March 19, 1963 O. A. KAMINSKY 3,081,559

CALCULATOR

Filed April 20, 1962 2 Sheets-Sheet 1

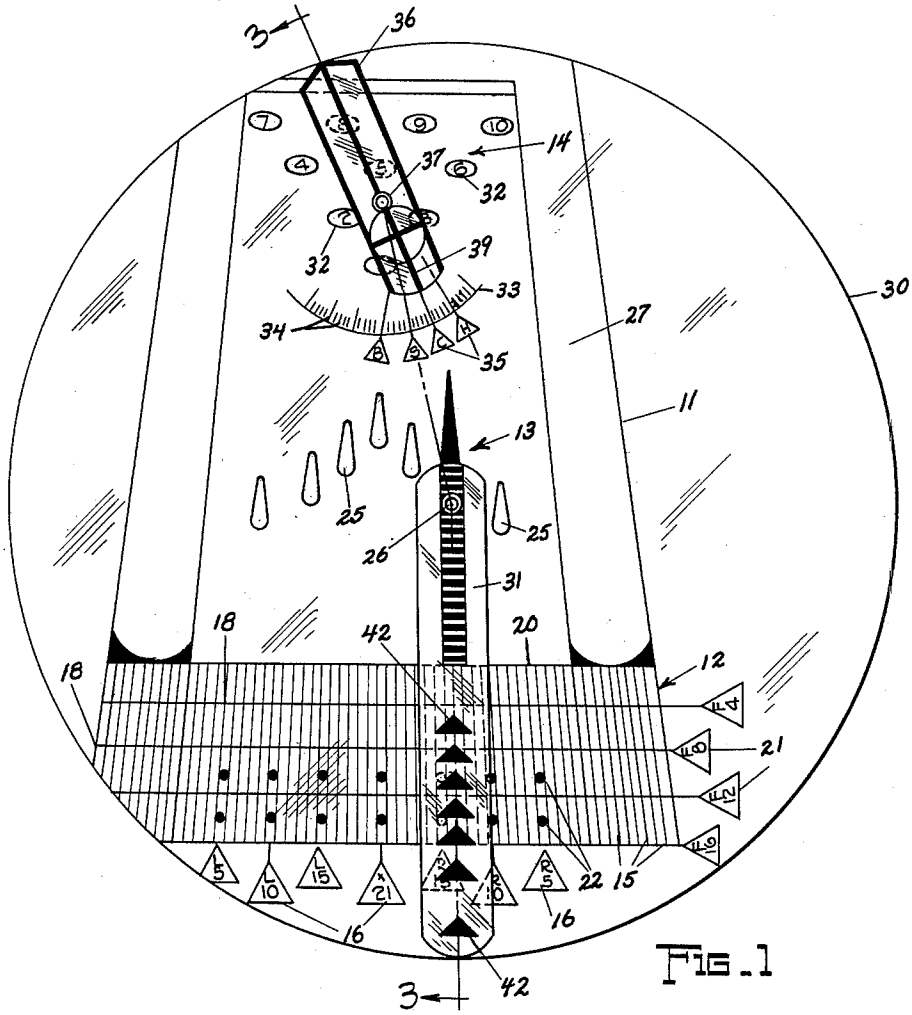


Fig. 1

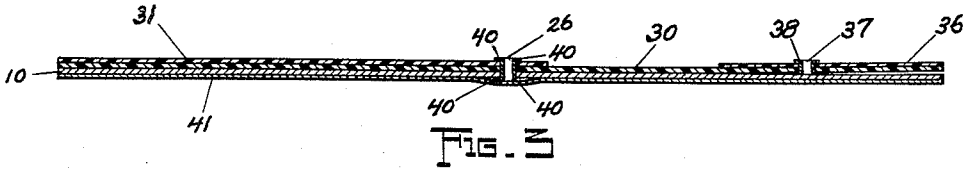


Fig. 2

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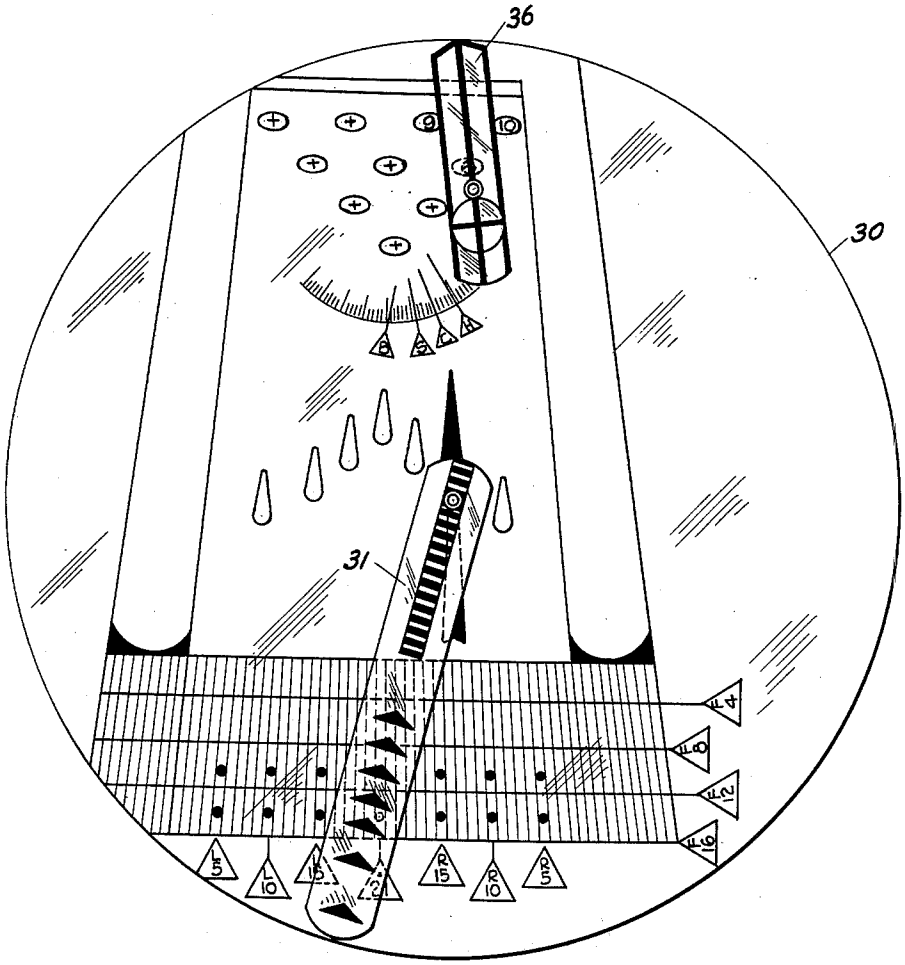


FIG. 2

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CALCULATOR

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This invention relates, as indicated, to a calculator, and more particularly to a concentric disc-type calculator especially adapted for use by bowlers who utilize the "spot" method of bowling.

In "spot" bowling the bowler attempts to direct his ball over a pre-selected alley target using the same delivery for each shot. Alley targets are located according to American Bowling Congress rules and regulations. In regulation alleys they number no more than seven and are located from 12 to 16 feet beyond the foul line. Ideally, a bowler who delivers uniformly a straight ball, curve, hook, or back-up ball, approaches from the same predetermined point and crosses the alley target most suited to him will get a strike. The infrequency of the "300 game" is indicative of the departure from the ideal, and finds most bowlers forced to take second shots. While the bowler may be quite consistent in where he stands to approach and deliver his first shot, the variety of possible remaining pin patterns necessitates variation in where the bowler stands to begin his approach and delivery, assuming he delivers his ball in the same way. It is not infrequent that not only the foot position changes but also the alley target, which the bowler feels necessary to make his spare.

Professional bowlers counsel that the target and delivery should always remain the same; only the position of the feet should change at the beginning of approach to the foul line.

