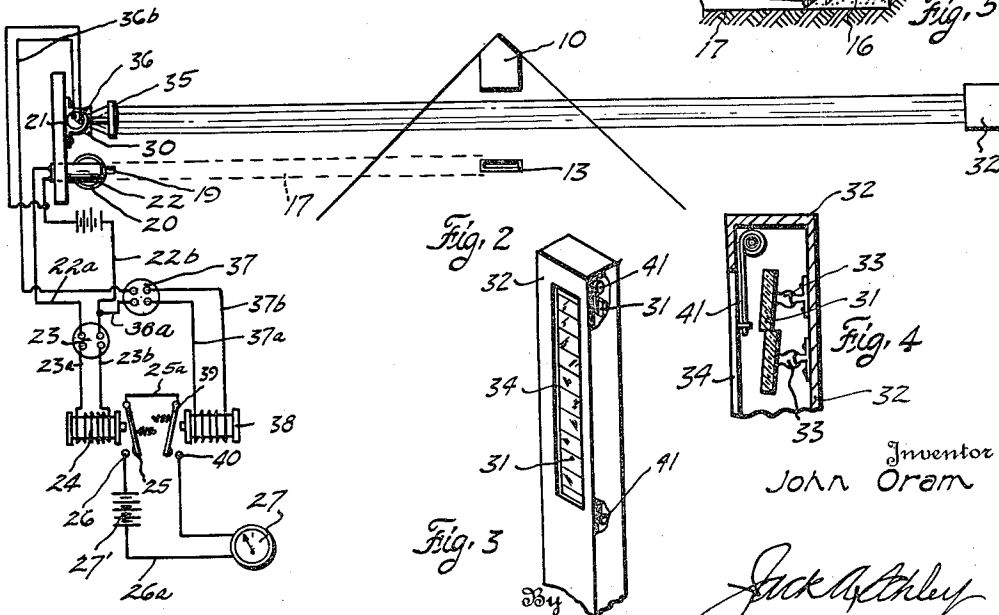
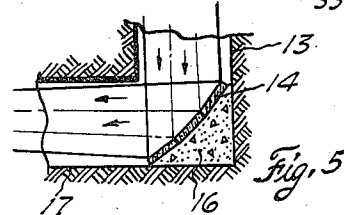


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INDICATOR

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This invention relates to new and useful improvements in indicators.

One object of the invention is to provide improved means in a game of baseball for accurately indicating whether or not a baseball thrown by the pitcher is a "strike"; that is, whether or not it has passed over the home plate between the batter's shoulders and knees.

Another object of the invention is to so coordinate a multiplicity of beams of electric-magnetic radiation as to indicate the passage of an object thru the prescribed zone occupied by said beams.

A further object of the invention is to provide means in a game of baseball for accurately indicating when a thrown baseball is a strike, which includes the projection of a multiplicity of light beams onto a photo-electric cell which, in turn, is electrically connected to and controls the operation of a suitable indicating device, whereby the passage of the thrown ball thru the beam will interrupt said beam to cause the photo-electric cell to operate the indicating device.

An important object of the invention is to provide means for accurately indicating when a thrown baseball is a strike which includes the projection of two light beams, one vertical which indicates the lateral position of the ball as it passes over the home plate, and the second horizontal which indicates the vertical position of the thrown ball as it passes over the plate, the horizontal beam being readily raised or lowered so as to always cover the space between the batter's shoulders and knees regardless of the size of said batter.

A construction designed to carry out the invention will be hereinafter described together with other features of the invention.

The invention will be more readily understood from a reading of the following specification and by reference to the accompanying drawing in which an example of the invention is shown, and wherein:

Figure 1 is a view partly in elevation and partly in section of an electrical baseball strike indicator constructed in accordance with the invention.

Figure 2 is a plan view of the same, the vertical projecting light being omitted.

Figure 3 is an isometric view of the horizontal beam reflecting mirrors.

Figure 4 is a detail of one of the mirrors; and Figure 5 is a detail of the mounting of the vertical beam reflecting mirrors.

In the drawing, the numeral 10 designates the

usual home plate or base, of a baseball diamond. The baseball thrown by the pitcher must pass over this plate and must also be in a vertical zone between the batter's knees and shoulders before it is a "strike". Of course, if a tall man is batting, the vertical zone is larger. Similarly, a small man batting decreases this space. However, tho the vertical zone thru which the ball must pass varies with each batter, the lateral zone always remains the same, the width of the plate being the boundaries of the lateral zone. Thus each ball, to be a "strike" must pass thru an imaginary zone, the height of which is determined by the space between the batter's shoulders and knees and the width of which is determined by the width of the home plate. Any thrown ball passing outside of the imaginary zone is a "ball".

In carrying out the invention, a suitable electric projector lamp 11 is positioned above the home plate 10. The lamp is sufficiently high above the ground so as not to interfere with the play of the game, and it is pointed out that said lamp is rigidly supported by guy wires 12, or any other suitable means, so as to be immovable.

