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(54) **GLOVE WITH CALIBRATED MARKINGS**

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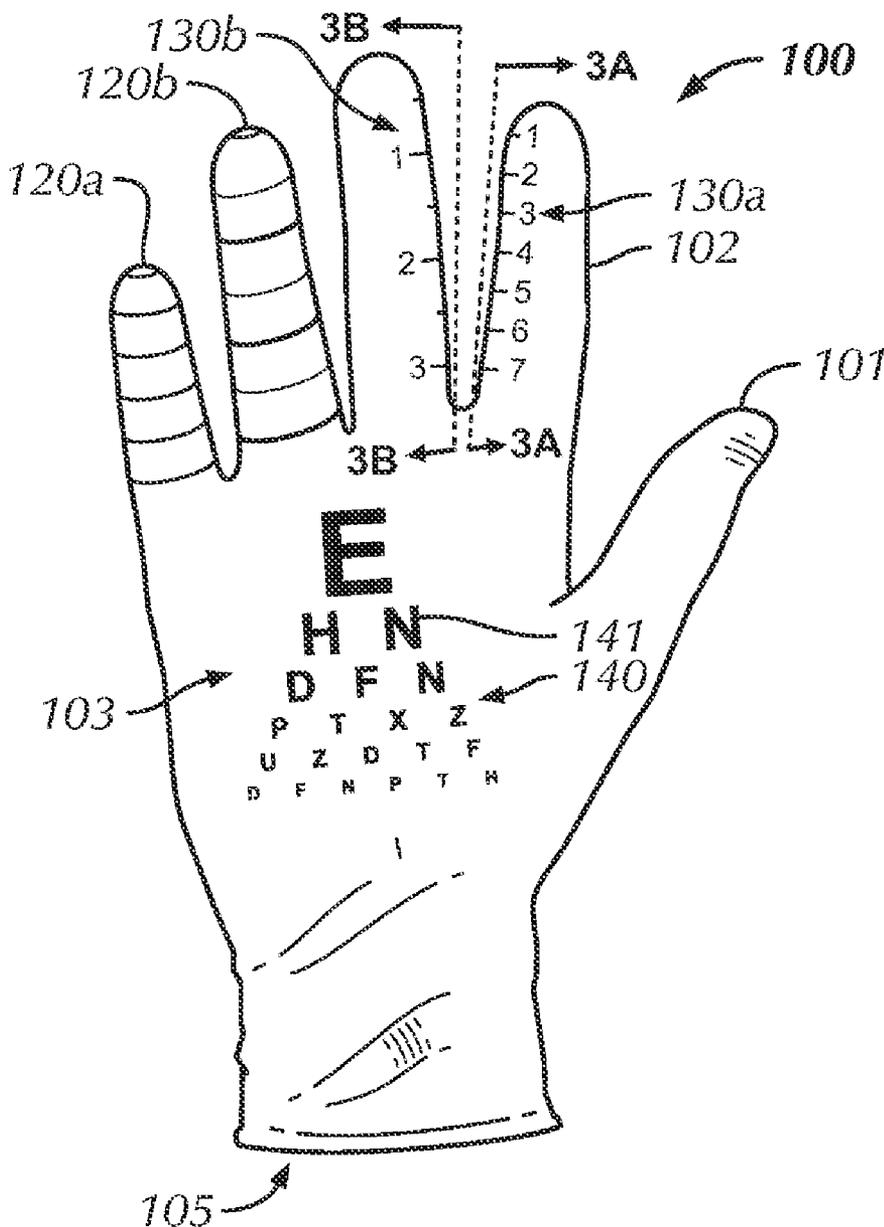
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(57) **ABSTRACT**

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A glove with a plurality of visual reference standards on the outer surfaces such that the wearer may reference the standards in determining characteristics, patient condition or for calculations, measurements, and conversions.