It is a primary object of this invention, therefore, to provide a calculator to enable the accurate determination of the initial position of the bowler's feet in preparation for approach and delivery against any combination of remaining pins over a single pre-determined alley target to afford the best chance to secure the maximum number of upset pins per shot.

This invention may be better understood by having reference to the annexed drawings illustrative of a preferred embodiment of the invention and wherein:

FIG. 1 is a plan view of a calculator in accordance herewith,

FIG. 2 is another plan view of the calculator of FIG. 1 illustrating its mode of use, and

FIG. 3 is a cross-sectional view taken on the line 3—3 of FIG. 1.

Briefly stated, the present invention is in the provision of a calculating device for bowlers. It is characterized by a stationary sheet, which may be a thin disc, having diagrammatic representations of the approach area, target area and pin deck of a bowling alley. Extending from the stationary sheet there is provided an axle to which is affixed a transparent movable disc. This axle is located at a pre-selected alley target in the diagrammatic representation, e.g. the second target inwardly from the right-hand gutter, the one which most spot bowlers use. Also mounted on this target axle is a radial arm which includes means adapted to coact with the diagrammatic representation of the approach area to indicate the bowler's foot position therein at the beginning of his approach. The rotatable transparent disc carries a second axle extending therefrom, preferably independent of the stationary sheet. To this is rotatably attached a second arm which coacts with the diagrammatic representation of the pin spots to indicate direction of the ball at the point of pin impact.

