March 19, 1963 R. JACKSICH ETAL 3,081,550

BOWLER'S GRIP-FITTING BALL

Filed Aug. 15, 1961 2 Sheets-Sheet 1

Fig. 1

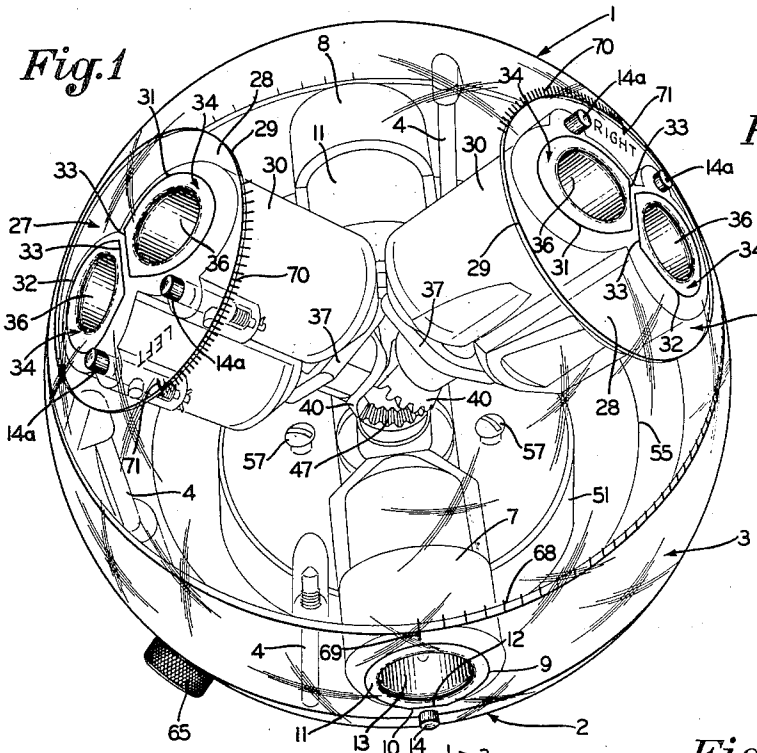


Fig. 9

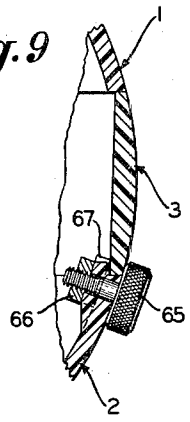


Fig. 5

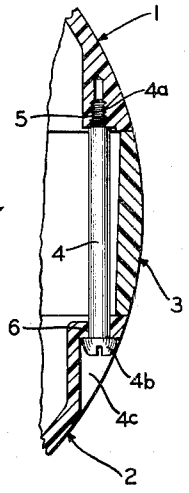
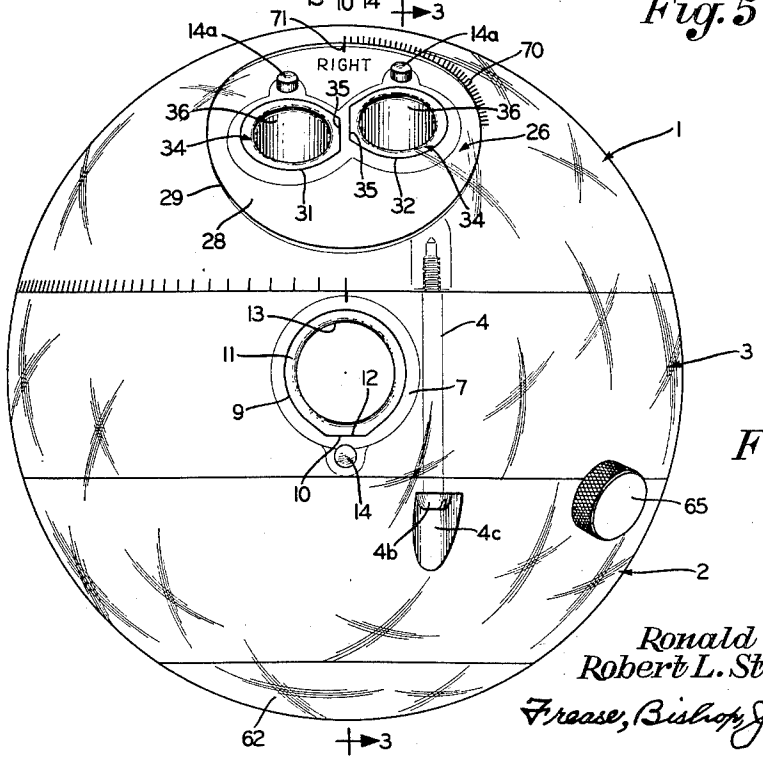


