

June 9, 1959

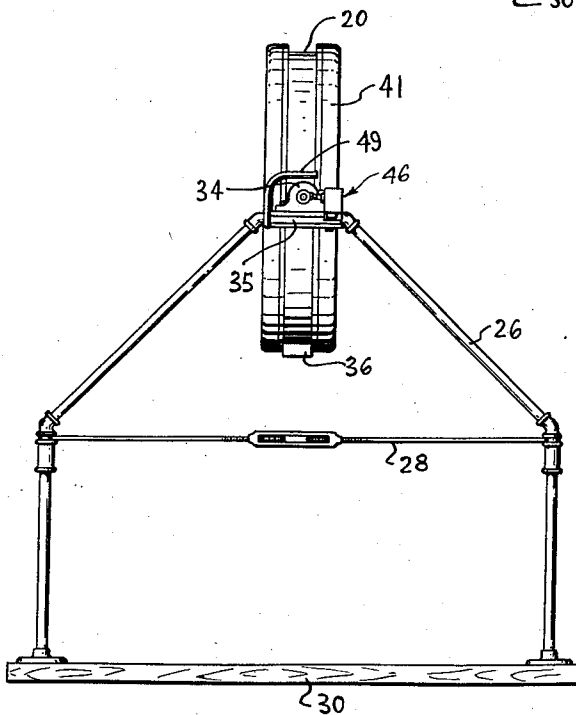
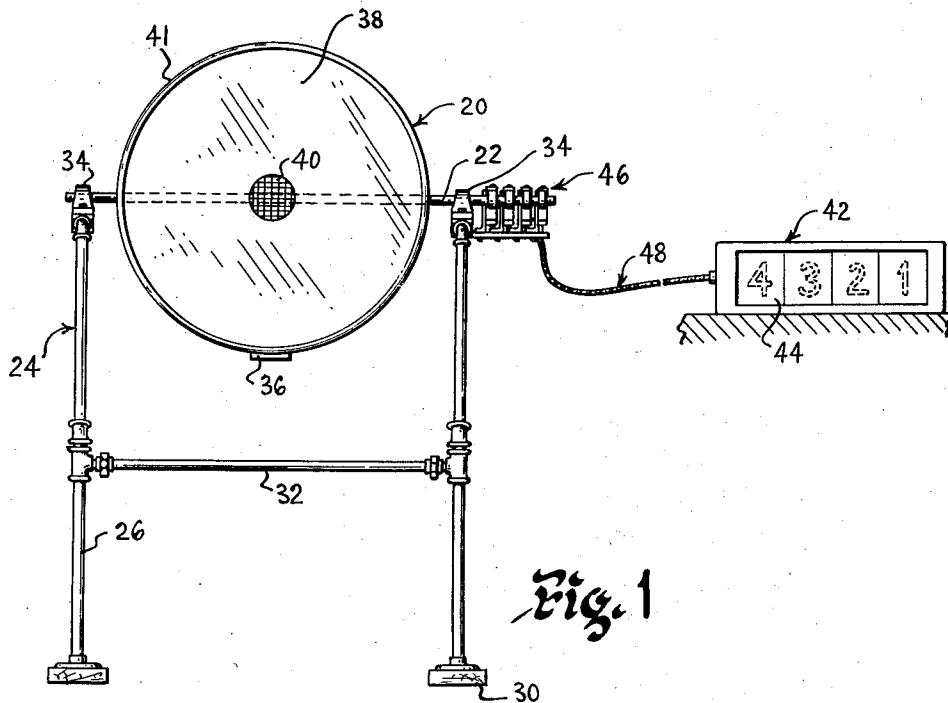
R. BURRELL