The beam of light from the lamp 11 is projected downwardly thru a slot 13 in the ground onto a plurality of inclined mirrors 14. The length of the slot is substantially the width of the home plate 10 and is positioned in front of the plate, in alinement therewith. The slot is positioned sufficiently far from the plate so as not to interfere with the batter, but is close enough so that the thrown baseball will not change its flight to any great extent from the time it passes over the slot until it passes over the home plate 10. Thus, it is obvious that any ball passing over the slot will pass over the plate. The slot 13 may have a screen 15, or other suitable transparent cover thereover.

The mirrors 14 onto which the light beam from the lamp 11 is projected are permanently secured in an inclined position at the lower end of the slot. In Figure 5, I have shown them mounted in concrete 16, but the invention is not to be so limited as any suitable rigid mounting, which will prevent the mirrors shifting out of position will suffice. The mirrors 14 being at an inclination, reflect the light beam thru an underground passage 17 onto a second set of inclined mirrors 18. These mirrors 18 are also rigidly mounted in any suitable way and are so positioned as to reflect the light beam upwardly thru a slot 19, and focus said beam through a condenser lens 20 which is mounted on a suitable support 21

above the ground. The condenser lens 20 serves to intensify the beam directly onto a photo-electric cell 22 of the usual type, also mounted on the support 21. Wires 22^a and 22^b lead from the photo-electric cell to an amplifier 23. The amplifier is directly connected thru wires 23^a and 23^b with a time delay relay 24. When this relay is energized, the relay switch arm 25 engages a contact 26 which is connected thru a lead wire 26^a to a suitable indicator 27. A battery 27' is connected in to wire 26^a.

Thus, it will be seen that the light beam projected from the lamp 11 above home plate is reflected by the mirrors 14 and 18 onto the photo-electric cell 22. When a thrown baseball passes over the slot 13, (and also over home base, since the slot is the width of the base) it will interrupt the light beam. This interruption will cause the photo-electric cell to energize the time delay relay and swing the switch arm 25 into engagement with the contact 26. It is pointed out that this action will not operate the indicator 27 since the contact 26 is only connected to one side of the indicator circuit, but each time the relay 24 is operated, the thrown ball has passed over the home plate, altho it is not known whether it was in the vertical space between the batter's knees and shoulders.

For determining the vertical position of the ball in relation to the batter, a second electric reflecting lamp 30 mounted on the support 21, projects a horizontal beam of light across the plate onto a plurality of mirrors 31 on the opposite side of said plate. For clearance sake, I have shown this beam as being projected slightly behind the beam projected vertically by the lamp 10 (Fig. 2) but it is preferable that the beams intersect. By this arrangement, both beams are sufficiently far from the batter so that he will not interrupt said beams in his natural batting stance.

The mirrors 31 onto which the light beam from the lamp 30 is projected, are mounted in a suitable case 32. Each mirror is mounted on a ball and socket 33 whereby the mirrors are individually adjustable. The casing is provided with a vertical opening 34 in its front wall and the light beam from the lamp enters this opening to strike the mirrors. Each mirror 31 is adjusted to reflect and focus the beam onto a condenser 35 which is mounted on the support 21. The condenser intensifies the beams and directs it onto a second photo-electric cell 36 which has connection thru lead wires 36^a and 36^b with an amplifier 37. The amplifier is connected by wires 37^a and 37^b to a time delay relay 38. The relay 38, when energized, serves to swing a switch arm 39 into engagement with a contact 40 which has a lead wire 40^a connecting it to the opposite side of the indicator 27. The switch arm 39 and the switch arm 25 have electrical connection thru a wire 25^a and it is obvious that both arms 25 and 39 must be engaging their respective contacts 26 and 40 to complete the circuit to the indicator.

When the thrown baseball passes thru the beam projected from the lamp 30, which is reflected onto the photo-electric cell 36, said beam is interrupted, whereby the photo-electric cell 36 will energize the time delay relay 38. This will swing the switch arm 39 into engagement with the contact 40. Thus, it will be seen that the relay 38 is energized only when the horizontal light beam from the lamp 30 is interrupted, and the relay 24 is energized only when the vertical light beam from the lamp 11 is interrupted. Since

the switch arms 25 and 39 are electrically connected it is obvious that it is only when both arms engage their respective contacts 26 and 40 that the circuit to the indicator is complete. Therefore, the thrown ball must intercept both the vertical and horizontal beams to energize the relays 25 and 38 simultaneously to operate the indicator and indicate a "strike".

It is pointed out that by providing the time delay relays 24 and 38, the circuit is held closed sufficiently long to permit the operation of the indicator. If the relays were quick acting relays, depending on the length of time of travel of the ball thru the light beams, for operation it is obvious that the circuit to the indicator would be closed for only a fraction of a second. If one relay were a fraction slower in energizing, the circuit would remain open and the indicator would fail to operate. Thus, by using time delay relays this disadvantage is overcome and the operation of the indicator, each time the ball intercepts both light beams, is assured.

