March 8, 1966 C. D. SNAKARD 3,238,628

BOWLING BALL GRIP MEASURING DEVICE

Filed June 12, 1963 2 Sheets-Sheet 1

Fig. 5.

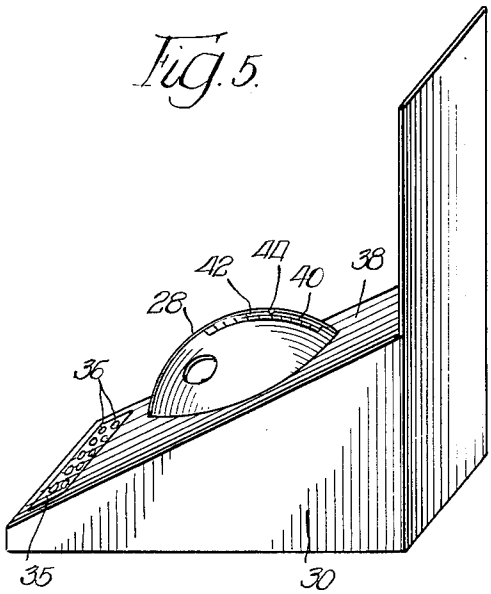


Fig. 2

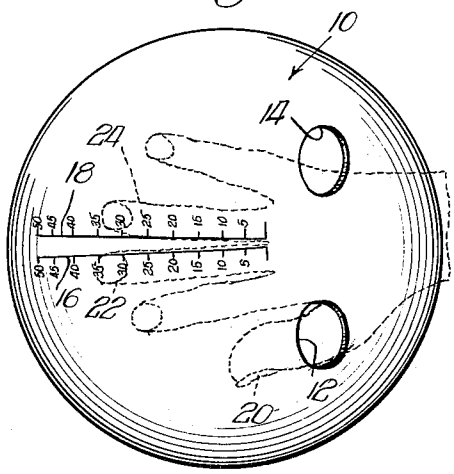


Fig. 1

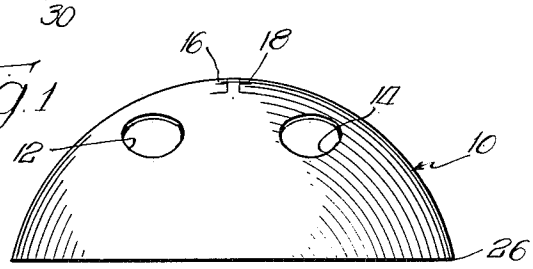


Fig. 4

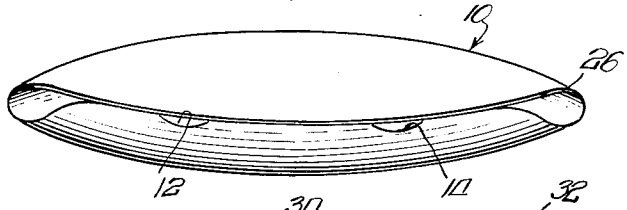
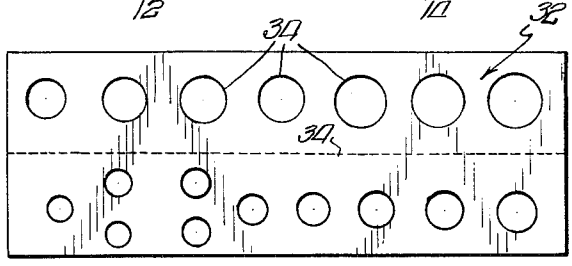


Fig. 3.



