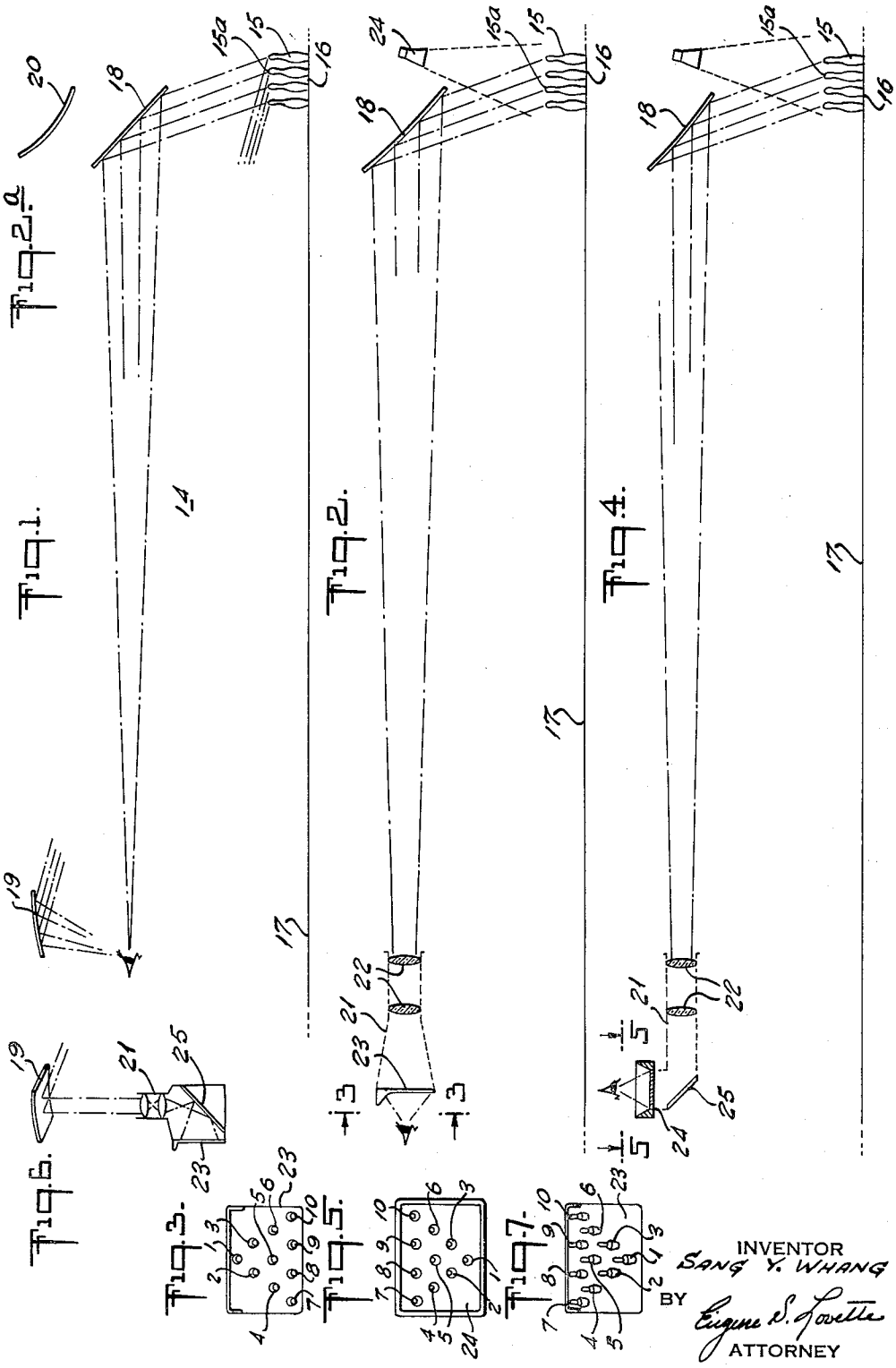
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APPARATUS FOR INDICATING THE POSITION OF STANDING BOWLING PINS

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APPARATUS FOR INDICATING THE POSITION OF STANDING BOWLING PINS

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The instant invention relates to an improved apparatus for indicating accurately to a person at the approach end of a bowling alley the upright bowling pins standing at the pin deck end of the alley, and in particular relates to means illustrating the respective positions of the standing pins in a plan view array.

