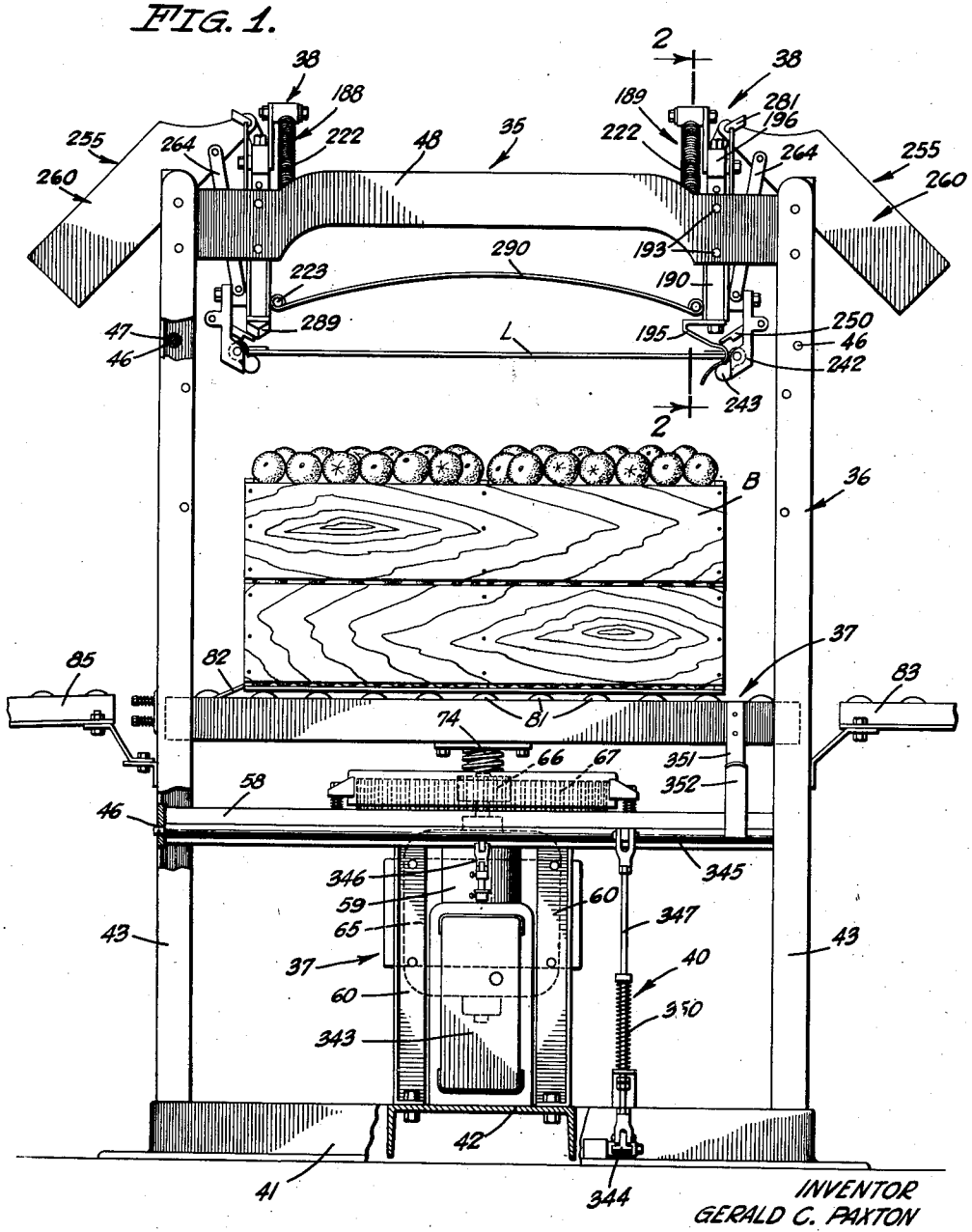
June 13, 1939. G. C. PAXTON 2,161,973

NAIL FEEDING MECHANISM

Filed Feb. 10, 1937 4 Sheets-Sheet 1

FIG. 1.



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NAIL FEEDING MECHANISM

Filed Feb. 10, 1937 4 Sheets-Sheet 2

FIG. 2.

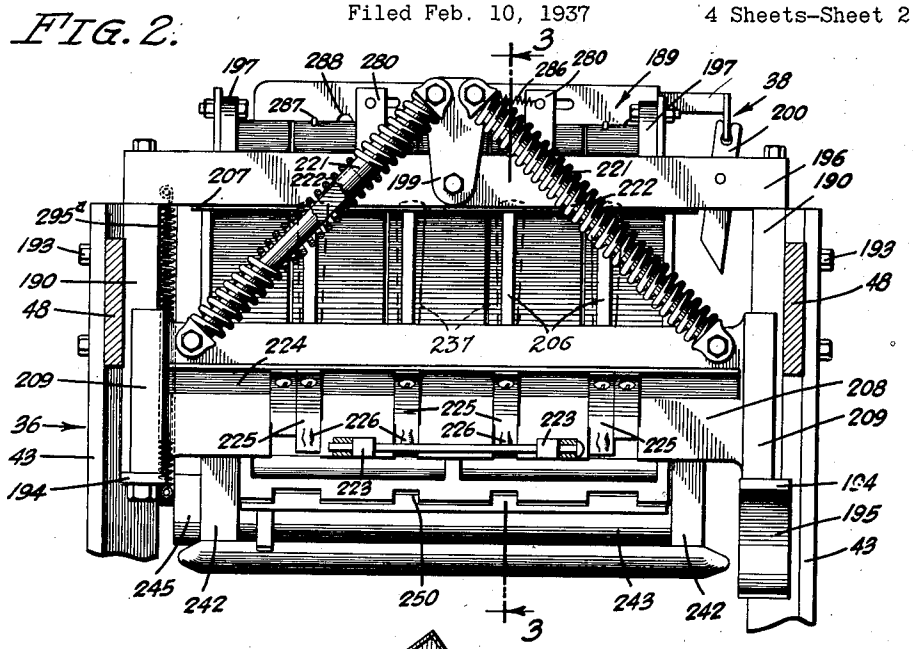


FIG. 4.