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Fig. 6

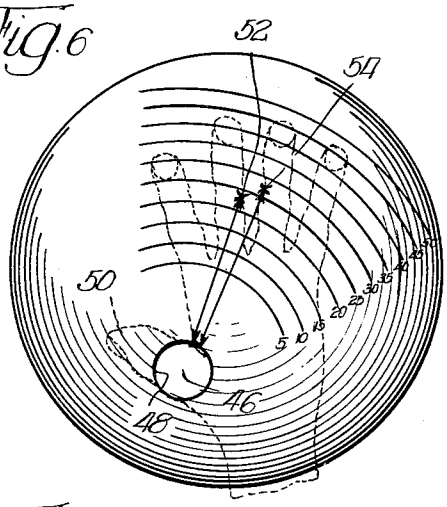


Fig. 7

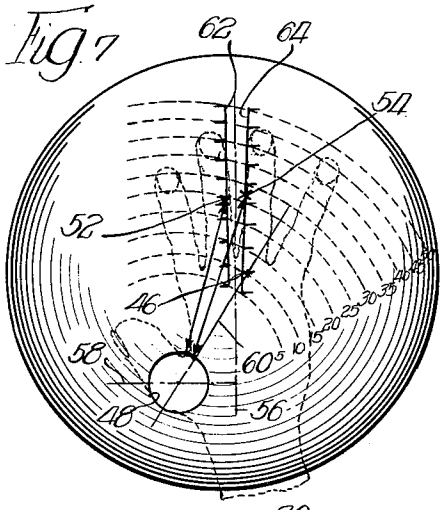


Fig. 8

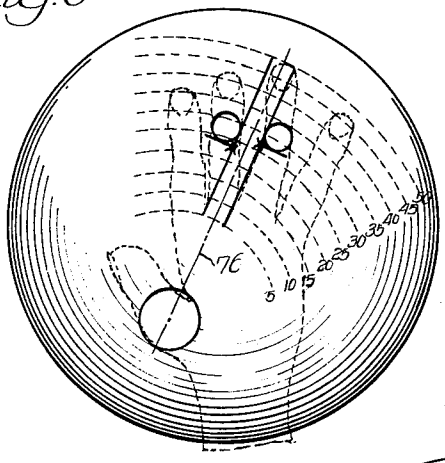


Fig. 9

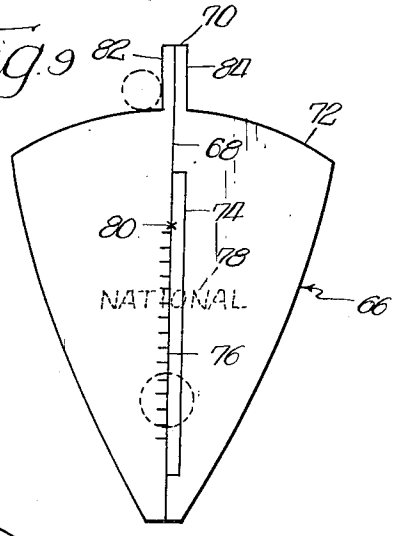
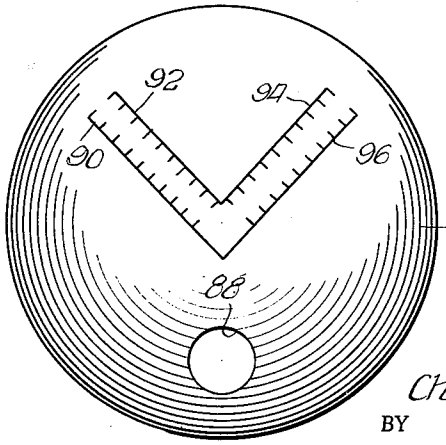


Fig. 10



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3,238,628

BOWLING BALL GRIP MEASURING DEVICE

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5 Claims. (Cl. 33—174)

This invention relates to a grip determining method and device for bowlers and more particularly, to a method and apparatus by which the correct location of the finger holes in a bowling ball may be quickly and accurately determined.

Many elaborate devices have been developed for use in determining where the finger holes and thumb hole should be drilled for the purchaser of a new bowling ball. The method and device described below have been developed principally to provide a means of marketing bowling balls on a mail order basis, or through a so called "catalog" store. In order for such a device to be useful in this manner, it must necessarily be quite inexpensive, and furthermore, quite simple, both in its construction and operation. As a matter of fact, it must be capable of being incorporated in a form that is inexpensive enough and simple enough to be used as a mailing piece, for distribution to customers seeking to purchase a bowling ball drilled to fit their particular grip.

Another object is to provide a device which can be made of suitably flexible material, so that its size can be substantially reduced by rolling the material into a compact form for mailing purposes.

Still another object is to provide such a device which is lightweight enough to be readily mailable but sufficiently durable to survive relatively rough handling.

Another object is to provide a grip determining device which, although simple and inexpensive, is sufficiently accurate to permit the span or grip measurements to be taken "remotely" by a customer, and then have this information forwarded to a supplier, who will then send an appropriately drilled ball back to the customer.

Further objects and advantages of this invention will become evident as the description proceeds and from an examination of the accompanying drawings which illustrate several embodiments of the invention and in which similar numerals refer to similar parts throughout the several views.

