

Aug. 11, 1925.

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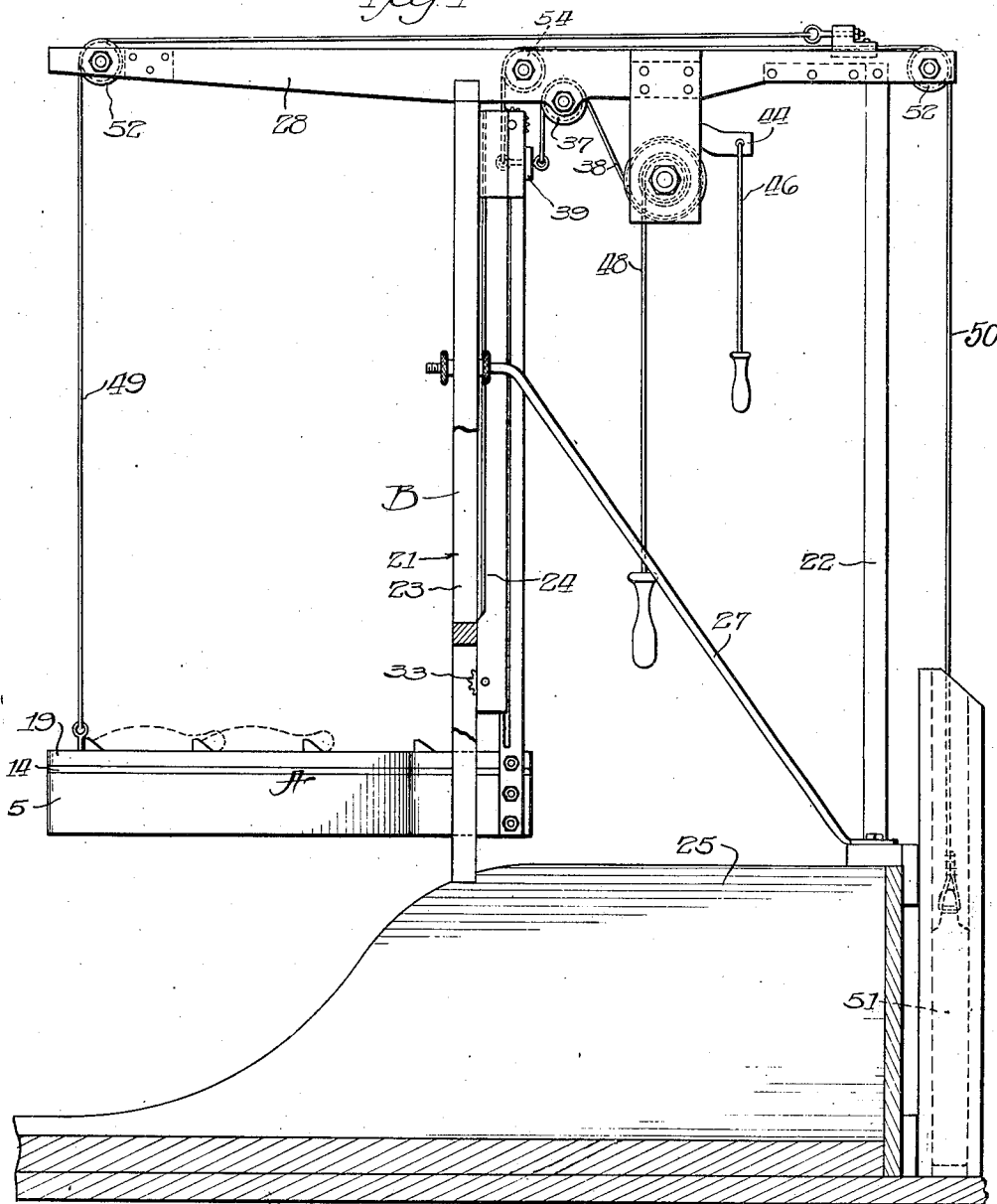
A. WICHERTJES