Fig. 2



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BOWLER'S GRIP-FITTING BALL

Filed Aug. 15, 1961 2 Sheets-Sheet 2

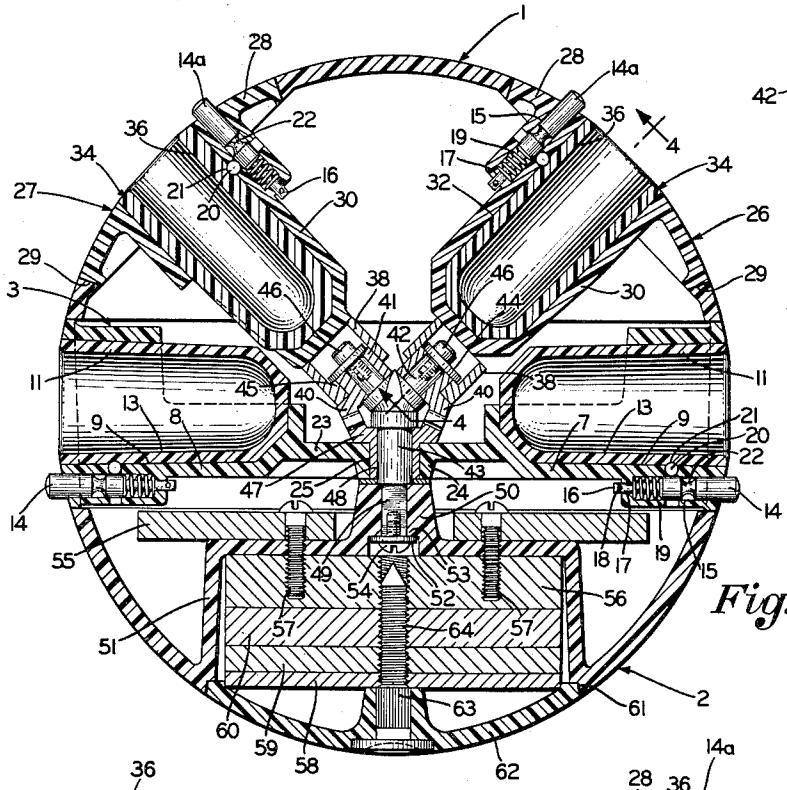


Fig. 3

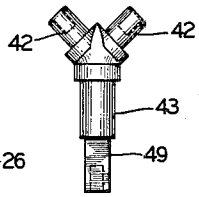


Fig. 8

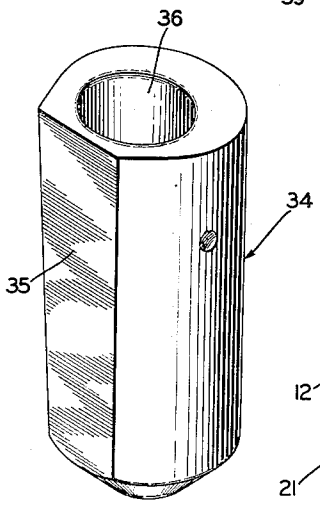


Fig. 7

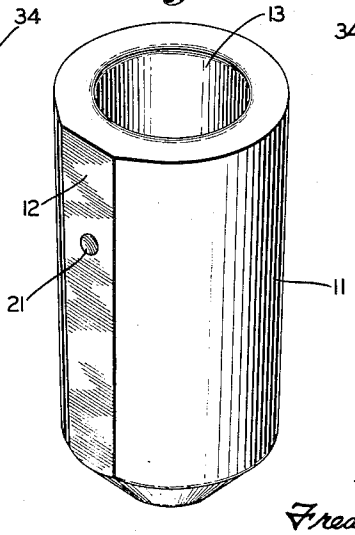


Fig. 6

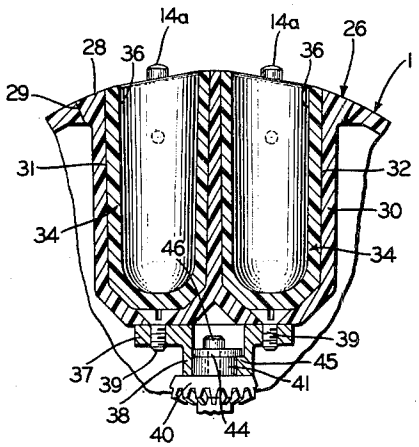


Fig. 4

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BOWLER'S GRIP-FITTING BALL

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11 Claims. (Cl. 33—174)

The invention relates to a device for measuring a bowler's grip, and more especially to means for measuring an individual's grip or span between the thumb and the middle and ring fingers to determine the proper location and size of the thumb and finger holes in a bowling ball.

It is customary to provide a bowling ball with holes into which the thumb and middle and ring fingers are inserted, for grasping the ball and swinging it to roll it onto the alley.

In order to provide for accuracy in bowling, as well as for the comfort and convenience of the bowler, the thumb and finger holes should be accurately located relative to each other so as to properly suit the individual bowler's grip, or span between the thumb and finger holes, measured over the circumference of the ball, as well as the proper sizes of the thumb and finger holes.

The average bowler has his own bowling ball made to order, with the thumb and finger openings of proper size bored therein to suit his grip. Since custom-made bowling balls are comparatively expensive, it is important that the purchaser's grip, as well as the diameters of the thumb and finger holes, be accurately determined before the holes are bored into the ball.

Bowling balls are ordinarily produced in different weights, generally varying in weight from 10 to 16 pounds, and each individual bowler generally prefers a ball of a certain weight.

It is, therefore, desirable not only to accurately determine the proper size and relative spacing and location of the thumb and finger holes, but also to permit the purchaser to grasp and swing a properly pored ball of desired weight so as to get the "feel" of the ball.

Because of the large variation in the sizes of human hands, and the diameters of the thumb and fingers, the diameters of the thumb holes may vary from about ¾" to 1⅜"; diameters of the finger holes may vary from ⅝" to 1", and the span between the thumb and middle finger may vary from 2½" to 5½" or even 5¾".

Furthermore, in the average human hand, the diameter of the ring finger is slightly less than that of the middle finger, and when the hand is flexed to grasp a bowling ball, the ring finger is farther from the thumb than the middle finger.

