Jan. 19, 1926. 1,570,156

H. T. KINGSBURY ET AL

DRILLING FIXTURE

Filed April 3, 1923 3 Sheets-Sheet 1

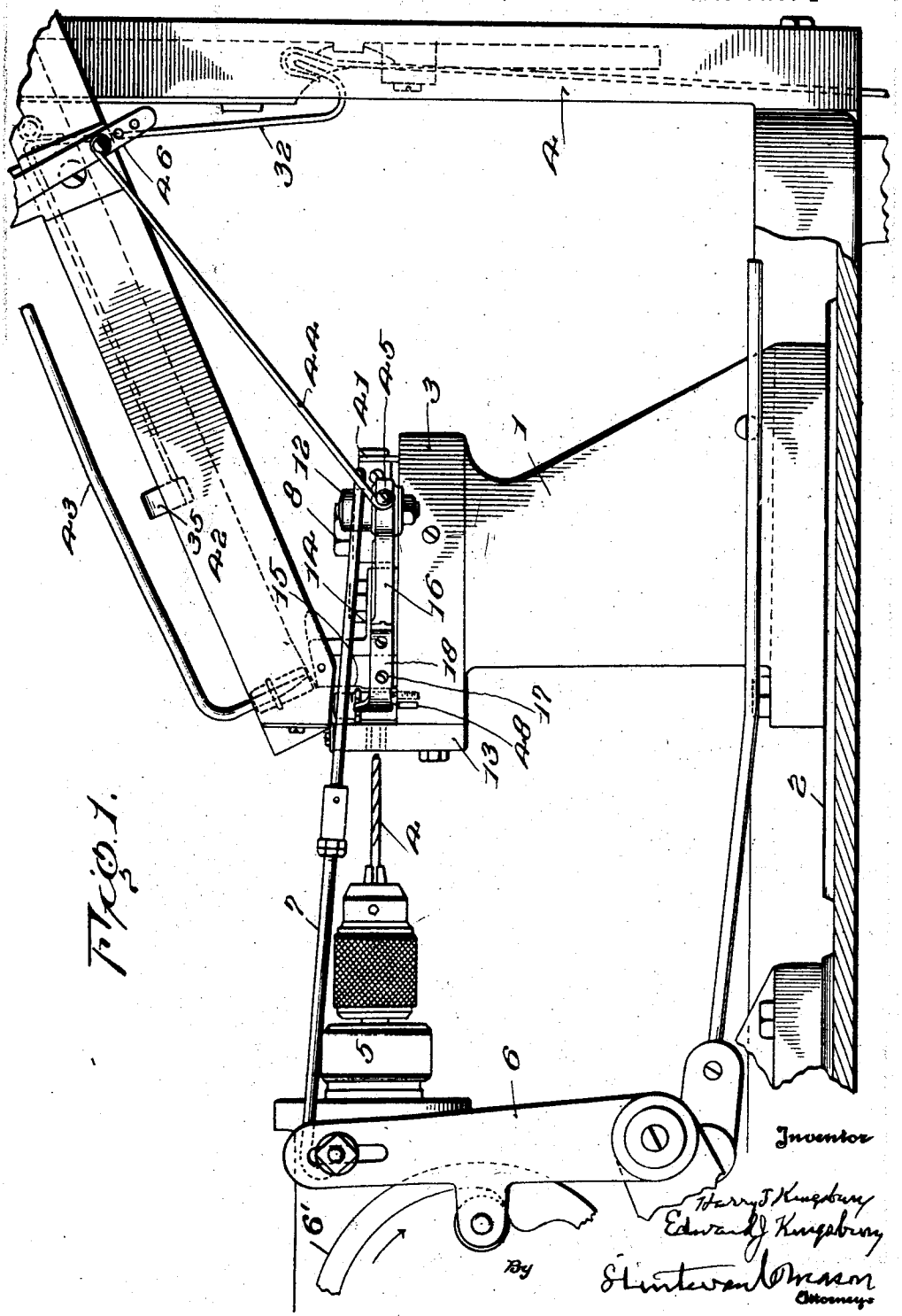


Fig. 1.

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Filed April 3, 1923 3 Sheets-Sheet 2

