C. B. BRENNEMAN.

BOWLING ALLEY.

APPLICATION FILED NOV. 5, 1906.

904,400.

Patented Nov. 17, 1908.

6 SHEETS—SHEET 1.

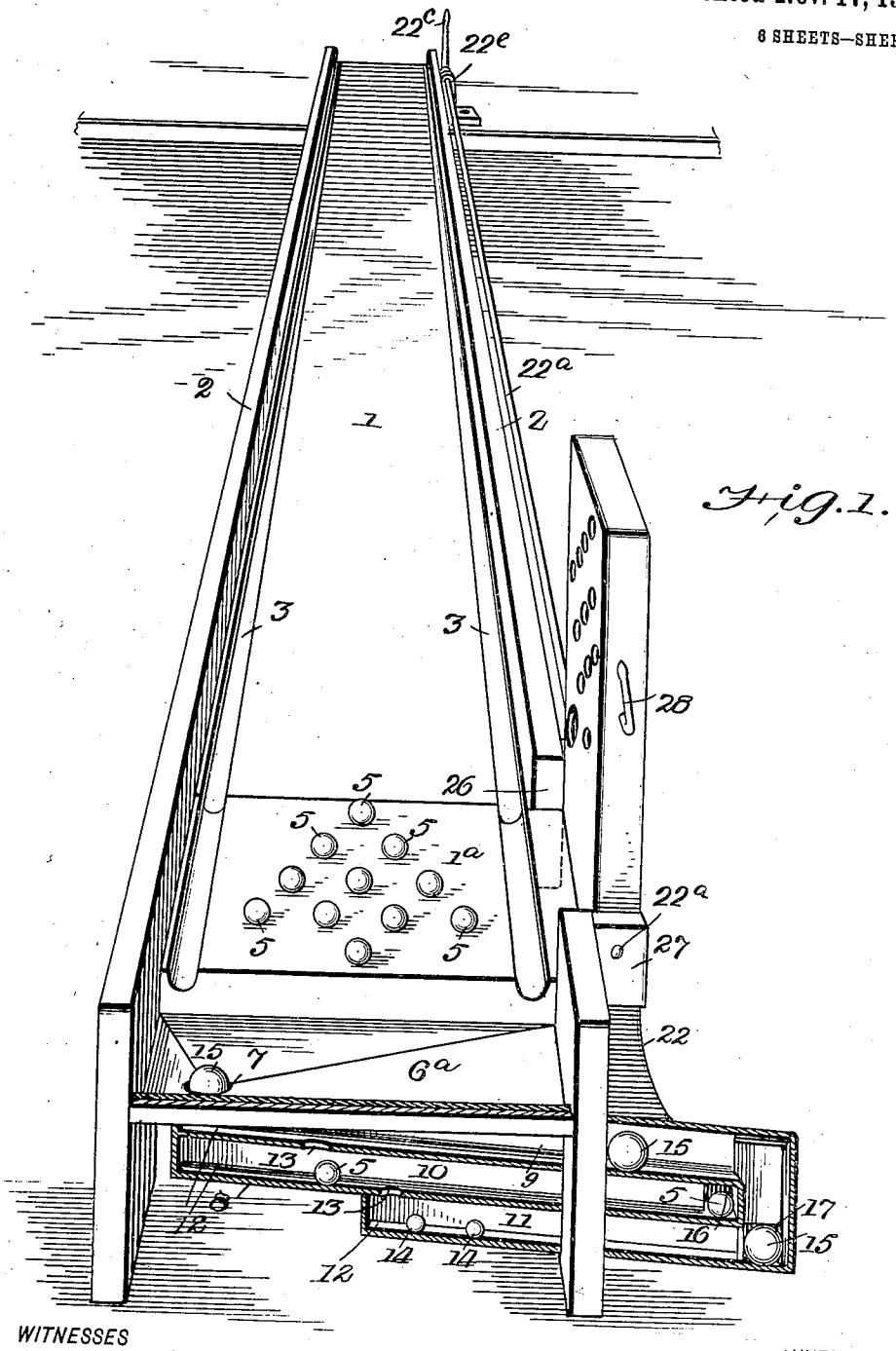


Fig. 1.

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6 SHEETS—SHEET 2.