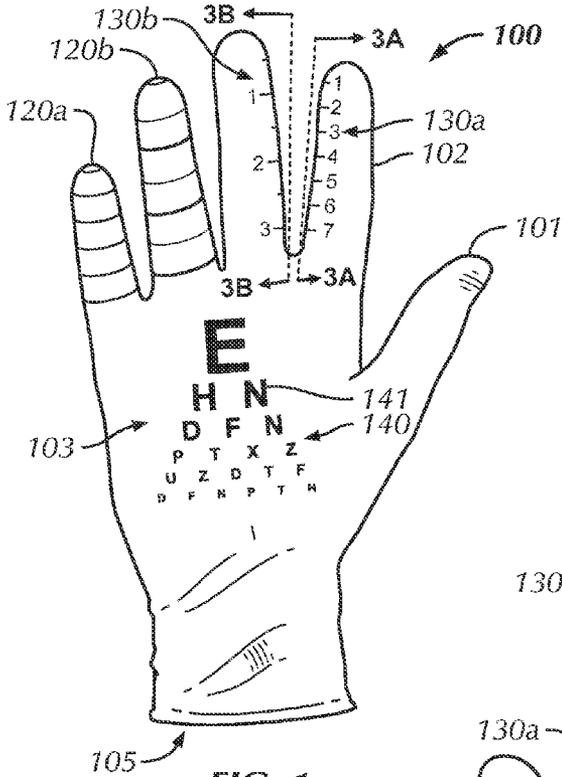


FIG. 1

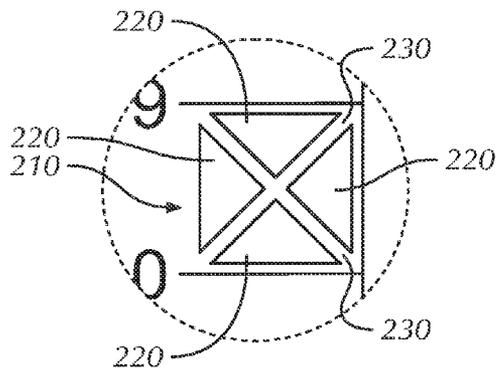


FIG. 2A

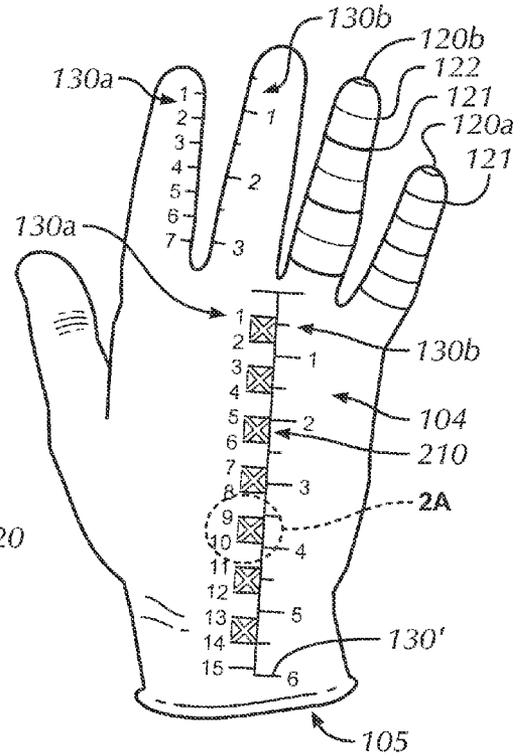


FIG. 2

