April 14, 1953 R. I. ANDERSON 2,634,978

BOWLING PIN SETTER

Filed April 14, 1949 2 SHEETS--SHEET 1

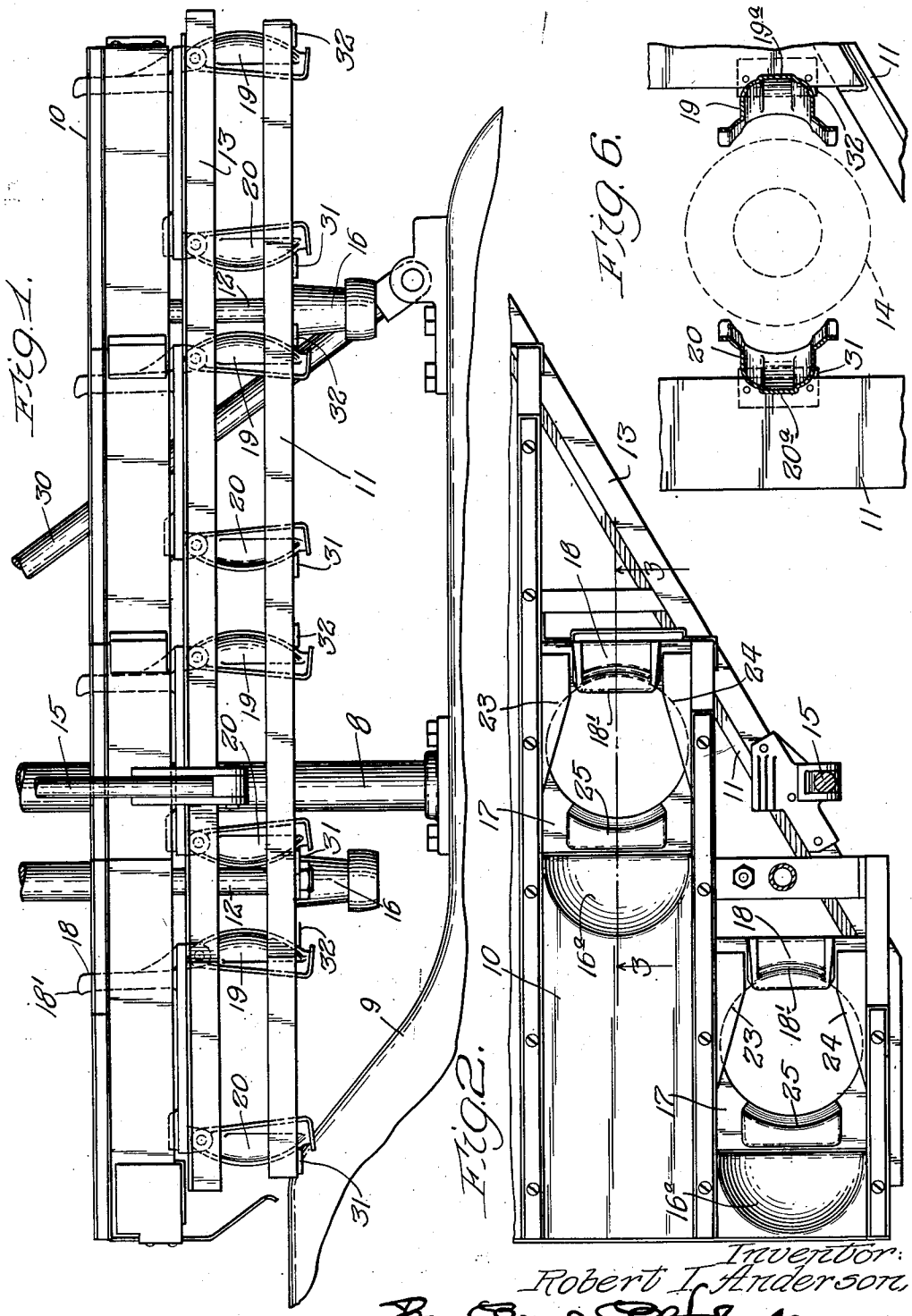


Fig. 1.

Fig. 2.

Fig. 6.

Inventor:
Robert I. Anderson
By Brace & Hofgren
Attys.

