

March 17, 1953

F. PFYFFER
NAILING MACHINE

2,631,284

Filed Feb. 5, 1952

4 Sheets-Sheet 1

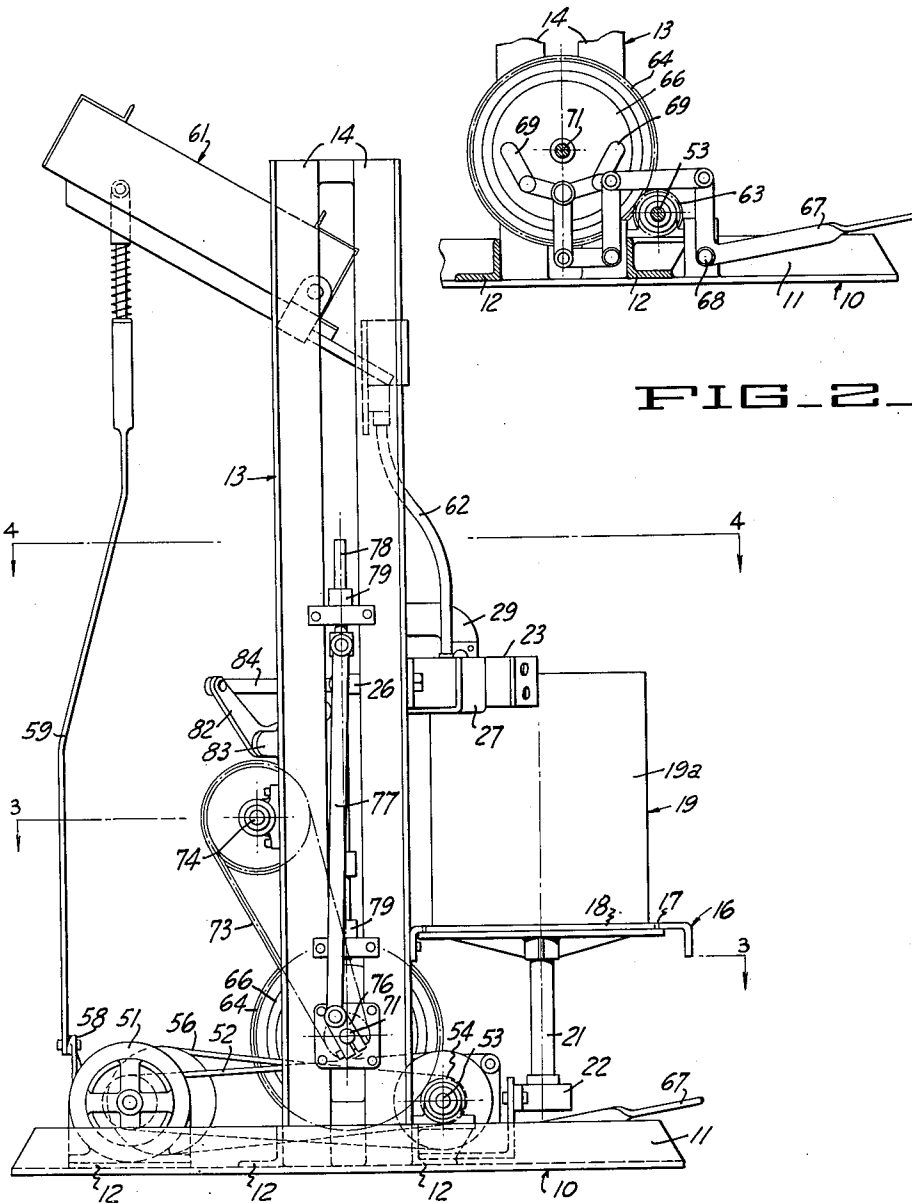


FIG. 1