2,890,052

TARGET WITH ELECTRICAL INDICATOR

Filed July 5, 1956

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

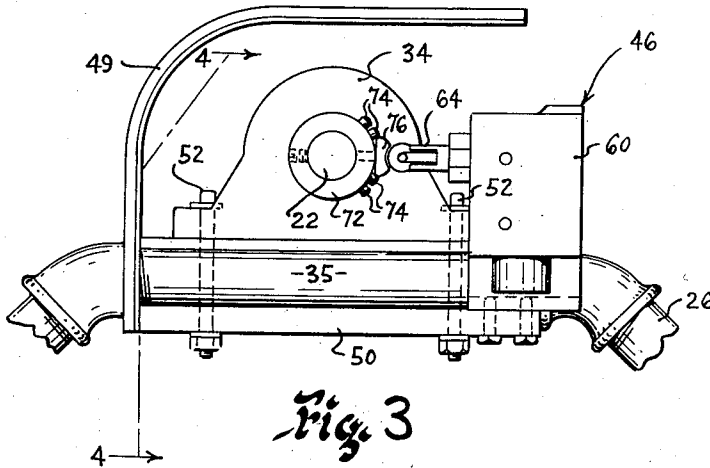


Fig. 3

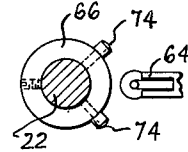


Fig. 5

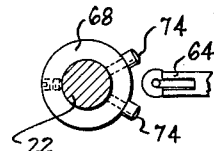


Fig. 6

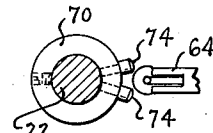


Fig. 7

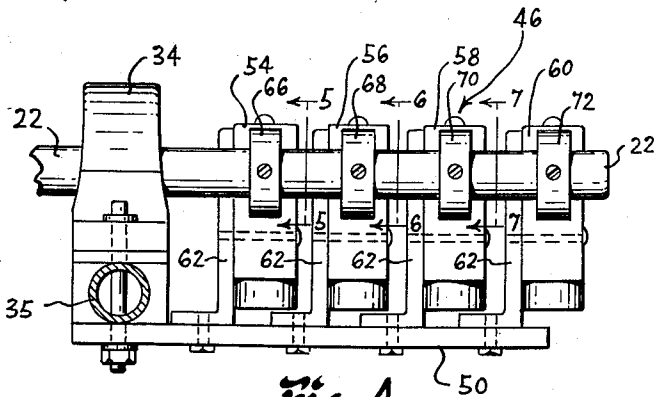


Fig. 4

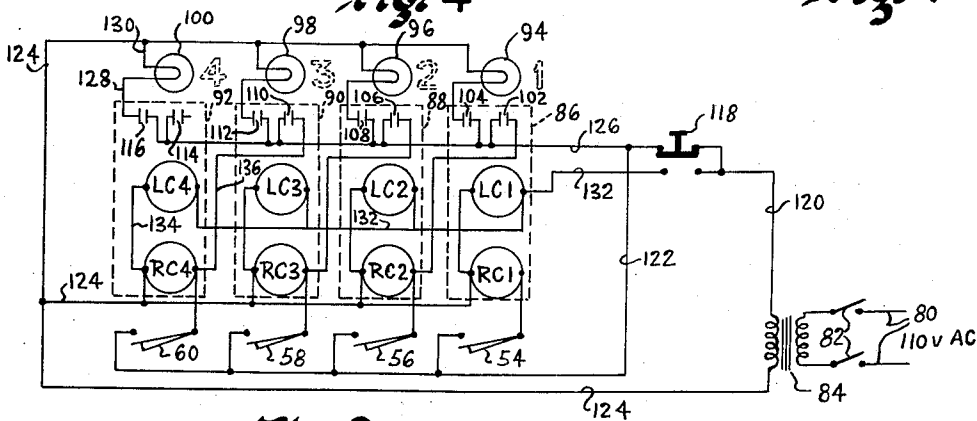


Fig. 8

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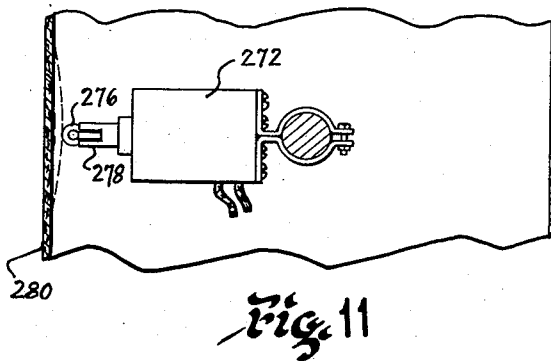
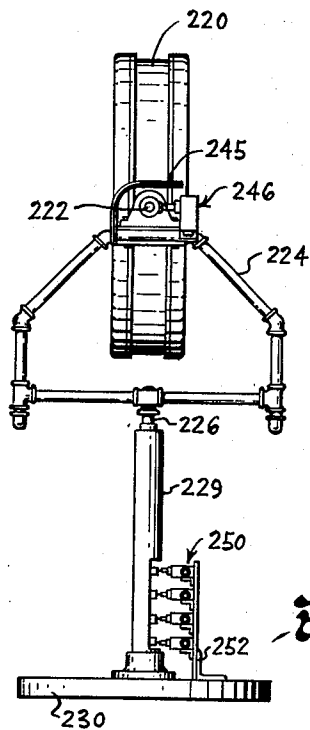
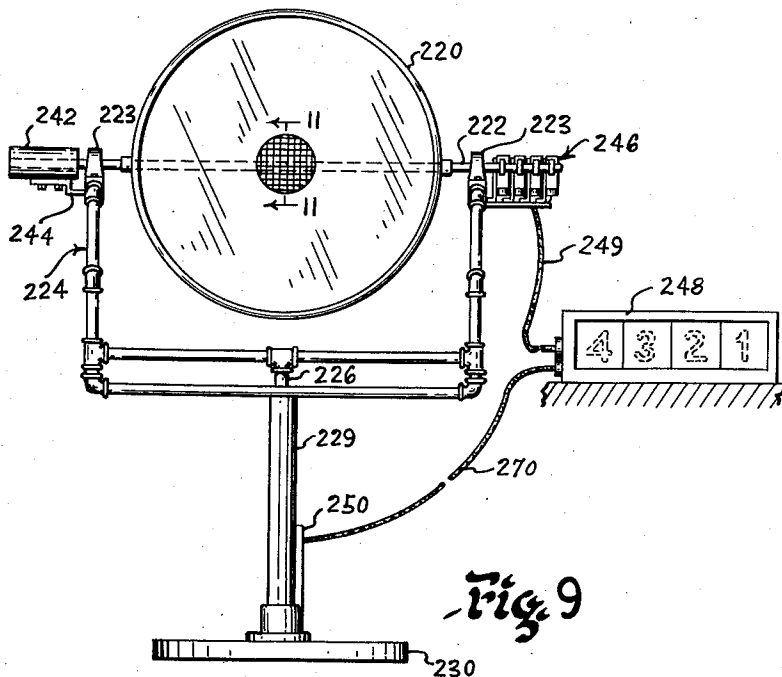
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4 Sheets-Sheet 4

