Oct. 8, 1940. R. L. LLOYD 2,217,063

BOWLING ALLEY

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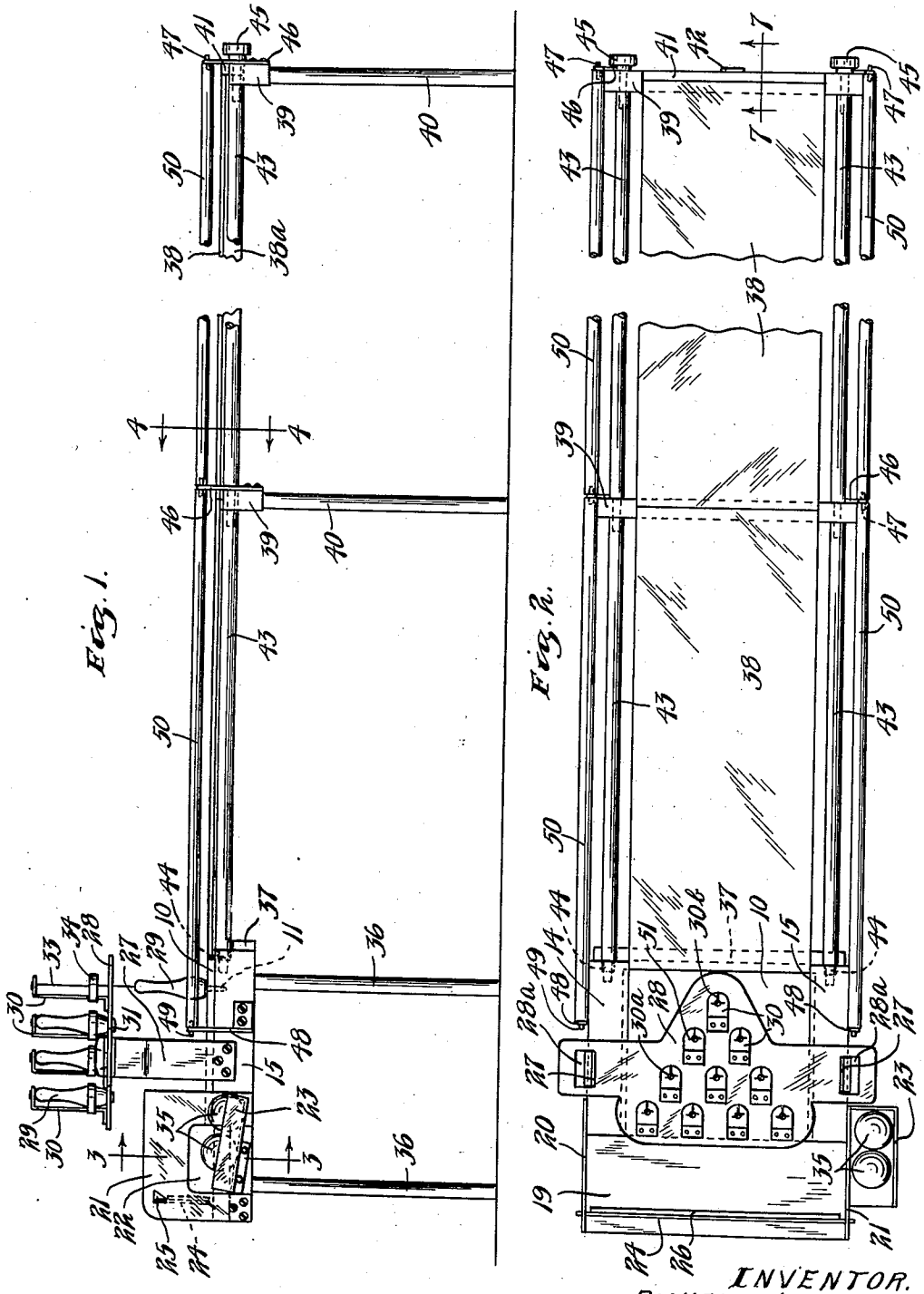


Fig. 1.

Fig. 2.