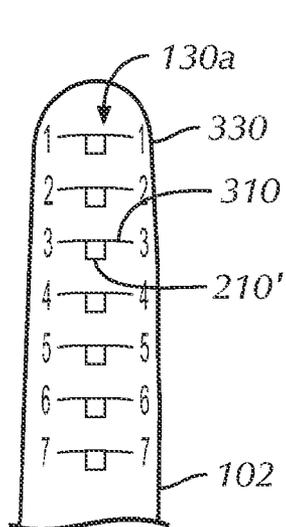


FIG. 3A

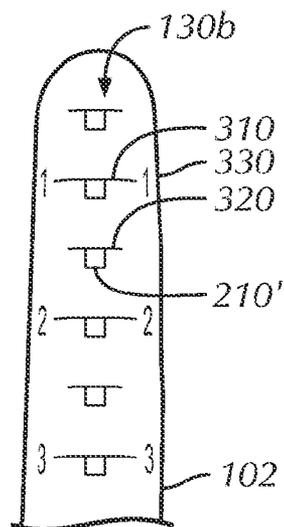


FIG. 3B

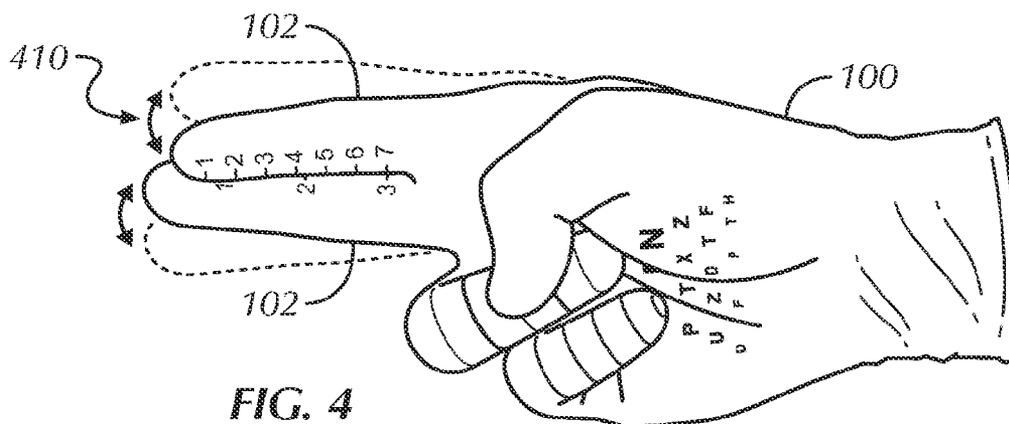
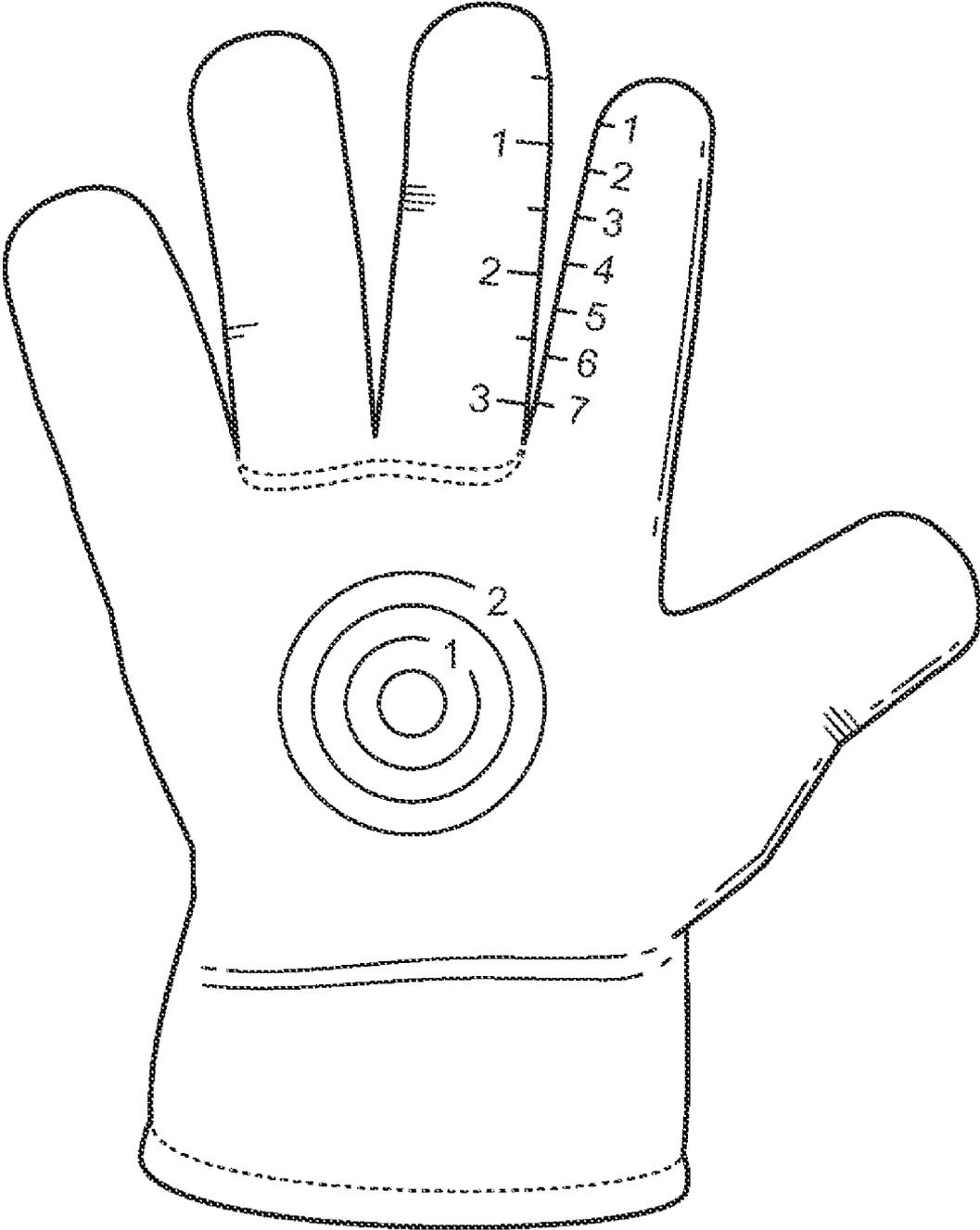