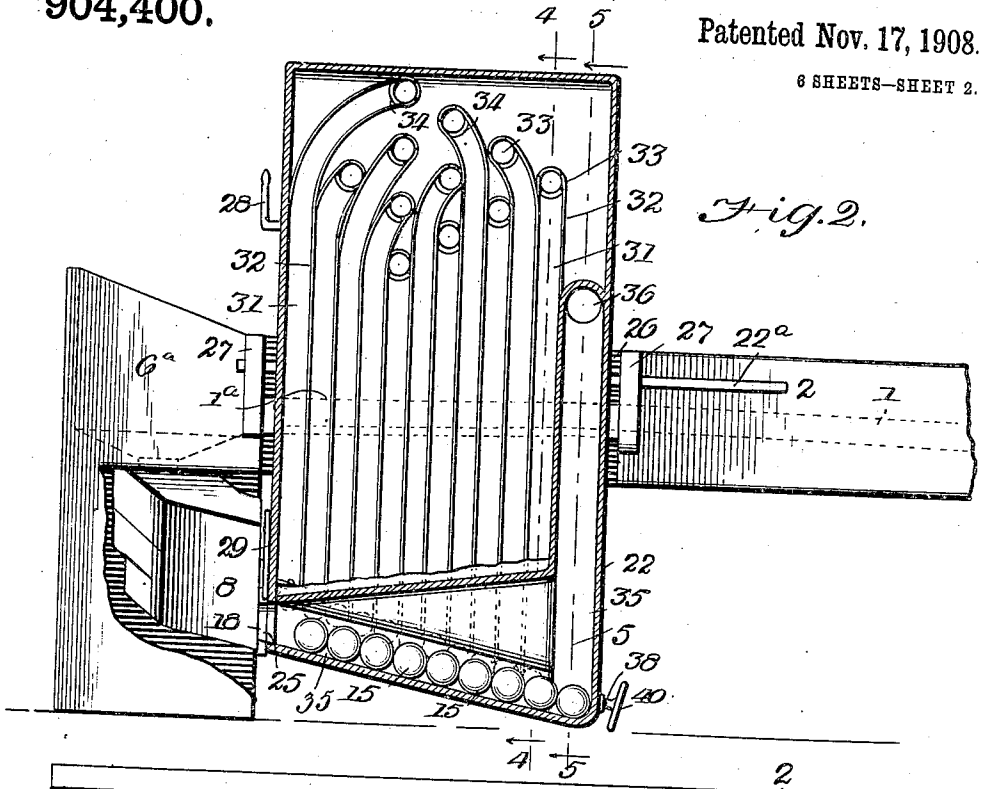


Fig. 2.

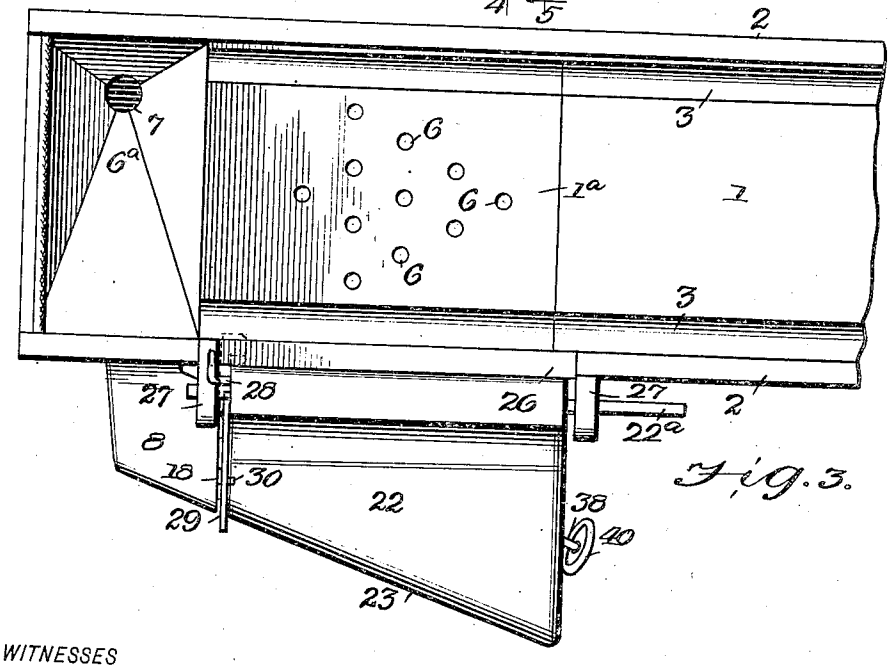


Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 6.

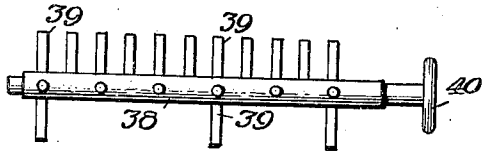


Fig. 4.

Fig. 7.

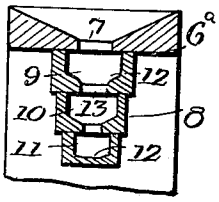
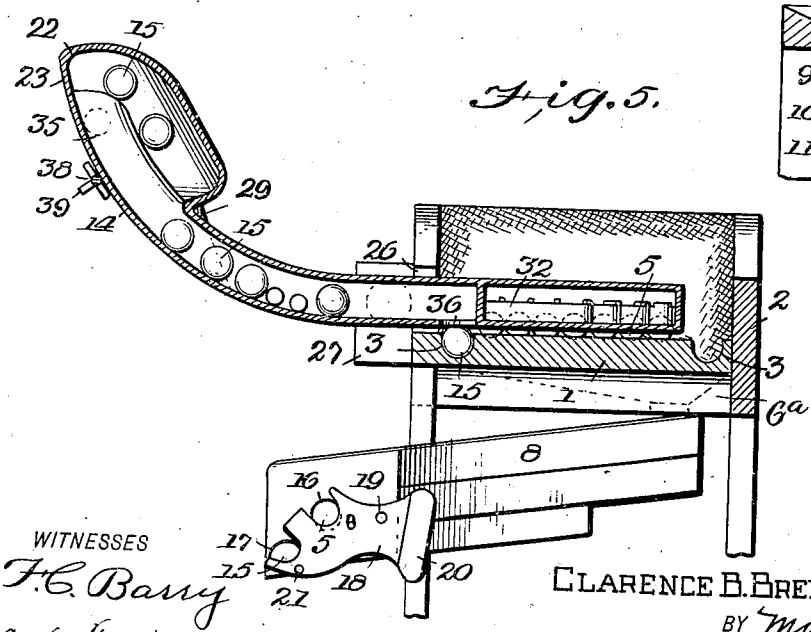


Fig. 5.