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Fig. 3.

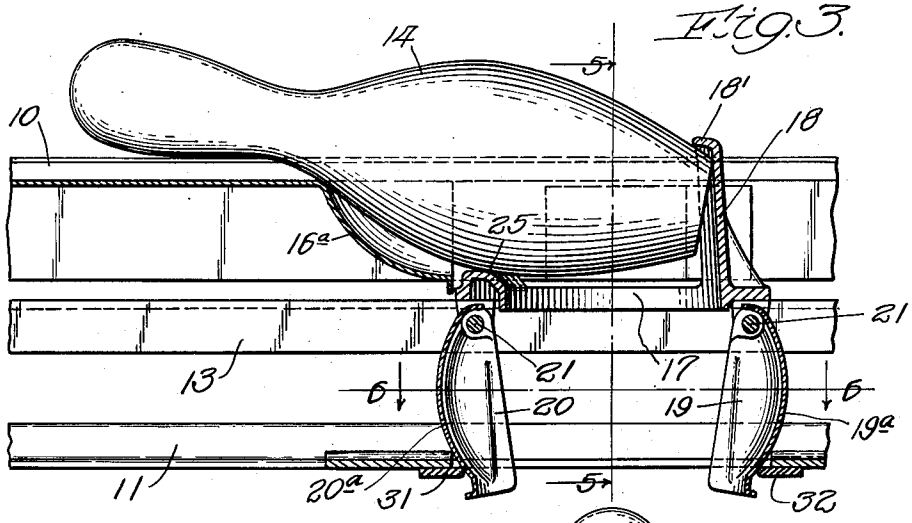
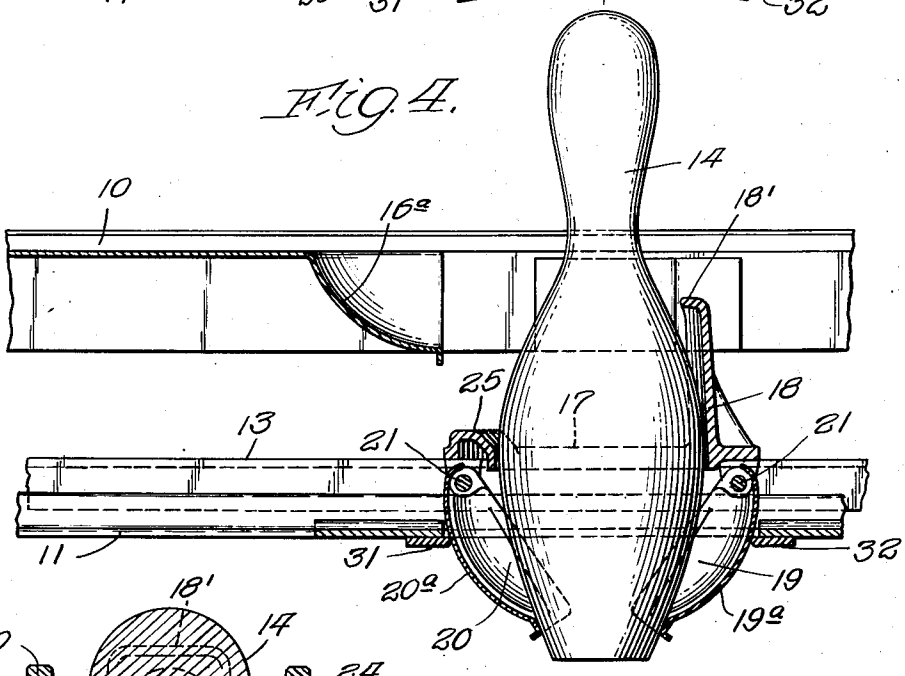


Fig. 4.



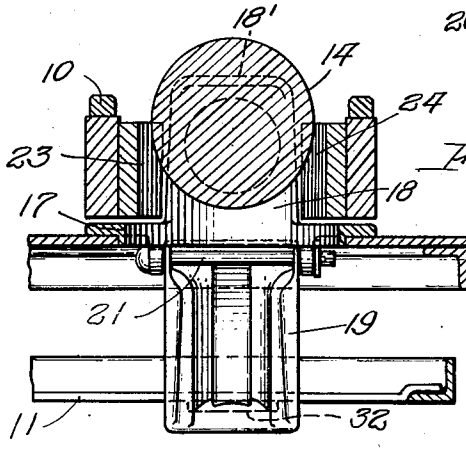


Fig. 5.