Referring now more particularly to FIGS. 1 and 3, there is shown a stationary sheet 10. This is conveniently made of thin sheet metal or cardboard and has imprinted thereon a diagrammatic representation of a bowling alley 11. The principal areas represented are the approach area, generally indicated at 12, the alley target area 13, and the pin deck area 14.

Approach area 12 preferably includes lines representing the floor boards 15. For ease in identification of the boards, triangles 16 bearing indicia of the board number from the right or left sides of a conventional alley are desirably provided. Also transverse lines 18 are provided indicating the number of feet behind the foul line 20. Triangles 21 bear indicia of the distance. Spots 22 may be shown as permitted by ABC regulations.

In the target area 13, there are shown six of the seven alley targets 25, the seventh being obscured by axle 26. Axle 26 is disposed at the position of the second alley target from the right-hand gutter 27. In the embodiment shown, axle 26 is conveniently a brass rivet, although any other means for rotatably securing disc 30 and radial arm 31 to stationary sheet 10 may be used.

Pin deck area 14 contains in proper perspective disposition indicia 32 of the pin locations, preferably including the regulation pin numbers for convenient reference.

Inscribed on the stationary sheet 10 is a scale 33 which is preferably an arc having graduation marks 34 extending therefrom which pass through the midpoint of the triangle formed by the 2, 3 and 5 pin spots. Ideally, any strike ball should pass over this point whether it is thrown as a straight ball, curve ball or hook ball. The paths of typical straight, curve, and hook balls are shown in FIGS. 1 and 2 by the initials in the triangles 35. The scale 33 enables the individual bowler to select the point on the scale which corresponds to his delivery.

Superimposed on sheet 10 is a disc or sheet 30 mounted for rotation about axle 26, which in the preferred embodiment is made of a clear plastic, e.g. Celluloid. No markings are required on this disc, its principal function being to rotate indicator arms 31 and 36 in their pre-set positions about axle 26 as hereinafter explained. Indicator arm 36 is a ball direction indicator and is carried by axle 37 in disc 30 about which it is free to rotate, preferably against a slight amount of friction such as may be generated by the clamping effect of out-turned flanges 38 on rivet 37 in compressing disc 30 and indicator arm 36 together.

Indicator arm 36 includes, in the preferred embodiment, markings or other indicia so proportioned with respect to the pin deck area 14 as to bear the same relation as the bowling ball does to the pins. Thus, as shown in FIGS. 1 and 3, indicator arm 36 represents a bowling ball and its direction. Axle 37 about which arm 36 rotates is located so as to be over the midpoint of the triangle formed by pins 2, 3 and 5 as represented on sheet 10. Direction line 39 extends through axle 37 and is adapted to coact with scale 33 to locate the direction of the ball as it enters the pin array. This direction will vary, of course, depending on the nature of the bowler's delivery. As indicated above, examples of a straight ball, curve ball and hook ball are given. Ideally, these shots at impact have direction which would carry the ball over the midpoint of the triangle formed on the plane of the pin deck by the 2, 3 and 5 pins. The length of the arm 36 is determined conveniently by the circumference of disc 30 and the location of scale 33. The latter is arbitrary and has as its center the aforesaid triangle midpoint. With the disc 30 set so as to locate axle 37 over the midpoint of the 2, 3, 5 pin triangle, indicator arm 36 may be set to correspond to the individual bowler's delivery and its normal location for a strike ball deter-

mined from scale 33. This determination is made by trial and error by the individual bowler.

Radial arm 31 is carried by axle 26 about which it is free to rotate, preferably against a slight amount of friction such as may be generated by the clamping effect of out-turned flanges 40 on rivet 26 in compressing disc 30 between arm 31 and sheet 10. A cover sheet 41, e.g. a paper backing, may be provided if desired on which may be printed directions for use or other information or ornamentation to complete a preferred embodiment of the calculator.

