

Dec. 9, 1930.

R. A. WILLIAMS

1,784,084

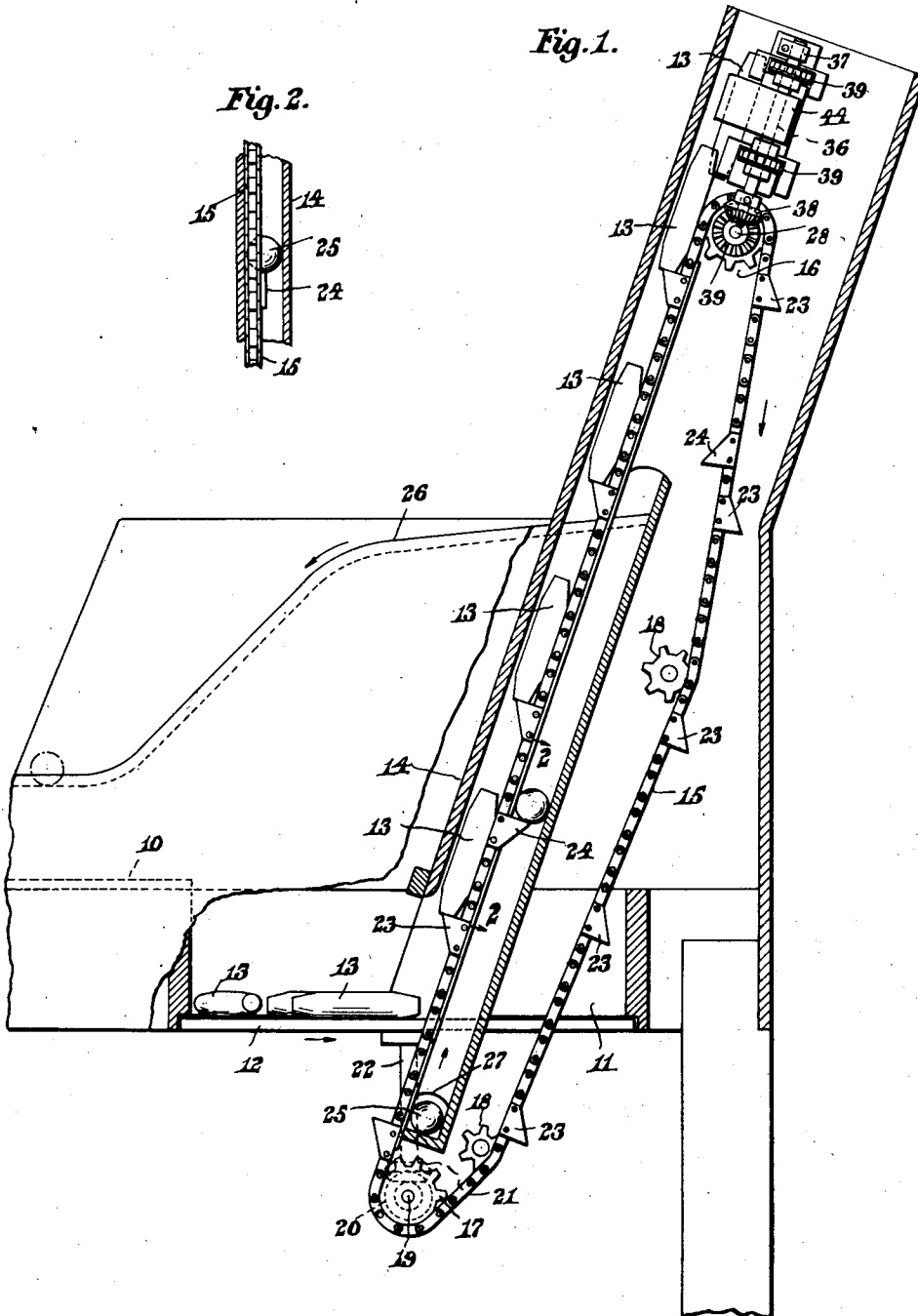
PIN MAGAZINE FOR BOWLING ALLEYS

Filed April 13, 1929

2 Sheets-Sheet 1

Fig. 1.

