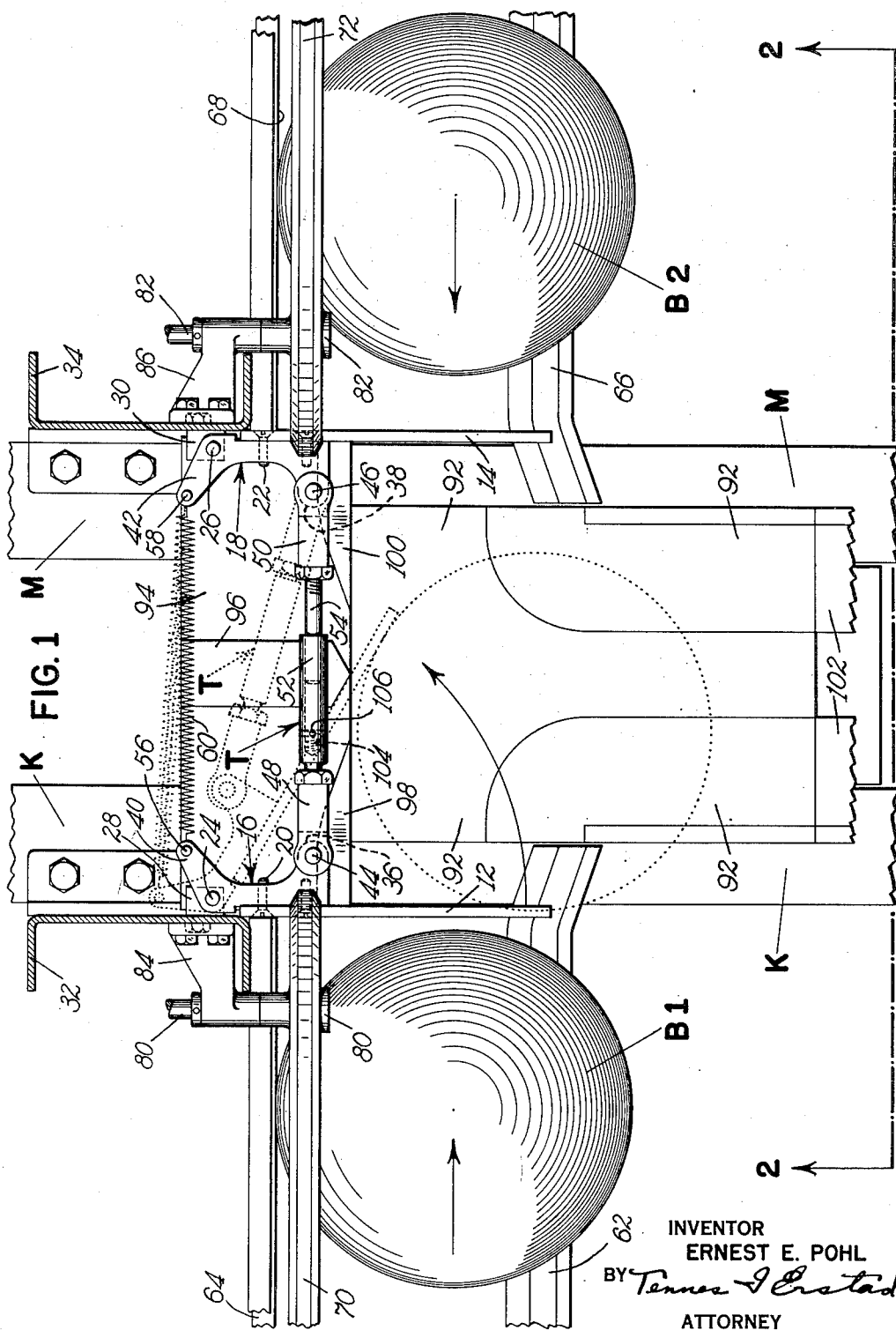


2,600,918

3 Sheets-Sheet 1



June 17, 1952