PIN SETTING DEVICE

Filed June 30, 1924

3 Sheets-Sheet 1

Fig 1



Witness

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Fig. 2

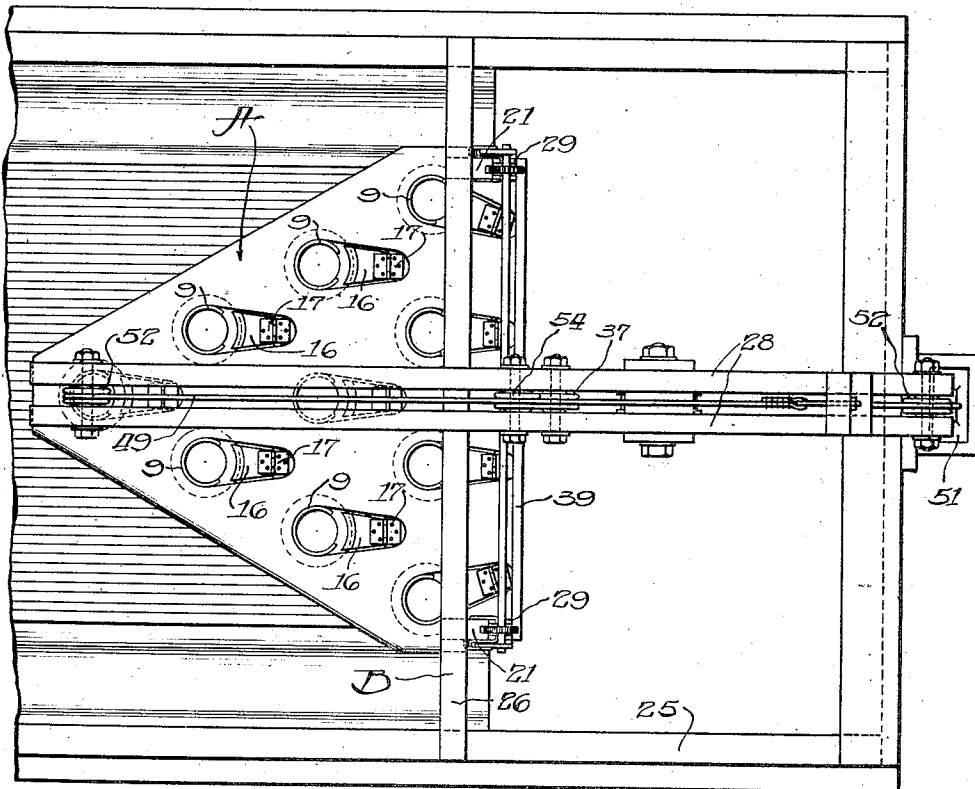
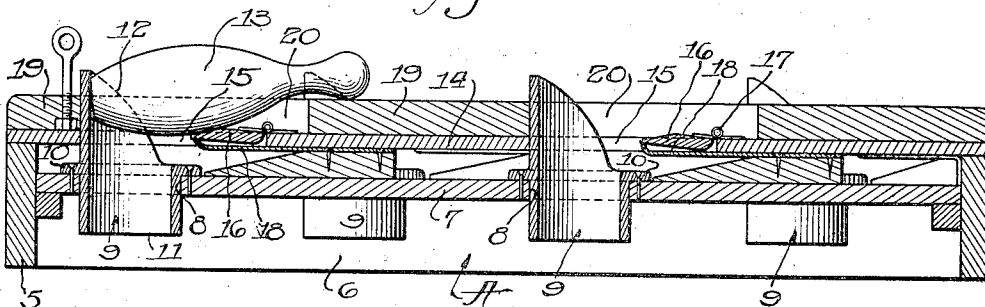


