No. 664,016. Patented Dec. 18, 1900.

R. F. DOWNEY.

TENPIN ALLEY.

(Application filed Feb. 9, 1900.)

(No Model.) 3 Sheets—Sheet 1.

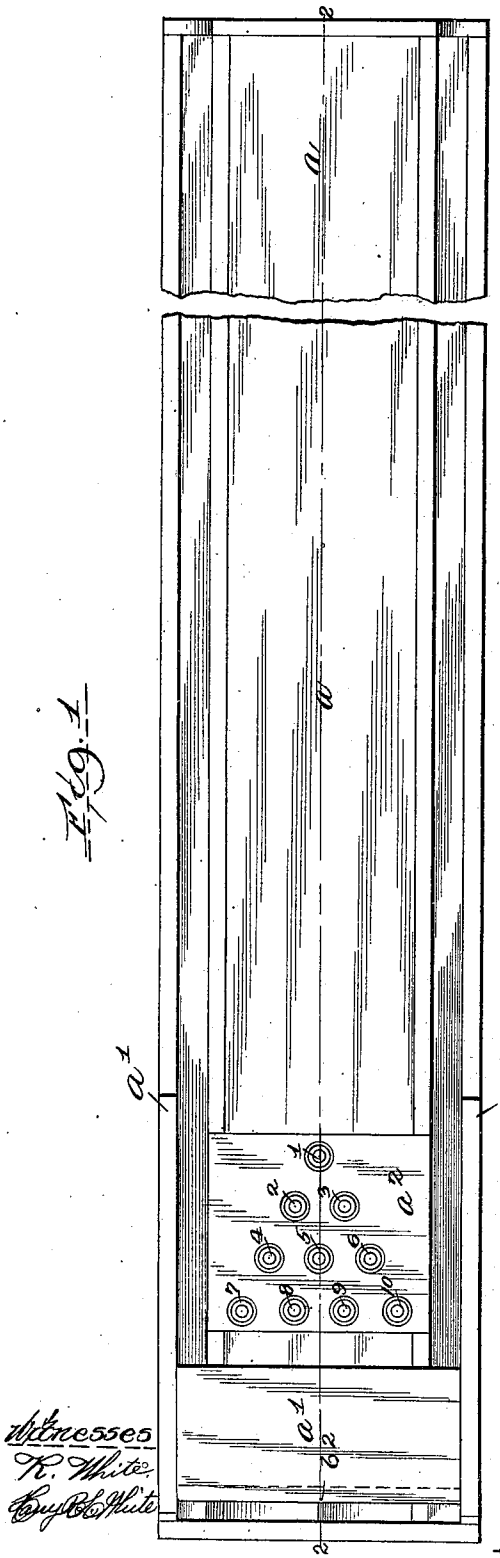


Fig. 1.

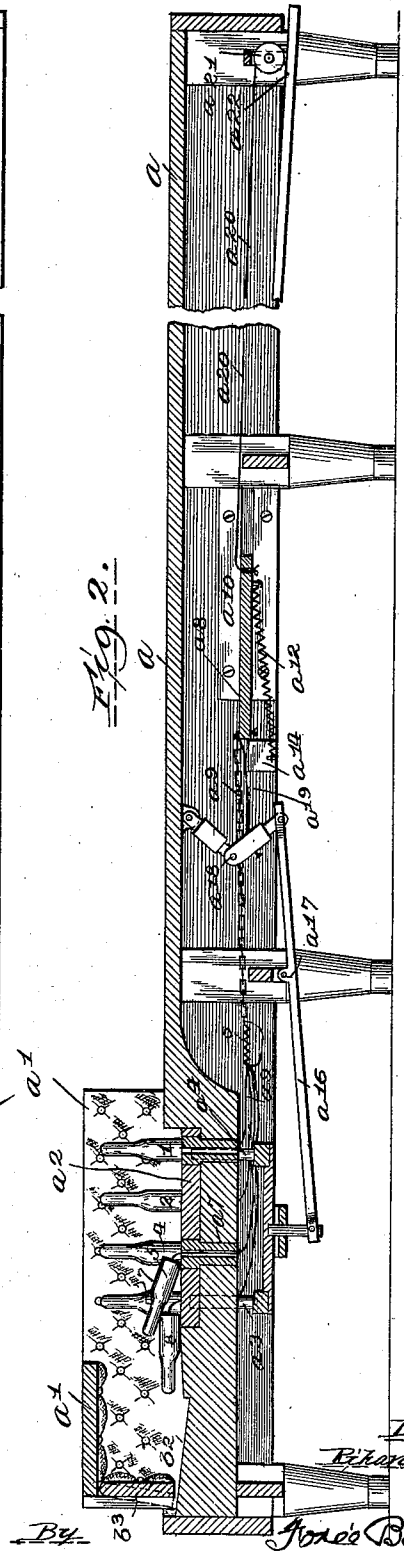


Fig. 2.

