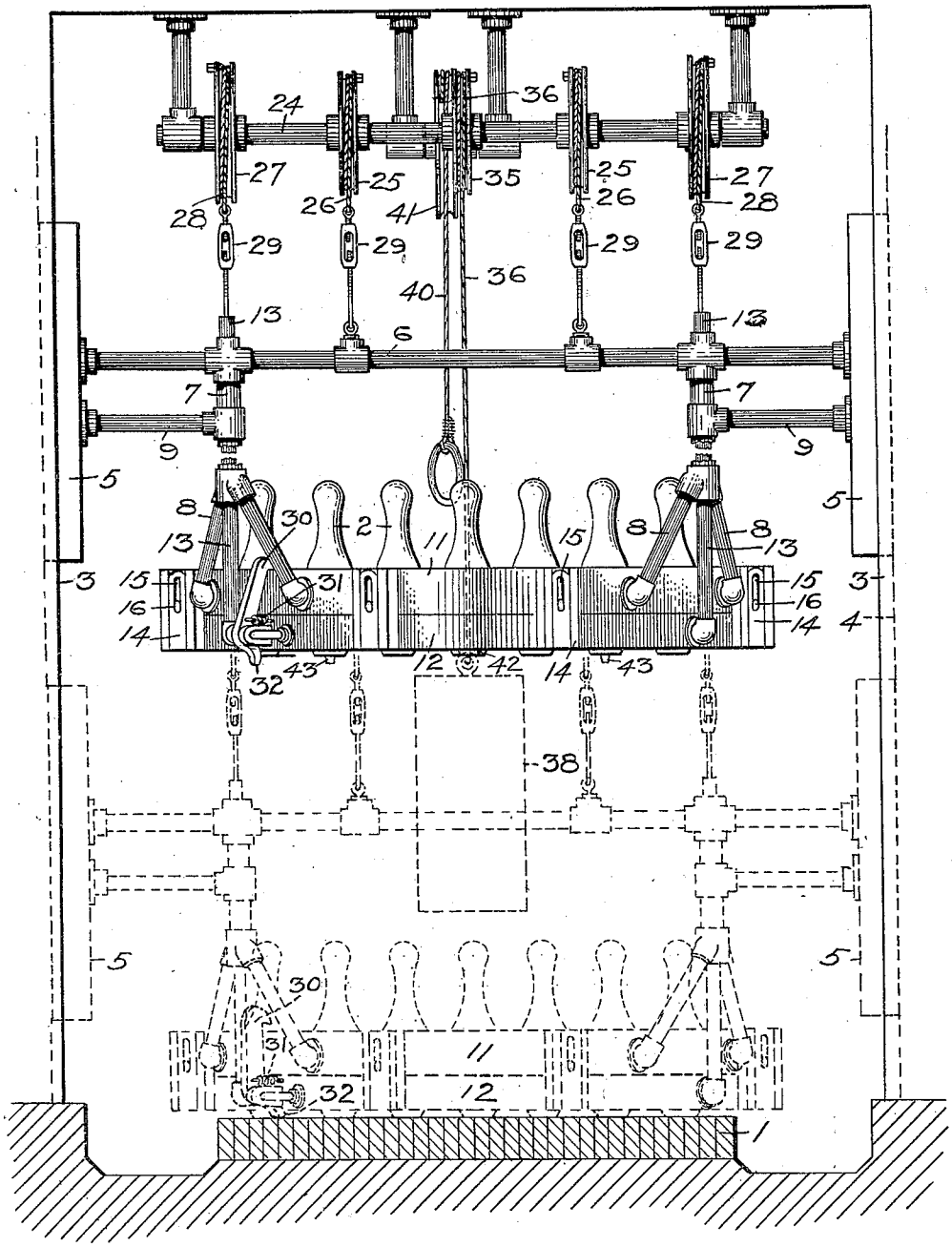
No. 838,766. PATENTED DEC. 18, 1906.