In the drawings:

FIGURE 1 is a view in elevation of one form of device incorporating the invention showing the right and left hand thumb holes and a portion of the "span" scales for the fingers.

FIGURE 2 is a plan view of the form of device shown in FIGURE 1 with the hand of a user being shown (in dotted lines) disposed in place for measuring the span of the finger holes.

FIGURE 3 is a plan view of a finger hole card gauge for use in determining the proper diameter for the thumb and finger holes.

FIGURE 4 is a view in elevation of a grip determining device of the form shown in FIGURE 1 rolled upon itself to the degree permitted by the flexible nature of the material from which it is formed.

FIGURE 5 is a perspective view of another embodiment of the invention incorporating devices such as shown in FIGURES 1 and 3 mounted in association on a support and particularly suitable for counter use.

FIGURE 6 is a diagrammatic representation of the manner in which the span of the middle finger and ring finger may be measured from a thumb hole, in a spherical bowling ball.

FIGURE 7 is a diagrammatic representation of the way the general method of span measurement illustrated in

FIGURE 6 is incorporated in the scales of the form of the invention shown in FIGURES 1 and 2.

FIGURE 8 is a diagrammatic showing of the manner in which the finger holes are preferably laid out on a bowling ball, once the span has been determined by use of the method and a device which is the subject of the present invention.

FIGURE 9 is a plan view of a preferred form of layout gauge adapted to be used with the grip determining device incorporating the invention.

FIGURE 10 is an alternative embodiment of a grip determining device incorporating the invention having only one thumb hole but being useful for both left and right handed users.

Referring now to FIGURES 1 and 2, a grip determining device embodying one form of the invention is shown therein, indicated generally by the numeral **10**. This member **10** is in the form of a segment of a sphere which may preferably be formed of a thin sheet-like material. At least one thumb hole **12** is provided in the surface of the spherical segment **10** which makes the device useful for a right-handed bowler. Preferably a second thumb hole **14** is also provided in spaced relation to the first thumb hole **12** which makes the device equally useful for a left-handed bowler. A pair of spaced scales **16** and **18** are disposed symmetrically between the two thumb holes **12** and **14**, and somewhat above them, so that one scale will be adapted to underlie the middle finger, and the other the ring finger, when the thumb of a user is fully inserted in one of the thumb holes, as shown in the dotted line representation of a right hand in FIGURE 2. As there shown, the thumb **20** of the right hand of the user is inserted in the thumb hole **12** and the middle finger **22** is shown in overlying relationship with the scale **16**, whereas the ring finger **24** is shown in overlying relationship with the scale **18**.

Obviously, if a user's left hand were placed on the grip determining device, the left thumb would be inserted in the thumb hole **14** and the middle finger would overlie the scale **18** and the ring finger overlie the scale **16**. Furthermore, it is apparent that such a device could be made for only right handed bowlers and in such instance the thumb hole **14** would be omitted. The preferred relationship between the thumb holes and the scales will be discussed in more detail below.

As shown in FIGURE 4 the spherical segment **10** may be formed of thin sheet material having substantial flexibility, so that it can be rolled sufficiently to substantially reduce its volume, and to produce a substantially ellipsoidal element which is capable of being inserted in a container such as a mailing tube. Any suitable material can be utilized for fabrication of the spherical segment, such as a polystyrene plastic. A sheet .015 inch in thickness has been satisfactorily utilized to form a self-supporting spherical segment, or shell, but which is also capable of being rolled into the form shown in FIGURE 4. It is preferable that a slight bead **26** be formed along the base of the segment, as shown in FIGURE 1, to reduce the likelihood of damage to that edge when the segment is so rolled. The segment need not be completely self-supporting in the sense of forming a true segment of a sphere in normal repose, since if somewhat flexible is still can be caused to assume the spherical shape in which it was originally molded by placing it on a flat supporting surface such as a table top with the edge containing the bead **26** in contact therewith and exerting a downward pressure thereon with the hand so that it expands to its full circumference, and forms a substantially rigid spherical surface.

Our course, it is also possible to form the spherical segment either as a solid or as a rigid shell, but in such instance it is not capable of being deformed into the sub-

stantially ellipsoidal form shown in FIGURE 4. Such a rigid type of element is shown in FIGURE 5 in the form of the spherical segment **28** which is permanently associated with a supporting base member **30** adapted to be utilized on a counter or the like.

