Nov. 22, 1932. H. E. TWOMLEY 1,888,520

NAIL GATE FOR NAILING MACHINES

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Fig. 1

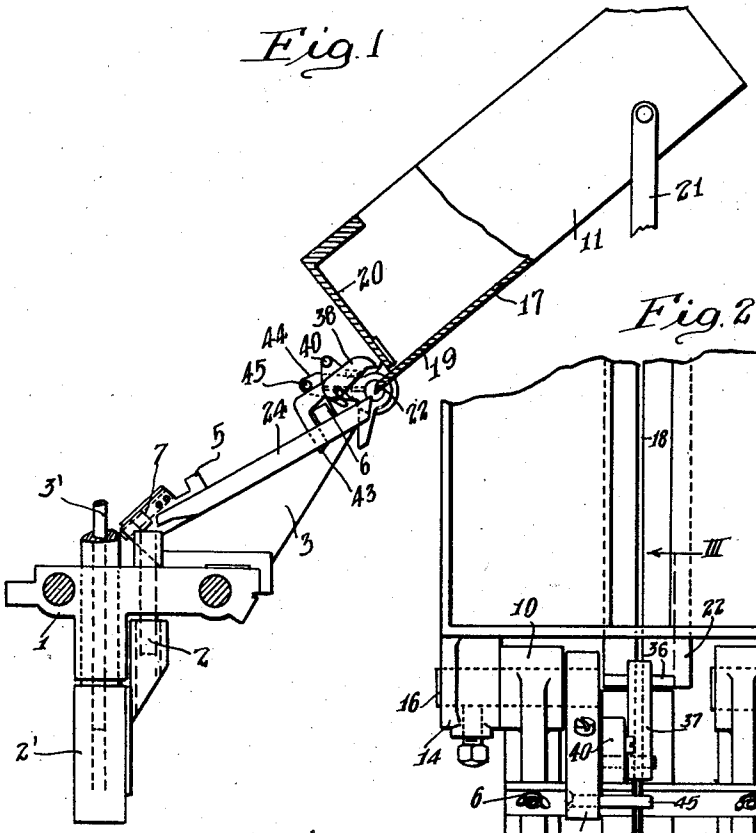


Fig. 2

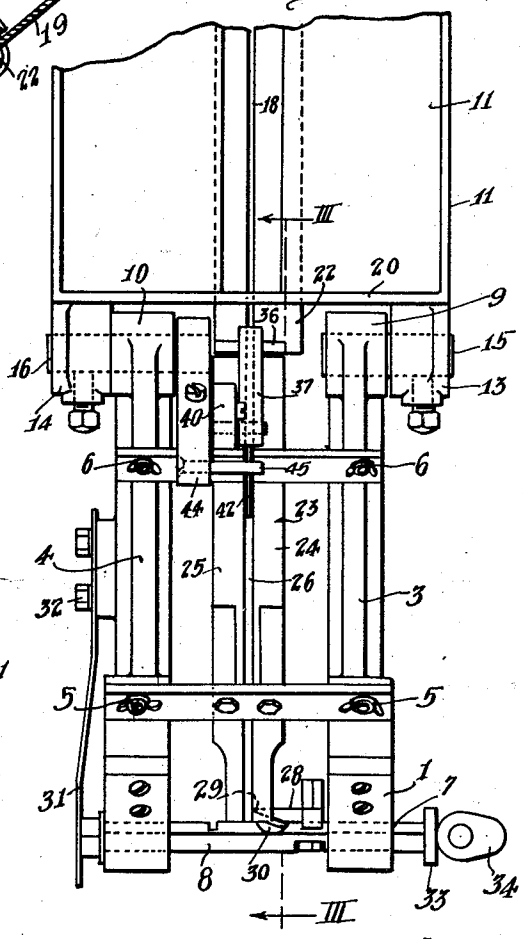
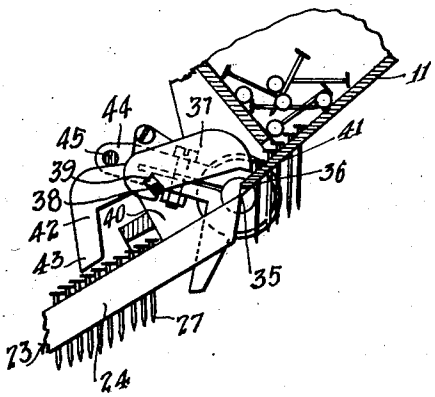