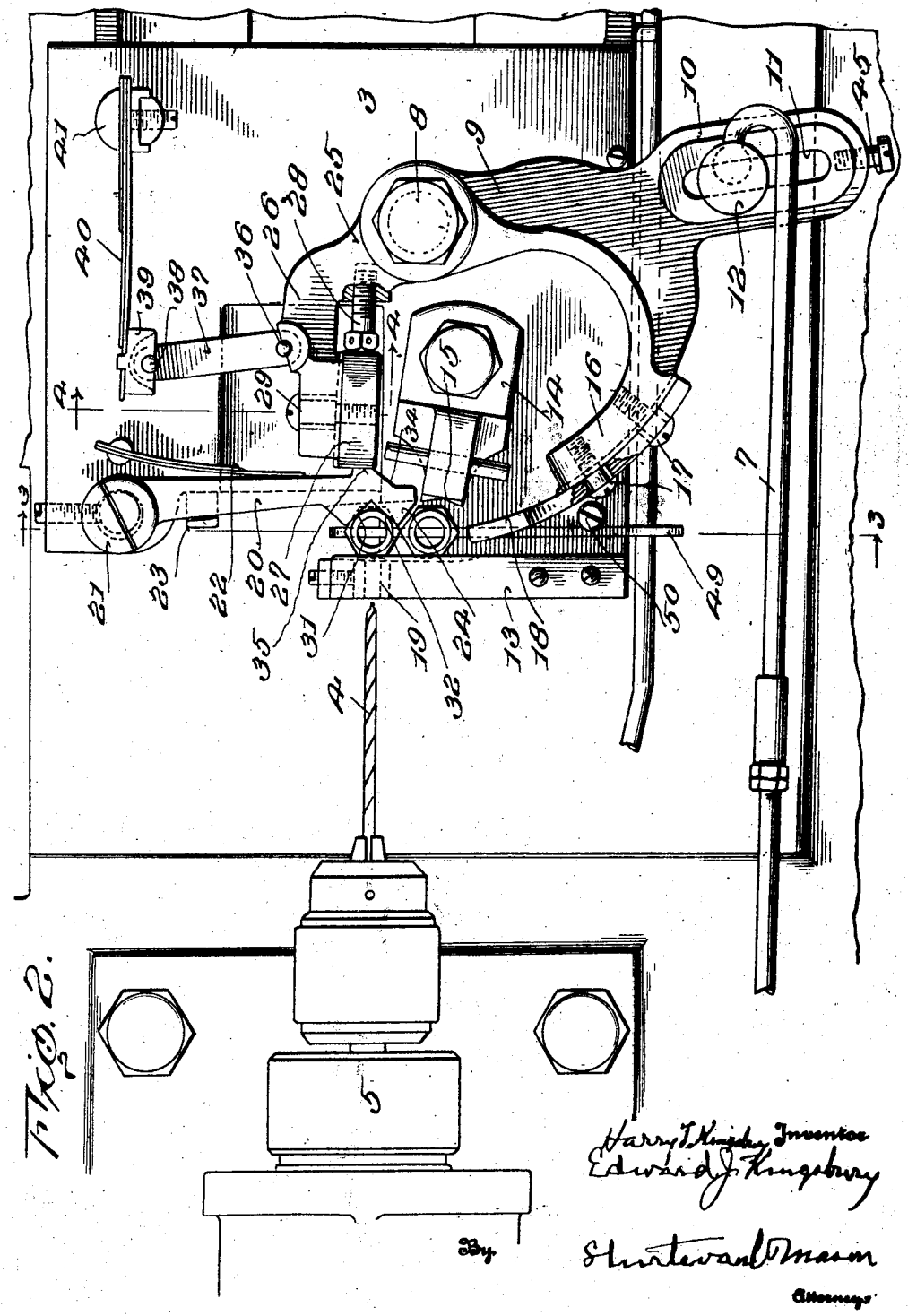


FIG. 2.

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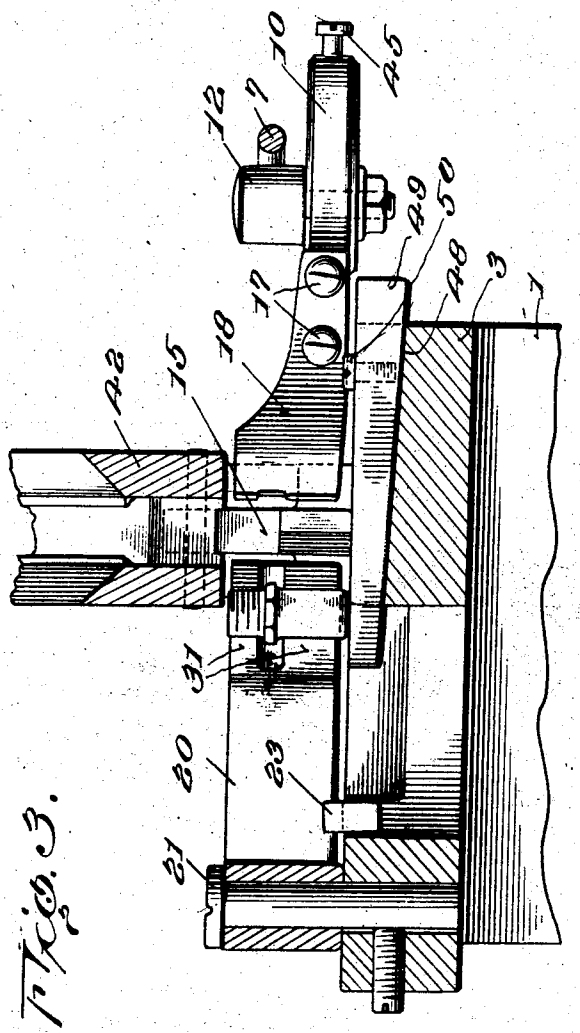


Fig. 3.

