Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 1

Fig. 1

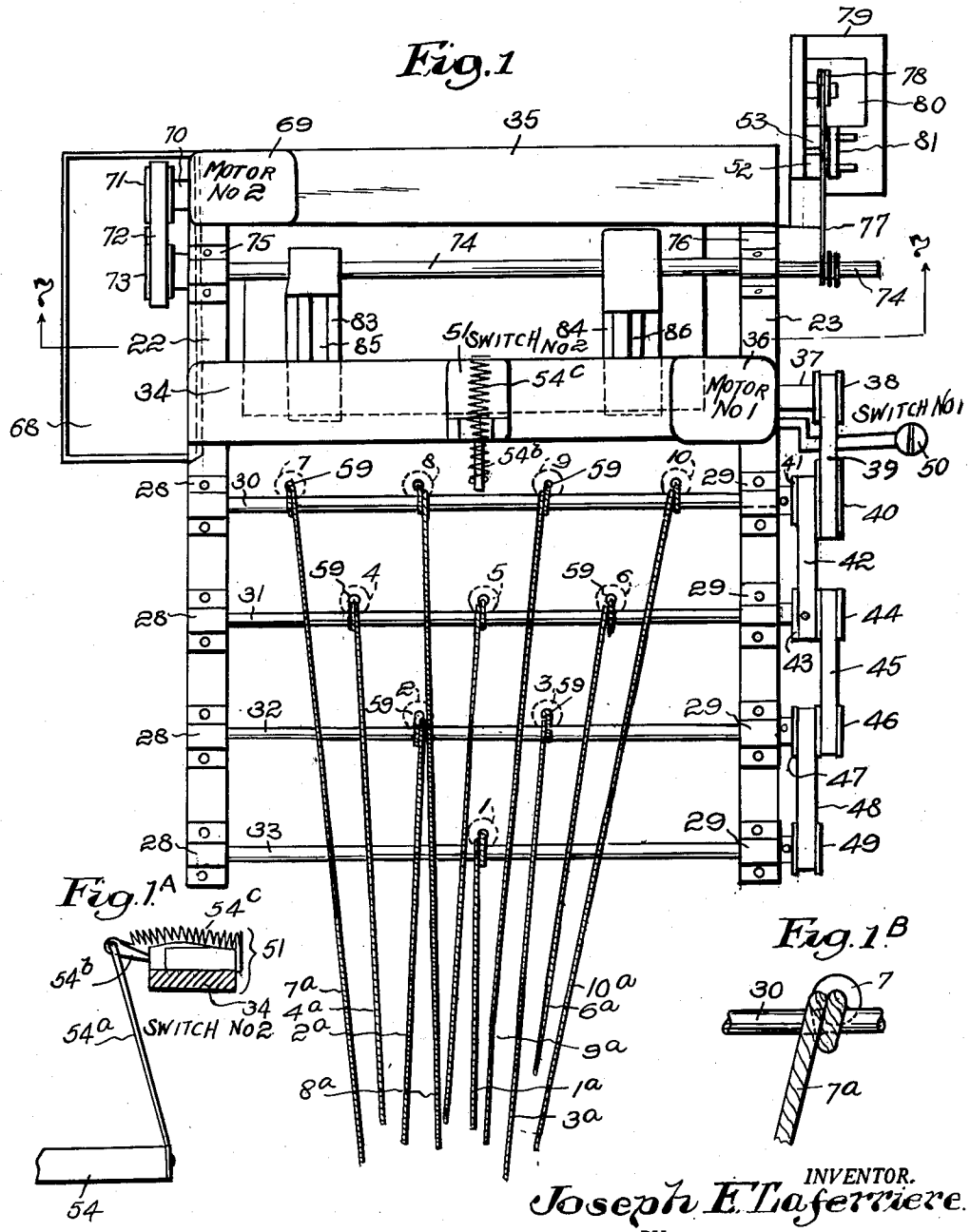


Fig. 1A

Fig. 1B

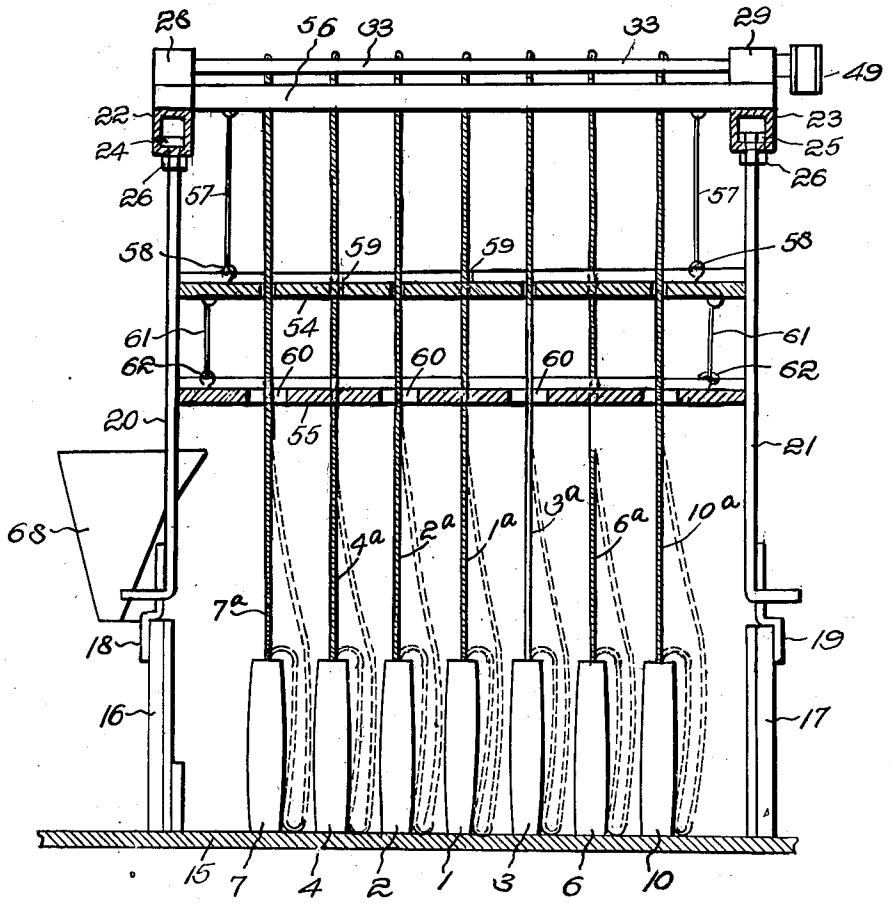
INVENTOR.
Joseph E. Laferriere.
BY
Emery, Booth, Townsend, Miller and Laughlin
Attys.

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 2

Fig. 2



INVENTOR.