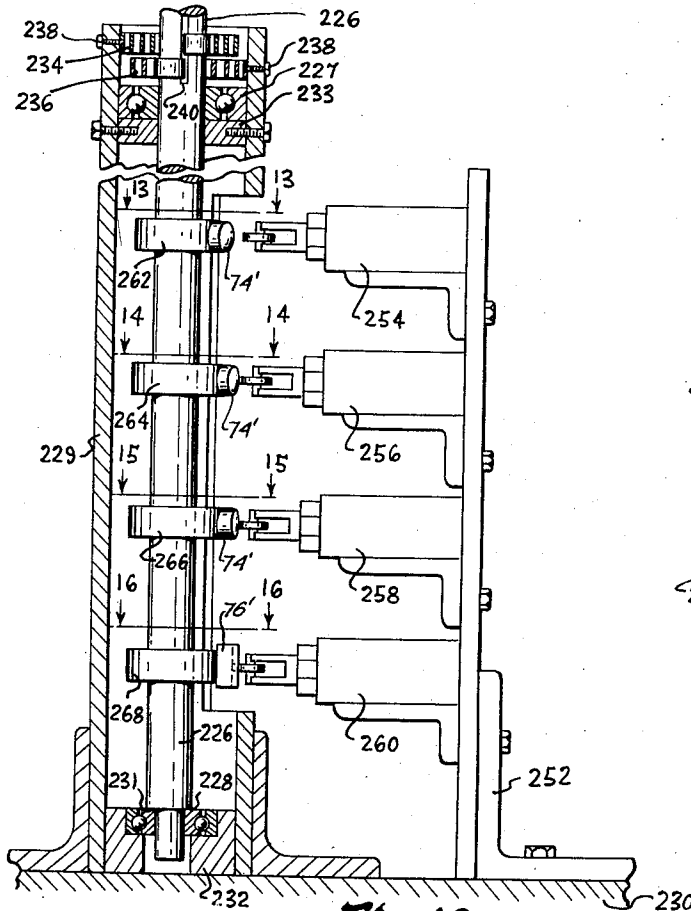


Fig. 12

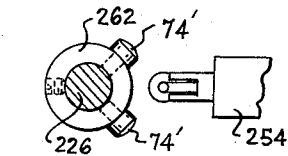


Fig. 13

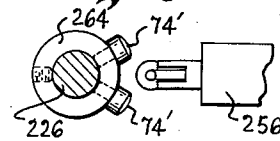


Fig. 14

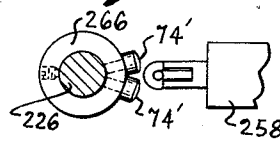


Fig. 15

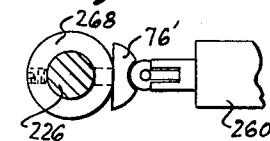


Fig. 16

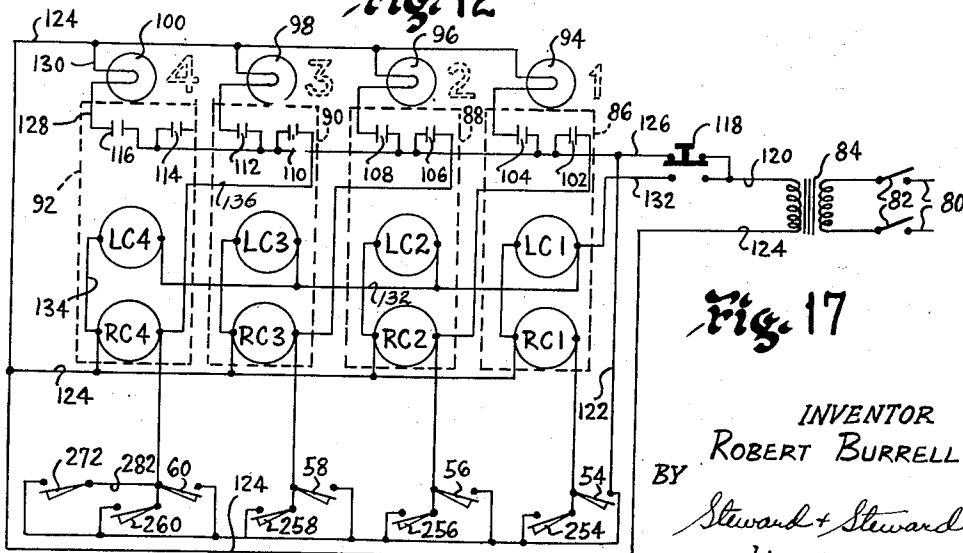


Fig. 17

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2,890,052

TARGET WITH ELECTRICAL INDICATOR

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Application July 5, 1956, Serial No. 595,886

8 Claims. (Cl. 273—102.2)

This invention pertains to a target device, and more particularly to a target device at which balls or similar objects may be projected or thrown and the accuracy of the hit upon the target recorded in a suitable manner.

It is an object of the invention to provide a target device useful either for actual training purposes, or one which may serve simply for amusement or entertainment. While the basic concept of the invention is applicable to various games of skill involving the striking of a target by an object, it is particularly suitable for providing a baseball pitching target device which indicates the accuracy of the pitcher.

It is accordingly a further object of the invention to provide a device which can be used in simulating the pitching of a baseball from a pitcher's box to home plate on a regulation baseball field, and to record temporarily for the player the result of his pitch in order to give him a visual indication of how accurate the pitch was.

In brief, a preferred embodiment of a device constructed in accordance with the invention comprises a tiltable target member or drum suitably supported upon a base or standard. The drum is positioned at a predetermined distance from the thrower or pitcher, with an end facing the latter, and it is the object of the game to throw a baseball at, and to strike the center of, the target marking or bullseye on the face of the drum. Depending upon the accuracy with which the thrower strikes the target; that is, the nearness to the bullseye with which he strikes the drum, the latter is caused to tip or tilt about a central axis or about rectangularly related central axes. The amount of rotational displacement about an axis is inversely proportional to the accuracy of the throw, that is, the less accurate the throw, the more the target tilts. In order to provide a recording of the result of each throw, the device includes an indicator system, comprising tell-lights which register in accordance with the amount of tilt of the device. Manual means for extinguishing the lights is provided so that after each throw and recording or noting of the score obtained, the indicator system may be cleared for recording the result of the next throw.