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FIG. 3

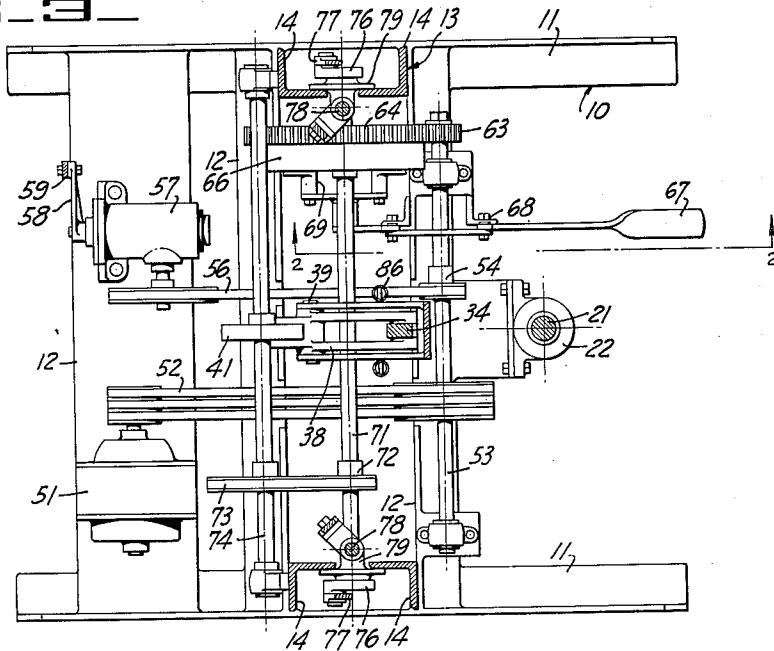
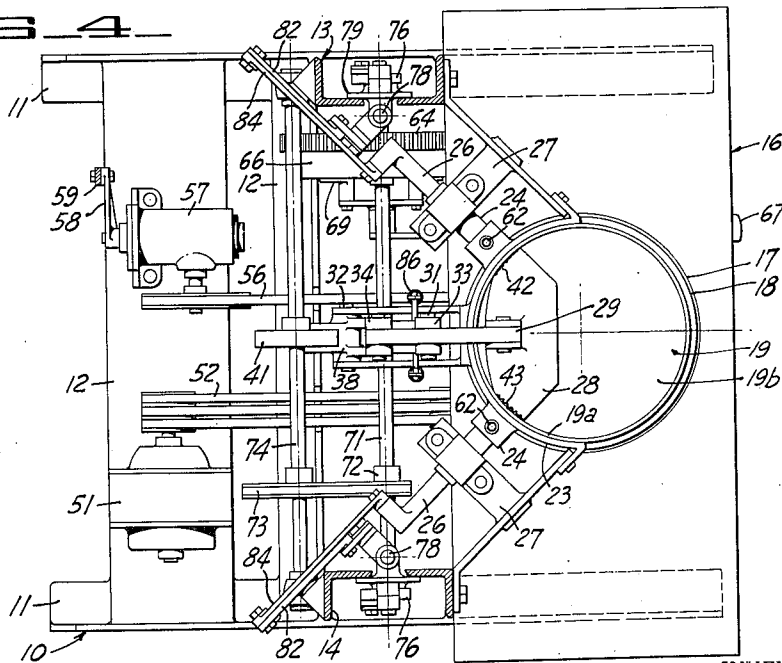


FIG. 4



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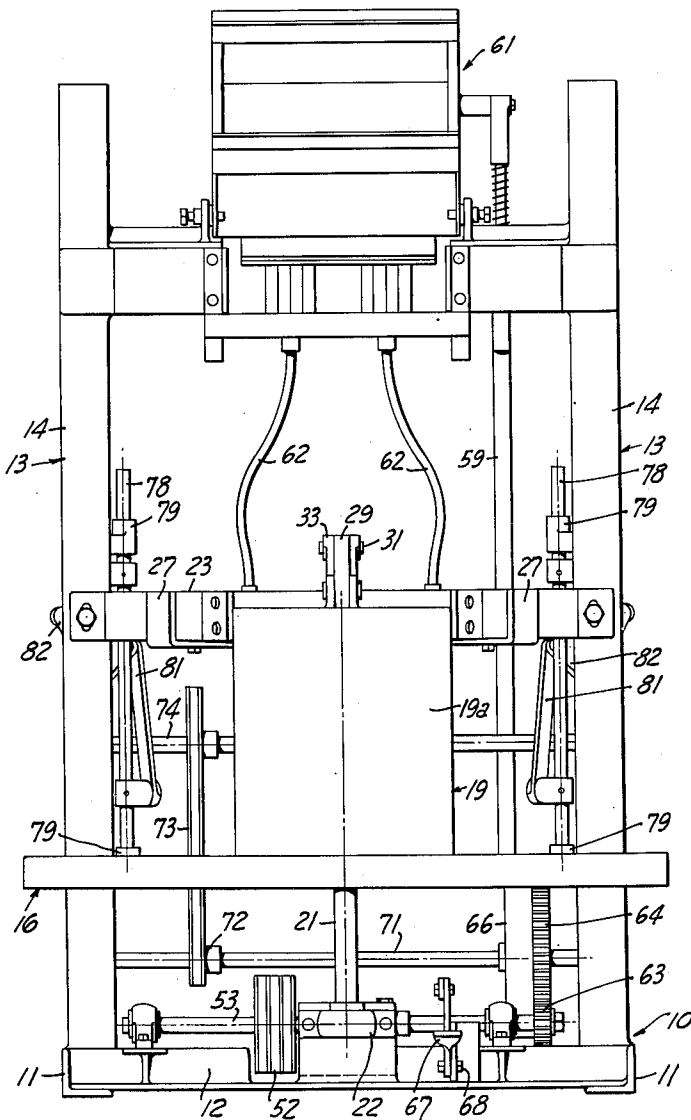
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FIG. 5



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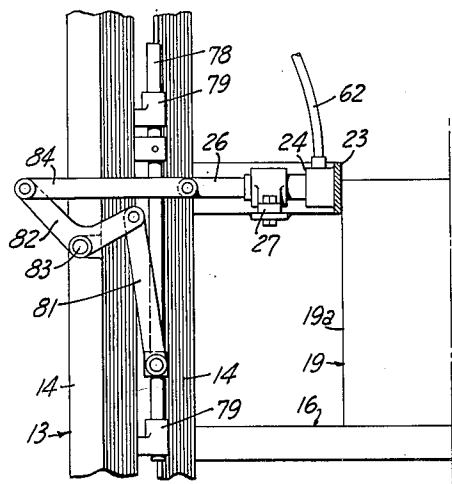


