the invention is primarily an improvement in baseball catcher’s protective handwear, another aspect of the invention is its broader application to the catching of baseballs by any defensive player. In such cases, baseball-catching outer gloves other than catcher’s mitts are involved, and the particular characteristics of the improved inner glove provide similar advantages, even though far less dramatic in terms of improved hand health because catchers uniquely suffer repeated pounding of the hand by high-speed baseballs during the course of a baseball game. The descriptions of preferred embodiments of this invention will refer to the outer glove being the mitt of a baseball catcher.

[0037] Certain preferred embodiments include a single finger-adjacent distal edge of the palm-surrounding portion which is spaced from the little finger, ring finger and middle finger sufficiently such that at least portions of the metacarpal regions of the palm adjacent to the little finger, the ring finger and the middle finger are substantially uncovered. In some of these preferred embodiments, the thumb-adjacent distal edge of the palm-surrounding portion is spaced from the thumb sufficiently such that at least a thumb-adjacent portion of the metacarpal region of the palm is also substantially uncovered. In other of these preferred embodiments, the palm-surrounding portion includes a portion adjacent to the little-finger side of the hand which is of an elastic material facilitating skin-engagement of the palm-surrounding portion; and, in one of such preferred embodiments, the palm-surrounding portion includes a portion adjacent to the thumb which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.

[0038] Another preferred embodiment includes a thumb-adjacent distal edge of the palm-surrounding portion which is spaced from the thumb sufficiently such that at least a thumb-adjacent portion of the metacarpal region of the palm is substantially uncovered. This enhances skin contact, related “feel,” and freedom of movement in one important gripping area of the hand.

[0039] Certain other preferred embodiments include, for each of the little, ring and middle fingers, a separate finger-adjacent distal edge of the palm-surrounding portion. In some of such preferred embodiments, these finger-adjacent distal edges are positioned short of the proximal interphalangeal creases of the little, ring and middle fingers; and in one such preferred embodiment, such distal edges are positioned at the palmar digital creases of the little, ring and middle fingers. In either of these embodiments, a tab may be attached for gripping purposes to each of the finger adjacent distal edges and the thumb adjacent portion to facilitate easy removal of the handwear. In other such preferred embodiments, the palm-surrounding portion of the handwear includes a portion adjacent to the little-finger side of the hand which is of an elastic material facilitating skin-engagement of the palm-surrounding portion; and, in one such preferred embodiment, the palm-surrounding portion includes a portion adjacent to the thumb which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.

[0040] In certain other preferred embodiments, the padding over the distal, middle and proximal phalanges of the index-finger portion includes pad portions separated from one another, thereby facilitating index-finger bending between the index-finger phalanges. One such preferred embodiment includes a single finger-adjacent distal edge of the palm-surrounding portion which is spaced from the little finger, ring finger and middle finger sufficiently such that at least portions of the metacarpal regions of the palm adjacent to the little finger, the ring finger and the middle finger are substantially uncovered. Another such preferred embodiment includes, for each of the little, ring and middle fingers, a separate finger-adjacent distal edge of the palm-surrounding portion.

[0041] In preferred embodiments, the tactile palm-surrounding portion and supple index-finger portions are of a material having a thickness of no more than about 0.40 mm. One particularly preferred material is one-ounce leather material. Cabretta leather with a thickness of under 0.40 mm is a particularly preferred material. Other acceptable materials are preferably thin synthetics that allow the required “feel” and freedom of movement. Acceptable materials would be known to those skilled in the art who become familiar with this invention.

[0042] In preferred embodiments, the padding is a shock-absorbing material having a thickness of no more than about 3.0 mm. Preferred materials include shock-absorbing polymeric foam materials, one example being polyurethane foams. Another possibility is a gel-type shock absorbing material. Another preferred example is a self-supporting energy-absorbing composite such as the material sold under the trademark d3o, available from Design Blue Ltd. of the United Kingdom. A wide variety of padding materials are acceptable; acceptable materials would be known to those skilled in the art who become familiar with this invention. Shock-absorbing materials have different performance capabilities based on their cell structure and the like.