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6 SHEETS—SHEET 4.

Fig. 8.

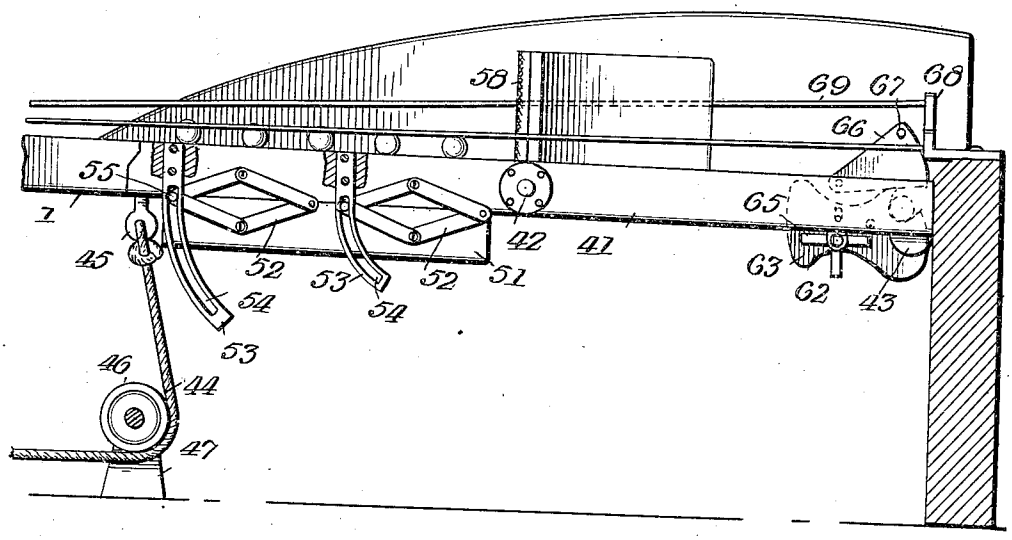
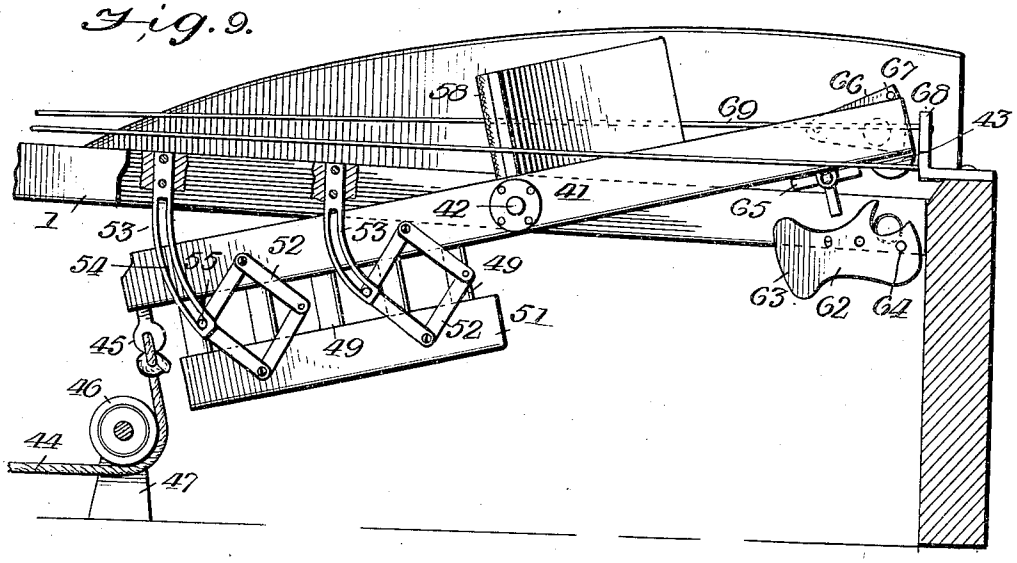


Fig. 9.



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6 SHEETS—SHEET 5.

Fig. 10.