A game device constructed in accordance with the present invention is characterized by relatively simple mechanical construction, but at the same time affords excellent accuracy in recording the results of the hit upon the target. The device is exceptionally rugged and little or no adjustment of it is required once it has been properly set up. With all this, the device is one which can be constructed at low cost, yet provides excellent operation and real enjoyment for persons using it. It is easily adapted for use indoors or outdoors and while having great appeal as an amusement device, as mentioned previously, it may also be used with good effect as a training device for baseball pitching practice. Thus the device may be so set up at the regulation distance from the pitcher, and may be positioned at such a level, as to compel a player to pitch a ball in much the same manner as that actually required of a pitcher in at-

tempting to get the ball across home plate and within the strike zone in a regular game.

Various other objects of the invention will become apparent from the following description and accompanying drawings in which certain modes of carrying out the present invention are described and shown for illustrative purposes.

In the drawings:

Fig. 1 is a front elevational view of a simple form of the target device and indicator system;

Fig. 2 is a side elevational view of the target device shown in Fig. 1;

Fig. 3 is a fragmentary view in end elevation, on an enlarged scale, looking from the right in Fig. 1, showing a portion of the indicator mechanism;

Fig. 4 is a similar view, but in side elevation, along line 4—4 in Fig. 3;

Figs. 5, 6, and 7 are sectional views on lines 5—5, 6—6, and 7—7, respectively, in Fig. 4;

Fig. 8 is a diagrammatic illustration of the electrical circuit of the indicator system used in conjunction with the target device of Figs. 1 and 2;

Fig. 9 is a front elevational view, similar to that of Fig. 1, of a modified form of target device;

Fig. 10 is an end elevational view of the device shown in Fig. 9;

Fig. 11 is a fragmentary view of a portion of a supplemental indicator system incorporated in the target device shown in Figs. 9 and 10;

Fig. 12 is an enlarged detailed view of the lower portion of the mounting standard shown in Figs. 9 and 10 and the indicator mechanism associated therewith;

Figs. 13, 14, 15 and 16 are sectional views on lines 13—13, 14—14, 15—15, and 16—16 respectively, in Fig. 12; and

Fig. 17 is a schematic diagram of the electrical circuit for the indicator system employed in connection with the target device shown in Figs. 9 through 12.