INVENTOR.
RICHARD L. LLOYD.
BY HIS ATTORNEYS.
Williamson & Williamson

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Fig. 3.

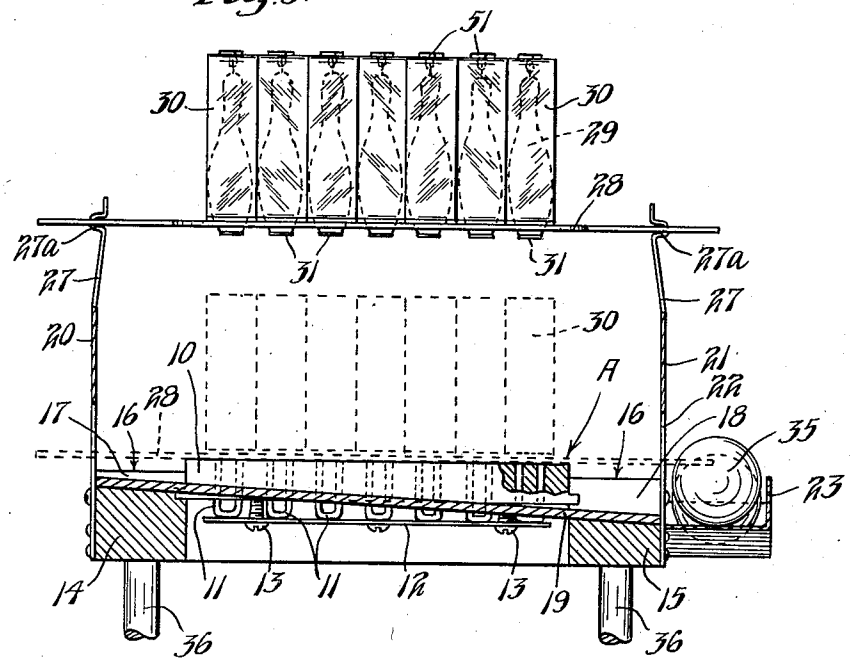



Fig. 4.

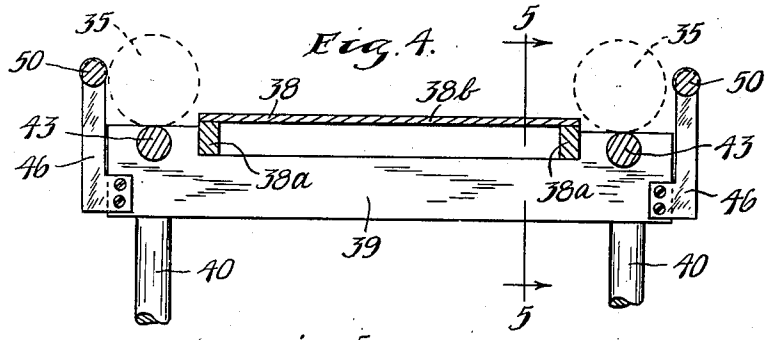
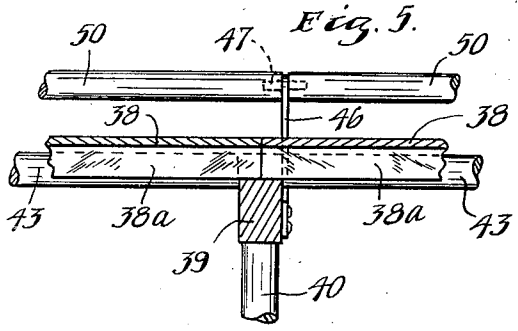



Fig. 5.




INVENTOR.
RICHARD L. LLOYD.
BY HIS ATTORNEYS.
Williamson & Williamson

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Fig. 8.