FIG. 4



**FIG. 5**

**GLOVE WITH CALIBRATED MARKINGS**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] Not Applicable

**STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

[0002] Not Applicable

**BACKGROUND OF THE INVENTION**

[0003] Gloves are worn in many professions as a means for protecting the hands from noxious insult. The composition of materials used in gloves varies widely. Common materials include leather, latex, polyurethane, and nitrile rubber. Many professions utilizing protective gloves also require rapid and accurate measurement of objects. For example, in construction and manufacturing sciences, verifying the correct diameter of a drill bit, screw or pipe may be necessary.

[0004] In healthcare, practitioners encounter many settings necessitating measurements in the operating room, during emergencies, ambulatory medicine, intensive care units or on the wards. Verifying device size for specific procedures is an important aspect of providing high quality healthcare. In examining patients, the initial presentation of the size of a lesion or traumatic injury is also important. From melanoma to simple lacerations, accurate description of the dimensions of a pathological process is essential and in certain circumstances may be the difference between life and death.

[0005] In surgery, standard distances between structures have been established. Perturbation of these measurements may suggest an underlying disorder or assist in pinpointing a diagnosis. Likewise, important structures in the body such as nerves, glands, ducts and vessels also have established spatial references frequently used by practitioners to remain in anatomical "safe zones." For example, in patients with severe odontogenic infections, the maximum mouth opening in millimeters is an important measurement that determines the severity of disease that may indicate impending airway obstruction if not addressed. Failure to abide by these anatomical reference standards may easily result in permanent disability or disfigurement.