The familiar game of bowling ten pins involves bowling a ball in a manner to strike down ten bowling pins standing upright in a familiar triangular pattern or array on the pin deck of the bowling alley. The distance between the foul line at the approach end of the alley and the pin deck is approximately 60 feet. The alley approach immediately to the rear of the foul line extends from 12 to 16 feet from the foul line and is used by the bowler in his running or walking approach to permit him to aim and release the bowling ball for the purpose of striking down the standing pins. Most alleys provide players with a score table at the rear of the alley approach and also provide a mezzanine for seating spectators behind the score table. After the bowler throws his first ball, he is entitled to a second throw in order to knock down any of the upright pins that remain standing after the first throw. It is well known to most bowlers that the strategy and technique to be used by the bowler while aiming, approaching and releasing the second ball will depend entirely upon how accurate the bowler knows which of the pins are standing and their relative positions occupied by same on the pin deck. Consequently, the bowler not only must know accurately which of the pins are standing which is sometimes misjudged because of "double wood," but also the relative positions of the pins on the pin deck, that is to say, the top plan view of the pins. For the experienced bowler such information helps him to plan artfully his aim, approach and release of the second ball. For the average bowler this information helps him develop a proficient game. In each case the information will assist the bowler in formulating exactly where and how he will release his second throw. Merely sighting the standing pins from approximately 90 feet back from the pin deck will indicate the number of pins standing and which pins they are, but as known to all bowlers it does not indicate or depict the relative positions of the pins in their triangular array. Oftentimes, visual sight down the alley leads to misjudging the standing pins when "double wood" exists; and as is clearly appreciated by all bowlers, visual sighting of the pins down the alley does not help the bowler to formulate a mental picture of the pattern formed by the standing pins.

Consequently, both the experienced and average bowler desires indicating means which depicts the relative positions of the pins in their triangular array which means also advises the bowler which of the standing pins remain upright. Accordingly, numerous methods and systems have been devised and formulated to indicate accurately to the bowler the array of standing pins after the first ball. For one or a number of reasons, however, such methods and apparatus have not proven entirely satisfactory. There exists one indicator system for indicating the array of standing pins, but this system or apparatus has one major disadvantage in that it is electrically tied in with a particular automatic pinspotter machine. The pinspotter machine is an exceedingly expensive piece of apparatus and automatically sets the bowling pins on

the pin deck. After the first ball is thrown, it sweeps away the dead wood and resets the remaining standing pins for the second ball to be thrown. The indicator operationally tied in with this apparatus will indicate the standing pins and their respective positions in the triangle pattern and thus provide a picture of the pin array to the bowler and spectators at the approach end of the alley. The disadvantage of the indicator referred to herein is that it is an incidental accessory of a particular pinspotter and thus is not available to bowling alleys employing a competitive type of pinsetter or to alleys where there are no automatic pinspotters at all.

It is the principal object of the instant invention to provide an improved apparatus for indicating accurately to a person at or to the rear of the approach end of the bowling alley the pattern or array of standing pins at the pin deck alley end during a bowling game, which apparatus is relatively simple in application and use in comparison to prior art apparatus.

It is a further object of the instant invention to provide an improved apparatus for indicating accurately to a person at or to the rear of the approach end of a bowling alley the standing pins at the pin deck alley end during a bowling game, which apparatus is relatively simple in fabrication and which apparatus is not related to or tied in with any particular automatic pinspotter machine and thus may be employed with any automatic pinspotter or pinsetter machine or in like manner may be employed in a bowling alley lacking automatic machines.

It is a further object of the instant invention to provide improved apparatus for indicating accurately the standing pins to a person at the approach end of a bowling alley during a bowling game wherein, the apparatus employs a reflecting mirror suitably disposed at either end of the bowling alley and oriented to allow the person to see the reflected images of the top ends of the pins by visually sighting the mirror or in modified form by employing a telescope at the approach end of the bowling alley which is oriented to sight the reflected images of the pins in the mirror.

In furtherance of the aforesaid object, it is a further object to employ a coated screen eyepiece and reflecting prism in the makeup of the telescope so that a person sighting the pin tops in the telescope will see the top ends of the standing pins in the exact array occupied by the pins at the pin deck alley end.

Other objects and advantages will become apparent upon reading the following description taken in conjunction with the figures, in which:

FIG. 1 is a side elevation depicting a bowling alley and standing pins at the pin deck end thereof and illustrates the application of the invention, wherein a mirror may be disposed in the vicinity of the pin deck alley end or as an alternative in the vicinity of the approach end of the alley for the purpose of reflecting images of the top ends of the pins to a person at the latter end of the bowling alley.

FIG. 2 is the same view of the alley showing a further embodiment employing a telescope at the approach end of the alley for sighting the images via a mirror and should be taken in conjunction with FIG. 3 depicting what is seen in the eyepiece of the telescope by a person looking into same; FIG. 2*a* illustrates a convex mirror that may be used in lieu of the large flat plane mirror employed in FIG. 2.