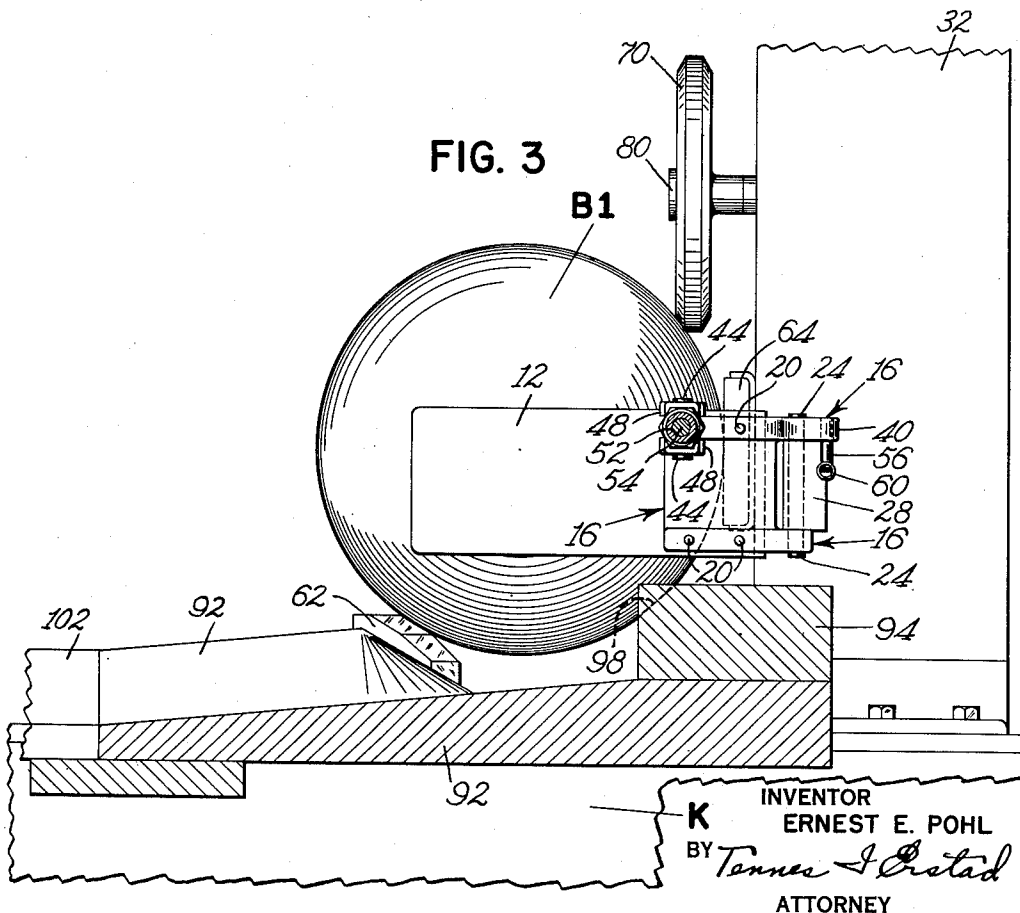
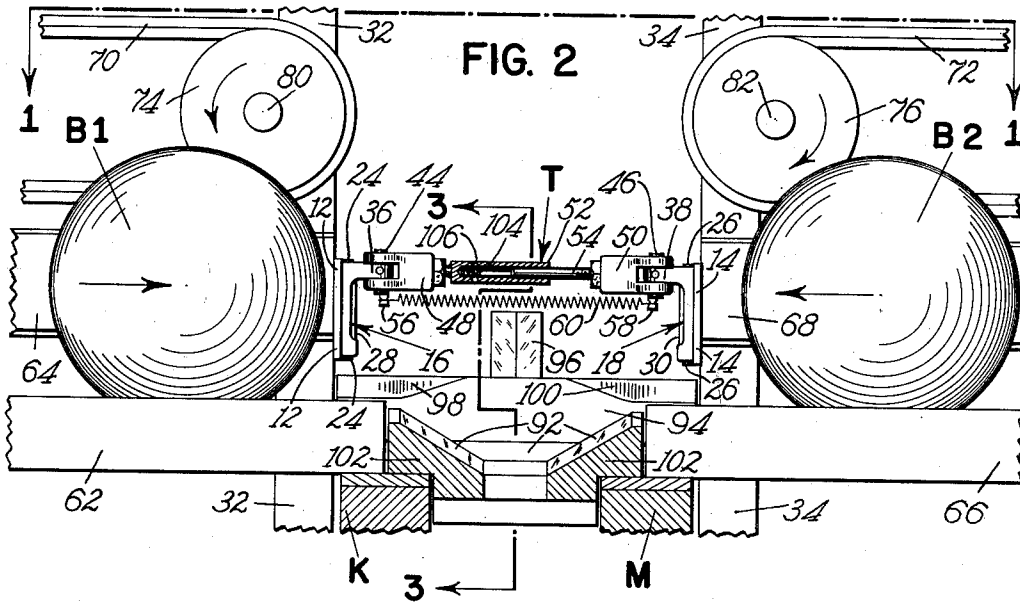
E. E. POHL