[0006] Current methods by which such measurements are made include estimation and measuring using a disposable ruler of approximately 10 cm in length. There are many shortcomings associated with the current art. As examples: first, estimation of the boundaries of a pathological process is inaccurate. Second, measuring rulers are not readily available in an emergency room, private clinic or ambulatory setting. Third, rulers are inaccurate when gauging the depth of penetration of an object. Fourth, rulers are prepackaged with a sterile marking pen generating significant amounts of refuse that must be incinerated as a biohazard if in contact with human fluids. Fifth, opening a sterile ruler requires the assistance of another individual if the practitioner has already put their gloves on, thereby decreasing productivity.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0007] FIG. 1 illustrates a palm side view of a glove in accordance with an exemplary embodiment of the invention.

[0008] FIG. 2 illustrates a back side view of a glove in accordance with an exemplary embodiment of the invention.

[0009] FIG. 2A illustrates in detail a close-up of the distortion indicia in accordance with an exemplary embodiment of the invention.

[0010] FIG. 3A and FIG. 3B illustrate views of linear scales located between the fingers of a glove in accordance with an exemplary embodiment of the invention.

[0011] FIG. 4 illustrates a movement which shows a purpose for placing linear scales between the fingers.

[0012] FIG. 5 illustrates an exemplary embodiment of the invention for use in the construction trade.

**DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[0013] This device improves on the current art by eliminating estimation from daily measurement practices in fields that utilize hand protective measures in the form of gloves. It provides a universal availability for measuring devices in settings where measurements are necessary. This device provides significantly enhanced ability to gauge the depth of penetration of an object or multiple objects. No additional assistance is required in making accurate and rapid measurement assessments, thereby reducing waste and increasing productivity. In healthcare, rapid identification of significant anatomical structures is facilitated by this device's use and patient safety is enhanced.

[0014] Described is a glove which incorporates a plurality of visual reference standards to aid a wearer in measuring or provide a reference for more accurate estimations. This glove is designed to be worn by anyone in any field that uses gloves and requires rapid and accurate measurements. The preferred embodiment described in detail below is designed to be worn by emergency room personnel, paramedics, and others in the healthcare field who need to provide accurate information but do not have the luxury of time to make their observations with the aid of separate reference materials.

[0015] In the preferred embodiment a standard examination glove is printed with linear charts and other visual references on various parts of the glove. The material commonly used for this type of glove is a thin impermeable elastic type material of latex or synthetic rubber type material. In the preferred embodiment the visual reference chart may be printed directly on the outer surface of the glove. In another embodiment, the glove may have embossed markings molded into the glove and further enhanced with a printed coating. In another embodiment the markings may be printed separately and adhered to the glove.

[0016] With an elastic material that is stretchable, a linear scale could possibly be stretched so as to no longer be accurate. A wearer should minimize this by wearing the proper sized gloves. However, even properly sized gloves could catch on a finger, or twist causing a pulling or other distortion of a visual reference scale. Such a distortion causes any measurement made to be less accurate. By using distortion indices on the scales, any distortion would be readily apparent. In the preferred embodiment the distortion indicia are comprised of small square outlines which allow the user to quickly and easily determine if the indicia are distorted. The wearer can visually determine if a scale is distorted because the squares would be pulled from a square into some other quadrilateral shape. In another embodiment the indicia comprise four triangles arranged to form a square with a minute separation between each. Any stretching of the glove will cause the triangles to distort or separate in a manner readily apparent to the wearer.

**[0017]** In another embodiment, at least the sections of the glove with the markings are molded of a thicker or otherwise less elastic material. However, doing so may affect the usability of the glove and wearer comfort. In another embodiment, the markings may be on a less elastic substrate which is adhered to the surface of the glove such that any stretching of the glove material would not distort the markings. However, doing so may cause the markings and the carrying substrate to separate from the glove. Further, this could occur at inopportune times causing serious issues for the wearer and/or patient.