Fig. 3



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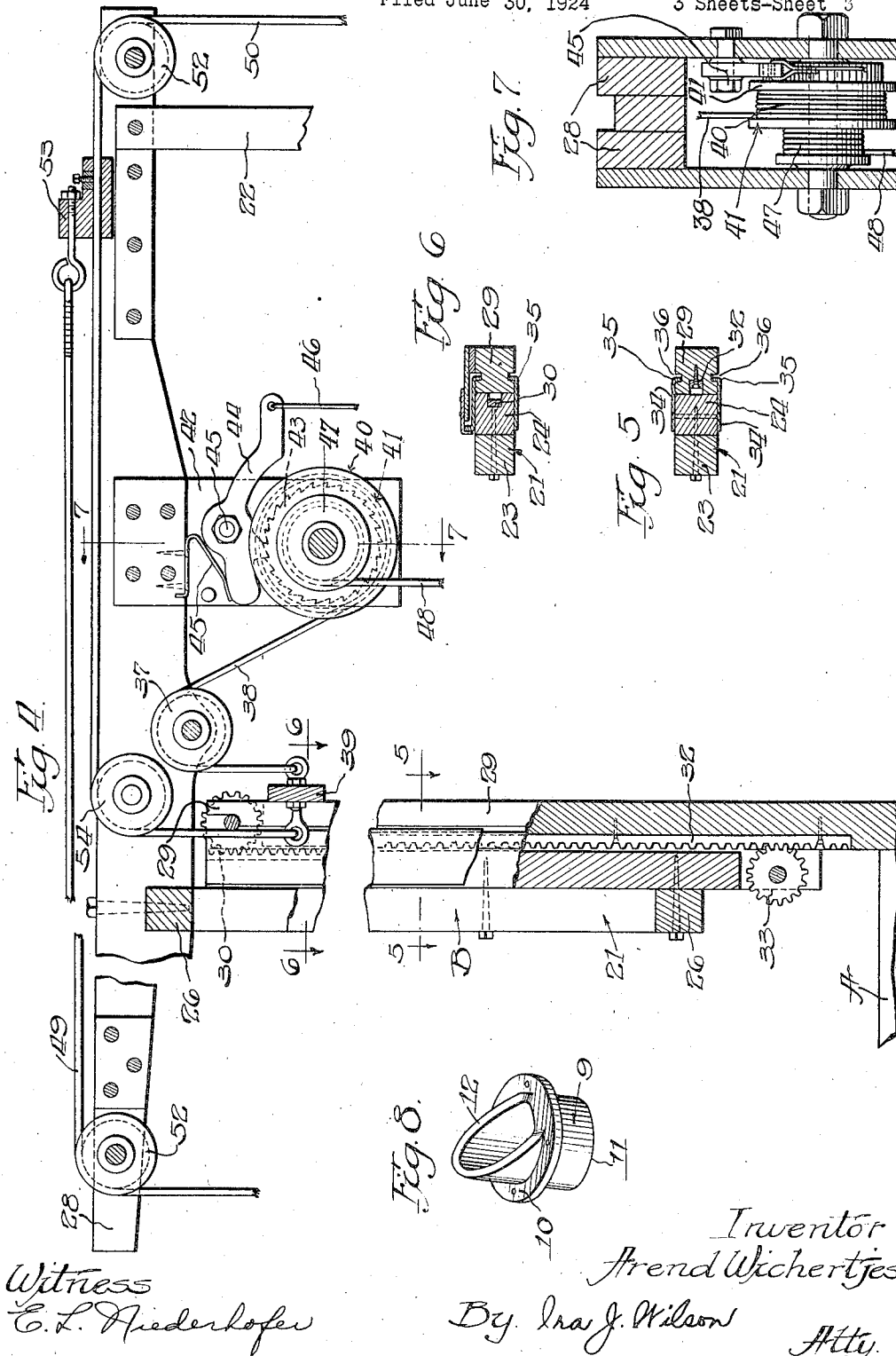
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE.

AREND WICHERTJES, OF CHICAGO, ILLINOIS.

PIN-SETTING DEVICE.

Application filed June 30, 1924. Serial No. 723,072.

To all whom it may concern:

Be it known that I, AREND WICHERTJES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Pin-Setting Device, of which the following is a specification.