J. H. BOYD.

BOWLING PIN SETTING DEVICE.

APPLICATION FILED MAR. 10, 1906.

3 SHEETS—SHEET 1.



WITNESSES.

J. R. Keller

J. C. Raymond

FIG. 1

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3 SHEETS—SHEET 2.

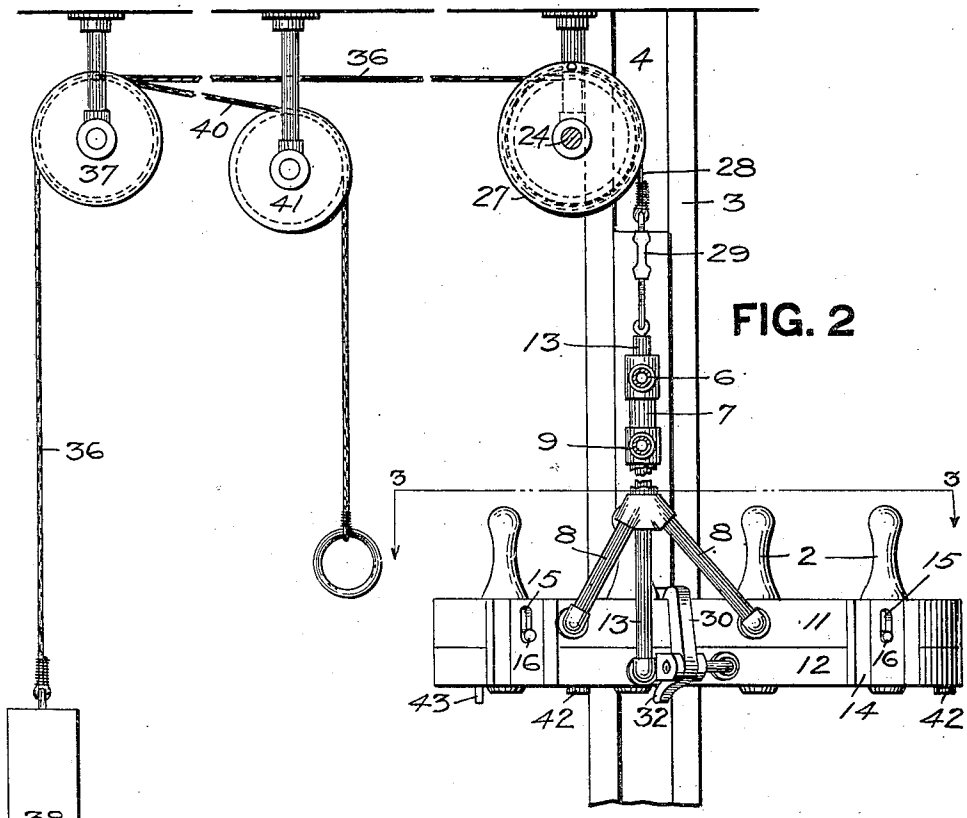
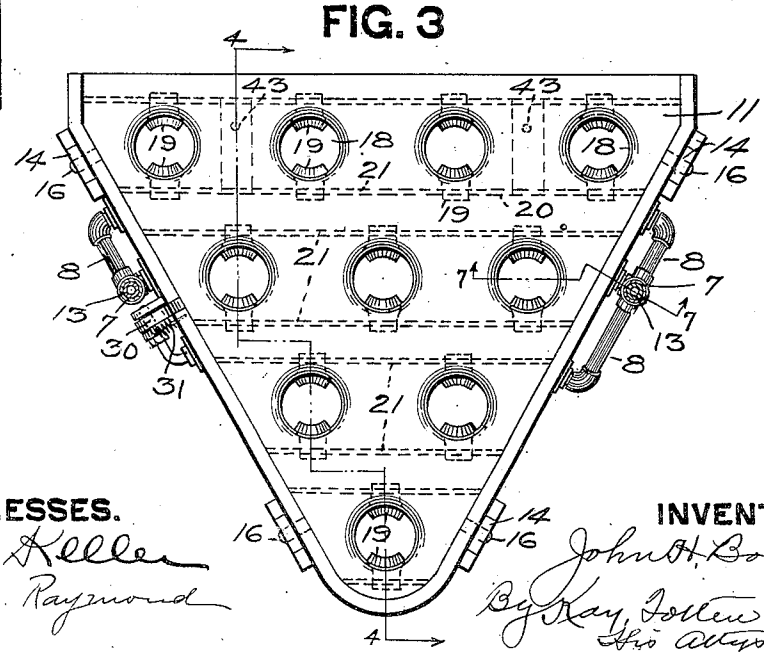