2,600,918

BOWLING BALL RETURN MECHANISM

Filed March 1, 1947

3 Sheets-Sheet 2



June 17, 1952

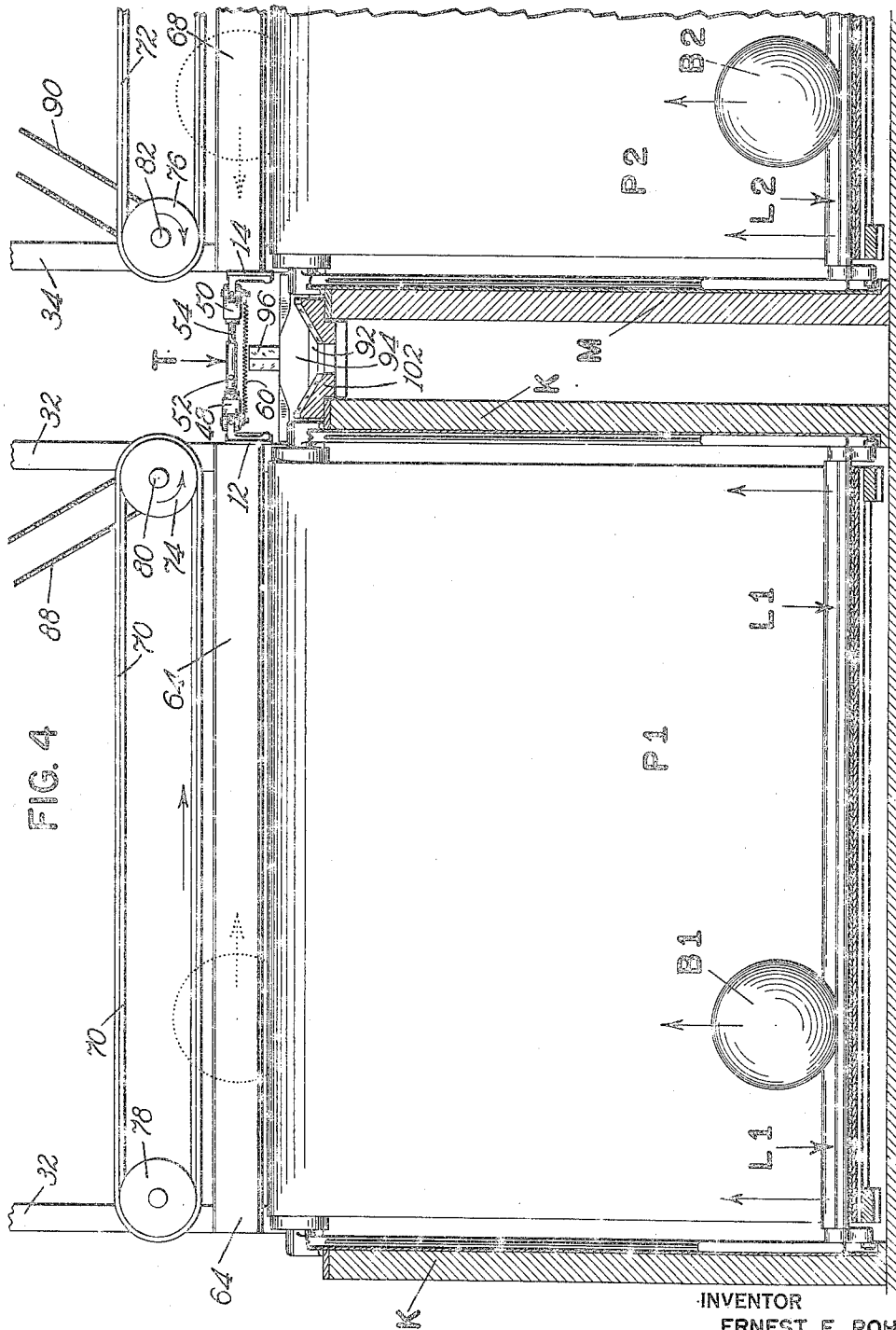
E. E. POHL

2,600,918

BOWLING BALL RETURN MECHANISM

Filed March 1, 1947

3 Sheets-Sheet 3



INVENTOR
ERNEST E. POHL
BY *Tennet & Ersted*
ATTORNEY

UNITED STATES PATENT OFFICE

2,600,918

BOWLING BALL RETURN MECHANISM

Ernest Erwin Pohl, Elmhurst, N. Y., assignor to
American Machine and Foundry Company, a
corporation of New Jersey

Application March 1, 1947, Serial No. 731,743

21 Claims. (Cl. 273-49)

1

This invention relates to bowling ball return mechanism for use with two adjacent bowling alleys which employ a common runway for returning the bowling balls to the players.