This invention relates to new and useful improvements in pin setting devices which are used in connection with bowling alleys for automatically setting the pins on the alley in the proper positions relative to one another.

One of the important objects of my invention is to provide a vertically movable frame for carrying the pins and adapted upon impact with the alley to cause the egress of the pins from the carrier onto the alley in proper standing relation.

Another important object of the invention is to provide a vertically movable carrier with means for maintaining the same in a horizontal plane throughout its vertical movements, both in a lateral direction and in a fore and aft direction, whereby said carrier will, with certainty, maintain its parallel relation with the alley at the time the pins are being discharged from the carrier onto the alley.

For the purpose of facilitating an understanding of my invention I have illustrated in the accompanying drawings a preferred embodiment thereof, from inspection of which, when considered with the following description my invention and many of its inherent advantages should be readily understood and appreciated.

Referring to the drawings which illustrate one form of my invention,—

Figure 1 is a side elevation of a pin setting device constructed in accordance with my invention,

Figure 2 is a top plan view thereof,

Figure 3 is an enlarged cross-sectional view of the pin carrier,

Figure 4 is an enlarged view of the supporting frame,

Figure 5 is a detail cross-sectional view taken on the line 5—5 of Fig. 4,

Figure 6 is a similar view, but taken on the line 6—6 of Figure 4,

Figure 7 is a sectional view taken on the line 7—7 of Figure 4, and

Figure 8 is a perspective view of one of the pin guides carried by the frame.

Referring in detail to the accompanying drawings,—

I have provided a vertically movable pin setting frame A and a support B therefor.

The pin setting frame A is substantially triangular in a plan view and includes a supporting wall 5 having an open bottom 6. A horizontal shelf is disposed within and supported by the wall 5 and this shelf 7 is formed with a plurality of openings 8 for permitting the egress of the pins as will be hereinafter explained. Disposed within each of these openings 8 is a tubular pin guide 9, the longitudinal axis thereof being disposed vertically. This tubular guide is formed intermediate its ends with a supporting flange 10 which rests upon and is secured to the shelf 7. Thus the guide 9 projects above and below said shelf, the lower edge 11 of said guide terminating above the bottom of the wall 5. The upper portion of the guide 9 is cut away as at 12 to form a mouth for receiving the associated pin 13. The mouths formed by the cut away portions 12 all open toward the rear so as to permit an operator who stands in rear of the carrier to readily position the butt ends of the pins into said mouths of said guide.

The upper end of the wall 5 extends above the shelf 7 but terminates below the upper end of the guide 9, and seated upon the wall 5 is a second shelf 14 which is formed with a plurality of elongated openings 15, the longitudinal axes of said openings 15 extending fore and aft of the carrier. In order to temporarily support the pins 13 with their butt ends lying within the upper portions of the guide 9, I have provided spring seats for respective pins. To this end there is disposed in the rear end of these openings 15 a finger 16 which is hingedly connected at its rear end to the shelf 14. This finger 16 is disposed between the opening 15 and the upper portion of the associated guide 9 and is normally held in a substantially horizontal plane, by a spring 18 said spring being disposed under the finger and tending to nor-

mally urge the same upwardly. The shelf 14 is disposed in spaced relation to the shelf 7 and consequently a space is provided for permitting the spring controlled finger or seat 16 to be moved downwardly against the tension of the spring 18. Seated upon the shelf 14 is a top plate 19 and this plate is formed with a plurality of elongated openings 20 which register with the respective guides 9 and openings 15. The major axes of these openings 20 lie in a fore and aft plane and the length of each opening 20 is a trifle shorter than the length of the associated pin so as to permit the head of the pin to rest upon the plate 19.