FIG. 2

FIG. 3



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3 SHEETS—SHEET 3.

FIG. 4

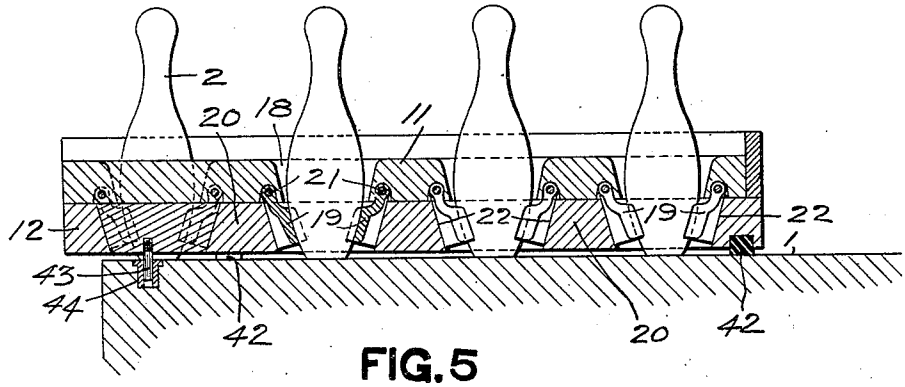


FIG. 5

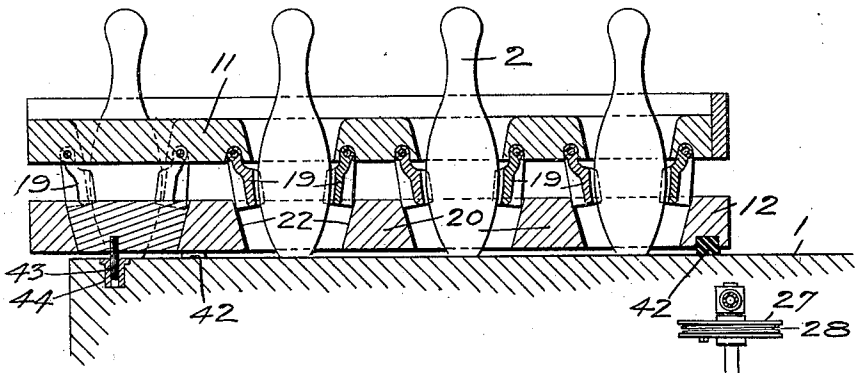


FIG. 6

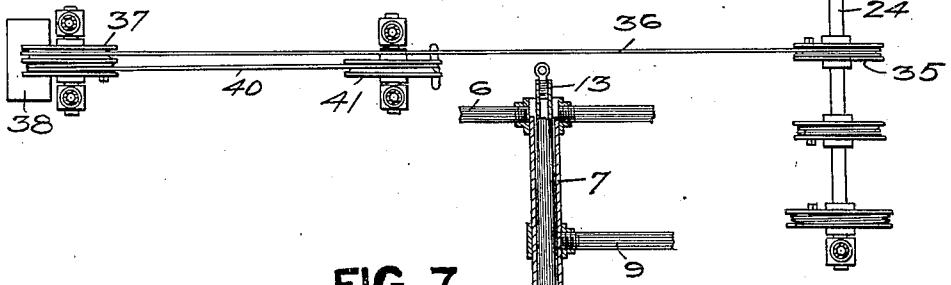
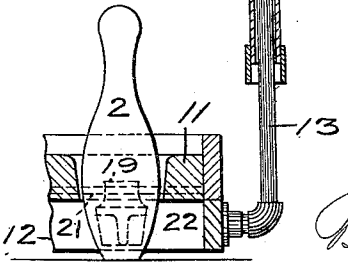


FIG. 7



WITNESSES.