The span between the thumb hole and the ring finger hole should therefore ordinarily be somewhat greater than the span between the thumb hole and the middle finger hole, although these proportions vary in different individuals.

It will thus be evident that there are many possible combinations of relative sizes and spacing of thumb and finger holes, making it important that the proper combination of relative sizes and spacing of the holes be accurately determined for each individual case before the holes are bored into the bowling ball.

It is known that there are several grip-fitting devices in the prior art, none of which is entirely satisfactory. Some of the prior art devices are objectionable because they merely measure the bowler's span or grip but do not permit him to grasp the ball with his thumb and fingers located in properly sized and spaced holes.

Others of these devices are objectionable because although they measure the grip or span they do not provide for measurement of the proper size of thumb and finger holes.

Still other prior art devices, although affording some degree of measurement of the sizes of the thumb and finger holes, and the bowler's grip, are expensive and complicated in construction and do not produce sufficiently accurate measurements to be commercially practical.

Also, the prior art devices generally provide only for spacing the thumb and finger holes at certain predetermined distances apart.

It is, therefore, an object of the present invention to provide a bowler's grip-fitting device which overcomes the disadvantages and difficulties of the prior art devices.

Another object of the invention is to provide a device of this character having a full range span coverage from the smallest hand to the largest.

A further object of the invention is to provide a bowler's grip-fitting ball of the character referred to which is in the form of a regulation size bowling ball and which is easily and quickly adjustable to the desired weight for the individual bowler.

A still further object of the invention is to provide a grip-fitting ball of the character referred to, in which the locations of both the middle finger hole and the ring finger hole, relative to the thumb hole, may be very accurately determined.

Another object of the invention is to provide a bowler's grip-fitting device of this character, including two spaced semispherical segments and an intermediate annular section rotatable relative to each other around an axis, the intermediate section containing a thumb hole and the upper segment containing finger holes, whereby the intermediate section may be rotated relative to the segments to provide for any required spacing between the thumb hole and the finger holes.