Inventor:
Robert I. Anderson,
By Owen & Owen
Attys.

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UNITED STATES PATENT OFFICE

2,634,978

BOWLING PIN SETTER

Robert I. Anderson, Muskegon, Mich., assignor to The Brunswick - Balke - Collender Company, Chicago, Ill., a corporation of Delaware

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3 Claims. (Cl. 273—42)

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This invention relates to a bowling pin setter, and more particularly to a pin setter having improved means for positioning pins thereon, and for releasing pins therefrom.

General objects of the invention are to provide a new and improved bowling pin setter having improved means for positioning pins thereon to prevent pins from accidentally falling through the setting openings.

Other objects of the invention are to provide positioning means of the character mentioned above which are positive in operation; which support the belly portion of a reclining pin at a point between the base and the center of gravity of said pin when the pin setter is in a raised position, so that the pin has no tendency to move from a reclining position to an upright position before the setting operation; and which are automatically moved to permit pins to fall through the setting openings when the setter is lowered to set pins.

Additional objects and advantages will become readily apparent from the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side view taken above the pin deck of a bowling alley showing the pin setter (but not the operating means therefor) in side elevation;

Fig. 2 is a fragmentary plan view of a portion of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged vertical longitudinal section taken along the line 3—3 of Fig. 2 and showing a pin in reclining position on the setter;

Fig. 4 is a fragmentary section similar to Fig. 3, but showing the setter in pin setting position;

Fig. 5 is a fragmentary transverse vertical section along the line 5—5 of Fig. 3; and

Fig. 6 is a fragmentary horizontal section taken along the line 6—6 of Fig. 3.

While I have illustrated in the drawings and shall herein describe in detail a preferred embodiment of the invention, it is to be understood that the invention is not limited to the particular form and arrangement shown. The scope of the invention will be pointed out in the claims.

The invention is shown as being embodied in a bowling pin setter of the type disclosed in the patent to Bishop, No. 1,626,446, which issued on April 26, 1927, and reference may be had to said patent for a complete disclosure of a pin setter of this general type, and particularly for an example of one type of operating means therefor.

Referring now to the drawings, the pin setter is mounted above the pin deck of an alley bed

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on supports as shown at 8 which are bolted or otherwise secured to the alley kickbacks 9. The pin setter comprises a vertically movable, horizontally disposed receiving frame having an upper deck portion 10 and a lower deck portion 11. These frame portions are rigidly secured together in vertical spaced relationship by a plurality of bolts 12. A setting frame 13 is arranged between the upper deck 10 and the lower portion 11 of the receiving frame, and is vertically movable conjointly with and relatively to the receiving frame, being guided in its relative movement by the bolts 12. The setting frame 13 is carried on the lower ends of a plurality of rods, as the rod 15, these rods being connected at their upper ends to an overhead operating mechanism (not shown) which may be similar to the mechanism shown in the earlier mentioned patent, or which may comprise hydraulic or electric mechanisms if desired, and which is supported on braces, one of which is shown at 30.

The frames have suitable vertically aligned openings therethrough, ten in number, and located at the proper positions for the ten pins which are to be set on the alley bed, these vertically aligned openings defining passageways for pins to be set through the frames. Pins are normally placed on the upper deck 10 of the receiving frame in reclining position as shown by the position of the pin 14 in Fig. 3 where the pin lies with its base portion over one of the passageways, but it often happens that pins are accidentally placed in the setter in nearly upright position, or that pins accidentally move into nearly upright position before the setter operates to set pins on the pin deck of the alley. The present invention discloses improved means for preventing pins from accidentally falling through the setting passageways before the pin setter is in position to set pins; and as will hereafter appear, a portion of this means is carried on the setting frame 13 so that it automatically moves to a withdrawn position during a pin setting operation, permitting the pin to fall through the passageway.