From the foregoing it will be seen that the pins are positioned on the carrier as shown in Figure 3, the butt end of each pin being disposed within the upper portion of the tubular guide 9, the intermediate portion of the pin resting upon the spring seat 16 and the head of the pin resting upon the top plate 19. After all of the pins have been thus positioned upon the carrier frame, the frame is lifted and then dropped onto the floor of the alley. Means are provided for supporting the frame during its vertical movements so as to maintain said frame in a horizontal plane both in a lateral direction and also in a fore and aft direction. Thus, after the frame has been lifted and released it will drop by gravity onto the floor of the alley, the frame engaging the floor at all points simultaneously. This impact between the frame and the floor causes the seats 16 to be depressed due to the weight of the pins thereon, and the pins are consequently lowered bodily into the upper portion of the guides and the spring seat 16 then rebounds, causing the pins to be raised vertically and projected through the tubular guides 9 onto the floor of the alley. Thus the pins are ejected from the carrier and are positively positioned in standing relation and in proper spaced relation on the floor of the alley.

In order to support the pin carrying frame in a horizontal plane and also to provide means for vertically lifting said carrier, I have provided the support B. This support B includes a front pair of standards 21 and 21 and a rear pair of standards 22 and 22. Each of the front standards 21 preferably consists of front and rear up-rights 23 and 24. These standards are preferably attached to the side walls 25 of the bowling alley. The front standards 21 and 21 are suitably braced by cross braces 26 and 26 so as to hold the support from lateral movement and by a brace 27 for preventing movements of the frame in a fore and aft direction.

Supported upon the front and rear standards is a pair of supporting arms 28 and 28 which extend longitudinally of the bowling

alley and are disposed centrally thereof. The two arms 28 are connected together so that in fact there is but a single arm and this arm projects forwardly of the front standard 21 and overhangs the pin carrying frame A.

The pin carrying frame A is mounted on the support B for vertical movements, and connections are provided between the frame and support for maintaining the former in a horizontal plane both in a lateral direction and also in a fore and aft direction throughout its vertical movements whereby said frame will with certainty be disposed in parallel relation to the floor at the time of impact therewith. To this end the frame A is provided with a pair of upwardly extending arms 29 and 29 which have vertical sliding engagements with the front pair of standards 21 and 21. Fixedly secured to the upper portion of each standard 21 is a rack bar 30 and journaled on the upper end of each arm 29 is a pinion 31, the pinions 31 engaging with the rack bars 30. Fixedly secured to the lower portion of each arm 29 is a rack bar 32 and journaled on the lower portion of the standards 21 are pinions 33 which are respectively engaged with the rack bars 32. In order to maintain the arms 29 in sliding engagement with the standards 21, I have provided each standard 21 with oppositely disposed guide plates 34 and 34, the rear edge portions thereof being inwardly flanged as at 35 and 35 for engagements in corresponding grooves 36 and 36 formed in the associated carrier arm 29. Thus by means of the rack and pinion connections between the arms 29 and the standards 21, I have provided a means for maintaining the pin carrying frame A in a horizontal plane in a lateral direction.

In order to provide means for lifting the frame A and for releasing the same at a predetermined elevation, I have journaled between the arms 28, a roller 37 over which a hoisting cable 38 is laid, one end of the cable fixedly connected centrally to a tie bar 39 which connects the arms 29 of the frame A, the other end of the cable 38 being fixedly secured to the larger cylinder 40 of a winding and unwinding drum 41. This drum is journaled upon a bracket 42 which is suspended from the horizontal arms 28. Fixed to the drum 41 is a ratchet 43 and co-operating with this ratchet is a locking pawl 44, said pawl being fulcrumed intermediate its ends as at 45 to said bracket 42. The pawl is normally urged downwardly into locking engagement with the ratchet by means of a spring 45 and a hand cord 46 is connected to the other end of said pawl for releasing the pawl from engagement with the ratchet whenever desired to release the winding cylinder 40 and thereby permit the pin carrying frame A to drop by gravity onto the

floor of the alley. Fixed to the winding cylinder 40 of the drum 41 is an unwinding cylinder 47, the latter being of smaller diameter than the cylinder 40. An operating cord 48 has one end fixed to the cylinder 47 so that when the pawl 44 is released and the frame A gravitates, the cable 38 unwinds from the cylinder, whereas the cable 48 winds upon the cylinder 47. As a result, when it is desired to elevate the frame A, the operator pulls downwardly upon the cable 48 unwinding the latter from the smaller cylinder 47 and simultaneously winding the cable 38 upon the larger cylinder 40. As a result of this, the vertical movement of the cable 48 will be considerably less than the vertical movement of the cable 38.

