

Sept. 14, 1954

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BOWLING BALL AND PIN SEPARATOR

Filed Dec. 7, 1950

2 Sheets-Sheet 1

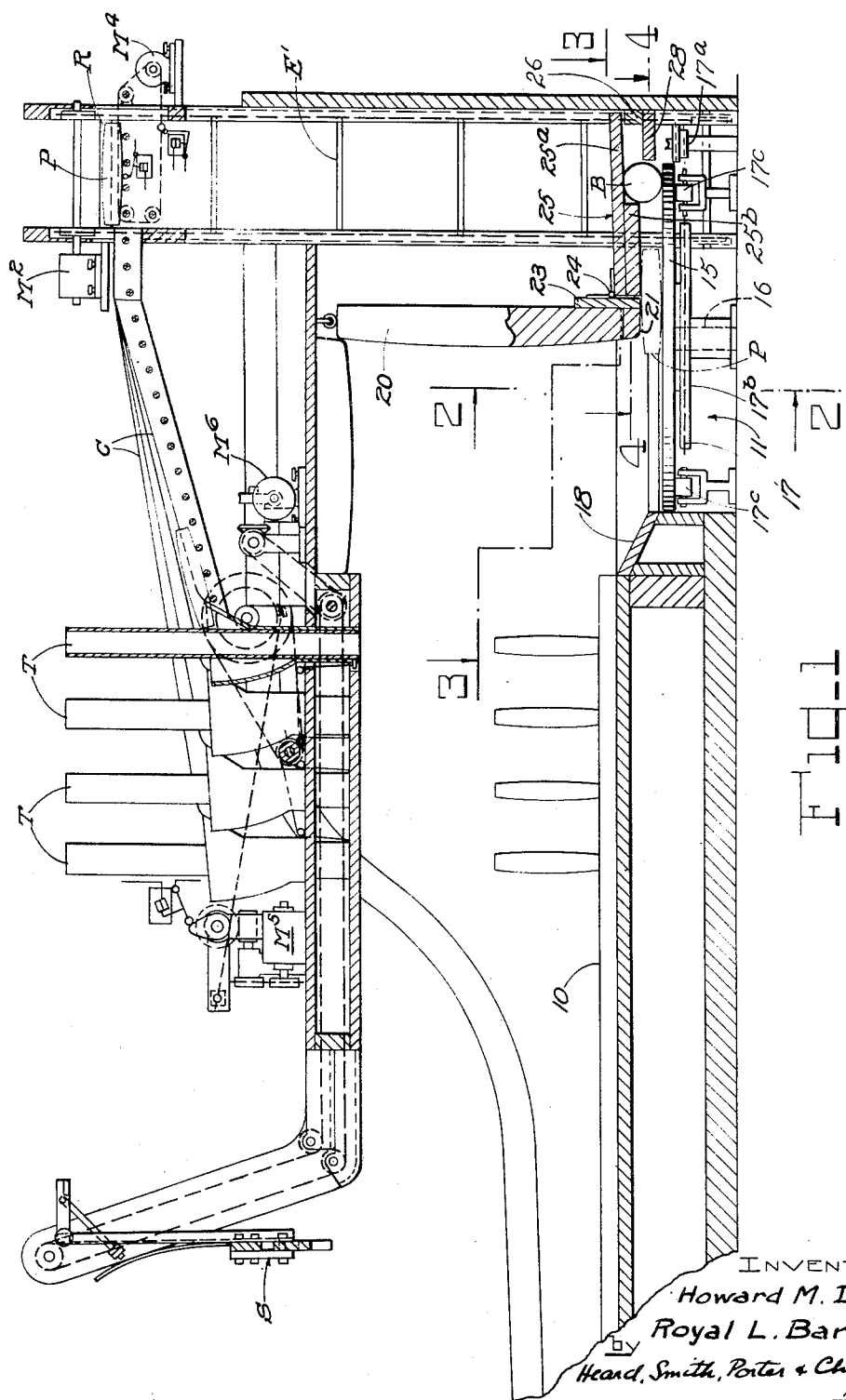


FIG. 1

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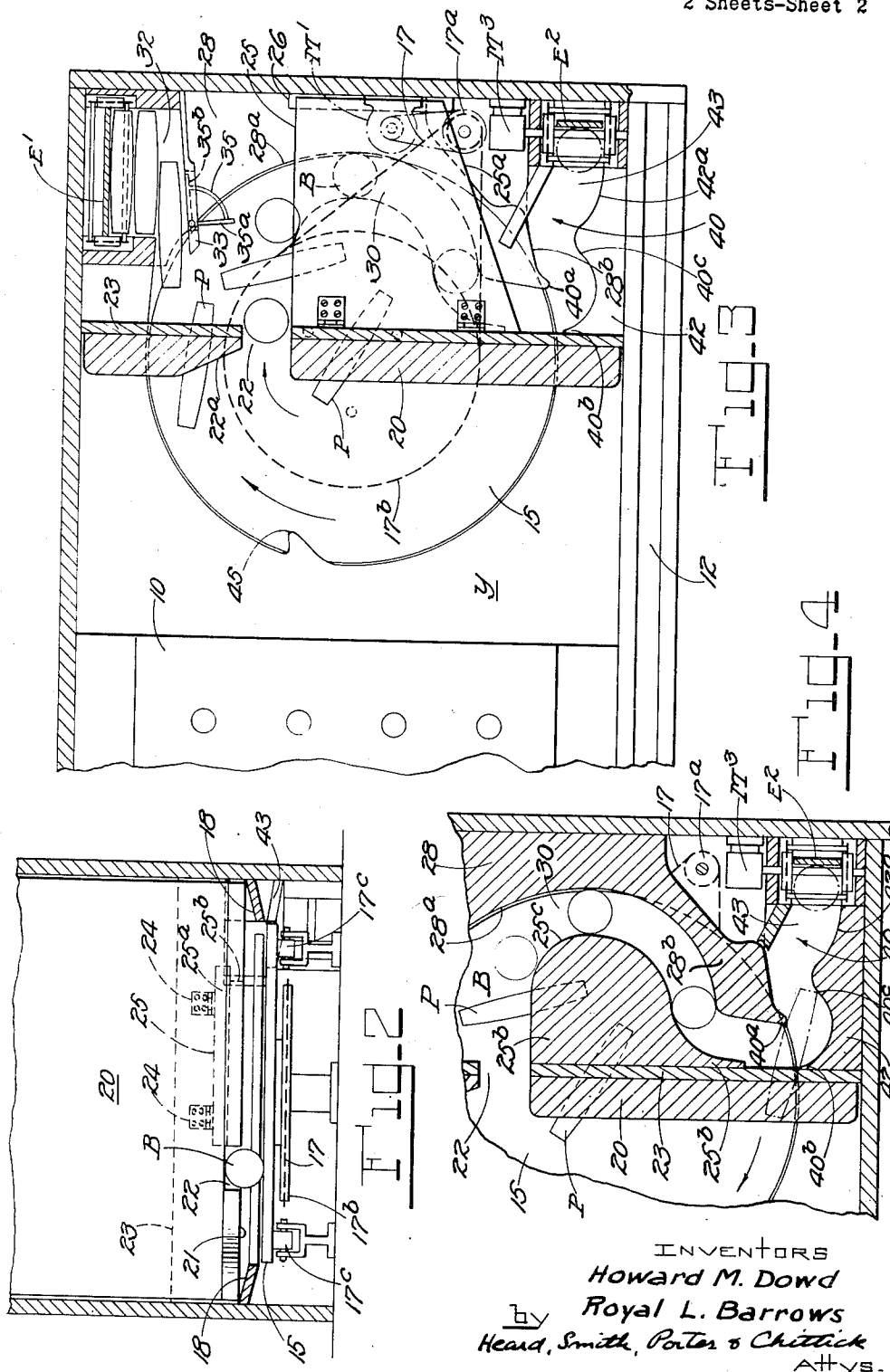
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2,689,128

BOWLING BALL AND PIN SEPARATOR

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Application December 7, 1950, Serial No. 199,678

4 Claims. (Cl. 273—43)

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This invention relates to ball and pin separators for use in bowling pin setting machines.