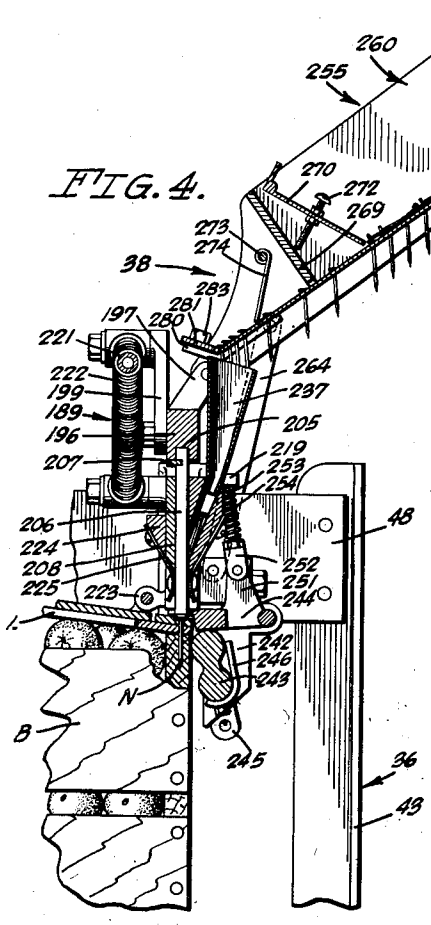
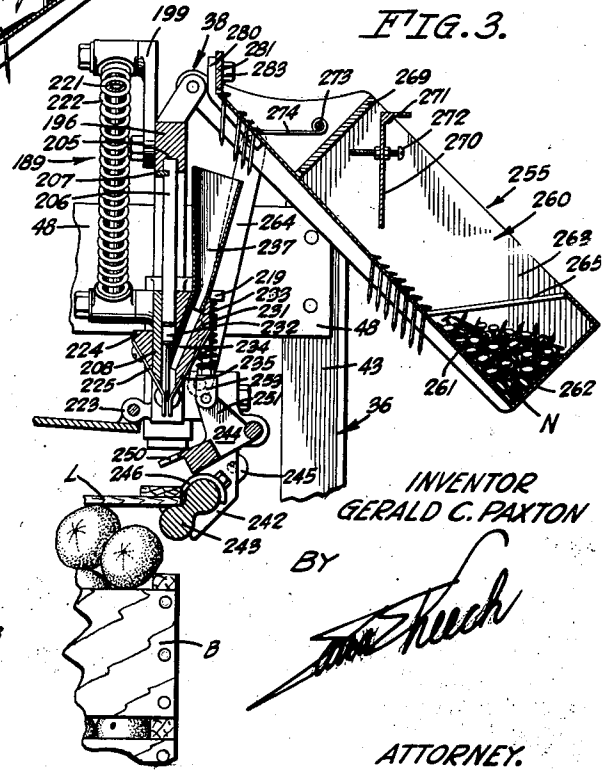


FIG. 3.



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NAIL FEEDING MECHANISM

Filed Feb. 10, 1937 4 Sheets-Sheet 3

FIG. 5.

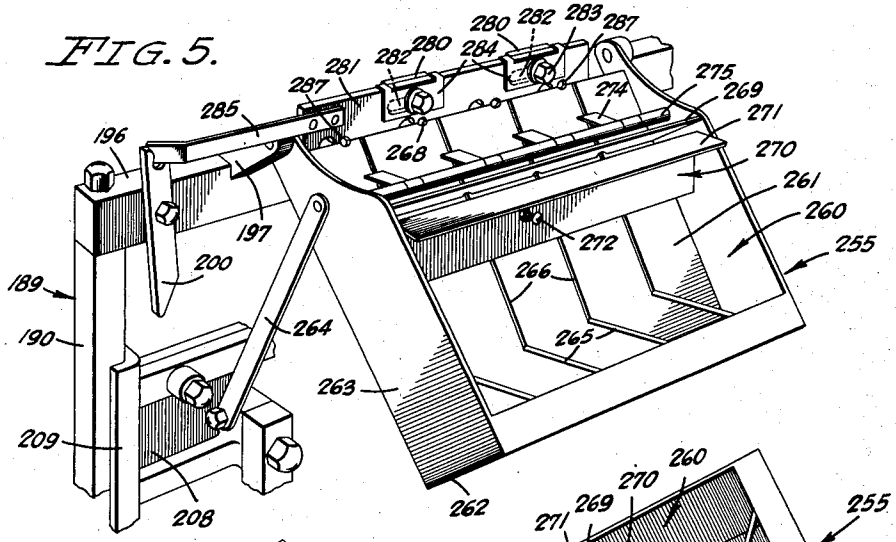
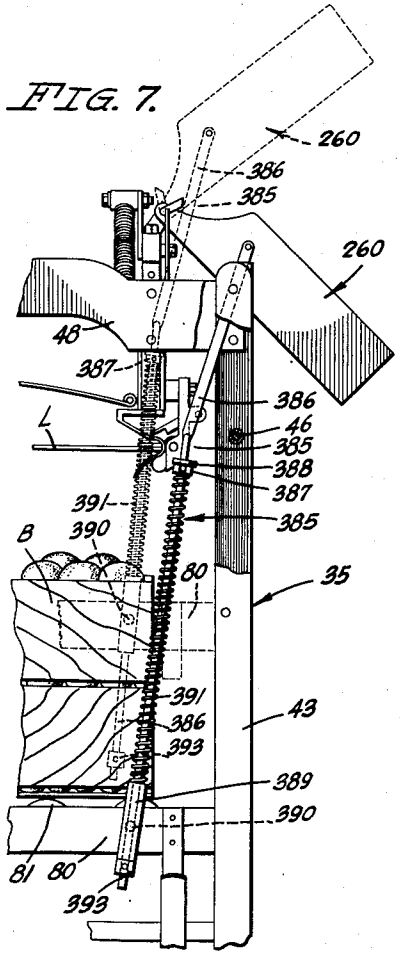


FIG. 7.