Fig. 2.



Inventor:
Raymond A. Williams,
by Walter E. Lombard,
Atty.

Dec. 9, 1930.

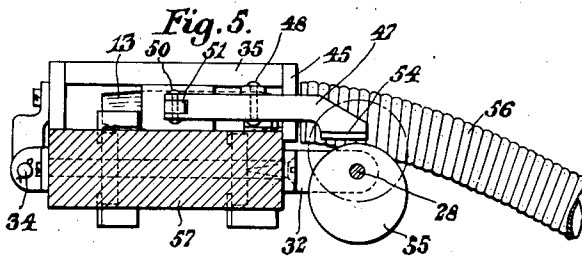
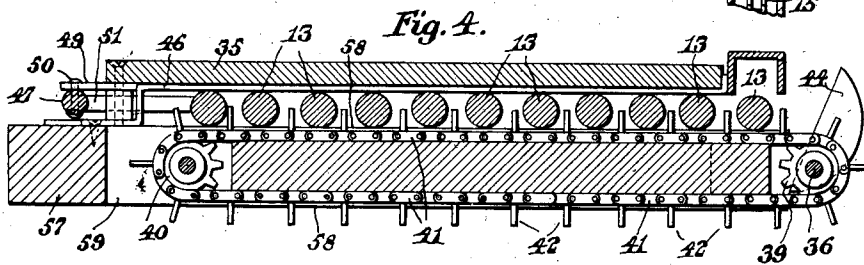
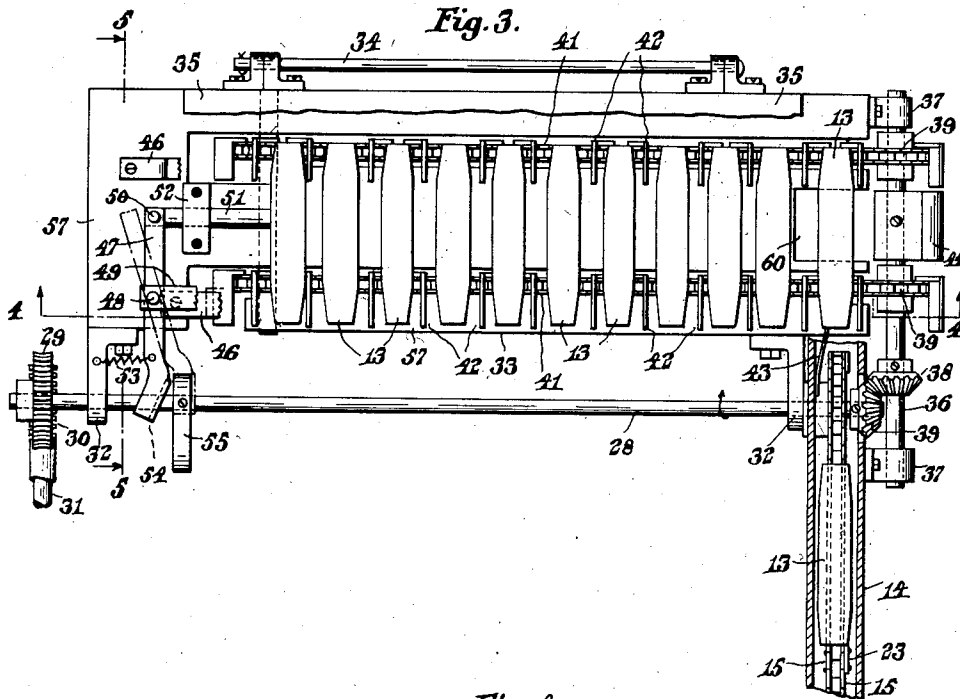
R. A. WILLIAMS

1,784,084

PIN MAGAZINE FOR BOWLING ALLEYS

Filed April 13, 1929

2 Sheets-Sheet 2



Inventor:
Raymond A. Williams,
by Walter E. Lombard,
Atty.