Bowling pin setting machines are now in use which, as controlled by the bowler, automatically sweep the alley clear of balls and pins after one to three balls have been bowled, as necessary, separate the balls from the pins, return the balls to the bowler, convey the pins to a pin collector or reservoir, and then station a new set of pins in position on the alley. Our invention is designed for use with any automatic bowling pin setting machine for separating and distributing the balls and pins to their respective conveyors, and has for its object the faster and surer separation of balls and pins, and the guiding of each to its proper conveyor for further distribution. Means is provided for preventing either balls or pins from getting into and clogging the other's exit. Our device further prevents traffic jams between the balls and pins on the rotary turntable by keeping the balls in their own traffic lane, and thus prevents a pin from getting between a ball and the ball exit, for instance. Our device further facilitates installation in a bowling alley, and its servicing and repair, because one uniform construction can be used in all alleys. By separating the pins and balls for further distribution on opposite sides of the alley, separate pin conveyors and ball conveyors can be used, which simplifies their construction, installation, servicing and repair.

Briefly our invention comprises a rotating turntable, mounted in the pit at the end of the alley, a top wall or "trap-door" mounted over the turntable, preferably over the rear half thereof, the top wall being spaced from the turntable sufficiently to allow the pins to pass beneath it while lying flat, but not the balls, and having a channel provided therein to receive and guide the balls, and separate exits for the pins and the balls from the turntable. Preferably the top wall is hinged transversely to allow it to rest on the balls and thus provide positive means for rolling the balls speedily to the ball exit, without lost motion. The pin exit and ball exit are both sized and shaped, respectively to prevent balls from getting into the pin exit, and pins into the ball exit.

In the drawings we have shown our invention as adapted for use with candle pins, but it will be understood that the invention is readily adaptable for use with duck pins if so desired.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of con-

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struction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways.

Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art. Other objects and advantages of our invention will appear in the following description and accompanying drawings, in which:

Fig. 1 is a vertical section of a bowling pin setting machine embodying the invention and shown applied to a bowling alley;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1, and

Figs. 3 and 4 are horizontal sections taken on lines 3—3 and 4—4 respectively, of Fig. 1.

Referring to the drawings, Fig. 1 shows the general arrangement of a suitable bowling pin setting machine with which our present invention is adapted to be used. Such a machine is described in detail in another application for Letters Patent Serial No. 87,646, filed April 15, 1949 (now abandoned) and need only be described generally herein. Briefly, the bowling pin setting machine is used in conjunction with a standard bowling alley, the floor of which is represented at 10 and the pit at the rear of the bowling alley is generally designated by 11, and the ball return trough by 12. The machine includes a turntable or distributor 15, which distributes the pins P to the pin elevator E1 and the balls B to the ball elevator E2 (from which the balls are delivered to the ball return trough 12). The machine further includes a pin reservoir or collector R, the pin chutes or conduits C leading therefrom to the vertical positioning tubes T through which the pins are positioned upon the alley 10. A sweeper generally designated at S is provided for sweeping the alley and gutters clear of pins or balls whenever the bowler desires a new set-up of pins. The respective operating parts are powered by individual motors generally designated by M1 to M6 inclusive.

The turntable 15 comprises a flat round table of any suitable material mounted for rotation in a horizontal plane on the vertical shaft 16. Motor M1 (Fig. 3) drives the turntable continuously by means of chain 17, and sprocket wheels 17a and 17b, the latter being mounted on shaft 16. Idler rolls 17c assist in supporting turntable 15. The top of the turntable 15 is preferably provided with a durable surface of fiberboard or