Witnesses
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Kenyon B. White

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

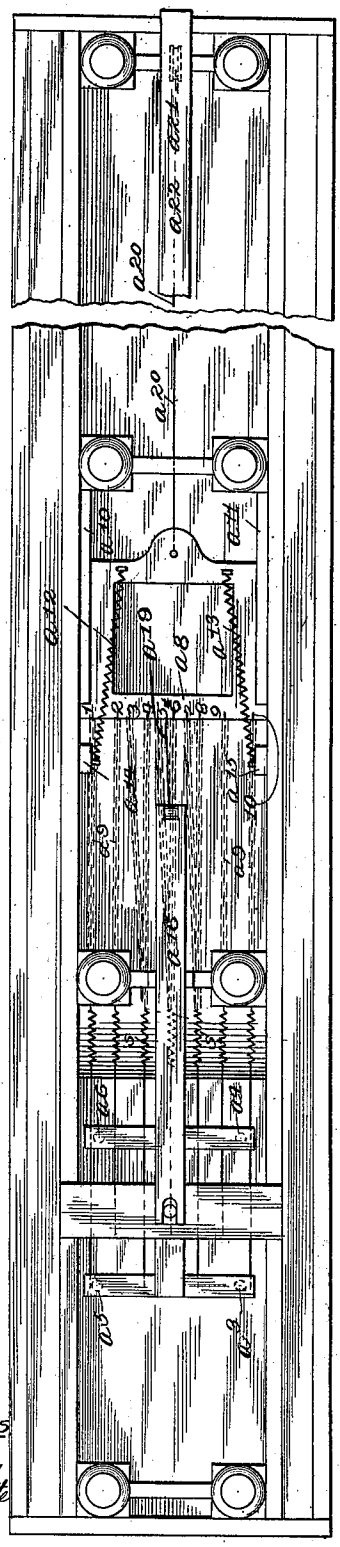
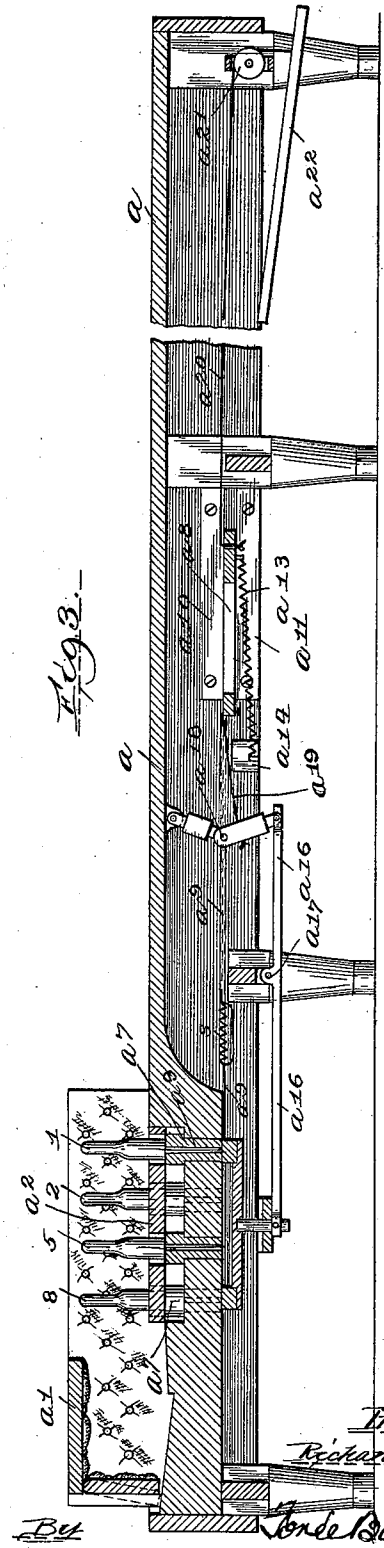


Fig. 3.