Fig. 3



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Fig. 4

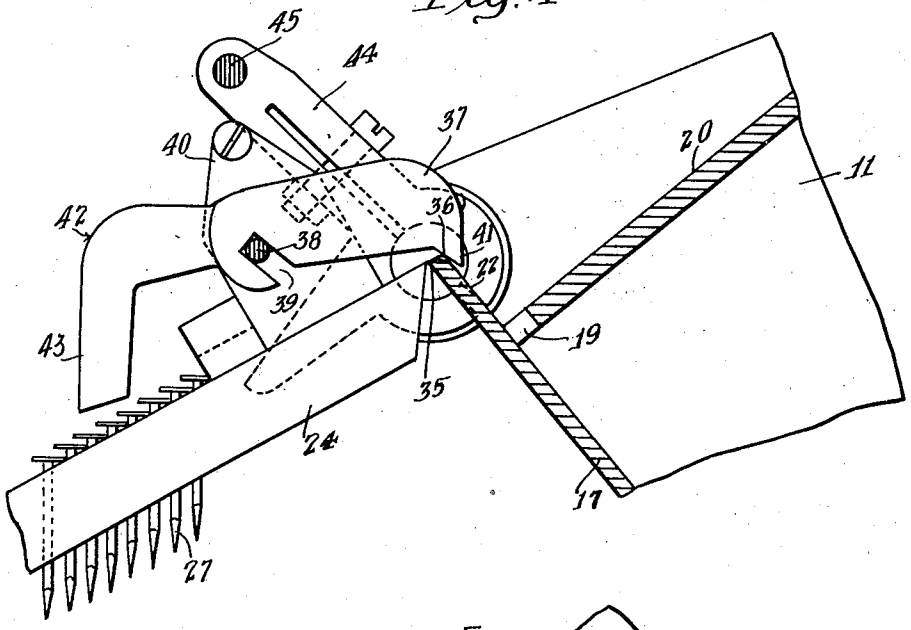
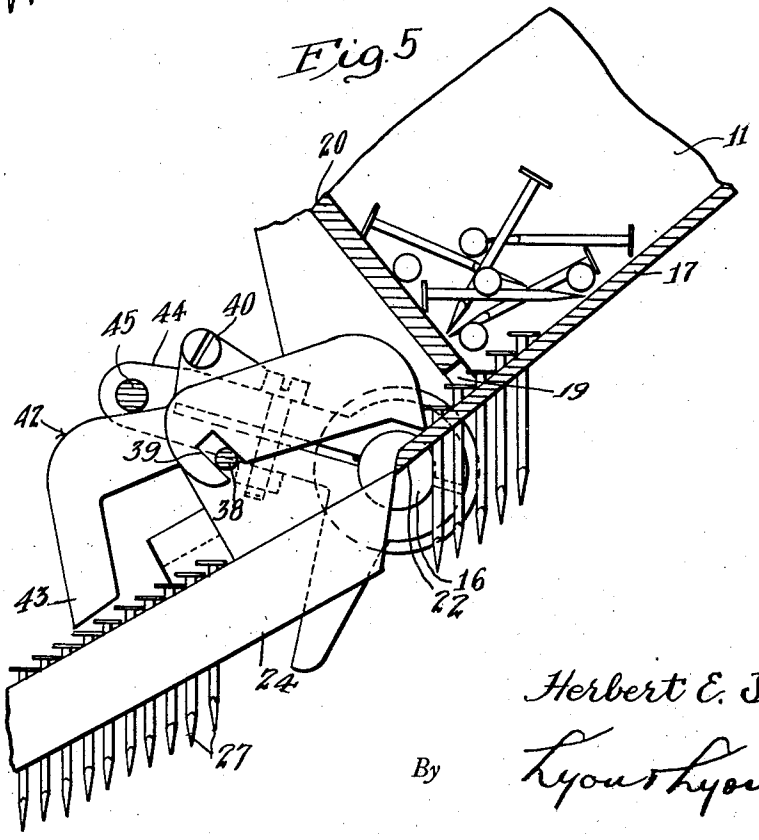


Fig. 5



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NAIL GATE FOR NAILING MACHINES