UNITED STATES PATENT OFFICE

RAYMOND A. WILLIAMS, OF ARLINGTON, MASSACHUSETTS

PIN MAGAZINE FOR BOWLING ALLEYS

Application filed April 13, 1929. Serial No. 354,949.

This invention relates to bowling alleys and particularly to bowling alleys in which the pins are automatically set, the object of the invention being the production of a pin magazine adapted to hold pins of different sizes, delivered thereto by an endless conveyor and discharge said pins into conduits leading to the pin setting mechanism when the magazine has been filled.

10 This object is attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described except as required by the scope of the appended claims.

Of the drawings:

25 Figure 1 represents a longitudinal vertical section of the pit end of a bowling alley.

Figure 2 represents a section on line 2, 2, on Fig. 1.

30 Figure 3 represents a plan of the pin magazine with the cover broken away and showing a portion of the pin conveyor in section.

Figure 4 represents a longitudinal section of same on line 4, 4, on Fig. 3, and

35 Figure 5 represents a transverse section of same on line 5, 5, on Fig. 3.

Similar characters indicate like parts throughout the several figures of the drawing.

40 In the drawings, 10 is the rear end of a bowling alley having a pit 11 in the bottom of which is a revoluble disk 12.

The upset pins and the spent balls drop into this pit 11 and are carried about the axis of the revoluble disk 12 in the same manner as is more fully shown and described in another application of mine filed December 29, 1928, and numbered 329,146.

45 The pins 13 are carried by the disk 12 into a conduit 14 in which is disposed an endless chain 15.

The chain 15 travels over sprocket wheels 16 and 17 being held taut by means of the idler sprocket wheels 18.

55 The sprocket wheel 17 is mounted on a shaft 19 having a bevel gear 20 thereon meshing with a bevel gear 21 on a revoluble shaft 22 to the upper end of which the revoluble disk 12 is secured.

60 The chain 15 has extending in one direction therefrom a plurality of projections 23 which are adapted to engage the pins 15 and carry them upwardly in the conduit 14 as indicated in Fig. 1 of the drawing.

65 Extending in the opposite direction from the chain 15 are other projections 24 which are adapted to engage the spent balls 25 and carry them upwardly in the conduit 14 and deliver them to a runway 26 extending to the head of the alley.

70 These balls 25 enter the conduit 14 at 27 when discharged from the pit 11 in the rotation of the disk 12.

75 The upper sprocket wheel 16 is mounted on one end of a shaft 28, this shaft having secured to its opposite end a worm gear 29 meshing with a worm 30 on a shaft 31 rotated by any suitable motor.

80 This shaft 28 rotates in bearings in brackets 32 secured to a magazine 33 having hinged thereto at 34 a cover 35.

At one end of the magazine 33 is a revoluble shaft 36 mounted in suitable bearings 37 secured to the magazine 33 and the conduit 14 respectively.

85 This shaft 36 has a bevel gear 38 thereon meshing with another bevel gear 39 secured to and revoluble with shaft 28.

90 The shaft 36 has sprocket wheels 39 secured thereto over which and the sprocket wheels pass endless belts 41 having a plurality of spaced projections 42 extending therefrom.

95 As the pins 13 are lifted through the conduit 14 they are successively delivered to one end of the magazine between a pair of the projections 42, as indicated at the right of Fig. 3.

In passing into the magazine each pin forces the spring member 43 toward the wall of the conduit 14 and as soon as the pin has passed this yielding member 43, it returns 100

into the position indicated in Fig. 3 of the drawings and prevents said pin from dropping.

The shaft 36 has secured thereto a cam member 44 which in the rotation of said shaft 36 comes into contact with the last pin 13 entering the magazine and forces said pin toward the opposite end of the magazine, at the same time moving the belts 41.

The projections 42 on the belts 41 are spaced apart a sufficient distance to accommodate pins of different diameters.

To the front end of the cover 35 is secured a plate 45 which normally closes the magazine.

Between the cover 35 and the pins 13 are two straps 46 extending the entire length of the magazine and preventing the pins 13 from moving laterally from the belts 41 even when the cover 35 is raised.