It is also an object of the invention to provide such a device in which the finger holes are located in a circular finger-hole socket member rotatable around a radial axis in the upper semi-spherical segment.

A still further object of the invention is to provide a grip-fitting ball of the character referred to in which a plurality of finger hole inserts, having various sizes of finger holes therein, may be interchangeably inserted into said rotatable circular member.

Another object of the invention is to provide such a device in which a plurality of thumb hole inserts, having thumb holes of varying size therein, may be interchangeably inserted into a socket in the intermediate annular section.

It is also an object of the invention to provide a bowler's grip-fitting device of this character in which the intermediate annular section is located between the upper and lower semi-spherical segments and rotatable relative thereto.

Furthermore, it is an object of the invention to provide a device of the character referred to in which the rotatable circular finger hole socket member in the upper segment is conneced by gears to the intermediate annular section, whereby the rotatable finger hole socket member in the upper segment will be automatically rotated upon its axis as the intermediate section and upper segment are rotated relative to each other.

It is also an object of the invention to provide such a device in which the grip of either a right-handed or left-handed bowler may be equally accurately determined.

And finally, it is an object of the invention to provide a bowler's grip-fitting ball of the character referred to which is formed of a clear transparent plastic material.

The above objects, together with others, which will be apparent from the drawings and following description, may be attained, the above described difficulties overcome

and the advantages and results obtained, by the apparatus, construction, arrangement and combinations, sub-combinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicants have contemplated applying the principle, being set forth in detail in the following description and illustrated in the accompanying drawings.

The invention may be briefly described in general terms as comprising a bowler's grip-fitting device of the size and shape of a standard bowling ball, formed of upper and lower hollow, substantially semi-spherical segments joined in spaced relation, and an intermediate annular section, all formed of clear transparent material such as plastic materials now obtainable upon the market under the trademarks "Lucite" and "Plexiglas."

Axially aligned sockets are formed in opposite sides of the intermediate annular section for selectively receiving hollow inserts having thumb holes of various sizes therein, with means for temporarily latching the thumb hole inserts therein.

Circular finger hole socket members, rotatable upon radial axes, are mounted in opposite sides of the upper semi-spherical segment, each having two finger hole sockets therein for selectively receiving finger hole inserts having finger holes of varying sizes therein, with means for temporarily latching the finger hole inserts therein.

A bevel gear is fixed within the center of the intermediate annular section and meshes with bevel pinions upon the inner ends of the circular rotatable finger hole socket members in the upper semi-spherical segment, whereby rotation of the semi-spherical segments relative to the intermediate annular section causes the circular finger hole socket members to rotate upon their axes.

One of the thumb holes and the corresponding pair of holes are adapted to receive the thumb and middle and ring fingers, respectively, of the right hand for measuring a right-handed bowler's grip, and the other thumb hole and finger holes are provided for measuring the grip of a left-handed bowler.

A plurality of interchangeable thumb hole inserts, having thumb holes of various sizes, may be interchangeably mounted in either of the thumb hole insert sockets, and in like manner a plurality of finger hole inserts, having finger holes of various sizes therein, are provided for selective insertion into the finger hole insert sockets, so that the device may be quickly adapted to the proper thumb and finger sizes for each individual customer.

In the use of the grip-fitting ball, the prospective customer selects the thumb hole insert which best fits his thumb and inserts the same into the proper thumb hole socket and latches it in place therein.

Two finger hole inserts which best fit his middle and ring fingers are then selected and inserted into the corresponding finger hole insert sockets and latched therein.

Assuming that the customer is right-handed, the thumb and finger hole inserts will be inserted into the corresponding sockets on the right-hand side of the ball. The customer may now insert the thumb and fingers of his right hand into the holes in the respective inserts.

The intermediate annular section of the ball being rotatable relative to the segments, the normal adjustment of the thumb and fingers to the proper grip or span, with the hand lying over the surface of the ball, will cause relative movement between the intermediate annular section, containing the thumb hole, and the upper segment containing the finger holes.

As the parts are thus moved relative to each other, the finger hole insert socket will be rotated upon its axis, by means of the gear and pinion connection, positioning the finger holes properly relative to the thumb hole.

