

Jan. 30, 1940.

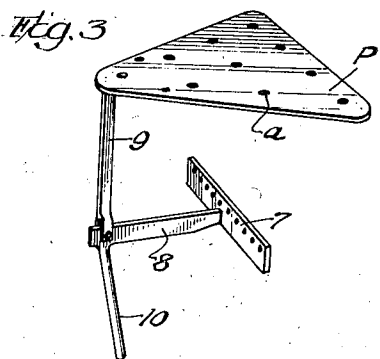
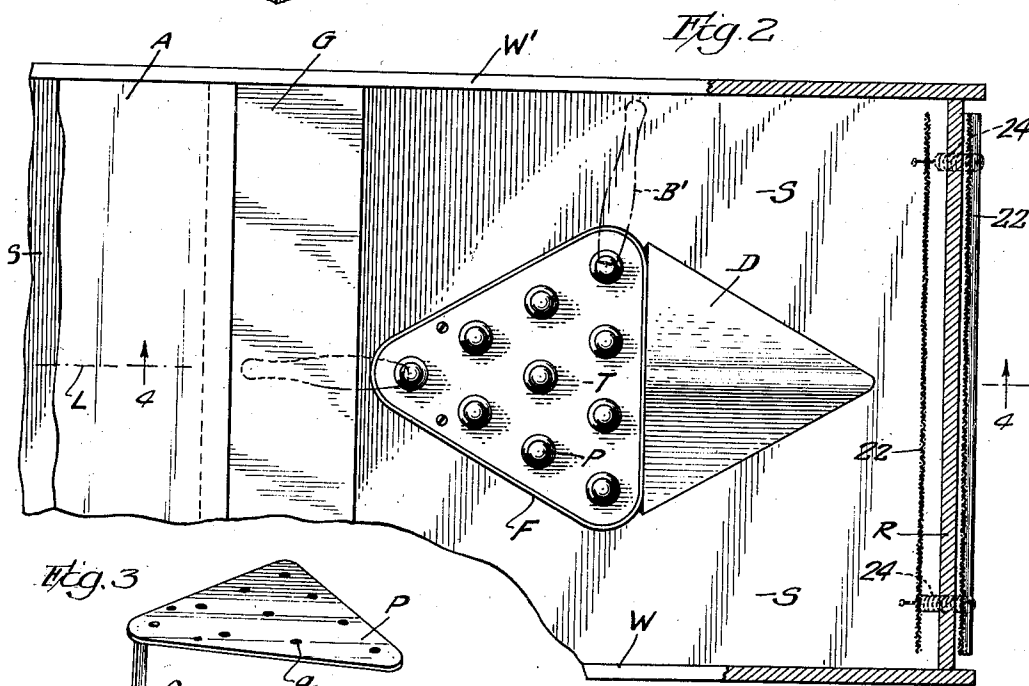
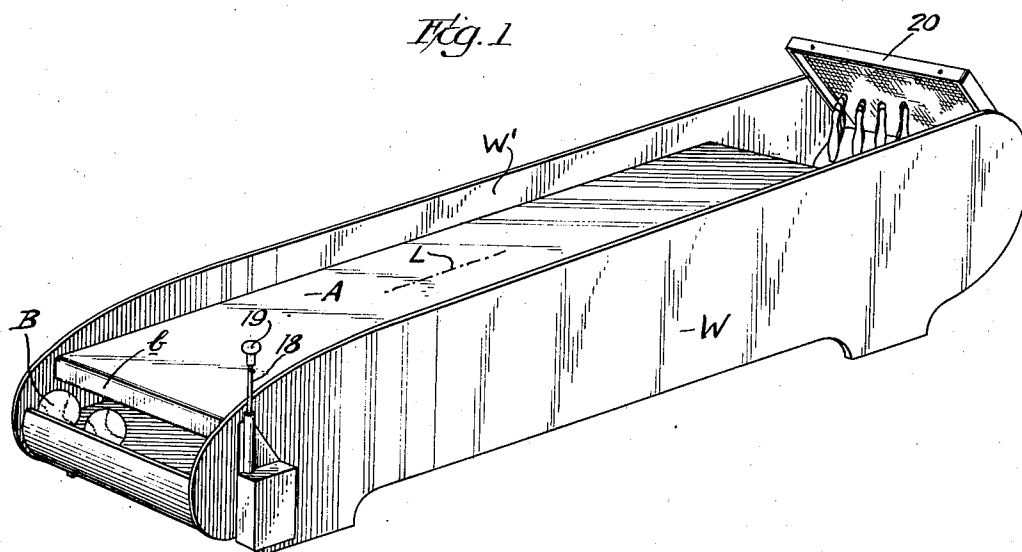
J. RIETSCHEL