The grip determining device **10** is designed only to measure the span or grip of the user. In order to custom fit a purchaser's hand to a ball, it is therefore necessary to have available a means of determining the diameter of the thumb hole and finger holes which will be required by the user. Such a finger hole gauge is shown in FIGURE 3 and is indicated generally by the numeral **32**. This element may take the form of a simple card gauge having a plurality of holes **34** formed therein of varying diameter. With such a gauge the individual utilizing the grip determining device can establish the diameter of the holes necessary to accommodate the thumb and fingers, in addition to the span or grip. Such a card member as the device **32** shown in FIGURE 3 may be formed so that it may be folded along the line **34**, which will permit it to be packaged with a grip determining device of the form shown in FIGURES 1 and 2, when it has been rolled into the form shown in FIGURE 4.

On the other hand, the finger hole gauge may also be incorporated with a more permanent form of grip determining device such as shown in FIGURE 5. There the finger hole gauge **35** is also of a more permanent nature, being formed as a plurality of holes **36** in the top surface **38** of the base **30** below the spherical segment **28**.

Because of the rigid nature of the segment **28**, each of the scales provided thereon, such as the scale **40**, may also have associated therewith a slot **42** in which a marker **44** is adapted to slide. Such a marker or index may be set at a particular position to record the precise reading obtained on the scale in the measurement of a particular user's grip. After obtaining the span measurements for the fingers in this way, the diameter of the hole required for those fingers and the thumb can be determined by use of the gauge **35**.

The specific manner in which the grip determining device **10** is utilized is best shown in FIGURE 2. As indicated therein by the dotted line representation of the hand of the user, the fully extended thumb **20** is inserted in the thumb hole **12**, and the middle and ring fingers are disposed over the two scales **16** and **18**, respectively, with the hand in the fully spread position. A reading is taken on each of the scales, corresponding to the location of the crease associated with the middle knuckle on the palm side of the finger. These two readings (or one, in the case of a two finger ball) form the information necessary to determine the location of the finger holes with respect to the thumb hole, or the span. The hole diameter that will be required by a particular user for each finger and thumb hole can be determined readily from the finger gauge, such as the gauge **32** shown in FIGURE 3, by finding the particular hole in which the finger or thumb fits snugly but can be readily withdrawn. With this information, a ball can be properly drilled to fit a particular hand.

The preferred method of accomplishing the transfer of the information obtained from the grip determining device as just described, is illustrated in FIGURES 6, 7 and 8. As shown in FIGURE 6, a plurality of concentric circles can be inscribed on a bowling ball utilizing the point **46**, corresponding to the center of the thumb hole **48**, as the center of the concentric circles. These circles themselves could form a gauge, such as that shown in FIGURE 6, and if the hand of a bowler were placed on the ball in the manner shown in dotted lines, with the thumb **50** fully inserted in the thumb hole **48**, the line or crease on the palm side of the middle and ring fingers immediately below the middle knuckle would fall at a particular point on the scale so formed by the concentric circles. The points **52** and **54**, illustrate in FIGURE 6 the location of the crease lines in the fingers, as described.

Because of the physical configuration of the human hand, these points are offset substantially from the thumb and the thumb hole **48**. If the concentric lines forming the scale were full circles on the surface of the ball, the measurement would be the same regardless of the orientation of the hand with respect to a particular point on the ball. In other words, with the thumb fully inserted in the hole **48**, the hand could be rotated completely around the ball and the points **52** and **54** thereon would fall continuously on the same lines or points of the scale. Such a scale, as shown in FIGURE 6, could be utilized in the grip determining device **10**, but it has been found that a scale of this nature is not readily understood by the average person and therefore, is not well accepted.

To overcome this problem, scales of the more conventional form shown in FIGURE 2 are placed on the spherical segment **10**, rather than the concentric circles shown in FIGURE 6. These scales are placed in a manner such that it will be natural for the user to place his fingers over them, after he has inserted his thumb in the thumb hole, and therefore, a correct measurement can readily be obtained by the user without personal supervision. The relationship to the concentric circle type of scale shown in FIGURE 6 of the scales shown in FIGURE 2 is illustrated in FIGURE 7. The indices on the scales **62** and **64** mark what would be the points of intersection by scales **62** and **64** with the concentric scale lines of FIGURE 6.