A relatively simple form of the game device constructed in accordance with the present invention adapted for use as a baseball target, is illustrated in Figs. 1 and 2 of the drawings. As there seen, the device comprises a drum 20 having a central axle or rock shaft 22 which is supported horizontally in a simple frame structure 24. The latter is composed of suitable piping 26 and an adjustable cross brace 28 forming a pair of A-frames. Each of these frames is mounted on a wooden base 30, and each leg of the frames is joined to the respectively opposite leg of the other by a tie 32. Suitable pillow blocks or bearings 34 are secured to the top member 35 of each A-frame, and rock shaft 22 is rotatably carried in these bearings at either side of drum 20. Thus the drum may be freely tipped or tilted about its central horizontal axis. In order to make the drum normally assume a position in which its end faces are substantially vertical, a counter-weight 36 is secured as shown to one side of the drum.

The face of the target drum is covered by a suitably stretched flexible membrane 38 on which is centrally painted a bullseye 40. A soft rubber ring 41 covers the rim of the drum to prevent damage to it if struck by a ball, as well as to prevent cutting of the ball. Similar protection to other exposed parts of the device, including the frame structure, is preferably employed. A pitcher, standing at a suitable distance from the target device, throws a baseball at the target, attempting to hit the bullseye 40. If the ball strikes the target substantially on the line of rock shaft 22, there will of course be little or no rocking or tilting of the target drum; however, if the ball strikes the target at some point above or below this axis, the drum will tilt or rock accordingly. The amount of tipping will be proportional to the dis-

tance from the axis at which the ball strikes the target. Therefore in order to provide an indication of the accuracy of the throw, the game device incorporates indicator means 42, as seen in Fig. 1, which registers a score in accordance with the amount of tipping of the drum about its horizontal axis.

The indicator device 42 comprises a set of four panels 44 which are translucent and bear scoring indicia thereon. In the present instance such scoring indicia comprises the numerals "4," "3," "2," and "1." Cubicles located behind each of these panels each contain an electric light which illuminates its respective panel to indicate a score and the illumination of these tell-lights is controlled by means of a cam-operated switch assembly 46 mounted on the frame 24. A portion of rock shaft 22 projects outwardly beyond the frame as seen in Fig. 1, and has fastened to it suitable cams which cooperate with respective switches in assembly 46 to cause illumination of the appropriate panels 44 of the indicator device. Connection between the switch assembly 46 and the indicator 42 is provided by a suitable electrical cable 48.

The cam-operated switch assembly 46 is shown in greater detail in Figs. 3 and 4 of the drawing. As seen in Figs. 2 and 3, it is protected from being hit by a ball by a rubber sheathed guard 49. In Fig. 1, the guard has been omitted for purposes of clarity. This guard and the switch assembly are carried on a mounting bracket or plate 50 which is conveniently secured to the underside of the upper A-frame member 35 by the same bolts 52 which secure the bearing block 34. Plate 50 supports four snap-action switches 54, 56, 58 and 60, each of which is secured to the plate by an angle 62. Each of these switches is provided with a roller type plunger 64 which projects from the respective switch housings toward the center of shaft 22. These plungers are spring biased to their extended positions but are depressed by engagement of a cam lobe. For this purpose, there is mounted in spaced relation on shaft 22 four collars 66, 68, 70 and 72. These are held in position on the shaft by suitable set screws which permit them to be adjusted angularly about the shaft as well as longitudinally thereof. Each of these collars carries cam means which cooperate, respectively, with the plungers 64 of respective switch units 54, 56, 58 and 60.

As seen in Figs. 5 through 7, the cam means provided on collars 66, 68, and 70 comprise sets of studs or pins 74, each set comprising two angularly spaced pins which, in the neutral or home position of the target drum, are disposed at equal rotative distances from the line drawn between plungers 64 and the center of shaft 22. In the case of collar 72, the cam means carried by the collar comprises a block 76 (see Fig. 3) which has a central depression corresponding with the contour of the roller on plunger 64 of switch unit 60. As will be apparent from the foregoing, rotation of shaft 22 in either direction from neutral position will first cause cam block 76 to depress plunger 64 of switch unit 60, thereby actuating that switch to closed condition. Further angular displacement of shaft 22 will next cause one of the studs on collar 70 to actuate the plunger of switch unit 58, as seen in Fig. 7. Still further rocking of shaft 22 will cause actuation of the respective plungers of switches 56 and 54 successively, as seen in Figs. 6 and 5, respectively.