When the bowler's grip has thus been determined, the exact relative locations and positions of the thumb and finger holes may be read upon the scales provided for this purpose on the surface of the grip-fitting ball.

With these readings, it will be easy to make a ball with the thumb and finger holes of proper size to fit the bowler's thumb and fingers, and properly located and positioned relative to each other to exactly suit the bowler's grip.

For the purpose of determining the desired weight of ball for each individual customer, the lower segment has a downwardly open pocket therein to receive weights. The bottom of the lower segment is open to provide access to said pocket, and a closure cap is provided for said opening.

Means is provided for locking the closure cap in closed position and securing the weights in the pocket. Thus, when the proper grip has been determined, the intermediate annular section is locked against movement relative to the segments, and the proper weights are secured in the pocket in the lower segment.

The customer may then grasp the ball and swing it to get the "feel" of the ball, so that he can decide whether the weight of the same is what he desires or whether the ball should be made heavier or lighter.

Having thus briefly described the invention, reference is now made to the accompanying drawings illustrating a preferred embodiment of the invention, in which;

FIG. 1 is a perspective view of the improved bowler's grip-fitting ball, showing the parts thereof adjusted to the maximum grip or span;

FIG. 2 is a side elevation of the right-hand side of the grip-fitting ball, showing the parts adjusted to the minimum grip or span;

FIG. 3 is a sectional view through the grip-fitting ball, taken as on the line 3—3, FIG. 2;

FIG. 4 is a fragmentary sectional view through the rotatable finger hole insert member, taken as on the line 4—4, FIG. 3;

FIG. 5 is a fragmentary sectional view through adjacent peripheral portions of the upper and lower segments and the intermediate circular section, showing the means for connecting the segments together in spaced relation;

FIG. 6 is a detached perspective view of a thumb hole insert;

FIG. 7 is a detached perspective view of a finger hole insert;

FIG. 8 is an elevation of the Y-shaped journal for the gears; and

FIG. 9 is a fragmentary sectional view showing the means for clamping the intermediate annular section against rotation relative to the segments.

Referring now more particularly to the embodiment of the invention illustrated in the drawings, in which similar numerals refer to similar parts throughout, the grip-fitting ball is in the form of a composite sphere comprising three principal parts.

The upper and lower, substantially semi-spherical segments **1** and **2** respectively, are connected together in spaced relation, and the intermediate annular section **3** is rotatably mounted therebetween. Both of the segments **1** and **2** and the annular section **3** are preferably formed of transparent material, which may be a clear transparent plastic material of the type such as sold under the trademarks "Lucite" and Plexiglas."

The segments are preferably hollow, as shown in the drawings, and are connected together in spaced relation by means of spacing tie bolts **4**, located through suitable apertures **5** and **6** in the upper and lower segments respectively. The upper end of each spacing tie bolt **4** is threaded, as indicated at *4a*, for engagement in the threaded opening **5** in the upper segment **1**.

The head *4b* of each spacing tie bolt is located within a recess *4c* in the surface of the lower segment **2**. As best shown in FIG. 5, the spacing tie bolts **4** are located within the interior of the intermediate annular section **3**.

Radially disposed tubular thumb hole insert socket elements **7** and **8** are formed at diametrically opposite points on the intermediate annular section **3**, and disposed

inwardly toward each other, for selectively receiving any one of a plurality of thumb hole inserts provided with thumb holes of various sizes.

The thumb hole insert socket element **7** is used when measuring the grip or span of the right hand, and the socket element **8** is used when measuring the grip of the left hand. Each of the thumb hole insert socket elements **7** and **8** has a substantially cylindrical socket **9**, with a flat side **10** formed therein, to receive the thumb hole inserts and hold them against turning movement therein.

Each of the thumb hole inserts **11** is of substantially cylindric form, with a flat side **12**, and is of such exterior dimensions that it may have a sliding fit within either of the thumb hole sockets **9**. A plurality of these thumb hole inserts are provided, each having a cylindrical thumb hole **13** therein.

In order to accommodate the thumbs of all hands, from the smallest woman's hand to the largest man's hand, a set of thumb hole inserts are provided, which for the purpose of illustration, may have thumb holes therein varying in diameter from ¾" to 1⅜".