Joseph E. Laferriere,

BY

Emery Booth, Townsend, Miller & Vaughan

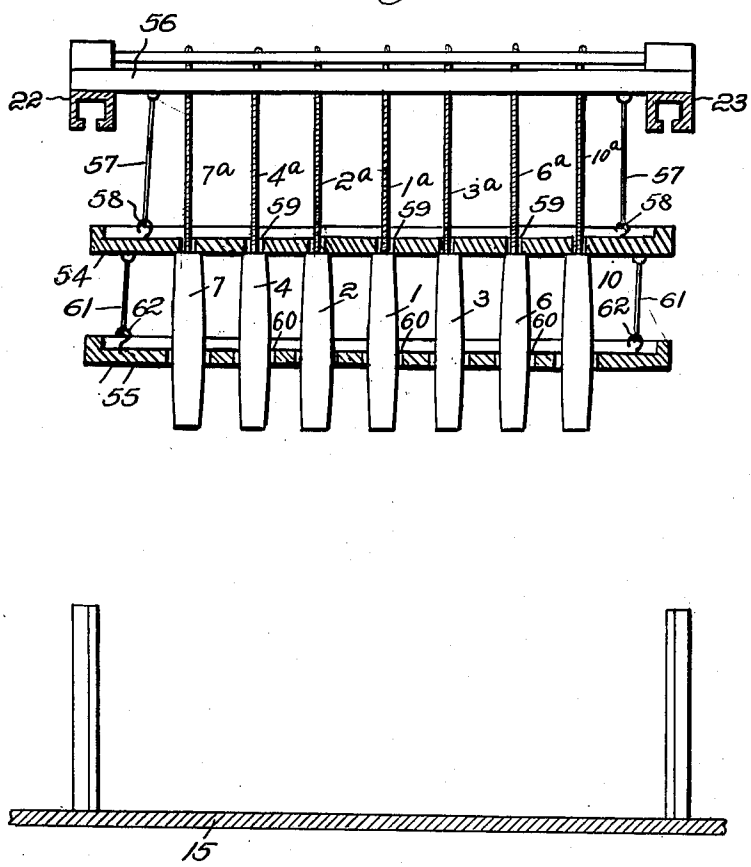
Attys.

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 3

Fig. 3



INVENTOR.
Joseph E. Laferriere
BY
Emery, Booth, Townsend, Miller and Huebner.
Attys

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 4

Fig. 4

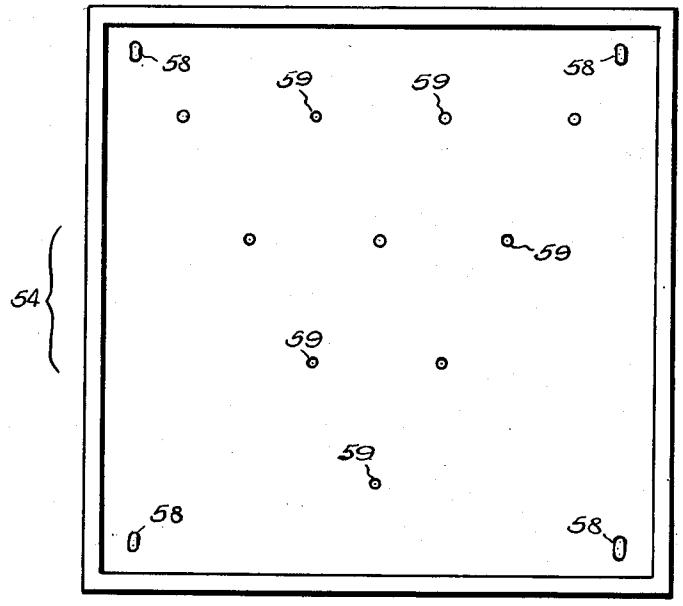
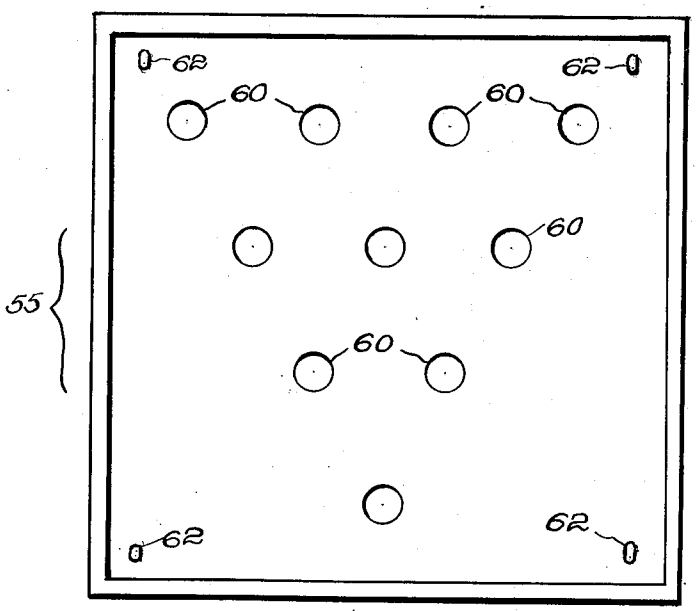


Fig. 5



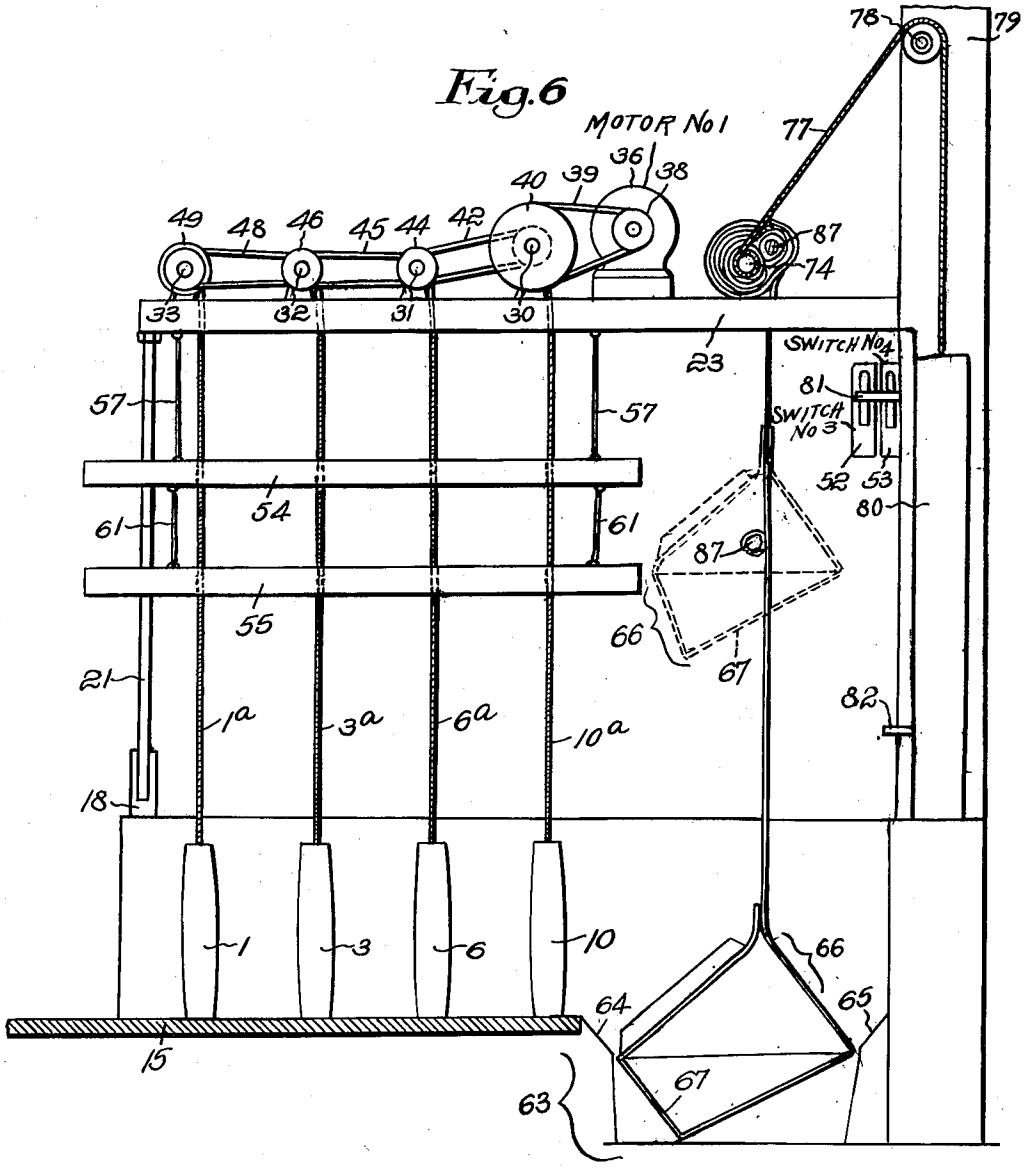
INVENTOR.
Joseph E Laferriere
BY
Emery, Booth, Townsend, Miller & Laughlin
Attys

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 5

Fig. 6



INVENTOR.