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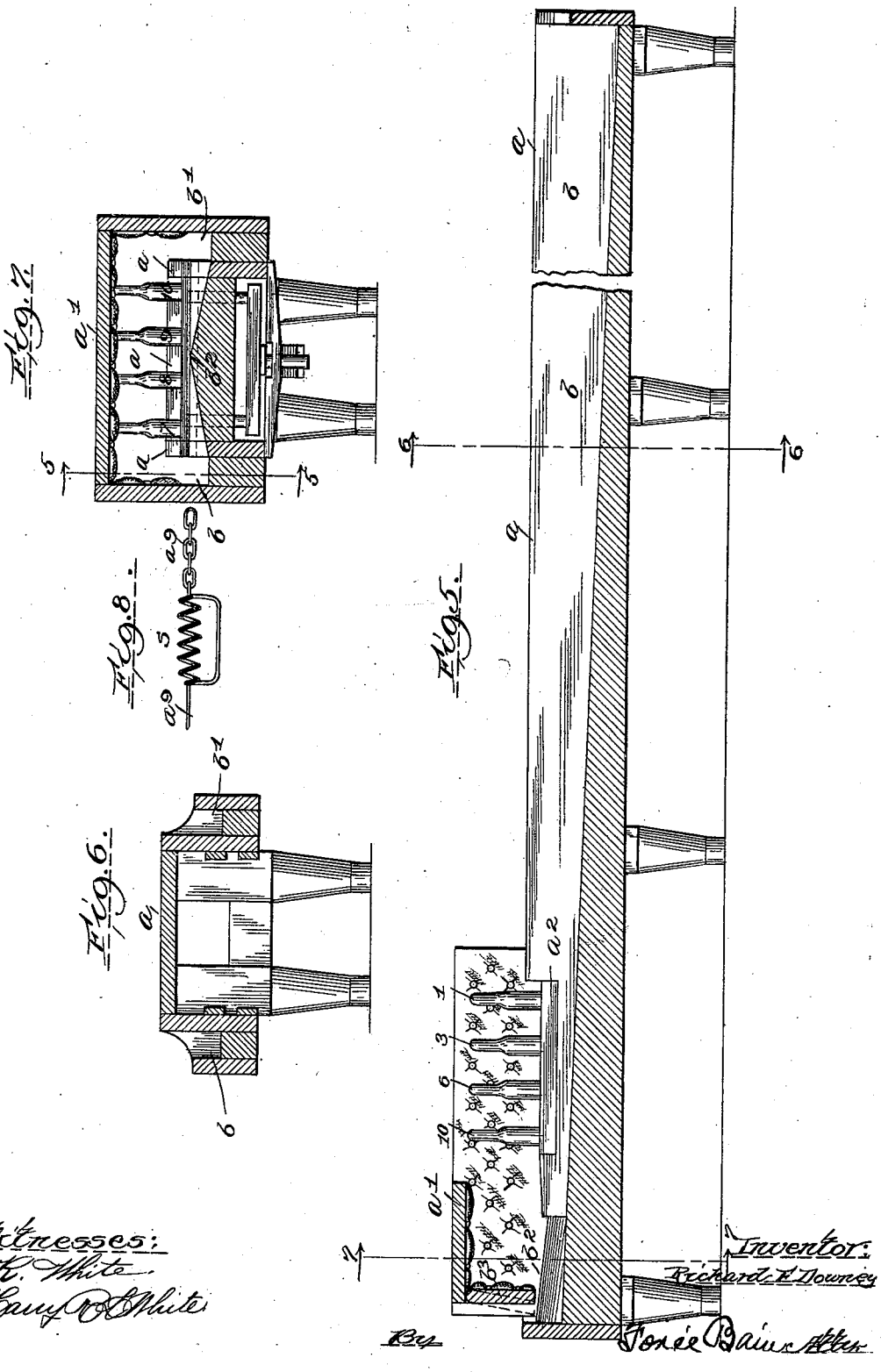
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(Application filed Feb. 9, 1900.)

(No Model.) 3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

RICHARD F. DOWNEY, OF MENOMINEE, MICHIGAN, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE AUTOMATIC BOWLING ALLEY COMPANY, OF MICHIGAN.

TENPIN-ALLEY.

SPECIFICATION forming part of Letters Patent No. 664,016, dated December 18, 1900.

Application filed February 9, 1900. Serial No. 4,604. (No model.)

To all whom it may concern:

Be it known that I, RICHARD FRANCIS DOWNEY, residing at Menominee, county of Menominee, and State of Michigan, have invented certain new and useful Improvements in Tenpin-Alleys; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable persons skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in tenpin-alleys. It has especial reference to a means for automatically restoring the pins to an upright position and for returning the balls automatically to the bowler.