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Fig. 6

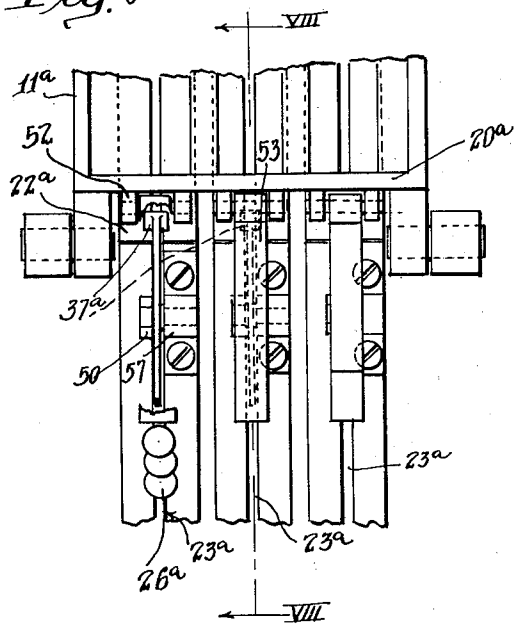
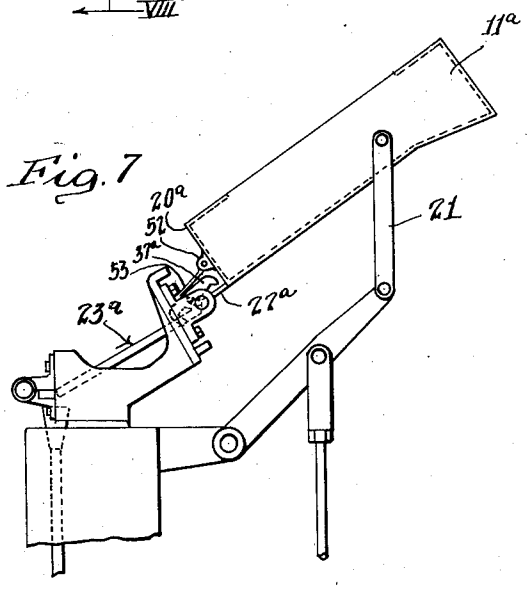


Fig. 7



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Fig. 8

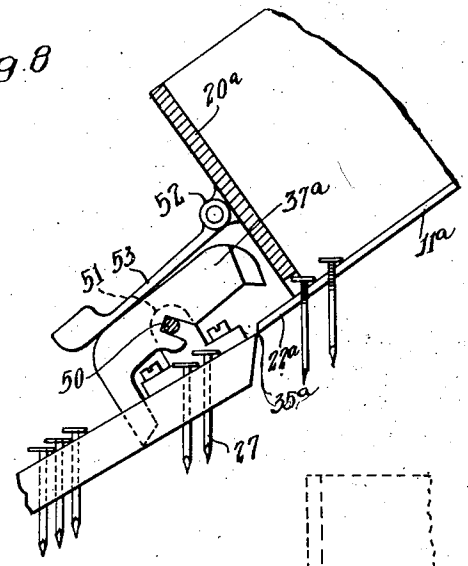


Fig. 9

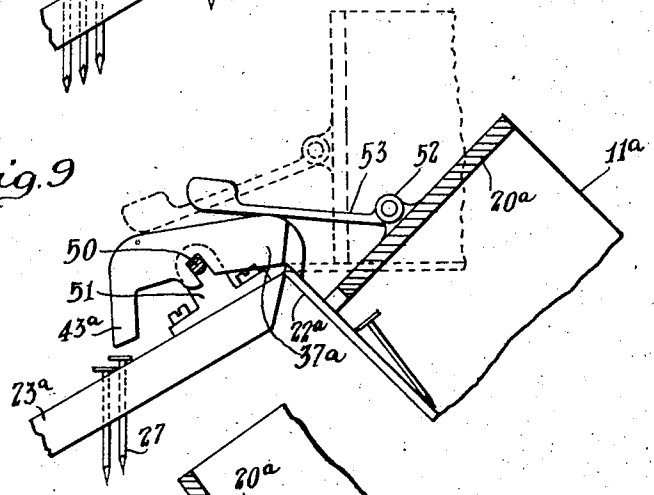
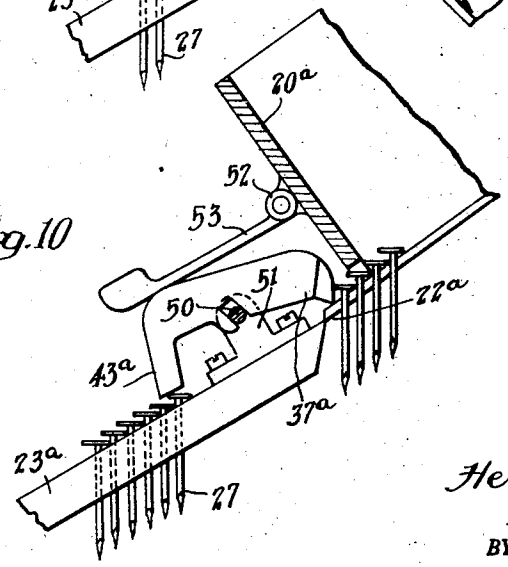