[0043] In a preferred embodiment, the inner glove comprises a tactile palm-surrounding portion extending from a proximal edge around the wrist to finger-adjacent and thumb-adjacent distal edges. The palm-surrounding portion is positioned so that it extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, middle finger and thumb substantially uncovered by the inner glove. The embodiment also includes a supple index-finger portion which extends from the palm-surrounding portion such that it receives and envelops the index finger, the index-finger portion having padding affixed thereto over the distal, middle and proximal phalanges. In this embodiment, padding is also affixed over the metacarpal region of the palm adjacent to the index finger. This embodiment provides targeted index-finger protection and index-finger-adjacent metacarpal region pro-
tection with gripping-finger-and-thumb freedom, in-mitt hand adjustment, and glove-interior surface feel, to facilitate catching baseballs.

[0044] The invention also includes an improvement in a baseball player’s protective handwear of the type including a ball-catching glove and non-connected inner glove for wearing inside the ball catching glove, wherein the inner glove comprises a tactile palm-surrounding portion extending from the proximal edge around the wrist to finger-adjacent and thumb-adjacent distal edges positioned such that the palm-surrounding portion extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, ring finger, middle finger and thumb substantially uncovered. In addition, the inner glove comprises a supple index-finger portion extending from the palm-surrounding portion such that it receives and envelops the index finger, the index-finger portion having padding affixed thereto over the distal, middle and proximal phalanges, as well as padding affixed over the metacarpal region of the palm adjacent to the index finger. In this manner, the invention provides targeted index-finger protection and index-finger-adjacent metacarpal region protection with gripping-finger-and-thumb freedom, in outer glove hand adjustment and glove interior surface feel, to facilitate catching baseballs.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] FIG. 1A is a palmar-side view of a first preferred embodiment of the invention.

[0046] FIG. 1B is a dorsal-side view of the preferred embodiment of FIG. 1A.

[0047] FIG. 2 is an anatomical schematic of the palmar side of the human hand, with notations on it to facilitate full understanding of the present invention. (The phalanges and proximal interphalangeal creases are marked for only some of the fingers, to avoid clutter.)

[0048] FIGS. 3A and 3B are palmar-side and dorsal-side views, respectively, of a second preferred embodiment of the invention.

[0049] FIGS. 4A and 4B are palmar-side and dorsal-side views, respectively, of a third preferred embodiment of the invention.

[0050] FIGS. 5A and 5B are palmar-side and dorsal-side views, respectively, of a fourth preferred embodiment of the invention.

[0051] FIGS. 6A and 6B are palmar-side and dorsal-side views, respectively, of a fifth preferred embodiment of the invention.

[0052] FIGS. 7A and 7B are palmar-side and dorsal-side views, respectively, of a sixth preferred embodiment of the invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0053] In describing the inner glove which is the improvement of this invention, anatomical references are made to the catcher’s hand. These are illustrated in FIG. 2, which can be referenced in understanding the descriptions herein.

[0054] FIGS. 1A and 1B illustrate a preferred inner glove 10 embodying the improvement of this invention. Inner glove 10 includes a tactile palm-surrounding portion 12 that extends from a proximal edge 14 around the wrist to finger-adjacent and thumb-adjacent distal edges 16 and 18 that are positioned such that palm-surrounding portion 12 extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, ring finger, middle finger and thumb substantially uncovered. Inner glove 10 also includes a supple index-finger portion 20 extending from palm-surrounding portion 12 such that index-finger portion 20 receives and envelops the index finger. Index-finger portion 20 has padding in the form of pad portions 22a-c affixed thereto over the distal, middle and proximal phalanges, respectively. Padding in the form of a pad portion 24 is affixed over the metacarpal region of the palm adjacent to the index finger. Each of pad portions 22a, 22b, 22c and 24 are separated from one another, which substantially facilitates index-finger bending. Pad portions 22a, 22b, 22c and 24 may be affixed on the exterior or in the interior of the inner glove 10 as worn on the hand. These pad portions may also vary somewhat in size and shape to provide the most comfort and protection for the individual wearer, while retaining the maximum freedom of movement and “feel” for the wearer. The padding should be of a shock-absorbing material, which could be polymeric foam a gel, although other materials known in the art for this purpose may be used. Preferably, the thickness of the padding should be no more than about 3.0 mm.