Joseph E. Laferriere,

BY

Emery, Booth, Townsend, Miller and Laughlin

Attys.

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 6

Fig. 7.

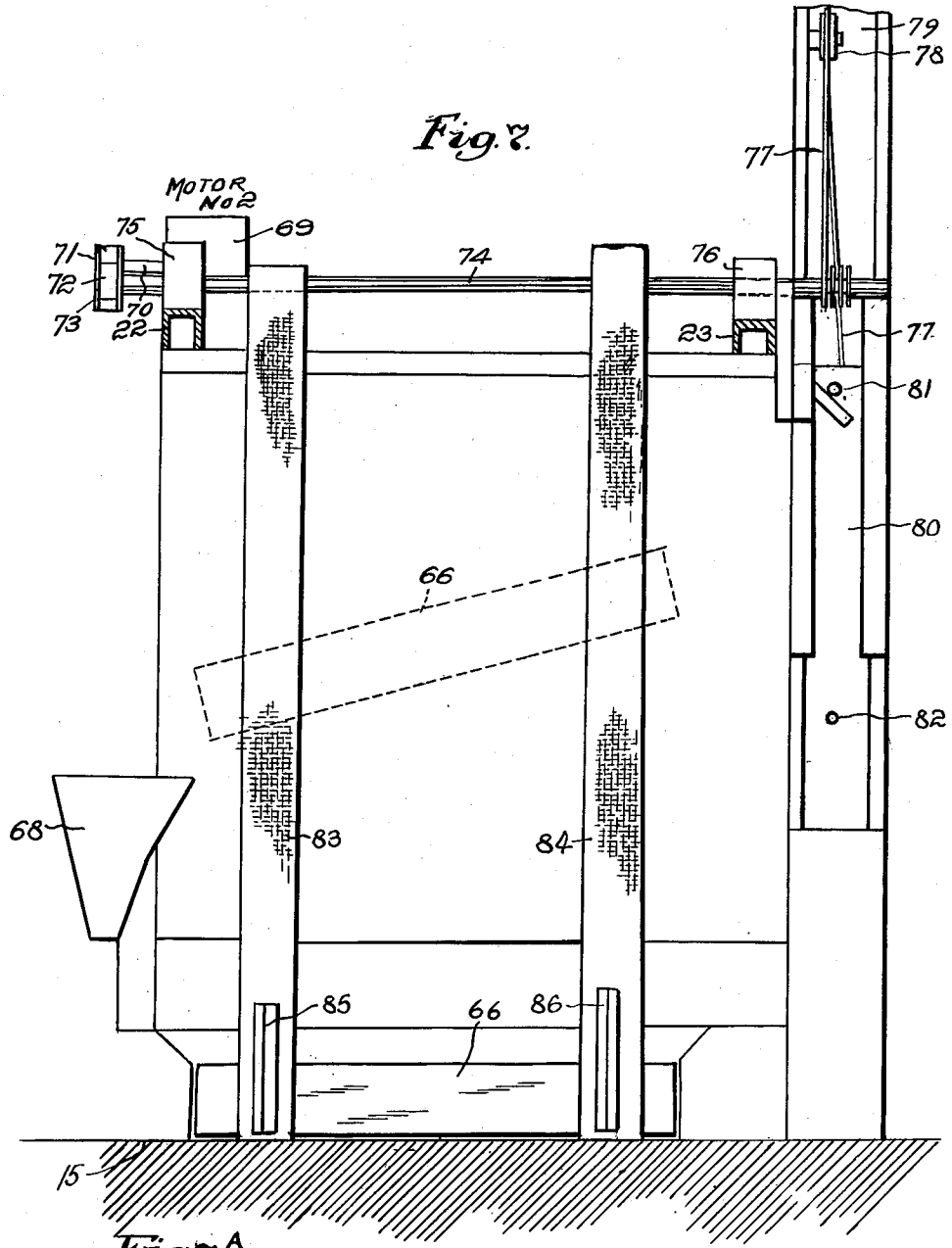
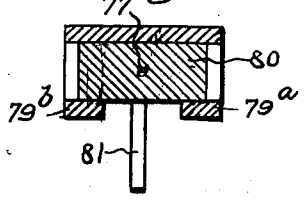


Fig. 7A



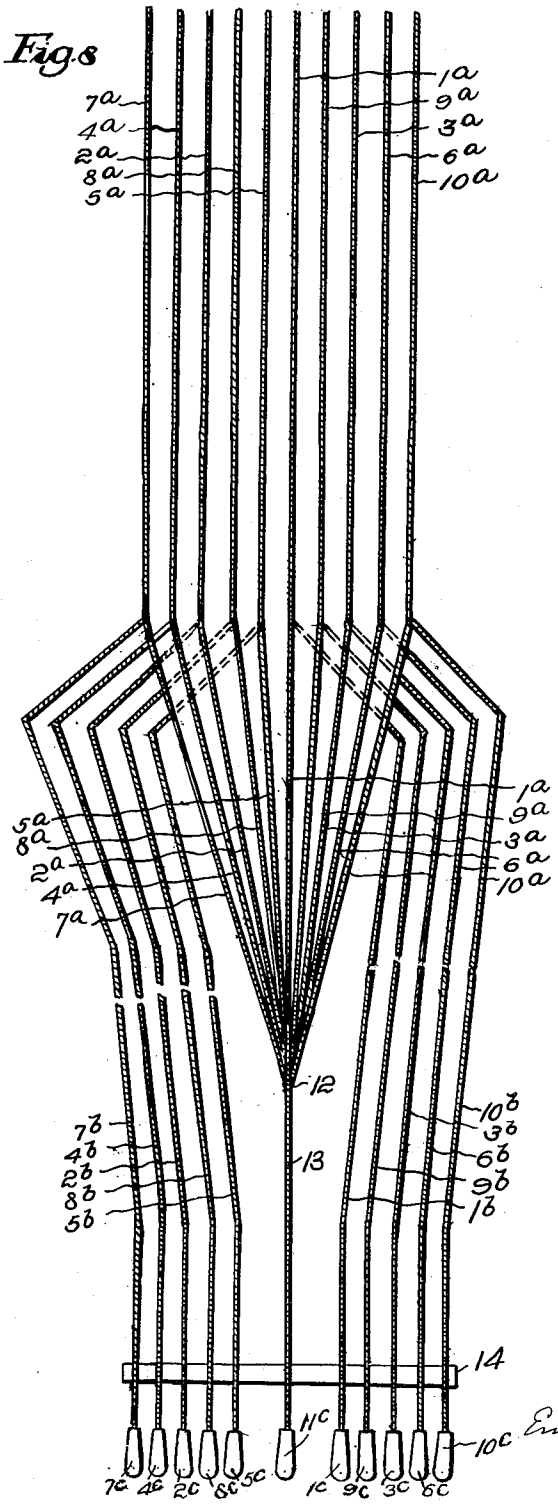
INVENTOR.
Joseph E Laferriere
BY
Emery, Booth, Townsend, Miller and Lundquist
Attys

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 7

Fig. 8



INVENTOR.
Joseph E. Laferriere
BY
Emery, Booth, Townsend, Miller and Laidman.
Attys.

Feb. 5, 1952 J. E. LAFERRIERE 2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Filed Feb. 5, 1949 8 Sheets-Sheet 8

Fig. 9.