FIG. 6

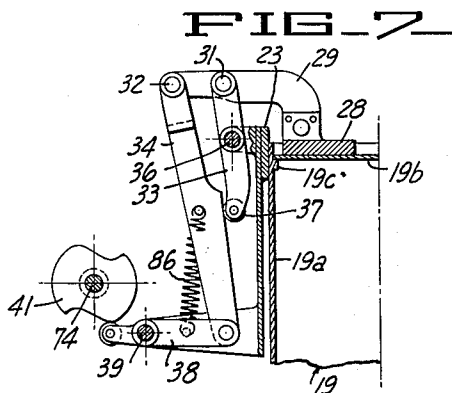


FIG. 7

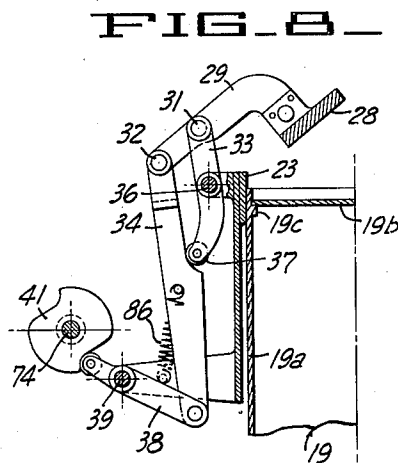


FIG. 8

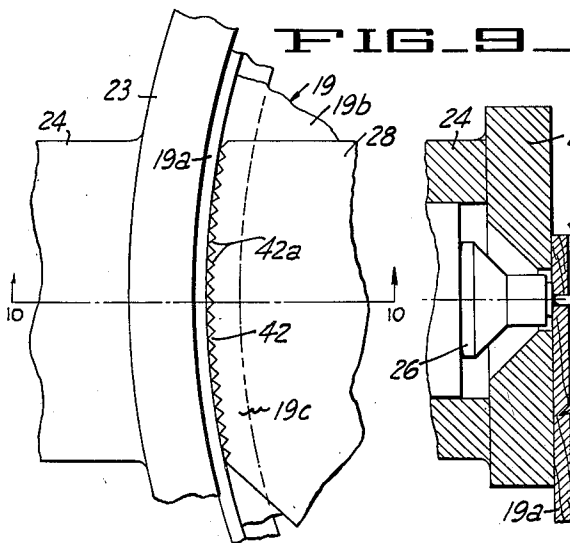


FIG. 9

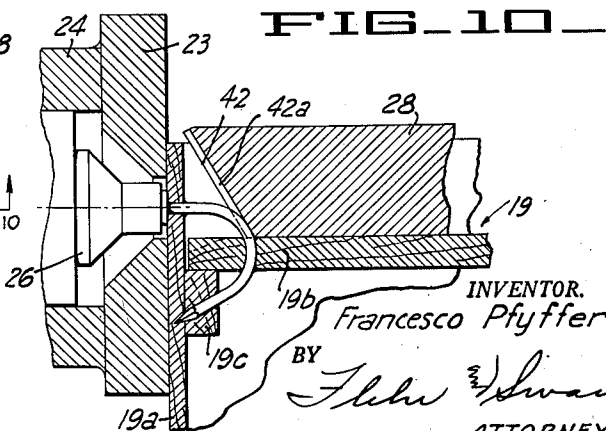


FIG. 10

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UNITED STATES PATENT OFFICE

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NAILING MACHINE

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Application February 5, 1952, Serial No. 270,049

11 Claims. (Cl. 1—13.5)

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This invention relates to nailing machines and particularly to that type of nailing machine which is adapted to be used in connection with the nailing of a wooden top in a wooden drum.

Wooden cylindrical drums are particularly used in California in connection with the packing and shipping of vegetable products, including Brussels sprouts. Generally, such drums are delivered to the shipper or packer with one end open and with the lids removed. The drums are provided with an annular inner lip at some point near the upper open end upon which the circular wooden top is adapted to rest. The tops are customarily provided with various types of hooks, clamps and other devices by which they may be secured to the open end of the drum by first positioning them against the lip and then securing the clamps or hooks.

Such devices are of necessity expensive not only as pieces of mechanism, but, since they add to the labor of packing and unpacking for inspection, because of the high labor cost involved in connection with their use.

Various simplified devices and mechanisms have been utilized to secure a proper and inexpensive means for fastening the cover in place. For example, my own co-pending application, Serial No. 155,220 filed April 11, 1950, shows one means of avoiding the clamps and hooks and other devices customarily utilized.

It is an object of this invention to provide a pack which would utilize merely a drum and a circular top without the use of hooks, clamps or other devices and which will utilize, instead of them, merely a conventional nail.

It is a further object of this invention to provide a simple means for maintaining a circular cover in place by means of one or more nails which have been inserted at appropriate places and then bent along a pre-determined path to hold the top in position.

It is an object of this invention to provide a device by which the top may be nailed in place by the utilization of conventional nails and substantially conventional nailing machines.

Other objects and advantages of the invention will appear from the following specification taken in conjunction with the accompanying drawings in which:

Figure 1 illustrates a side elevational view of a nailing machine incorporating my invention;

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Figure 2 is a side elevational view of a foot control means for actuating my device and illustrates a foot control lever and the linkage by which the same controls a clutch and is taken along the line 2—2 of Figure 3;

Figure 3 is a cross-sectional view taken along the lines 3—3 of Figure 1 illustrating the drive mechanism from the motor and the means for actuating the clutch together with other apparatus which, in turn, is actuated by the operation of the clutch;

Figure 4 is a cross-sectional detail taken along the lines 4—4 of Figure 1 and illustrates nailing hammers and the mandrel in operating position with respect to a drum;

Figure 5 is a front elevational view of the device showing a drum in position;

Figure 6 is a detail of the nailing mechanism and the linkage for actuating the same;

Figure 7 is a detail of the mandrel and the linkage for actuating the same and illustrates the mandrel in annealing position;

Figure 8, like Figure 7, is a detail of the mandrel and the linkage for actuating the same and showing the mandrel in elevated or non-operating position in which position the drum may be removed from the machine;

Figure 9 is an enlarged fragmentary view of one portion of the mandrel, as illustrated in Figure 4; and

Figure 10 is a cross-sectional detail taken along the lines 10—10 of Figure 9 showing a portion of the hammer, mandrel, top and drum after a nail has been positioned to hold the top in the drum.