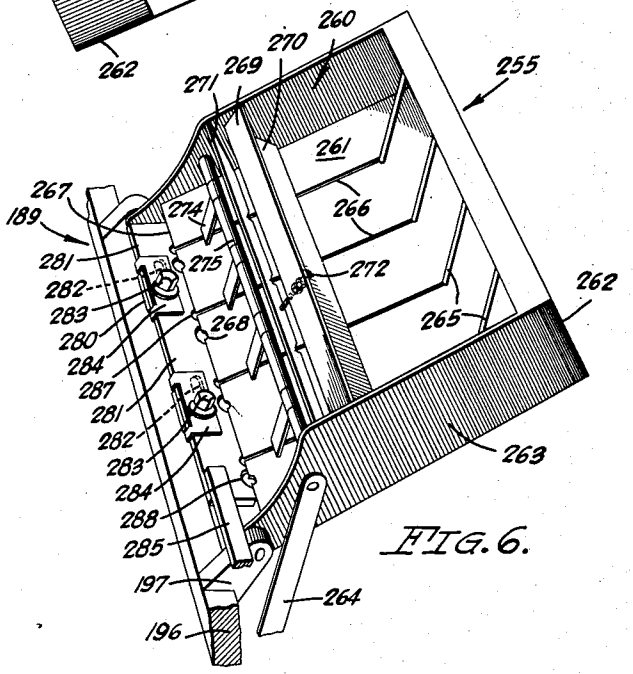


FIG. 6.

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June 13, 1939. G. C. PAXTON 2,161,973

NAIL FEEDING MECHANISM

Filed Feb. 10, 1937 4 Sheets-Sheet 4

FIG. 9.

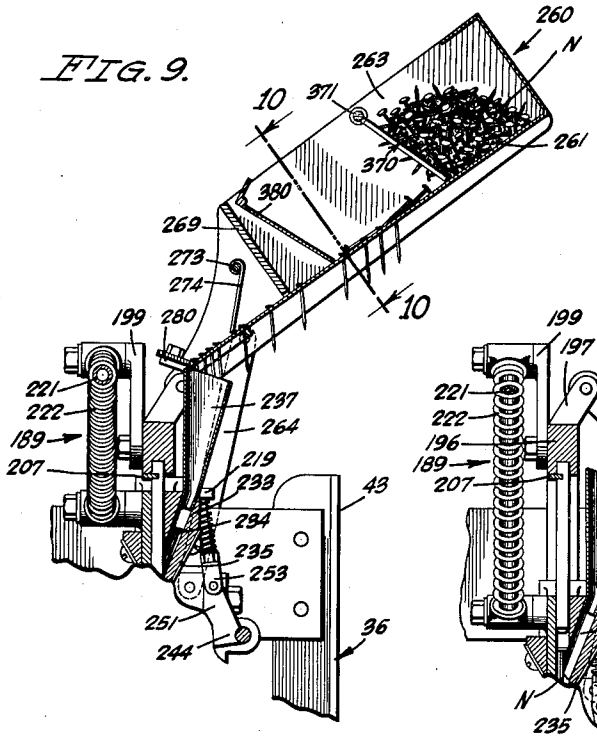


FIG. 8.

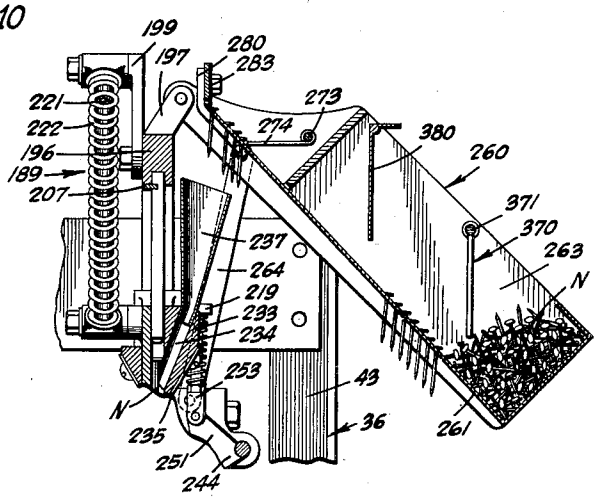


FIG. 11.

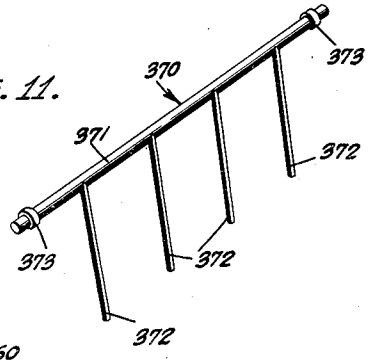
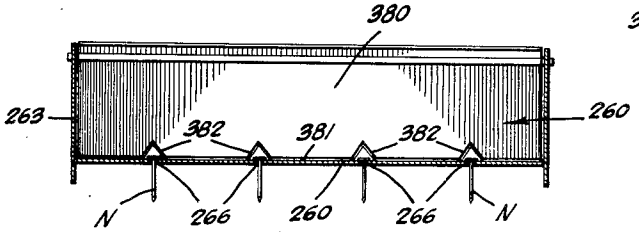


FIG. 10.



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Patented June 13, 1939

2,161,973

UNITED STATES PATENT OFFICE

2,161,973

NAIL FEEDING MECHANISM

Gerald C. Paxton, Santa Ana, Calif., assignor to Food Machinery Corporation, San Jose, Calif., a corporation of Delaware

Application February 10, 1937, Serial No. 125,096

18 Claims. (Cl. 1—16)

This invention relates to the nailing machine art and has particular utility in feeding nails automatically as these are required by a nailing machine.

It is an object of my invention to provide a nail feeding mechanism which is simple in construction and certain in its operation.

While my invention is adapted for use with a wide variety of types of nailing machines, certain features of the invention render it particularly useful on a type of nailing machine shown in copending application, Serial No. 688,104 filed September 5, 1933, in which I am a joint applicant, the present application being a continuation in part of the aforesaid copending application. In that particular machine the nail drivers are fixed in the upper structure of the frame; the nail chucks are slidably suspended about the lower ends of the drivers; and the work is supported on a nailing table which is elevated to lift the work against the nail chucks which are supplied with nails prior to each nailing operation by the nail feeding mechanism of my invention, the nailing table then continuing upward to lift the nail chucks and impale the work on the nails with the same effect as if the nails had been driven downwardly into the work.

It is a further object of my invention to provide a nail feeding mechanism which is particularly adapted to operate in the feeding of nails to a nailing machine of the particular type above noted.

The manner of accomplishing the foregoing objects, as well as further objects and advantages will be made manifest in the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a nailing machine in which a preferred embodiment of my invention is incorporated.

Fig. 2 is an enlarged sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a view similar to Fig. 2 with the parts thereof in different operative positions.

Fig. 5 is a perspective view of the nail feeding mechanism of my invention positioned as shown in Fig. 3.

Fig. 6 is a perspective view of the nail feeding mechanism of my invention positioned as shown in Fig. 4.

Fig. 7 is a fragmentary front elevational view of a nailing machine embodying the nail feeding mechanism of my invention with a modified form of hopper rocking means.

Fig. 8 is a view similar to Fig. 3 and illustrating modified forms of the baffle plate and gridiron of my invention.

Fig. 9 is a view similar to Fig. 4 illustrating different operative positions of the aforesaid modified forms of baffle plate and gridiron.

Fig. 10 is a cross sectional view taken on the line 10—10 of Fig. 9 and illustrating the modified form of baffle plate shown therein.

Fig. 11 is a perspective view of the modified form of gridiron shown in Figs. 8 and 9.

Referring specifically to the drawings and particularly to Figs. 1–6 inclusive, I have shown therein a preferred embodiment of my invention as incorporated in a lid nailing and strapping machine 35, this machine including a frame 36, an elevator 37, a nailing mechanism 38, and a control mechanism 40.

The frame 36

The frame 36 includes a rectangular base 41 having a heavy transverse channel iron 42 and four posts 43 which are rigidly secured to the corners of the base 41 and extend vertically upward therefrom. End pairs of the posts 43 are connected by bars 46 and spacers 47. Upper ends of side pairs of the posts 43 are connected together by relatively heavy side plates 48.

The frame 36 also includes a channel iron 58 which is supported at opposite ends on the bars 46. The channel iron 58 has an aperture formed vertically therethrough, through which a hollow standard 59 extends, the lower end of this standard resting on channel iron 42 and being welded to both the channel irons 42 and 58. Also extending between and secured at their ends to the channel irons 42 and 58 are angle iron motor struts 60.

The elevating table 37

Bolted on the motor struts 60 is an electric motor 65, this motor having a drive pinion 66 which meshes with a jack gear 67, the latter having a nut formed at the middle thereof which threadedly engages a jack screw 74 on the upper end of which is fixed a nailing table 80. This nailing table is provided with rollers 81 to form a conveyor on which a box B may be received in the machine 35 a stop 82 being located on the discharge end of the nailing table to properly locate the box B thereon. The box B is conveyed to the machine 35 on a packed box conveyor 83 and after the box B has been lidded and strapped it is discharged from the machine on to a discharge conveyor 85.

The nailing mechanism

The nailing mechanism 38 consists primarily of two nailing units 188 and 189, these being substantially identical so that a description of one with an explanation of the differences will suffice for both. The nailing unit 189 has side slide bars 190, the unit being rigidly mounted upon the side plates 48 by cap screws 193 extending through

suitable apertures of the side plates 46 and into suitable threaded holes provided in the side slide bars 190. Secured at the lower ends of the side slide bars 190 are chuck beam stops 194, the front stop 194 having a lid guiding hook 195 secured thereon. Extending between and preferably rigidly connected at its opposite ends to the upper ends of the side slide bars 190 is a cross bar 196, this bar having hopper supporting ears 197, an upwardly extending spring hanger 199 pivoted thereon, and a picker operating cam lever 200 pivotally mounted thereon. Formed in the lower face of the cross bar 196 is a groove 205 and square nail drivers 206 have their upper ends held in place in the groove 205 by a key 207 which extends into suitable notches provided in the drivers 206, the key 207 being secured in any suitable manner to the lower face of the cross bar 196.

Disposed between the side slide bars 190 is a chuck beam 208 having guide shoes 209 provided on its opposite ends, these guide shoes embracing the side slide bars 190 so as to guide the chuck beam vertically thereon. Provided on the upper edge of the chuck beam 208 at the middle of the beam is a lid centralizer spring lug 219. Pivotally mounted on the spring hanger 199 and on opposite ends of the chuck beam 208 are telescopic spring spindles 221 on which heavy compression springs 222 are mounted under constant tension. Provided on the lower edge of the chuck beam 208 and extending inwardly is a pair of crown sheet attaching eyes 223.

Formed on the chuck beam 208 and extending inwardly across its entire length is a chuck spring supporting boss 224, chuck springs 225 being secured by screws to an inclined lower face of this boss and extending through suitable notches in the lower edge of the chuck beam 208 and downwardly on the opposite side of the chuck beam. The lower ends of the chuck springs 225 are bent to extend vertically downward and pockets 226 are formed in these springs, preferably by expressing the material thereof outwardly. Yieldably held against the chuck beam 208 by any suitable means is a compound spring chuck block 231, this block having a plurality of driver guideways 232, provided thereon, and a rearwardly extending boss 233 opposite each of these guideways, this boss providing a nail feeding duct 234, leading into the channel 232 and inwardly inclined faces against which chuck springs 235 are secured by screws. These springs are substantially identical with springs 225 and extend inwardly and downwardly to cooperate with springs 225 in the manner which will be made manifest hereinafter.

Removably supported in each of the ducts 234 and connected therewith is a nail funnel 237. Mounted on the chuck beam 208 are brackets 242, these pivotally carrying opposite ends of an end tucker 243 and a lid depressor and centralizer 244. The end tucker 243 comprises two substantially cylindrical bodies, one of which is disposed on the axis of rotation of the tucker and the other of which is disposed parallel with the first body and spaced therefrom, the two being connected with a substantially continuous web of metal. After extending through the rearmost bracket 242, the tucker 243 has an arm 245 which extends outwardly at an angle as shown in Fig. 3, this arm being connected by a spring 295a to the bar 196. The end tucker is thus held yieldably in its downwardmost position as shown in Figure 3, in which position it is adapted to support one end of a box lid L. Secured on the tucker 243 is a lid backstop 246.

The lid depressor and centralizer 244 has a cross section as shown in Figs. 3 and 4, which provides a notched lip 250 which extends inwardly therefrom. Pivotally connected to an arm 251 on the lid depressor and centralizer is the clevis of a rod 253, the upper end of this rod extending through the lug 219 and carrying a spring 254, which constantly urges the lid depressor and centralizer 244 downwardly.

Included in the nailing mechanism 38 is a pair of nail supporting and feeding units 255, one of which is associated with each of the nailing units 188 and 189. Each of the units 255 includes a nail hopper 260, having a floor 261, a rear wall 262, and side walls 263, the inner ends of the latter being pivotally connected with the hopper 263 are also connected by links 264 to the chuck beam 208, as shown in Fig. 5.

Extending from the upper edge of the rear wall 262 to spaced points in the floor 261 are the individual rods of a nail mass breaking gridiron 265. From the points where the rods of this gridiron are secured to the floor 261, slots extend forwardly in this floor to a front edge 267 of the latter. Formed in the edge 267 adjacent to each of the slots 266 is a relatively small keeper notch 268. The hopper 260 has a fixed baffle wall 269 extending between the walls 263 and rigidly secured thereto, and to the floor 261, there being notches provided in the lower edge of the baffle wall 269, each of these notches spanning one of the slots 266 to permit nail head of nails which have dropped downwardly into the slots 266 to pass underneath the baffle wall 269. Pivotally mounted between the walls 263 is a baffle plate 270, this plate having a flange 271 at its upper end, and a set screw 272, the latter being adapted to engage the fixed baffle wall 269 as shown in Fig. 4 to limit the downward swinging movement of the baffle plate 270. Also extending between the walls 263 and in front of the fixed baffle wall 269 is a rod 273 and in front of the fixed baffle wall 269 is a rod 273 on which are pivotally mounted a series of nail traps 274, these being held in spaced relation by spacers 275. Each of the traps 274 is disposed over one of the slots 266 as shown in Figs. 5 and 6.

Referring now to Figs. 2, 3 and 4, two brackets 280 are connected to the lower face of the hopper floor 261 and extend forwardly beyond the front edge 267 of said floor. Slidably mounted on these brackets 280 (Figs. 3, 4 and 5) is a picker bar 281 having a pair of slots 282 through which cap screws 283 extend, these screws then screwing into suitable apertures in the brackets 280. Disposed between the heads of the cap screws 283 and the picker bar 281 so as to cover slots 282 are guard washers 284. Fixed on the picker bar 281 is an actuating arm 285, the extremity of which is bent as shown in Fig. 5 to extend into the upper bifurcated end of the cam lever 200 by which the picker bar 281 is adapted to be actuated. As shown in Fig. 2, a coil spring 286 attaches to one of the brackets 280 and the picker bar 281 so as to constantly urge this picker bar into the position in which it is shown in Figs. 2 and 5.

The picker bar 281 has its lower edge disposed parallel and close to the front edge 267 of the hopper floor 261, and this edge of the picker bar is provided with a series of pairs of notches, one pair for each of the slots 266 of the hopper floor. Each of these pairs of notches comprises a small

transfer notch 287 and a large discharge notch 288, the notch 287 of each of these pairs being opposite one of the keeper notches 268 when the picker bar is positioned as shown in Fig. 5, while the large discharge notch 288 of that pair is on the opposite side of the keeper notch 268 from the slot 266 adjacent that keeper notch 268. The notches 287 and 288 are spaced apart the same distance from their centers as is each of the slots 266 and the adjacent keeper notch 268.

We have now completed the description of the nailing unit 189. Nailing unit 188 is an exact duplicate of nailing unit 189 except that instead of a hook 195 being formed on the forward chuck beam stop 194, the corresponding chuck beam stop in nailing unit 188 merely has a shallow V-shaped lid end guide 289, as shown in Fig. 1. Suspended at its opposite ends on eyes 223 is an arched crown sheet 290.

The control mechanism 40

This mechanism includes a switch 343 which is mounted upon a frame 36 as shown in Fig. 1, this switch being controlled by a foot pedal 344 through a shaft 345 to which a switch is connected by linkage 346, and to which the pedal is connected by a link 347, the latter being urged upwardly by a spring 350. This arrangement is so that when the operator depresses the pedal 344 with his foot, it rotates the shaft 345 to lift on the linkage 346 and engage the switch 343 to energize the motor 65 to cause it to rotate in a direction to lift the nailing table 80. When the operator releases the pedal 344 to allow it to return to the position in which it is shown in Fig. 1, the current is shut off from the motor 65 so that this stops, leaving the nailing table 80 where it happens to be. When the operator releases all pressure from the pedal 344, the spring 350 on the link 347 lifts this link, thereby causing the switch 343 to reverse the direction of rotation of the motor 65 and causing this to rapidly draw the nailing table 80 downwardly. When the nailing table approaches its lowermost position, an arm 351 thereon engages an arm 352 on the shaft 345 so as to rotate the latter sufficiently to neutralize the switch 343 and shut off the motor.