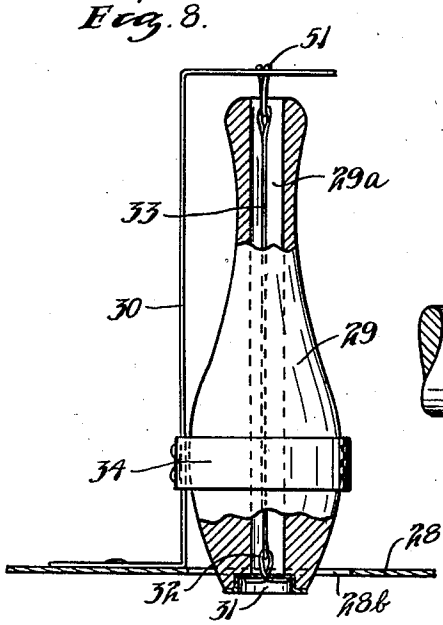



Fig. 6.

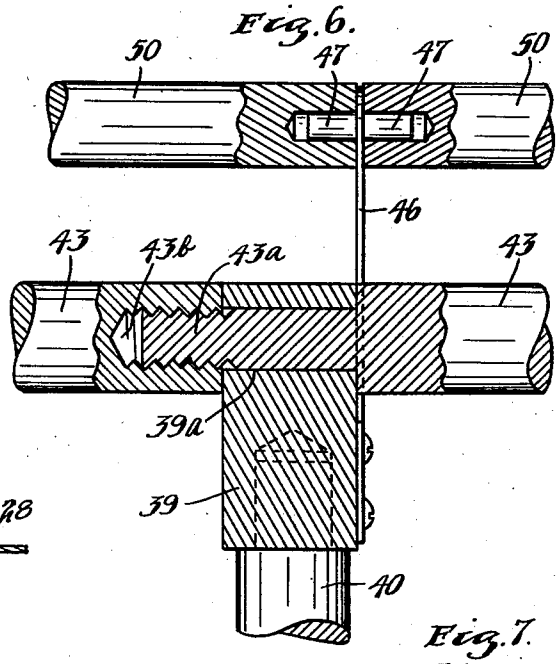



Fig. 9.

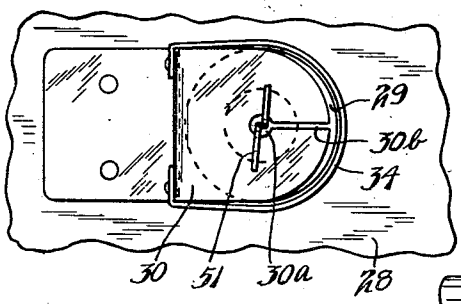
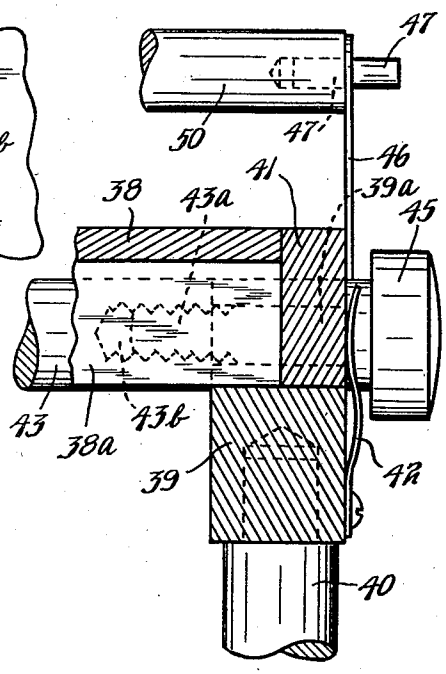



Fig. 7.




INVENTOR.
RICHARD L. LLOYD.
BY HIS ATTORNEYS.
Williamson & Williamson

Patented Oct. 8, 1940 2,217,063

# UNITED STATES PATENT OFFICE

2,217,063

## BOWLING ALLEY

Richard L. Lloyd, Minneapolis, Minn.

Application October 10, 1938, Serial No. 234,148

8 Claims. (Cl. 273—51)

This invention relates to bowling alleys.

It is one of the objects of the invention to provide a novel and improved bowling alley of knock-down construction including simple and effective means for holding the parts in assembled relation for play and at the same time assisting in forming ball gutters.

Another object is to provide a cheap and simple bowling alley which may be shipped and stowed away in knock-down condition in small compass and which can be quickly and readily assembled for play when desired.