The object of my invention is to provide a means whereby the pins that may from time to time be knocked down by the balls, as in the usual process of playing the game, may be restored to their normal position of rectitude by the application of suitable mechanism that may be applied by the bowler at a point not far removed from the location he occupies while bowling and whereby the balls will return automatically to the bowler after they have been projected toward the pins. The latter function, a result of my improved alley, is necessary to render the former-described portion thereof valuable to the greatest extent.

By the use of my improvements it is not necessary to employ an extra attendant to set up the pins and to return the balls, as with the ordinary alleys.

I have shown my improvements applied to a portable alley; but it is evident that it can just as easily be attached to or made a part of a permanent alley.

In the drawings, Figure 1 is a plan view of my improved alley. Fig. 2 is a longitudinal section of the same, taken on line 2 2 of Fig. 1, showing several of the pins down and the mechanism in position to raise the pins. Fig. 3 is a longitudinal section taken on line 2 2 of Fig. 1, showing all of the pins in an upright position and the mechanism in the act of raising the pins. Fig. 4 is a view from below, showing the mechanism in the same position. Fig. 5 is a longitudinal view taken on line 5 5 of Fig. 7, showing the incline of the return-chute for the balls. Fig. 6 is a cross-section taken on line 6 6 of Fig. 5. Fig. 7 is a cross-section taken on line 7 7 of Fig. 5. Fig. 8 is an enlarged detail view of the "take-up" spring shown in Figs. 2 and 3.

In all of the figures the same reference-letters are used to indicate similar parts.

In Fig. 1 the bowling-table a extends from one end to a point just beyond the sides of the canopy a', where it terminates. An apron a^2 is adapted to be moved on its guides a^3, a^4, a^5, and a^6 in a vertical direction to the top of the table a, as shown in Fig. 3. It will return to its normal position (shown in Fig. 2) when the controlling mechanism is released.

The pins are numbered from "1" to "10," inclusive.

Projecting through the body portion of the table and immediately under the apron a^2 are a series of ten thimbles a^7, which extend through the said apron, the upper ends of which are flush with the upper surface of the apron when it is in position. (Shown in Fig. 2.) The pins when in an upright position each stand upon one of these thimbles. The pins are attached at their respective bottoms to a cord, preferably of catgut. These strings are each threaded through one of the thimbles a^7 to the bottom of the table. Then each string is attached to a separate closed spiral tension-spring s. (Shown enlarged in Fig. 8.) The connection from this point is made to a sliding frame a^8 by a chain a^9. The frame a^8 may be easily reciprocated within its guides a^{10} a^{11}, attached to the under side of the table. The chains a^9 are attached to the frame a^8 at points "1" to "10," inclusive, which are numbered to correspond with the pins. Two spiral springs a^{12} and a^{13} are attached to the frame a^8 and to the frame of the table and serve as a means for holding the said frame normally against stops a^{14} a^{15}. A lever a^{16}, pivoted at a^{17}, is connected to a toggle-joint a^{18} at one end and to the apron a^2 at the other. When the toggle-joint is somewhat straightened, the apron is raised, as shown in Fig. 3. The center of the toggle-joint is connected to the frame a^8 by means of a chain a^{19}. (See Figs. 2 and 3.) A cord or chain a^{20} is connected to the frame a^8. It

passes over the pulley a^{21} and is connected to the hinged lever a^{22}. The tension-springs a^{12} a^{13} serve to hold this lever up in its normal position. (Shown in Fig. 2.)

In Fig. 2 the apron a^2 is shown in the position it occupies at the time when the ball is projected toward the pins. It will be noticed that the apron is slightly lower than the level of the table and that the bottoms of the pins rest upon thimbles that are on a level with the upper surface of the apron. By this arrangement the flight of the ball is continued amid the pins, so as to strike them fairly in their centers, whereby they are more easily capsized than when the point of concussion is near the base of the pins. Another object I have in placing the base upon which the pins rest in a plane lower than the table of the alley is to permit the balls to pass freely over such pins that may be down at the time when the ball is projected. Such pins when down, known as "dead-wood," would otherwise deflect the ball and render it almost impossible to capsize the rear pins after the front pins had been knocked down, as described. If the base was not lower than the table, and thus allow the balls to pass freely over the dead-wood, it would be a difficult, uncertain, and annoying feature of the game to attempt to upset the rear pins after the king-pin and other front pins had first been capsized.

In order to confine the balls to the frame upon which the table is erected, I prefer to surround the end near location of the pins with a canopy a', and for the purpose of preventing an abnormal noise by the balls striking the inside surface of the canopy I prefer to pad or upholster the inside, as shown. The end panel of this canopy b^3 I hinge from the top, so that the force of the ball is absorbed to some extent by virtue of the yielding nature of this panel.