In many bowling alleys, it is the practice to use a common ball return between two adjacent bowling alleys instead of an individual ball return for each bowling alley. When a common ball return is used between two adjacent alleys, there are usually transverse runways provided for each alley which deliver the bowling balls to the common ball return runway. The possibility exists, with this type of arrangement, that balls being delivered from each alley simultaneously to the common runway will collide. This collision often results in the balls becoming jammed, broken or falling off the runway.

My invention may be used with bowling alleys where the ball is placed on the transverse runways by hand or may be used with automatic pin spotting machines which place the ball on the transverse runways by automatic mechanism.

It is an object of my invention to provide a device which will prevent two bowling balls from simultaneously meeting at the point where they are delivered to the common return and thereby prevent jamming, damage or displacement of such bowling balls.

Another object of my invention is to provide a device which will expedite the return of a bowling ball to the player in a minimum of time and which will synchronize the operation of automatic bowling ball returns on adjoining bowling alleys using a common ball return runway.

Another object of my invention is to provide a device which will accelerate the movement of a ball down a common return runway after it has been received from an adjacent bowling alley.

A further object is to provide a device which will not only prevent bowling balls received from adjacent bowling alleys having a common ball return runway from jamming or becoming deadlocked, but which will also deflect a bowling ball down the common ball return runway when it is received from one of the adjacent bowling alleys.

A further object is to provide a locking device for a bowling alley which, when two balls are about to be delivered to the common runway simultaneously, will be controlled by the ball having the greater momentum.

A further object is to provide an anti-jamming device for two adjoining bowling alleys having a common ball return runway which will

2

minimize wear and tear by absorbing the momentum of a bowling ball and diverting the traveling bowling ball down the common ball return runway.

Another object is to provide a gate in front of each transverse runway for stopping pins and bowling balls from being discharged onto the common ball return runway and to further provide means for maintaining one of said gates closed whenever the other of said gates is open.

Other objects and features of the invention will appear as the description of the particular physical embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

Fig. 1 is a plan view of the dual bowling ball return check employed in combination with side by side alleys having a common center ball return runway;

Fig. 2 is a front view of the same taken on line 2-2 of Fig. 1, showing the telescoping cylinder partly in cross section;

Fig. 3 is a sectional side elevation taken on line 3-3 of Fig. 2; and

Fig. 4 is a sectional front elevation of the pits of two adjacent alleys, showing the dual bowling ball return check and the common ball return runway between the two alleys.

This invention may be used either with bowling alleys where the bowling ball is elevated by hand for return, through gravity, along a common runway, or in connection with a plurality of alleys employing automatic pin setting machines.

In the embodiment shown in Fig. 1, the dual bowling ball return safety check consists of two pivotally mounted check gates 12 and 14, extending into the path of a ball being ejected from either of two adjoining ball and pin handling machines. Gates 12 and 14 are situated near the ends of two transverse ball return guides 62, 64, 66 and 68 of the adjoining machines where the guide rails 62, 64, 66 and 68 of each machine join a center ball return section 92 mounted between the kickbacks K and M of the alleys which section 92 connects the transverse ball return runways with the common ball return runway 102. The purpose of said gates 12 and 14 is to allow one ball at a time to be ejected from its respective machine and thus prevent the balls being ejected from both machines from colliding and jamming at the juncture of the rear guide rails and the common center runway.

When my invention is used with automatic pin handling mechanism of the general type shown in U. S. Patent 2,389,643 issued to G. J. Schmidt on November 27, 1945, the gates 12 and 14 will also prevent bowling pins from falling onto the common center ball return when being discharged into the pin chutes, the top of which is formed by the transverse runways 62, 64, 66 and 68 of the automatic pin spotters. If desired, reference may be made to U. S. Patent 2,293,018 issued to G. E. Hagquist on August 11, 1942, for a more detailed showing of the apron and chute employed for the automatic handling of bowling pins and balls.

Gates 12 and 14 are securely mounted on swinging brackets 16 and 18 by screws 20 and 22. Brackets 16 and 18 are pivotally mounted on pins 24 and 26 respectively which are held by blocks 28 and 30 fastened to rear frames 32 and 34 of the automatic bowling machines. The upper portions of said brackets 16 and 18 are provided with integral lugs 36 and 38 respectively at one end and lugs 40 and 42 at the other end. Yokes 48 and 50 are pivotally mounted on pins 44 and 46 carried in lugs 36 and 38. A telescoping link T, consisting of a cylinder 52 and a plunger 54 is adjustably connected to yokes 48 and 50.

