

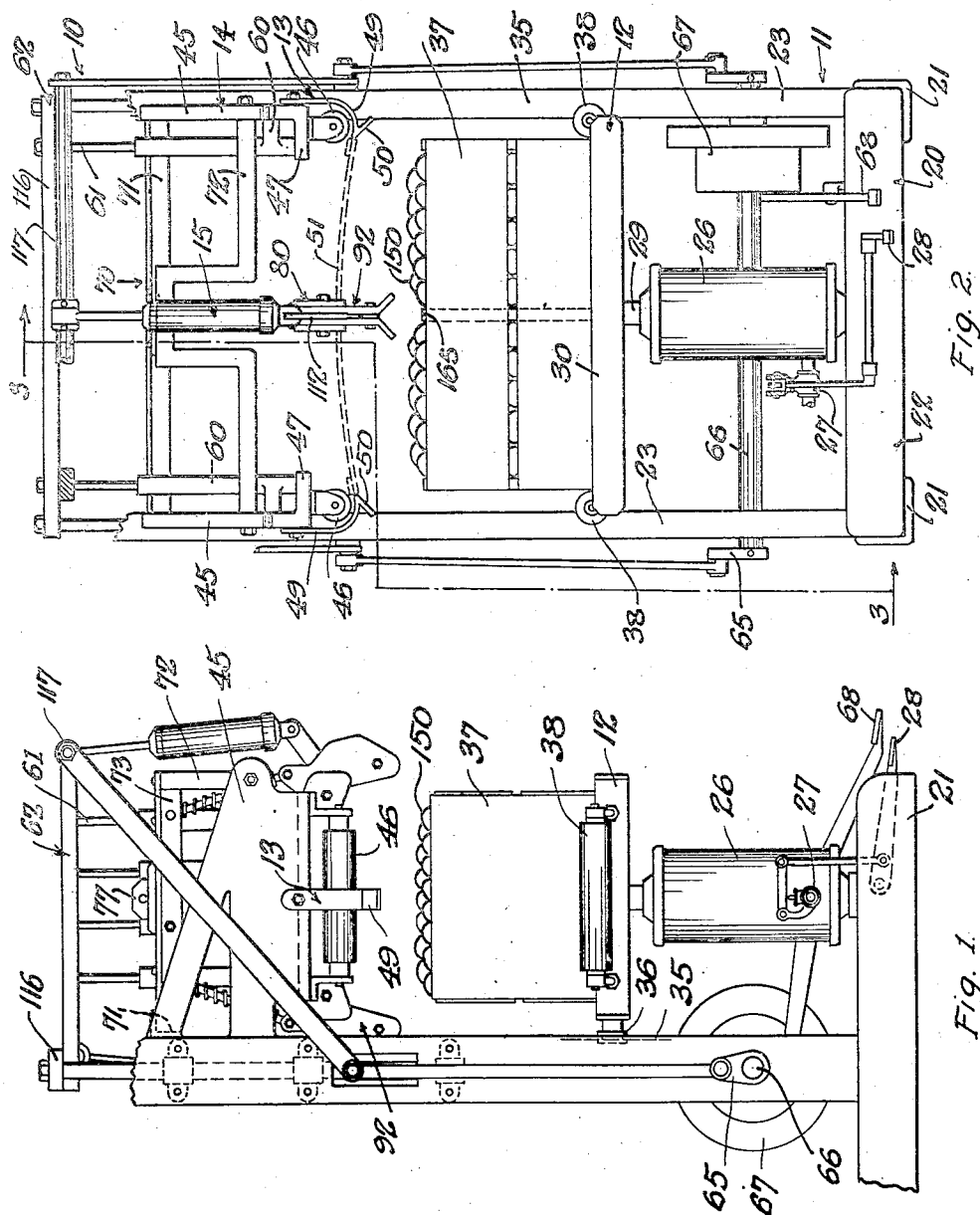
Dec. 5, 1933.

H. D. BENSON

1,938,244

METHOD OF AND APPARATUS FOR SECURING COVERS TO CONTAINERS

Original Filed Dec. 30, 1930 3 Sheets-Sheet 1



INVENTOR.
Harry D. Benson
 BY
Francis C. Kuebler
 ATTORNEY.