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INVENTOR.

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UNITED STATES PATENT OFFICE.

JOHN H. BOYD, OF BARBERTON, OHIO.

BOWLING-PIN-SETTING DEVICE.

No. 838,766. Specification of Letters Patent. Patented Dec. 18, 1906.

Application filed March 10, 1906. Serial No. 305,380.

To all whom it may concern:

Be it known that I, JOHN H. BOYD, a resident of Barberton, in the county of Summit and State of Ohio, have invented a new and useful Improvement in Bowling-Pin-Setting Devices; and I do hereby declare the following to be a full, clear, and exact description thereof.

This invention relates to a pin setter and spotter for bowling-alleys. Its object is to provide a device of this character which is simple of construction, easy to operate, which will set the pins accurately in position, and which will prevent the pins becoming worn away around the bases.

In order that absolutely equal conditions exist between contestants in bowling matches, it is essential that the pins be always set on exactly the same spots, so as to always have the same relative positions with reference to each other. With hand-setting this is almost impossible, so that unintentionally one contestant may have the pins in slightly better relative positions than the other contestant. Furthermore, the bowling must cease while the boy is setting the pins, and the greater care he exercises in properly positioning the pins the greater is the loss of time. Furthermore, in hand-setting the boy invariably strikes the alley with a corner of the pin-base. This quickly wears away the corners and leaves the pin round on the bottom, so it will not stand securely. These difficulties have been long recognized, and mechanical devices for setting and spotting the pins have been devised for avoiding the difficulties mentioned.

My invention is an improvement upon prior devices of this character in order to provide a device by which the pins can be accurately positioned and which operates in such a manner that there is no danger of toppling over any of the pins after being set. The invention comprises a certain arrangement of parts hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a front elevation of my device, showing the alley in cross-section, and in dotted lines showing the device in its lowermost position. Fig. 2 is a side view of the device, one of the guideways being omitted. Fig. 3 is a horizontal section on the line 3 3, Fig. 2. Fig. 4 is a vertical section of the carrying-frame on the line 4 4, Fig. 3. Fig. 5 is a similar view indicating the position of parts when the frame starts to rise. Fig. 6 is a plan view of the actuating mechanism; and Fig. 7 is a vertical section on the line 7 7, Fig. 3.

The alley is indicated at 1 and the pins at 2. At the pin position on either side of the alley are suitable standards or uprights 3, provided with guideways 4 for the slides 5 of the pin-setter. Connected to the slides 5 is a cross bar or rod 6, having connected thereto the depending tubes 7, which at their lower ends have branches 8, connected to the setter-frame. The tubes 7 are steadied and held against twisting or wabbling by brace members 9, connecting said tubes near their lower ends with the slides 5.

The setter-frame comprises two frame members, one of which—namely, the upper one, 11—has the suspending-tubes 8 connected thereto and is vertically movable with the rod or bar 6, and a supplementel frame 12, which has connected thereto suspending-rods 13, which pass up through the tubes 7. These frames are further connected by means of guides or links 14, secured to one frame and provided with slots 15 for receiving pins 16, carried by the other frame. These two frames therefore have a limited vertical movement independently of each other. One of these frames is provided with suitable pin-openings and has suitable pin gripping or holding members, while the other frame has cam means for actuating said gripping members when the frames move relatively one to the other.