As previously mentioned, the switch assembly 46 is connected to indicator 42 by a suitable multiconductor cable 48 and the tell-lights in the indicator are illuminated in accordance with actuation of the several switches. The electrical circuit by which this is accomplished is shown diagrammatically in Fig. 8. As there seen, electrical power is supplied through power mains 80 and a double pole disconnect switch 82 to a step-down transformer 84. This latter supplies low voltage power for

the indicator circuit. Housed within the indicator 42 is a relay panel comprising a set of four latching type relays 86, 88, 90, and 92, each one of which is associated with a tell-light 94, 96, 98 and 100, respectively. These are conventional relays, such as Model 51BXX manufactured by Struthers-Dunn, Inc., Pitman, N. Y. Each carries a set of normally open double pole single throw switch contacts, relay 86 having contacts 102, 104; relay 88 having contacts 106, 108; relay 90 having contacts 110, 112; and relay 92 having contacts 114, 116. Upon energizing the respective closing coil RC1, RC2, RC3 or RC4 of each relay, the contacts are closed and mechanically latched in this condition; energization of the respective unlatching coil LC1, LC2, LC3, or LC4 trips the latch and allows the contacts to spring back to normally open position again. The tell-lights are those indicated previously which illuminate the respective indicator and are controlled by the relay contacts. Also associated with each of the relays, being located in the circuit of the respective relay closing coils, is one of the switch units 54, 56, 58 or 60 actuated by the rocking of shaft 22. The indicator circuit also includes a manually operated tell-light clearing or extinguishing switch 118.

When the game device is in use, the power disconnect switch 82 is first closed to energize the step-down transformer 84. This places the indicator system in condition for operation, but nothing occurs until the target has been struck by a baseball. Assuming that a ball strikes the target so as to cause a slight rocking movement just sufficiently to depress the plunger 64 and close switch 60, electrical power is then supplied to operating coil RC4 of relay 92 through the "hot" lead 120, switch 118, lead 122 and switch 60 to one side of RC4, and through the common return or lead 124 to the other side of RC4. Energization of this operating coil causes contacts 116, 114 to be closed and latched in the circuit-closing position. Closing of contacts 116 immediately completes a circuit to tell-light 100, illuminating this light, through leads 120, manual switch 118, leads 126 and 128 to one side of the light, and through lead 130 and common return 124 to the other. The tell-light stays lit, due to the latching of relay 92, even though the target drum returns to home position after the impact of the hit. The score indicated for such a hit is therefore "4" and this continues to register until the player or another person depresses the manual clearing switch 118. This action completes the circuit to the latch releasing coil LC4 of relay 92 through leads 120 and 132 to one side of the coil, and through leads 134, 124, to the other side. Thereupon the switch contacts 116 are again opened and tell-light 100 is extinguished. In the case of relay 92, the companion set of contacts 114 is not used.

Assuming that a hit upon the target is somewhat farther away from center than in the previous example, the target and shaft 22 will rock a greater distance and this will cause the respective plungers 64 of switches 60 and 58 to close those respective switches momentarily. Closing of switch 60 illuminates tell-light 100 as just described, and the closing of switch 58 will likewise illuminate tell-light 98, through closing of contacts 112 of relay 90 in similar fashion. In this case also, the companion contacts 110 of relay 90 complete a circuit to the "hot" side of operating coil RC4 of relay 92 through lead 136. This is a feed-back circuit to assure that the preceding tell-light in the system is lighted in case the first switch, normally operating that tell-light, was actuated so rapidly as to fail to cause latching of the respective relay in its operated position.

The indicator system now shows tell-lights 100 and 98 both illuminated. In the simple form of indicating system here employed, the player will understand that the score which he receives for his hit is the lower of the two numbers registered on the indicator.

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It will be apparent from the foregoing that hits upon the target at successively greater distances from the central axis will cause greater swinging movement of the target about the axis and will therefore operate more of the switches in assembly 46 in succession. In such case the indicator 42 will register successively lower scores. Each time a score has been noted, it is then extinguished by depressing the manual switch 118 to clear the indicator for the next throw.

As previously mentioned, the foregoing target device represents a very simple arrangement embodying the invention. Such a unit is readily constructed at extremely low cost and yet affords a very entertaining device. It will be obvious, however, that this very simple form of device has certain limitations which, for some purposes, may be undesirable. Chief among these is the fact that while it is capable of indicating the accuracy of the throw in respect to elevation, it cannot register the deviation of a throw in azimuth. It is relatively easy, however to adapt the foregoing device to overcome this limitation, as is illustrated in Figs. 9 through 12 of the drawings.

Basically, the modified form of the target device shown in these figures is closely similar to that previously described, the chief difference being that the mounting for the target drum includes means for permitting angular displacement about a vertical axis, as well as about a horizontal axis, and for indicating the deviation of a hit from that vertical axis.

As in the previous example, a target drum 220 is mounted upon a horizontal shaft 222, the latter being carried adjacent its ends in bearings 223 to permit free movement of the drum about the axis of shaft 222. A pipe frame 224 supports the bearings substantially as before, but in this case frame 224 is carried centrally upon the upper end of a vertical shaft 226. The latter in turn is journaled in upper and lower bearings 227, 228 (see Fig. 12) which are retained in a vertical housing or sleeve 229. In this manner the drum is provided with a gimbal mounting, permitting it to swing about either a horizontal or a vertical axis or both.