Fig. 10



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Patented Nov. 22, 1932 1,888,520

UNITED STATES PATENT OFFICE

HERBERT E. TWOMLEY, OF RIVERSIDE, CALIFORNIA, ASSIGNOR TO CLARA B. PARKER, OF RIVERSIDE, CALIFORNIA, AS EXECUTRIX OF GEORGE D. PARKER, DECEASED

NAIL GATE FOR NAILING MACHINES

Application filed December 28, 1931. Serial No. 583,585.

My invention relates to nail feeding apparatus for automatic nailing machinery, and has particular reference to a nail gate which controls the feeding of nails through such nail feeding apparatus.

In box making machines or nailing devices of the character employed in packing industries, such as that illustrated in the patent to George D. Parker, No. 1,576,213, granted March 9, 1926, a nail feeding apparatus is employed which automatically aligns the nails and feeds them through strippers to a nail pick device ready for feeding to the nail driving apparatus of the machine. However, the nail feeding devices in such machines are designed to operate continuously, whereas the nails are drawn from the feeding device only as they are required for actual use and the result is that a congestion frequently occurs in the nail feeding apparatus which causes the nails to jam therein and prevents the correct operation of the entire machine.

It is an object of my invention to provide a nail feeding apparatus of the character described with a device for automatically preventing the feeding of more nails through the feeding device than are actually required for use.

Another object of the invention is to provide an attachment for nail feeding devices which will automatically prevent the feeding of nails in excess of the demand of the machine for nails.

Another object of the invention is to provide a nail gate for a nail feeding apparatus which will automatically close the nail feeding apparatus against the further feeding of nails until the supply of nails previously fed through has been reduced to a predetermined amount.

Another object of the invention is to provide a nail gate as set forth in the preceding paragraph in which the nail gate is automatically operated by the movements of the nail feeding apparatus.

Other objects of my invention will be apparent from a study of the following specifications, read in connection with the accompanying drawings, wherein

Figure 1 is a side elevational view of a nail feeding apparatus of the character employed in nailing machines, illustrating my invention attached thereto.

Figure 2 is a top plan view of a portion of the nail feeding device shown in Figure 1.

Figure 3 is a detail sectional view taken along line III—III of Figure 2.

Figure 4 is an enlarged sectional view, similar to Figure 3, illustrating the gate in closed position with the nail pan in retracted position.

Figure 5 is a view similar to Figure 4, illustrating the gate in position to prevent the feeding of nails through the gate.

Figure 6 is a plan view, similar to Figure 2, but illustrating a modified form of my device.

Figure 7 is a side elevational view, similar to Figure 1, of the modified form of my device.

Figure 8 is a detail, sectional view, taken along line VIII—VIII of Figure 6, illustrating the nail gate in its open position.

Figure 9 is a sectional view, similar to Figure 8, illustrating the nail gate in closed position with the nail pan retracted, and

Figure 10 is a sectional view, similar to Figure 8, showing the nail gate in closed position elevated to feed further nails.

Referring to the drawings, I have illustrated in Figure 1 a nail feeding device which may be attached to a nailing machine, as by securing a frame member 1 in any suitable position upon the nail driving machine. The frame member 1 is provided with nail chutes 2 which are adapted to be connected by suitable tubes to feed nails from the feeding device to the nail chucks 2′ and drivers 3′ of the machine.

The frame member 1 is illustrated as comprising a pair of struts 3 and 4 extending in spaced parallel relation and secured to each other as by means of cross bars 5 and 6. The outer ends of the struts 3 and 4 are provided with square openings 7 extending laterally therethrough to reciprocably mount a square nail pick-bar 8 so that the nail pick-bar 8 may be reciprocated at right angles to the direction of the struts 3 and 4.