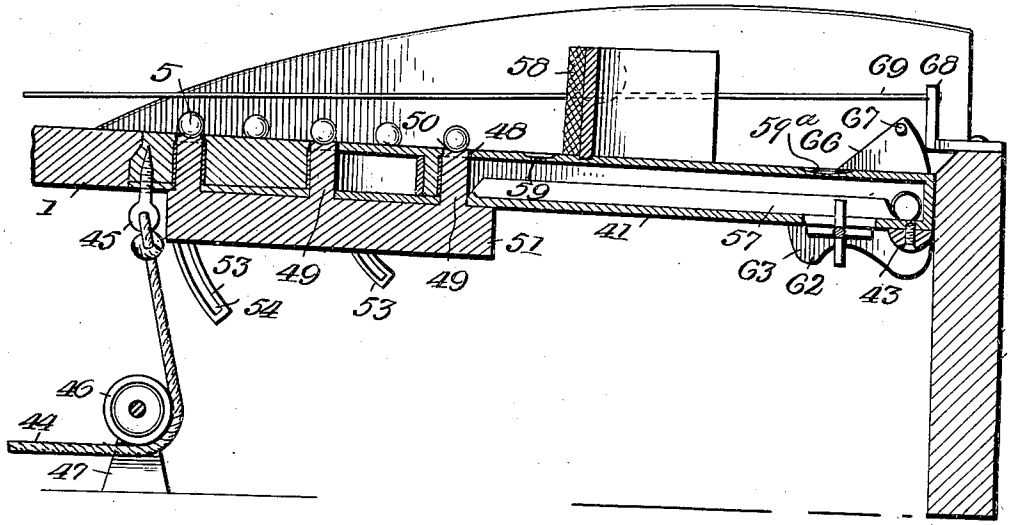
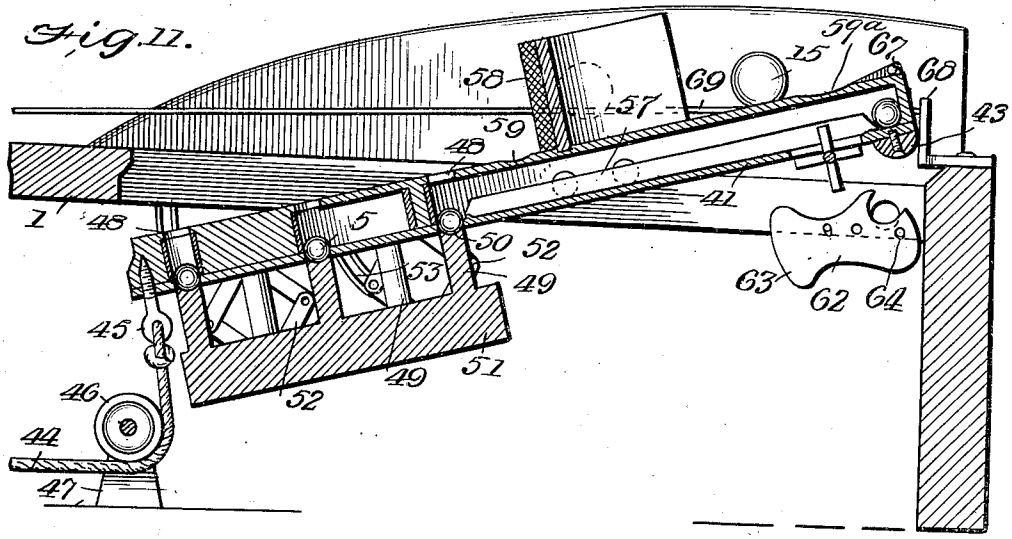


Fig. 11.



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6 SHEETS—SHEET 6.

Fig. 12.

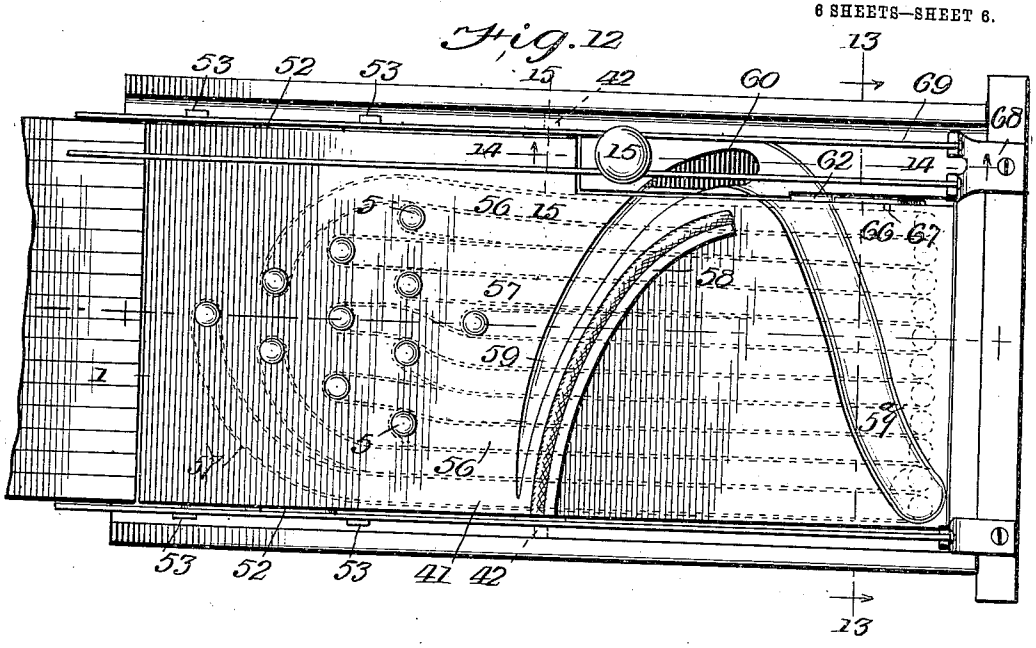


Fig. 14.

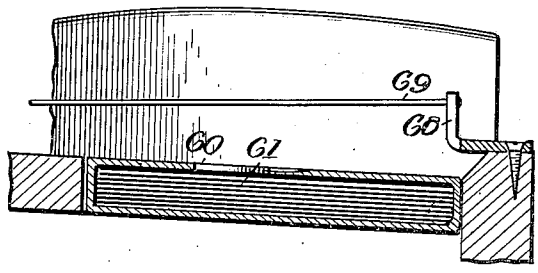


Fig. 13.