Radial arm 31 contains indicia which coact with the approach area 12 as represented on sheet 10. In the embodiment shown, these indicia take the form of darts 42 which show the position of the bowler's feet with respect to the approach area 12 at the start of his delivery. One or more darts 42 may be provided, or any other convenient means, e.g. a radial scale on arm 31, may be used to locate the position of the bowler's feet as he begins his approach. Since in the specific embodiment shown in FIG. 1, the alley target 25 which is used is the second from the right gutter 27, radial arm 31, which also may include means indicating the direction of the ball at release, is pivoted on such target 25.

Having positioned indicator arm 36 and radial arm 31 for his individual normal delivery, the device is set for use. When he fails to get a strike, the bowler usually knows how his ball should strike the remaining pin array in order to obtain the maximum number of upset pins. His problem is where to stand for delivery over his usual alley target. FIG. 3 shows an exemplary situation wherein the 6—9—10 pins are left. Without disturbing the position of arms 36 and 31, disc 30 is rotated clockwise until the indicator for the ball direction is positioned where in actuality the 6—9—10 leave would be upset for a spare. With the rotation of disc 30, arm 31 has moved relative to the approach area 12 on sheet 10 and now indicates to the bowler a new position for his feet from which to begin his approach. If he is successful in making his normal delivery and causing his ball to pass over the preselected alley target 25, the 6—9—10 pin leave will be upset.

In laying out the simulated bowling alley inscribed on sheet or disc 10, different proportions are used for longitudinal dimensions from those used for lateral dimensions. Additionally, the inscription is in perspective which gives rise to uniform variation in the proportions in the direction of the vanishing point. The relative proportions shown in the annexed drawings may be used, if desired, in laying out the respective inscriptions for any diameter calculator. For example, for a 7" diameter disc 30, the vanishing point is 14" from the center and is at the apex of an angle of 16°. The foul line 20 is 1.24" from the center, and the diagrammatic inscription of the alley is disposed so that the #2 alley target is at the center of the disc 30. The back of the approach area is parallel to the foul line and 2.64" from the center. The full width of the approach and of the alley projected beyond its intersection with the disc 30 is 4.7" and the board widths are .076" at this back line. Each board represents a conventional 1" wide approach area board. The pins are 0.61" on center laterally, and otherwise properly proportioned in the perspective view. The width of the ball direction indicating arm is proportional to the actual diameter of the ball, and is 0.48". The midpoint of the 2—3—5 pin triangle is 2.38" from the center of disc 30. Scale 32 is struck on any convenient radius using the 2—3—5 triangle midpoint as center. All dimensions longitudinally of the alley representation are proportional to the conventional alley dimensions, and all dimensions laterally of the alley representation are proportional to conventional alley dimensions. However, these proportional relationships are different as above indicated.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore particularly pointed out and distinctly claimed as the invention:

1. A calculating device for bowlers comprising in combination:

(*a*) a stationary sheet having diagrammatic representations of the approach area, target area including at least one alley target, and the pin spots of an equilateral triangular ten pin arrangement inscribed thereon, respectively,

(*b*) a first axle extending from said stationary sheet and located at said alley target,

(*c*) a transpartent movable disc rotatably mounted on said first axle,

(*d*) a radial arm mounted for rotation also about said first axle including means adapted to coact with said approach area to indicate the bowler's foot position therein,

(*e*) a second axle extending from said transparent movable disc and located a distance from said first axle equivalent to the distance from said alley target to the midpoint of the triangle formed by the pin spots thereon representing the 2, 3 and 5 pins, and

(*f*) a second arm rotatably mounted on said second axle including means adapted to coact with said pin spots to indicate direction of a bowling ball.

2. A calculating device for bowlers comprising in combination:

(*a*) a stationary sheet having diagrammatic representations of the approach area, target area including at least one alley target, and the pin spots of an equilateral triangular ten pin arrangement inscribed thereon, respectively,

(*b*) a first axle extending from said stationary sheet and located at said alley target,

(*c*) a transparent movable disc rotatably mounted on said first axle,

(*d*) a radial arm mounted for rotation also about said first axle including means adapted to coact with said approach area to indicate the bowler's foot position therein,

(*e*) a second axle extending from said transparent movable disc and located a distance from said first axle equivalent to the distance from said alley target to the midpoint of the triangle formed by the pin spots thereon representing the 2, 3 and 5 pins,

(*f*) an arcuate scale inscribed on said stationary sheet indicia of which converge on said midpoint, and

(*g*) a second arm rotatably mounted on said second axle and including means adapted to coact with said arcuate scale and said pin spots to indicate direction of a bowling ball.

3. A calculating device in accordance with claim 2 in which the second arm is transparent and includes a diagrammatic representation of a bowling ball inscribed thereon.

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