The lugs 40 and 42 carry pins 56 and 58 to which the ends of tension spring 60 are connected. The tension spring 60, by exerting a pulling force on the pins 56 and 58, maintains the gates 12 and 14 in a normally closed position as shown in Fig. 1.

As shown in Fig. 4, the pits P1 and P2 of the side by side alleys are provided with automatic ball lifting cradles L1 and L2, consisting of two parallel cross bars, similar in construction to the one disclosed in detail in Schmidt Patent No. 2,389,643. After a ball B1 has been rolled by a player, its momentum brings it to the rear of the pit P1 where it comes to rest on the ball lifting cross bars forming cradle L1. The cradle L1 then lifts the ball B1 upwardly as indicated by arrows in Fig. 4 and, upon reaching the desired height, deposits the ball B1 on transverse guide rails 62 and 64 of one machine as shown in dotted outline (Fig. 4).

The pin and ball handling machine on the adjoining bowling alley operates in a similar manner. The momentum of ball B2 carries it to the rear of the alley where it comes to rest on the cradle L2. The cradle L2 elevates and deposits the ball B2 on a pair of transverse rails 66 and 68 which are similar in construction to the rails 62 and 64 of the adjoining alley. If desired, reference may be made to the aforementioned patent to G. J. Schmidt 2,389,643 for a more detailed description of the operation and construction of the cradles L1 and L2 as well as of the pin handling apron which rests on the bottom of each pit P1 and P2 and the mechanism actuating the same.

Guides 64 and 68 are secured to rear frames 32 and 34 respectively, while guides 62 and 66 are supported between the kickbacks K and M of their respective alleys.

In order to accelerate and deliver the bowling balls from their respective machines to the common center ball return 102, the machines are provided with endless belts 70 and 72 respectively which are situated above the rear transverse guide rails 64 and 68 and are so positioned as to contact one side of the bowling ball as shown in Fig. 3. Said belts are mounted on

driving pulleys 74 and 76 and idler pulleys 78 (one not shown).

Driving pulleys 74 and 76 are fixedly mounted on shafts 80 and 82 which rotate in bearing brackets 84 and 86. The bearing brackets 84 and 86 are fixedly mounted on frames 32 and 34 respectively. Idler pulleys 78 are mounted in a similar manner.

The shafts 80 and 82 are driven by sprocket chains 88 and 90 from a suitable drive (not shown). The chains 88 and 90, coacting with suitable sprockets (not shown), cause the shafts 80 and 82 to rotate the pulleys in the directions indicated by the arrows in Fig. 4. This rotation will cause the belts 70 and 72 to travel in the direction indicated by the arrows.

That portion of the common center runway situated adjacent the dual ball return check is comprised of a center section 92, Fig. 1, to the rear of which is secured a cross piece 94 having integral therewith or securely fastened thereto at its center a stop 96 for gates 12 and 14. One edge of cross piece 94 is provided with bevels 98 and 100 that form part of the ball support guide rails as the bowling balls leave their machines and roll onto the common center runway 92 which is mounted on the kickbacks K and M of the two machines.

Fig. 1 may be taken as an illustrative example of the operation of my dual bowling ball return safety check. As shown in Fig. 1, the bowling ball B1 being ejected from the left side machine, under the propulsion of belt 70, is about to reach its control gate 12 in advance of the ball B2 being ejected from the adjacent machine reaching its corresponding control gate 14. If the momentum of ball B1 is greater than that of ball B2, the momentum of ball B1 will cause it to push the control gate 12 open to its maximum position as shown in dotted position in Fig. 1. If the other ball B2 has a greater momentum than the ball B1, which hit gate 12 first, the ball with the lesser momentum, B1, would be pushed back by the gate 12 while the ball with the greater momentum would continue its travel down the center runway 92 onto the continuation runway 102. This feature has the advantage that it stops the bowling ball with the lesser momentum whenever the gate, which is engaged by the ball with the greatest momentum, is not in locked position. It will also be noted that the gates 12 and 14, when open, extend beyond the center of the common ball return runway. This feature provides a positive means for directing the ball down the center runway.

The opening of gate 12 decreases the distance between pivot pins 44 and 46 but this lost motion is taken up by telescoping link T which, when gate 12 opens, swings to such a position in relation to the other gate 14, that it locks the latter gate in closed position (as shown in dotted outline in Fig. 1).

Ball B2 will thus be held back until ball B1 has started down the common center return runway 92. From there, ball B1 passes onto the continuation runway 102 which returns the ball to the player. Runway 102 is also supported by kickbacks K and M. After ball B1 has cleared the gate, ball B2 will be released to follow ball B1 in succession in a similar manner.