The upper ends 9 and 10 of the struts 3 and

4 are pivotally secured, respectively, to opposite sides of a nail pan 11, as by forming lugs 13 and 14 upon the nail pan structure through which pivot pins 15 and 16 may extend. This pivotal mounting of the struts upon the nail pan constitutes a pivotal mounting of the nail pan, permitting the same to be oscillated relative to the struts 3 and 4 through a considerable angle.

The nail pan is illustrated as comprising a substantially rectangular box, the bottom 17 of which is provided with a longitudinally extending slot 18 at about its center, the slot 18 communicating with an opening 19 in the front wall 20 of the pan near the base, the opening 19 being sufficient to permit nail heads to pass therethrough provided the plane of the nail head is substantially parallel with the bottom of the nail pan 17.

As will be understood by those skilled in the art, oscillation of the nail pan, as by means of a connecting rod 21, will agitate the nails contained in the pan so that upon each oscillation several of the nails will fall through the slot 18, being held from falling out of the pan by the engagement of the nail heads with the sides of the slot, it being understood that the slot 18 is slightly larger than the diameter of the nail but less than the diameter of the nail head. Thus when the nail pan is elevated to the position shown in Figure 1, any nails which are in the slot 18 will tend to slide forwardly and downwardly along the slot 18 to pass through the opening 19.

The bottom 17 of the nail pan is illustrated as having an extension 22 formed thereon to extend the slot 18 beyond the front wall 20 of the nail pan to a point substantially aligned with the axis of the pivot pins 15 and 16. Immediately adjacent the outer end of the extension 22 a nail stripper or holder 23 is secured, the nail stripper comprising a pair of bars 24 and 25 mounted upon the cross bars 5 and 6 in spaced parallel relation to each other by an amount substantially equal to the width of the slot 18 in the nail pan so that nails which are fed from the pan through the slot 18 and through the opening 19 will pass into the nail passage or the space 26 between the stripper bars 24 and 25. The stripper bars 24 and 25 are illustrated as normally extended downwardly at a considerable angle so that nails which pass into the stripper will fall by gravity toward the nail pick-bar.

By referring particularly to Figure 2, it will be observed that the nails which pass through the stripper will come to rest against the nail pick-bar 8. That is, a line of nails, such as is indicated at 27 in Figure 3, will be spaced along the stripper from the nail pick-bar 8 ready to be taken off by the pick-bar.

By referring particularly to Figure 2, it will be observed that the nail pick-bar 8 is formed with a laterally extending lug or nail pick 28 which moves with the nail pick-bar so that the point 29 thereof will enter between the first and second nails in the line adjacent the nail pick-bar, moving the first nail outwardly of the stripper 23 while holding the remainder of the nails in the stripper. Also, immediately adjacent the lug 28, is a slot or recess 30 in the side of the nail pick-bar 8, which recess is sufficiently large to permit the head of the nail picked off to drop through into the chute 2 and thence to pass to the nailing device.

The nail pick bar 8 is illustrated as being normally biased to the position shown in Figure 2 by means of a relatively heavy spring 31 secured at 32 to the strut 4, while the opposite end of the nail pick is provided with an enlarged head 33 against which a cam 34 may operate to reciprocate the nail pick as the nailing machine operates.

It will be understood by those skilled in the art that the cam 34 will be rotated by some moving part of the nail driving apparatus so that upon each operation of the nail driving apparatus the cam will rotate to feed a new nail into the chute 2.

As hereinbefore described, the elevation of the nail pan 11 will cause nails to slide downwardly into the stripper. However, when the stripper becomes full further nails cannot slide downwardly and hence the nails tend to jam the stripper. This is especially true when a nail is positioned at the axis 35 or juncture between the extension 22 of the nail pan and the upper end of the stripper bars. A nail at this point will be caught by the outer end 36 of the extension 22 when the pan 11 is in its lowermost position and hence when the pan is again elevated the edge 36 will tend to squeeze the nail toward the stripper thus binding all of the nails in the stripper and preventing the effective operation of the nail pick 28.