Another object is to provide a bowling alley having at the rear of the pin receiving base a novel mechanism for absorbing the kinetic energy of the balls after they have passed over the pin area of the pin base.

Still another object is to provide a novel and improved pin setting mechanism for a bowling alley.

The objects and advantages of the invention will more fully appear from the following description, made in connection with the accompanying drawings, in which like reference characters refer to the same or similar parts throughout the various views, and in which

Fig. 1 is a view in side elevation illustrating a bowling alley embodying the invention;

Fig. 2 is a plan view of the bowling alley;

Fig. 3 is a vertical section in enlarged scale taken on the line 3—3 of Fig. 1, as indicated by the arrows;

Fig. 4 is a vertical transverse section taken on the line 4—4 of Fig. 1, as indicated by the arrows;

Fig. 5 is a vertical longitudinal section taken on the line 5—5 of Fig. 4, as indicated by the arrows;

Fig. 6 is an enlarged detail of certain of the parts shown in Fig. 5, a number of the parts being broken away and shown in section;

Fig. 7 is a longitudinal section taken on the line 7—7 of Fig. 2, but showing the parts in enlarged scale;

Fig. 8 is a detail taken chiefly in side elevation and vertical section of part of the pin setting mechanism, and

Fig. 9 is a plan view looking down on the structure shown in Fig. 8.

Referring to the drawings, a knock-down bowling alley is provided in accordance with the invention which can be employed for playing the game of tenpins or any other game commonly played on the ordinary bowling alley.

The bowling alley includes a pin base designated as an entirety by the letter A. This pin base includes a rectangular block 10 having pairs of vertical openings running therethrough to receive the arms of U-shaped permanent magnets 11, these magnets being located relative to the block 10 at points which correspond to the tenpin receiving spots on an ordinary bowling alley. The magnets 11 rest on a triangular plate 12 underlying the block 10 and spaced therefrom by spacing studs 13. At the sides of the block 10 bars 14 and 15 are secured to the block and the upper surfaces of these bars are located somewhat below the top surface of the block 10 to form gutter continuations 16. The two bars 14 and 15 project rearwardly from the block 10 and have inclined notches 17 and 18 cut therein so that the top surfaces of these notches lie in the same plane and an inclined ball chute 19 rests in the notches 17 and 18 with the forward edge of the chute flush against a portion of the rear end of block 10 and, of course, the chute 19 is secured to the bars 14 and 15. Naturally, the top surface of the chute 19 is at a lower level than the top of the block 10. Attached to the outer sides of the two bars 14 and 15 respectively, are side plates 20 and 21 which extend from the rear ends of the bars 14 and 15 forwardly for some little distance in opposed relation. In alignment with the chute 19 the plate 21 is provided with an opening 22 to permit passage of the bowling balls from the chute 19 into a ball retaining cup 23 attached to the bar 15 adjacent side plate 21, this cup having a downwardly and forwardly inclined bottom.

Extending across between the two side plates 20 and 21 adjacent the top rear edge thereof and over the chute 19 is a swinging gate 24 having end tab projections fulcrumed within angular-shaped notches 25 formed by providing triangular-shaped openings in the side plates 20 and 21. These openings have rear vertical walls. With this arrangement the gate 24 is mounted for limited rearward swinging movement, but cannot swing forwardly and as a result swinging movement of the gate is checked. The gate 24 normally hangs by gravity substantially vertically from the two plates 20 and 21. A pad of absorbent material 26 is preferably secured to the forward side of the gate. With this arrangement a bowling ball, after having moved with considerable force over the top surface of block 10, strikes the pad 26 of the gate 24 tending to swing the gate rearwardly and most of the kinetic energy of the ball is absorbed by the

gate so that the ball drops without bouncing onto the chute 19 to roll down the chute through the opening 22 into the cup 23.