2,188,740

PORTABLE BOWLING ALLEY

Filed Jan. 25, 1939

3 Sheets-Sheet 1



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Fig. 4

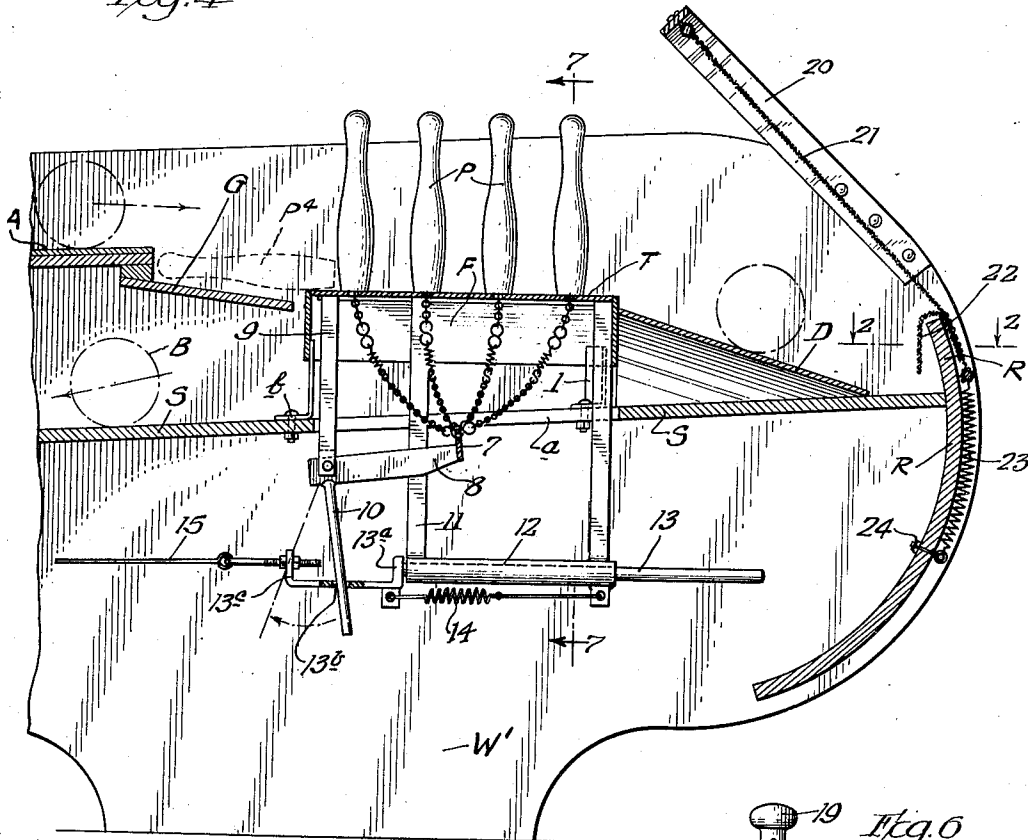


Fig. 5

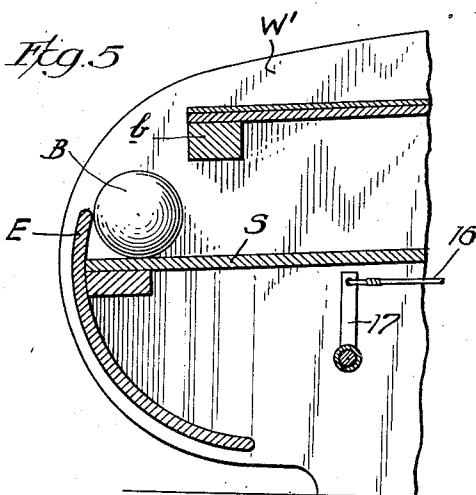
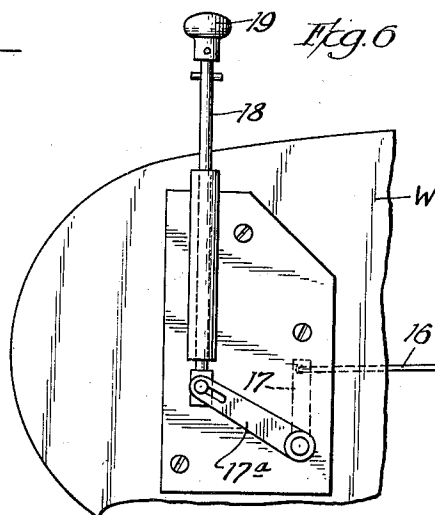