For the purpose of latching the thumb hole insert within the socket **9**, a plunger **14** is slidably mounted in a longitudinally disposed passage **15** at one side of the thumb hole insert socket element.

The reduced inner end **16** of the plunger is slidably located through an opening **17** in the inner wall of the passage **15**, a cotter pin **18** or the like limiting outward movement of the plunger. A coil spring **19** surrounds the reduced portion **16** of the plunger for normally urging the plunger outward.

A ball **20** is located through a transverse opening in the adjacent side wall of the thumb hole insert socket element for engagement in a recess **21** in the adjacent side wall of the thumb hole insert **11**.

An annular groove **22** is formed in the enlarged portion of the plunger **14**. By pressing the plunger inward until the annular groove **22** therein registers with the ball **20**, the ball will drop into the groove **22** permitting the thumb hole insert to be removed from the socket.

As best shown in FIG. 3, the thumb hole insert socket elements **7** and **8** are connected together at their opposed inner ends by an integral bar **23** having a central depending boss **24** formed therein with central bore **25**, for a purpose to be later described.

A pair of rotatable finger hole insert socket members, indicated generally at **26** and **27**, are located in opposite sides of the upper segment **1** for cooperation with the thumb hole insert socket elements **7** and **8** respectively. As indicated on the drawings, the member **26** is used in cooperation with the element **7** for measuring the grip of the right hand, and the member **27** is used in cooperation with the element **8** for measuring the grip of the left hand.

Each of these finger hole insert socket members includes a disc **28** rotatable in a circular opening **29** in the segment **1**, the outer surface of the disc being sperical and conforming to the contour of the outer surface of the segment **1**.

A twin tubular portion **30** extends inwardly from the disc **28** and is provided with a pair of finger hole insert sockets **31** and **32**, slightly offset laterally from each other as best shown in FIG. 2. Each of the sockets **31** and **32** is substantially cylindrical with a flat face **33**.

The finger hole inserts, indicated generally at **34**, are similar to the thumb hole inserts but of somewhat smaller diameter and are generally cylindrical with a flat face **35**. These finger hole inserts are shaped to have a sliding fit within the finger hole insert sockets **31** and **32** as desired.

Each of the finger hole inserts has a finger hole **36** therein. A plurality of these finger hole inserts is provided having finger holes therein of from about ⅝" diameter to 1" diameter, so as to fit the middle fingers and ring fingers of hands of all sizes.

The finger hole inserts are adapted to be latched in the finger hole insert sockets by spring-loaded plungers **14***a* of the same construction and arrangement as the plungers **14** which latch the thumb hole inserts in position.

An adapter plate **37**, with hollow boss **38** thereon, is attached to the lower end of the twin tubular portion **30** of each finger hole insert socket member, as by screws **39**. Bevel pinions **40**, having hollow bosses **41** thereon, are fixed to the adapter plate **37** as by a drive fit or other usual and well known means.

These bevel pinions are journalled upon the angular journal portions **42** of the Y-shaped journal member **43**. Washers **44** are located within the hollow bosses **38** of the adapter plate, against the upper ends of the hollow bosses **41** of the bevel pinions and against the internal shoulders **45**, and held in position as by cap screws **46**.

The bevel pinions **40** mesh with the bevel gear **47**, located upon the Y-shaped journal member **43** and having a hollow boss **48** which has a drive fit within the depending boss **24** on the bar **23**. The reduced depending shank **49** of the Y-shaped journal member **43** is located through the hollow central boss **50** upon the top wall of the downwardly open cup **51** formed intergal with the lower segment **2**.

A washer **52** is seated against the internal shoulder **53** in the boss **50**, and a screw **54** is located therethrough and into the internally threaded shank **49** of the Y-shaped journal member **43**. A weighted disc **55** is located upon the top of the cup and a weight **56** is located within the upper end of the cup, screws **57** attaching said weights in place as shown in FIG. 3.

The weights **55** and **56**, added to the weight of the ball, bring the total weight up to the minimum weight for bowling balls, which is usually 10 pounds. Additional weights **58**, **59** and **60** of 1, 2 and 3 pounds respectively may be selectively placed with the cup **51** to make the total weight of the ball anywhere between 11 and 16 pounds, the usual maximum weight for bowling balls.