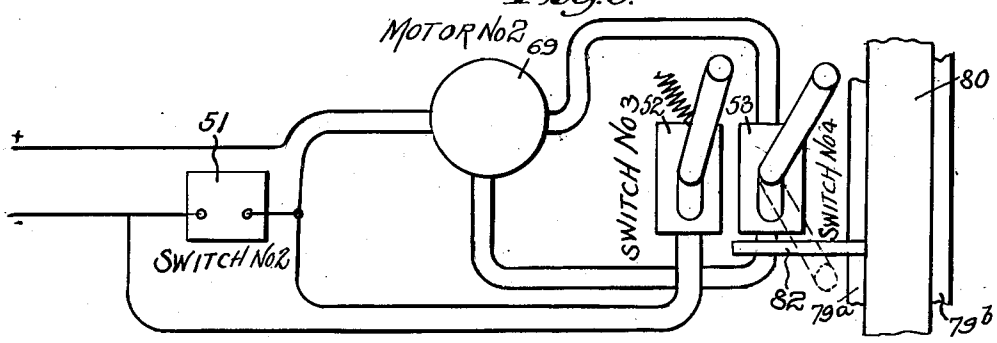


Fig. 10

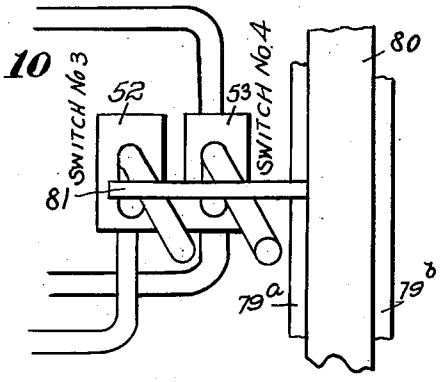
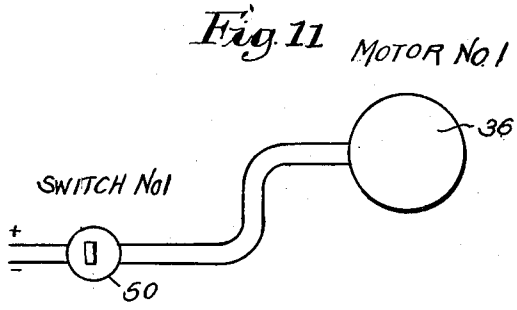


Fig. 11



INVENTOR.
Joseph E Laferriere.
BY
Emery, Booth, Townsend, Miller and Emery
Attys.

Patented Feb. 5, 1952 2,584,596

UNITED STATES PATENT OFFICE

2,584,596

SEMIAUTOMATIC PIN-SETTING-UP AND BALL-RETURNING APPARATUS FOR BOWLING ALLEYS

Joseph E. Laferriere, Boston, Mass.

Application February 5, 1949, Serial No. 74,782

24 Claims. (Cl. 273—44)

1

This invention relates to player-operated means for positioning pins of bowling alleys and for returning the balls to the player-end thereof, and is an improvement upon the constructions shown in my Patents No. 2,361,482, October 31, 1944, and No. 2,440,013, April 20, 1948.

In order that the principle of the invention may be readily understood, I have disclosed a single embodiment thereof, in the accompanying drawings, wherein—

Fig. 1 is a plan view of the rear portion of the apparatus constituting my invention;

Fig. 1A is a detail partly in section of switch #2 and its operating means;

Fig. 1B is a detail representing a cord from one of the playing pins wrapped about one of the four power-driven shafts that are horizontally supported at the upper part of the apparatus directly above the setting-up positions of the pins;

Fig. 2 is a vertical transverse section through the two guide plates, both of which plates are there shown in their lowermost positions;

Fig. 3 is a vertical section on a transverse irregular line and representing the playing pins as elevated into the openings in the lower guide plate and into contact with the upper guide plate;

Fig. 4 is a plan view of the upper guide plate;

Fig. 5 is a plan view of the lower guide plate;

Fig. 6 is a right-hand side elevation of a portion of the apparatus at the setting-up position of the playing pins, the floor of the bowling alley being shown in vertical section;

Fig. 7 is a rear elevation of the portion of the apparatus shown in Fig. 6, partly in section on the line 7—7 of Fig. 1;

Fig. 7A is a detail in transverse section through the vertically sliding member that operates certain switches;

Fig. 8 is a plan view of that portion of the apparatus that is forward of the structure shown in Fig. 1 and represents the continuation to the player-end of the apparatus of the ten cords shown in Fig. 1, which cords are respectively connected to the playing pins;

Fig. 9 is a diagrammatic representation of the electric motor for the receptacle-elevator and the three switches associated therewith, and showing a pin for operating one of said switches and about to reverse the current of the elevator-motor;

Fig. 10 is a diagrammatic representation of two of the switches associated with said motor for the receptacle-elevator and certain means for operating said switches, the power being shut

2

off by one of the switches and the direction of rotation of the elevator-motor being reversed by another of the said switches; and

Fig. 11 is a diagrammatic representation of the electric motor for applying power to shafts, about which pass the cords from the playing pins, and the switch for controlling said motor.

An important purpose of my invention is to provide not only mechanical means for setting up of the playing pins of bowling alleys after one or more or all of the playing pins have been knocked down, or all the balls have been played, but also to provide mechanical means for removing the "dead wood" from the floor or setting-up area immediately after the rolling of each ball, or at such other time or times as desired and also to provide means to return the balls to the player-end of the bowling alley.

The size and proportion of parts may be widely varied within the scope of my invention, the pins may be of any desired size, shape and number, and the size of the balls will be varied accordingly. My invention provides means for bowling according to the usual rules of play. In the selected embodiment of the invention, the pins are represented as so-called Boston pins, but they may be bottle pins or some other type or character of pin.

In the disclosed embodiment of the invention, the playing pins are represented as ten in number, and for clearness of description they are numbered 1 to 10 respectively, as indicated in dotted lines in Fig. 1, certain of the playing pins being shown in elevation in other figures. The arrangement of the playing pins, when set up, is in the present disclosure, the usual triangular arrangement indicated in Fig. 1, and is evident from the arrangement of the holes in the two guide plates to be referred to. The invention is, however, in no wise limited to any particular size or proportion of parts and any material or materials may be employed for the various parts, such as wood, metal, etc.

Referring more particularly to the drawings, where a single embodiment only of the invention is shown, and first referring briefly to Figs. 1 to 8, it will be noted that I have assigned the numerals 1*a* to 10*a* to the cords which lead respectively from the playing pins 1 to 10.

It will be understood that the ten cords 1*a* to 10*a* extend from the playing pins 1 to 10 vertically to and over or about four shafts, shown in Fig. 1, which will be presently referred to in detail. The said ten cords 1*a* to 10*a* then pass forwardly in a horizontal path, as shown

in Fig. 8 and indicated in part in Fig. 1, until they reach the player-end of the apparatus. The said cords are of suitable non-elastic material, and I may employ nylon for the purpose. Intermediate said four shafts and the player-end of the apparatus, the cords may pass over supporting rods if desired. At a suitable point, as indicated in Fig. 8, which is desirably near the player-end of the apparatus, there are respectively attached to the ten cords 1*a* to 10*a*, ten supplemental cords 1*b* to 10*b* which extend to the player-end of the apparatus and there desirably pass over ten pulleys supported in the upright framing of the apparatus which upright framing at that point may be similar to that shown at the player-end of the bowling alley in Figs. 10 and 11 of my said Patent No. 2,440,013. The said pulleys are not shown in Fig. 8 of this application, but there is indicated a transversely extending portion 14 of the framing of the apparatus over which the said cords 1*b* to 10*b* pass, and at which location pulleys may be provided as shown in Figs. 10 and 11 of my said Patent No. 2,440,013.