By observing Figure 1, it is seen that the only zone where the two beams intersect each other and can both be intercepted at the same time by a thrown ball is between the shoulders and knees of the batter vertically, and the width of the plate horizontally, as designated by dotted lines. When a ball passes thru this zone, both beams are intercepted and the relays 25 and 38 are operated simultaneously and the circuit to the indicator is closed to indicate a "strike". However, if the ball is waist-high of the batter but wide of the plate, it intercepts only the horizontal beam, projected from the lamp 30, and only the relay 38 is energized. This does not operate the indicator. Similarly, if a ball is thrown directly over the plate but above the batter's shoulders only the vertical beam from the lamp 11 is intercepted and only the relay 25 is energized, which does not close the circuit to the indicator.

For raising and lowering the light beam projected from the lamp 30 and reflected by the mirrors 31, in order to adjust said beam so as to always be in line with the batter's shoulders and knees, regardless of his size, a pair of roller shades 41 are provided at the upper and lower end of the opening 34 in the case 32.

By pulling down the upper shade and lowering the lower shade, the upper mirrors 31 are covered and the lower mirrors are uncovered so that the beam projected onto and reflected from the uncovered mirrors in the case is lowered for a smaller batter. Any suitable means (not shown) may be used for holding the shades in an adjusted position. It is obvious that by using the shades the desired adjustment can be made, whereby the horizontal beam is always exactly the distance between the batter's shoulders and knees, regardless of said batter's size. None of the playing time is lost, as the adjustment may be made quickly and easily as each player comes to bat.

The electric elements may be properly shielded against outside influences. While I have shown and described a photo-electric cell, it is to be understood that any device suitable for the purpose may be used. The lamps 11 and 30 may project visible light rays or they may be devices for projecting beams of electro-magnetic radiation, not necessarily visible.

Although I have shown the device as used to indicate a "strike" in a baseball game, it is clear that the arrangement can be used whenever it is desired to indicate the passage of an object thru a particular designated zone.

The description which has been given recites more or less detail of a particular embodiment of the invention which is set forth as new and useful, however, I desire it understood that the invention is not limited to such exact details of construction, because it is manifest that changes and modifications may be made within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent, is:

1. Apparatus for indicating a pitched ball as a strike in a baseball game, comprising, in combination with the home plate, means for creating a rectangular active zone of crossed vertical and horizontal beams in front of the plate and at an elevation above ground, said zone being of a horizontal width substantially the same as the width of the plate and of a vertical length substantially the same as the distance between the shoulders and knees of the batter, means for varying the vertical dimension of the zone and its elevation above the ground to adjust the same to the stature of each batter, an indicator, and beam responsive means for operating said indicator only when both the vertical and horizontal beams within the area of said active zone are interrupted by a pitched ball passing through the zone.

2. Apparatus for indicating a pitched ball as a strike in a baseball game, comprising, in combination with the home plate, means for creating a rectangular active zone of crossed beams in front of the plate and at an elevation above the ground and of a horizontal width substantially the same as the width of the plate and a vertical length substantially the same as the distance between the shoulders and knees of the batter, said means including a projector arranged to project a beam vertically and another projector to project a beam horizontally in a different and non-interfering vertical plane, an electrical indicator in a normally open circuit including two separate switches each having a separate time delay operating element, and a separate beam responsive energizer for each of said operating elements, means for separately reflecting and concentrating the vertical beam on one of said energizers and the horizontal beam on the other energizer, whereby each switch is separately controlled and normally opened and both are closed at the same time only when a pitched ball passes through said active crossed beam zone and interrupts both the vertical and

the horizontal beam, and means for varying the width of the horizontal beam and adjusting the elevation of said beam above the ground to proportion the vertical dimension of said active crossed beam zone, and position the zone according to the stature of each batter.

3. The herein described strike indicator for the pitched ball in a baseball game, comprising, in combination with the home plate and the provision of a transverse underground passageway with a beam-receiving slot at its inner end, said slot being located in front of the home plate and of a length substantially the same as the width of the plate, said passageway having a beam-projecting opening at its outer end, and beam-reflecting mirrors in said passageway below its beam-receiving slot and its beam-projecting opening, an electric projector lamp supported above and projecting a vertical beam of substantially the same width of the home plate downwardly into said beam-receiving slot of the underground passageway, another electric projector lamp located laterally of the home plate and projecting a horizontal beam in front of the plate and across said vertical beam in a different and non-interfering vertical plane, an opposed vertical stand of mirrors located laterally from the opposite side of the home plate and reflecting said horizontal beam back across said vertical beam and increasing the width of the horizontal beam, adjustable means at the top and bottom of said reflecting mirror stand for variably covering the adjacent mirror element whereby vary the active width of the horizontal beam and its elevation above the ground, separate photo-electric cells one located to receive the reflection of the horizontal beam from the vertical stand of mirrors and the other to receive the reflection of the vertical beam from the underground passageway, condensing lens for concentrating the beam reflections on the respective photo-electric cells, and an electric indicator device having a normally open circuit including two separate switches each provided with a time delayed operating element, an energizer for one of said operating elements controlled by one of said photo-electric cells, and a separate energizer for the other operating element controlled by the other photo-electric cell, whereby the indicator circuit is closed and the indicator operated to indicate a strike only when the pitched ball passes through the active crossed beam zone and both beams are thereby interrupted.

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