Ball B1, when ejected, is guided onto the center return runway 92 by transverse guide rails 62 and 64, by bevel 98 on block 94 and by control gate 12 against gate stop 96. It will be noted that the gate 12 in its dotted position forms an

5

angle with respect to the direction of travel of the bowling ball. This assists in deflecting the ball in the direction of runway 92.

When the ball B1 starts its travel down the runway 92, tension spring 60 closes gate 12 and telescoping link T assumes the position shown in full outline in Fig. 1, at which time the ball that had been held back by control gate 14, pushes same open by the propulsive action of belt 12. The operation of link T now is similar, to that described above, except that at this point control gate 12 is held in a locked position until the moving ball clears its machine and starts down the common center runway 92, at which time tension spring 60 closes gate 14 and the dual bowling ball return check is now ready for the next ball or balls to be ejected from either or both machines. The bowling ball ejected from the machine on the right side is guided from its machine onto center return runway 92 by transverse guide rails 66 and 68, bevel 100 on block 94 and by control gate 14 against stop 96.

While I have shown a stop device having a cylinder 52 and a plunger 54 as one embodiment of my invention, it will be appreciated that other stops, if desired, can be substituted for this cylinder and plunger arrangement I have shown and described.

In order to provide a cushioning effect and remove the shock of either control gate 12 or 14 slamming against gate stop 96, due to a ball from either machine striking the control gate, a short light compression spring 104 is inserted at the bottom of cylinder 52 and is contacted by plunger 54 when telescopic link T is shortened due to the opening of either control gate 12 or 14 by a bowling ball being ejected from its respective machine. A plurality of air escape ports 106 are also provided in cylinder 52 for the escape of air compressed within said cylinder when telescopic link T is shortened. The spring 60, by acting on control gates 12 and 14, helps to give the bowling ball which has been delivered to the common ball return runway a push down the runway. The momentum of the ball in striking either the gate 12 or 14 is partially absorbed by spring 60 and partially dissipated by deflecting the ball down the common runway.

The invention above described may be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible embodiments of the same. The invention, therefore, is not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. Apparatus for use with adjoining bowling alleys having mechanical ball returns and a common ball return runway, said apparatus consisting of, pivotally mounted gate members adjoining said common ball return runway for releasing balls from mechanical ball returns successively onto said common ball return runway, gate connectors formed on each of said members at a point which moves to one side of a plane passing through the pivotal mounting of one of said members and the gate connector of the opposing member when the gate is opened and to the other side of said plane when said gate is closed, a stop for limiting the distance said gates can open, and a telescoping link connecting the fastening means mounted on each of said gates to maintain one gate closed whenever the other gate is opened.

2. Safety mechanism for use with adjoining bowling alleys having mechanical ball returns

6

connecting at right angles with a common ball return runway located between the adjoining alleys for returning bowling balls to the players, said mechanism having, a gate mounted at the delivery end of the mechanical ball return of each runway for stopping balls from being deposited by said ball returns on the common ball return runway, and linkage interconnecting said gates to maintain one of said gates closed whenever the other of said gates is open.

3. A safety mechanism for use with adjoining bowling alleys having mechanical ball returns and a common ball return runway between both alleys, said safety device having, a gate adjoining one bowling alley for stopping balls from being delivered to said common ball return runway, a second gate adjoining the other bowling alley for stopping balls from being delivered to said common ball return runway, resilient tension means for maintaining said gates in ball stopping position, and an elongated telescoping member connected at opposite ends to said gates to lock one of said gates in ball stopping position whenever the other of said gates has been opened to deliver a bowling ball to the common ball return runway.

4. Apparatus for delivering only one bowling ball at a time to a common ball return runway positioned between two adjoining bowling alleys, said apparatus comprising, a bowling ball elevator for each bowling alley, a transverse runway for each bowling alley to receive bowling balls from said elevator and deliver them at right angles to the common ball return runway, a ball stopping gate located at the end of each transverse runway where said transverse runways join said common ball return runway, and a device interconnecting said gates to effect a successive delivery of balls on to said common ball return runway.

5. In a bowling pin setting machine installation having a plurality of pin setting machines located side by side upon adjacent bowling alleys, a common ball return runway paralleling said alleys located between two machines, mechanism for delivering bowling balls out of said machines at right angles to said common ball return runway, and a ball stop device positioned at the juncture of said mechanism and said runway for releasing one ball at a time from said mechanism to effect a successive delivery of balls onto said common ball return runway.