In addition to the relationship just mentioned, the preferred form shown in FIGURE 2 also has a thumb hole such as the hole **48** with a diameter of 1⅛ inches and the reference line **56** is disposed at right angles to the line **58**, which is an extended diameter of the thumb hole **48**. The line **56** is preferably at a distance of ¾ of an inch from the center **46** of the thumb hole. The base line of the two scales is located at a point on the line **56** at which an extended radius **60** of the hole **48** intersects the line **56**, when the distance along the line **60** from the edge of the thumb hole to the line **56** is 2¼ inches. The two scales **62** and **63** are preferably disposed 3/16 of an inch apart at the lowermost point, and ⅜ of an inch apart at the uppermost point, the scales themselves being preferably 3⅛ inches in length. All of these dimensions, of course, are for a bowling ball of standard diameter. As mentioned the points of intersection of the concentric circles forming the scale shown in FIGURE 6 with the edges of the scales **62** and **64** become scale marks of the scales **62** and **64**.

The preferred way in which the information for the span or grip obtained from the grip fitting device may be transmitted to a new bowling ball for drilling is illustrated in FIGURES 8 and 9. If the points **52** and **54**, for example, shown in FIGURE 7, have been located on the scales **62** and **64**, they can be laid out on a ball by the use of a conventional marking gauge, such as is illustrated in FIGURE 9. The gauge is indicated generally by the numeral **66** and is formed as a segment of a spherical shell. It has a central axis **68** and a tongue member **70** extending at right angles to the upper edge **72** of the guage. A slot **74** is provided in the gauge immediately adjacent the center line **68**, and a scale **76** is provided on one edge of the slot. The tongue **70** is 5/16 of an inch in width, in such a conventional gauge which establishes a standard distance between the peripheries of the finger holes in drilling a bowling ball, but not a standard distance between their centers. The larger the diameters of the finger holes, the larger will be the distance between centers.

When the proper position of the thumb and finger holes is to be marked on a blank, undrilled ball, the gauge **66** is preferably disposed on the surface of the ball so that the manufacturer's identification, indicated by the dotted lines **78**, falls substantially in the center of the gauge, and the balance point **80**, which is provided on every ball, will be lined up with the center line **68**. The two edges **82** and **72**, then form lines of tangency to the hole for the middle finger, it being given a diameter identical with that measured by the finger gauge to be the appro-

priate size. The thumb hole is then located by use of the scale **76** to establish the span between the periphery thereof and the periphery of the middle finger hole.

The ring finger hole is then located by disposing the scale **76** so as to provide the measured span between the periphery of the thumb hole and that of the ring finger hole. The latter is again located so that the edge **84** and the edge **72** are tangentially disposed to a hole of the appropriate diameter for the ring finger. Although a constant spacing is established by the tongue **70** between the finger holes, it is apparent, as mentioned above, that the centers of these holes will be farther apart when the holes are of larger diameter than the centers are if the holes are of smaller diameter. There is, therefore, a natural accommodation for larger sized hands in the distance separating the centers of the finger holes.

The relationship of the manner in which the holes are laid out with the gauge **66** to the concentric circle form of scale is shown in FIGURE 8.

An alternative embodiment of a grip determinining device incorporating the invention having only one thumb hole but being useful for both left and right handed users, is shown in FIGURE 10. In this form of device, a thumb hole **86** is provided similar to the thumb hole **12** shown in FIGURES 1 and 2. This alternative form includes a spherical segment **86** of the same general form as the segment **10** shown in FIGURES 1 and 2. However, only a single thumb hole **88** is provided which may be used either by a left handed or a right handed bowler. Two pairs of scales are disposed on the surface of the spherical member **86**, the scales **90** and **92** being adapted for use by a right handed bowler and the scales **94** and **96** being adapted for use by a left handed bowler, substantially in the same manner as previously described for the embodiment shown in FIGURES 1 and 2.

Upon close examination, it will be noted that the scales **90** and **92** have a relation to the thumb hole **88** that is similar to the relation that the scales **16** and **18** have to the thumb hole **12**. The principal difference is that the scale **92** is somewhat shorter than the scale **18**. Likewise, the scales **94** and **96** have a similar relation to the thumb hole **88** as do the scales **16** and **18** to the thumb hole **14**. The manner of use of the form of device shown in FIGURE 10 is the same as that shown in FIGURES 1 and 2, except for the fact that the same thumb hole is used for both hands.

In the drawing and specification, there has been set forth several embodiments of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation. Changes in form and in the proportion of parts, as well as the substitution of equivalents are contemplated, as circumstances may suggest or render expedient, without departing from the spirit or scope of this invention as further defined in the following claims.