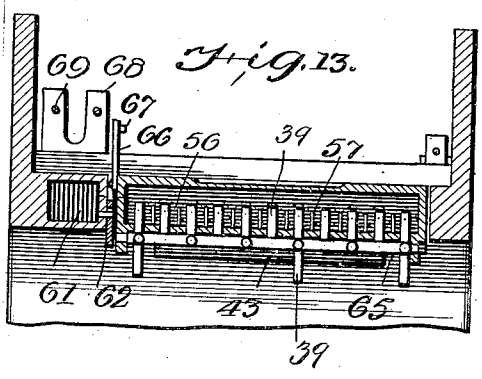
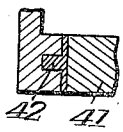


Fig. 15.



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UNITED STATES PATENT OFFICE.

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BOWLING-ALLEY.

No. 904,400. Specification of Letters Patent. Patented Nov. 17, 1908.

Application filed November 5, 1906. Serial No. 342,073.

To all whom it may concern:

Be it known that I, CLARENCE B. BRENNEMAN, a citizen of the United States, and resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Bowling-Alleys, of which the following is a specification.

My invention is an improvement in bowling alleys, and consists in certain novel constructions and combinations of parts hereinafter described and claimed.

Referring to the drawings forming a part hereof, Figure 1 is a perspective view partly in section of my improved bowling alley. Fig. 2 is a side view of one end of the alley partly in section. Fig. 3 is a plan view of one end of the alley. Fig. 4 is a section on the line 4—4 of Fig. 2, looking in the direction of the arrows. Fig. 5 is a section on the line 5—5 of Fig. 2, looking in the direction of the arrows. Fig. 6 is a detail view of the ball releasing device. Fig. 7 is a vertical transverse section through the ball separating device on the line 7—7 of Fig. 4. Fig. 8 is a side view of an alley showing a modified form of my invention. Fig. 9 is a similar view showing the setting device in a different position. Fig. 10 is a longitudinal section of Fig. 8. Fig. 11 is a longitudinal section of Fig. 9. Fig. 12 is a plan view of Fig. 8. Fig. 13 is a section on the line 13—13 of Fig. 12 looking in the direction of the arrow. Fig. 14 is a section on the line 14—14 of Fig. 12 looking in the direction of the arrow; and Fig. 15 is a section on the line 15—15 of Fig. 12 looking in the direction of the arrow.

In the present embodiment of my invention, the alley-way is of ordinary form and construction, comprising the floor 1, the side walls 2 and the return grooves 3, adjacent to the side walls, and upon each side of the floor. Instead of pins, I make use of balls 5, and that portion of the floor of the alley upon which the balls are placed, is provided with depressions 6, the said depressions being arranged in proper position with respect to each other.

That portion 1^a of the floor of the alley-way upon which the pin balls are placed, is inclined slightly toward the end of the alley, as shown by dotted lines in Fig. 2, and the grooves 3 upon each side of the portion 1^a of the floor are also inclined towards the end of the alley-way, whereby to guide the pin balls and the casting balls into a receptacle 6^a at the end of the alley-way, the floor of the said receptacle having at one end thereof an opening 7, for permitting the passage of the balls therethrough, and the floor of the receptacle is inclined in all directions toward the said opening.

A separating device 8 is arranged beneath the receptacle 6^a, the said device comprising a casing having therein a plurality of horizontal partitions dividing the casing into compartments 9, 10, and 11, the compartments 9 and 11 being arranged above and below the compartment 10 and communicating with each other as shown in Fig. 1. The partitions which divide the casing of the separating device into compartments, are each provided upon the upper surface thereof with a longitudinal groove 12, in which may roll the balls, and at suitable positions in the grooves are apertures 13, the said apertures being of different sizes in the different partitions, the aperture in the partition between the compartment 9 and the compartment 10 being of a size to permit the passage of the pin balls 5 and the smaller casting balls 14, and to prevent the passage of the larger casting balls 15, and the partition between the compartments 10 and 11 is large enough to permit the passage of the smaller casting balls, while preventing the passage of the pin balls. It will be evident from the description, that the large casting balls are retained in the compartment 9, while the pin balls and the smaller casting balls pass through the opening 13 into the compartment 10, and from this compartment the smaller casting balls pass through the opening into the compartment 11, where they are joined by the larger casting balls, as shown in Fig. 1.

Each of the compartments 10 and 11 is provided at its lower end with openings 16, 17, respectively, and the openings are normally closed by a stop plate 18, pivoted to the casing of the separating device as at 19. The stop plate 18 is of the shape shown in Figs. 4 and 5, one of the ends thereof being weighted as at 20, whereby to normally retain it in the position shown in Fig. 5, and the other end is provided with a pin 21 for engagement by the spotting device 22, whereby to move the stop plate in position to un-

cover the openings 16, 17, as clearly shown in Fig. 4.

The spotting device 22 comprises a closed casing pivoted to the side of the bowling alley, said casing being rectangular in cross section and having the lower end thereof curved outwardly as at 23, the said curved end being provided with openings 24, 25, registering with the openings 16, 17, of the separating device, when the casing is in the position shown in Figs. 1 and 2. The side wall 2 of the alley-way is cut away as at 26, and the casing is pivoted by trunnions 22^a to lugs 27 arranged upon each side of the said cut away portion, said cut away portion corresponding in extent to the length of the portion 1^a of the alley floor. A handle 28 is arranged upon one side of the casing for convenience in manipulating the same, and a shutter 29 is pivoted to the side of the casing in position to cover the openings 24, 25, the said shutter being engaged by the stop plate 18 to move the shutter from over the openings when the spotting device is in the position shown in Fig. 4, and when the spotting device is rocked into the position shown in Fig. 5, the shutter falls by gravity over the openings, a pin 30 upon the shutter limiting the motion thereof with respect to the casing.