**[0018]** In the preferred embodiment several visual reference standards are incorporate into the glove including but not limited to linear scales, ring scales, conversion charts, reference charts, Snellen charts, and charts with other optotypes or color combinations. Visual reference standards may be for use by the wearer to reference when making measurements, conversions, or comparisons. Visual reference standards may be for use by the wearer in examining the patient. Visual reference standards may be for reference of the wearer as a memory aid or for mental calculations. In one embodiment scales are provided in both the International System of Units (SI) and United States customary system (American System) formats. In one embodiment a visual reference standard comprises a series of comparison colors. An example can be the colors for comparison such as those determining pH on a test stick. In another embodiment the visual reference standard comprises a Snellen chart or other visual chart for testing visual disturbances.

**[0019]** Ring scales comprise bands or markings surrounding one or more fingers. By extending the finger with the correct ring scales for the comparison to be made, the wearer may then lay the finger against the object to be measured and note the size. As an alternative, a wearer may insert the finger into an opening to measure the depth by determining where the finger touches the bottom and observing the entry point of the opening against the gloved finger. In the preferred embodiment multiple ring scales in different reference standards are available on different fingers, including but not limited to one for American System measures and/or one for SI measures. Ring scales may be comprised of different thicknesses of bands to aid the wearer in quickly assessing measurements. For example, a ring scale may have thicker bands for inch measurements and thinner bands for half or quarter inch measurements.

**[0020]** Linear scales comprised of tick marks are placed on the inside edge of one or more fingers in the preferred embodiment. The fingers are convenient locations because they can be easily aligned with objects to be measured. Different fingers may contain American System and SI measurements. As an alternative, multiple measurement standards can be incorporated into a single linear scale. A longer scale can be included along the back of the hand to the opening in the glove. Such a scale could even start at the tip of a finger for lengthier measurements. As described above, the linear scales should include distortion indicia. Linear scales may be comprised of different thicknesses of tick marks or different lengths of tick marks to aid the wearer in quickly assessing measurements. For example, a linear scale may have longer ticks for inch measurements and shorter ticks for half or quarter inch measurements.

**[0021]** In soiled environments it is possible for visual reference standards on the glove to become obscured by foreign substances such as blood, grease, mud, etc. Further, abrasive

or corrosive environments could obscure the visual reference standards. By placing linear charts between the fingers they are protected from excessive wear, or obstruction. Further, if the charts become obscured, the wearer may simply pass the two fingers by each other causing each to wipe foreign substances from the other. In this manner, the wearer may clear their glove without using the other hand, or another object which could add contaminates to the environment.

**[0022]** One skilled in the art would appreciate that the application could be used for other types of gloves in other situations. In one embodiment, the glove may be a leather work glove, in another embodiment the glove may be a thick rubber insulating glove. One example is the use of a linear scale along the back of the hand and up the forearm of a thick rubber glove for use by fishermen to determine if a catch is of legal size. Another example is a work glove with concentric ring scales for use in determining inside and outside diameter of piping on a plumbing or construction job. Another example is a reference chart printed on the back of a construction glove for calculating the proper bend radiuses for conduit.

**[0023]** In one embodiment a Snellen chart is printed on the palm of a glove so the wearer may hold a palm up to the patient and ask them to recite a particular series of optotypes. In another embodiment other optotypes can be used to examine patients who are cannot read. One skilled in the art would appreciate that other types of charts meant to be shown to others, or to be referenced by the wearer could be printed on the palm or other parts of the glove. As an example conversion charts for volumetric conversions can be printed on the back of the thumb where they are easily viewed by the wearer.

**[0024]** The gloves described herein are of a chiral design, that is there are right- and left-handed versions. Thus visual reference standards indicated to be on the palm would be printed on the glove such that the thumb is on the right side of the printing for a right handed version and the thumb is on the left side of the printing for a left-handed version. One skilled in the arts would appreciate that the teachings could also be applied to achiral gloves where a printing would appear on the palm or back of the hand depending on if the wearer placed the glove on the left or right hand. In some instances such an application could have advantages. For instance, a Snellen chart printed such that it appears on the palm of the right hand can be used to check a patient's visual acumen. At the same time, the chart printed on an identical glove would be on the back of a wearer's left hand and could easily be referenced to verify the patient response. This is especially useful if the visual chart is comprised of non-standard optotypes such that the wearer has not memorized the chart.