The vertical housing 229 is secured to a base or platform 230 to mount it in upright position. At its lower end, shaft 226 is reduced to provide a shoulder 231 which rests upon the inner race of bearing 228. As seen in Fig. 12, bearing 228 is seated in a recess in a plug or block 232 at the lower end of the housing 229. Bearing 228 thus acts as a thrust bearing for the load on shaft 226. Bearing 227 at the upper end of the housing is retained therein by means of a collar 233 held in the housing by suitable set screws.

In addition to the upper bearing within the upper end of housing 229 there is provided a pair of flat spiral springs 234, 236. One end of each of these is secured by screws 238 to the interior of the housing 229, while the other end is secured within a slot or recess 240 in shaft 226. Springs 234, 236, are wound in opposite directions, and each opposes the action of the other upon rotation of the shaft, thereby yieldingly resisting the rotation of the shaft in either direction and serving to return the shaft to a fixed or "home" position.

At the left hand end of shaft 222, as viewed in Fig. 9, a cylindrical housing 242 is fastened to frame 224 by means of a bracket 244. Within this housing there is a set of counter-acting flat coil springs, similar to springs 234, 236, just described, which engage shaft 222 and resiliently retain it in, or return it to, a fixed position corresponding to the home position of the target drum in respect to the horizontal axis. Housing 242 also serves a further purpose namely, that of being a counter weight to offset the weight of switch assembly 246 at the right hand of the shaft, so that the target device is balanced about the vertical axis.

The modified target device again includes a switch assembly 246 which is identical in all respects with assembly

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46 shown in Figs. 1, 3 and 4. Also, a visual indicator device 248, similar to indicator 42, is connected to the switch assembly by a multiconductor cable 249. This switch assembly functions, just as in the previous example, to indicate the angular displacement of the target by a ball striking above or below the horizontal axis.

In addition to the foregoing switch assembly 246, the device shown in Figs. 9 to 12 includes a second, similar assembly 250 located adjacent the lower end of shaft 226.

A portion of the lower end of housing 229 is cut away to expose the shaft thereat, and cams on the exposed section of the shaft cooperate with this switch assembly to cause actuation of the latter in accordance with the extent or amount of rotation of this shaft about its vertical axis. To this end switch assembly 250 is supported by a bracket 252 secured to base 230. The switch assembly comprises four plunger-actuated switch units 254, 256, 258 and 260, and these are operated by respectively cooperating cam means on collars 262, 264, 266, and 268 which are secured to shaft 226. As seen in Figs. 13 through 16, the cam means provided is identical with that previously shown and described in connection with Figs. 3 and 5 through 7. A cable 270 makes connection between the lower switch assembly and the visual indicator 248.

As an optional refinement, the target device here illustrated includes a single, plunger-actuated switch unit 272, identical with each of the individual switch units previously mentioned, unit 272 being held by a clamp 274 on horizontal shaft 222 within drum 220. This is illustrated in Fig. 11 from which it will be seen that the switch is held by the clamp so as to cause the roller 276 of its plunger 278 to lie just behind the membrane 280 of the drum in the area corresponding to the bullseye. A ball striking the target on absolute dead center, both in respect to the vertical and horizontal axes, will obviously not cause the drum to tip. No indication would thus be registered on the visual indicator 248, but by providing the supplemental switch 272 just described, the local deflection of the membrane, upon being hit by a ball, will cause actuation of the switch. As will presently be explained, this switch is so connected to the indicator circuit as to provide a means of recording a hit on dead center.

While it would be entirely possible and perhaps even desirable in some cases to use separate visual indicators for registering tilting movement of the target drum about its horizontal and its vertical axes, the present embodiment incorporates a single indicator which provides a composite registration of the accuracy of the hit with respect to both the vertical and horizontal axes of the target. The electrical control circuit diagram for such an indicating system is shown in Fig. 17. As will be seen, this circuit differs from that shown in Fig. 8 only by the addition of switches 254, 256, 258, and 260, which are connected in parallel, respectively, with switches 54, 56, 58 and 60, and by the addition of the supplemental switch 272 which is also connected in parallel with switches 60 and 260.

Since the functioning of this circuit is the same in all material respects as that previously described in connection with Fig. 8, it will not be necessary to go into any great detail on it here. It is believed sufficient merely to point out that by reason of the pairing of switches, whereby one actuated by a given degree or amount of movement of the target about one axis is connected in electrical parallel with another actuated by a similar degree or amount of movement of the target about the other axis, results in the registering of a composite score. Thus, for example, where a ball strikes the target directly on the horizontal axis, for which a score of "4" would normally be received, but at some distance from the vertical axis, for example, corresponding to a score of "2" in respect to that axis, then the net score for that throw will be the smaller figure, namely "2." It will be seen that in such a case, the indicator will have the numbers "4," "3" and "2" all illuminated, in the circuit design shown in the ac-

companying diagram, and the player will know that the smallest number illuminated represents his score.