Each of the said ten supplemental cords 1*b* to 10*b* is provided with a corresponding handle 1*c* to 10*c*, shown in Fig. 8. It will be noted, viewing Fig. 8, that the ten cords 1*a* to 10*a* at a certain point, which is desirably about where the ten supplemental cords 1*b* to 10*b* are attached thereto, converge together and are united at a point 12, where there is attached to said combined cords a cord 13, which may be a continuation of the cord 1*a*, which cord 13 extends parallel with the supplemental cords 1*b* to 10*b*, at a central position with respect to them, and passes over a suitable pulley or over the indicated portion 14 of the framing and is provided with a handle, indicated at 11*c*. The said portion of the framing is shown at 14 in Fig. 8.

It will be understood, and more particularly referred to in the ensuing portion of the description, that any one of the cords 1*b* to 10*b* may be operated by being individually pulled upon by the handle pertaining to such individual cord 1*b* to 10*b*, or that all the ten cords 1*a* to 10*a* may be operated by being simultaneously pulled upon by grasping and pulling the handle 11*c* attached to the cord 13 leading from the point 12 where the ten cords 1*a* to 10*a* are united.

Referring now more particularly to Figs. 1, 2, 6 and 7, it is to be noted that the bowling alley itself may be of the usual proportions, such as the length of sixty feet from the rear of the pit to the front of the apparatus. The playing pit is modified or altered from the usual construction, because there are no pin boys. The floor of the bowling alley is indicated at 15 in Figs. 6 and 7, and the low sides of the bowling alley are indicated at 16, 17 in Fig. 2. Upon each of said low sides 16, 17 there are a suitable number of brackets or members 18, 19, two being represented in Fig. 2, respectively attached to said sides and extending slightly upward therefrom, and to the said brackets or members 18, 19 are connected a suitable number of metallic uprights or rods, two of which are indicated at 20, 21 in Fig. 2. Two or more of such upright rods may be provided at each side of the apparatus, and at their upper ends they extend into or are otherwise suitably connected to longitudinally extending metallic channel members 22, 23.

One of said channel members is indicated in Fig. 6. Upon each of the said two longitudinally extending channel members 22, 23, there are supported four shaft bearings. Upon one of said members there are four bearings 28 and upon the other member there are four bearings 29 in parallelism with the respective bearings 28, and in the respective pairs of said bearings 28, 29 there are supported four horizontally positioned shafts 30, 31, 32 and 33, which are, in the present embodiment of my invention, so located that the shaft 30 is directly above the four pins 7, 8, 9, 10; the shaft 31 is directly above the three pins 4, 5, 6; the shaft 32 is directly above the two pins 2, 3; and the shaft 33 is directly above the one pin 1. These four shafts are of relatively small diameter and are desirably smooth, as I have found such shafts to be well adapted for the purpose of my invention.

In the disclosed embodiment of the invention, these shafts are horizontally positioned and extend from one side of the apparatus to the other, but it is to be understood that I may in other embodiments of my invention arrange shafts upright but have the cords from the respective pins passed about them (as herein disclosed about the horizontally positioned shafts) or that in place of relatively long shafts, such as shown, there may be stub shafts each receiving one or more of the cords from the pins. In any case the shafts or members are power driven.

In Fig. 1 there is shown a horizontally, transversely extending member of the framing of the apparatus at 34 and another at 35. Upon the transversely extending member 34 is mounted at a suitable point a small electric motor 36 from which extends a shaft 37 having thereon a pulley 38 about which passes a driving belt 39 extending to a pulley 40 of suitable size and which is fast upon the first of the four shafts referred to, namely, the shaft 30. Fast upon said shaft 30 is a small pulley 41 about which passes a belt 42 that passes also about a pulley 43 fast on the shaft 31, which shaft 31 also has fast thereon a pulley 44 about which passes a belt 45 that extends about a pulley 46 fast on the shaft 32, which shaft 32 has also fast thereon a pulley 47 about which passes a belt 48 that also passes about a pulley 49 fast upon the shaft 33. The said four shafts 30 to 33 are all driven at the same speed.

The apparatus is provided with four electrical switches. Switch #1 is indicated diagrammatically at 50 in Fig. 1 and is shown also in Fig. 11. Switch #2 is indicated at 51 in Fig. 1 and is shown also in Figs. 1A and 9, and will be subsequently more particularly referred to. Switches #3 and #4 are indicated respectively in Fig. 6 at 52, 53, and are also shown in Figs. 9 and 10, and will be subsequently more specifically referred to. I will hereinafter refer to said switches only by their ordinals #1, #2, #3, #4.

The purpose of switch #1 is to turn on or turn off the motor 36 for driving the four shafts 30, 31, 32, 33. This switch #1 is turned on prior to the commencement of play, so that the motor 36 runs continuously until it is stopped by turning off the said switch #1. When the switch #1 is turned on, the motor 36 is driven and through the belts 39, 42, 45, 48 the said shafts 30, 31, 32, 33 are all driven by said motor at the same speed, which may be a low speed

or whatever speed is suitable for the purpose, namely, to provide power means for rotating constantly, so long as the play continues, the four shafts or cord-receiving rotatable members 30, 31, 32, 33.

In the disclosed embodiment of the invention, as already indicated, the four cords from the four pins 7, 8, 9, 10 are passed desirably at least once and if necessary more than once, or it may be only partially about the shaft 30. Desirably said cords pass about the shaft 30 to the extent indicated in Fig. 1b where one of the cords which may, for example, be the cord 7a, is passed once completely about the said shaft. In the same manner the cords from the playing pins 4, 5, 6 are passed about the shaft 31, the cords from the playing pins 2, 3 are passed similarly about the shaft 32, and the cord from the playing pin 1 is passed similarly about the shaft 33. As already stated, these cords 1a to 10a, after passing as described about the shafts 30, 31, 32, 33 extend horizontally, as shown in Fig. 8, over suitable supporting intermediate rods nearly to the player-end of the apparatus. That is to say, the supplemental cords 1b to 10b extend to the player-end of the apparatus and the cord 13, to which all the ten cords 1a to 10a are attached at the point 12, also extends to the player-end of the apparatus, where they may be received as indicated in Figs. 10 and 11 of my said Patent No. 2,440,013.

If the power means which has just been described were not provided, and it were necessary to elevate the playing pins solely by manual pull upon their respective cords, it will be evident that very considerable force would be necessary, inasmuch as the bowling alley may have the normal length of sixty feet. Inasmuch, however, as all ten cords pass loosely about the four power-driven shafts 30, 31, 32, 33, it will be understood that a very slight pull upon any one or all of the cords 1a to 10a will tighten such cord or cords about the said shaft or shafts 30 to 33 and that these power-driven shafts, the cord or cords having been thus tightened about them, will feed, transport or move said cord or cords lengthwise forward and thus elevate the corresponding pin or pins very quickly and merely as the result of the very slight manual force employed by the player in tightening the cord or cords about the shaft or shafts 30 to 33. As soon as the player relaxes his slight pull on any cord or cords, the corresponding shafts 30 to 33 cease to feed, transport or move said cord or cords, the friction between the cords and shafts having sufficiently lessened.

Thus, by applying merely enough pulling force to the handle 11c, and therefore to the cord 13 which is united at 12 to all ten cords 1a to 10a, all the ten pins from 1 to 10 are elevated quickly because all ten cords 1a to 10a have been tightened about the shafts 30 to 33. Or any one or more of the handles 1c to 10c may be grasped and slightly pulled upon and, through the corresponding supplemental cords 1b to 10b and the main cords 1a to 10a, any one or more of the ten pins may be individually quickly elevated.

Although I have referred to four shafts 30, 31, 32, 33, it is to be understood that with other arrangements or set-ups of the pins, the number of shafts 30 to 33 is or may be correspondingly varied, the number of shafts 30 to 33 depending entirely upon the arrangement or set-up of the pins and the number of pins.