**[0025]** FIG. 1 illustrates a palm side view of a glove in accordance with an exemplary embodiment of the invention. The glove (100) is of a chiral design and is illustrated as a right hand version viewed from the palm side (103). Thus, the thumb (101) is on the right side and four fingers (102) point up from the wrist opening (105).

**[0026]** The ring scales (120) are delineated with major band indicators (121) which are of a thicker or otherwise more prominent designation to indicate whole units. In the instance of the American System measurements (120B) such designations would delineate inches. In the instance of SI measurements (120A) such designations would delineate centimeters. The ring scales (120) are further delineated with minor band indicators (122) which are of a thinner or otherwise less prominent designation to indicate smaller than whole unit increments. In the instance of the American System measure-

ments (120B) such designations could delineate half inches. In the instance of SI measurements (120A) shown such designations are not included.

[0027] Linear scales (130) are located between the fingers (102) and are further discussed in reference to FIGS. 3A and 3B below. The linear scales (130) may be in SI measurement standards (130A) or American System measurement standards (130B).

[0028] The palm (103) has a visual reference standard (140) comprising a plurality of optotypes (141) of various configurations. Illustrated, as an example here is a standard Snellen chart with which one skilled in the arts would be familiar. Other optotypes such as the Landolt C or the Tumbling E could be used in place of the ten Sloan letters found on a traditional Snellen chart for patients who are illiterate or too young to read. One skilled in the art would appreciate that other charts or visual reference standards could be used in place of or in addition to the Snellen chart to test a patient's visual acuity and other characteristics.

[0029] FIG. 2 illustrates a back side view of a glove in accordance with an exemplary embodiment of the invention. The glove (100) is of a chiral design and is illustrated as a right hand version viewed from the back side (104). Thus, the thumb is on the left side and four fingers point up from the wrist opening (105). As discussed above, ring scales (120A and 120B) comprised of a plurality of major band indicators (121) and minor band indicators (122) are illustrated as wrapping around at least one finger (102) of the glove (100). Linear scales (130A and 130B) are located between the fingers (102) and are further discussed in reference to FIGS. 3A and 3B below.

[0030] The dorsum of the hand (104) has a dual linear scale (130') which illustrates both a SI measurement scale (130A) and American System measurements (130B). The dual linear scale further comprises a plurality of distortion indicia (210) which are shown in detail in FIG. 2A.

[0031] FIG. 2A illustrates in detail a close-up of the distortion indicia. Pluralities of triangle indicia (220) are grouped with minute divisions (230) to form a square distortion indicator (210). If the glove is pulled or material stretched the triangles will deform and/or the minute divisions will expand causing the square to distort giving the wearer a visual indication that the scale may be inaccurate.

[0032] FIG. 3A and FIG. 3B illustrate views, as indicated in FIG. 1, of linear scales located between the fingers of a glove in accordance with an exemplary embodiment of the invention. FIG. 3A illustrates a SI linear scale (130A) on the finger (102) of a glove. FIG. 3B illustrates an American System scale (130B) on the finger (102) of a glove. These illustrations are not illustrated to scale. The scales are comprised of a plurality of major tick marks (310) which indicate whole unit designations on the scale. The American System scale (130B) is further comprised of minor tick marks (320) which delineate smaller than whole unit increments, in this case half units. Further, the scales are comprised of a plurality of distortion indicators (210') which are square outlines which will deform into another quadrilateral shape if the material is stretched or otherwise distorted such that the scale may not be accurate.

[0033] FIG. 4 illustrates a purpose for placing linear scales between the fingers. By placing the linear scales (130A and 130B) between the fingers (102) of the glove (100), any obstruction can be easily removed by the motion (410) of

passing the fingers across each other. Since this is done with the one hand, no further contaminants are introduced to the environment.