The interior of the casing of the spotting device 22 is divided into a plurality of passageways 31, by the partitions 32 secured to the bottom of the casing, and each of said passageways leads to an opening 33 in the bottom of the casing, the openings 33 corresponding in position to the depressions for receiving the pin balls 5, and being of a diameter sufficient to permit the passage of the said pin balls. The partitions 32 extend entirely around the openings 33, as clearly shown in Fig. 2, and a shoulder 34 is arranged in each passageway at the edge of the opening, the said shoulder being merely high enough to offer a momentary check to the pin ball as it passes thereover, this being for the purpose of preventing a second ball from passing through the opening, until the spotting device is lifted high enough from the floor of the alley so that the inclination of the bottom thereof will return the balls toward the rear end.

It will be noticed from an inspection of Figs. 2 and 4, that the opening 24 Fig. 4 in the side of the casing of the spotting device 22, communicates with the body of the interior of the casing, while the opening 25 Fig. 2 communicates with a passageway 35 which leads along the end of the casing to the opposite side thereof, and from thence to a relatively large opening 36, which when the spotting device is rocked into the position shown in Fig. 5, registers with one of the grooves 3 of the alley-way. The pin balls passing through the registering openings 16, 24, are received in a groove 37 arranged transversely of the spotting device, the inner ends of the partitions 32 ending at the edge of the said groove.

It will be evident from the description, that when the spotting device is rocked into the position shown in Fig. 5, the pin balls in the groove 37 will roll into the passageways 31, and through the openings 33 into the depressions on the portion 1^a of the floor, while the casting balls 14, 15, will roll through the passageway 35 and through the opening 36 into the groove 3.

I have shown my improved bowling alley arranged for eleven pin balls. In games requiring a less number of balls, a device is made use of which will permit the passage of the required number of balls from the groove 37 to the alley floor, while preventing the passage of the remaining balls. This device comprises a shaft 38 journaled in the casing of the spotting device 22 adjacent to the commencement of the passageways 31, and the said shaft is provided with longitudinal series of radial fingers 39, one of said series having a finger corresponding to each passageway 31, while the remaining series are provided with a less number of fingers. For instance, in a six-ball game, the shaft would be turned to bring a series of fingers into the passageways, which would retain all but six of the balls, it being understood that the passageways to the proper openings would be left open, while the remaining passages would be closed by the fingers. A hand wheel 40 is provided on the end of the shaft for convenience in manipulating the same.

One of the trunnions 22^a of the spotting device 22 is extended to the opposite end of the alley and is provided with a crank 22^c, whereby to manipulate the spotting device from the opposite end of the alley, a suitable bearing 22^e being provided for supporting the extended portion of the trunnion.

It will be noticed from an inspection of Fig. 4 that a pocket 23^a is provided at the end of each passageway 31 immediately in front of the groove 23. These pockets receive the balls from the groove when the spotting device is tilted and insure the proper positioning of the ball with respect to the passageway.

It will be understood that the groove 23 is just long enough to receive the maximum number of balls, so that when the balls are in the groove, they will be properly lined up before the passages.

In the modification shown in Figs. 8 to 15 inclusive, a portion of the floor 1 of the alley-way is cut away, and within the opening is pivotally mounted a casing 41, the said casing being provided with trunnions 42 engaging openings in the sides of the cut away portion of the floor, and the rear end of the casing is provided with a weight 43,

whereby to normally maintain the casing in the position shown in Fig. 8. To the front end of the swinging casing is attached a rope 44, by means of an eye bolt 45, the said rope passing over a pulley 46, journaled on a bracket 47, to the front end of the alley. The casing 41 at the front end thereof is provided with a plurality of circular openings 48 therethrough, corresponding in number and position to the position of the pin balls, and movable in each of the openings is a pin 49 having a depression 50 in the upper end thereof, the said pin being integral with a block 51, connected to the casing 41, by means of lazy tongs 52. Brackets 53 are secured to the floor of the alley-way, and project downwardly therefrom, the said brackets being provided with curved slots engaged by rollers 55 upon the lazy tongs as shown in Figs. 8 and 9. When the casing 41 is rocked into the position shown in Fig. 9, the engagement of the roller 55 with the cam slot 54, opens the lazy tongs, thus moving the block 51 away from the casing 41, and moving the pins 49 into the position shown in Fig. 11.

The interior of the casing 41 is provided with passageways 56, formed by partitions 57 secured to the bottom of the casing and leading to the circular openings 48, the partitions being continued around the openings whereby to form a stop for the balls as they roll along the passageway. Upon the upper surface of the casing 41, is arranged a cushion 58, the said cushion being curved as shown in Fig. 12, whereby to deflect the balls to one side of the casing, and immediately in front of the cushion is a groove 59. The groove 59, connects with a groove in the top of a receptacle 61 at the side of the casing, and the groove in the top of the receptacle connects with a groove 59^a on the top of the casing behind the cushion leading to the opposite side of the casing from the receptacle. The groove 59 is connected with the groove 59^a by the groove on the top of the receptacle, thus forming practically a continuous groove, and the groove in the top of the receptacle is provided with an opening 60 leading into the receptacle. The receptacle 61 has an opening in the side thereof covered by a stop plate 62 similar to the plate 18 before described, the plate being normally retained in the position shown in Fig. 9 by the weight 63 on one end thereof, and being moved into the position shown in Fig. 8, by the engagement of the casing 41 with a pin 64 upon the said stop plate. The opening in the side of the receptacle 61 registers with an opening in the side of the casing 41, when the said casing is in the position shown in Fig. 8, thus admitting the balls to the interior of the casing, the balls taking a position across the rear end thereof, as shown in Fig. 12. being retained in this position by the retaining device 65, said device being in all respects similar to the retaining device shown in Fig. 6. The opening in the side of the casing is normally closed by a shutter 66, pivoted to the side of the casing, the shutter being elevated by engaging the stop plate 62, when the casing is in the position shown in Fig. 8, and dropping by gravity over the opening when the casing is in the position shown in Fig. 9. A pin 67 on the shutter engages the casing, as shown in Fig. 9, whereby to limit its motion with respect to the casing.