[0055] Distal edge 16 is a single edge of palm-surrounding portion 12 which is spaced from the little finger, ring finger and middle finger sufficiently that at least portions of the metacarpal regions of the palm adjacent to the little finger, ring finger and middle finger are substantially uncovered. Thumb-adjacent distal edge 18 is positioned such that at least part of the thumb-adjacent portion of the metacarpal region of the palm is also uncovered. Leaking these portions of the palm uncovered increase the “feel” of the wearer when catching the ball and also enhance the catcher’s freedom of movement.

[0056] Inner glove 10 provides excellent targeted index-finger protection and index-finger-adjacent metacarpal region protection, and does so while preserving gripping-finger-and-thumb freedom, in-mitt hand adjustment and glove-interior surface feel.

[0057] FIGS. 3A and 3B illustrate another preferred embodiment of inner glove 30 in accordance with this invention, which differs somewhat from inner glove 10 but provides all the same advantages. In inner glove 30, palm-surrounding portion 32 includes a lateral portion 32a, adjacent to the little-finger side of the hand, that is made of a thin, even sheer, elastic material which facilitates skin-engagement of palm-surrounding portion 32. A wide variety of very thin elastic materials are useful for this purpose, and acceptable choices would be well known to those skilled in the art who become familiar with this invention. One acceptable material is sheer stretchy nylon material, but other materials could also be used in this invention.

[0058] Another difference in inner glove 30 when compared to inner glove 10 is that thumb-adjacent distal edge 18 is positioned farther away from the thumb, thereby leaving uncovered a greater part of the thumb-adjacent portion of the metacarpal region of the palm. This embodiment of the invention thereby provides more freedom of movement in the thumb portion of the hand, if desired by the wearer of the protective device.

[0059] FIGS. 4A and 4B illustrate another preferred inner glove 40 in accordance with this invention, which also differs somewhat from the other embodiments already described. In particular, in addition to having lateral portion 32a as in inner
glove 30, palm-surrounding portion 32 of inner glove 40 includes a thumb-adjacent portion 32b which is of the same or similar thin elastic material as 32a. Portions 32a and 32b cooperate to provide excellent skin-engagement of palm-surrounding portion 32 with the palm of the catcher's hand. Another difference in inner glove 40 when compared to inner gloves 10 and 30 is that thumb-adjacent distal edge 18 is positioned in a manner which covers and protects the thumb-adjacent portion of the metacarpal region of the palm.

[F0060] FIGS. 5A and 5B illustrate still another preferred inner glove 50 which differs in some ways from inner gloves 10, 30 and 40. Inner glove 50 resembles inner glove 40 in having thumb-adjacent portion 32b. However, inner glove 50 also has separate finger-adjacent distal edges 52a, 52b and 52c for each of the little, ring and middle fingers, respectively. Edges 52a-c are positioned short of the proximal interphalangeal creases of the little, ring and middle fingers. Another difference is that inner glove 50 has a thin elastic lateral portion 54 of palm-surrounding portion 32. Lateral portion 54, unlike lateral portion 32a of inner gloves 30 and 40, extends up to edge 52a and 52b. Another difference is that pad portion 56 over the metacarpal region of the palm adjacent to the index finger, unlike pad portion 24 of the earlier-described embodiments, extends laterally toward and over a part of the metacarpal region of the palm adjacent to the middle finger. Numerous variations in size and shape of the pad portions and elastic lateral and thumb-adjacent portions are possible to provide the optimal protection, comfort and “feel” to suit individual needs and all of these variations are intended to be included in this invention.

