Nov. 15, 1966 J. O. KELLEY 3,284,928

POSITIONAL COMPUTER FOR BOWLING

Filed May 18, 1964

Fig. 1

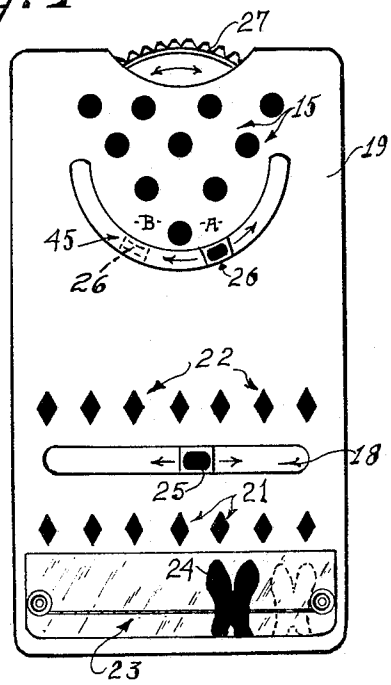


Fig. 2

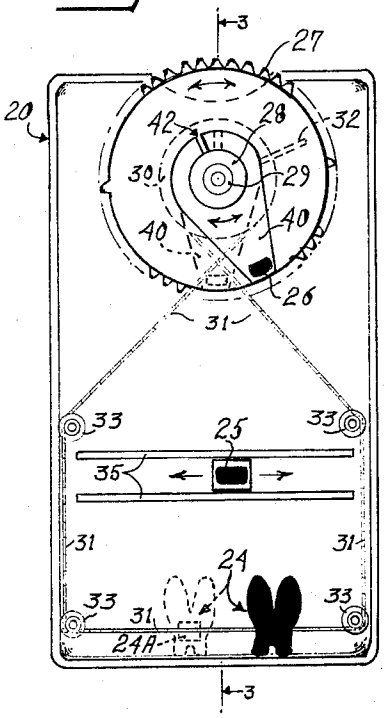


Fig. 3

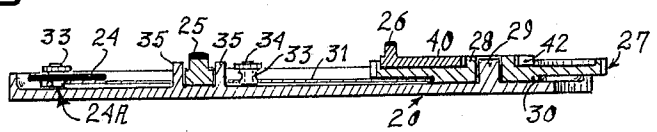
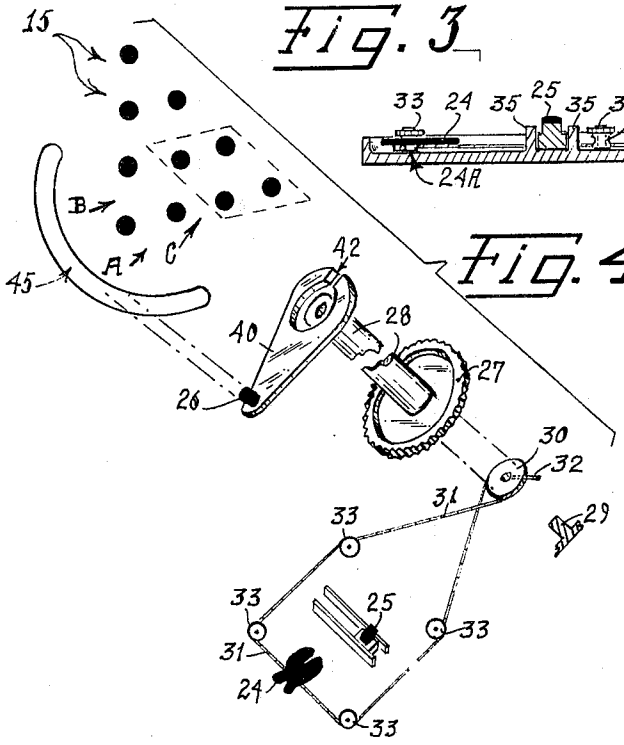


Fig. 4



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POSITIONAL COMPUTER FOR BOWLING

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This invention provides an inexpensive, compact and easily understood and manipulated computer for use in bowling for the purpose of determining recommended positions to be assumed by the player in dropping or delivering the ball onto the alley and correcting the approach in order to direct the ball most effectively into the pin array.

While numbers of devices of this class have been proposed from time to time, those deemed at all workable have been objectionable because of bulk and complexity, being too involved to be of interest to the average bowler.

One of the outstanding features of the presently disclosed computer is its small size and flat compactness which permits it to be carried easily in the shirt pocket.