In order to maintain the carrier A in a horizontal plane in a fore and aft direction, I have provided a flexible connection such as a cable 49 and 50 which is connected at one end to the front part of the frame A, and at its other end to a counterweight 51. This cable 49 and 50 passes over suitable rollers 52 journaled on the arms 28 of the support B. I preferably interpose an adjustable block 53 between the cable 49 and 50 so as to permit an adjustment in the length of the cable being made to thereby position the frame A in a horizontal plane in a fore and aft direction. I preferably extend this cable section 50 over a roller 54 and connect the end thereof to the tie bar 39. As a result of the above construction it will be seen that the counterweight moves downwardly as the frame A is lifted and consequently the labor incident to the lifting operation will be comparatively small.

It is believed that my invention, its construction, mode of operation and many of its inherent advantages will be understood and appreciated from the foregoing without further description, but it should be manifest that the details of construction illustrated and described may be varied within wide limits without departing from the essence of my invention as defined in the following claims.

I claim:

1. In a pin setting device, a pin-carrying frame having a plurality of egress openings for the pins, and means associated with the respective openings for temporarily retaining said pins in co-operative relation with said openings whereby said pins through their inertia will be caused to be projected downwardly through said openings upon impact of the frame against the floor.

2. In a pin setting device, a pin-carrying frame having a plurality of egress openings for the pins, and means including an upwardly extending guide associated with the respective openings for temporarily retaining said pins in co-operative relation

with said openings whereby said pins through their inertia will be caused to be projected downwardly through said openings upon impact of the frame against the floor.

3. In a pin setting device, a pin-carrying frame having a plurality of egress openings for the pins, and means including a spring seat associated with the respective openings for temporarily retaining said pins and whereby said pins under their inertia will be caused to be projected downwardly through said openings upon impact of the frame against the floor.

4. In a pin setting device, a pin-carrying frame having a plurality of egress openings for the pins, and means including an upwardly extending guide and a co-operating spring seat associated with the respective openings for temporarily retaining said pins in co-operative relation with said openings whereby said pins will be caused to be projected downwardly through said openings upon impact of the frame against the floor.

5. In a pin setting device, a pin-carrying frame comprising a surrounding wall, a shelf carried by said wall and formed with a plurality of openings, and a tubular guide disposed in each opening for permitting egress of the associated pin, each guide having a portion projecting above and a portion projecting below said shelf and cut away to form a receiving mouth for said pin.

6. In a pin setting device, a pin-carrying frame comprising a surrounding wall, a shelf carried by said wall and formed with a plurality of openings, and a tubular guide disposed in each opening for permitting egress of the associated pin, each guide having a portion projecting above said shelf and cut away to form a receiving mouth for said pin, and a downwardly yieldable seat mounted on the frame adjacent each opening for temporarily supporting said pin with its butt end in the mouth of said guide.

7. In a pin setting device, a pin-carrying frame comprising a surrounding wall, a shelf carried by said wall and formed with a plurality of openings, a tubular guide disposed in each opening for permitting egress of the associated pin, each guide having a portion projecting above said shelf and cut away to form a receiving mouth for said pin, a downwardly yieldable seat mounted on the frame adjacent each opening for temporarily supporting said pin with its butt end in the mouth of said guide, and a top plate disposed above said seats and formed with openings which respectively register with said guides and seats, the length of the opening being less than the length of the pin whereby the head of the pin may be supported by said top plate.

8. In a pin setting device, the combination with a support, of a vertically movable pin-carrying frame associated with said support, and means connecting said support and frame for maintaining the latter in a horizontal plane both laterally and fore and aft throughout its vertical movements, said means including rack and pinion connections for maintaining said frame in a horizontal plane in one direction, and adjustable flexible connection for maintaining said frame in a horizontal plane in the other direction.