As illustrated in Figure 1, I have provided a device mounted upon a base 10 which forms a base for the entire apparatus. The base 10 is formed of a pair of side members 11, in the form of angle irons which are spaced by cross members 12. The base also supports vertical side members 13, each of which is illustrated in Figs. 3 and 4 and is composed of a pair of vertical angle irons 14 which are secured to the base in any suitable manner as by being bolted thereto or welded thereto.

The side members 13 support a platform 16 which, as indicated in Figure 4, is provided with a circular cut-out portion 17 which accommodates a circular platform 18 upon which a drum 19 may be mounted. The circular platform 18 is mounted upon a spindle 21 which, in turn, is rotatably mounted in bearings 22.

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The vertical side channels 13 support a semi-circular member 23 whose inner diameter is substantially equal to the outer diameter of the drum 19. Member 23 forms a backing surface for the drum 19 as illustrated in Figure 10 and also provides a support for the forward ends 24 of the automatic hammers 26. The hammers 26 are also supported by bracket arms 27, as indicated.

The member 23 further provides a support upon which the mandrel 28 is mounted. As viewed particularly in Figures 7 and 8 the mandrel 28 is mounted on one end of an arm 29 which is pivoted at points 31 and 32 respectively to levers 33 and 34 respectively. The member 33 is pivoted at 36 and its other end is provided with a roller 37 which bears against one side of the lever 34 which, as indicated, is irregular in shape and, as viewed in Figures 7 and 8, is adapted to act as a cam with respect to the roller 37. The member 34 is connected to a lever 38 pivoted at 39 which, in turn, is actuated by a cam 41. When the cam 41 rotates it actuates the lever 38 with the result that the mandrel 28 is raised or lowered as indicated.

As viewed in Figures 4 and 10 the mandrel 28 is provided with two surfaces 42 and 43 which bear against the inside surface 19a of the wall of the drum 19 when the mandrel is in the lowered position illustrated in Figure 7. The surfaces of the portions 42 and 43 are serrated or grooved as viewed in Figure 9, and, as viewed in Figure 10, are sloped at an angle of approximately 60° to the vertical.

Generally speaking, when the mandrel is in the position viewed in Figures 4, 7 and 10 a nail which is driven by one of the automatic hammers 26 will be driven through the wall 19a of the drum 19 and will engage one of the surfaces 42 or 43 on the mandrel 28. When the nail strikes the mandrel 28 it will be bent downwardly by the sloping surface of the mandrel and caused to pass through the top 19b of the drum, the lip 19c of the drum and back into the wall 19a of the drum, as viewed in Figure 10.

The serrations or grooves 42a in the surfaces 42 and 43 of the mandrel 28 will direct the nails in a predetermined path and will prevent them from bending from one side to the other as would be the case if the surfaces 42 and 43 were smooth. In that event it is apparent that the nail would be free to follow substantially any course and might not be directed downwardly in the path illustrated in Figure 10.

The mechanism for operating the power hammers and the mandrel in the other component portions of the machine may be described as follows:

An electric motor 51 provides the power through transmission belts 52 to a horizontal cross shaft 53 which is mounted in suitable bearings. The shaft 53 is provided with a pulley 54 which through a belt 56 and a gear box 57 drives rotating arm 58 which, through an arm 59, operates the nail hopper 61. The nail hopper 61 is of the conventional type and feeds nails through the tubular members 62 to the hammers 26.

The cross shaft 53 is also provided with a gear 63 which is in constant mesh with a gear 64 which forms the outer driving member of a clutch assembly 66.

The clutch 66 is engaged by the operation of foot lever 67. The foot lever 67 is pivoted at 68 and through the linkage illustrated generally in Figure 2, when the same is depressed, the arms 69 are urged apart causing the driven portion of the clutch 66 to engage the driving portion there-

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of and transmit power to the cross shaft 71. The cross shaft 71 is provided with a suitable sprocket 72 which, through a chain 73, drives a cross shaft 74 upon which the cam 41 is mounted.