In the case of a direct hit at the center of the bullseye, thereby closing switch 272, just the number "4" will be lighted. The same result is obtained if a ball strikes the target so nearly on center as to cause actuation of either or both of switches 60 and/or 260, but no others. If desired, provision may easily be made whereby a hit dead center, i.e., one causing actuation of switch 272 only, may cause a separate indication, either visual or aural, to be energized. As will be obvious to those skilled in the art, this can be conveniently done by disconnecting lead 282 from its connection to switches 60 and 260, and running it instead to a separate light, bell or similar device to give a momentary indication.

Many other modifications of the indicating system will be apparent from the foregoing description. As has already been suggested, separate indicator devices may be employed for each switch assembly; also, it is quite easy by making a small change in the relay circuits shown in Figs. 8 and 13 to have the cam-operated switches effect extinguishment of the tell-light previously lighted by a preceding switch in the sequence of operation, whereby the indicator will show only the last or smallest score registered.

Modifications in the mechanical construction of the target device will also be apparent, as the frame or standard specifically disclosed here for purposes of illustration is intentionally simplified. Yet a unit constructed exactly as shown has proven entirely practical and has the decided virtue of being rugged and able to withstand considerable abuse without adverse effect upon its operation. Moreover it is relatively economical to construct. Mention may also be made of various other means for resiliently biasing the target in its "home" or neutral position. For example, regular extension springs connected between the lower edges of the drum and members of the frame 24 or 224 may be substituted for the means shown to maintain the drum normally erect in respect to rotation about its horizontal axis, and similar means may be employed to position the target in its vertical axis.

The foregoing embodiments of the invention are, therefore, to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are accordingly intended to be embraced therein.

What is claimed is:

1. A tiltable target device comprising a member having a unitary plane target face adapted to be struck by an object projected against it, a mount for said member including axle means located on a central axis of the member parallel to said face, and bearing means by which said axle means is pivotally supported on said mount to permit rotative angular displacement of said member in opposite directions from a normal position wherein said face is disposed substantially perpendicular to the path of the object striking the target, means urging said member to said normal position, and indicator means operatively connected to said member and successively operated thereby in response to increasing amounts of rotative displacement of said member in either direction from said normal position, including means for registering the maximum amount of such angular displacement.

2. A target device as defined in claim 1, wherein said mount includes axle means located on the central vertical and horizontal axes of the member parallel to its face to permit angular displacement of said member about each of said axes.

3. A baseball target device for indicating the accuracy of a pitch thrown at the target by a player, said device comprising a drum including a membrane stretched across one face thereof, a standard, an axle supported thereby, said drum being mounted on said axle so that the latter

substantially coincides with a central axis of the drum in a plane parallel to said membrane, said drum being capable of swinging movement about said axle in opposite directions when said membrane is struck off-center with respect to said axle by a thrown ball, means yieldably urging said drum toward a neutral or home position on said axle to dispose said membrane substantially perpendicular to the path of the thrown ball, indicator means operated sequentially by said drum in response to increasing amounts of rotative displacement thereof in either direction from said home position, including means for registering the maximum amount of such displacement.

4. A target device as defined in claim 3, wherein said device includes additional indicator means disposed behind said membrane at the center of the target area, said second indicator means being actuated only by inward deflection of said membrane at the center of said target area.

5. A target device as defined in claim 3, wherein said drum is fixed to said axle and said indicator means includes tell-lights and a source of electric power therefor, switches respectively controlling the illumination thereof from said power source, and cam means carried by said axle for operating said switches successively with increasing amounts of swinging movement of said drum about said axle.

6. A target device as defined in claim 5, which further includes a latching relay associated with each tell-light and cam-operated switch, each relay having a set of normally open contacts adapted to be closed by said relay upon actuation of the respectively associated cam-actuated switch, and latching means on said relay automatically engaged upon closing of said contact points to hold them in that position, each said relay also including an unlatching coil adapted upon energization to trip said latch magnetically and allow said contacts to resume their normal open-circuit position, and a manually operated switch for energizing said unlatching coil from said power source.

7. A target device for indicating the accuracy of a pitch thrown at the target by a player, comprising a drum including a membrane stretched across one face thereof to provide a unitary, plane target face, a standard supporting said drum, said standard comprising a gimbal, the two axes of which pass substantially through the center of gravity of said drum and lie in a plane substantially parallel to said target face, said drum being capable of swinging movement about either axis in opposite directions when said face is struck off-center of the respective axes by a thrown ball, means yieldably urging said drum to a neutral or home position with respect to each of said axes wherein said target face is disposed substantially perpendicular to the path of the thrown ball, and indicator means operatively connected to said drum and successively operated thereby for registering increasing amount of angular displacement of said drum in any direction from said neutral position.

8. A target device as defined in claim 7, which further includes additional indicator means disposed behind said target face at the center thereof and operated only by inward deflection of said face at the center of said target.

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