Another feature of the device is its ease of manipulation in requiring only the setting of a single index element and turning of a dial to move a display element in the form of a configuration simulative of the player's feet whereby to designate the position the player should assume to cause the ball to enter the pin array at a desired point either for the purpose of making a "strike" or a "spare," no adjustments being needed for use by left-handed players.

Additional features and aspects of novelty and utility relate to details of the operation and construction of the device as a flat packet with but few and simple working parts requiring no calculations or special skill, and requiring only the usually observed data familiar to all spot bowlers in noting the spot on the alley at which the player customarily tends to drop or deliver his ball, and the point of entry of that ball into the pin array, all of which will be more fully understood as the following description proceeds in view of the annexed drawings in which:

FIGURE 1 is a plan view of the face of a preferred embodiment of the computer shown at approximately full scale;

FIGURE 2 is an internal view in plan of the casing shown in FIGURE 1 with its cover plate removed;

FIGURE 3 is a cross-section taken along lines 3—3 of FIGURE 2;

FIGURE 4 is a schematic diagram of the functional relationship of the essential parts.

In the pocket-sized embodiment shown approximately to size in FIGURE 1, the relevant spotting and foul-line markings and pin array are designated on the cover plate **19** of the device in simulation of the relative arrangement in a regulation spot-bowling alley, the usual array **15** of ten pins being situated at the upper end of the unit corresponding to the remote end of the alley, and the drop-guiding spots **22** being disposed beyond the usual foul-line designated by the markers **21**.

The cover plate **19** of the casing is preferably formed of initially clear molded plastic with its major area beyond the foul line rendered opaque either by localized pigmentation in the clear plastic or by applied color or other opaquing means, there being left a small clear area constituting a window **23** at the foot of the unit through which is exposed to view a movable foot-position indicating means **24** in the form of an element molded in the configuration to simulate the player's feet.

Exposed through the endwall of the casing at the top near the pin array is the milled edge of a dial or selector

wheel **27** which may be turned in opposite directions to effect movement of an "entry" index member **26** movable along the arc of a slot **45** to assume various positions relative to the approach side of the pin array to show the point at which the ball has entered or is to enter the array.

Disposed between the spotting marks **22** and the markings **21** at the foul line is a laterally-movable spotting designator or marker **25** exposed through a transverse linear slot **18**, said marker being freely slidable into selected positions opposite any spotting mark **22** to indicate the point at which the player has dropped or intends to drop or deliver his ball.

The movable parts **24**, **25**, **26** and **27** are contained in the cavity of the base portion **20** of the casing as depicted in FIGURE 2, the cover plate **18** being preferably fitted and cemented into permanent assembly with said base portion, which includes as an integrally molded part thereof (FIGURE 3, also) a spindle stud **29** upon which is seated for free rotation the dial wheel **27**, which in turn includes as an integrally molded part thereof, on its bottom, a pulley wheel or sheave **30**.

Also molded as a part of said dial and pulley structure, on the upper side thereof, is a hub portion **28** upon which is forcibly fitted the under sized bore of a selectively-adjustable index arm **40** having a radial expansion slot **42** cut into said bore to afford sufficient expansion in fitting upon the hub so that the arm frictionally seizes the hub and normally tends to rotate with the latter and the dial, it being possible nevertheless to move the index arm **40** itself independently of the dial, as will more fully appear.

The ball entry index **26** is preferably molded as a part of the index arm **40** and projects upwardly from the plane of the latter for exposure through the arcuate slot **40** where it may be engaged by the finger tip for selective positiong without disturbing the dial wheel.

Integrally molded as a part of the base section **20** are a pair of spaced upstanding lateral guide ribs **35** between which the laterally-adjustable spotting marker **25** glides in guided lateral movement with just sufficient fractional resistanse to cause it to stay in whatever position it is put.

A set of pulley rollers **33** is disposed on integral studs **34** on the base floor to guide a nylon cord **31** trained around and fixedly attached to the driving pulley **30** by means of a drive pin **32** forced into a suitable bore in the pulley rim, and by which means the relationship of the dial to the position of feet-location element **24** is determined, said feet element being held fast on the cord **31** (as by cementing) in a small block portion **24A** forming a part of the element **24** on the underside thereof (FIGURES 2 and 3).

Thus, when the dial is turned, the feet-locating indicator element **24** will be positively shifted to some particular corresponding position, and moves in the opposite direction from the element **24**, it being observed also in passing that responsive to such movement of the dial, the "entry" index arm **40** will also normally be moved in step with the dial and therefore with the foot or stance indicator element **24**. However, the resistance or loading contributed by the pulley cord system, which is more or less tightly trained over the rollers **33**, is such in relation to the frictional grab and slippage of the split yoke and hub means **42**, **28** which couples the index arm **40** to the dial, as to permit manual movement of arm **40** and its entry indicator **26** to any point along the arcuate slot **45** without at the same time disturbing the setting of the dial wheel or the stance indicator **24**.