As appears from Fig. 1, the receiving frame 10 is carried on the setting frame 13 so that normally the setting frame is closely adjacent the upper deck 10 of the receiving frame. When it is desired to set pins on the pin deck, the overhead operating mechanism causes the rod 15 to moved downwardly and both frames move down together as a unit. The lower portion 11 of the receiving frame carries bumpers 16 which engage the pin deck and stop downward movement

of the receiving frame. However, the setting frame continues to move down, moving vertically relative to the receiving frame to a position spaced from the upper deck 10 and closely adjacent the lower deck 11 as shown in Fig. 4, and during this relative movement between the frames the pins are moved to be set on the alley deck.

In order to facilitate positioning of the pins in reclining position over the passageways, the upper deck 10 is provided with a dished portion 16a rearwardly of each pin passageway. On the setting frame 13 a collar member 17 surrounds each pin opening and has an upstanding portion 18 which provides a stop member at the front of each passageway for the base of the pin. As shown in Fig. 3 the stop member 18 normally projects slightly above the top of the deck 10 at the edge of the passageway for positioning a pin in reclining position with its base portion over the passageway. A rearwardly turned flange 18' at the top of the member 18 overlies the adjacent bottom end of the pin when it is positioned as in Fig. 3 and acts to move the pin toward upright position during the relative movement between the frames.

In order to prevent pins from accidentally falling through the pin setting passageways before the apparatus is in position to set pins, means carried partly on the receiving frame and partly on the setting frame are provided for preventing pins from accidentally falling through the passageway before the pin setting operation.

The means carried on the receiving frame comprises a pair of wedge blocks 23 and 24 which are mounted on the deck portion 10 and extend into the pin setting passageway on two opposite sides thereof. The blocks are so spaced from each other and so shaped that the pin cannot fall through the passageway when in reclining position as shown in Fig. 3, but the blocks are shaped to permit passage of the pin when it is moved to upright position as shown in Fig. 4.

The portion of the means which is carried on the setting frame to cooperate with the wedge blocks to prevent the pin from falling through the passageway when the setting frame is closely adjacent the upper deck 10 of the receiving frame as shown in Fig. 3 regardless of whether the pin is in upright or in reclining position, engages the pin in such manner that the pin has no tendency to move to or remain in upright position before the setting frame moves downwardly with respect to the receiving frame. This improved structure comprises a raised pin supporting lip 25 on the collar 17 of the setting frame 13, said raised lip extending partially around and into the pin setting passageway on a third side thereof. As shown in Figs. 3 and 4, the lip 25 preferably is formed integrally with the collar 17, and the blocks 23 and 24 and the raised lip 25 extend into the passageway and limit the size of the opening into said passageway to less than the largest diameter of the belly portion of a pin when the deck portion 10 and the setting frame 13 are closely adjacent each other. Consequently, even if the pin is accidentally turned nearly upright it cannot fall through the pin passage so long as the setter frames are in the relative positions of Fig. 3. The raised lip 25 is so positoned that it engages the belly portion of a reclining pin at a point between the base of the pin and the center of gravity of said pin when the pin is in reclining position as shown in Fig. 3. This engagement eliminates any tendency of the pin to upright itself until the base is pulled down by the flange 18', and even if the pin is placed on the deck 10 in nearly upright position it will fall to the reclining position of Fig. 3.

When the setter is lowered to set pins on an alley bed, the bumpers 16 strike the alley bed and arrest the movement of the receiving frame, while the setting frame continues to move downward. The relative movement between the two frames causes the lip 18' to move the pin toward upright position as it pivots over the supporting lip 25, and the relative movement between the frames moves the lip 25 down into the passage below the plane of the wedge blocks, thereby enlarging the mouth of the passage to such dimensions that the pin, when in upright position, readily falls through the passage and is set upon the pin deck. Upon reversal of movement of the pin setter, the setting frame 13 first moves upwardly relative to the receiving frame until it engages the lower side of the upper deck 10, at which time it picks up the receiving frame so that the entire setter moves back to its normal or pin setting position.