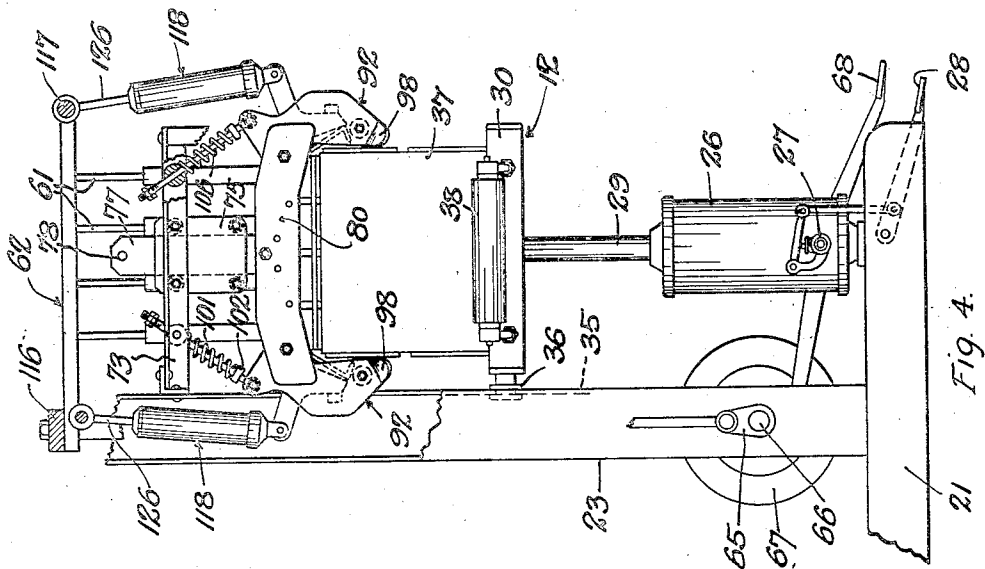
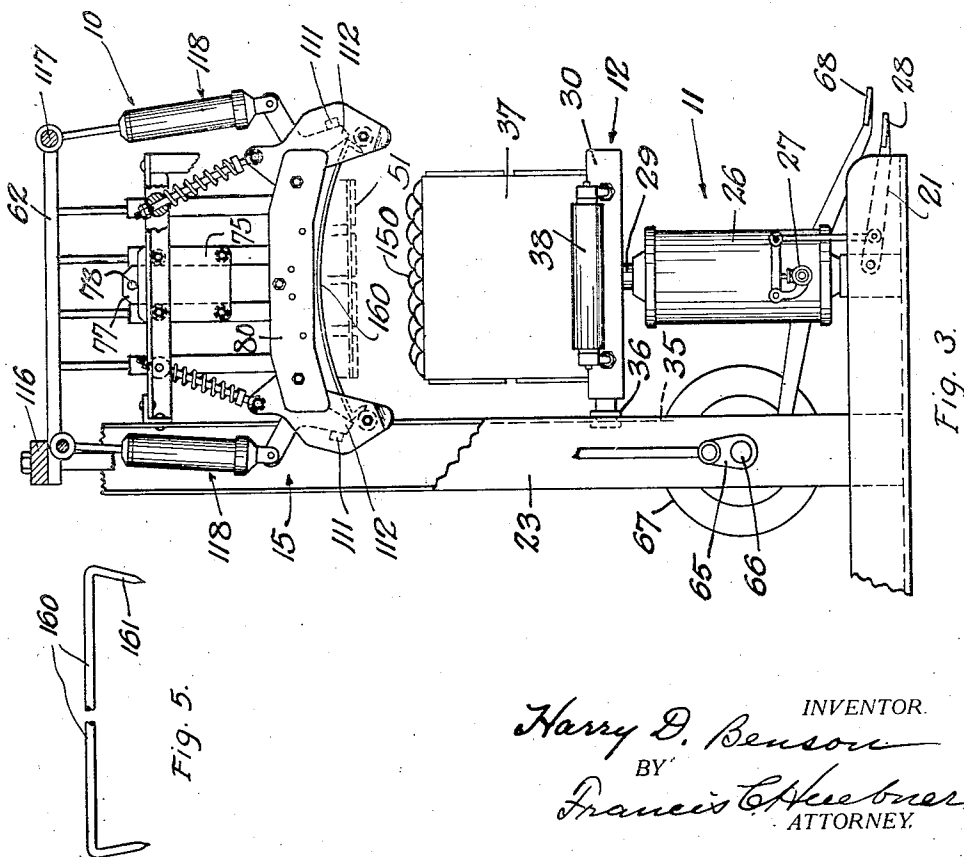
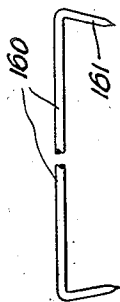
Dec. 5, 1933.

H. D. BENSON

1,938,244

METHOD OF AND APPARATUS FOR SECURING COVERS TO CONTAINERS

Original Filed Dec. 30, 1930 3 Sheets-Sheet 2



INVENTOR.
Harry D. Benson
BY
Francis C. Heebner,
ATTORNEY.

Dec. 5, 1933.