I claim:

1. A bowling ball grip measuring device which comprises a shell member, said shell member being formed from a segment of relatively thin flexible sheet material that is collapsible into a rolled configuration and that forms a hemispherical measuring surface with a radius equal to that of a conventional bowling ball when the edge thereof is supported on a plane under slight pressure, at least one thumb hole formed in said shell member so as to receive the extended thumb of a user whose grip is to be measured when the hand of the user is placed in measuring orientation on said hemispherical measuring surface formed by the shell member, and means defining a pair of spaced scales on said shell member including a plurality of scale marks that mark the location of points on equally spaced circles concentric with the said thumb hole, said defined scale marks being disposed relative to said thumb hole so as to underlie the middle and ring finger of the hand of a user when disposed in measuring orientation on said hemispherical measuring surface.

2. A grip determining device for bowlers comprising a normally collapsible shell member formed of relatively thin flexible material having a substantially hemispherical configuration with a radius equal to a conventional bowling ball when supported along its edge under slight pressure by a planar surface, a pair of spaced thumb holes in said shell member and a pair of scales on said spherical shell member equidistant and symmetrically disposed on opposite sides of a line normal to and bisecting a second line joining the centers of said thumb holes, said scales comprising a plurality of scale marks marking the location of a portion of equally spaced circles concentric with said thumb hole, said marks being adapted to underlie the middle and ring finger of said hand of said user when so applied to said shell member.

3. A grip determining device for bowlers comprising a normally collapsible shell member formed of relatively thin flexible material having a substantially hemispherical configuration with a radius equal to a conventional bowling ball when supported along its edge under slight pressure by a planar surface, a pair of spaced thumb holes in said shell member, one of which is adapted to receive the extended thumb of a right handed bowler, and the other of which is adapted to receive the extended thumb of a left handed bowler, and a pair of spaced scales on said shell member, one scale of said pair being adapted to underlie the middle finger of said right handed user and the other of said scales being adapted to underlie the ring finger of said right handed user, respectively, when the thumb is fully inserted in said thumb hole for a right handed bowler and the fingers are spread on said surface in normal ball-gripping relation to each other, said scales being disposed in such spaced relation as to permit the reading of the position of the middle knuckle of each said finger on the scale which it overlies, said scales being adapted to likewise underlie the ring and middle fingers, respectively, of a left handed user when the thumb is fully inserted in said thumb hole for a left handed bowler.

4. A grip determining device for bowlers comprising a normally collapsible shell member formed of relatively thin flexible material having a substantially hemispherical configuration with a radius equal to that of a conventional bowling ball, a thumb hole in said shell member capable of receiving the extended thumb of the user and a pair of spaced scales on said surface extending away from said hole at an angle to a line bisecting said hole, and a second pair of spaced scales on said shell member extending away from said hole at an angle to and on the opposite side of said line bisecting said hole.

5. A grip determining device for bowlers comprising a normally collapsible shell member formed of relatively thin flexible material having a substantially hemispherical configuration with a radius equal to that of a conventional bowling ball, a thumb hole in said shell member capable of receiving the extended thumb of the user and two pairs of spaced scales on said surface, one scale of each said pair being adapted to underlie the middle finger of said user and the other of said scales being adapted to underlie the ring finger of said user, respectively, when the thumb is fully inserted in said thumb hole and the fingers are spread on said surface in normally extended relation to each other, said scales in each pair being disposed in such spaced relation as to permit the reading of the position of the middle knuckle of each said finger on the scale which it overlies, said readings being taken on the sides of said fingers lying adjacent to each other, one pair of scales of said two pairs being disposed to so cooperate with the fingers of a right handed user when the thumb of the right hand is so inserted in said thumb hole, and the other pair of scales being disposed to so cooperate

with the fingers of a left handed user when the thumb of the left hand is so inserted in said thumb hole.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,238,628 March 8, 1966

Charles D. Snakard

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 62, for "is" read -- it --; line 70, for "Our" read -- Of --; column 4, line 38, for "63" read -- 64 --; column 6, line 10, for "shell member" read -- surface --; lines 46 and 58, after "ball", each occurrence, insert -- when supported along its edge under slight pressure by a planar surface --; lines 47 and 59, after "user", each occurrence, insert -- when the hand of said user is applied to said shell member --; same column 6, line 60, for "surface" read -- shell member --.

Signed and sealed this 24th day of January 1967.

(SEAL)

Attest:

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Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents