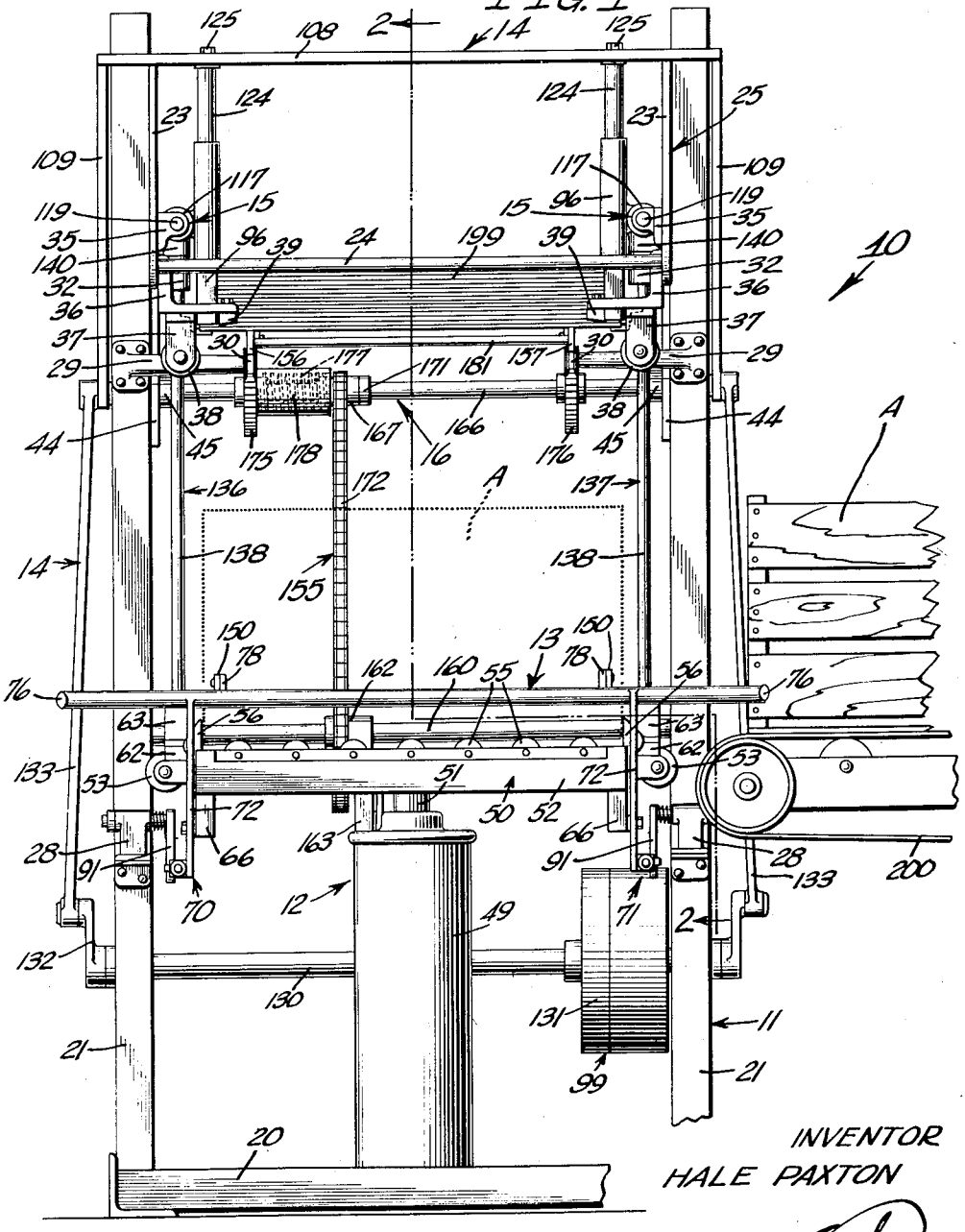
May 22, 1934. H. PAXTON 1,959,839

CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

Filed Aug. 27, 1932 5 Sheets-Sheet 1

FIG. 1



INVENTOR
HALE PAXTON

BY

ATTORNEY

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CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

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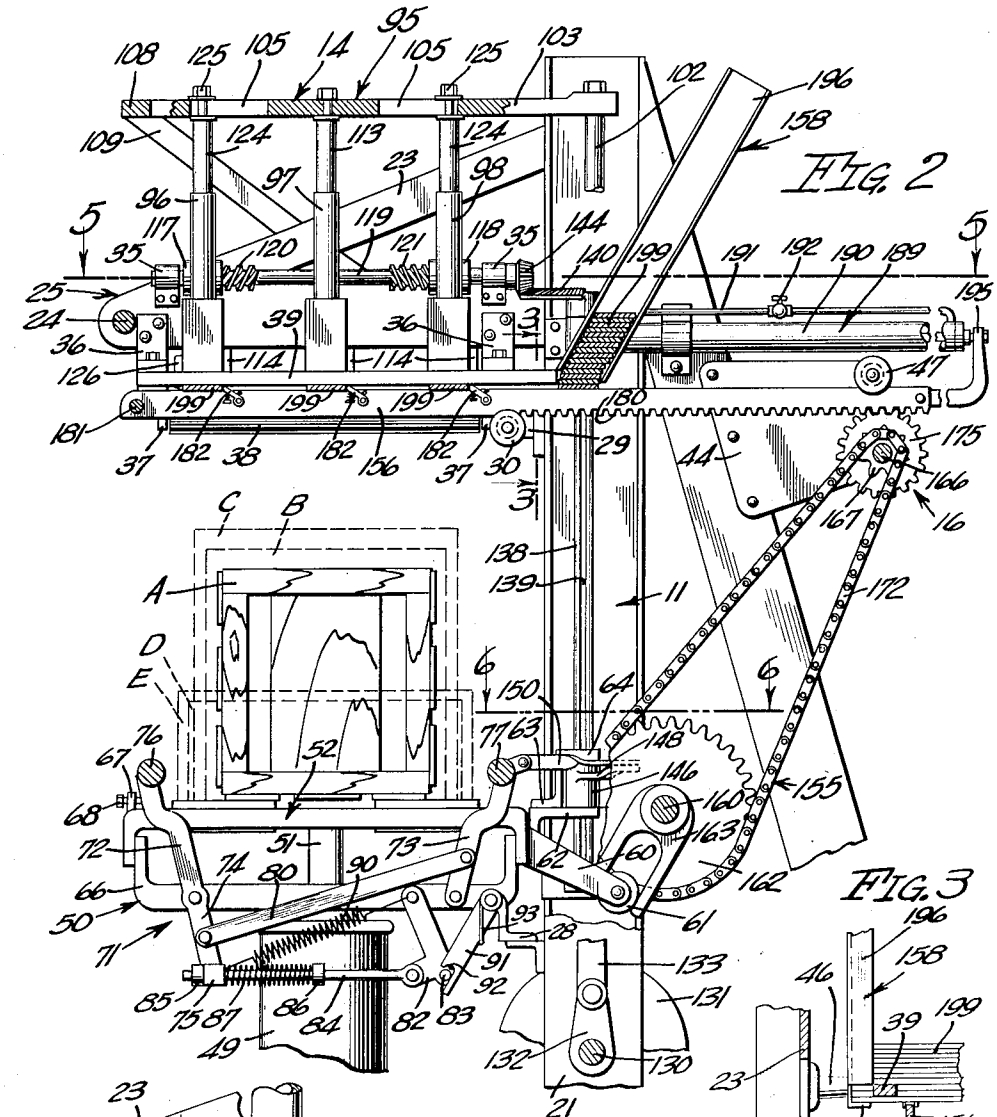


FIG. 2

FIG. 3

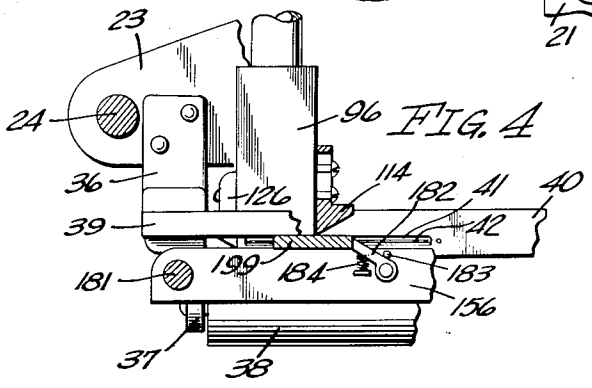


FIG. 4

INVENTOR
HALE PAXTON

BY

ATTORNEY

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CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

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FIG. 5

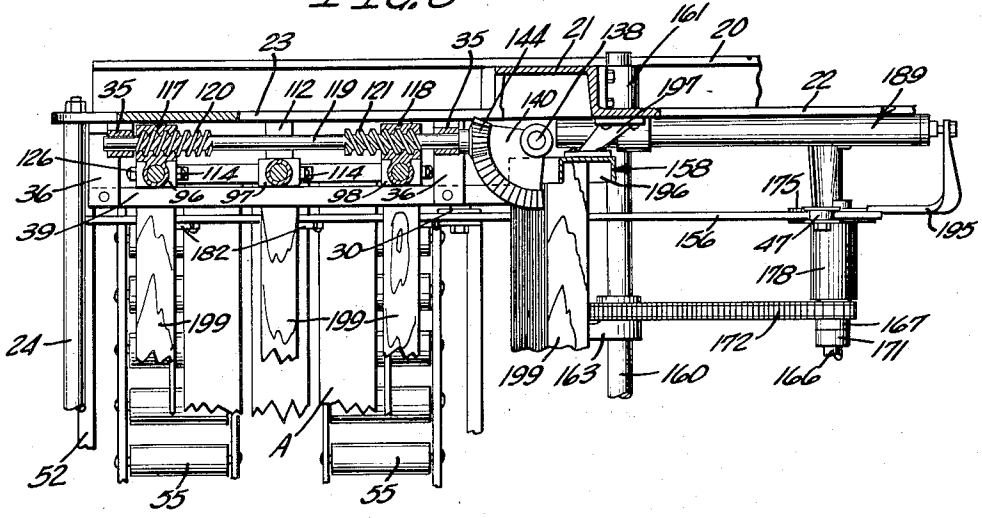


FIG. 6

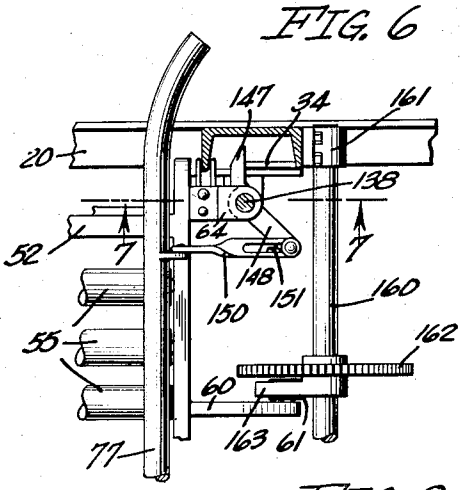


FIG. 7

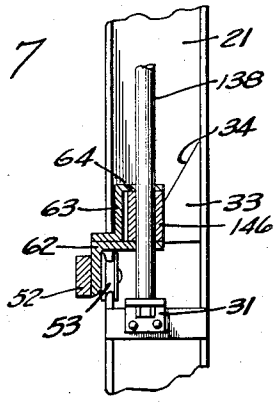


FIG. 9

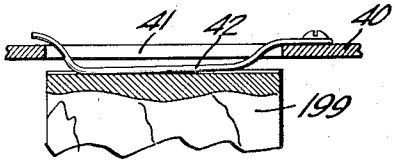
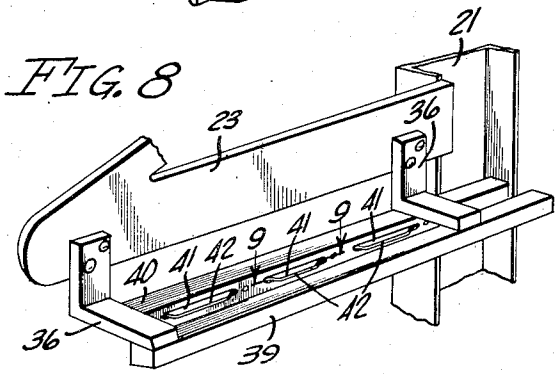


FIG. 8



INVENTOR
HALE PAXTON

BY

ATTORNEY

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CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

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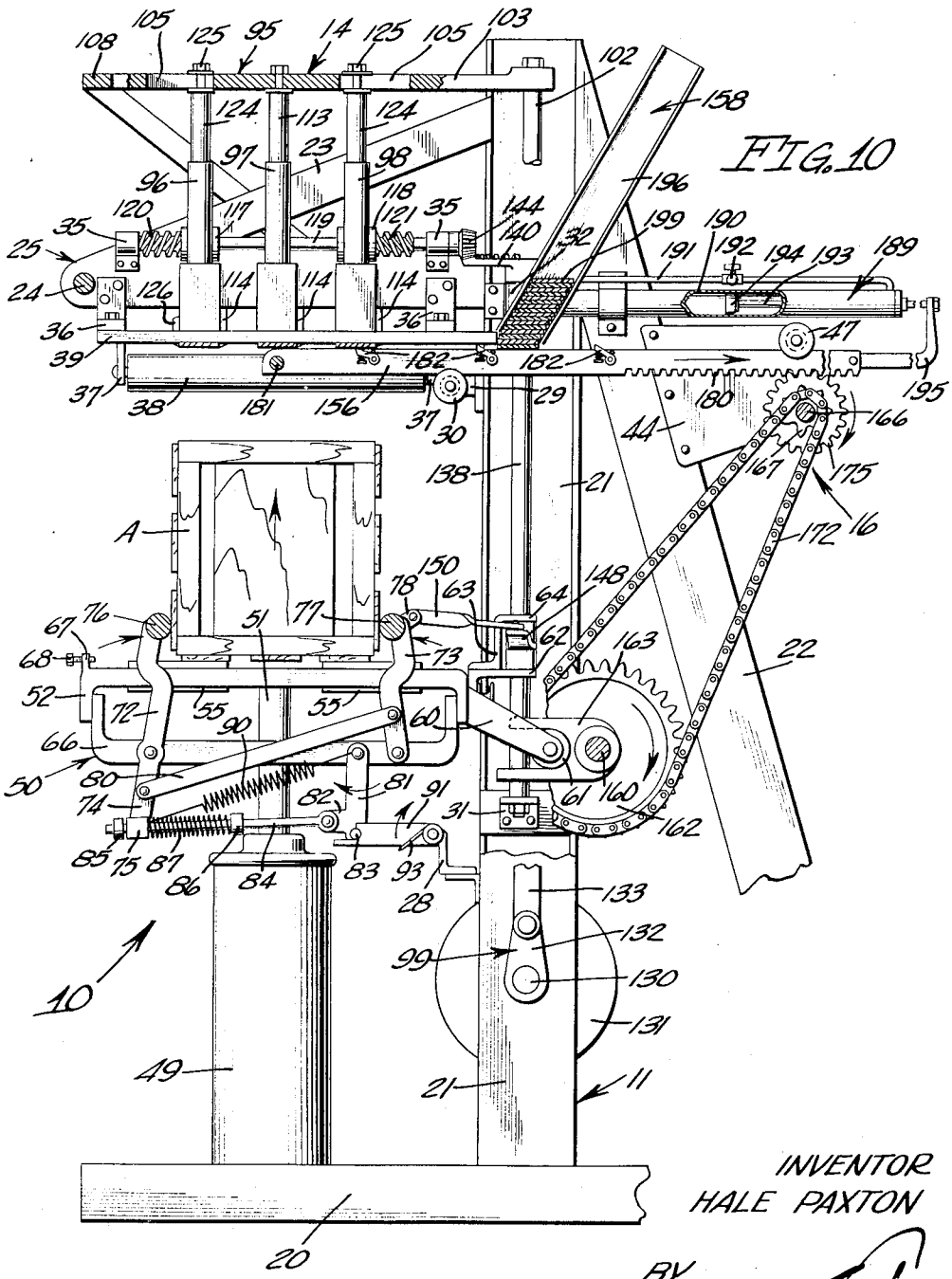


FIG. 10

INVENTOR
HALE PAXTON

BY

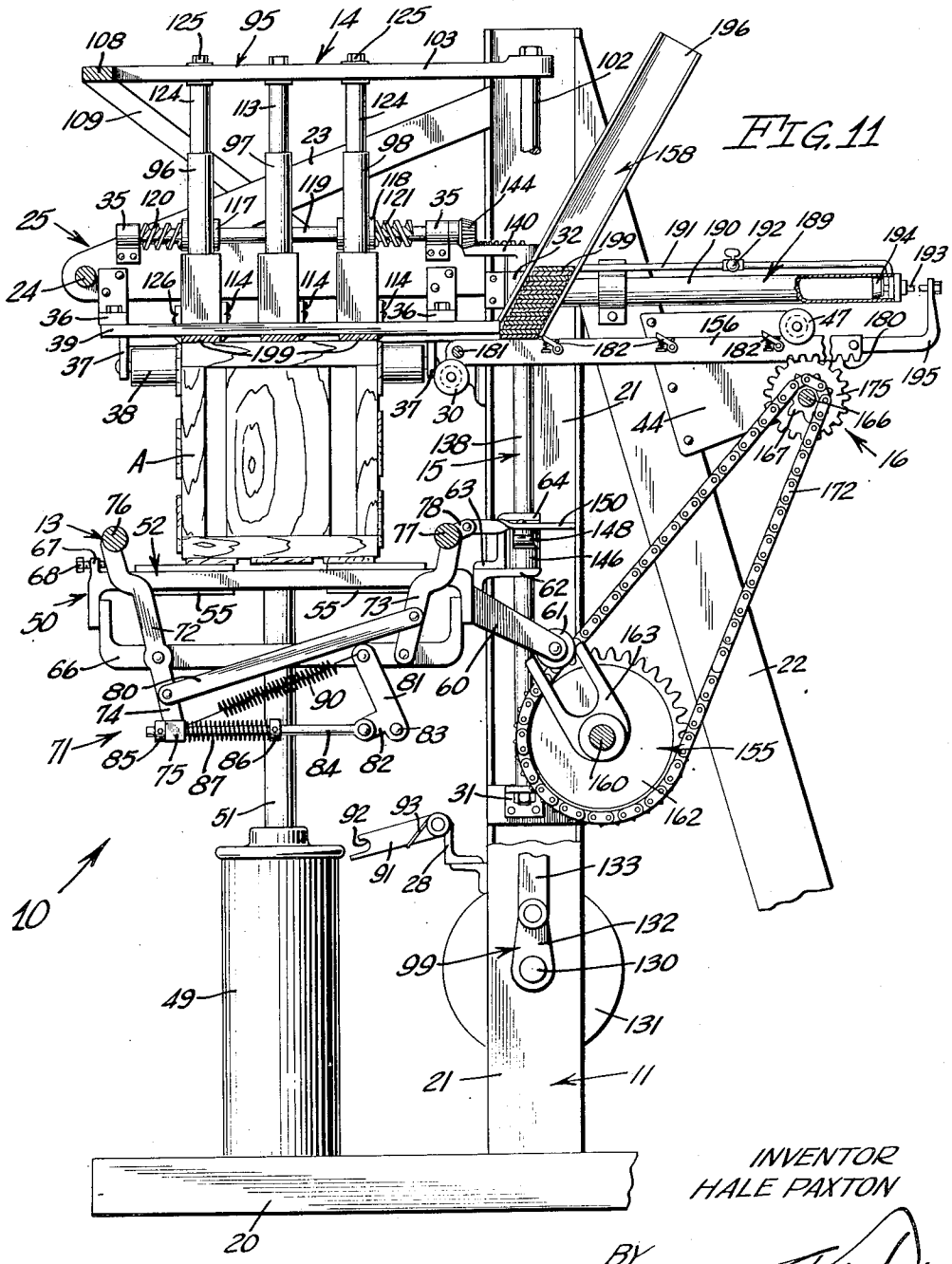
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CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

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FIG. 11



INVENTOR
HALE PAXTON

BY

ATTORNEY

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UNITED STATES PATENT OFFICE

1,959,839

CHUCK SHIFTING MECHANISM FOR LIDDING MACHINES

Hale Paxton, Redlands, Calif., assignor to Paxton Credit Corporation, Sanger Calif., a corporation of California

Application August 27, 1932, Serial No. 630,705

25 Claims. (Cl. 1—10)

My invention relates to crate or box lidding machines and is particularly useful in applying lids to crates or boxes which vary in width.

In the packing of certain agricultural products for shipment different sized crates or boxes are used for the different varieties of fruits and vegetables, these crates usually being approximately equal in length and variable in height and width. When certain fruits and vegetables are in season at the same time it is often necessary for one packing house to pack several varieties of produce simultaneously, and the different sized crates must be segregated for the lidding operation as the lidding machines are usually adjusted to receive a crate of a certain width and the machines must be readjusted for crate of different sizes.

An object of my invention is to provide a lidding machine in which the lid nail chucks are automatically shiftable to proper vertical alignment with crates or boxes of various widths.

Another object of my invention is the provision of a lidding machine in which separate lid slats are automatically fed to position below the nail chucks.

A further object of my invention is to provide a crate or box lidding machine in which the lid slats are automatically spaced to fit crates or boxes of various widths.

Further objects and advantages will become apparent in the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a preferred embodiment of my invention.

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

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

Fig. 4 is an enlarged fragmentary view showing the operation of a portion of the machine shown in Fig. 2.

Fig. 5 is a fragmentary, horizontal sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary, horizontal sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary perspective view of the portion of the machine shown in Fig. 4.

Fig. 9 is a horizontal fragmentary sectional view taken on the line 9—9 of Fig. 8.

Fig. 10 is a vertical sectional view similar to Fig. 2 showing a stage in the operation of the various parts thereof.

Fig. 11 is a vertical sectional view similar to Fig. 2 showing a stage of operation subsequent to the stage of operation shown in Fig. 10.

Referring specifically to the drawings, a crate or box lidding machine 10, comprising a preferred embodiment of my invention, is shown throughout the several views, this machine including a frame 11, an elevator 12, a box centering mechanism 13, a nailing mechanism 14, a nail chuck shifting mechanism 15, and a slat feeding mechanism 16.

The frame 11

The frame 11 includes a suitable base 20, vertical side standards 21 and diagonal braces 22, the latter being adapted to brace the side standards 21. Secured to each of the standards 21 adjacent the upper ends thereof are forwardly extending brackets 23 which are tied at their extremities by a horizontal tie rod 24, the brackets 23 forming a superstructure 25. Mounted on the front edges of each of the standards 21 are bearing brackets 28 and inwardly extending horizontal arms 29, the latter having grooved rollers 30 rotatably mounted on the inner extremities thereof, as clearly shown in Figs. 1 and 2. The purpose of the bearing brackets 28 will become evident in connection with the description of the box centering mechanism 13 to be hereinafter set forth, and the function of the arms 29 will be likewise made clear in the description of the slat feeding mechanism 16. Secured to the inwardly disposed sides of the standards 21 are apertured angle brackets 31 which are positioned in vertical alignment with bearings 32, the latter being mounted above the brackets 31, it being noted that apertures of the brackets 31 and the bores of the bearings 32 are vertically disposed, as shown in Fig. 10. Fixed to the inwardly disposed sides of the standards 21 in close proximity with the angle brackets 31, as shown in Figs. 6 and 7, are vertical plates 33 having angular cam faces 34. Mounted on the inner surfaces of each of the brackets 23 is a pair of horizontally aligned bearing blocks 35. The purpose of the brackets 31, bearings 32, and bearing blocks 35 will be made evident hereinafter in connection with the chuck shifting mechanism 15.

Secured to each of the brackets 23 adjacent the lower edges thereof is a pair of inwardly disposed horizontally aligned angle plates 36, as shown in Figs. 1 and 2. Depending from the under side of each of the angle plates 36 is an apertured angle bracket 37, each pair of the brackets 37 having horizontal rollers 38 rotatably mount-

ed therebetween. Also secured to the under sides of the pairs of angle plates 36 are horizontal bars 39 and angle iron bars 40, as shown fragmentarily in Fig. 8, it being noted that the bars 39 and angle bars 40 are equal in length and disposed in parallel relation. The vertically disposed sides of each of the angle iron bars 40 are provided with three equally spaced horizontal slots 41 as best shown in Figs. 8 and 9. Suitably mounted on each of the angle iron bars 40 are three spring wire fingers 42 which extend through the slots 41 as shown in Figs. 8 and 9.

Mounted on the inner surface of each of the diagonal braces 22 is a rearwardly extending plate 44, as shown in Fig. 2. Mounted on the plates 44 adjacent the rear edge thereof are horizontally aligned bearings 45 and inwardly extending arms 46, the latter having grooved rollers 47 rotatably mounted on the innermost extremities thereof as shown in Figs. 1 and 2. The grooved rollers 47 are disposed in the same vertical plane but slightly elevated in relation to the aforementioned grooved rollers 30. The purpose of the bearings 45 and the grooved rollers 47 will become evident hereinafter incidental to the description of the slat feeding mechanism 16.

The elevator 12

The elevator 12 includes a hydraulic cylinder 49 and a box supporting platform 50, as shown in Fig. 1. The cylinder 49 has a piston (not shown) from which a piston rod 51 extends vertically. The platform 50 includes a frame 52 which is secured to the upper end of the piston rod 51, the frame 52 having grooved rollers 53 mounted on opposite ends thereof, it being noted that the rollers 53 are positioned to embrace the inner edges of the side standards 21 so as to guide the platform 50 in its vertical movement relative to the standards 21. Rotatably mounted on the frame 52 of the platform 50 are two rows of rollers 55 which are adapted to receive a crate A as shown in Figs. 1 and 2. Suitably mounted at opposite ends of the platform frame 52 are box stops 56 which are adapted to automatically position a box at a predetermined location on the platform 50 relative to the longitudinal axis of the box. A complete disclosure of the structure and operation of the stops 56 can be found in my copending application for U. S. Letters Patent Serial No. 468,680, filed July 17, 1930, for Automatic box stops for lidding machines.

Fixed to the rear edge of the platform frame 52 is a rearwardly extending arm 60 having a roller 61 on the end thereof as shown in Figs. 2 and 6. Also fixed to the rear edge of the frame 52, at opposite ends thereof, are rearwardly extending apertured angle plates 62, the apertures of which are disposed in vertical alignment with the axes of the hereinbefore mentioned angle brackets 31 and bearings 32 which are fixed to the side standards 21. Mounted on top of the angle plates 62 are members 63, portions 64 of which are disposed in vertical spaced relation to the angle plates 62. The portions 64 of the members 63 have openings 65 therein, the latter being aligned vertically with the apertures in the angle plates 62, as shown in Figs. 2 and 7. Hung below opposite ends of the platform frame 52 in transverse relation thereto are parallel bars 66 and on top of the frame 52 at opposite ends thereof are lugs 67 which receive threaded stop screws 68, the purpose of which will be made evident hereinafter.

The box centering mechanism 13

In Fig. 2 several crates are shown diagrammatically, the crate A being shown by solid lines while crates of different widths and heights indicated at B, C, D, and E are shown by dotted lines. All of these crates can be properly lidded by the machine 10 of my invention, and the box or crate centering mechanism 13 is adapted to center any one of the crates A, B, C, D, or E with respect to the platform 50. The centering mechanism 13 includes a pair of units 70 and 71 mounted on opposite ends of the platform frame 32, as shown in Fig. 1. As the units 70 and 71 are identical a detailed description of but one of the units will be set forth, and like reference numerals will denote like parts in each of the units 70 and 71.

As shown in Fig. 2, the unit 71 of the centering mechanism 13 includes a pair of arms 72 and 73, these being pivotally mounted on one of the bars 66, the arm 72 having a downward extension 74, on the lower end of which a bored block 75 is pivotally mounted. Secured to the upper ends of the arms 72 and 73 of each of the units 70 and 71 are front and rear guide rails 76 and 77, these being curved at their ends, as shown fragmentarily in Fig. 6, to facilitate the guiding of a box or crate onto the platform 51. Fixed to the rear guide rail 77, as shown in Figs. 1 and 2, is a pair of apertured ears 78, the purpose of which will become apparent hereinafter in connection with the description of the chuck shifting mechanism 15. The arms 72 and 73 are connected by a diagonal tie rod 80, as shown in Fig. 2, so that they swing inwardly and outwardly in unison. Pivoted on the bar 66 at a point close to the fulcrum of the arm 73 is a depending arm 81 having an ear 82 and an outwardly extending pin 83 provided on the lower end thereof. Pivoted on the ear 82 of the arm 81 is a link 84, the opposite end of which is slidably received by the block 75 on the arm 72. Fixed on the link 84 at opposite sides of the block 75 is a pair of collars 85 and 86, the collar 85 being normally held in contact with the block 75 by a compression spring 87, the latter being mounted on the link 84 between the block 75 and the collar 86, as shown. The arm 72 is urged against the stop screw 68 of the platform frame 52 by a contractile spring 90 which is suspended from the extension 74 of the arm 72 to the pivot point of the depending arm 81 as shown. Swingably mounted by means of the aforedescribed bearing bracket 28 on the side standard 21 is an arm 91 having a recess 92 at its end. The arm 91 is positioned so that the recess 92 therein normally embraces the pin 83 of the depending arm 81, the arm 91 being normally urged against the pin 83 by a torsion spring 93, as shown in Fig. 2. Further details of the box centering mechanism 13 can be found in my copending application for U. S. Letters Patent Serial No. 616,933, filed June 13, 1932, for Crate centering device for lidders.

The nailing mechanism 14

The nailing mechanism 14 includes a nail driving head 95, front, central, and rear pairs of nail chucks 96, 97, and 98, respectively, and a driving head actuating mechanism 99.

The driving head 95 includes a pair of cross-heads (not shown) which are slidable vertically in a well known manner on the side standards 21. Extending upwardly from the cross-heads are vertical rods 102, as shown in Fig. 2, and bolted to the upper ends of the vertical rods 102 are forwardly extending horizontal bars 103 which have

elongated slots 105 provided therein. The front ends of the horizontal bars 103 are connected by a transverse bar 108, opposite ends of the latter being braced by diagonal bars 109 which are connected at their lower ends to the aforementioned cross-heads (not shown).

The central nail chucks 97 are rigidly secured to the brackets 23 by hangers 112, as shown in Fig. 5, these chucks being adapted to receive drivers 113, the upper ends of the latter being securely bolted to the horizontal bars 103, as shown in Fig. 2. Slidable vertically on the rear edge of the central nail chucks 97 are slat keepers 114, it being noted in Fig. 11 that the keepers 114 normally extend a short distance below the lowermost face of the chucks 97.

The front and rear chucks 96 and 98 are provided with internally threaded lugs 117 and 118, respectively, the lug 117 having left-hand threads while the lug 118 has right-hand threads. The chucks 96 and 98 are mounted in horizontal alignment with the central chucks 97 by means of shafts 119 which are rotatably mounted in the horizontally aligned bearing blocks 35 on the brackets 23. The shafts 119 have left and right-hand threaded portions 120 and 121 which are threadedly received by the lugs 117 and 118 of the chucks 96 and 98, respectively. The chucks 96 and 98 slidably receive nail drivers 124 which are bolted to the horizontal bars 103 of the nailing head 95 by bolts 125, the latter passing through the slots 105, as shown in Fig. 2. The threaded shafts 119 upon which the front and rear nail chucks 96 and 98 are mounted will be further described hereinafter in connection with the description of the chuck shifting mechanism 15.

Fixed to the front edges of the front nail chucks 96 are stationary slat keepers 126, and slidable vertically on the rear edges of the chucks 96 and 98 are slat keepers 114 identical with the keepers 114 on the chucks 97, as shown in Fig. 2. The function of the slat keepers on the several chucks will be made manifest hereinafter.

The driving head actuating means 99 includes a driven shaft 130 which is suitably journalled on the side standards 21, as shown in Figs. 1 and 2. The shaft 130 is adapted to be given a single revolution at the desire of the operator by means of a suitable clutch 131, shown diagrammatically in Fig. 1. Fixed on opposite ends of the shaft 130 are cranks 132, the latter being operatively connected to the aforementioned cross-heads by pitmans 133.

The chuck shifting mechanism 15

The chuck shifting mechanism 15 includes a pair of substantially identical units 136 and 137 positioned at the left and right sides of the machine 10. The function of these units, as will be hereinafter made clear, is to transmit the motion of the box centering mechanism 13 to the nail chucks 96 and 98 to effect a shifting of these chucks in direct relation to the various widths of boxes or crates which are to be lidded.

The units 136 and 137 of the mechanism 15 include a pair of vertical shafts 138 having splines 139, these shafts being pivotally supported at their lower ends on the aforementioned angle brackets 31 and journalled at their upper ends in the vertical bearings 32, as shown in Fig. 2. It will be noted that the shafts 138 are rotatably received by the vertically aligned apertures of the aforementioned angle plates 62 and members 63 on the platform 50. Keyed to the upper ends of the shafts 138 are beveled sector gears 140, the hubs of the latter resting on the upper faces of the bearings 32 as shown in Figs. 2 and 5. The sector gears 140 are positioned so as to mesh with beveled pinions 144, the latter being keyed to the rear ends of the aforementioned horizontal screw shafts 119 which are journalled in the bearing blocks 35.