Fig. 6



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Fig. 7

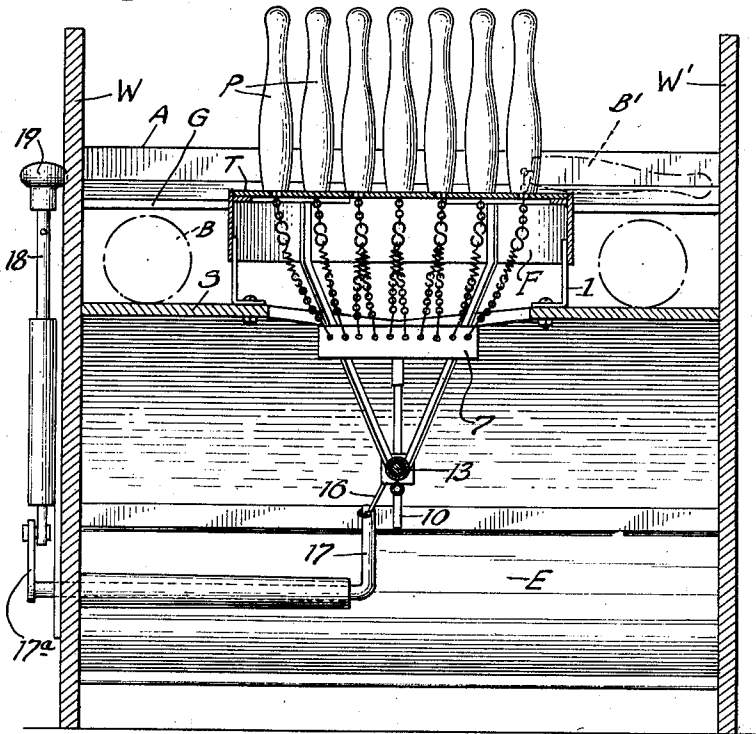


Fig. 8

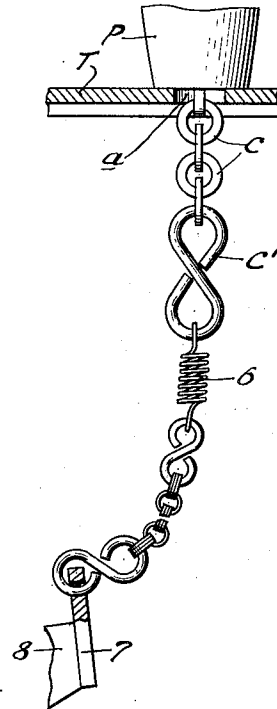


Fig. 9

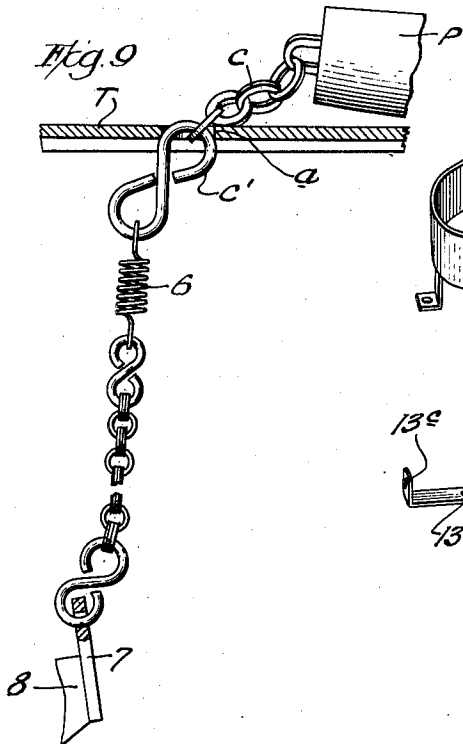
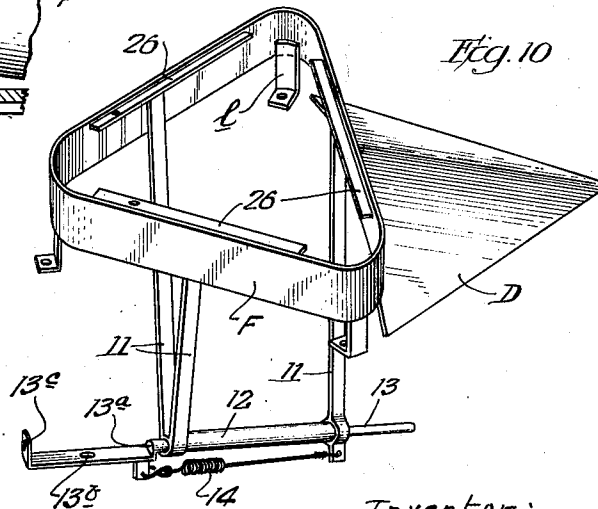