These straps 46 do not prevent endwise movement of the pins 13 when the cover 35 is raised.

At the end of the magazine opposite the cam 44 is a lever 47 pivoted at 48 to an ear 49 secured to the inner face of the cover 35.

Pivoted at 50 to one end of the lever 47 is a rod 51 extending through a bearing 52 secured to the cover 35.

This rod 51 projects into the magazine in the path of the pins 13 and is normally held in this position by means of the spring 53, all as indicated at the left of Fig. 3 of the drawings.

The other end of the lever 47 has an ear 54 extending therefrom.

Adjacent to the lever 47 and secured to the revoluble shaft 28 is a cam 55.

When the magazine becomes filled with pins 13 the first pin to enter the magazine will come into contact with the rod 51 and move the lever 47 into the position indicated in dotted lines in Fig. 3, with the forward end of said lever above the revoluble cam 55.

As the cam 55 revolves it will come into contact with the lever 54 and move the cover 35 about the axis of its hinge 34, lifting the plate 45 so that the pins in said magazine may pass from the belts 41 into the flexible tubes 56 to the pin setting device.

During the rotation of the cam 55 the ear 54 will come into contact with one face of said cam thereby preventing the lever 47 from returning to its normal position until the cam has made a complete revolution and returned to its normal position, as indicated in Fig. 5 of the drawings.

At this time the spring 53 will act to return the lever 47 and rod 51 to their normal position preparatory to another filling of the magazine.

The motor driving the shaft 31 not only delivers pins into the magazine and pushes these pins toward the opposite ends of the magazine, but also actuates the cover lifting

device, the spent ball lifting mechanism and the revoluble disk in the bottom of the pit 11.

The shaft 28 is in continuous rotation causing the continuous movement of the chain 15, and the projections 23 on this chain from time to time pick up a pin from the revoluble disk 12 and delivers it to the magazine 33.

If a pin has been delivered into the right hand end of the magazine, the cam 44 will act thereon and push it toward the opposite end of the magazine, but in case no pin enters the magazine the cam will move about the axis of the shaft 36 without performing any duty.

The bottom of the magazine is made in the form of a solid block 57 having grooves 58 in the opposite faces thereof for the endless belts 41, and this block also has an opening 59 therethrough in which is disposed the sprocket wheel 40.

One end of the block 57 is bifurcated as at 60 to permit the passage of the cam 44 during its rotation.

By providing the belts 41 with the projections 42 suitably spaced apart, the magazine may be used for either candle pins or Boston pins regardless of how much the pins may have been shortened or reduced in diameter after such constant use as to have necessitated their re-shaping.

It is believed that the operation and many advantages of the invention will be understood readily without further description.

Having thus described my invention, I claim:

1. In a bowling alley, a pin magazine; an endless pin-supporting belt adapted to move endwise therethrough provided with laterally extending separated projections; a pin conduit beneath and communicating with one end of said magazine; means within said conduit for moving pins upwardly and delivering them to said magazine and means for pushing a pin delivered from said conduit to said magazine, between a pair of said projections, toward the opposite end of the magazine.

2. In a bowling alley, a pin magazine; an endless belt adapted to move endwise therethrough provided with laterally extending separated projections; a pin conduit communicating with one end of said magazine; and a revoluble cam for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine.

3. In a bowling alley, a pin magazine; an endless belt adapted to move endwise therethrough provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered

from said conduit to said magazine between a pair of projections, toward the opposite end of the magazine; and mechanism connected to said cover at the opposite end of the magazine operated by contact with one

of said pins for lifting said cover when the magazine is filled and thereby permitting the discharge of the pins therein.

4. In a bowling alley, a pin magazine; an endless belt adapted to move endwise there-through provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; and a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins.

5. In a bowling alley, a pin magazine; an endless belt adapted to move endwise there-through provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins; and means for retaining the cover in open position a predetermined time.

6. In a bowling alley, a pin magazine; an endless belt adapted to move endwise there-through provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins; and means for

disengaging the lever from said cam after a predetermined time.