[F0061] FIGS. 6A and 6B illustrate yet another preferred inner glove 60 which is quite similar to inner glove 50. The characteristic distinguishing inner glove 60 from inner glove 50 is that the separate finger-adjacent distal edges 62a, 62b and 62c are positioned at the palmar digital creases of the little, ring and middle fingers for slightly enhanced feel and finger freedom.

[F0062] FIGS. 7A and 7B illustrate another preferred embodiment. Inner glove 70 is similar in appearance to inner glove 50 but includes tabs 72a-1, 72b-1 and 72c-1 and 72d-1, which provide a material gripping surface in the nature of tabs on the palmar side to allow the easy removal and pulling off of the inner glove from the catching hand. By consecutively pulling on tabs 72a-1, 72b-1, 72c-1 and 72d-1, the wearer can loosen the inner glove from the little, ring, middle fingers and thumb, thereby making the device easier to pull off of the hand when desired. As shown in FIG. 7A, the handwear in this embodiment includes a portion 74 which extends to just below the joint 76 in the thumb. In this embodiment, there is included a portion 78 that is made of a thin elastic material which facilitates skin-engagement of this portion 78 of the handwear.

[F0063] Each of the embodiments of this invention illustrated provides all of the advantages of this invention. As indicated above, a variety of acceptable materials meeting the requirements of this invention are available and would be apparent to those skilled in the art who have become familiar with the invention.

[F0064] While the principles of the invention have been shown and described in connection with specific embodiments, it is to be understood that such embodiments are by way of example and are not limiting.

We claim:
1. In a baseball catcher’s protective handwear of the type including a catcher’s mitt and a non-connected inner glove for wearing inside the catcher’s mitt, the improvement wherein the inner glove comprises:
(a) a tactile palm-surrounding portion extending from a proximal edge around the wrist to finger-adjacent and thumb-adjacent distal edges positioned such that the palm-surrounding portion extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, ring finger, middle finger and thumb substantially uncovered;
(b) a supple index-finger portion extending from the palm-surrounding portion such that it receives and envelopes the index finger, the index-finger portion having padding affixed thereto over the distal, middle and proximal phalanges; and
(c) padding affixed over the metacarpal region of the palm adjacent to the index finger, thereby providing targeted index-finger protection and index-finger-adjacent metacarpal region protection with gripping finger-and-thumb freedom, in-mitt hand adjustment, and glove-interior surface feel, to facilitate catching baseballs.
2. The baseball catcher’s protective handwear of claim 1 wherein there is a single finger-adjacent distal edge of the palm-surrounding portion which is spaced from the little finger, ring finger and middle finger sufficiently such that at least portions of the metacarpal regions of the palm adjacent to the little finger, the ring finger and the middle finger are substantially uncovered.
3. The baseball catcher’s protective handwear of claim 2 wherein the thumb-adjacent distal edge of the palm-surrounding portion is spaced from the thumb sufficiently such that at least a thumb-adjacent portion of the metacarpal region of the palm is also substantially uncovered.
4. The baseball catcher’s protective handwear of claim 2 wherein the palm-surrounding portion includes a portion adjacent to the little-finger side of the hand which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.
5. The baseball catcher’s protective handwear of claim 4 wherein the palm-surrounding portion includes a portion adjacent to the thumb which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.
6. The baseball catcher’s protective handwear of claim 1 wherein the thumb-adjacent distal edge of the palm-surrounding portion is spaced from the thumb sufficiently such that at least a thumb-adjacent portion of the metacarpal region of the palm is substantially uncovered.
7. The baseball catcher’s protective handwear of claim 1 wherein for each of the little, ring and middle fingers there is a separate finger-adjacent distal edge of the palm-surrounding portion.
8. The baseball catcher’s protective handwear of claim 7 wherein such separate finger-adjacent distal edges are positioned short of the proximal interphalangeal creases of the little, ring and middle fingers.
9. The baseball catcher’s protective handwear of claim 8 having a thumb-adjacent portion wherein a tab is attached for gripping purposes to each of the finger-adjacent distal edges and the thumb-adjacent portion, to facilitate easy removal of the handwear.
10. The baseball catcher’s protective handwear of claim 8 wherein such separate finger-adjacent distal edges are positioned at the palmar digital creases of the little, ring and middle fingers.