6. Apparatus for delivering bowling balls successively from a plurality of adjacent bowling alleys to a common ball return runway located in between said alleys, said apparatus comprising, a bowling ball elevator associated with each bowling alley, a runway for each alley for receiving bowling balls from said elevators and delivering the same at right angles to said common ball return runway, gates associated with each of said alley runways for controlling the release of bowling balls onto said common runway, and mechanism interconnecting said gates to effect a successive delivery of balls on to said common ball return runway.

7. A safety device for use with adjoining bowling alleys having mechanical ball returns delivering bowling balls from the opposite directions at right angles to a common ball return runway located between both alleys, said device having gates pivotally mounted at the delivery end of each mechanical ball return, a spring tension mechanism for maintaining said gates in a normally closed position, and a lock interconnecting said gates to lock one of said gates whenever the

other of said gates has been opened by a bowling ball.

8. Safety mechanism for use with adjoining bowling alleys having mechanical ball returns delivering bowling balls from opposite directions at right angles to a common ball return runway located between both alleys for returning bowling balls to the players, said mechanism having a gate mounted on the mechanical ball return of each runway for stopping balls from being deposited by said ball returns on the common ball return runway, a tension device for maintaining said gates in normally closed position, and linkage interconnecting said gates for locking one of said gates in closed position whenever the other of said gates is open.

9. Apparatus for use with adjoining bowling alleys having a common ball return runway and automatic ball return mechanism for delivering bowling balls from either alley to said common ball return runway, said apparatus comprising, a bowling ball stop associated with each automatic ball return mechanism, and a telescoping link interconnecting said bowling ball stops for maintaining one of said stops in closed position whenever a bowling ball is being delivered past the other stop to the common ball return runway.

10. Apparatus for delivering bowling balls successively from a plurality of adjacent bowling alleys to a common ball return runway located between said alleys, said apparatus comprising, a device mounted on each alley for delivering balls from each of said alleys at right angles to said common ball return runway, and bowling ball gate stops positioned at the discharge end of said devices, and interconnections between said gates to maintain one of said gates closed whenever the other of said gates is open.

11. Apparatus for delivering bowling balls successively from adjoining bowling alleys to a common ball return runway located between said alleys, said apparatus comprising, transverse bowling ball runways connecting each of said alleys at right angles to said common ball return runway, bowling ball stops located at the point of joinder between each of said transverse runways and said common ball return runway, and means for maintaining one of said bowling ball stops closed whenever the other of said bowling ball stops is open to thereby effect the delivery of one ball at a time from said transverse runways onto said common ball return runway.

12. Apparatus for use with adjoining bowling alleys for delivering one ball at a time from said alleys to a common ball return runway located between and lengthwise of said alleys, comprising transverse bowling ball runways running from each of said alleys at right angles to said common ball return runway, a bowling ball stop device mounted on each of said transverse runways, and mechanism interconnecting said ball stops to maintain one ball stop closed whenever the other ball stop is open to thereby prevent two balls from being delivered to the common ball return runway at the same time.

13. Apparatus for use with adjoining bowling alleys having a common center ball return, transverse ball returns located over each alley for delivering bowling balls from opposite directions at right angles to said center ball return, a belt positioned above each of said transverse ball returns for moving balls toward said common center ball return, a bowling ball stop device positioned at the juncture of the transverse ball returns and the common center ball returns, and

means for locking one of said stops in closed position whenever the other of said stops is open to prevent two balls from being delivered onto said common ball return runway simultaneously.

14. Apparatus for preventing a plurality of bowling balls from being delivered simultaneously from a plurality of adjacent bowling alleys on to a common ball return runway located between said alleys, said apparatus comprising, bowling ball runways running from each of said alleys and connecting at right angles with said common ball return runway, a belt positioned above each of said runways for moving balls on said runways toward said common return runway, and a stop gate mounted at the ball discharge end of each of said ball return runways, means interconnecting said stop gates to lock one gate whenever the other gate is open to prevent a plurality of bowling balls from adjacent bowling alleys being delivered to the common ball return simultaneously.

15. Apparatus for delivering bowling balls successively from a plurality of adjacent bowling alleys to a common ball return runway located between said alleys, ball return runways associated with each of said adjacent bowling alleys for delivering bowling balls from each of said adjacent bowling alleys at right angles to said common ball return runway, a bowling ball stop positioned at the delivery end of each of said return runways for stopping bowling balls from being delivered to said common ball return runway, and mechanism for maintaining one of said stops in operative position whenever the other of said stops has been opened to allow a bowling ball to be delivered to said common ball return runway.