H. D. BENSON

1,938,244

METHOD OF AND APPARATUS FOR SECURING COVERS TO CONTAINERS

Original Filed Dec. 30, 1930 3 Sheets-Sheet 3

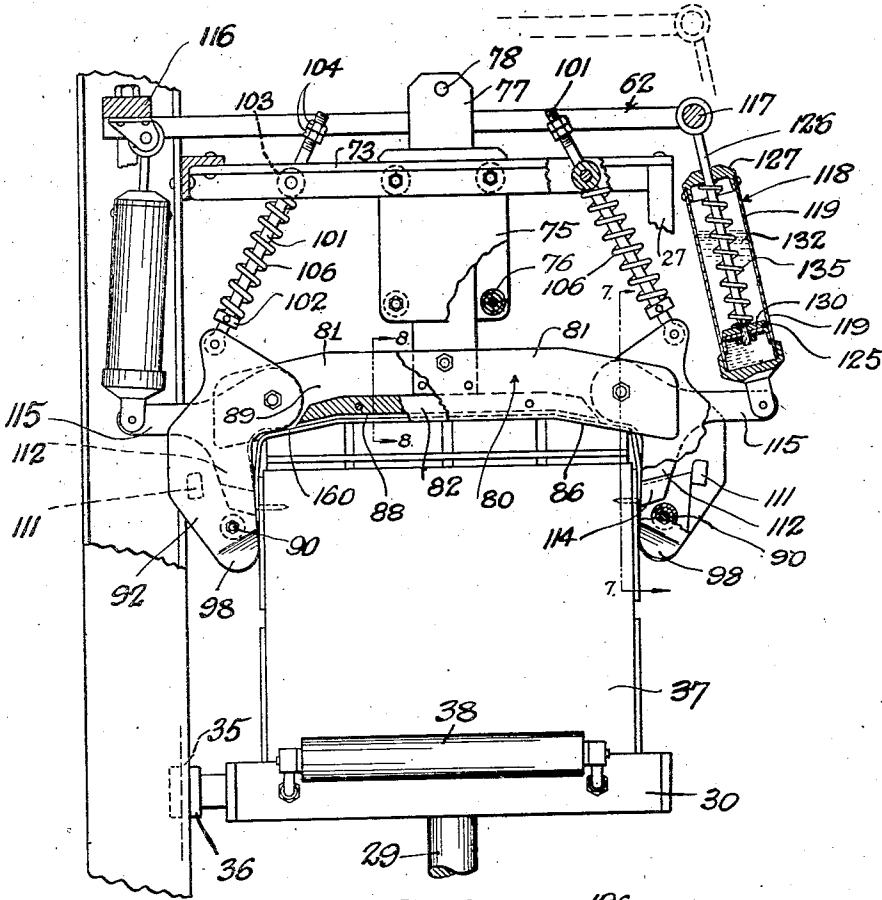


Fig. 6.

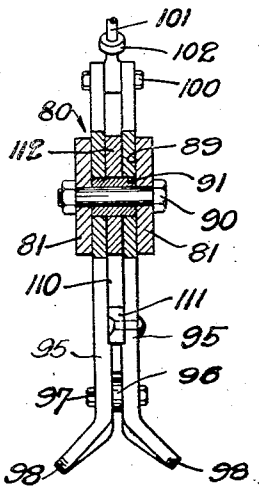


Fig. 7

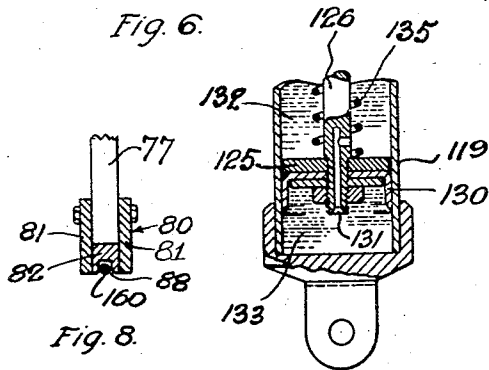


Fig. 9.

INVENTOR.

INVENTOR.
Harry D. Benson
BY
Francis C. Huebner
ATTORNEY.

BY.

ATTORNEY.

UNITED STATES PATENT OFFICE

1,938,244

METHOD OF AND APPARATUS FOR SECURING COVERS TO CONTAINERS

Harry D. Benson, Sanger, Calif., assignor, by
mesne assignments, to Paxton Credit Corpora-
tion, Sanger, Calif., a corporation of California

Application December 30, 1930

Serial No. 505,575

Renewed May 8, 1933

31 Claims. (Cl. 1-10)

My invention relates to the art of applying closures to shipping cases and particularly to a novel method of and apparatus for lidding and strapping fruit shipping boxes.

While my invention is adapted for use in many different industries, it is particularly useful in the preparation of citrus and deciduous fruits for shipment. These fruits are usually packed in wooden crates or boxes so that the fruit extends upwardly above the top of the box and must be pressed down at the ends by the lid when the latter is applied and nailed at its ends to the box ends. When thus applied, the lid bulges upwardly in the middle and it is found desirable to apply a strap transversely of the box to prevent the lid breaking.

In the method at present used of lidding and strapping these fruit shipping boxes, the boxes pass along a conveyer through two machines, in the first of which the box is lidded and in the second of which the strap is applied.

It is an object of my invention to provide a method of and apparatus for securing lids to containers which will decrease the amount of machinery which has to be provided and the time consumed in the lidding and strapping of fruit shipping boxes.

In the citrus industry it is frequently desired to pack part of a day's run in domestic shipping boxes, which have relatively thin side slats, and another part of the day's run in export boxes, the sides of which are considerably thicker. In none of the strapping machines in general use is it possible to accommodate both domestic and export shipping boxes without making a difficult adjustment in the machine.

It is accordingly an object of my invention to provide an apparatus for strapping shipping boxes which will accommodate boxes of considerable variation in width practically without any adjustment being required.

Further objects of my invention are: to provide a machine which will accomplish the combined lidding and strapping of a fruit shipping box in one operation; to provide a machine for lidding and strapping a box which will occupy a relatively small space; to provide a box strapping mechanism which is relatively small and of simple construction; and to provide a machine for strapping boxes which may be embodied with a box lidding machine and actuated by driving mechanism thereof.