Forward of the two side plates 20 and 21 upstanding stanchions 27 are secured to the outer sides of the two bars 14 and 15 in opposing relation. These stanchions are preferably of spring steel and are bent toward each other slightly adjacent their upper ends and are equipped with notches 27a near their upper ends. A locator plate 28 overlies the block 10 and has lateral projecting arms with passages 28a therein through which the stanchions 27 extend. When the locator plate 27 is raised to the position shown in Fig. 3, the spring tension of the stanchions 27 will force the upper portions of the stanchions inwardly to cause the arms of the locator plate 28 adjacent the inner sides of the opening 28a to be engaged within the notches 27a. The extreme upper ends of the stanchions form handles which can be swung outwardly to cause disengagement between the notches 27a and the arms of the locator plate 28a, thereby permitting the locator plate and the parts carried thereby to be lowered downwardly against the block 10 of the pin base A while being guided by the stanchions 27.

Above each magnet 11 the locator plate 28 is provided with a tenpin opening 28b through which a tenpin 29 may pass. Secured to the top of the locator plate 28 preferably at the rear of each opening 28b is a pin supporting bracket 30 having a lower horizontal arm secured to the plate 28, an elongated upstanding arm and a top horizontal arm overlying the pin opening 28b. Each tenpin 29 is provided with a bore 29a extending from top to bottom thereof and fitting within the base of the tenpin is a small cup or block 31 formed of a metal such as iron which is subject to attraction by a magnet. The top horizontal arm of each bracket 30 is provided, as best seen in Fig. 9, with a small aperture 30a communicating with a narrow slot 30b running to the edge of the arm and a wire eye 51 has oppositely bent arms which project through the aperture 30a. Mounted in each cup 31 is another eye 32. An elastic cord 33 for each pin 29 is connected at one end to an upper eye 51 and is connected at its other end to an eye 32. This elastic is of such strength that it will hold the pin 29 normally upwardly in the position shown in Fig. 8, but the elastic does not have sufficient strength to raise the pin 29 to which it applies from one of the magnets 11 when the cup 31 of that pin is engaged with the magnet. The pin 29 can be removed from its bracket 30 by raising the eye 51 well above the upper arm of the bracket and thereupon passing the elastic cord 33 through the slot 30b. The upstanding arm of each bracket 30 carries a pin confining ring 34 near its lower end which will encircle the pin 29 and confine it at the greatest diameter of the pin for guiding movement down onto the block 10 of the pin base A when the pin is in the raised position shown in Fig. 8.

To set the pins 29 after some or all of them have been knocked down by the bowling balls 35, it is merely necessary to disengage the notches 27a of the stanchions 27 from the locator plate 28, whereupon by running the plate 28 downwardly on the stanchions against the block 10 of the pin base A, all the pins 29 are made to stand upright on the block 10 in their proper position with the various cups 31 of the pins in contact with the magnets 11. After the plate 28 is lowered, it is raised to the position shown in Figs. 1 and 3 whereupon the plate will be supported above the block 10. As the plate 28 is raised the elastic cords 33 will be stretched, but the force attracting the cups 31 to the magnets 11 will be sufficient to maintain the pins in upright position on the blocks 10 against the tension of the elastic cords 33. They will be maintained in such position until knocked down by the balls 35 whereupon as the balls strike the pins, the cups 31 will be knocked off the magnets 11 and thereupon the elastic cords 33 will raise the pins 29 to their upper positions through the pin openings 28b in the plate 28.

The pin base A is preferably supported as by four legs 36 mounted in the bars 14 and 15 and projecting downwardly therefrom. A cross supporting bar 37 preferably runs across between the forward ends of the two bars 14 and 15.

To form a ball runway a plurality of ball runway sections 38 are provided, each of these sections including a pair of side bars 38a supporting a deck 38b. The various runway sections 38 are longitudinally aligned with the block 10 of the pin base A with the top surfaces of the decks 38b flush with the top surface of the block 10. The rear runway section 38 is supported at its rear end by the cross bar 37 and cross bars 39 support adjacent ends of the various runway sections. These cross bars 39 are notched downwardly from their upper edges, as best shown in Fig. 4, to receive the side bars of the runway sections and it will be noticed from an inspection of Fig. 4 that laterally of the runway sections 38 the cross bars 39 extend below the level of the top surfaces of the decks 38b. Each cross bar 39 is supported as from the floor by means of a pair of legs 40 attached to the cross bar. Attached to the forwardmost end of the forwardmost runway section 38 is a cross slat 41, best seen in Fig. 7, and in order that the various runway sections may be held tightly in engagement with each other, and pressed toward the block 10 of the pin base A, a bar spring 42 is secured at its lower end to the forward side of the front cross bar 39 and the free end portion of this spring bears against the cross slat 41 to urge all of the runway sections 38 toward the block 10 of the pin base A.