Bowlers generally have a characteristic delivery pattern in dropping the ball onto the alley, and frequently this pattern will involve a hook or spin or some other dynamic

idiosyncrasy which causes the ball to deviate from the intended course it should otherwise follow when consistently dropped in relation to one or another of the guide or spotting marks **22**.

One of the correctives for these individual habits or faults is for the player to shift his position laterally across the alley in some predetermined or calculated relationship to a selected one of the spotting marks **22** until by trial the desired delivery and entry is achieved or improved.

In order to make a strike on the pin array, it is known that the ball should approach and enter the array at one of two strike zones A or B depicted in the schematic view of FIGURE 4, and it becomes one of the requirements for the player to adopt that stance or delivery approach in relation to the alley markers **22** which will result in his directing the ball into one of these two strike zones.

In the case of a "spare" which fails to result in a "strike" and leaves one or more pins standing, similar principles of critical ball approach to the pins left standing will prevail in the manner well-understood in the art.

It might be supposed, for example, that a "spare" leaves the 5–6–9–10 pins standing, as indicated by the dotted enclosing lines in FIGURE 4, in which case a suitable point of entry for the ball might be at the position C.

Thus, the entry index **26** may be variously positioned along the arc **45** before the appropriate point of entry for one or another pattern formed by whatever pins remain standing, whereby to designate the desired or necessary approach and entry for the second ball in order to make the spare and knock the remaining pins down, so that in these latter respects the computer is equally useful as a means for indicating the best position for a particular player who has carefully observed his habits of approach and dropping of his ball and corresponding point of entry of that ball into the array, in order to pick off any pin or pins in making either a strike or a spare, whether the player is left- or right-handed.

By way of an example of the operation of the device, let it be assumed that the full-line settings of the several movable parts seen in FIGURE 1 illustrate the position of the player's feet (at **24**, full lines) and the point of entry of the ball substantially into the right-hand strike zone A (i.e. at the full-line position of the "entry" index **26**), the ball having touched the alley substantially in the region denoted by the full-line position of the drop marker **25**. Under these conditions, it is supposed that the player finds that he does not achieve the expected "strike," and he decides to try for the left-hand strike zone B. Accordingly, he turns the dial **27** clockwise to cause the entry index **26** to shift to the left until the index **26** is in the dotted-line position opposite zone B, in consequence of which it will be observed that the foot-positioning indicator **24** has shifted still farther toward the right into the dotted-line position seen in FIGURE 1.

In the setting of the indicating components found in FIGURE 2, it will be assumed that when the foot-position indicator **24** and the drop index **25** are in the full-line positions shown, the ball actually strikes the kingpin, as represented by the dotted-line position of the entry index **26** and arm **40**. If now the dial **27** is turned counter-clockwise until the entry index **26** is brought from the dotted-line position into the full-line position where it would be aligned with strike zone A (for example, as in FIGURE 1), then the foot-position indicator **24** would shift toward the left in FIGURE 2 and into the dotted-line position to indicate the new stance which should cause the ball to enter the strike zone A instead of travelling head-on into the kingpin.

Thus, the entry index **26** may be moved into any position whatever along the arc of travel **45** before the simulated pin array, and the dial wheel **27** may be turned to reposition said index to any other desired point along said arc, the stance or foot-position indicator **24** always shifting accordingly, and always in an opposite direction from the movement of index **26**. For example, if the index **26** were standing in the dotted-line position of FIGURE 2 and the stance indicator **24** were exactly centered in its lateral run of displacement (approximately as in FIGURE 4), then a movement of index **26** to the right would shift the foot element **24** to the left of center, and vice versa.

The outer face of the casing or body member **19** has thus been contrived to simulate the layout of a bowling alley with the pin-spotting positions **15** in the triangular array representing the disposition of the pins on the usual pin deck of a regulation alley, and the markings **21** simulating the foul line in the player's approach zone at the opposite end of such an alley.

The arc of travel for the ball-entry index member **26** is partially circumambient of the pin array sufficient to afford positions at all critical points of entry of the ball into such an array. The number **1** pin or "kingpin" at the head of the array nearest the arcuate opening **45** lies on a median longitudinal axis extending lengthwise of the simulated alley through the mid-region of the array of delivery guide marks or "spots" **22**, the transverse line of movement for the dropping or delivery index member **25**, and the transverse path of movement of the foot-position indicator **24**.