In the box strapping machines now in use, the strapping mechanism extends downwardly opposite both sides of the box, and the space in

front of the box is thus obstructed to prevent its full use for any other purpose.

It is therefore another object of my invention to provide a box strapping mechanism which is disposed substantially entirely above the box so as to leave the space in front of the box available for such other uses as may be desired.

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

Fig. 1 is a side elevational view of a preferred embodiment of the lidding and strapping machine of my invention, certain parts being broken away to illustrate its operation.

Fig. 2 is a front elevational view of Fig. 1.

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

Fig. 4 is a view similar to Fig. 3 illustrating the machine at a different point in the strapping operation.

Fig. 5 is a fragmentary view of a strap such as is adapted to be applied by a machine of my invention.

Fig. 6 is an enlarged transverse sectional view of the strapping apparatus of my invention illustrating the completion of the strapping operation, the beginning of which is shown in Fig. 3.

Fig. 7 is a sectional view of the strapping mechanism taken on the line 7-7 of Fig. 6.

Fig. 8 is a sectional view of a saddle bar of my invention taken on the line 8-8 of Fig. 6.

Fig. 9 is a fragmentary sectional view of a yieldable driving link included in my invention.

The apparatus of my invention as illustrated in the drawings, is embodied in a combined lidding and strapping machine 10 which includes a frame 11, a box receiving and elevating mechanism 12, a lid positioner 13, a lid nailing mechanism 14 and a strapping mechanism 15.

The frame 11 has a base 20 including feet 21 formed of heavy angle iron. These feet are connected by a heavy cross bar 22 and have channel beam standards 23 extending upwardly therefrom. At their upper ends the standards 23 are connected by a suitable connecting bar (not shown).

The box receiving and elevating mechanism 12

The box receiving and elevating mechanism 12 includes a hydraulic lift 26 which is controlled by a valve 27 having a foot lever 28. The lift 26 has a piston rod 29 which is elevated when the lever 28 is depressed and lowered when this

lever is released. Mounted on the piston rod 29 is a box receiving table 30. Secured to the table 30 and embracing flanges 35 of the channel beam standards 23 are guide wheels 36. Provided on the ends of the table 30 for positioning a packed box of fruit 37 on this table are rollers 38.

The lid positioner 13

10 The lid positioner 13 is mounted upon a pair of brackets 45 which extend forwardly from and are rigidly fixed upon the standards 23. The lid positioner 13 includes a pair of stationary rollers 46 mounted on under faces of feet 47 provided along the lower edges of the brackets 45. Also 15 secured on these brackets are yieldable large arms 49 having lower cam faces 50 against which ends of a lid 51 come in contact when such a lid is lifted upwardly until it is bowed, as shown in Fig. 2, so that the ends slip between 20 surfaces 50 and are trapped between lower edges of the arms 49.

The lid nailing mechanism 14

25 The lid nailing mechanism 14 includes a plurality of nail chucks 60 mounted on the feet 47 of the brackets 45, these chucks being supplied with nails by a suitable automatic stripper (not shown) secured upon the frame 11 at a point 30 above these chucks and in the well known manner. Slidable in each of the chucks 60 is one of a series of hammers 61 which are mounted on a frame 62. This frame is reciprocable vertically on the frame 11 by means of cranks 65 provided on a shaft 66 and rotated through a clutch 35 67. The clutch 67 is controlled by a foot pedal 68 so that the depression of this pedal causes the shaft 66 to make a single rotation and come to a halt in its original position, this resulting 40 in the hammers 61 going through a complete nailing cycle.

The strapping mechanism 15

45 The strapping mechanism 15 is mounted on a frame 70 including cross bars 71 and 72 which are connected centrally by angle iron beams 73.

Secured between the beams 73 is a stationary slide box 75 provided with opposite pairs of rollers 76 between which slidably extends a 50 mounting stem 77 of the strapping mechanism 15. At the upper end of the stem 77 is a stop 78 which limits downward movement of this stem. Rigidly secured to the lower end of the stem 77 is a fabricated saddle bar 80 preferably 55 made up of plates 81 and a channel bar 82 disposed therebetween adjacent lower edges of these plates and permanently secured thereto. The saddle bar 80 has a lower lid shaping edge 86, outer ends of which extend downwardly for 60 shaping a lid 51 during the strapping operation.

The channel bar 82 is shorter than the plates 81 and has a relatively deep channel 88 formed upwardly therein throughout its length.

Between opposite ends of the plates 81 are free 65 spaces 89. Secured in place in these spaces by bolts 90 are spacers 91, these bolts extending through the plates 81 and the spacers. The spacers 91 are cylindrical and provide pivotal supports for strapper jaws 92 which extend into 70 the spaces 89 as shown in Fig. 6. Each strapper jaw 92 includes a pair of plates 95 shaped as clearly shown in Figs. 6 and 7 and held in spaced relation at their lower ends as by a spacer 96 and a bolt 97. Lower extremities of the plates 95 75 are flared outwardly to provide guides 98 for a

purpose which will be made evident hereinafter.