It is immaterial which of the two frames carries the elements above named. As shown, the main frame 11 is provided with the pin-openings 18 and with depending gripping-dogs 19, while the supplemental frame 12 is provided with suitable dog-actuating means, such as the cross-bars 20. The gripping-dogs 19 are pivoted on rods 21; but obviously this is a detail which can be varied within wide limits. The outer face of the dogs or the side faces of the bars 20, or both, are provided with cam-faces, so that in one relative position of the two frames the dogs are pressed inwardly to grip or retain the pins, while in another relative position of the frame these dogs are free to swing by gravity to a vertical position, thus releasing the pins. As shown, cross-bars 20 are provided with inclined faces 22, which act as cams to force the dogs inwardly to inclined position, as shown in Fig. 4, thus gripping or retaining the pins. When the two frames are sepa-

rated, as shown in Fig. 5, the gripping-dogs, by gravity, fall away from each other, thus releasing the pins.

The movement of the frame relative to each other is brought about automatically by the suspending mechanism employed. This mechanism may be of various forms, the necessary characteristic of which must be that it starts to raise one of the frames before it raises the other frame and raises the frame last started at a greater speed than the one first started, so that at the beginning of the raising movement one of the frames is raised from the other to release the pins; but when the frames approach the limit of their upward movement they are again brought together, so that the gripping-dogs are moved to inclined position (shown in Fig. 4) to retain the pins.

The specific suspending mechanism shown comprises an overhead shaft 24, provided with drums of different sizes. The smaller pair of drums 25 are connected by suitable cables or the like 26 to the cross-bar 6, and said drums therefore constitute the elevating mechanism for the upper frame 11. The larger drums 27 are connected by similar means 28 to the rods 13, and therefore constitute the raising mechanism for the lower frame 12. The several cables are provided with suitable adjusting means, such as the turnbuckles 29, so that the length of said cables can be accurately adjusted.

The parts are so arranged that when the frames are fully elevated, as shown in Fig. 1, all of the cables 26 and 28 are substantially taut and the two frames are brought together so as to move the gripping-dogs to pin-retaining position. In this position the frame is in condition for receiving the pins, which will be placed therein by an attendant, said pins being held in substantially vertical position. As the frame is being lowered the cables 28 from the larger drums 27 are paid out more rapidly than the cables from the smaller drums 25, and the former cables become slack. This naturally would permit the lower frame to descend more rapidly than the upper. As this would result in discharging the pins, means is provided for preventing the separation of the frames when descending, this means comprising a suitable latch 30, pivoted to one of the frames, preferably the lower frame, and engaging the other frame. This latch is either counterweighted or provided with a spring 31 to cause the same to automatically lock the two frames together. The latch is provided with a toe 32, which when the frames rest on the alley swings the latch outwardly, as shown in dotted lines, Fig. 1, thus unlocking the frames.

While the frames are being lowered, the latch 30 holds the two frames in fixed relative position, so that the retaining-dogs hold the pins in position. As the lowering proceeds the cables from the large drums 27 become more and more slack, and the frame is really suspended from the smaller drums 25. When the frame strikes the alley, the dog 30 is swung outwardly by reason of its toe 32 engaging the alley itself, thus unlocking the frames. The shaft 24 is now rotated in the opposite direction, thus winding up the cables on the several drums. Inasmuch as the cables from the smaller drums 25 are without slack, they pull upwardly on the cross-bar 6, thus raising the main frame 11. Meanwhile the lower frame 12 remains in its lowermost position, due to the fact that its cables are slack. This movement will continue until the pins 16 reach the ends of the slots 15, when the two frames will be in the relative positions shown in Fig. 5. In this position the dogs 19 have swung so far apart that in the further upward movement to the frames they clear the pins, thus leaving the same in proper position on the alley.

As the frames continue to move upwardly the larger-size drums 27 wind up their cables more rapidly than the smaller-size drums 25. Consequently the slack is gradually taken out of the cables 28 and eventually the two frames drawn together, thus permitting the latch 30 to lock the two frames together and also causing the gripping-dogs to be moved to pin-retaining position. (Shown in Fig. 4.)