Fig. 10



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UNITED STATES PATENT OFFICE

2,188,740

PORTABLE BOWLING ALLEY

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Application January 25, 1939, Serial No. 252,793

15 Claims. (Cl. 273—45)

My invention relates to a bowling alley apparatus adapted to be set on a floor of a building and constructed for enabling players to display their bowling ability according to the usual bowling alley rules, without requiring the services of an attendant either for returning the balls or for resetting the pins.

In portable bowling alleys of this general class it has already been proposed to have the pins tethered to a pin-plate disposed forwardly of the forward end of the alley floor, to provide a mechanism operable from the rear end of the alley for resetting toppled pins, to provide either lateral gutters or a space below the alley floor as ball return passages, and to provide means for deterring balls from bouncing over riser walls at or near the forward end of the apparatus. However, no such heretofore proposed bowling apparatus, to the best of my knowledge, has ever become commercial, presumably because of the following shortcomings, all of which my here presented bowling alley has already overcome in prolonged and extensive usage:

(1) Toppled pins when tethered to a pin-plate unduly obstruct the path of rolled balls, both when the pin-plate has its top flush with that of the alley floor and with a somewhat lower pin-plate disposed close to the forward end of the alley floor, thereby correspondingly affecting the player's score.

(2) With the pin-plate lower than the forward end of the alley floor, a pin toppled forwardly so as to rest partly on this alley floor end will also unduly obstruct the path of the ball.

(3) With pins tethered to a pin-plate disposed so near to the somewhat higher forward end part of the alley floor, or to a riser wall part of the alley, the impact of a ball against such parts is apt to rupture the tethering.

(4) Balls striking one or more pins which have been toppled on a pin-plate disposed according to prior patents also are apt to be bounced over the guard wall provisions of heretofore proposed bowling alleys, thereby causing injuries to bystanders.

(5) When side gutters are included in the ball return provisions, these undesirably increase the width of the apparatus, and an attendant may still be needed for pushing balls into the gutters.

(6) If any portion of the pin-resetting mechanism is disposed in a ball-return passage under the alley floor, such a part or parts may interfere with the free return of the balls and also may be damaged by the latter. And if disposed outside the frame of the alley, such mechanism parts

may catch upon and injure the clothing of bystanders when the mechanism is operated for resetting the pins.

(7) If the apparatus is constructed for providing a substantially horizontal floor part between the pin-table and the forward end wall of the frame structure, a slowly rolled ball may easily be trapped in front of the pin-table. And if the just mentioned floor part is approximately at the same elevation as the top of the pin-table, more swiftly rolled balls may rebound from the forward end wall against still standing pins, thereby unduly modifying the player's proper score.

Illustrative of the manner in which I avoid all of the above listed shortcomings of previously proposed portable bowling alleys and also obtain additional advantages.

Fig. 1 is a perspective view of a portable bowling apparatus embodying my invention.

Fig. 2 is an enlarged plan view of the rear end of this apparatus, with the rear wall and adjacent parts shown in a section taken along the line 2—2 of Fig. 1, and with portions of the riser sides and the two floors of the structure broken away.

Fig. 3 is a perspective view of the pin-supporting plate and parts attached to it.

Fig. 4 is a vertical section through rearward parts of the apparatus, the section being taken along the common medial and longitudinal line (L in Figs. 1 and 2) of the alley floor, the bowling-pin supporting pin plate, and the ball deflector behind this plate.

Fig. 5 is a fragmentary vertical section through the forward part of the apparatus, taken along the line 5—5 of Fig. 1 but drawn on a larger scale.

Fig. 6 is an enlarged side elevation of the forward portions of the pin-resetting mechanism which are partly concealed in Fig. 1 by the casing shown near the lowest corner of that figure.

Fig. 7 is a transverse vertical section taken along the line 7—7 of Fig. 4.

Fig. 8 is an enlarged elevation showing the chain and spring provision interposed between the lower part of each untopped bowling pin and the lever shown in Fig. 3, with the pin part, chain parts and spring shown in elevation, and with both a portion of the pin-plate and of the said lever shown in section.

Fig. 9 is a view allied to Fig. 8, showing the positions of the same parts after the bowling pin has been toppled over.

Fig. 10 is a perspective view, drawn on approximately the same scale as Figs. 2, 4 and 7, showing

the unitary sub-assembly of the triangular frame which supports the pin plate, the brackets which support this frame above the sub-floor, the semi-pyramidal deflector which is fastened to
 5 and extends rearwardly from this frame, and parts of the pin-resetting mechanism supported by the said frame.

In the illustrated embodiment, the rigid body assembly includes two parallel side walls W and
 10 W¹ spanned by two floors which are slightly inclined forwardly and which are spaced from each other by a considerably greater distance than the diameter of the bowling balls B. The lower or sub-floor S, upon which the played balls roll
 15 back and of which the two end parts are shown respectively in Figs. 4 and 5, extends rearwardly from a frontal and returned ball halting end plate E, to a rear end wall R. Both of these rigid end parts desirably extend upwardly from
 20 this sub-floor for a height somewhat greater than the uniform radius of the bowling balls B, and the frontal plate desirably is rearwardly concaved and extends considerably below the forward end of the sub-floor.

The upper or alley floor A has its forward end disposed somewhat farther rearward than that of the sub-floor and desirably supported by a beam b which spans the two side walls and which is sufficiently spaced from the top of ball-stop
 30 plate F so that a player can readily reach and grasp a ball which has rolled back against that plate to the stored position shown in Figs. 1 and 2. The said alley floor A has its rear end spaced forwardly from the rear end wall R by a sufficient
 35 distance to allow a horizontal and preferably triangular bowling-pin-supporting table top T to be spaced considerably both from that rear end of the alley floor and from the rear end wall R.

This triangular pin-plate is rigidly supported with respect to the previously described wall and floor assemblage, with the top of this pin-plate sufficiently lower than that of the forward end of the alley floor, so that a ball rolled along the alley can fly over already toppled pins without touching them, and is of adequate size for
 45 supporting ten bowling pins P (of a size proportioned to that of the alley) in the customary relation to the longitudinal center line L (Fig. 1) of the alley floor and for allowing the lower end parts of toppled pins to remain on the pin-plate.

For this supporting, Figs. 4 and 10 show the pin-table T as seated on webs W respectively fastened to the sides of a triangular frame F. That frame is supported by depending legs l
 55 fastened by bolts b to a sub-floor S, the lower edge of the said frame being spaced from the sub-floor by a distance considerably less than the diameter of a ball, so that no ball reaching the part of the sub-floor behind the rear end of the alley floor can roll under the same frame.

To insure an operative positioning of the pin-table and pins in relation to the alley floor, I dispose this triangular frame and table assembly with its apex forward and its medial line in alignment with the said center line, as shown in
 65 Fig. 2. Then I also provide a ball-deflector D behind the said pin-table for laterally deflecting balls which have passed over the said table, which balls then roll rearwardly down on the sub-floor into the ball-returning passage in which such a ball is shown in the left-hand portion of Fig. 4. For this purpose I desirably shape this deflector D as a diagonal half of a hollow square pyramid
 70 less tall than the height of the pin-table above

the sub-floor, and fasten this deflector to the rearward part of the table frame F.

To prevent the bowling pins from being knocked completely off the pin-table I provide the following also illustrated pin-tethering and pin-resetting provisions: First, I provide the pin-table T with apertures a having their axes disposed respectively as those of properly positioned bowling pins, each aperture being of smaller diameter than the lower end of a pin. Next I fasten the lower end of each pin to a chain which has a few uppermost links C small enough to pass through the adjacent aperture, and which has the next lower link C¹ sufficiently larger to halt the upward pulling of a chain, as in Fig. 9, when the pin is upset.