Upper ends of the plates 95 of each jaw 92 are pivotally connected by a bolt 100 to an eye on the lower end of a rod 101 which has a collar 102 and extends upwardly through a slide 80 box 103 rotatably fixed on one of the angle beams 73 and is provided with nuts 104 on its upper end for adjusting its downwardmost position. Disposed between the collar 102 and the slide box 103 is a spring 106 for maintaining the 85 rod 101 in its lowermost position.

Inner faces of the plates 95 are machined off to provide a driverway 110 in a lower portion of which is fixed a driver stop 111. Disposed in each driveway 110 and pivotally mounted on 90 the spacer 90 is a driver 112 having a lower driving head 114 and a laterally extending arm 115.

The frame 62 has front and rear bars 117 and 116 each of which is pivotally connected to one of the driver arms 115 by one of a pair of 95 yieldably extensible links 118. Each link 118 includes a cylinder 119, the lower end of which is pivoted to one of the arms 115, this cylinder having a piston 125, which is connected to a piston rod 126 extending upwardly through a head 100 127 of the cylinder and pivotally connected to one of the bars 116 or 117 of the frame 62. The piston 125 is provided with a packer 130, which faces downwardly, and a passageway 131 is formed through the lower end of the piston rod 105 126 so as to communicate between the upper and lower chambers 132 and 133 into which the piston 125 divides the interior of the cylinder 119. Disposed between the piston 125 and the cylinder head 127 is a compression spring 135 which 110 continually urges the cylinder 119 upwardly so as to lift the driver arm 115 and bring the head 114 against the driver 111.

Operation

115 The operation of the combined lidding and strapping machine 10 in carrying out the method of my invention is as follows:

A box of fruit 37, with fruit 150 extending above the top of the box, is positioned on the 120 table 30 between the rollers 38 as clearly shown in Figs. 1 and 2. At this time the jaws 92 are in outward position, as shown in Fig. 3, owing to the stem 77 hanging downward with the pin 78 resting on the slide box 75.

125 A strap 160 having its opposite ends 161 bent and pointed as shown in Fig. 5, is now lifted upwardly into the strapping mechanism 15 so that the opposite ends of the strap are guided into place by the guides 98 and snap into position 130 between the spacers 96 and the driver heads 114 as shown in Fig. 3, the strap being under compression so as to be bowed upwardly almost into contact with the saddle 80. When the strap is thus positioned it is of course aligned with the 135 channel 88 and disposed directly therebeneath.

The lid 51 is now inserted in place with its ends in contact with the cam surfaces 50 of the lid positioner 13 and lifted until it snaps into bowed position as shown in Fig. 2.

140 The pedal 28 is now depressed as shown in Fig. 4, which operates the valve 27 to admit liquid under pressure to the hydraulic elevator 26. As the box 37 moves upwardly the fruit 150 engages the lid 51 and forces this lid upwardly 145 past the rollers 46, thus increasing the bulge in the lid and loosely trapping the strap 160 in the channel 88 with the lid bearing against the shaper saddle 80 so as to lift this as shown in Fig. 4. Upward movement of the saddle 80 150

swings the jaws 92 downwardly, this motion bending end portions of the strap 160 so that these lie opposite the sides of the rising box 37 in line with a center partition 165 provided in this box.

The yieldable extensible links 118 are provided to compensate for the saddle 80 being lifted to different heights by different sized boxes 57 or different amounts of fruit 150 piled up therein.

When the frame 62 is stationary in its upward position the springs 135 of the links 118 urge the cylinders 119 upward so as to retain the heads 114 of the drivers 112 pressed outwardly against the stops 111 even though in the preliminary adjustment of the saddle 80 and associated parts, the drivers 112 are actually lifted relative to the reciprocating frame 62. Operation of the springs 135 to maintain this condition during this preliminary adjustment is possible owing to the relatively slow speed with which the adjustment is made so that part of fluid in the chambers 133 of the links 118 has ample time to flow through the passages 131 into the upper chambers 132.

As this preliminary action of the strapping mechanism 15 is completed, the ends of the lid 51 are pressed by ends of the box 37 against the lower faces of the nailing chucks 60, this pressure resisting further upward movement of the carriage 30 so as to cause the lift to merely hold the box in this position as long as the pedal 28 is held down.

With the box thus positioned, the pedal 68 is depressed, whereupon the clutch 67 rotates the shaft 66 a single revolution which moves the frame 62 down and up for a single reciprocation. This causes the hammers 61 to drive nails from each of the chucks 60 through ends of the lid 51 into ends of the box 37 and simultaneously to push downward on the piston rods 126 of the extensible links 118. The suddenness of this motion does not give time for the escape of liquid from the chambers 133 through the passages 131 into the chambers 132 of the extensible links 118 so that the drivers 112 are swung downwardly, driving the pointed ends 161 of the strap 160 into the middle partition 165 of the box 37, while the upper portion of the strap is still loosely positioned in the channel 88. During the first part of the rapid upward return of the reciprocating frame 62 the driver heads 114 are returned into contact with the stops 111 which halts upward movement of the cylinders 119 of the extensible links 118. During the remainder of the upward travel of the frame 62 the packers 130 collapse sufficiently to permit oil in the upper chambers 132 to pass downwardly around the packers 130 into the lower chambers 133 of the cylinders 119.