7. In a bowling alley, a pin magazine; an endless belt adapted to move endwise there-through provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins; and an ear on said lever adapted to contact with one face of said cam to retain the cover in open position a predetermined time.

8. In a bowling alley, a pin magazine; an endless belt adapted to move endwise there-through provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; a revoluble cam for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; a lever pivoted to the opposite end of the cover of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins; a revoluble shaft on which said cover-raising-cam is mounted; and means for actuating the pin-pushing-cam from said revoluble shaft.

9. In a bowling alley, a pin magazine; means for moving pins endwise thereof; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means in said conduit for delivering pins onto said pin moving means; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the opposite end of said magazine in the path of the pins therein; and a revoluble cam adapted to coact with the other end of said lever when the magazine is filled and raise the cover to permit the discharge of the pins.

10. In a bowling alley, a pin magazine; means for moving pins endwise thereof; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit adapted to deliver pins to one end of said magazine onto said

pin moving means; a lever pivoted to the opposite end of said magazine; a rod extending from one end of said lever into the magazine in the path of the pins therein; a revolable cam adapted to coact with said lever when the magazine is filled and raise the cover to permit the discharge of the pins; and an ear on said lever adapted to contact with one face of said cam to retain the cover in open position a predetermined time.

11. In a bowling alley, a pin magazine; means for moving pins endwise thereof; a pin conduit beneath and communicating with one end of said magazine; means within said conduit adapted to deliver pins upwardly to one end of said magazine onto said pin moving means; a revoluble cam; a cover for said magazine contacting with and supporting pins disposed in said magazine and mechanism adapted to be actuated by said cam to raise the cover when the magazine is filled to permit the discharge of the pins.

12. In a bowling alley, a pin magazine; an endless belt adapted to move endwise thereof provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine and from which pins are adapted to be delivered onto said pin moving means; means for pushing the pins on said moving means toward the opposite end of the magazine; mechanism at the opposite end of said magazine adapted to operate when the magazine is filled to raise the cover and permit the discharge of the pins; a runway for spent balls; and means in said conduit for delivering used pins to said magazine and spent balls to said runway.

13. In a bowling alley, a pin magazine; an endless belt adapted to move endwise thereof provided with laterally extending separated projections; a cover for said magazine contacting with and supporting pins in said magazine; a pin conduit communicating with the bottom of one end of said magazine; a pin elevator in said conduit adapted to deliver pins to said magazine between pairs of said projections; and means for successively moving said pins toward the opposite end of the magazine as they are delivered thereto.

14. In a bowling alley, a pin magazine; an endless belt adapted to move endwise thereof provided with laterally extending separated projections; means for delivering pins into one end of said magazine between said projections; a revoluble cam for pushing the delivered pins toward the opposite end of the magazine; and means operable by the moving pins for opening the magazine when filled to permit the discharge of the pins therein.

15. In a bowling alley, a pin magazine; an endless belt adapted to move endwise thereof provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit; means therein for delivering pins to one end of said magazine onto said belt between a pair of said projections; mechanism at the opposite end of the magazine for lifting said cover when the magazine is filled and thereby permitting the discharge of the pins therein; and a plurality of flexible tubes to receive said pins when discharged.

16. In a bowling alley, a pin magazine; an endless belt adapted to move endwise thereof provided with laterally extending separated projections; a hinged cover for said magazine contacting with and supporting pins disposed in said magazine; a pin conduit communicating with one end of said magazine; means for pushing a pin, delivered from said conduit to said magazine between a pair of said projections, toward the opposite end of the magazine; cover lifting mechanism at the opposite end of said magazine; a cam adapted to open said cover when the magazine is filled and permit the discharge of the pins; pin lifting mechanism in said conduit; a revoluble shaft to which said cover actuating cam is secured; and means coacting with said shaft for operating the pin-lifting mechanism and the pin-pushing means.

Signed by me at 294 Washington St., Boston, Mass., this 9th day of April, 1929.

RAYMOND A. WILLIAMS.

5
10
15
20
25
30
35
40
45
50
55
60
65

70
75
80
85
90
95
100
105
110
115
120
125
130