9. In a pin setting device, the combination with a support, of a vertically movable pin-carrying frame associated with said support, and means connecting said support and frame for maintaining the latter in a horizontal plane both laterally and fore and aft throughout its vertical movements, said means including rack and pinion connections for maintaining said frame in a horizontal in the other direction, means for lifting said frame, and a releasable latch for holding said frame in its lifted position.

10. In a pin setting device, the combination with a support including a pair of spaced standards, of a vertically disposed rack bar fixed to the upper end of each standard, a pinion journaled on the lower end of each standard, a pin-carrying frame including a pair of upwardly extending arms, pinions journaled on said arms for engagement with said rack bars, rack bars fixed to said arms and engageable with said first mentioned pinions, and means for lifting said pin-setting frame.

11. In a pin setting device, the combination with a support including a pair of spaced standards, of a vertically disposed rack bar fixed to the upper end of each standard, a pinion journaled on the lower end of each standard, a pin-carrying frame including a pair of upwardly extending arms, pinions journaled on said arms for engagement with said pin setting frame, and a releasable latch for holding said frame in its lifted position.

12. In a pin setting device, the combination with a support including a pair of spaced standards, of a vertically disposed rack bar fixed to the upper end of each standard, a pinion journaled on the lower end of each standard, a pin-carrying frame including a pair of upwardly extending arms, pinions journaled on said arms for engagement with said rack bars, rack bars fixed to said arms and engageable with said first mentioned pinions, and a manually operable flexible connection between the support and frame for lifting the latter.

13. In a pin setting device, the combination with a support including a pair of spaced standards, of a vertically disposed rack bar fixed to the upper end of each stand-

ard, a pinion journaled on the lower end of each standard, a pin-carrying frame including a pair of upwardly extending arms, pinions journaled on said arms for engagement with said rack bars, rack bars fixed to said arms and engageable with said first mentioned pinions, a horizontal tie bar connecting said arms, and a manually operable flexible connection between the support and the center of said tie bar for lifting said frame.

14. In a pin setting device, the combination with a support including a standard and a forwardly extending horizontal arm, of rollers supported on said arm, a pin carrying frame disposed below said arm and having at its rear side vertical sliding engagement with said standard, counterweight disposed in rear of said frame, a cable extending over said rollers and having one end connected to said counterweight and its other end connected to the front side of said frame, and means for lifting said frame.

15. In a pin setting device, the combination with a support including a standard and a forwardly extending horizontal arm, of rollers supported on said arm, a pin carrying frame disposed below said arm and having at its rear side vertical sliding engagement with said standard, said sliding engagement including a rack and pinion connection between the frame and the standard, a counter-weight disposed in rear of said frame, a cable extending over said rollers and having one end connected to said counterweight and having its other end connected to the front side of said frame, and a manually operable flexible connection between the support and the frame for lifting the latter.

16. In a pin setting device, the combination with a support including a standard and a forwardly extending horizontal arm, of rollers supported on said arm, a pin carrying frame disposed below said arm and having at its rear side vertical sliding engagement with said standard, the counterweight disposed in rear of said frame, a cable extending over certain of said rollers and having one end connected to said counterweight and its other end connected to the front side of said frame, and a manually operable flexible connection between the support and the frame for lifting the latter, said manually operable connection including a differential drum journaled on the support, a cable extending over certain of said rollers and having one end connected to said frame and other to one cylinder of said drum, a hand-operated cable connected to the other cylinder of said drum, and a releasable latch co-operating with said drum to hold the frame in its lifted position.

17. In a pin setting device, a pin-carry-

ing frame having a plurality of egress openings for the pins, means associated with the respective openings for temporarily retaining said pins in co-operative relation with
5 said openings whereby said pins through their inertia will be caused to be projected downwardly through said openings upon impact of the frame against the floor, means for vertically moving said frame, and means for maintaining said frame in a horizontal plane both laterally and fore and aft
10 throughout its vertical movement.

AREND WICHERTJES.