Front and rear locating shoes 19 and 20 are carried on the setting frame 13 on pivot pins 21 which are journalled through flanges depending from said frame. Each of said shoes has a flattened portion of substantial width extending throughout substantially the entire length of the shoe in the center of the back thereof. These portions, which are shown in cross section at 19a and 20a in Fig. 6, provide surfaces of substantial width which engage cam blocks 31 and 32 respectively. These blocks may be formed of vulcanized fibre, and are bolted onto the lower deck of the receiving frame as shown in Fig. 6. The shape of the surfaces 19a and 20a conforms in transverse cross section to the respective cooperating cam surface of each cam block, being shown as straight in transverse cross section for engaging the cam over a substantial area on said shoe for minimizing wear on the shoes. Since the shoes 19 and 20 locate the pin upon the pin deck during the setting operation, it is important that the position of the shoes be accurately predetermined during the setting operation. If the shoes have a portion of only small area for engaging the operating cam edge, wear on this small area will change the angular position of the shoes from the proper setting position, as shown in Fig. 4, so that the pins will not be set upon their proper spots on the pin deck. The provision of a surface of substantial area in engagement with the cam edge minimizes wear and insures that the pins will be set in their proper positions over a long period of continued use.

As the setting frame 13 moves down relative to the receiving frame the cam action causes the lower ends of the shoes to move toward each other to receive and set a pin as shown in Fig. 4. Upon return movement of the frames to the position of Fig. 3 the weight of the shoes causes them to pivot back to the position shown in Fig. 3.

I claim:

1. A bowling alley pin setter comprising a receiving frame having a deck portion, a setting frame below said deck portion, said frames having vertically aligned openings defining passageways for pins therethrough and said frames being vertically movable relative to each other from a position where said deck and setting frame are closely adjacent each other to a position wherein they are spaced from each other, limiting means on said receiving frame extending into each said

passageway, a collar on said setting frame and defining a portion of the passageway and a lip on the collar adapted to contact a pin between its base and its center of gravity to hold the pin in reclining position when the frames are adjacent each other, said collar cooperating with the limiting means on the receiving frame when the frames are closely adjacent each other to reduce the maximum diameter of said passageway to a size less than the largest diameter of the belly portion of a pin to prevent pins from falling therethrough and said collar and said limiting means being adapted when spaced apart by relative movement of said frames to permit a pin to pass through each passageway, and means engaging the base of a pin and operative upon relative separating movement of said frames to tilt a pin to a substantially vertical position.

2. A bowling alley pin setter comprising a receiving frame having a deck portion, a setting frame below said deck portion, said frames having vertically aligned openings defining passageways for pins therethrough and said frames being vertically movable relative to each other from a position where said deck and setting frame are closely adjacent each other to a position wherein they are spaced from each other, a pair of wedge blocks on the receiving frame and extending into each passageway, a collar on said setting frame and defining a portion of each passageway and a lip on each collar adapted to contact a pin between its base and its center of gravity to hold the pin in reclining position when the frames are adjacent each other, said collars cooperating with the wedge blocks on the receiving frame when the frames are closely adjacent each other to reduce the maximum diameter of said passageways to a size less than the largest diameter of the belly portion of a pin to prevent pins from falling therethrough and said collar and said wedge blocks being adapted when spaced apart by relative movement of said frame to permit a pin to pass through each passageway, and means engaging the base of a pin and operative upon relative separating movement of said frames to tilt a pin to a substantially vertical position.

3. A bowling alley pin setter comprising a receiving frame having a deck portion and setting frame below said deck portion, said frames having vertically aligned openings defining a passageway for pins therethrough and said frames being vertically movable relative to each other from a position where said deck and setting frame are closely adjacent each other to a position wherein they are spaced from each other, a well in the deck on one side of each passageway, a stop member on the setting frame and extending upwardly above the deck and adjacent the opposite side of each passageway, a pair of wedge blocks on the receiving frame and extending into each passageway, a collar on said setting frame and defining a portion of each passageway and a lip on each collar adapted to contact a pin between its base and its center of gravity to hold the pin in reclining position when the frames are adjacent each other, said collars cooperating with the wedge blocks on the receiving frame when the frames are closely adjacent each other to reduce the maximum diameter of said passageway to a size less than the largest diameter of the belly portion of a pin to prevent pins from falling therethrough and said collar and said wedge blocks being adapted when spaced apart by relative movement of said frames to permit a pin to pass through each passageway, and means engaging the base of a pin and operative upon relative separating movement of said frames to tilt a pin to a substantially vertical position.

ROBERT I. ANDERSON.

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