The ends of the cross shaft 71 are provided with crank arms 76 which actuate a pair of connecting rods 77. The rotary motion of the crank pins 76 through the connecting rods 77 imparts a vertical motion to shafts 78 which are mounted for reciprocating motion in suitable bearings 79. The reciprocating shafts 78 as viewed in Figure 6, actuate arms 81 which are pivotally connected to rocker arms 82, which are pivoted at 83 and serve to actuate levers 84 which, in turn, operate the mechanical hammer assemblies 26.

Operation of the entire device may briefly be described as follows:

The electric motor 51 is connected to a suitable source of outside power and is continually rotating. Motor 51 drives the countershaft 53 and, through the gears 63 and 64, drives the driving portion of the clutch assembly 66. Through the pulley 54, belt 56, gear assembly 57 and crank arm 58, the nail hopper 61 is actuated to supply nails through the tubes 62 to the two mechanical hammers 26. A loaded drum 19 is placed upon the turntable 18 in such a manner that its upper side walls 19a engage the abutment plate 23. A top 19b is placed on the lip 19c. The operator then depresses the foot pedal 67 which, through the linkage illustrated in Figure 2, serves to actuate the driven portion of the clutch 66. By actuating the driven portion of the clutch 66 the shaft 71 will be rotated and each revolution of the shaft 71 causes the cam 41 to rotate one-half a revolution. One-half a revolution of the cam 41 will, through the linkage illustrated in Figures 7 and 8, move the mandrel 28 from the position in Figure 8 to the position illustrated in Figure 7.

The revolution of the shaft 71 will also impart one complete revolution to the crank 76 and will cause operation of the two hammers 26. The linkages previously described are so adjusted that the mandrel 28 will be in the position illustrated in Figure 7 at the moment that the mechanical hammers 26 are actuated. Actuation of the hammers 26 will, as previously described, drive a nail through the side wall 19a of the drum 19, into engagement with the sloping serrated face of the mandrel 28, through the top 19b and into and through the horizontal lip 19c.

After one complete revolution of the shaft 71 the mandrel 28 will be returned to the position illustrated in Figure 8 whereupon the drum 19 may be rotated upon the turntable 18 in any desired position and the operation completed.

It will be apparent from the foregoing that I have supplied a simplified method for securing the tops to wooden drums of this character by providing a simple mandrel of the type illustrated which not only directs the nail downwardly and back into the top 19b and the rib 19c but also serves to hold the drum 19 against the backing plate 23. A study of Figures 7 and 8 will reveal that upward movement of the lever 34 will urge the arm 29 in a counterclockwise direction as viewed in Figure 7 with the result that the mandrel 28 is urged to the left as viewed in Figure 7.

A spring 86 tends to urge the mandrel-actuating mechanism to the position illustrated in Figure 8 and maintains the cam roller on the arm 38 in positive engagement with the cam 41.

It is also obvious that the clutch assembly 66, may be of the single revolution type and need not

be one which may be caused to remain in engagement and rotate the shaft 71 for so long a period as the foot pedal 67 is depressed, in which event the mandrel 28 will be reciprocated continuously. However, the automatic nailers 26 will be operated only at such times as the mandrel 28 is in the position illustrated generally in Figure 7.

It will be apparent from the foregoing that I have provided a simplified form of nailing machine which is particularly useful in connection with the nailing of circular wooden tops on wooden drums.

I claim:

1. In a nailing machine particularly adapted to be used in conjunction with securing a head to a wooden drum, a backing plate adapted to engage said wooden drum about a substantial portion of its periphery, an automatic hammer adapted to direct a nail through the wall of said drum in a plane parallel to and above said head, means for directing the nail downwardly from said plane and through said head comprising a mandrel having a serrated surface set at an angle to the direction at which the nail is first driven through said drum.

2. In a nailing machine, a backing plate adapted to engage a wooden drum, an automatic hammer adapted to direct a nail through the wall of said drum in a plane parallel to and above the cover of said drum, means for directing the nail downwardly from said plane and through said cover, said means comprising a mandrel having a serrated surface set at an angle to the direction at which the nail is first driven through said wall.

3. In a nailing machine particularly adapted to be used in conjunction with securing a head to a wooden drum, a backing plate adapted to engage a wooden drum, an automatic hammer adapted to direct a nail through the wall of said drum in a plane parallel to the head, means for directing the nail downwardly from said plane and through said head, said means comprising a mandrel having a serrated surface set at an angle to said plane.