16. Apparatus for use with adjoining bowling alleys having automatic pin spotting and ball return mechanism associated with each bowling alley and a common ball return runway running in between and parallel to said adjoining alleys, said apparatus comprising, a transverse ball return runway associated with each pin spotting machine for delivering bowling balls from each alley at right angles to said common ball return runway, a stop gate associated with each transverse ball return runway for controlling the delivery of bowling balls to the common ball return runway, means for maintaining each of said stop gates in a normally yieldable closed position, and mechanism for locking one of said stops in closed position to prevent bowling balls from being discharged onto said common ball return runway whenever the other of said stops is opened while a bowling ball is being delivered to said common ball return runway.

17. Apparatus for use with adjoining bowling alleys having a common ball return runway, said apparatus comprising, transverse bowling ball runways running from each of said bowling alleys to said common ball return runway, a pivoted bowling ball stop member positioned at that area of each of said transverse runways where bowling balls are delivered to said common ball return runway, a telescoping link pivotally connected at its ends to said stops for maintaining one of said stops closed whenever the other of said stops is open, said telescoping link having a cylinder and a plunger having a predetermined amount of inward movement, and a spring positioned between said cylinder and plunger for cushioning the shock when said cylinder and plunger are telescoped together by a ball engaging a stop being maintained in closed position.

18. Apparatus for use with adjoining bowling alleys employing automatic pin spotting and ball return mechanism for each bowling alley wherein a common ball return runway running parallel to said adjoining alleys is used for returning the bowling ball to the player automatically, said apparatus comprising; runways positioned transversely to said common ball return runway for delivering bowling balls from each of said alleys to said common ball return runway; conveyor mechanism associated with each transverse runway for propelling bowling balls along each transverse runway toward said common ball return runway; yieldable pivoted stopping members located at the delivery end of each transverse runway for preventing bowling pins and balls from falling onto the common ball return runway; means having a telescoping cylinder and plunger for maintaining one of said members in locked closed position whenever the other of said pivoted members has been opened by a bowling ball, and a cushion positioned between said cylinder and plunger to absorb the forces of impact resulting from a ball striking one of said gates while it is in locked closed position.

19. Apparatus for use with adjoining bowling alleys for delivering one ball at a time from said alleys to a common ball return runway located between and lengthwise of said alleys, said apparatus comprising, transverse bowling ball runways connecting each of said alleys at right angles to said common ball return runway for delivering bowling balls from each of said alleys to said common ball return runway; a swinging gate positioned at the delivery end of each of said transverse alleys, a device limiting the extent said gates can open to form, when opened, an angle of approximately 45° with respect to said common ball return runway to deflect a ball received from a transverse runway down the common ball return runway, spring tension means for normally maintaining said gates in yieldably closed position, and means for locking one of said gates in closed position whenever the other of said gates is pushed open to a 45° angle by a bowling ball.

20. Apparatus for use with adjoining bowling alleys for delivering one ball at a time from said alleys to a common ball return runway located between and lengthwise of said alleys, said apparatus comprising, transverse bowling ball run-

ways connecting each of said alleys to said common ball return runway for delivering bowling balls from each of said alleys from opposite directions at right angles to said common ball return runway, a yieldable gate positioned at the delivery end of each of said transverse alleys, means for transferring the force exerted by a bowling ball on one gate to the other gate in such a manner as to cause the gate having the lesser force exerted thereon to be pushed closed, and a lock actuated by the opening of one gate for maintaining the other gate closed.

21. Apparatus for use with adjoining bowling alleys for preventing two or more balls from said alleys from being delivered simultaneously to a common ball return runway located between and lengthwise of said alleys, said apparatus comprising, transverse bowling ball runways connecting each of said alleys at right angles to said common ball return runway for delivering bowling balls from each of said alleys to said common ball return runway, a swinging gate positioned at the delivery end of each of said transverse runways for delivering one ball at a time to said common ball return runway, a spring acting on the gates to maintain said gates in normally closed position and to yield under the impact of a bowling ball, and a stop limiting the extent said gates swing open to cause said gates to form an angle with said common ball return runway sufficient to deflect a ball discharged from said transverse bowling ball runways down the common ball return runway.

ERNEST ERWIN POHL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
456,375	Bruns	July 21, 1891
695,624	Reisky	Mar. 18, 1902
709,163	Lahr	Sept. 16, 1902
1,068,131	Holland et al.	July 22, 1913
2,130,330	Sibley	Sept. 13, 1938
2,207,643	Strong	July 9, 1940
2,265,719	Cargill	Dec. 9, 1941
2,349,968	Kampfer	May 30, 1944
2,389,643	Schmidt	Nov. 27, 1945