In order to hold the various parts in assembled relation and to permit of ease in assembling and in disassembling the parts as well as to assist in forming ball gutters at the sides of the ball runway sections 38, a plurality of rods 43 are provided. Each rod 43, as best shown in Fig. 6, has one reduced end 43a forming a dowel pin which is screw threaded near its end. Each rod 43 also has a tapped recess 43b in its other end adapted to receive the screw threaded portion of the dowel 43a of an adjacent rod 43. The various cross bars 39 are provided with openings 39a in spaced relation outwardly from the side edges of the runway sections 38 to receive the dowels 43a and these openings 39a are at such a level that when a dowel 43a is inserted in one of the openings the upper portions of the rod 43 carrying the dowel will be approximately flush with the top surfaces of those portions of the cross bar 39 laterally of the runway sections 38.

The forward ends of the two bars 14 and 15 are provided with suitable tapped openings 44 to receive dowels 43a, these tapped openings being of course aligned at the same level with the openings 39a in the cross bars 39. In assembling the bowling alley, a pair of the rods 43 are re-

leasably connected to the two bars 14 and 15 of the pin base A by screwing the dowels 43a of these two rods into the tapped openings 44. A second pair of rods 43 are then used and the dowels 43a of these rods are passed through the openings 39a of the rearmost cross bar 39 and the dowels of these latter two rods are then screwed into the tapped openings 43b of the first two rods 43 to produce the structure shown in Fig. 6. It will be seen that the cross bar 39 is clamped between ends of the first two rods 43 used and shoulders formed adjacent the ends of the next two rods used. Additional cross bars 39 and rods 43 are employed until a runway of the proper length is obtained. The front cross bar 39 instead of being secured in place by additional rods 43 is clamped by means of short headed screws 45 which may be of wooden construction to properly fit the forward ends of the forwardmost rods 43. Of course, the runway sections 38 are put in place to rest on the cross bars 37 and 39 after the cross bars 39 and rods 43 have been assembled together with the pin base A. It will be noted, as perhaps best shown in Figs. 4 and 5, that the upper surfaces of the rods 43 lie at a level somewhat below the top surfaces of the runway sections 38 for a purpose presently to appear, and it will also be noted that these rods 43 run parallel to the side edges of the runway sections 38 in outwardly spaced relation therefrom a distance preferably somewhat greater than the radius of one of the balls 35 and less than the diameter of one of the balls.

Secured to the forward sides of each cross bar 39 adjacent each outer end thereof is an angular-shaped rail bracket 46 shown in detail in Figs. 4, 5 and 6. Each rail bracket has a short arm secured to the cross bar 39 and it has an elongated upstanding arm within the upper end portion of which a pin 47 is secured, this pin projecting from both faces of the bracket. Attached to the sides of the two bars 14 and 15 are a pair of rail brackets 48 carrying pins 49 and similar to the brackets 46 with the exception that the short arms of the brackets 48 are set normal to the long upstanding arms of these brackets. The brackets 48 are of course located closely adjacent the forward edges of the stanchions 27. Rods 50 forming side rails have pin openings within their ends to receive the projecting portions of the pins 47 and pins 49. The brackets 46 and 48 have considerable resiliency and accordingly, the rods 50 forming the side rails can be engaged with the pins 44 and 47 after the rods 43 and crossbars 39 have been assembled together. For example, a pair of rear rods 50 can be first applied by engaging the forward end portions of the pins 49 in the rear pin openings of these rods, whereupon the two rearmost rail brackets 46 can be sprung forwardly and the rear portions of the pins 47 of these brackets 46 can be aligned with the forward pin openings in the rear rods 50 and the brackets 46 can then be released. In like manner the more forward rods can be applied.