[0034] FIG. 5 illustrates an exemplary embodiment of the invention for use in the construction trade. The linear scales are shown between the fingers of the glove. The palm side of the glove shows a visual reference standard for determining the inside diameter or outside diameter of construction materials including, but not limited to, pipe, bar stock or tubing.

[0035] The above descriptions discuss the palm (ventral) and dorsal aspects of the glove thus making the glove either a right or left handed glove identified by which side the thumb is located on when viewing the back of the glove. However one skilled in the art would appreciate that the gloves may be manufactured in an achiral fashion such that one glove would fit either hand. In this fashion, visual standard references such as a linear scale along the back of the glove would appear on the palm of the other hand, and thus may be less useful. However, the opposite could also be said, because a Snellen chart on the palm of one hand, which is shown to the patient, could be referenced by the wearer on the dorsum of the contralateral hand to confirm what was being reported by the patient.

[0036] The diagrams in accordance with exemplary embodiments of the present invention are provided as examples and should not be construed to limit other embodiments within the scope of the invention. For instance, heights, widths, and thicknesses may not be to scale and should not be construed to limit the invention to the particular proportions illustrated. Additionally some elements illustrated in the singularity may actually be implemented in a plurality. Further, some elements illustrated in the plurality could actually vary in count. Further, some elements illustrated in one form could actually vary in detail. Further yet, specific numerical data values (such as specific quantities, numbers, categories, etc.) or other specific information should be interpreted as illustrative for discussing exemplary embodiments. Such specific information is not provided to limit the invention.

[0037] The above discussion is meant to be illustrative of the principles and various embodiments of the present invention. Numerous variations and modifications will become apparent to those skilled in the art once the above disclosure is fully appreciated. It is intended that the following claims be interpreted to embrace all such variations and modifications.

1. An examination glove comprising:
  - visual reference standards on the glove's outer surface;
    - wherein the visual reference standards are provided in a plurality of ink colors.
2. The examination glove of claim 1, wherein the glove is constituted of thin elastic material with four fingers and a thumb.
3. The examination glove of claim 1, wherein the visual reference standards are printed on the outer surface of the glove.
4. The glove of claim 9, wherein the visual reference standards are printed in a single color ink.
5. (canceled)
6. The examination glove of claim 1, wherein the visual reference standards are molded into the glove's material.
7. The glove of claim 12, wherein the visual reference standards on the glove are embossed.
8. The glove of claim 12, wherein the visual reference standards are adhered to the glove's surface.

- 9.** A glove comprising:  
visual reference standards on the glove's outer surface;  
wherein the glove is constituted of thin elastic material  
with four fingers and a thumb; and  
wherein the visual reference standards comprise a linear  
scale with square indices positioned such that distortion  
of the scale will distort the indices in a visually apparent  
manner.
- 10.** The glove of claim **9**, wherein the linear scale is  
between two adjacent fingers.
- 11.** (canceled)
- 12.** A glove comprising:  
visual reference standards on the glove's outer surface;  
wherein the visual reference standards comprise linear  
scales, and wherein the linear scales are marked to com-  
ply with a plurality of different measurement standards.
- 13-17.** (canceled)
- 18.** The glove of claim **12**, wherein portions of the glove are  
of a non-elastic material to prevent distortion of the visual  
reference standards.
- 19.** A process for conducting an examination comprising:  
wearing a glove with visual reference standards;  
comparing an item to be examined to the visual reference  
standards;  
observing characteristics of the item being examined; and  
noting the characteristics of the item being examined.
- 20.** (canceled)
- 21.** The glove of claim **9**, wherein each of the indices is  
positioned within a space between units of the linear scale.
- 22.** The glove of claim **9**, wherein the indices comprise  
triangles.
- 23.** The glove of claim **9**, wherein the glove is an exami-  
nation glove.
- 24.** The glove of claim **12**, wherein the glove is an exami-  
nation glove.

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