FIG. 4 is a similar embodiment showing a further modification wherein the telescope employs a reflecting mirror or prism and horizontal eyepiece and should be taken in conjunction with FIG. 5 which illustrates or depicts the view seen by a person watching the telescope set of FIG. 4; and FIG. 6 shows a further embodiment

wherein the telescope set is aimed at a concave mirror mounted at the approach end of the bowling alley and should be taken in conjunction with FIG. 7 which depicts the view seen by a person watching the telescope set of FIG. 6.

Reference is now made to the figures for the details of the invention and, in particular, FIG. 1 which depicts the longitudinal side view of bowling alley **14**. Bowling pins **15**, are set on alley pin deck **16**, in the customary triangular array, the other end **17**, of the alley, is the approach end. The invention contemplates positioning or supporting sight reflecting means such as a mirror **18**, directly over or over and to the side of standing pins **15**. Mirror **18** may be supported by guide wires from the ceiling or mounted to any kickback side wall of the alley. Mirror **18** is oriented so that a person standing at alley approach end **17**, or a spectator sitting in the mezzanine (to the rear of approach end **17**) may sight the images of the top ends **15***a* of the standing pins by mirror **18** to ascertain the standing pins and the pattern formed by the standing pins any time during a bowling game. Before the fist ball is thrown it is expected that the ten pins would be upright in the familiar triangular form.

A mirror **19**, preferably concave in shape may be supported at the alley approach end **17**, and suitably oriented to provide a person with a reflected view of the pin tops in lieu of mirror **18**, or may be used in combination with mirror **18**, wherein mirror **19** is oriented for the spectators and mirror **18** for the players. Mirror **18** is depicted as a flat plane mirror, hence it will be relatively large in size.

FIG. 2 illustrates a modification employing a telescope set **21**. For this application of the invention, it is preferable to have image reflecting means **18** supported at alley pin deck end **16**. Telescope set **21** may be supported by the score table (not shown herein) or at some other convenient position to the rear of the alley approach and may have a conventional magnifying lens system **22** to indicate the top ends of pins **15** standing on the pin deck **16**. It will be understood that telescope **21** is oriented to sight the images of pin tops **15***a* reflected by mirror **18** wherein the view seen in a telescope screen **23** (as depicted in FIG. 3) will show the mirror reflected images inverted and reversed with respect to the positional relationship of the pins they actually occupy on pin deck **16**.

Screen **23** may be a frosted plate of glass mounted at the rear end of telescope **21**. The screen **23** will be dimensioned large enough so that more than one person view bowling pins **15**, displayed thereon, that is to say, the bowler as well as spectators behind the bowler. In FIG. 3 the pins are numbered wherein No. 1 pin is the reflected image of No. 1 pin on pin deck **16**, and so on. A light source **24** is conveniently supported to illuminate pins **15** and thus brighten the picture viewed in screen **23**. To increase the brightness of the view presented by telescope **21**, screen **23** may be coated with any suitable material which will cause pin tops **15***a* to stand out in greater contrast in respect to background material. As an alternative, pins **15** may be painted or covered with a material which will increase the reflection of same seen in screen **23**.

Since telescope **21** can magnify a view, a small convex mirror **20** may be used in lieu of large flat mirror **18**; note FIG. 2*a*.

FIG. 4 is essentially FIG. 3 except that telescope **21** is modified to present a view of pin tops **15***a* seen in screen **23** in the same array as the respective pins **15** occupy on pin deck **16**, as shown in FIG. 5. This is achieved by employing a reflecting prism or mirror **25** so that the pattern seen in screen **23**, which is now disposed horizontally, corresponds to the position occupied by the respective pins **15**.

With respect to the embodiment shown in FIGS. 6 and 7, concave mirror **19** is supported at or near the approach end of the alley so that the bowler looks up into same to see pins **15** displayed thereon. Inasmuch as mirror **19** is far away from the pins, the position in which the pins are visible may be limited to one spot, and thus only one person will be able to sight the pins in mirror **19**. A uni-dimensional concave mirror is suggested for this embodiment and is particularly suitable if one does not desire to support a mirror at the pin deck end of the alley when automatic pinspotter or pinsetter machines are employed. To allow more than one person to sight pins **15** when using mirror **19**, one may employ a telescope set **21** as depicted in FIG. 6 which is a modification of the telescope set shown in FIG. 4 only in the fact that in this case telescope **21** has its viewing screen **23** confronting the spectators as well as the bowler. The advantage of this arrangement is that the picture viewing screen **23** depicts the bowling pins in a vertical position so that many persons can look into same simultaneously, and by suitably orienting mirror **19** more than the pin tops will be shown, that is to say, the pins will show up in a somewhat perspective view. Because of the telescopic magnification, mirror **19** may be small in size compared to a mirror positioned over the pins at the pin deck end of the alley. In addition, when employing telescope **21**, mirror **19** may be placed anywhere on top of the alley between the approach end and pin deck end. Telescope set **21** then will be directed properly to sight mirror **19** and the mirror will be oriented so that the standing pins will be properly projected on to the vertical screen **23**.