As soon as the lid has been thus nailed and strapped the pedal 28 is released and the table 30 moves rapidly down to its lower position in which it is shown in Figs. 1 and 2, and the lidded and strapped box 37 is removed from the table.

A complete cycle of operation of the machine 10, illustrative of the method of my invention, has now been accomplished.

It is thus seen that I have produced a method of securing lids to containers by which the time of lidding and strapping covers on fruit shipping boxes may be practically cut in half. It is also seen that I have produced an apparatus for carrying out this method which will eliminate one half of the machinery formerly re-

quired for lidding and strapping covers on fruit shipping boxes.

It is also desired to call attention to the fact that the yieldable manner in which the jaws 92 are mounted to swing about the spacers 91 permits the machine 10 to handle boxes which vary considerably in width without any adjustment of the machine being necessary. The manner in which this may be accomplished may be seen by an inspection of Figs. 4 and 6, where the jaws 92 are inclined inwardly against the sides of the box 37. In case a wider box than the box 37 were to be placed on the platform 30 and lifted against the saddle bar 80, as shown in Fig. 4, the springs 106 would merely be compressed slightly more than shown in this figure, so that the jaws 92 would accommodate the wider box. At the same time further expansion of the springs 135 in the yieldable links 118 would be permitted so that the drive heads 114 would be retained in contact with the stops 111. Thus, no matter what width of box might be placed in the machine, (within the range of widths which the machine is capable of handling) the yieldably extensible links 118 maintain the drivers 112 in such position that reciprocation of the frame 62 will just actuate the drivers 112 sufficiently to drive the strap ends into the box as shown in Fig. 6.

Another advantage of the invention is seen in the provision of the strapping mechanism above the box so that the space in front of the box is free to be used in any way which may be desired. In the present embodiment this arrangement of the strapper mechanism gives the operator complete freedom for inserting a strap in the strapper, placing the lid in the lid positioner, and for moving a box from one conveyer onto the platform 30 and, after this is lidded and strapped, removing this box from the platform onto the second conveyer.

These two conveyers, which in practically all strapper installations are disposed on opposite sides of the platform 30, are not shown in the drawings, as the manner in which these are provided and used in connection with a box strapping machine is well known in the art. The customary manner of using these conveyers is to feed the boxes in a practically continuous stream to the strapping machine so that a packed box ready to be lidded and strapped is always available for insertion in the machine as soon as the previous box has been discharged therefrom.

While I have shown and described but a single embodiment of the apparatus of my invention, it is to be understood that many modifications and changes might be made in this without departing from the spirit of the invention or the scope of the appended claims.—

I claim as new and ask for Letters Patent:

1. A method of securing lids to containers which consists in feeding said containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across a central portion of said lid, bringing said lid and said container together and simultaneously nailing said lid to said container and securing opposite ends of said strap to said container.

2. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which method consists in feeding said filled containers

consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across a central portion of said lid, bringing said lid and said container together so as to depress end portions of said surplus into said container and bring the ends of said lid in contact with ends of said container and simultaneously nailing ends of said lid to said container and securing opposite ends of said strap to said container.

3. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which method consists in feeding said filled containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across a central portion of said lid, shaping said lid transversely beneath said strap, bringing said lid and said container together so as to depress end portions of said surplus into said container and bring the ends of said lid in contact with ends of said container and simultaneously nailing ends of said lid to said container and securing opposite ends of said strap to sides of said container.

4. A method of securing lids to containers which consists in feeding said containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning transversely across said lid a strap having pointed ends, bringing said lid and said container together, shaping said strap so that end portions thereof are disposed opposite the sides of said container and substantially simultaneously nailing said lid to said container and driving opposite ends of said strap into said container.

5. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which method consists in feeding said filled containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across said lid, elevating said container to bring said surplus pressurably against said lid so as to bow said lid and bring its ends into contact with the ends of said container and depress end portions of said surplus into said container, and nailing ends of said lid to said container and securing opposite ends of said strap to sides of said container.

6. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which method consists in feeding said filled containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across said lid, bringing said lid and said container together so as to simultaneously bow said lid with its ends against the ends of said container and shape said lid beneath said strap, nailing said lid to said container, and securing opposite ends of said strap to said container.

7. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which method consists in feeding said filled containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning

a strap transversely across said lid, bringing said lid and said container together so as to simultaneously bow said lid with its ends against the ends of said container and shape said lid beneath said strap, forming said strap to the same shape as given said lid, nailing said lid to said container, and securing opposite ends of said strap to said container.

8. A method of securing lids to containers filled with a substantial surplus of the contents extending above the top of the container, which methods consists in feeding said filled containers consecutively along a given path, halting each container in a given position in said path, positioning a lid above said container, positioning a strap transversely across said lid, bringing said lid and said container together so as to simultaneously bow said lid with its ends against the ends of said container and shape said lid beneath said strap, forming said strap to the same shape as given said lid, and simultaneously nailing said lid to said container and securing opposite ends of said strap to said container.

9. In a machine for lidding and strapping boxes, the combination of: means for positioning a box in said machine; means for nailing the ends of a lid on said box while so positioned; and means for applying a strap across said lid between its ends and securing it to sides of said box while the latter is so positioned.