In order to prevent such jamming, I have illustrated a nail gate 37 which is formed from a flat section of metal having a width greater than the width of the slot 26 in the stripper. The gate 37 is illustrated as pivoted upon a pivot pin 38 which engages a slot 39 in the nail gate, the pin being mounted upon a lug 40 formed upon or attached to one of the stripper bars 25. The upper end of the nail gate is illustrated as being formed with a knife-like edge 41 to rest against the extension 22 of the nail pan 11 so as to obstruct the slot 18 and prevent nails from passing from the nail pan. The nail gate is illustrated as having a tail piece 42 extending rearwardly therefrom, a portion 43 of which extends downwardly toward the stripper and is of such width as to readily pass through the slot 26 between the stripper bars.

It will be observed that the nail gate 37

is biased toward the extension 22 in any suitable manner, as by a spring, or as is illustrated herein, the major portion of the weight of the gate 37 is formed upon the upper side of the pivot to bias the same by gravity. In order to lift the nail gate to permit the passage of nails, I have provided an extending arm 44 frictionally secured to the pivot pin 16 and extending forwardly therefrom to the outer end of which is secured to pin 45 extending across and above the tail piece 42 of the nail gate 37 so that as the pan 11 is elevated the pin 45 will be moved downwardly toward the tail piece 42 and will engage and depress the tail piece to thereby rock the nail gate 37 around its pivot 38, lifting the knife edge 41 of the nail gate from the extension 22 to a position such as is shown in Figure 1, permitting nails to pass the nail gate. The depression of the tail piece 42 will cause the extending end 43 thereof to pass between the stripper bars so that no obstruction to the lifting of the nail gate occurs. Upon the next descent of the nail pan 11 the nail gate follows the downward movement into engagement with the extension 22, while the tail piece is lifted out of the slot 26 permitting nails that had passed from the nail pan to continue down the slide formed by the stripper. However, when nails have filled the stripper to a point at which the nail heads are immediately below the tail piece 42, elevation of the nail pan will not cause the depression of the tail piece 42, since the tail piece is obstructed by the nail heads and hence the nail gate 37 will not be lifted and further passage of nails to the axis 35 will not be permitted. Thus there is no opportunity for nails to become jammed in the stripper.

By reason of the frictional engagement of the arm 44 with the pivot pin 16, movement of the nail pan without movement of the nail gate is permitted. However, as soon as the nail pick-bar 8 has picked off a sufficient number of nails to remove the nails from the tail piece 43, the tail piece may be again depressed and more nails may be fed into the stripper.

A modified form of my invention is illustrated in Figures 6 to 10, in which a plurality of strippers 23*a* are illustrated, each of which is provided with a nail gate 37*a* each of which is pivoted at 50 upon a lug 51 attached to one of the bars of the stripper with which it is associated. In this instance, the nail gate 37*a* is illustrated as comprising a relatively thin strip of metal, the upper end of which is swedged out to form a broad knife edge to engage the extensions 22*a* of the nail pan 11*a* to perform the same function as was described with the nail gate shown in Figures 1 to 5.

The front end 20*a* of the nail pan 11*a* is illustrated as being provided with a plurality of outstanding lugs 52 to which is pivotally secured a weighted lever 53 which extends over and rests upon the nail gate 37*a*. The lugs 52 are illustrated as being spaced considerably above the axis 35*a* so that a considerable linear movement is given the weighted lever 53 whenever the nail pan 11*a* is oscillated.

By referring particularly to Figures 8, 9 and 10, it will be observed that when the nail pan 11*a* is in its lower position the point of contact between the lever 53 and the nail gate 37*a* is on the right-hand side of the pivot, thereby pressing the nail gate downwardly toward the extension 22*a*, thereby assisting the weight of the nail gate in rotating the gate about its pivot 50.

It will be observed that the rear end of the nail gate 37*a* is provided with a downwardly extending portion 43*a* normally adapted to pass into the slot 26*a* of the nail stripper except when this slot is obstructed by nails filling the stripper up to a point immediately below the extending end 43*a*.

Whenever the nail pan 11*a* is elevated the lever 53 will be moved to the position shown in Figures 8 and 10, in which the weight is applied to the nail gate 37*a* on the other side of the pivot to thereby lift the nail gate from engagement with the extension 22*a*. However, when nails are filling the stripper to a point at which the end piece 43*a* can no longer descend into the slot, the nail gate is prevented from lifting so that the gate end is not lifted from the extension 22 and nails are not permitted to pass.

The form of the invention shown in Figures 6 to 10 is particularly adapted for a battery of nail strippers which must be mounted close together, since the construction and operation of the nail gate 37*a* is such that only a small amount of lateral space is needed therefor.