Keyed to and slidable vertically on the splined shafts 138 are collars 146, shown clearly in Figs. 2, 6, and 7. These collars are confined vertically between the aforementioned angle plates 62 and members 63 of the platform 50. Secured to the collars 146 are horizontal outwardly extending fingers 146, these being positioned so as to normally contact the cam faces 34 of the plates 33, as shown in Figs. 6 and 7. Extending rearwardly and inwardly from the collars 146 are horizontal arms 148 having pins 149 which are connected to the apertured ears 78 of the rear guide rail 77 by means of links 150, the latter having lost motion slots 151 provided therein as shown in Fig. 6. The units 136 and 137 of the chuck shifting mechanism 15 are identical in structure and operation with the exception that in operation the vertical shafts 138 rotate in opposite directions, as will be made clear hereinafter, thus causing the driven shafts 119 to rotate in opposite directions. Therefore, in order to cause the pairs of chucks 96 and 98 to be shifted in unison the right and left-hand threaded portions of one of the shafts 119 must be in reversed relation to those of the other shaft 119.

Slat feeding mechanism 16

The slat feeding mechanism 16 includes an actuating mechanism 155 shown in Figs. 2 and 5, left and right-hand slat feeding bars 156 and 157, respectively, shown in Figs. 1 and 2, and a slat magazine 158.

The actuating mechanism 155 includes a horizontal drive shaft 160, opposite ends of which are journalled in suitable bearings 161, the latter being mounted on the rear edges of the side standards 21 of the frame 11. Fixed on the drive shaft 160 between the bearings 161 is a relatively large sprocket wheel 162, the latter having a bifurcated arm 163 securely fixed thereto. As shown in Fig. 2, the bifurcation of the arm 163 is normally disposed in a downwardly inclined position in embracing relation with the aforementioned roller 61 on the arm 60 of the platform frame 52.

Journalled in the bearings 45 of the plates 44 on the diagonal braces 22 is a driven shaft 166 rotatably mounted in parallel relation with the drive shaft 160. Positioned on the driven shaft 166 in radial alignment with the sprocket 162 is a relatively small idle sprocket 167, the latter being interposed between a pair of fixed collars 170 and 171. The small sprocket 167 is operatively connected to the large sprocket 162 by a suitable chain 172. Fixed to the driven shaft 166 adjacent opposite ends thereof are left and right-hand gear wheels 175 and 176, respectively, as shown in Fig. 1. Disposed about the driven shaft 166 between the left-hand gear wheel 175 and the small sprocket 167 is a torsion spring 177, opposite ends of the latter being fixed to the gear 175 and the sprocket 167, as shown in Figs. 1 and 5. The spring 177 is enclosed by a tubular housing 178, as shown in Figs. 1 and 5. The purpose of the housing 178 will be made clear hereinafter. It will be noted in Figs. 1, 2, and 5 that the gear wheels 175 and 176 are positioned on the driven shaft 166 in vertical alignment with the herein-

before mentioned grooved rollers 47 on the arms 46 of the plates 44.

The slat feeding bars 156 and 157 have toothed rack portions 180, as shown in Fig. 2, the bottom and top edges of these bars being received by the grooved rollers 30 and 37, respectively, it being noted that the rack portions 180 of the bars mesh with the gear wheels 175 and 176. The feed bars are tied together at their forward ends by a transverse tie rod 181. Pivotally mounted at equally spaced intervals on the inner surfaces of the feed bars 156 and 157 are slat engaging pawls 182, these being normally urged against stop pins 183 by small compression springs 184, as shown in Figs. 2 and 4.

Clamped to the left-hand diagonal brace member 22 in parallel relation with the slat feeding bar 156 is a dashpot 189 including a cylinder 190, the latter having a by-pass tube 191 connected to opposite ends thereof, the tube 191 having a manually adjustable valve 192 provided thereon. Slidably received by the rear end of the cylinder 190 is a piston rod 193, the latter carrying a conventional cup type piston 194. As shown in Figs. 2 and 5, the free end of the piston rod 193 is connected to the rear end of the slat feeding bar 156 by means of an arm 195.

The slat magazine 158, clearly shown in Figs. 2 and 3, includes a pair of inclined channel iron members 196, these being mounted in parallel relation by suitable brackets 197, the latter being secured to the diagonal braces 22 of the frame 11, as shown in Fig. 5. Provided at the lower ends of the channel members 196 are inwardly bent feet 198 which are adapted to carry the weight of a plurality of slats 199 disposed within the magazine 158, as shown in Fig. 3.

Operation

The lidding machine 10 of my invention is operated in the following manner: Prior to the lidding of the first crate the machine must be put through one cycle of operation in order to feed the initial set of slats 199 from the slat magazine 158 to their respective positions under the chucks 96, 97, and 98, as shown in Fig. 2. This is done by depressing a foot pedal (not shown) which admits fluid into the cylinder 49 causing the platform 50 to rise. As the platform rises the roller 61 on the arm 60 contacts the bifurcated arm 163, thus rotating the large sprocket 162, as shown in Fig. 10. Rotation of the sprocket 162 is transmitted to the small sprocket 167 by the chain 172, and rotation of the small sprocket is transmitted to the driven shaft 166 through the medium of the torsion spring 177. The gear wheels 175 and 176 are thereby rotated and the slat feeding bars 156 and 157 are carried to the position shown in Fig. 10. The tubular housing 178 disposed about the spring 177 serves to prevent this spring from being unwound as the shaft 166 rotates to retract the slat feeding bars 156 and 157.

The operator then allows the platform 50 to return to its normal position and the roller 61 again contacts the bifurcated arm 163, and the sprocket 162 is rotated back to its normal position and the slat feeding bars 156 and 157 are carried forward. As the feeding bars 156 and 157 are driven forward the pawls 182 on these bars contact the edges of the lowermost slats 199 in the magazine 158 carrying three of these slats forward to the positions shown in Fig. 2. It will be noted that the sliding keepers 114 on the chucks 96, 97, and 98 rise, as shown in Fig. 4, to permit the slats to be positioned under the chucks.