4. In a nailing machine adapted to be utilized in connection with securing wooden tops to round wooden drums, a plurality of automatic nailing hammers, a backing plate adapted to engage a drum and to support said hammers, means for deflecting the path of the nails from said nailing hammers through said lid comprising a reciprocating mandrel adapted to engage said lid and said drum and hold the same securely against said backing plate and having a plurality of serrated planar surfaces adapted to be engaged by the nail and to deflect the same from its original path through said top.

5. In a nailing machine adapted to be utilized in connection with securing wooden tops to round wooden drums, a pair of automatic nailing hammers, a backing plate adapted to engage a drum and to support said hammers, means for deflecting the path of the nails from said nailing hammers through said lid, said means comprising a mandrel adapted to engage said lid and said drum and hold the drum securely against said backing plate and having a pair of serrated planar surfaces adapted to be engaged by the nail and to deflect the same from its original path through said top.

6. In a nailing machine adapted to be utilized in connection with securing wooden tops to round wooden drums, a pair of automatic nailing hammers, a backing plate adapted to engage the

drum and to support said hammers, means for deflecting the path of the nails from said nailing hammers through said lid, said means comprising a mandrel adapted to engage said lid and hold said drum securely against said backing plate and having a plurality of serrated planar surfaces adapted to deflect said nails from their original paths through said top, and means for moving said mandrel into and out of nail-deflecting position whereby said drum and said lid may be positioned for nailing operations and removed therefrom.

7. In a nailing machine adapted to be utilized in connection with securing tops to drums, a plurality of automatic nailing hammers, a backing plate adapted to engage the drums, means for deflecting the path of the nails from said nailing hammer through said lid, comprising a reciprocating mandrel having a plurality of serrated planar surfaces adapted to be engaged by the nail and to deflect the same from its original path through said top, and means for moving said mandrel into and out of nail-deflecting position.

8. In a nailing machine particularly adapted to be used in conjunction with securing heads to wooden drums, a backing plate adapted to engage a wooden drum about a substantial portion of its periphery, an automatic hammer adapted to direct a nail through the wall of said drum in a plane parallel to and above the head, means for directing the nail downwardly from said plane and through said head comprising a reciprocating mandrel having a serrated surface set at an angle to the direction at which the nail is first driven through said drum, means for actuating said mandrel and means for driving said hammers whereby said hammers are caused to operate only when the mandrel is in nail-deflecting position.

9. In a nailing machine particularly adapted to be used in conjunction with securing heads to wooden drums, an automatic hammer adapted to direct a nail through the wall of a drum in a plane parallel to and above the head, means for directing the nail downwardly from said plane and through said head, said means comprising a mandrel having a serrated surface set at an angle to the direction at which the nail is first driven through said drum, means for actuating said mandrel and means for driving said hammers whereby said hammers are caused to operate only when the mandrel is in nail-deflecting position.

10. In a nailing machine particularly adapted to be used in conjunction with securing a head to a wooden drum, a backing plate adapted to engage said wooden drum about a substantial portion of its periphery, an automatic hammer adapted to direct a nail through the wall of said drum in a plane parallel to and above said head, means for directing the nail through approximately a 180° curve with reference to the initial direction by first directing the nail horizontally through said wall, then downwardly through said head and then outwardly through an annular lip supporting said head and into said wall, said directing means comprising a mandrel having a serrated surface set at an angle to said plane.

11. In a nailing machine adapted to be utilized in connection with securing wooden tops to round wooden drums, a platform provided with a circular rotatable portion for supporting a drum, a pair of automatic nailing hammers, means for feeding nails to said hammers, a backing plate adapted to engage said drum and to support said

hammers, a mandrel for deflecting the path of the nails from said nailing hammers through said top, said mandrel engaging said lid and holding said drum securely against said backing plate and having a plurality of serrated planar surfaces at an angle to said top adapted to deflect said nails from their original paths through approximately a 180° curve by first directing the nails horizontally through walls of said drum then downwardly through said top and then outwardly through said wall, and means for moving said mandrel into and out of the nail deflecting position whereby said drum and said lid may be positioned for the nailing operation and removal therefrom.

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