the like, suitably roughened to provide traction for the balls and pins rolling thereon. The floor 18 of the pit preferably inclines downwardly and provides a surrounding wall for the turntable 15. Vertically mounted on the frame of the pin setting machine (or on the walls of the alley), is a bumper 20, suitably padded, which extends transversely above the turntable 15 at approximately its center, as shown in Figs. 1 and 3. The bottom edge 21 of the bumper 20 lies above the floor of the turntable 15 a distance of about $3\frac{1}{4}$ inches, or less than the diameter of a bowling ball which is $4\frac{1}{2}$ inches. A pin P can thus pass under the lower edge 21 of the bumper 20 while lying on its side, but a ball can not. For the balls B a gate 22 is provided in the bottom wall 21 of the bumper 20 (as shown in Figs. 2, 3 and 4), preferably with an inclined side wall 22a leading to the gate 22. A cross piece 23 is rigidly fixed to the rear side of bumper 20 at the bottom thereof and on the portion thereof to the right of the gate 22 (looking from the front in Fig. 2), a top wall or "trap-door" 25, is hinged mounted by means of hinges 24 and overlies the rear half of turntable 15. Top wall 25 is composed of two parts, an upper part 25a and a lower part 25b. The upper part 25a of top wall 25 is trapezoidal in shape, and its rear edge normally rests upon cross piece 26 rigidly fixed at the rear of the machine. The lower part 25b fixedly attached to the underside of upper part 25a is substantially P-shaped and has an outer arcuate wall indicated at 25c and at its front straight edge abuts the lower side of cross piece 23 (Figs. 1, 3 and 4). A rear platform 28 having front side wall 28a is mounted around the rear side of turntable 15 and extends substantially two inches above the surface of turntable 15. The pins P thus may be carried around on turntable 15 until they reach the peripheral edge thereof and are directed into the pin exit 32. Balls B on the other hand, once in channel 30 are not able to pass beyond the cross piece 23 which forms the front side wall of the ball channel 30 at the far end of said ball channel, and the balls leave the surface of the turntable 15 and are directed into the ball exit 40. At its right side, however, (as seen from the front in Fig. 4), platform 28 carries an inwardly extending projection 28b having an arcuate shape parallel and complementary to the outer wall 25c of lower part 25b of the trapdoor 25. Side wall 25c of the under part 25b of top wall 25, and the front wall 28a of rear platform 28 thus form a ball channel 30 for the balls B around the outer rear edge of turntable 15.

It will thus be noted (Figs. 3 and 4) that a ball B carried on the forepart of rotating turntable 15 will be carried through the gate 22 provided in bumper 20 and cross piece 23 and thence rearwardly directly into ball channel 30 formed by the side walls 25c and 28a of lower part 25b of top wall 25 and of rear platform 28 respectively. At the same time pins P lying sidewise are carried under the bottom side of bumper 20 and cross piece 23 until they are rolled by centrifugal force to the peripheral edge of the turntable 15, where they remain until directed into the pin exit 32, described below. At the same time balls B are carried through the ball channel 30 and let out through a ball exit 40, described below. All pins will promptly pass under the bumper 20, cross piece 23 and trapdoor 25 and will be carried around on the turntable several times until directed by centrifugal force toward the outer edge

of the turntable 15 and into the pin exit 32. The balls B however, cannot pass under the bumper 20 and cross piece 23 except through the gate 22, where the clockwise rotation of the turntable 15 immediately carries them into the ball channel 30. There the hinged construction of the trapdoor 25 provides an upper surface or ceiling on the underside of top wall 25a which rests on the balls and rolls them directly through the ball channel 30 and out the ball exit 40, and thus prevents the balls from merely spinning on the turntable 15 and under the trapdoor 25.

Arranged at the left side of rear platform 28 (as seen from the front of Fig. 3) is a pin exit 32 which includes a rigid arm 33 which extends inwardly of and over turntable 15 a short distance; sufficient to intercept any pins which may be carried on the outer edge of turntable 15 and direct them into the pin exit 32. It will be understood that the pins preferably roll down an inclined plane (not shown), there to be picked up and elevated by a suitable pin elevator generally indicated at E1 (powered by motor M2) (Figs. 1 and 3). As the pin elevator E1 forms no part of this invention it need not be described in detail. A kicker 35 is preferably provided on the arm 33, in the shape of a bell crank, one finger 35a of which extends inwardly and over the turntable 15 and the other arm 35b normally lies in the plane of the inner edge of the arm 33, and is pivotally mounted at the apex of the arms for horizontal movement. It will be understood that if a pin P becomes jammed in the pin exit 32, a subsequent pin on the turntable 15 may be caused to hit the inwardly extending arm 35a of the kicker 35, and thus dislodge the pin which may be jammed in the pin exit 32 (Fig. 3).