The purpose of the dashpot 189 is to control the speed of the feed bars 156 and 157 as the latter move forward. In actual practice the platform 50 of the machine 10 rises at a relatively slow rate of speed but is allowed to gravitate rapidly to its lowermost position, and, as the feed bars 156 and 157 are driven forward in response to the rapid downward movement of the platform 50, it is found necessary to slow up the feed bars by employing the dashpot 189. It will be noted in Figs. 1 and 5 that rotation of the large sprocket 162 is not transmitted directly to the driven shaft 166 but is absorbed by the torsion spring 177. The spring 177 winds up within the housing 178 and exerts a torsional force on the driven shaft 166 and the speed of this shaft is governed by the dashpot 189, it being clear that by regulating the valve 192 of the dashpot 189 the speed of the feed bars 156 and 157 can be controlled. After completing its first cycle of operation the machine 10 is ready to receive a crate and apply a lid thereto in the following manner:

Referring particularly to Fig. 1, I have shown therein a power conveyor 200 which is adapted to deliver packed crates of various widths and heights onto the platform 50 of the lidding machine 10. When the platform 50 is at rest in its lowermost position the crate centering mechanism 13 is in the position shown in Fig. 2, it being noted that the rails 76 and 77 thereof are swung apart and that the arms 72 are urged against the stop screws 68 of the platform frame 52 by the contractile springs 90. As a packed crate, such as the crate A shown in the drawings, is fed onto the platform 50, the automatic stops 56 function to center the crate in longitudinal relation with the platform 50 as shown by the dotted line position of the crate A in Fig. 1. The elevator 12 is now operated to lift the crate A up to the lid applying position. As the platform 50 is raised by the hydraulic cylinder 49, as shown in Fig. 10, the arm 91 is swung upwardly by the pin 83 of the depending arm 81. This movement of the arm 91 forces the depending arm 81 to swing in the direction of the arrow in Fig. 10, and the link 84 yieldably urges the arms 72 and 73 inwardly until the guide rails 76 and 77 contact opposite sides of the crate A. As the rails 76 and 77 move inwardly it is obvious that they are at all times equidistant from the central axis of the platform 50, and it is clear that a crate contacted by the rails 75 and 76 will be automatically centered in relation to the platform.

As the platform 50 is raised, as shown in Fig. 10, the large sprocket wheel 162 is rotated by the engagement of the roller 61 with the bifurcated arm 163 as aforedescribed, and the driven shaft 166 is in turn rotated, thus retracting the feed bars 156 and 157. As the bars 156 and 157 recede to their rearmost positions the three slats 199 previously fed to the chucks 96, 97, and 98 are retained under these chucks by the sliding keepers 114, it being noted that the pivotal mounting of the pawls 182 on the bars 156 and 157 allows these pawls to swing downwardly as they pass under the slats 199. It will be noted in Fig. 9 that after the bars 156 and 157 have been withdrawn from under the three slats 199 under the chucks, these slats are retained from falling by the tension of the spring wire fingers 42 of the bars 40, these springs being adapted to frictionally engage opposite ends of the slats.

As the platform 50 is raised and the guide rails 76 and 77 swing inwardly against the crate A the links 150 of the chuck shifting mechanism are

drawn forward and the vertical shafts 138 are rotated through the medium of the collars 146 which are splined to these shafts. Rotation of the shafts 138 is transmitted to the horizontal screw shafts 119 by the sector gears 140 and pinions 144. As the shafts 119 rotate the threaded portions 120 and 121 are rotated within the threaded lugs 117 and 118 of the chucks 96 and 98, and these chucks are drawn inwardly into proper vertical alignment with the crate A. It will be noted that as the chucks 96 and 98 move inwardly the slats 199 positioned under these chucks are moved with the chucks by the stationary keepers 126 on the chucks 96 and the slidable keepers 114 on the chucks 98.

As the inward movement of the chucks 96 and 98 is directly proportional to the movement of the rear guide rail 77, it is obvious that when the crates A, B, C, D, and E of various widths are centered on the platform 50 the chucks 96 and 98 and the slats disposed therebeneath will be automatically positioned in proper vertical alignment with the respective crates.

As the platform 50 continues upwardly from the position shown in Fig. 10 the pin 83 of the arm 81 is lifted out of engagement with the arm 91 allowing the latter to gravitate to the position shown in Fig. 11, the arm 91 being supported in this position by the torsion spring 93. As the platform 50 continues upwardly the centering mechanism 13 returns to its normal position but rearward movement of the rear guide rail 77 is not transmitted to the chuck shifting mechanism 15 due to the lost motion slots 151 in the links 150, as shown in Fig. 6.

When the crate A arrives at the position shown in Fig. 11 the feed bars 156 and 157 have been completely withdrawn and are disposed in readiness to supply another set of slats 199 to the chucks 96, 97, and 98. A foot pedal (not shown) is now depressed, causing the nailing mechanism to function in a conventional manner so as to nail the slats 199 onto the crate A.

Immediately after the slats are nailed onto the crate A, the platform 50 is allowed to return to its lowermost position, and, as the platform approaches bottom, the slat feeding mechanism 16 is again actuated in the aforedescribed manner to feed another set of slats from the magazine 158 to the nail chucks. As the platform 50 arrives at its lowermost position the chucks 96 and 98 are returned to their normal position by the shifting mechanism 15 in response to the contact of the fingers 147 of the collars 146 with the cam faces 34 of the plates 33 shown in Figs. 6 and 7, it being noted that the collars 146 are rotated by the cam faces 34 and that the arms 148 are swung so that the pins 149 thereof again contact the outer extremities of the slots 151 in the links 150. It will also be noted that upon the arrival of the platform 50 at its lowermost position the pin 83 of the depending arm 81 depresses the spring supported arm 91 until the pin 83 is finally embraced by the recess 92 of the arm 91, as shown in Fig. 2.

After being lidded, the crate A is discharged from the machine 10 onto a suitable discharge conveyor (not shown) and the machine 10 is in readiness to immediately receive another crate from the delivery conveyor 200.

It is seen that the lidding machine 10 of my invention is capable of efficiently lidding crates or boxes which vary in width and height, and it is clear that the adjustments necessary in the machine 10 for lidding crates of various widths are accomplished entirely automatically.

Although I have shown and described but one form of my invention, it is to be understood that various changes and modifications might be made without departing from the spirit and scope of the following claims.

I claim as my invention:

1. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said supporting means closer together; box positioning means mounted on said box supporting means, said positioning means being adapted to position boxes of various widths in a predetermined relation with said box supporting means; a plurality of nailing chucks mounted on said superstructure, certain of said chucks being shiftably mounted; and means mounted on said frame and responsive to said box positioning means for shifting said shiftable nail chucks into proper vertical alignment with boxes of various widths when such boxes are fed in irregular order onto said supporting means.

2. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said box supporting means and said superstructure closer together; crate positioning means mounted on said box supporting means, said positioning means being adapted to position boxes of various widths in a predetermined relation with said box supporting means; a plurality of nail chucks shiftably mounted on said superstructure; means for shifting said chucks into operative position, said last mentioned means being responsive to said box positioning means; and means for returning said chucks to normal position, said last mentioned means being responsive to said relative vertical movement of said box supporting platform and said superstructure.

3. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said supporting means closer together; a plurality of nailing chucks mounted on said superstructure, certain of said chucks being shiftably mounted; means mounted on said frame for shifting said shiftable nail chucks into proper vertical alignment with boxes of various widths when such boxes are fed in irregular order onto said supporting means; lid slat supporting means provided on said superstructure; and slat shifting means provided on said superstructure for shifting said slats into proper positions to be applied to boxes of various widths.