The apparatus is provided above the setting-up position of the playing pins with two guide plates constituting a further improvement upon the construction shown in my said Patent No. 2,440,013. In the present construction the two guide plates are shown generally at 54 and 55 in Figs. 4 and 5, and also in Figs. 2, 3 and 6. They are both rectangular in form, and since, in accordance with the present embodiment of the invention, the ten pins are set up in the triangular arrangement which has been referred to, both of the said guide plates 54, 55 are provided with ten holes therethrough and arranged in accordance with the set-up of the pins. The upper guide plate 54 is hung or supported directly from cross members of the framing, one being indicated at 56 in Figs. 2 and 3, by means of a suitable number of cords or like flexible members 57, two being shown in Fig. 2. Four such members 57 are provided, being attached to the four hooks 58, shown in Fig. 4. The holes in the plate 54, herein ten in number, are all indicated by the numeral 59, and they are merely large enough to permit the ready passage therethrough of the cords from the ten pins 1 to 10.

The ten holes through the lower guide plate 55 are all indicated at 60, and they are large enough to permit the pins 1 to 10 to be elevated therethrough, or partially therethrough, until they come in contact with the lower face of the upper guide plate 54, as indicated in Fig. 3, and when they do so contact with the lower face of the upper guide plate 54, they elevate the same slightly until said upper guide plate permits the closing of switch #2 in any suitable manner (herein as shown in Fig. 1A) and hence the operation of motor #2, indicated at 69 in Figs. 1 and 9. Herein, for the purpose, as shown in Fig. 1A, the upper guide plate 54 is connected by a flexible cord 54a to the pivoted arm 54b of switch #2. A slight elevation of the said upper guide plate 54 slackens the cord 54a and instantly the coiled spring 54c closes said switch #2 and starts motor #2.

The said second guide plate 55 is flexibly supported from and beneath the upper guide plate 54 by a suitable number (herein four) of cords or other flexible members 61, two of which are indicated in Figs. 2 and 3 and hooks for which are indicated at 62 in Fig. 3 and also in Fig. 5, at the four corners of said lower guide plate 55.

The purpose of the lower guide plate 55 is to sort out, to straighten, and to steady the playing pins so that they are ready to drop through the said lower plate 55 onto the playing surface in the proper set-up position.

Referring next to Figs. 6 and 7, the pit, into which the pins are knocked and into which the balls roll, is located in the rear of the set-up position of the pins, as best generally indicated in Fig. 6 at 63. It is composed of four downwardly sloping, rectangularly arranged members which converge toward the center of the pit, two of them being indicated at 64, 65 in Fig. 6. The lower portion of the pit may be of the generally rectangular shape indicated in Figs. 6 and 7, so as to receive therein the rolled-ball receptacle-elevator indicated at 66, which desirably has a transversely tapered but elongated bottom indicated at 67. Said receptacle-elevator is indicated in its down position in the pit in full lines in Figs. 6 and 7, and is indicated in its upper tilted position in dotted lines in said Figs. 6 and 7, at which upper position it discharges the ball or balls into the chute 68 at the side

of the apparatus. The said chute 68 extends to the player-end of the bowling alley so that the balls deposited therein by the said receptacle-elevator roll to the player-end of the bowling alley, though my invention is not restricted to returning the ball all the way to the player end of the bowling alley.

In order to support and to operate the said receptacle-elevator 66, the following construction is provided.

Upon the cross member 35 of the framing, as shown in Fig. 1, is mounted motor #2, indicated at 69. Extending therefrom is a shaft 70 having fast thereon a pulley 71 about which passes a driving belt 72 that extends about a pulley 73 fast on a transverse shaft 74 mounted in suitable bearings 75, 76 upon the longitudinally extending members of the frame on which the bearings 28, 29 for the shafts 30 to 33 are mounted. Fast upon the shaft 74 is one end of a cord 77, best shown in Figs. 6 and 7, which, as there illustrated, passes about a guide pulley or member 78 extending from an upright member 79 of the framing of the apparatus. The said upright member 79 is in part at least of a general channel form, as indicated at 79*a*, 79*b*, Fig. 7A, to receive a vertically slidable member 80 of sufficient weight for the purpose to be described, and which is provided with two extending pins 81, 82, as shown in Figs. 6 and 7, the pin 81 being located near the upper end of the slide 80 and the pin 82 near the lower end thereof, as shown in Fig. 7.

Referring now to Fig. 7, the receptacle-elevator 66 has attached thereto near its opposite ends two flexible, non-elastic bands or belts 83, 84, which may be of canvas or other suitable flexible material and which, at their lower ends, are provided with lengthwise extending, rigid strips 85, 86, desirably of wood and triangular in cross section, for the purpose of deflecting a ball striking them to one side or the other into the receptacle-elevator 66.

The said bands or belts 83, 84, shown in Figs. 1, 6 and 7, are connected at their upper ends to the shaft 74, previously referred to. One of the said bands or belts 83, 84 (namely, the band or belt 84) is provided with a formation which may be referred to as of a general knob-like structure or enlargement, indicated at 87 in Fig. 6. The purpose of the said formation or knob-like projection 87 is to cause more rapid winding of the band or belt 84 about the shaft 74 than the winding of the band or belt 83 when, in the lifting of the receptacle-elevator 66, it arrives at or about at some such position as that indicated in dotted lines in Fig. 6. Such more rapid winding of the band or belt 84 causes the receptacle-elevator 66 to tilt as shown in Fig. 7, so that the ball or balls roll into the chute 68 and return to the player-end of the bowling alley. This tilting occurs when the receptacle-elevator 66 has reached a height above the chute 68.

It will be understood that switch #2, shown at 51 in Fig. 1, is suitably connected by the wiring of the circuit for the motor #2, shown at 69 in Fig. 1, so that when the upper guide plate 54 is elevated into a position to operate said switch #2, it will cause the starting of said motor #2.

Means are provided whereby, after the receptacle-elevator 66 has dumped its contents of balls as hereinbefore described into the return chute 68, the direction of rotation of the shaft 74 upon which the bands or belts 83, 84 are wound, is reversed thereby to enable the said receptacle-elevator 66 to descend to its position at the bottom of the pit 63 by gravity.

This is accomplished by means of switch #4, Figs. 6, 9 and 10. The said switch #4 is a reversing switch to stop the further lifting movement of the receptacle-elevator 66, allowing the shaft 74 to reverse its direction of motion until the said receptacle-elevator 66 has returned by gravity to its bottom position, shown in full lines in Figs. 6 and 7. However, switch #3 shuts off the power to the motor #2 after the receptacle-elevator 66 has returned to its bottom position. Switch #2 starts the elevator motor which continues to operate until reversed by switch #4, and until it is shut off by pin 81, as shown in Fig. 10.

Switch #4, indicated in Figs. 6, 9 and 10, is merely a reversing switch; that is to say, it is not an on-and-off switch. It does not cut off the power to motor #2. It merely controls the direction of motion of the said motor #2. This is necessary because of the up-and-down movements of the receptacle-elevator 66, which have already been described.

Referring again to the vertically slidable member 80 and to the two pins 81, 82 laterally extending from near the upper end and the lower end thereof respectively, as the said vertically slidable member 80 rises, the bottom pin 82 thereof engages an arm or part extending from switch #4, thereby reversing the receptacle-elevator motor #2, and when it does so the said member 80 immediately descends of its own weight. As the said vertically slidable member 80 descends, the upper pin 81 extending therefrom acts on both the switches #3 and #4. This causes the switch #4 to reverse the direction of rotation of the motor #2, and switch #3, when thus operated, cuts off the current to the elevator motor #2. As stated, switch #4 merely changes the direction of rotaiton of the elevator motor 69 (motor #2). As already stated, the current to motor #2 is provided by switch #2, which switch #2, as stated, is operated by the upper guide plate 54 when the latter is lifted for the purpose of resetting the playing pins.