The ball exit 40 is formed at the rearward end of the ball channel 30, by the side walls 25c and 28a as previously mentioned. Projection 28b of rear platform 28 terminates in a straight surface leading sideways about the edge of turntable 15, to the right (as seen from the front in Fig. 3). Projection 28b ends in a point 40a, approximately over the edge of turntable 15. Ball exit 40 is substantially S-shaped and is formed by the extension of the sidewall 28a of rear platform 28 which after point 40a reversely bends and extends rearwardly to the rear edge of rear platform 28. The other side of ball exit 40 is formed by the complementary S-shaped side wall 42a of side platform 42. The ball channel 30 and ball exit 40 have a width slightly larger than the diameter of the balls B, and it will be seen that clockwise rotation of the turntable 15 carries the balls thereon through ball channel 30 and out through ball exit 40. Ball exit 40 is preferably made S-shaped to prevent pins from being carried out through the ball exit, and it will be noted as shown in Fig. 4, that a pin carried into the ball exit 40 by accident is prevented from passing through the ball exit by the projecting point 40a on one side of the ball exit and points 40b and 40c on the other side of the ball exit. At the same time more than half the pin remains on the turntable, as shown in Fig. 4, whereby it is immediately carried away from the ball exit 40. It will be understood that the balls B passing through ball exit 40 will pass down an inclined runway 43 to be picked up by a suitable ball elevator generally indicated at E2 and powered by motor M3.

As shown in Fig. 3 a projection 45 extends inwardly from platform 18 over the turntable 15 at the front thereof and serves to prevent more

than two pins P from becoming lined up in tandem relation at the pin exit 32. A third pin is thus prevented by deflector 45 from lining up similarly behind the other two pins, which might cause jamming of the pins in the pin exit 32, with such force that the kicker 35 could not operate.

In operation it will be understood that pins P and balls B from the alley will pass down onto the rotating turntable 15 in the pit 11 at the rear of the alley, as propelled by the bowler or carried through by the sweeper S.

The turntable as shown in the drawings, particularly Fig. 3, rotates in a clockwise direction. Such direction of rotation is used when the ball return alley 12 is arranged on the right side of the alley. In bowling alleys as usually constructed, however, the ball return alley is alternately at the right and left of adjoining alleys. When the ball return alley is at the left of the alley the positions of the ball exit 40 and pin exit 32 with respect to the turntable 15 are reversed, and the ball exit 40 and ball elevator E2 will be at the left side of the alley, and the pin exit 32 and pin elevator E1 will be at the right side of the alley. At the same time the direction of rotation of the turntable 15 in that event will be counter-clockwise, and the gate 22 will be arranged above the right hand portion of the turntable 15, in reverse relation to that shown in Fig. 3.

It will thus be seen that we have provided a simple and efficient ball and pin separator which readily separates the pins and balls and directs them to their separate exits, there to be carried to their proper distributing points in the pin-setting machine.

We claim:

1. A bowling ball and pin separator comprising a rotary turntable to receive spent balls and pins, a rigid cross member spanning said rotary table and spaced thereabove a distance sufficient to allow pins carried on said rotary table to pass beneath said cross member while lying flat, but not sufficient to allow balls to pass beneath it, a door provided in said rigid cross member to receive the balls, a top wall member hingedly

mounted on said cross member, a side wall in said top wall member behind the door in said cross member forming a channel with a fixed side wall member to receive and guide balls around said rotating turntable to the ball exit, said top wall member resting on the balls passing through said ball channel, and separate fixed ball and pin exits provided at the edge of said rotary table.

2. A bowling ball and pin separator comprising a rotary turntable to receive spent balls and pins, a rigid cross member spanning said rotary table and spaced therefrom a distance sufficient to allow pins carried on said rotary table to pass beneath said cross member while lying flat, but not sufficient to allow balls to pass beneath it, a door provided in said rigid cross member to receive the balls, a top wall member hingedly mounted on said cross member, a side wall in said top wall member behind the door in said cross member forming a channel with a fixed side wall member to receive and guide balls around said rotating turntable to the ball exit, said top wall member resting on the balls passing through said ball channel, a wall extending around said rotary table above the plane thereof and separate fixed ball and pin exits provided in said wall around said rotary table.

3. A bowling ball and pin separator according to claim 2 having a pin deflector mounted on the front portion of the wall extending around the rotary table, and extending inwardly over the peripheral edge of said rotary table.

4. A bowling ball and pin separator according to claim 1, in which the ball channel receiving and guiding balls around said rotating turntable to the ball exit has projections arranged at its exit and defining a reversely bent passage too sharply bent for the passage of pins therethrough.

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