Operation

In commencing the operation of the machine 35 parts thereof are positioned as shown in Fig. 1. A box B is first rolled on the nailing table 80 from the conveyor 83 until the box comes to rest against the stop 82. A lid L is then inserted from the machine into the position in which this is shown in Fig. 1, with the ends of the lid resting on the end tuckers 243. At this time it is to be noted that the ends of the box B are located vertically beneath the end tuckers 243, the ends of the lid L, and the batteries of nail chucks in the nailing units 188 and 189. The operator now steps upon the pedal 344, causing the nailing table 80 to rise until the overfilled fruit F therein engages the lid L and arches this upwardly against the crown sheet 290. During this upward movement the end tuckers 243 engage the fruit in the box and tuck this inwardly, and these tuckers are then engaged by the ends of the box and rotated upwardly and outwardly allowing the lid ends to be pressed on the box ends by the lip 250 of the lid depressor and centralizer 244. When this is effected the upward movement of the nailing table is transmitted positively to the box ends and lid ends through the lid depressor and centralizer so as to lift these against the lower faces of the chuck beams 208. Up until this point the chuck beams 208 have been held in their downwardmost positions by the downward pressure exerted against the chuck beams by the springs 222. The lid ends are now pressed on to the ends of the box in readiness to be nailed there, and this is effected by the chuck beams responding to the positive upward pressure of the nailing table so that these beams rise, compressing springs 222 and permitting nails deposited in the guideways 232 to be held downward by the stationary nail drivers 206, thus causing the lid ends and box ends to be impaled on these nails as shown in Fig. 4 with the same effect as if the nails had been driven down through the lid ends into the ends of the box. When the box reaches its upwardmost position as shown in Fig. 4, the motor stalls, the operator removes his foot from the pedal 344, and the action of spring 350 causes the switch 343 to reverse the motor and draw the nailing table 80 downward until it is stopped in its downwardmost position by engagement of the arms 351 and 352 as above described.

As the nailing table returns downwardly from its upwardmost position, the parts embodied in each of the nailing units 188 and 189 return to the positions in which they are shown in Figs. 1, 2 and 3.

The upward and downward reciprocation of the chuck beams 208 in each nailing operation accomplishes through the links 264 the oscillation of the nail hopper 260 between downwardly inclined positions as shown in Figs. 1, 2, 3 and 5 and upwardly inclined positions as shown in Figs. 4 and 6.

A quantity of nails N are maintained in the hopper 260, the great mass of these being retained in the back end of each of the hoppers 260 behind the bars of the gridiron 265 thereof. As the hoppers 260 are rocked upwardly as shown in Fig. 4, the mass of these nails behind the grid 265 are hurled against the bars of this grid so that individual nails are separated from the mass and drop forwardly on to the floor 261 in front of the gridiron. A certain portion of these individual nails roll into position where the body of the nail drops into one or the other of the slots 266. The nails which thus find their way into these slots hang therein by their heads, and with each upward rocking of the nail hoppers, these nails slide downwardly underneath the baffle plate 270 and baffle wall 269 until they eventually pass under the latches 274 by which they are retained in those portions of the slots 266 which lie adjacent to the mouths of these slots at the edge 267 of the hopper floor 261. It is thus seen that the latches 274 always retain a supply of nails in the forward ends of the slots 266 in readiness to be fed from these slots.

When the chuck beam 208 moves upwardly in each nailing operation, it not only tilts the hopper 260 upwardly as shown in Figs. 4 and 6, but the roller 213 shown in Fig. 5 engages the picker operating cam lever 200 so as to shift the picker bar 281 rearwardly into the position in which it is shown in Fig. 6. This places the transfer notches 287 of the picker bar 281 opposite the respective hopper floor slots 266 at a time when this hopper floor is inclined steeply upwardly from the edge 267 thereof. This results in a nail being delivered by gravity from the mouth of each of the slots 266 to each of the transfer notches 287. This same movement of the picker bar 281 brings the large discharge notches 288 opposite the small keeper notches

268 in the hopper floor edge 267, with a result which will be explained hereinafter. The return movement of the picker bar to the position in which it is shown in Fig. 5 commences while the hopper floor is still inclined upwardly from its edge 267 so that the transfer notches 287 carry the nails fed thereinto away from in front of the slots 266, and when the picker bars 281 have returned to their forwardmost position as shown in Fig. 5 and the hoppers 260 have rocked downwardly as shown in that view, the nails thus removed from the slots 266 are deposited from the transfer notches 287 into the keeper notches 268.

The nails thus deposited in the keeper notches 268 remain there until another rocking cycle of the nail hoppers 260 takes place. When this occurs, the rearward movement of the picker bars 281 commences before the hoppers 260 have swung upwardly sufficiently to transfer the nails in the keeper notches 268 back into the transfer notches 287. These nails thus remain in the keeper notches 268 as the picker bars 281 slide rearwardly and the hoppers 260 are rocked upwardly past the horizontal position into their upwardly inclined positions as shown in Fig. 6. The rearward movement of the picker bars 281 brings the large discharge notches 288 opposite the keeper notches 268 as shown in Fig. 6 so that the nails which were fed to the keeper notches during the preceding hopper rocking cycle now drop downwardly through the discharge notches 288 into the respective nail funnels 237 positioned therebeneath as shown in Fig. 4. It is thus seen that a nail is fed downwardly through a funnel 237 to each of the nail driving guideways 232 of the machine 35 so that in each nailing operation, this guideway contains a nail which will be driven therefrom by the driver 206 which slides into this guideway as the chuck beams 208 are lifted.

From the foregoing description it is evident that I have provided an extremely simple nail feeding mechanism which combines both the nail hopper and the nail feed control and in which these are operated in a very simple manner directly from the moving parts of the nailing mechanism.

Reference is now made to Figs. 8, 9, 10 and 11 which illustrate modified means for use in my invention for breaking up the mass of nails in the nail hopper and facilitate their dropping individually into the stripping slots of the hopper. These means include modified form of gridiron 370 which, as shown in Fig. 11, includes a shaft 371 having bars 372 welded thereto and extending downwardly in parallel relation. Opposite ends of the shaft 371 are provided with collars 373 to space the gridiron 370 relative to the side walls 263 of the hopper 260 when the extreme ends of the shaft 371 are disposed rotatably in suitable holes in the side walls 263. The gridiron 370 is free to swing by gravity about the shaft 371, as the hopper 260 is rocked upwardly, until the lower ends of the bars 372 engage the bottom 261 of the hopper. This limited position to which the gridiron 370 rocks as the hopper is lifted is shown in Fig. 9, where it is seen that the nails have fallen inwardly and downwardly against the bars 372 with the result that individual nails separate themselves from the mass which gravitate downwardly on to the floor 261, so that a certain portion of these fall into the slots 266.