The function of the lower pin 82 on the vertically slidable member 80 is, when said member 80 ascends, to reverse again the current to motor #2. Switch #2 and switch #3 respectively start and stop the elevator motor #2. They both are so arranged in the circuit that each operates independently of the other. The switch #3 is provided with a spring which keeps it normally closed.

When the entire mechanism is at rest and the elevator motor #2 is off, the switch #4 provides a definite direction of rotation (say clockwise) for the elevator shaft 74. Such switch #4 is merely a means for changing the direction of rotation of the armature of the said motor elevator #2. The current itself for such motor #2 is supplied by means of switch #2, and the current is turned off from said motor #2 by switch #3, which switch #3, as already described, is operated by the pin 81 extending from the vertically slidable member 80.

A player could, if desired, manually elevate the vertically slidable member 80, having the said two pins 81, 82, to effect release of switch #3 thereby to cause the elevator motor #2 to perform its lifting operation upon the said vertically slidable member 80, and the cord and pulley

connection with the shaft 74 causes the vertically slidable member 80 to rise until the lower pin 82 has reached such a height as to trip switch #4, thereby to reverse the elevator motor #2. When the said elevator motor #2 is thus reversed, the rotation of the shaft 74 is reversed, and the cord 77 is unwound, causing the vertically slidable member 80 to descend by its own weight, and the upper pin 81 acts on both switches #3 and #4, causing said switch #4 to reverse again the current to motor #2 and causing switch #3 to shut off the current of the said elevator motor #2.

It will be understood from the foregoing description that the operation of the entire apparatus is what may be termed semi-automatic. That is to say, the receptacle-elevator 66 is moved up and down automatically, but the pin-setting mechanism is manually controlled by a slight hand pull upon the desired cord or cords 1*a* to 10*a* in the manner already described.

Having thus described one illustrative embodiment of the invention, it is to be understood that although specific terms are employed, they are used in a generic and descriptive sense and not for purposes of limitation, the scope of the invention being set forth in the following claims.

I claim:

1. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when standing at the player-end of the bowling alley when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement having holes therethrough for the passage only of the cords respectively and corresponding in number and playing position to all the pins when set, at least one cord-receiving rotatable member supported above the set position of the pins and at least partially about which the cords from said pins extend in their course to the player-end of the apparatus, so that one or more of said cords may be slightly manually pulled upon at the player-end of the apparatus to increase the friction between said cord or cords and said at least one rotatable member, a motor for rotating said at least one member, whereby the tightening of the cord or cords upon the said at least one rotating member by slight pull at the player-end upon the cord or cords results in the application to said cord or cords of the pulling force of said at least one rotating member, and thereby reduces markedly the pulling force that must be manually used by a player in pulling upon the said cord or cords sufficiently to elevate the pin or pins from the playing surface, a rolled-ball receptacle-elevator which upon elevation discharges balls into the return chute, a second motor to operate said elevator, and means operated by the lifting of the said guide plate by the pins in the pin-setting action, to operate said second motor thereby to lift said elevator.

2. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when standing at the player end of the bowling alley when the pins or any of them have been knocked down by a rolled ball, rotatable pin-elevating means and a vertically movable guide plate supported vertically over the pins for up-and-down movement and having holes therethrough for the passage only of the cords respectively and corresponding in number and playing position to all the pins when set, at least one cord-receiving rotatable shaft supported above the set position of the pins and at least partially about which the cords from said pins extend in their course to the player-end of the apparatus so that one or more of said cords may be grasped and slightly manually pulled upon at the player-end of the apparatus to increase the friction between said cord or cords and said at least one rotatable shaft, a motor for rotating at least one shaft, whereby the tightening of the cord or cords against the said at least one shaft by slight manual pull thereon at the player-end of the apparatus results in the application of the pulling force of said at least one rotating shaft to the said cord or cords, and thereby reduces markedly the pulling upon the said cord or cords sufficiently to elevate the pin or pins from the playing surface, a rolled-ball receptacle-elevator which upon elevation discharges balls into the return chute, a second motor to operate said elevator, and means operated by the lifting of the said guide plate by the pins in the pin-setting action, to operate said second motor thereby to lift said elevator.

3. A construction in accordance with claim 2, wherein as the rotatable pin-elevating means supported above the set position of the pins, there is provided a series of substantially horizontally positioned, cord-receiving, rotatable shafts about which the cords from the pins selectively extend in their course to the player-end of the apparatus, for the purpose of applying the pulling force of said rotating shafts to the said cord or cords.

4. A bowling apparatus in accordance with claim 2 wherein as the rotatable pin-elevating means supported above the set position of the pins, there is provided a set of four horizontally-positioned cord-receiving rotatable shafts substantially directly above the set position of the pins and about each of which shafts extends one or more of the cords from the pins, for the purpose stated.

5. Player-operated bowling apparatus for use in usual bowling alleys having used-ball chutes, comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when standing at the player-end of the bowling alley when the pins or any of them have been knocked down by a rolled ball, two vertically movable guide plates supported vertically over the pins for up-and-down movement, each of said guide plates having holes therethrough for the passage of said cords respectively, the holes in the upper guide plate being merely large enough to permit the ready passage therethrough of the cords from the pins and the holes in the lower plate being merely large enough to permit the at least partial elevation therethrough of the pins, said holes corresponding in number and playing position to all the pins when set, cord-like means for supporting the upper guide plate from the framing of the apparatus and cord-like means

for supporting the lower guide plate from the said upper guide plate, a plurality of shafts above the upper one of said vertically movable guide plates, said non-elastic cords passing over said shafts, a motor for rotating said shafts, a rolled-ball receptacle-elevator to deposit, when elevated, used balls in the return chute, a second motor to operate said elevator, and means operated by the lifting of said upper guide plate by the pins in the pin-setting operation to cause said second motor to operate to lift said elevator to deposit the used balls in such return chute.

6. Player-operated bowling apparatus for use in usual bowling alleys having ball-return chutes comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when standing at the player-end of the bowling alley when the pins or any of them have been knocked down by a rolled ball, two vertically movable guide plates supported vertically over the pins for up-and-down movement, each of said guide plates having holes therethrough for the passage of said cords respectively, the holes in the upper guide plate being merely large enough to permit the ready passage therethrough of the cords from the pins and the holes in the lower plate being merely large enough to permit the at least partial elevation therethrough of the pins, said holes corresponding in number and playing position to all the pins when set, cord-like means for supporting the upper guide plate from the framing of the apparatus and cord-like means for supporting the lower guide plate from the said upper guide plate, a series of horizontally-supported cord-receiving shafts substantially directly above said upper guide plate and about which the cords from the pins respectively extend and thence extend onward toward the player-end of the apparatus, a motor to rotate said shafts, a rolled-ball receptacle-elevator to deposit, when elevated, used balls in the return chute, a second motor to operate said elevator, and means operated by the lifting of said upper guide plate by the pins in the pin-setting operation to cause said second motor to operate to lift said elevator to deposit the used balls in such return chute.

7. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when standing at the player-end of the bowling alley when the pins or any of them have been knocked down by a rolled ball, two vertically movable guide plates supported vertically over the pins for up-and-down movement, each of said guide plates having holes therethrough for the passage of said cords respectively, the holes in the upper guide plate being merely large enough to permit the ready passage therethrough of the cords from the pins and the holes in the lower plate being merely large enough to permit the at least partial elevation therethrough of the pins, said holes corresponding in number and playing position to all the pins when set, cord-like means for supporting the upper guide plate from the framing of the apparatus and cord-like means for supporting the lower guide plate from the said upper guide plate, a series of shafts horizontally supported substantially directly above said upper guide plate and about which the cords from said pins respectively extend, and thence extend onward toward the player-end of the apparatus, a motor for rotating said series of shafts, a rolled-ball receptacle-elevator, a second motor to operate said elevator, and means operated by the lifting of the upper guide plate by the pins to cause said second motor to operate to lift said elevator.

8. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein.

9. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, two flexible bands attached to spaced-apart portions of said receptacle-elevator and extending to said shaft and adapted to be wound thereon, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to wind said bands onto said shaft and thereby to lift said receptacle-elevator with the at least one rolled ball therein.

10. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby,

a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein, and means to tilt said receptacle-elevator when it reaches an elevated position and a return chute into which the at least one ball is deposited from said tilted receptacle-elevator.

11. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, two flexible bands attached to spaced-apart portions of said receptacle-elevator and extending to said shaft and adapted to be wound thereon, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to wind said bands onto said shaft and thereby to lift said receptacle-elevator with the at least one rolled ball therein, one of said flexible bands having a formation which causes the receptacle-elevator to tilt and discharge the contained at least one ball when, in the rotation of said shaft and the consequent winding of said bands, said formation arrives at said shaft.

12. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, two flexible bands attached to spaced-apart portions of said receptacle-elevator and extending to said shaft and adapted to be wound thereon, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to wind said bands into said shaft and thereby to lift said receptacle-elevator with the at least one rolled ball therein, one of said flexible bands having a knob-like projection thereon which causes the receptacle-elevator to tilt and discharge the contained at least one ball when, in the rotation of said shaft and the consequent winding up of said bands, said formation arrives at said shaft.

13. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a series of substantially horizontally positioned cord-receiving rotatable shafts about which the cords from the pins selectively extend in their course to the player-end of the apparatus, for the purpose of applying the power-pulling force of said rotating shafts to said cords, whereby the tightening of the cords against the said shafts by slight manual pull thereon at the player-end of the apparatus results in the application of the power-pulling force of said rotating shafts to said cords and thereby reduces markedly the manual pulling force that must be used by the player in pulling upon said cords to elevate the pins from the playing surface, a motor to rotate said shafts, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage only of the cords respectively, said holes corresponding in number and playing position to all the pins when set, a rolled-ball receptacle-elevator, a second motor to operate said elevator, and means operated by the lifting of said guide plate by the pins to operate said second motor, thereby to lift said elevator.

14. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage only of the cords respectively, said holes corresponding in number and playing position to all the pins when

set, said guide plate being attached to be lifted by said pins when the latter are lifted by said cords, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft to be wound upon said shaft, and thereby to lift said receptacle-elevator, a motor to rotate said shaft and means operated by the lifting of said guide plate to operate said motor.

15. A player-operated bowling apparatus comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage only of the cords respectively, said holes corresponding in number and playing position to all the pins when set, said guide plate being adapted to be lifted by said pins when the latter are lifted by said cords, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft to be wound upon said shaft, and thereby to lift said receptacle-elevator, a motor to rotate said shaft, and means operated by the lifting of said guide plate to operate said motor, a motor-controlled switch for said motor and located in operative relation thereto, thereby to control the operation of said last mentioned motor for the lifting of said receptacle-elevator.

16. A player-operated bowling apparatus comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage only of the cords respectively, said holes corresponding in number and playing position to all the pins when set, said guide plate being adapted to be lifted by said pins when the latter are lifted by said cords, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft to be wound upon said shaft, and thereby to lift said receptacle-elevator, a motor to rotate said shaft, and means operated by the lifting of said guide plate to operate said motor, motor controlled switch for said motor and located in operative relation thereto, thereby to control the operation of said last-mentioned motor for the lifting of said receptacle-elevator, and means to reverse the direction of rotation of said receptacle-elevator shaft to enable said receptacle-elevator to descend to its lowest position by gravity.

17. A player-operated bowling apparatus comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage only of the cords respectively, said holes corresponding in number and playing position to all the pins when set, said guide plate being adapted to be lifted by said pins when the latter are lifted by said cords, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator and extending to said shaft to be wound upon said shaft, and thereby to lift said receptacle-elevator, a motor to rotate said shaft, and means operated by the lifting of said guide plate to operate said motor, motor controlled switch for said motor and located in operative relation thereto, thereby to control the operation of said last-mentioned motor for the lifting of said receptacle-elevator, and a reversing switch to reverse the direction or rotation of said last-mentioned motor for said receptacle-elevator shaft, thereby to enable the said receptacle-elevator to descend to its lower position by gravity.

18. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable horizontally positioned guide plate supported vertically by flexible strands directly above the set position of said pins, said guide plate being adapted to be lifted by said pins when the latter are lifted by said cords, a motor supported upon a stationary part of said apparatus, a motor controlling switch supported upon a stationary part of the apparatus adjacent the path of movement of said guide plate when so lifted by said pins, whereby said switch is permitted by said guide plate when so lifted to function, a shaft operated by said motor, and a rolled-ball receptacle-elevator which is lifted by the rotation of said shaft by said motor when said motor is activated by said switch.

19. A player-operated bowling apparatus in accordance with claim 18, wherein means are provided to reverse the direction of said motor and consequently of said shaft when said elevator has reached its highest position.

20. A player-operated bowling apparatus in accordance with claim 18, wherein a switch is provided to reverse the direction of rotation of said motor when said elevator has reached its highest position, and means for automatically operating said switch.

21. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball

and also said at least one rolled ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, and means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein, a vertically movable member lifted by the rotation of said shaft by said motor and a switch operated by said vertically movable member to control said motor.

22. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein, a vertically slidable upright member lifted by the rotation of said shaft by said motor, and a plurality of switches to control said motor through the movements of said vertically slidable upright member.

23. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one rolled ball and also said at least one rolled ball, a rolled-ball receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein, a vertically slidable upright member lifted by the rotation of said shaft by said motor, and a plurality of switches to control said motor through the movements of said vertically slidable upright member, one of said switches being constructed and arranged to reverse the direction of rotation of said shaft, thereby to permit said receptacle-elevator to descend.

24. Player-operated bowling apparatus for use in usual bowling alleys comprising at least one ball and a set of pins to be knocked over thereby, a series of non-elastic cords respectively attached at one end to the pins and thence extending to and supported in convenient position to be pulled by the player or players when the pins or any of them have been knocked down by a rolled ball, a vertically movable guide plate supported vertically over the pins for up-and-down movement, said guide plate having holes therethrough for the passage of only the cords respectively, said holes corresponding in number and playing position to all the pins when set, a series of shafts horizontally supported substantially directly above said guide plate and about which the cords from the pins extend, a motor for said series of shafts, a pit in the rear of the set position of said pins and into which fall pins knocked down by at least one ball and also said at least one ball, a rolled-ball receptacle-elevator, a shaft for operating said receptacle-elevator, flexible means attached to said receptacle-elevator and extending to said shaft, means operated by the lifting of said guide plate by the pins in the pin-setting action to operate said second motor, thereby to rotate said shaft, thereby to lift said receptacle-elevator with the at least one rolled ball therein, a vertically slidable upright member, one of said switches being constructed and arranged to reverse the direction of rotation of said shaft, thereby to permit said receptacle-elevator to descend by gravity to its lowest position.

JOSEPH E. LAFERRIERE.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
858,229	Stokes	June 25, 1907
1,063,983	Lawrence	June 10, 1913
1,794,967	Lloyd	Mar. 3, 1931
2,019,607	Hedenskoog	Nov. 5, 1935
2,326,554	Nall	Aug. 10, 1943
2,361,482	Laferriere	Oct. 31, 1944