Referring to Fig. 7, b and b' are the chutes through which the balls return by gravity to the bowler. b^2 is the apex of the chute, which is located in the middle of the table behind the pins, as shown in Fig. 5, where one of the side chutes b is also shown. The incline down which the ball rolls on its return will also be noted.

The use and operation of my device are as follows: The pins are all set up, as shown in Fig. 1, each resting upon its respective base-piece or thimble a^7. At this time the apron a^2 is down and all of the cords and chains a^9 between the pins and the sliding frame a^8 are slack, so that the pins will be unrestrained in their act of falling over. When a ball is projected along the table a, after passing through the pins it strikes the hinged pendent panel b^3, which being yielding in its nature a part of the force of the ball is absorbed thereby and the speed of its flight slackened. It then rolls on either side of the apex b^2 of the return-chute $b\,b'$ down the incline thereof to the point from which it was started. To raise the pins to a vertical position, all that is necessary to be done is to depress the hinged lever a^{22}, as by pressing the foot thereon. The effect of depressing the lever a^{22} is to draw the sliding frame a^8 back against the resilience of the springs a^{12} a^{13} by means of the cord or chain a^{20}, which passes over the pulley a^{21}. When the frame a^8 is drawn back from the position shown in Fig. 2, where it rests against the stops a^{14}, to the position shown in Fig. 3, the chains and cords a^9 are drawn up taut, which has the effect of straightening the toggle-joint a^{18}, thereby raising the lever a^{16}, and the apron a^2, by means of the guides a^3 a^4 a^5 a^6, the perforations in the apron passing up over the pins, as shown in Fig. 3. The cords connected to each pin being drawn taut cause the pins to assume an upright position. When the pressure is removed from the lever a^{22}, the frame a^8 is again drawn to its normal position by the springs a^{12} a^{13}. The apron a^2 again drops down, leaving the pins in an upright position, each standing upon its own respective base, and the cords connected to the respective pins again become slack, so that the pins stand free in a vertical position without any extraneous influences.

The spring s included within the chains or cords a^9, or at the junction thereof, are designed to compensate for any variation in the length or adjustment of the cords, so that the force applied to each pin through the agency of the cords is sufficient to raise the pins, although the force may be transmitted through the springs s.

I do not wish to be understood as confining my invention strictly to the mechanism and devices illustrated by the accompanying drawings, but reserve to myself the right to make such variations as may be found advantageous without departing from the gist of my invention and within the scope thereof.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a tenpin-alley, a series of pins, a table, a perforated base in a plane lower than the table upon which the said pins are adapted to stand, and cords passing through the said perforations, and attached to said pins, substantially as set forth.

2. In a tenpin-alley, a pin, a perforated base upon which the said pin is adapted to stand, a cord passing through said perforation attached to the bottom of said pin, and a guide surrounding said base and adapted to be moved vertically over said base, substantially as set forth.

3. In a tenpin-alley, a series of pins, a perforated base for each pin upon which each of the said pins is adapted to stand, a cord passing through said perforation, attached to the bottom of each pin, a guide surrounding separately the base for each pin, and a means for moving the said guide vertically over the lower ends of the said pins, substantially as set forth.

4. In a tenpin-alley, a pin, a perforated base upon which the said pin is adapted to stand, a cord passing through said perforation, attached to the bottom of said pin, a guide surrounding said base, a lever for raising said guide, and a frame or slide to which the said cord and the said lever are attached, substantially as set forth.

5. In a tenpin-alley, a series of pins, a base for supporting said pins, and a table located in a plane above said base, substantially as set forth.

6. In a tenpin-alley, a series of pins, a base for supporting said pins, a table located in a plane above said base, and a canopy partly surrounding said base, substantially as set forth.

7. In a tenpin-alley, a series of pins, a base for supporting said pins, a table located in a plane above said base, a ball-return chute on each side of said table, inclined toward the bowler's position on said table, and a canopy or guard, partly surrounding said pins, substantially as set forth.

8. In a tenpin-alley, a series of pins, a perforated base-piece a^7 for each pin, a guide a^2 adapted to surround each pin, a lever a^{16} for raising said guide, a slide-frame a^8, springs a^{12} and a^{13} attached to said slide, and cords or chains a^9 for connecting said pins to said slide, and a means for reciprocating said slide, substantially as set forth.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 25th day of January, 1900.

RICHARD F. DOWNEY.

Witnesses:
J. L. McCLEAR,
L. D. EASTMAN.