Then I connect each such larger or stop link C¹ through a tension spring 6 and additional links of sufficient total length respectively to the apertured parts of a chain-spacing bar 7 fastened to one arm 8 of a bell-crank lever which is pivoted (as in Fig. 3) to a bar-supporting rod 9 depending from and supported by the pin-table, as shown in Fig. 4. To co-operate with the other arm 10 of the said bell-crank lever, the triangular pin-table-supporting frame F also has rigid straps 11 fastened to and depending from it, as shown in Fig. 10, which straps jointly support a horizontal guide tube 12 through which a rod 13 slidably extends longitudinally of the bowling alley. The part of the rod 13 rearward of the tube is provided both with a stop shoulder 13a which limits the forward drawing of that rod by a spring 14, and also has a perforation 13b through which the lever arm 10 extends as in Fig. 4 when pin-resetting mechanism is assembled.

In addition to those formations, the slidable rod 13 also has its forward end part 13c connected by a wire or cable 15 to one arm 17 of a second ball-crank lever (Figs. 5 and 6) which has its other arm 17a connected to a slidably depressible upright pin-reset-actuating rod 18 supported by a forward portion of a side wall W of the alley structure and shown in Figs. 1 and 6 as having a knob 19 at its upper end.

When the bowling pins are in their normal upright positions, the chains fastened to them are somewhat slack and the weight of these chains co-operates with the proportioning of the upper chain links to the corresponding pin-table apertures for holding the pins properly disposed. However, whenever a pin is bowled over, this pin draws the smaller sized upper links of the corresponding chain upwardly through the corresponding pin-table aperture a until the adjacent larger sized stop-link C engages that table as in Fig. 9 and also indicated in Fig. 7, the length of the chain part between the bottom of the pin and this stop-link being so proportioned to the spacing of the pin from the nearest edge of the pin-table that the pin will then be halted in an approximately horizontal position.

To prevent the most rearward pin, when toppled forwards, from being depressed too far by the impact of other pins or of a ball, I also dispose a guard plate G between the rear end of the alley floor A and the forward edge of the pin-table, as shown in Fig. 4. This guard plate preferably slopes rearwardly downward, so that a ball bouncing on it will readily roll off, and the said plate has its top at such an elevation that a toppled pin P₄ resting on it will be below the level of the rear end of the alley floor, thereby permitting a subsequently rolled ball to clear that
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pin. For this purpose, the guard plate desirably has its forward end lower than the rear end of the alley floor, and that plate also has its rear end somewhat lower than pin-table T but spaced upwardly from the sub-floor S by a sufficient distance to permit a ball B to roll freely under it.

When my bowling alley is in use, the effective balls usually move in a downwardly curving path after having passed the forward end of the alley floor. Consequently, the rear end wall R of the frame of my apparatus only needs to extend upwards from the top of the rear end of the sub-floor to a height not materially above the level of the pin-support, and even to less than that height, as shown in Fig. 4.

To cushion the impact of balls against the still upwardly projecting part of this rear end wall, and also to prevent balls from bouncing out of my apparatus over the upper end of this rear end wall (which in practice need only reach upwardly from the sub-floor to an elevation somewhat lower than that of the pin-table) I desirably provide these rear end provisions.

First, I fasten the shanks of a downwardly open and upwardly forward sloping U-shaped screen support 20 respectively to the upper parts of the rear end portions of the side walls W and W' of my structure, as shown in Figs. 1 and 4. To the top (or U-bight) of this support I next fasten the upper end of a flexible guard sheet 21 which reaches nearly to each U-shank of the said support, which sheet extends downward behind the upper part of the rigid rear end wall R. I also provide a cushioning and noise-dampening strip 22 of such fabric (of a length nearly spanning the side walls of my structure) which presents a cushioning part behind the said rear end wall, this cushioning strip being shown in Fig. 4 is folded over the top of that wall.

Then I fasten the lower end of both of the guard sheet 21 and the rearward part of the said cushioning strip 22 to the upper end of a tension spring 23 which has its lower end anchored to the said rear end wall (as by I-bolts 24) so that to be flexed rearwardly by the impact of an upwardly bounced ball, and which also prevent downward friction of a ball on the part of the cushioning strip 22 which depends in front of the rear end wall from pulling that strip out of sound-deadening position shown in Fig. 4.