It will, therefore, be observed that I have provided a nail gate construction which permits nails to be fed from the nail pan into the stripper until the stripper is substantially full and which thereafter operates to effectively prevent further nails passing from the pan and thus obviates any possibility of jamming the nail stripper and nail pick.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not wish to be limited to any of the details of construction described herein, except as defined in the appended claims.

I claim:

1. In a nail feeding device having an agitated nail container and a slot through which nails may pass from the container, a nail holder for receiving nails from said slot, a nail gate for obstructing said slot to prevent

passage of nails therethrough, means operably responsive to the movement of said nail container for moving said nail gate to non-obstructing position, and means responsive to the presence of a predetermined number of nails in said holder for preventing effective movement of said nail gate.

2. In a nail feeding device having an agitated nail pan with a slot therein through which nails may pass, a stripper forming a slotted holder for receiving nails from said slot, a nail gate for obstructing said slot to prevent nails passing therethrough, a tail piece on said nail gate aligned with the slot in said holder, and means operably responsive to movement of said nail pan for moving said nail gate from obstructing position and to project said tail piece through the stripper slot, the engagement of said tail piece with nails in said stripper slot preventing effective movement of said nail gate.

3. In a nail feeding device having a nail container and a slot through which nails may pass, a nail stripper constituting a nail holder having a passage therein for receiving nails from said slot, means pivotally mounting said nail container relative to said stripper, a nail gate for obstructing said slot, means operable by pivotal movement of said nail container for moving said nail gate out of obstructing position, and a tail piece on said nail gate engaging nails in said stripper when said stripper contains more than a predetermined number of nails for preventing effective movement of said nail gate.

4. In a nail feeding device having an agitated nail container and a slot through which nails may pass from the container, a nail holder for receiving nails from said slot, a nail gate engaging said slot for obstructing passage of nails therethrough, normally biased by gravity to obstructing position, and means operably responsive to movement of said nail container for moving said nail gate to nonobstructing position, and means operably responsive to the presence of a predetermined number of nails in said holder for preventing effective movement of said nail gate.

5. In a nail feeding device having a nail pan and a slot therein through which nails may pass, a nail stripper constituting a nail holder having a nail passage for receiving nails from said slot, means pivotally mounting said nail pan relative to said stripper, a nail gate for obstructing said slot, means frictionally connected to said nail pan for engaging said nail gate and moving said gate to nonobstructing position, and a tail piece on said nail gate projectable through the nail passage in said stripper when said nail gate is moved and obstructed by the presence of more than a predetermined number of nails in said stripper to prevent movement of said nail gate.

6. In a nail feeding device a nail pan having a slot therein through which nails may pass, a nail stripper constituting a holder having a passage for receiving nails from said slot, means pivotally mounting said nail pan relative to said stripper, a nail gate comprising a pivoted lever having its end on one side of the pivot engaging said nail pan slot and having its opposite end projectable through the nail passage in said stripper, means biasing said nail gate to obstructing position, and means operable by movement of said nail pan for moving said nail gate against the force of said biasing means, said last named means being yieldable whereby obstruction of the passage by more than a predetermined number of nails prevents movement of said nail gate.

7. In a nail feeding device, a nail pan having a slot therein through which nails may pass, a nail stripper constituting a holder having a passage for receiving nails from said slot, means pivotally mounting said nail pan relative to said stripper, a nail gate comprising a pivoted lever having its end on one side of the pivot engaging said nail pan slot and having its opposite end projectable through the nail passage in said stripper, means movable with said nail pan for rocking said lever between obstructing position and a non-obstructing position, said last-named means being yieldable whereby engagement of said projectable end of said nail gate with nails in said stripper when more than a predetermined number of nails are in said stripper prevents effective movement of said nail gate.

8. In a nail feeding device, a nail pan having a slot therein through which nails may pass, a nail stripper constituting a holder having a passage for receiving nails from said slot, means pivotally mounting said nail pan relative to said stripper, a nail gate comprising a pivoted lever having its end on one side of the pivot engaging said nail pan slot and having its opposite end projectable through the nail passage in said stripper, and a weight resting on said nail gate and having a linear movement relative to the pivot thereof responsive to movement of said nail pan for rocking said lever between obstructing position and a non-obstructing position.

Signed at Riverside, California, this 18 day of Dec., 1931.

HERBERT E. TWOMLEY.