A further advantage of the instant invention, particularly in comparison to the prior art indicator referred to hereinbefore, is that the mirror apparatus for sighting pins not only shows the position of the pins in the array they occupy on the pin deck, but it also shows accurately the relative positions of the pins, that is to say, it will show whether a pin is off its normal position to the right or left, forward or to the back and thus will indicate if the pins had moved slightly along the floor after the first throw of the bowling ball.

It will be understood that the invention is not operationally related or tied in with an automatic pinsetter or pinspotter, and is equally applicable in an alley lacking any automatic device. If the alley does employ such machines, the mirror may be supported from alley side kickback walls and properly angled and oriented so that a person sees a view that is essentially looking down upon the tops of the standing pins.

Since many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. Apparatus for indicating accurately to a person at the approach end of a bowling alley the standing pins and their relative positions on the pin deck end of said alley comprising, sight reflecting means comprising a single mirror supported above said alley, said mirror reflecting all the standing pins on the alley pin deck and the relative positions thereof, and telescope means at the approach end of said alley, said telescope being directed to sight the tops of said pins and the relative positions thereof as reflected by said single sight reflecting mirror means wherein the person may sight the aforesaid pins and the positions thereof through said telescope, said telescope having a coated screen whereby the pin tops shown therein stand out in contrast to the background, and a light source for improving the illumination of the pin top images shown in the telescope screen.

2. Apparatus for indicating accurately to a person at the approach end of a bowling alley the pin tops of the upright standing pins at the pin deck end of the alley com-

prising, a single mirror supported at the approach end of the alley and being oriented to reflect the sight of the top ends of all the upright pins towards the approach end of the alley, a telescope mounted at the approach end of the alley having a lens system and a coated screen, said telescope being oriented to sight images of the top ends of the upright standing pins reflected by said mirror, and a light source for brightening the image of the top ends of the upright pins appearing on said screen.

3. Apparatus as defined in claim 2 wherein, said telescope includes a reflecting prism, said prism and screen being disposed in said telescope so that a person looking into said screen will sight the reflected pin top images in an array corresponding to the respective positions of said upright pins as they are standing on the pin deck.

4. Apparatus for indicating accurately to a person at the approach end of a bowling alley the upright standing pins at the pin deck end of the alley comprising, a single mirror supported over the alley and being oriented to reflect the sight of all the upright pins towards the approach end of the alley, a telescope mounted at the approach end of the alley and having a lens system and a coated screen, said telescope being oriented to sight images of the standing pins reflected by said mirror, said mirror being a uni-directional concave mirror.

5. Apparatus as defined in claim 1, said mirror being a uni-directional concave mirror supported over the alley, a reflecting prism in said telescope for displaying the images on said screen in same array as they appear on the pin deck, said screen being supported in a vertical plane confronting the approach area of said alley whereby more than one person in the alley approach area may at the same time observe the pin display on said screen.

6. Apparatus as defined in claim 1 wherein, said sight reflecting means is a relatively small convex mirror.

7. Apparatus for indicating accurately to a person at the approach end of a bowling alley the standing pins and their relative positions on the pin deck end of said alley comprising, sight reflecting means comprising a single mirror supported above said alley, said mirror reflecting all the standing pins on the alley pin deck and

the relative positions thereof, and telescope means at the approach end of said alley, said telescope being directed to sight the tops of said pins and the relative positions thereof as reflected by said single sight reflecting mirror means wherein the person may sight the aforesaid pins and the positions thereof through said telescope, said mirror being concave and supported near the approach end of said alley, said telescope having a vertical viewing screen confronting persons in the region of the approach area of the bowling alley to permit more than one person to sight the bowling pin images displayed by said screen.

8. Apparatus for indicating accurately to a person at the approach end of a bowling alley the standing pins and their relative positions on the pin deck end of said alley comprising, sight reflecting means comprising a single mirror supported above said alley, said mirror reflecting all the standing pins on the alley pin deck and the relative positions thereof, and telescope means at the approach end of said alley, said telescope being directed to sight the tops of said pins and the relative positions thereof as reflected by said single sight reflecting mirror means wherein the person may sight the aforesaid pins and the positions thereof through said telescope, said sight reflecting means being a unidirectional concave mirror, said telescope including a reflecting prism and an operative associated viewing screen for displaying the standing pin images on said screen.

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