Thus constructed, my bowling apparatus can readily be factory-assembled and shipped as a unitary assembly, and with the major parts constructed of wood can readily be carried by two men even when built in lengths of up to twenty feet. Moreover, since the player does not need to take more than a single step forward, my apparatus requires only a short space rearwardly of it for the players and hence used readily in household rooms. So also, since no player needs to move to the rear end of the alley for picking up and resetting pins, many duplicates of my apparatus can freely be used when positioned side by side and relatively near to each other in any public play room.

Moreover, if the pin-setting mechanism needs re-adjustment, as for example because of a gradual stretching of the pull wire 16, or if a damaged pin needs to be replaced, the pin plate table can readily be detached from its supporting frame for access to the mechanism below the sub-floor. So also, by first making the sub-assemblages shown in Figs. 9 and 10, I simplify and cheapen the cost of assembling my entire apparatus; and by detachably fastening both the guard screen 21 and

the cushioning strip to a spring or the like, I permit a ready replacement of these parts.

So also, by disposing the pin-support with its top spaced downward from that of the forward end of the alley floor by a distance greater than the maximum diameter of the pins but considerably less than the height of the pins, I allow rolled balls to clear already toppled pins while effectively directed against more rearward ones.

However, while I have heretofore described my bowling alley apparatus in connection with an embodiment including many details of construction and arrangement which I have found desirable, it should be obvious that many changes might be made without departing either from the spirit of my invention or from the appended claims.

I claim as my invention:

1. In a bowling alley for use with a given uniform size of bowling pins, comprising an alley floor, and a pin-support spaced forwardly from the forward end of the alley floor by a distance equal to a major fraction of the height of a pin, the pin-support having the level of its top spaced downwardly from the elevation of the forward end of the alley floor by a distance greater than the maximum diameter of a pin but considerably less than half the height of a pin.

2. In a bowling alley, an alley floor and pin-support assemblage as per claim 1, in combination with a guard plate extending rearwardly from the forward end of the alley floor toward the pin-support for halting the downward tipping of the several most forward pins when these are forwardly toppled, the guard plate having its top spaced sufficiently downwards from the plane of the top of the alley floor to permit subsequently rolled balls to clear such toppled pins while moving against more rearward pins.

3. In a bowling alley, an alley floor and pin-support assemblage as per claim 1, in combination with a guard plate extending rearwardly from the forward end of the alley floor toward the pin-support for halting the downward tipping of the several most forward pins when these are forwardly toppled, the guard plate having its top spaced sufficiently downwards from the plane of the top of the alley floor to permit subsequently rolled balls to clear such toppled pins while moving against more rearward pins; and a sub-floor underlying the space surrounding the pin-support and spaced downwardly from the guard plate by a distance greater than the diameter of a bowling ball proportioned in size to the said pins.

4. In a bowling alley, an alley floor and pin-support assemblage as per claim 1, in combination with a guard plate extending rearwardly from the forward end of the alley floor toward the pin-support for halting the downward tipping of the several most forward pins when these are forwardly toppled, the guard plate having its top spaced sufficiently downwards from the plane of the top of the alley floor to permit subsequently rolled balls to clear such toppled pins while moving against more rearward pins; and a sub-floor underlying the space surrounding the pin-support and spaced downwardly from the guard plate by a distance greater than the diameter of a bowling ball proportioned in size to the said pins, the sub-floor extending rearwardly below the alley floor so that balls can roll back under the entire length of the latter; and a riser web fast on the rear end of the sub-floor, the said web having its upper end spaced from the rear end of the alley floor by a distance sufficiently

greater than the said ball diameter to allow a ball-grasping hand to move therebetween.

5 5. A bowling alley for use with counterpart miniature bowling pins and balls of proportionate size, of the class in which a pin-plate is disposed forwardly of the forward end of the alley floor, and in which this pin-plate has its upper face at lower elevation than the top of the forward end of the alley floor and at higher elevation
10 than a sub-floor part forward of the said alley floor end; characterized by having the pin-plate spaced forwardly from the said alley floor end by a distance approximating the height of one of the said pins, and by having the pin-plate
15 present a horizontal top spaced downwardly from the elevation of the forward end of the top of the alley floor by a distance greater than the diameter of the thickest part of a bowling pin.