In Figs. 8, 9 and 10 I also show a modified form of swinging baffle plate 380 which is substantially like the swinging baffle plate 270 previously described but which lacks a stop screw 272, the plate 380 being slightly longer than the plate 270 so that the lower edge 381 thereof engages the hopper bottom 261 to limit the swinging movement of the baffle plate 380 in response to the upward rocking of the hopper 260. The lower edge 381 of the baffle plate 380 is provided with notches 382, one of these being located over each of the slots 266, these notches providing free spaces when the edge 381 of this plate is resting against the floor 261, through which the heads of nails may pass to permit the nails hanging in the slots 266 to slide downwardly beneath the baffle plate 380 when the hopper 260 is in upwardmost position as shown in Fig. 9.

The mounting of the baffle plate 380 so as to swing free of the floor 261 when the hopper 260 is in downwardmost position causes all the nails which might have become engaged with the lower edge of this plate to be freed to gravitate downwardly. Furthermore the freedom of the gridiron 370 to swing as shown in Fig. 8 when the hopper is down, permits all the nails thus gravitating rearwardly in the hopper to pass underneath the gridiron 370 into the mass of nails confined in the rear portion of the hopper. This accomplishes a cleaning out of all places where the nails might stick in the hopper each time the hopper returns to downward position, and assures that in the next upward rocking movement of the hopper, what nails there are in the hopper besides those which have already dropped into the slots 266, will have to be sifted through the gridiron 370 in order to again appear on the floor 261 of the hopper between the baffle plate 380 and the gridiron 370. It is to be noted that the bars 372 are equal in number and are spaced equally with the slots 266 so that what nails are thrown between the bars, with the upward swing of the hopper, land on the floor in between the slots 266 so as not to interfere with the tendency of nails lying near these slots to roll into the slots.

Referring now to Fig. 7, I have shown herein a modified form of means for rocking the nail hoppers 260. Each of these means comprises a telescopic link 385 and includes a rod 386 which is flattened at its upper end and pivotally connected to the hopper 260 which it is to operate. The rod 386 has a collar 387 adjustably secured thereon, the collar having a finger 388 which extends outwardly so as to extend under the frame plate 48 on that side of the machine. The lower end of the rod 386 extends through a collar 389 which is pivotally mounted by a pin 390 on nailing table 80 of the machine 35. Coiled about the rod 386 between the collars 387 and 389 is an expansion spring 391. Fixed adjustably upon the rod 386 below the collar 389 is a stop collar 393. When equipped with links 385 for operating the hoppers 260, the machine 35 of my invention operates in a similar manner to that already described, excepting that the upward swinging of the nail hoppers 260 starts as soon as the elevation of the nailing table 80 commences. The collar 387 is so adjusted on the rod 386 as to engage the lower edge of the frame plate 48 thereabove, when the hopper 260 has been rocked upwardly to the proper upwardly inclined position. During the balance of the upward movement of the nailing table therefore, the collar 389 merely compresses the spring 391, but does not impart any further elevation to the

link 286. One of the advantages of the link 286 is that a much slower upward rocking movement may be imparted to the hoppers 260 by the use of these links than by the use of the links 264, the lower ends of which are pivoted to the chuck beams 208. This is desirable as where the nailing operation is performed speedily, the chuck beams 208 rise with such speed as to flip the nails from the hopper 260 when this stops in its upward position.

What I claim is:

1. In a nail feeding mechanism, the combination of: a nail hopper having a rear wall, side walls, and a floor, there being a slot formed in said floor having a mouth at the front edge of said floor, there being a keeper notch in said edge adjacent the mouth of said slot; means for rocking said hopper about an axis parallel to said edge between positions inclined upwardly and inclined downwardly from said edge; a nail picker bar mounted adjacent said edge and shiftable between nail receiving and nail transferring positions, there being a small transfer notch and a relatively large discharge notch in said picker bar, said transfer notch being opposite said mouth and said discharge notch being opposite said keeper notch when said picker bar is in nail receiving position, said bar being in this position when the hopper is inclined upwardly from said edge, said transfer notch being opposite said keeper notch when said hopper is inclined downwardly from said edge and said picker bar is in nail transferring position; and means for coordinately actuating said hopper and picker bar as aforesaid.

2. A combination as in claim 1 in which a latch means is provided on said hopper to prevent the nails disposed in said slot close to said mouth from sliding back said slot towards the rear end of said hopper when said hopper is inclined downwardly from said edge.

3. In a nail feeding mechanism, the combination of: a nail hopper having a floor with a stripper slot therein, said slot having a mouth at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; a picker bar shiftably mounted on said hopper adjacent said edge of said floor; means for rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; and means for actuating said picker bar coordinately with the hopper to receive a nail from said mouth in the first of said positions, isolate said nail temporarily while said hopper is in the second of its positions, and discharge said nail upon said hopper returning again to the first of said positions.

4. In a nail feeding mechanism the combination of: a nail hopper having a floor with a stripper slot therein, said slot having a mouth at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; means for rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; and feed control means slidably disposed adjacent said edge opposite the mouth of said slot and operating to receive a nail from said mouth during each such rocking cycle and during each such cycle to drop a nail so received, said receiving and dropping functions both taking place when said hopper is inclined upwardly from said edge.

5. A combination as in claim 4 in which said feed control means is mounted on said hopper.

6. A combination as in claim 4 in which the nail dropped during each rocking cycle is the nail received during the cycle immediately preceding.

7. A combination as in claim 4 in which said feed control means is mounted on said hopper and in which the nail dropped during each rocking cycle is the nail received during the cycle immediately preceding.

8. In a nailing machine the combination of: a table for supporting the work; a nailing unit including a nail driving bar, a plurality of drivers thereon; a plurality of chucks suspended about the lower ends of said drivers and slidable relative to the latter, and a chuck beam for uniting said chucks; means for causing relative vertical movement between said table and said unit to bring said chuck beam and work into engagement and cause said chuck beam to slide relative to said drivers and cause nails to thus be driven into said work; a nail hopper having a floor with stripper slots therein, said slots having mouths at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge thereof; link means pivotally connected to said hopper and to said nailing table for rocking said hopper about said axis between positions in which said floor is inclined upwardly and then downwardly relative to said edge; and means for controlling the delivery of nails from the mouths of said slots to said chucks.