As shown in FIG. 3, an opening **61** is formed in the lower segment **2**, providing access to the cup **51**. A closure cap **62** is provided for this opening and has a screw **63** attached to the center thereof.

The weights **56**, **58**, **59** and **60** have centrally located tapped bores **64** therein for receiving the screw **63**, whereby the closure cap is secured in place in the opening **61** and the weights **58**, **59** and/or **60** are secured in place within the cup **51**.

The intermediate annular section **3** may be locked against movement relative to the segments by means of the clamping screw **65** and clamping nut **66**, having a gasket **67** of rubber, plastic material or the like, for contact with the inner surfaces of the lower segment **2** and the intermediate annular section **3**.

In the use of the bowler's grip-fitting ball, assuming that it is desired to measure the grip of a right-handed bowler, the proper size thumb hole insert **11** is selected and inserted into the socket **9** of the right-hand thumb hole insert socket member **7**, and latched in place by the plunger **14**.

The proper size finger hole inserts **34**, to fit the middle and ring fingers of the right hand, are then selected and inserted into the sockets **31** and **32** of the right-hand finger hole insert socket member **26** and latched in place therein by the plunger **14***a*.

The clamping screw **65** is loosened, and the intermediate annular section **3** is rotated relative to the segments to the position shown in FIG. 1, which provides the maximum span between the thumb and fingers.

The thumb and fingers of the right hand are then inserted into the thumb hole **13** and finger holes **36**, and by manipulation of the hand the intermediate annular

section 3 is rotated relative to the segments until the parts are adjusted relative to each other to provide the desired span or grip.

As the intermediate annular section 3 is rotated relative to the segments, through the pinions 38 and gear 47, each finger hole insert socket member will be rotated upon its axis. When the proper adjustment of the parts is made, the clamping screw 65 is tightened to prevent relative movement of the intermediate annular section 3 and the segments 1 and 2.

It will be understood that the same procedure is followed to measure the span of a left-handed bowler, the proper size thumb hole insert being inserted into the thumb hole insert socket element 8, and the proper size finger hole inserts being inserted into the finger hole insert socket member 27.

Graduations 68 are provided around the lower edge of the upper segment 1, and an indicator mark 69, cooperating therewith, is provided upon the upper end of the intermediate annular section 3. The exact span will thus be indicated upon these graduations.

Graduations 70 are provided on the surface of the upper segment 1, surrounding the opening 29 within which the disc 28 of the rotatable finger hole insert socket member 26 rotates. An indication line 71 is formed upon the disc 28, cooperating with these graduations, so that the exact relative positions of the finger holes will thus be indicated.

The desired weights 58, 59 and/or 60 may be mounted in the cup 51, and the customer may then grasp the ball with his thumb and middle and ring fingers in the thumb and finger holes respectively, and swing the ball as in bowling to get the "feel" of the same to determine whether the weight is correct.

With the size and relative locations of the thumb and finger holes thus determined, the permanent ball of correct weight may then be bored with thumb and finger holes corresponding therewith.

It should be understood that the thumb hole socket insert elements 7 and 8, the finger hole socket insert members 26 and 27 and the thumb hole inserts 11 and finger hole inserts 34 may all be formed of clear transparent material.

This transparency of the parts is important as it enables one to see any pressures that exist on the thumb or fingers. The fitter can then make the necessary adjustments to correct any visible point of pressure.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

We claim:

1. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, an intermediate annular section rotatable relative to said upper and lower segments, there being a thumb hole in said intermediate annular section, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger holes in said circular member, and means for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

2. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical hollow segments, an intermediate annular section rotatable relative to said upper and lower segments, said upper and lower segments and said intermediate annular section being formed of transparent material, there being a thumb hole in said intermediate annular section, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger holes in said circular member, and means for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

3. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, an intermediate annular section rotatable relative to said upper and lower segments, means connecting said upper and lower segments together in spaced relation, there being a thumb hole in said intermediate annular section, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger holes in said circular member, and means for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

4. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, an intermediate annular section rotatable relative to said upper and lower segments, there being a thumb hole socket in said intermediate annular section, a thumb hole insert in said thumb hole socket, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger hole sockets in said circular member, finger hole inserts in said finger hole sockets, and means for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

5. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, an intermediate annular section rotatable relative to said upper and lower segments, there being a thumb hole in said intermediate annular section, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger holes in said circular member, a centrally located gear fixed to said intermediate annular section, and a pinion fixed to said rotatable circular member and meshing with said gear, for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

6. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, an intermediate annular section rotatable relative to said upper and lower segments, there being a thumb hole in said intermediate annular section, a circular member located in the upper segment and rotatable upon a radial axis therein, there being a pair of finger holes in said circular member, means for rotating said circular member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments, a downwardly open pocket within said lower segment, weight means detachably located in said pocket, there being an opening in the bottom of said lower segment providing access to said pocket, a closure cap for said opening, and means for locking said cap in closed position and simultaneously securing said weight means in said pocket.

7. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, means connecting said segments together in spaced relation, an intermediate annular section rotatable relative to said upper and lower segments, a thumb hole insert socket in said intermediate annular section, a

thumb hole insert detachably located in said socket, means for latching said thumb hole insert in said socket, a circular finger hole insert socket member located in the upper segment and rotatable upon a radial axis therein, a pair of finger hole inserts detachably located in said finger hole insert socket member, means for latching said finger hole inserts in said finger hole insert socket member, and means for rotating said circular finger hole insert socket member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

8. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments of transparent material, means connecting said segments together in spaced relation, an intermediate annular section of transparent material rotatable relative to said upper and lower segments, a thumb hole insert socket in said intermediate annular section, a thumb hole insert detachably located in said socket, means for latching said thumb hole insert in said socket, a circular finger hole insert socket member located in the upper segment and rotatable upon a radial axis therein, a pair of finger hole inserts detachably located in said finger hole insert socket member, means for latching said finger hole inserts in said finger hole insert socket member, and means for rotating said circular finger hole insert socket member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

9. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially semi-spherical segments, means connecting said segments together in spaced relation, an intermediate annular section rotatable relative to said upper and lower segments, a thumb hole insert socket in said intermediate annular section, a thumb hole insert detachably located in said socket, means for latching said thumb hole insert in said socket, a circular finger hole insert socket member located in the upper segment and rotatable upon a radial axis therein, a pair of finger hole inserts detachably located in said finger hole insert socket member, means for latching said finger hole inserts in said finger hole insert socket member, a centrally located bevel gear fixed to said intermediate annular section, and a bevel pinion fixed to said rotatable circular finger hole insert socket member and meshing with said bevel gear for rotating said circular finger hole insert socket member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

10. A bowler's grip-fitting ball comprising a sphere

formed of upper and lower substantially hollow semi-spherical segments of transparent material, means connecting said segments together in spaced relation, an intermediate annular section of transparent material rotatable relative to said upper and lower segments, a thumb hole insert socket in said intermediate annular section, a thumb hole insert detachably located in said socket, means for latching said thumb hole insert in said socket, a circular finger hole insert socket member located in the upper segment and rotatable upon a radial axis therein, a pair of finger hole inserts detachably located in said finger hole insert socket member, means for latching said finger hole inserts in said finger hole insert socket member, a centrally located bevel gear fixed to said intermediate annular section, and a bevel pinion fixed to said rotatable circular finger hole insert socket member and meshing with said bevel gear for rotating said circular finger hole insert socket member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments.

11. A bowler's grip-fitting ball comprising a sphere formed of upper and lower substantially hollow semi-spherical segments of transparent material, means connecting said segments together in spaced relation, an intermediate annular section of transparent material rotatable relative to said upper and lower segments, a thumb hole insert socket in said intermediate annular section, a thumb hole insert detachably located in said socket, means for latching said thumb hole insert in said socket, a circular finger hole insert socket member located in the upper segment and rotatable upon a radial axis therein, a pair of finger hole inserts detachably located in said finger hole insert socket member, means for latching said finger hole inserts in said finger hole insert socket member, a centrally located bevel gear fixed to said intermediate annular section, a bevel pinion fixed to said rotatable circular finger hole insert socket member and meshing with said bevel gear for rotating said circular finger hole insert socket member upon its axis when said intermediate annular section is rotated relative to said upper and lower segments, a downwardly open pocket within said lower segment, weight means detachably located in said pocket, there being an opening in the bottom of said lower segment providing access to said pocket, a closure cap for said opening, and means for locking said cap in closed position and simultaneously securing said weight means in said pocket.

No references cited.