10. In a machine for lidding and strapping boxes, the combination of: means for positioning a box in said machine; and means for simultaneously lidding said box with a middle portion of the lid thereof arched above end portions thereof, and strapping said middle portion of the lid to said box while the box is so positioned.

11. In a machine for lidding and strapping boxes, the combination of: means for positioning a box in said machine; means for positioning a lid above said box while in said position; means for shaping said lid and positioning a strap transversely of said lid while said box is so positioned; and means for securing both said lid and said strap to said box while the latter is so positioned.

12. In a machine for lidding and strapping boxes, the combination of: means for positioning a box in said machine; means for positioning a lid above said box while in said position; means for shaping said lid and positioning a strap transversely of said lid while said box is so positioned; and means for simultaneously securing both said lid and said strap to said box while the latter is so positioned.

13. In a lidding and strapping machine, the combination of: means for receiving a box; means for positioning a lid thereon; means at opposite ends of said box for nailing ends of said lid to said box; means located between said lid nailing means for shaping said lid transversely; and means for securing opposite ends of a strap to opposite sides of said box with the strap disposed transversely of said lid to retain said lid in shaped conformation.

14. In a lidding and strapping machine, the combination of: means for receiving a box; means for positioning a lid thereon; means at opposite ends of said box for nailing ends of said lid to said box; means located between said lid nailing means for shaping said lid transversely; means for securing opposite ends of a strap to opposite sides of said box with the strap disposed transversely of said lid to retain said

lid in shaped conformation; and means for simultaneously actuating said nailing and strap securing means.

15. In a machine for strapping lids on boxes, the combination of: means for positioning a strap, having driving ends, across a lid; jaws for positioning said strap ends adjacent opposite side faces of said box a given distance from said faces in readiness to be driven thereinto; yieldable means for actuating said jaws to permit said jaws to uniformly position said strap ends regardless of substantial variations in box width; and means, actuated after said positioning in readiness, for driving said strap ends into said box.

16. In a machine for applying a strap across a given face of an object and securing it to two other adjacent faces, the combination of: a table for supporting said object; jaws adapted to receive and confine end portions of a strap within a given plane; a member having its opposite ends pivotally connected to said jaws to form a strap confining unit; means to bring said unit and said object together to cause said member to engage said given face and to swing said jaws inwardly close to said adjacent faces, said strap ends being swung in with said jaws so as to lie in said plane and close to said adjacent faces; and means on said unit for securing said strap ends to said adjacent faces of said object.

17. In a machine for applying a strap across a given face of an object and securing it to two other adjacent faces, the combination of: a table for supporting said object; jaws receiving and confining in a given plane end portions of a strap having integral driving ends; a member pivotally connected to said jaws to form a strap confining unit; means to bring said unit and said object together to cause said member to engage said given face and to swing said jaws inwardly close to said adjacent faces, said end portions being thus positioned close to said adjacent faces; and drivers on said unit for driving said strap driving ends into said adjacent faces of said object with said jaws positioned inwardly as aforesaid.

18. In a machine for applying across a given face of an object a strap having driving ends and driving said ends into two other adjacent faces, the combination of: a pair of jaws having pockets formed therein for confining said strap driving ends; means to support said jaws to permit them to rotate about axes relatively close to corners of intersecting pairs of said faces, thus bringing said jaws to rest in proximity with said adjacent faces, said strap driving ends being placed by said rotation in proper position to be driven into said adjacent faces; means causing rotation of said jaws to so position said strap ends; and drivers forming opposed end walls of said pockets and rotating with said jaws when the latter position said strap ends, said drivers then being movable through said pockets in a direction substantially normal to said adjacent faces to expel said strap ends from said pockets into said faces.

19. In a machine for strapping a cover on an overfilled packed box, the combination of: a frame; a box supporting table on said frame; an inverted U-shaped strapper structure supported on said frame transversely over said table and vertically movable as a unit relative to said frame, said unit having a relatively deep mouth adapted to receive the cover and a substantial upper portion of a box resting on said table;

means for causing relative movement between said table and said unit to bring said cover and box into said mouth, there being guideways on said unit to confine a strap at this time in substantial conformation with said cover and with the ends of said strap opposite sides of said box; and means on said unit for securing ends of said strap to sides of said box.

20. In a mechanism for applying a strap to a plurality of faces of an object, the combination of: a central member for contacting a face of said object; strap supporting and shaping members connected to opposite ends of said central member; means for bringing said central member and said face into pressurable engagement; means responsive to said engagement to move said strap shaping members inwardly to shape end portions of a strap inward towards other faces of said object; and means for securing ends of said strap in place to retain said strap on said object.

21. In a strapping device the combination of: an overhead structure; a saddle bar movably mounted thereon and yieldably urged into strap receiving position; jaws pivotally connected to opposite ends of said bar; links connecting said jaws to said overhead structure, said links causing said jaws to be extended when said bar is in strap receiving position; means for bringing said overhead structure and an object to be strapped towards each other so that a face of said object engages said bar and moves it into strap applying position, this causing said jaws to rotate inwardly on said bar and form end portions of said strap alongside other faces of said object; and means actuated by movement of a portion of said overhead structure for securing ends of said strap in place to retain said strap on said object.