6. A portable bowling alley as per claim 5, including a ball-deflector disposed forwardly of the pin-table and with its uppermost portion at an elevation not higher than the top face of the pin-table, the said deflector comprising two parts sloping downward to the sub-floor respectively
20 in opposite directions from a vertical plane extending along the longitudinal axis of the alley floor.

7. A portable bowling alley as per claim 5, including a ball-deflector disposed forwardly of the pin-table and with its uppermost portion at an elevation not higher than the top face of the pin-table, the said deflector comprising two parts sloping downward to the sub-floor respectively in opposite directions from a vertical plane extending along the longitudinal axis of the alley floor, the said deflector parts being triangular and sloping downwardly also toward the forward end of the sub-floor.
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8. A portable bowling alley as per claim 5, in which riser walls extend both along opposite sides of the sub-floor and forwardly beyond the pin-plate and to a higher elevation than the alley floor; including a guard plate effectively spanning the space between the forward end of the alley floor and the rearmost part of the pin-plate; the guard plate spanning the said side walls, and having its upper face sloping forwardly downward at a sharply acute angle to the horizontal and presenting a forward edge at an elevation near to but not higher than the rearmost part of the top face of the pin-table.
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9. A bowling alley for use with balls of a given size, of the class in which a forwardly upwardly sloping ball-returning sub-floor extends below and forwardly beyond the forward end of the alley floor, characterized by having all portions of the alley floor freely spaced upwardly from the sub-floor by a distance greater than the diameter of balls of the said size, and having no obstructions within the space between the said two floors; the bowling alley including a pin-table supported by the sub-floor forwardly of the forward end of the alley floor; the pin-table being spaced by distances greater than the said ball diameter from the forward end of the alley floor, the forward end of the sub-floor, and the side edges of the sub-floor, so as to permit balls to roll along all sides of the pin-table.
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10. A bowling alley of the class in which a ball-

returning sub-floor extends below and forwardly beyond the alley floor, a pin-table detachably fastened to the sub-floor and spaced forwardly from the forward end of the alley floor; the pin-table comprising a pin-plate detachably fastened to a supporting structure, and the supporting structure including guard provisions preventing balls upon the sub-floor from rolling under the pin-plate.

11. A bowling alley of the class in which a ball-returning sub-floor extends below and forwardly beyond the alley floor, a pin-table detachably fastened to the sub-floor and spaced forwardly from the forward end of the alley floor; the pin-table comprising a pin-plate detachably fastened to a supporting structure, and the sub-floor having an opening underlying the pin-plate; and pin-resetting means including elements extending downwardly through the pin-plate and the said opening, and also including means fastened to the pin-plate for co-operation with an actuating member disposed below the sub-floor.
10 15 20

12. Pin-resetting means for a bowling alley of the class in which side riser walls are spanned both by an alley floor and by a sub-floor which extends farther forward than the alley floor, in which a pin-table is supported forwardly of the forward end of the alley floor, and in which bowling pins are tethered to the top of the pin-table by flexible elements extending downwardly through the said top; the pin-resetting means including an actuating member movably supported outwardly of the rearward portion of one of the side riser walls, and instrumentalities operatively connecting the actuating member with the said flexible elements, the said instrumentalities having their major portions disposed below the sub-floor and having no part thereof disposed in the space between the two floors.
25 30 35

13. Pin-resetting means for a bowling alley of the class in which a pin-table supports bowling pins separately tethered to the top-plate of the said table by flexible members extending downwardly through the said plate, the said means including a lever support fastened to and depending from the said top-plate; a bell-crank lever pivoted upon the lower end of the lever support and having one lever arm connected respectively to all of the flexible members, and also including a lever-moving member operatively connected to the other arm of the lever.
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14. Pin-resetting means as per claim 13, including a guide disposed at lower elevation than the first named lever arm, in which guide the lever-moving member is slidable, and means fast with respect to the top-plate of the pin-table for supporting the said guide.
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15. Pin-resetting means as per claim 13, including a guide disposed at lower elevation than the first named lever arm, in which guide the lever-moving member is slidable, means fast with respect to the top-plate of the pin-table for supporting the said guide, and spring means interposed between the lever-moving member and a part of the guide-supporting means for resisting a movement of the lever-moving member in the direction tensioning the said flexible member.
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