9. In a nailing machine the combination of: a table for supporting the work; a nailing unit including a nail driving bar, a plurality of drivers thereon; a plurality of chucks suspended to receive the lower ends of said drivers and slidable relative to the latter, and a chuck beam for uniting said chucks; means for causing relative vertical movement between said table and said unit to bring said chuck beam and work into engagement and cause said chuck beam to slide relative to said drivers and cause nails to thus be driven into said work; a nail hopper having a floor with stripper slots thereon, said slots having mouths at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge thereof; link means pivotally connected to said hopper and to said nailing table for rocking said hopper about said axis between positions in which said floor is inclined upwardly and then downwardly relative to said edge; lost motion means to limit the rocking movement which may be imparted by said link means to said hopper, said lost motion means absorbing the excess relative movement between said hopper and said nailing table following the coming into operation of said limit means; and means for controlling the delivery of nails from the mouths of said slots to said chucks.

10. In a nail feeding mechanism, the combination of: a nail hopper having a floor with a series of stripper slots therein, said slots having mouths at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; means for rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; means for controlling the delivery of nails from said mouths during each rocking cycle; means in said hopper for obstructing the movement of nails downwardly therein when said floor is inclined upwardly relative to said edge excepting for those nails which have dropped downwardly into said slots with their heads lying just above said slots; and a gridiron pivotally

mounted on said hopper to hang downwardly therein and be rotated by gravity as the hopper rocks as aforesaid, the rotation of said gridiron being limited to cause it to obstruct at spaced points the downward movement of a mass of nails contained in said hopper thereby causing individual nails to be detached from said mass and deposited on said floor beyond said gridiron.

11. In a nail feeding mechanism the combination of: a nail hopper having a floor with a stripper slot therein, said slot having a mouth at a give edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; means for periodically rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; barrier means for confining the bulk of a mass of nails placed in said hopper at the opposite end thereof from said edge but permitting individual nails to break away from said mass and fall onto said floor when said floor is inclined upwardly, certain of the nails thus breaking away dropping into said slot; a second barrier means disposed between said first barrier means and the aforesaid edge of said floor, said second barrier means preventing gravitation past it of any nails excepting those which have dropped into said slot; trap means disposed between said second barrier means and said edge of said floor, said trap means preventing the return towards said second barrier means of nails which already have gravitated past said trap means when said floor is inclined upwardly from said edge; and means for receiving nails from said mouth of said slot when said floor is inclined upwardly.

12. A combination as in claim 11, in which said first barrier means is pivotally suspended in said hopper so as to swing free from said floor when the latter is inclined downwardly from said edge, permitting nails which have gravitated downwardly through said first barrier means when said floor is inclined upwardly from said edge and which nails have not dropped into said slot, to gravitate beneath and behind said first barrier means so as to be confined therebehind when said hopper again rocks to incline said floor upwardly relative to said edge.

13. A combination as in claim 11, in which said second barrier means is pivotally suspended on said hopper so that when the floor of the latter is inclined downwardly from said edge said second barrier means swings free from the floor to permit any nails caught thereunder to gravitate downwardly to rejoin the aforesaid mass of nails.

14. A combination as in claim 11, in which both said barrier means are pivotally suspended on said hopper so as to swing clear of the floor of said hopper when the latter is inclined downwardly relative to said edge.

15. In a nail feeding mechanism the combination of: a nail hopper having a floor with a stripper slot therein, said slot having a mouth at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; means for periodically rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; barrier means confining the bulk of a mass of nails placed in said hopper at the opposite end thereof from said edge but permitting individual nails to break away from said mass and fall onto said floor when said floor is inclined upwardly from said edge, certain of the nails thus breaking away dropping into said slot; a second barrier means disposed between said first barrier means and the aforesaid edge of said floor, said second barrier means preventing gravitation past it of any nails excepting those which have dropped into said slot, said second barrier means being pivotally suspended from said hopper so as to hang clear of said floor when said hopper has been rocked to bring said floor into its downwardly inclined position aforesaid; and means for receiving nails from said mouth of said slot when said floor is inclined upwardly as aforesaid.

16. In a nail feeding mechanism the combination of: a nail hopper having a floor with a series of stripper slots therein, said slots having mouths at a given edge of said floor; means for pivotally mounting said hopper on an axis parallel to said edge; means for rocking said hopper between positions in which said floor is inclined upwardly and then downwardly relative to said edge; a gridiron comprising a body and a series of fingers extending rake-like downwardly from said body, said gridiron body being pivotally mounted on said hopper to permit said fingers to hang downwardly therefrom, said gridiron being rotated by gravity as the hopper rocks to cause said fingers to swing free of said floor when the latter is inclined downwardly as aforesaid, rotation of said gridiron being limited however to cause the latter to obstruct downward movement of a mass of nails contained in said hopper when said floor is inclined upwardly as aforesaid, thereby causing individual nails to be detached from said mass and be deposited on said floor below said gridiron; barrier means disposed between said gridiron and the aforesaid edge of said floor, said barrier means preventing gravitation past it of any nails excepting those which have dropped into said slots; and means for receiving nails from said mouths of said slots when said floor is inclined upwardly as aforesaid.

17. A combination as in claim 15, in which said second barrier means comprises a plate having means for limiting the rotation thereof about its pivotal axis when said hopper rocks to incline the floor thereof upwardly, the lower edge of said plate when its rotation about its pivotal axis is thus limited, lying close to said floor where said plate is disposed over said slot so as to permit the heads of nails which have dropped into said slot behind said plate to slide downwardly along said slot beneath said plate while said floor is thus inclined upwardly.

18. A combination as in claim 16, in which said barrier means comprises a plate which is pivotally suspended from said hopper and which has means for limiting the rotation thereof about its pivotal axis when said hopper rocks to incline the floor thereof upwardly, the lower edge of said plate when its rotation about its pivotal axis is thus limited, lying close to said floor where said plate is disposed over said slots so as to permit the heads of nails, which have dropped into said slots behind said plate, to slide downwardly along said slots beneath said plate while said floor is thus inclined upwardly.

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