A bracket 68 is secured to the end of the alley-way at one side thereof, and connected with the bracket is a runway formed by two rods 69 secured to the bracket and extending to the opposite end of the alley-way, the said rods being spaced apart a sufficient distance from each other, whereby to prevent the passage of the casting balls therethrough.

In the operation of the modification, the casting balls and the pin balls are deflected by the cushion 58, into the groove 59, the pin balls passing through the opening into the receptacle 61, while the casting balls pass behind the cushion into a groove 59^a, it being understood that said groove 59^a gradually increases in depth from the opening in the receptacle 61 to the opposite side of the casing. When it is desired to reset the balls, a pull upon the rope 44 swings the casing into the position shown in Fig. 9, with the block 51 separated from the casing 41 so that the tops of the pins 49 are on a level with the inner surface of the bottom of the casing. The casting balls in this position, roll back down the part 59^a of the groove 59 and on to the runway formed by the rods 69, thus returning to the opposite end of the alley-way. The pin balls have meanwhile passed by the stop plate 62 into the casing, being retained therein by the shutter 66, and when the casing is rocked, as shown in Fig. 11, the pin balls pass down the passageways and into the depressions on the tops of the pins 49. When the rope 44 is released, the weight swings the casing into its normal position, and the engagement of the rollers on the lazy tongs with the cams 53, moves the block 51 up against the casing 41, thus causing the pins to push the balls through the openings in the top of the casing, as shown in Fig. 1, it being understood that the pins are sufficiently high to bring their upper surface on a level with the floor of the bowling alley when the block is in contact with the casing.

I claim:

1. In a bowling alley, the combination with the floor having a return groove upon each side thereof, and depressions for receiving the pin balls, of a receptacle at the end of the alley for receiving the balls from the floor, said receptacle having an opening in the bottom thereof to permit the passage of

the balls, a device for separating the pin balls from the casting balls, comprising a casing beneath the receptacle, said casing being divided by horizontal partitions into a central compartment for receiving the pin balls, and upper and lower compartments for receiving the casting balls, said upper compartment opening into said lower compartment, a spotting device comprising a casing pivoted to the alley, and adapted to be rocked whereby to bring the lower face of the casing in contact with the floor of the alley, the bottom of the casing being provided with openings for the pin balls corresponding in number and position to the depressions for receiving the pin balls, and with an opening for the casting balls adapted to register with a return groove, and with openings in the side thereof registering with openings leading from the separating device whereby to receive the balls therefrom, the interior of the casing being divided into passageways, one of said passageways for receiving the casting balls and leading to the opening therefor, and the other passageways for receiving the pin balls and leading to the openings therefor.

2. In a bowling alley, the combination with the floor having a return groove upon each side thereof and depressions for receiving the pin balls, of a receptacle at the end of the alley for receiving the balls, said receptacle having an opening in the bottom thereof, a device for separating the pin balls from the casting balls, comprising a casing beneath the receptacle, said casing being divided by horizontal partitions into a central compartment for receiving the pin balls, and upper and lower compartments for receiving the casting balls, said upper compartment opening into the lower compartment, and means for spotting the pin balls in the depressions and for placing the casting balls in the return grooves.

3. In a bowling alley, the combination with the floor having a return groove upon each side thereof, and depressions for receiving the pin balls, of a receptacle at the end of the alley for receiving the balls, a device in connection with the receptacle for separating the pin balls from the casting balls, a spotting device comprising a casing pivoted to the side of the alley and adapted to be rocked to bring the bottom of the casing in contact with the surface of the floor, said casing having openings for the pin balls in the bottom thereof and corresponding in number and position to the depressions for receiving the pin balls, and an opening for the casting balls adapted to register with a return groove, and means in connection with the separating device and the spotting device for leading the pin balls to the openings therefor, and the casting balls to the openings therefor.

4. In a bowling alley, the combination with the floor having a return groove upon each side thereof and depressions for receiving the pin balls, of a receptacle at the end of the alley for receiving the balls, a device for separating the pin balls from the casting balls, and means for receiving the balls from the separating device and for placing the pin balls in the depressions and the casting balls in the return grooves.

5. In a bowling alley, the combination with the floor, of means at one end of the floor for receiving the pin balls and the casting balls and for separating said pin balls from said casting balls, means in connection with the alley for returning the casting balls to the opposite end thereof, and means for receiving the balls from the separating device and for spotting the pin balls on the floor and placing the casting balls in the returning device.

6. In a bowling alley, the combination with the floor, of a receptacle at the end of the alley for receiving the balls, a spotting device comprising a casing having openings in the bottom thereof corresponding in number and position to the position of the pin balls on the floor, and at the opposite end thereof a groove for receiving the balls from the receptacle, passageways leading from the groove to the individual openings, and a retaining device between the groove and the passageways, said device comprising a shaft journaled in the casing and provided with longitudinal series of fingers adapted to be interposed in the passageways whereby to retain sundry of the balls in the groove.