22. In a cover press and strapping machine for overfilled boxes the combination of: means for pressing ends of a cover downward against the box ends in position for nailing thereto and permitting the middle portion of the cover to bulge upwardly; means for positioning a strap transversely across said bulged portion of said cover and shaping said bulged portion transversely beneath said strap; mechanism for causing relative movement between said box and the aforesaid means in a given vertical path to apply said cover to said box in bulged and transversely shaped condition and apply a strap thereover, said strap applying and transverse cover shaping means being yieldably related vertically to said cover end pressing means to compensate for varying heights of bulge in different boxes; and means for securing the ends of said strap to opposite sides of said box.

23. In a strapping device the combination of: a frame; a central member; jaw members pivoted on end portions of said central member; means for mounting said members on said frame so that they yieldably resist movement relative to said frame in a given direction transverse to the longitudinal axis of said central member; means on certain of said members for supporting a strap having driving ends; means for bringing an object to be strapped into pressurable contact with said central member to cause movement of the latter in the aforesaid direction relative to said frame thereby causing said jaw members to fold about said object and shape said strap thereabout; and means for driving the ends of said strap into said object when said strap is so shaped.

24. In a machine for securing a cover on a box having a partition by a strap having integral driving ends, the combination of: a table for supporting said box; a cover shaping bar extending across said cover thereabove; strap confining extensions provided on opposite ends of said bar and extending downwardly opposite upper portions of the sides of said box, there being recesses in said extensions for confining end portions of said strap in the plane of said partition and disposed inwardly adjacent opposite sides of said box, said bar and extensions comprising a unit; means for causing relative vertical movement between said unit and said table to shape said cover and position said strap ends as aforesaid; and means pivotally mounted on said unit and operating in said recesses for driving said strap ends into said partition.

25. In a machine for strapping a cover on an overfilled packed box, the combination of: a table adapted to support a box, there being horizontal paths of travel, for delivering a box onto or removing it from said table, said paths being open during intervals between strapping operations from at least one end and one side of said machine; strapping means supported transversely over said table above said paths so as not to interfere with box movement along said paths; and means for causing relative vertical movement between said table and said strapping means to apply a strap across a middle portion of said box and secure ends of said strap to opposite sides of said box.

26. In a machine for securing across a cover of a box a strap having integral driving ends, the combination of: means for shaping said cover transversely and loosely confining a middle portion of said strap adjacent and transversely of said cover and substantially conforming to the shape of said cover; means provided on the aforesaid means to support said driving ends of said strap and to push said strap upwardly relative to the aforesaid means and centralize said strap on its longitudinal axis relative to said box; and means for driving said strap ends into said box when the strap is so centralized.

27. In a machine for binding a cover onto an overfilled packed box by a strap applied across a middle portion of said cover in a transverse plane, the combination of: a table for supporting said packed box in upright position with a cover positioned thereover; means to confine opposite end portions of a strap in said plane, to drive the strap ends into opposite sides of said box in said plane, and to guide the strap ends in said plane while being so driven; and cover shaping means extending across said cover and connecting said aforementioned means to form a strapper unit having movement as a unit relative to said box supporting table to apply a strap across the cover of said box, shape said cover, and drive the strap ends into opposite sides of said box.

28. In a machine for binding a cover onto an overfilled packed box by a strap applied across a middle portion of said cover in a transverse plane, the combination of: a table for supporting said packed box in upright position with a cover positioned thereover; means to confine opposite end portions of a strap in said plane, to drive the strap ends into opposite sides of said box in said plane, and to guide the strap ends in said plane while being so driven; and a member extending across said cover and connecting said aforementioned means to form a strapper unit having movement as a unit relative to said box supporting table to apply a strap across the cover of said box and drive the strap ends into opposite sides of said box.

29. In a machine for strapping a cover on an overfilled packed box having a partition the combination of: a table for supporting said packed box in upright position with a cover positioned thereover; means to confine opposite end portions of a strap in the plane of said partition and to then secure the strap ends to said box; and cover shaping means extending across said cover and connecting said aforementioned means to form a strapper unit having movement as a unit relative to said box supporting table to apply a strap across the cover of said box, shape said cover, and secure the strap ends to opposite sides of said box.

30. In a machine for strapping a cover on an overfilled packed box having a partition the combination of: a table for supporting said packed box in upright position with a cover positioned thereover; means to confine opposite end portions of a strap in a plane of said partition and to then secure the strap ends to said box; and a member extending across said cover and connecting said aforementioned means to form a strapper unit having movement as a unit relative to said box supporting table to apply a strap across the cover of said box and secure the strap ends to opposite sides of said box.

31. In a combined cover press and strapping machine for overfilled boxes, the combination of: means for pressing ends of a cover, disposed over a box, against the ends of said box in position for nailing thereto and permitting the middle portion of the cover to bulge upwardly; means for positioning a strap transversely across said bulged portion of said cover; mechanism for causing relative up and down movement between said box and the aforesaid pressing means to apply said cover to said box and apply a strap thereover, there being an open horizontal space in the aforesaid pressing means before the starting of said pressing and strap applying operation to permit said cover to be inserted broadside into position over said box; and means for securing opposite ends of said strap to sides of said box.

HARRY D. BENSON.