11. The baseball catcher’s protective handwear of claim 7 wherein the palm-surrounding portion includes a portion adjacent to the little-finger side of the hand which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.

12. The baseball catcher’s protective handwear of claim 11 wherein the palm-surrounding portion includes a portion adjacent to the thumb which is of an elastic material facilitating skin-engagement of the palm-surrounding portion.

13. The baseball catcher’s protective handwear of claim 1 wherein the padding over the distal, middle and proximal phalanges of the index-finger portion includes pad portions separated from one another, thereby facilitating index-finger bending between the index-finger phalanges.

14. The baseball catcher’s protective handwear of claim 13 wherein there is single finger-adjacent distal edge of the palm-surrounding portion which is spaced from the little finger, ring finger and middle finger sufficiently such that at least portions of the metacarpal regions of the palm adjacent to the little finger, the ring finger and the middle finger are substantially uncovered.

15. The baseball catcher’s protective handwear of claim 13 wherein for each of the little, ring and middle fingers there is a separate finger-adjacent distal edge of the palm-surrounding portion.

16. The baseball catcher’s protective handwear of claim 1 wherein the tactile palm-surrounding portion and supple index-finger portions are of a material having a thickness of no more than about 0.40 mm.

17. The baseball catcher’s protective handwear of claim 16 wherein the material is cabretta leather.

18. The baseball catcher’s protective handwear of claim 1 wherein the padding is a shock-absorbing material.

19. In a baseball catcher’s inner protective handwear for use with a catcher’s mitt, wherein the inner glove comprises:
(a) a tactile palm-surrounding portion extending from a proximal edge around the wrist to finger-adjacent and thumb-adjacent distal edges positioned such that the palm-surrounding portion extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, ring finger, middle finger and thumb substantially uncovered;
(b) a supple index-finger portion extending from the palm-surrounding portion such that it receives and envelops the index finger, the index-finger portion having padding affixed thereto over the distal, middle and proximal phalanges; and
(c) padding affixed over the metacarpal region of the palm adjacent to the index finger,
thereby to provide targeted index-finger protection and index-finger-adjacent metacarpal region protection with gripping-finger-and-thumb freedom, in-mitt hand adjustment, and glove-interior surface feel, to facilitate catching baseballs.

20. In a baseball player’s protective handwear of the type including a ball-catching glove and a non-connected inner glove for wearing inside the ball-catching glove, the improvement wherein the inner glove comprises:
(a) a tactile palm-surrounding portion extending from a proximal edge around the wrist to finger-adjacent and thumb-adjacent distal edges positioned such that the palm-surrounding portion extends over the hypothenar eminence and the thenar eminence while leaving at least the little finger, ring finger, middle finger and thumb substantially uncovered;
(b) a supple index-finger portion extending from the palm-surrounding portion such that it receives and envelops the index finger, the index-finger portion having padding affixed thereto over the distal, middle and proximal phalanges; and
(c) padding affixed over the metacarpal region of the palm adjacent to the index finger,
thereby to provide targeted index-finger protection and index-finger-adjacent metacarpal region protection with gripping-finger-and-thumb freedom, in-outer-glove hand adjustment, and glove-interior surface feel, to facilitate catching baseballs.

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