Other alley markings suggested or contemplated by the rules of the American Bowling Congress (ABC) might be added if desired, such as an approach line (not shown), planking delineations (not shown), etc.. Moreover, the form and relative positioning of the simulative markings and configurations for the ten pins **15**, indicating and index members **24**, **25** and **26**, and foul-line and spotting markers **21**, **22**, may take other forms if desired, and the form and arrangement of other parts of the mechanism may be changed within the scope of the invention as defined in the appended claims.

I claim:

1. A player's position indicator for bowling which includes a body member having thereon a simulated portrayal of a bowling alley with designations including a pin deck area at one end thereof and a player's zone and a lateral array of ball-delivery guide marks near an opposite end thereof; means delineating the conventional pin-spotting positions in triangular array for a set of ten pins on said deck area with the kingpin thereof disposed foremost toward said player's zone and lying along an axis extending through the mid-region of said lateral array of guide marks and the player's zone; a selector wheel rotatable about an axis normal to and beneath the plane of said pin deck and array of pins; a ball-entry index member movable along an arcuate path partially circumambient of said pin array between the kingpin and said array of guide marks; means impositively coupling the index member and selector wheel such that angular movement of the latter produces angular shifting of the index member to various ball entry-designating position before the pin-array, said coupling means being of a character to permit relative forced slippage between the index member and wheel such that the index member may be selectively positioned before the pin array without moving the wheel if the wheel is restrained a predetermined degree, a foot-position indicator movable transversely of the alley across said axis near the player's zone to desired positions in selective alignment with said guide marks; and means drivingly interconnecting said wheel and foot-position indicator for moving the latter into predetermined selected positions relative to said guide marks responsive to predetermined selecting movements of said wheel, said index member being moved predetermined angular amounts positively by such selecting movements of the wheel to designate points of entry for a bowled ball into the pin array in expected correspondence to the position of the player relative to the pin array as indicated by the foot-position indicator for the corresponding setting of the entry index member.

2. A device according to claim **1** further characterized

in that said interconnecting means for the wheel and foot-position indicator loads the selector wheel to said predetermined degree necessary to cause the wheel to remain motionless when the entry index member is manually moved into selected positions as aforesaid.

3. A device according to claim 1 further characterized in that said body member includes a laterally shiftable ball drop indicator movable in parallelism with said foot-position indicator into selected positions along a line closely paralleling said array of delivery spotting marks whereby the position for dropping a ball, or at which a ball has been dropped, may be optionally designated in relation to any particular setting of the foot-position indicator, and/or any position of said entry index member.

4. A device according to claim 1 in which said foot-position indicator comprises a member having a configuration simulative of the outline of the soles of a player's feet.

5. A device according to claim 1 in which the body member has a transparent window area at said player's zone and said foot-position indicator is disposed for selective movement as aforesaid within said body member behind said window.

6. A device according to claim 1 in which said wheel, said entry index member, and said foot-position indicator are all located in part within said body member and said wheel and index member have portions exposed anteriorly of the body member for manual operative engagement, and said body member has a window area exposing to view the full range of movement of the foot-position indicator.

7. In a position indicating computer for bowling, the combination with means depicting a representation of a pin array and a linear array of ball-delivery spotting marks guidingly aligned with said pin array, of a foot-position indicator movable in parallelism with said array of spotting marks; a ball-entry index movable in an arcuate path before the pin array, and manually-operable actuating means for simultaneously moving said index and said foot-position indicator.

8. In a position indicating computer for bowling, the combination with means providing a flat surface simulatively representing a bowling alley having delineated thereon a triangular array of bowling pins and a traverse linear array of ball-delivery marks as a simulated player's area remote from the pin array along an imaginary ball-rolling axis extending from the mid-region of said player's area through the kingpin of the pin array; a foot-position indicating means movable transversely of said axis in substantial parallelism with said array of delivery marks at a side of the latter remote from the pin array toward the player's area; a selector wheel rotatable beneath said alley surface; an index arm cooperable with said wheel; a ball-entry index moved by said arm in an arcuate path before said pin array to designate points of entry of a ball into the array; means drivingly connecting the index arm with said wheel for effecting positive angular movement of the arm independently of movement of the wheel for selective manual positioning of said entry index before the pin array; and means providing a positive driving connection for transmission of a driving force responsive to angular movement of the wheel to said foot-position indicator to shift the latter relative to said array of delivery marks in correspondence with changes in position of said entry index relative to the pin array.

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