The shaft 24 may be rotated by any suitable mechanism, that shown in the drawings comprising a suitable drum 35 on the shaft 24 and having wrapped around the same a cable 36, which passes over one member of a double pulley 37 and has connected thereto the counterweight 38. Secured to and wrapped around the other member of the double pulley 37 is a cable 40, which passes over a guide-sheave 41 and has its end in convenient position for operation. The counterweight 38 serves to elevate the carrying-frame. To lower the same, an attendant pulls down on the cable 40, thus raising the counterweight and permitting the frame to descend. As soon as it strikes the alley-floor the attendant releases the cable 40, when the counterweight automatically returns the carrying-frame to its elevated position. The frame is provided with elastic cushions 42 to prevent disagreeable noise when it strikes the alley.

The carrying-frame is guided in its movements by the guideways 4, so that the pins are always brought down accurately on the pin-spots of the alley. To insure the accurate positioning of the pins on the alley, the carrying-frame is provided with a pair of dowels 43, adapted to enter bushings 44 in the alley itself, thus positioning the pins with mathematical accuracy.

The device illustrated is simple in construction and easy to operate. The only attention necessary is to place the pins in the

frame and to pull down on the cable 40 to lower the frame. It is only necessary to see that the necessary number of pins are in the frame and that when the frame is lowered it comes fully in contact with the alley. All the other operations are automatic, the two frames being automatically unlocked by striking the floor, automatically elevated by the counterweight 38, and automatically brought together and locked by the differential hoisting mechanism shown. The pins themselves are held in vertical position in the frame, so that when released by the frame there is practically no danger of toppling over, a result that is liable to occur where the pins are held in inclined position in the carrying-frame and are swung into vertical position when the frame rises.

The details of mechanism may be varied within wide limits, and I wish it understood that no limitations upon the terms of the claims herein made are to be imposed either by the specific illustration or the foregoing description.

What I claim is—

1. In a bowling-alley pin-setter, the combination of a frame movable toward the alley to deposit the pins thereon and provided with pin-openings, means carried by the frame and arranged when the frame is in elevated position to grip the pins and retain them in said openings, and automatic means for releasing said gripping means when the frame begins to move away from the alley.

2. In a bowling-alley pin-setter, the combination of a frame movable toward the alley to deposit the pins thereon and provided with pin-openings, means carried by said frame and arranged when said frame is in elevated position to grip the pins and retain them in said openings, and means automatically rendered operative when the frame reaches its lowermost position and arranged to release the pin-gripping means.

3. In a bowling-alley pin-setter, the combination of a frame movable toward the alley to deposit the pins thereon and provided with pin-openings, means carried by said frame and arranged when the frame is in elevated position to grip the pins and retain them in said openings, and automatically-acting means arranged to become inoperative as the frame approaches the limit of its upward movement, to remain inoperative while the frame is being lowered and rendered operative when the frame reaches its lowermost position to release the pin-gripping means.

4. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, pin engaging and carrying means so arranged when the frames are in one relative position to retain the pins and when the frames are in another relative position to release the pins, and suspending means for said frames arranged to normally hold said frames in position to retain the pins and when elevating said frames to raise one of said frames before the other and thus relatively displace the same to release the pins.

5. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, pin engaging and carrying means, and suspending means for said frame and retaining means arranged to normally hold said frames in position to retain the pins and in elevating said frames to raise one of the same before the other thus moving them relatively and releasing the pins.

6. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, pin-retaining means arranged when the frames are in one relative position to retain the pins and when the frames are in another relative position to release the pins, means arranged when the frames approach the limit of their upward movement for locking the same in fixed relative position and when the frames reach their lowermost position to unlock the same, and suspending means for said frames arranged to raise one of said frames before the other and thus relatively displace the same to release the pins.

7. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, said frames being movable relatively to each other, dogs mounted on one frame and arranged to engage and carry the pins, means on the other frame for moving said dogs to position to retain the pins, and suspending means for the frames arranged to normally hold said frames in position to retain the pins and in elevating said frames to raise one frame before the other thus causing the release of the pins.

8. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, said frames being movable relatively to each other, gripping-dogs on one frame, means on the other frame for engaging said dogs and moving the same to pin-retaining position, means arranged when the frames approach the limit of their upward movement for locking them together and when they reach their lowermost position to unlock the same, and suspending means for the frames arranged to raise one of the frames before the other thus moving them relatively to each other and releasing the pins.

9. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, pin-retaining means arranged when the frames are in one relative position to retain the pin and when the frames are in another relative position to release the same, a spring-latch arranged to lock the frames together and provided with

tripping means operated when the frames reach their lowermost position, and suspending means arranged to raise one frame before the other thus relatively displacing them and releasing the pins.

10. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, a supplemental frame, pin-retaining means arranged to engage and carry the pins, and differential elevating mechanism connected to said frame and said pin-retaining means whereby one of said means begins its upward movement before the other to move the same relatively and release the pins and thereafter said frame and pin-retaining means are brought into normal position to cause the pin-retaining means to grip the pins.

11. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, pin-retaining means, differential hoisting means, and suspending means from one thereof to one frame and from the other thereof to the pin-retaining means.

12. In a bowling-alley pin-setter, the combination of a pin-carrying frame, pin-retaining means carried thereby, an operating device for said retaining means movable relatively to the pin-carrying frame, and differential hoisting mechanism having independent connection to the frame and to the retaining operating device.

13. In a bowling-alley pin-setter, the combination of a frame provided with pin-openings, pin-retaining means, and hoisting mechanism connected to said frame and retaining means and arranged to lift one before the other and raise the one which starts last at a greater speed than the other.

14. In a bowling-alley pin-setter, the combination of a pair of frames having independent vertical movement, pin-holding means carried by one of said frames and arranged to be engaged by the other frame, independent suspending means for said frames, and hoisting mechanism connected to said suspending means and arranged to lift one of said frames before the other and to raise the frame which starts last at a greater speed than the other frame.

15. In a bowling-alley pin-setter, the combination of a pair of frames having independent vertical movement, pin-holding means carried by one of said frames and arranged to be engaged by the other frame to retain the pins, independent suspending means for said frames, hoisting mechanism connected to said suspending means and arranged to elevate one at a slower speed and before the other, and means for holding said frames in fixed relative position when being lowered, said means being released automatically when the frames reach their lowermost position.

16. In a bowling-alley pin-setter, the combination of two frames having independent vertical movements, pin-holding means carried by one of the frames and arranged to be held in retaining position by the other frame, independent suspending cables connected to said frames, and differential drums for said cables whereby said frames will be raised at different speeds and one start before the other.

17. In a bowling-alley pin-setter, the combination of a pair of frames having independent vertical movement, pin-retaining means carried by one frame and arranged to be held by the other frame in retaining position, independent cables connected to said frames, differential drums for said cables whereby one frame will be raised at a greater speed than the other, and means for holding said frame in fixed relative position when being lowered, said means being automatically released when the frames reach their lowermost position.

18. In a bowling-alley pin-setter, the combination of a pair of vertically-movable frames having movement relatively to each other, pin-retaining means carried by one frame and arranged to be held in retaining position by means of the other frame, independent suspending mechanism for said frames arranged to elevate them at different speeds and to start one before the other, automatically-acting means to lock said frames in relative fixed position when they approach the limit of their upward movement and for unlocking said frames when they reach their lowermost position.

19. In a bowling-alley pin-setter, the combination of a pair of members having independent vertical movement, pin-holding means carried by one member and adapted to be held by the other member in retaining position, suspending mechanism for said members arranged to begin the lifting of one before the other thus relatively displacing the same and releasing the pins, and guide-pins carried by said members and arranged to enter guide-openings in the alley.

In testimony whereof I, the said JOHN H. BOYD, have hereunto set my hand.

JOHN H. BOYD.

Witnesses:
F. W. WINTER,
ROBERT C. TOTTEN.