4. A combination as in claim 3 in which said slat shifting means is responsive to the shifting of said chucks.

5. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said supporting means closer together; a plurality of nailing chucks mounted on said superstructure, certain of said chucks being shiftably mounted; means mounted on said frame for shifting said shiftable nail chucks into proper vertical alignment with boxes of various widths when such boxes are fed in irregular order onto said supporting means; lid slat supporting means provided on said superstructure; slat feeding means mounted on said frame, said last mentioned means being adapted to deliver a plurality

of lid slats from a source of supply to said slat supporting means; and slat shifting means provided on said superstructure for shifting said slats into proper spaced relation to be applied to boxes of various widths.

6. A combination as in claim 5 in which said slat feeding means is responsive to relative vertical movement of said superstructure and said box supporting means.

7. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said box supporting means closer together; box positioning means provided on said supporting means, said positioning means being adapted to shift boxes of various widths in a predetermined relation to said supporting means; lid slat supporting means provided on said superstructure; a plurality of nail chucks shiftably mounted on said superstructure; and means for shifting said chucks and aligning lid slats with the shifted position of said chucks.

8. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said supporting means closer together; a plurality of nailing chucks mounted on said superstructure, certain of said chucks being shiftably mounted; means mounted on said frame for shifting said shiftable nail chucks into proper vertical alignment with boxes of various widths when such boxes are fed in irregular order onto said supporting means; lid slat supporting means on said superstructure; means for feeding slats to said slat supporting means, said slat feeding means being responsive to relative vertical movement of said superstructure and said box supporting means; and means for controlling the speed of said slat feeding means irrespective of the speed of the relative vertical movement of said box supporting means and said superstructure.

9. In a lidding machine the combination of: a frame; a superstructure provided on said frame; box supporting means on said frame below said superstructure; means for bringing said superstructure and said supporting means closer together; a plurality of nailing chucks mounted on said superstructure, certain of said chucks being shiftably mounted; means mounted on said frame for shifting said shiftable nail chucks into proper vertical alignment with boxes of various widths when such boxes are fed in irregular order onto said supporting means; lid slat supporting means provided on said superstructure; slat feeding means mounted on said frame, said last mentioned means being adapted to deliver a plurality of lid slats from a source of supply to said slat supporting means, said slat feeding means being adapted to supply slats to said slat supporting means when said box supporting means and said superstructure move relatively apart; and slat shifting means provided on said superstructure for shifting said slats into proper spaced relation to be applied to boxes of various widths.

10. In combination: means to position successively a series of pieces of primary work varying in a given dimension; means operating in response to said dimension of each piece to properly relate secondary work horizontally relative to said piece of primary work when the latter is positioned as aforesaid; means for bringing said primary and secondary work vertically together into juxtaposition as thus related; and means for securing said primary work and said secondary work together when so juxtaposed.

11. In combination: means to position successively a series of pieces of primary work varying in a given dimension; means operating in response to said dimension of each piece to juxtapose a plurality of separate, spaced members of secondary work relative to said piece of primary work when the latter is positioned as aforesaid; and means for securing said primary work and said secondary work together when so juxtaposed.

12. In combination: means to position successively a series of pieces of primary work varying in a given dimension; means operating in response to said dimension of each piece to space a plurality of separate members of secondary work and juxtapose them relative to said piece of primary work when the latter is positioned as aforesaid, said separate members being spaced distances in proportion to said dimension; and means for securing said primary work and said secondary work together when so juxtaposed.

13. In combination: means to position successively a series of pieces of primary work varying in a given dimension; means operating in response to said dimension of each piece to juxtapose a plurality of separate members of secondary work in spaced relation with said piece of primary work when the latter is positioned as aforesaid, said separate members being spaced distances in proportion to said dimension and in the same direction as said dimension; and means for securing said primary work and said secondary work together when so juxtaposed.

14. In combination: means to position successively a series of pieces of primary work varying in a given dimension; means to secure a plurality of separate elements of secondary work to said primary work; and means operating in response to said dimension of each such piece to position said securing means and said elements relative to said piece in accordance with the value of said dimension.

15. A combination as in claim 14 in which means is provided for bringing the work and the securing means together vertically, both of said positioning means operating in response to said vertical movement.

16. In combination: means to position successively a series of pieces of primary work, varying in a given dimension for the purpose of securing individual members of secondary work to each of said pieces of primary work; means operating in response to said dimension of each of said pieces to properly relate horizontally certain of said members of secondary work to said piece of primary work; and means for bringing said primary work and said members, so related thereto, vertically together to permit the latter to be secured to the former.

17. In a nailing machine, the combination of: means to position successively a series of pieces of primary work, varying in a given dimension, to permit a plurality of secondary work members to be nailed to each piece of primary work; nailing means for accomplishing said nailing; and means for variously spacing said members relative to each piece to which they are to be nailed and likewise spacing said nailing means opposite said members, said spacing being responsive to and determined by said dimension.

18. In a nailing machine, the combination of: means to position successively a series of pieces of work varying in a given dimension; means for

performing a plurality of spaced nailing operations upon each of said pieces; and means for bringing said aforementioned means vertically together, said last mentioned means adjusting said nailing means to determine said spacing according to said dimension.

19. In a nailing machine, the combination of: means to support and caliper a piece of work; means to perform a plurality of spaced nailing operations thereon, said two aforementioned means being spaced apart vertically to accommodate work varying in height; means operative following said calipering to cause relative vertical movement between said two aforementioned means to bring said work and said nailing means into operative relation; and means responsive to said first mentioned means to determine the spacing of said operations according to a given dimension calipered.

20. In a nailing machine the combination of: a pair of nail chucks; slat positioning means adjacent said chucks; and means to correlatively shift said chucks and said positioning means across the direction of the axes of said chucks to reposition said chucks and said positioning means.

21. In a nailing machine the combination of: a pair of nail chucks; slat positioning means adjacent said chucks; means to feed a slat to said positioning means; and means to correlatively shift said chucks and said positioning means across the direction of the axes of said chucks to reposition said chucks and said slat engaged by said positioning means.

22. In a nailing machine the combination of: a pair of nail chucks; slat positioning means on said chucks; means to feed a slat to said positioning means; and means to shift said chucks across the direction of the axes of said chucks to reposition said chucks and said slat.

23. In a mechanism for positioning a plurality of slats relative to a piece of work to which said slats are to be secured, the combination of: a work support; a plurality of individual slat receiving means opposite said support; means to feed a slat to each of said means; and means to shift one of said slat receiving means to modify the relative positions of said slats after their being delivered to said receiving means and prior to their being secured to the work.

24. A combination as in claim 23 in which means is provided for bringing the work support and slot receiving means closer together to apply the slats to the work, said means automatically actuating the aforesaid shifting means.

25. A combination as in claim 23 in which means is provided for bringing the work support and slat receiving means closer together to apply the slats to the work, said means automatically actuating the aforesaid feeding means and shifting means.

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