It will be noted that the side rails formed by the rods 50 are located well above the level of the top surfaces of the runway sections 38, and the rods 50 are also spaced outwardly from the side edges of the runway sections 38 preferably a distance approximating the diameter of the balls 35 employed. The side edges of the runway sections 38, the rods 43 and the side rails 50 accordingly form ball gutters at the sides of the runway sections 38 so that if the balls run sideways off the runway sections they are caught in the gutters to pass rearwardly along the alley into the gutter extensions 16 without striking any of the pins 29 that may be set up on the pin base A. The inner edges of these gutters are formed by the side edges of the runway sections 38; the bottoms of the gutters are formed by the rods 43 which tie and hold the various parts in assembled relation and the outer sides of the gutters are formed by the rods or rails 50. In Fig. 4 a pair of the bowling balls 35 are illustrated in dotted lines as they will appear when rolling down the gutters.

It will be seen that an exceedingly cheap and simple bowling alley is provided which can be shipped in knocked-down condition and quickly and readily assembled for use in bowling and which can again be knocked down and stowed away in small space.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departure from the scope of the present invention, which generally stated, consists in the matter shown and described and set forth in the appended claims.

What is claimed is:

1. A bowling alley having in combination a pin base, a plurality of ball runway sections aligned with said pin base, the side edges of which sections form the inner edges of ball gutters, cross supports supporting said sections, tie rods spaced outwardly from the side edges of said sections located below the top surfaces thereof, extending between and forming ties between the various cross supports and forming the bottoms of the ball gutters and rails spaced outwardly from said rods and extending above the level of the top surfaces of said sections and forming the outer sides of said gutters.

2. The structure defined in claim 1, and resilient means pressing said runway sections towards said pin base.

3. The structure defined in claim 1, said cross supports being notched to receive said runway sections.

4. The structure defined in claim 1, said cross supports being notched to receive said runway sections and resilient means pressing said runway sections towards said pin base.

5. A knock-down bowling alley comprising a pin base, a plurality of ball runway sections aligned with said pin base, a plurality of cross supports upon which said runway sections rest, a plurality of rods spaced laterally from the sides of said runway sections located at a level below the top surfaces of said runway sections and projecting between said pin base and the cross support most closely adjacent the pin base and between adjacent cross supports, said rods holding the parts in assembled relation, said pin base and said cross supports being mutually constructed to permit of releasable connection between the same and said pin base and cross supports, rails spaced outwardly from said rods and extending at higher levels than the top surfaces of said runway sections, the side edges of said runway sections, said rods and said rails cooperating to form ball gutters.

6. A bowling alley comprising a pin base upon which tenpins may be placed, a plurality of ball runway sections aligned with said pin base and having top surfaces flush with the top surface of said pin base, cross supports on which said runway sections rest, rods spaced from the sides

of said runway sections and located at lower levels than the top surfaces of said runway sections, said rods having means releasably connecting said rods to each other and to said pin base and said cross supports to hold said pin base, runway sections and cross supports in assembled relation, means resiliently urging said runway sections towards said pin base and side rails having releasable connection with said pin base and cross supports and extending well above the top surfaces of said runway sections and cooperating with the side edges of said runway sections and said rods to form ball gutters.

7. A bowling alley having in combination a pin base, a plurality of ball runway sections aligned with said pin base, the side edges of which sections form the inner edges of ball gutters, cross supports supporting said sections and tie rods spaced outwardly from the side edges of said sections, extending between and forming ties between the various cross supports and cooperating with the side edges of said runway sections to assist in forming the ball gutters and in supporting the balls as they run in such gutters.

8. A bowling alley having in combination, a pin base, a plurality of ball runway sections aligned with said pin base, a plurality of cross supports located at spaced intervals from said pin base and formed to loosely receive such runway sections, tie rods securing together such cross supports and said pin base and means carried by the cross support most remote from said pin base, normally bearing against the runway section most remote from said pin base and urging all of said runway sections into tight engagement with each other and toward said pin base.

RICHARD L. LLOYD.