7. In a bowling alley, the combination with the floor having a return groove at the sides thereof, of a receptacle at the end of the floor for receiving and separating the pin balls from the casting balls, said means having openings in the side thereof for permitting the passage of the balls, a normally active stop plate for closing said openings, a spotting device comprising a casing pivoted to the side of the alley and adapted to be rocked whereby to bring the lower face of the casing in contact with the floor of the alley, the bottom of the casing being provided with an opening for the pin balls corresponding in number and position to the position of the pin balls on the floor, and with an opening for the casting balls adapted to register with one of the return grooves, said casing having grooves transversely thereof at the opposite end from the openings for receiving the balls from the separating device and having passages leading from said grooves to the openings.

8. In a bowling alley, the combination with the floor having depressions for receiving the pin balls, and return grooves upon each side of the floor for the casting balls, of a receptacle at the end of the alley for

receiving the balls, means in connection with the receptacle for separating the pin balls from the casting balls, and means for receiving the balls from the separating device and for returning the pin balls to the depressions and the casting balls to the return grooves.

9. In a bowling alley, the combination with the floor upon which are placed the pin balls, of a receptacle for receiving the balls from the floor, means for separating the pin balls from the casting balls, a pivotally mounted spotting device for receiving the balls from the separating means, means for returning the casting balls to the opposite end of the alley, means whereby to rock the spotting device, and means whereby the rocking of the device will spot the pin balls upon the floor and deliver the casting balls to the returning device.

10. In a bowling alley, the combination with the floor having means for the return of the casting balls, of a receptacle at the end of the alley for receiving the balls, a device for separating the pin balls from the casting balls, and means for spotting the pin balls and delivering the casting balls to the returning means.

11. In a bowling alley, the combination with the floor, of means at one end of the floor for receiving the balls, and for separating the pin balls from the casting balls, and means for receiving the pin balls from the separating device and spotting them on the floor.

12. In a bowling alley, the combination with the floor, of means for receiving the balls and for separating the pin balls from the casting balls, a spotting device for receiving the pin balls therefrom and spotting them on the floor, and means in connection with the spotting device whereby to vary the number and position of the balls spotted.

13. In a bowling alley, the combination with the floor, of a casing for receiving the balls and for separating the pin balls from the casting balls, a spotting device comprising a movable casing for receiving the pin balls and spotting them on the floor of the alley, said casings having registering openings whereby to permit the passage of the pin balls, stop devices for closing said openings, and means whereby the movement of the spotting device may operate said stop devices.

14. In a bowling alley, a spotting device, comprising a casing mounted to rock upon the side of the alley, and provided in the bottom thereof with openings corresponding in position and number to the position of the pin balls on the floor, and means for separating the pin balls from the casting balls and means for leading the pin balls to the spotting device.

15. In a bowling alley, a spotting device, a device for separating the pin balls from the casting balls, means for conducting the balls to the spotting device, a returning device in connection with the alley, and means in connection with the spotting device for delivering the casting balls to the returning device.

16. In a bowling alley, a spotting device, means for separating the pin balls from the casting balls and means delivering them to the spotting device.

17. In a bowling alley, a spotting device comprising a casing pivotally mounted by the center thereof, and adapted to be rocked whereby to bring the bottom of the casing in contact with the floor of the alley, said casing having at one end openings in the bottom thereof corresponding in number and position to the number and position of the balls on the floor, and at the other end a groove for receiving the balls and having passageways leading from the groove to the individual openings.

18. In a bowling alley, a spotting device comprising a casing pivotally mounted by the center thereof and adapted to be rocked whereby to bring the bottom thereof in contact with the floor of the alley, said casing having at one end openings in the bottom thereof, corresponding to the positions of the balls on the floor, and at the other end a groove for receiving the balls and with passageways leading from the groove to the individual openings, and means interposable in the passageways to restrain the balls.

19. In a bowling alley, a spotting device comprising a casing pivotally mounted by the center thereof and adapted to be rocked whereby to bring the bottom thereof in contact with the floor of the alley, said casing having at one end openings in the bottom thereof, corresponding to the positions of the balls on the floor, and at the other end a groove for receiving the balls and with passageways leading from the groove to the individual openings, and means interposable in the passageways for restraining sundry of the balls whereby to vary the position and number of balls on the floor.

20. In a bowling alley, a spotting device comprising a casing pivotally mounted by the center thereof, and adapted to be rocked whereby to bring the bottom of the casing in contact with the floor of the alley, said casing having at one end openings in the bottom thereof corresponding in number and position to the number and position of the balls on the floor, and at the other end a groove for receiving the balls and having passageways leading from the groove to the individual openings and shoulders in the passages at the edge of the openings.

21. In a bowling alley, a spotting device comprising a casing adapted to be rocked whereby to bring the bottom of the casing

into contact with the floor of the alley, said casing having at one end openings in the bottom thereof, corresponding in number and position to the number and position of the balls on the floor, and at the other end a groove for receiving the balls and having passageways leading from the groove to the individual openings, and with a pocket at the commencement of each passageway and directly in front of the groove.

CLARENCE B. BRENNEMAN.

Witnesses:

ABBOTT W. SAWYER,

E. P. SAWYER.