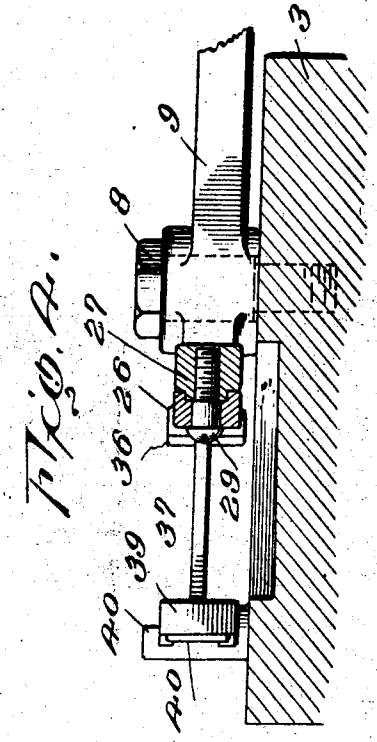


Fig. 4.

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UNITED STATES PATENT OFFICE.

HARRY T. KINGSBURY AND EDWARD J. KINGSBURY, OF KEENE, NEW HAMPSHIRE.

DRILLING FIXTURE.

Application filed April 3, 1923. Serial No. 629,717.

To all whom it may concern:

Be it known that we, HARRY T. KINGSBURY and EDWARD J. KINGSBURY, citizens of the United States, residing respectively, at Keene, in the county of Cheshire, State of New Hampshire, have invented certain new and useful Improvements in Drilling Fixtures, of which the following is a description, reference being had to the accompanying drawing, and to the figures of reference marked thereon.

The invention relates to new and useful improvements in drilling fixtures.

The object of the invention is to provide a drilling, milling and topping fixture which is adapted to hold a rivet, bolt, nipple or the like in vertical position while being drilled, as well as means whereby the rivets, bolts, nipples or the like are fed one at a time and rigidly held while being drilled, milled or topped.

Another object of the invention is to provide a drilling fixture in which the feeding mechanism is timed with the drill so that one nipple, rivet or the like is pushed from the device by another on its way to drilling position while the drill is receding preparatory to another drilling operation, and the drill being frictionally fed, as disclosed in my Patent No. 1,379,765, the jamming of a nipple will stop the feeding, as well as the mechanism for feeding the nipple and prevent the breaking of any parts of the drill or fixture.

Another object of the invention is to provide a fixture of this character, in which the discharge of the bored nipple and the placing of another in position is practically simultaneous so that the drill will recede and instantly advance—losing no time in the interval between the discharge of the bored nipple and the placing of another nipple in position to be bored.

A still further object of the invention is to provide a simple, cheap and effective drilling fixture having certain details of structure and combination of parts hereinafter more fully pointed out.

In the accompanying drawings—

Figure 1 is a side elevation of my improved drilling fixture, in combination with my improved automatic drilling machine and feeding mechanism;

Fig. 2 is an enlarged top plan view of Fig. 1, showing the feeding mechanism removed;

Fig. 3 is a vertical transverse sectional view taken on the line 3—3 of Fig. 2; and

Fig. 4 is a transverse vertical sectional view taken on the line 4—4 of Fig. 2.

Referring now to the drawings, 1 represents a base, which, as shown, is mounted upon the base 2 of the drilling machine and is provided at its upper end with an enlarged flat table-like portion 3, which is arranged in a plane slightly below the drill 4, as clearly shown in Fig. 1 of the drawings. The drill 4 is removably mounted in the drill spindle 5 and is reciprocated back and forth as fully disclosed in my prior patent. The arm 6 is driven forward by means of the cam 6′ and which arm operates the drill fixture as will now be described. The drill fixture takes its power off of the arm 6, by means of the rod 7, and thus if this rod meets with any undue resistance—by the jamming of a nipple—the same will stop until the nipple is removed and the drill will also stop.

Pivotally mounted at 8 on the base is the Y-shaped feed lever 9, having its stem 10 provided with an elongated slot 11, in which is adjustably mounted the swiveled member 12, to which the rod 7 is connected, whereby the throw of the Y-shaped lever may be varied for nipples or rivets of different sizes, as will be later described. The forward edge of the base 3 is provided with an elongated vertically disposed guide plate 13 which extends above the face of the base for guiding the nipples forward to the drilling position. Rigidly but adjustably supported by the base 3, between the arms of the Y-shaped lever 9, is a guide member 14, which has its outer end slightly curved or V-shaped, to conform with the shape of the nipple, as shown in Fig. 2 and indicated at 15. This guide is arranged at a slight angle to the guide plate 13 and about midway its ends. The end of the arm 16 of the Y-shaped lever 9 has adjustably attached thereto, by means of screws 17, the feed plate 18 which engages the nipple and feeds it forward to drilling position and simultaneously pushes the previously drilled nipple from the fixture.

The guide plate 13 is also the clamping plate against which the nipple is firmly clamped while being drilled, and is, therefore, provided with an opening 19 through which the drill 4 passes for drilling the

hole in the nipple, and which is clamped firmly behind the hole, as clearly shown in Fig. 2 of the drawings. This clamping action is accomplished by the pivoted member 20, pivoted at 21, and outwardly spring held by the spring 22. The outward movement of the member 20 is limited by the stop 23, so that the free end 24 can not swing over against the guide 13 and block the entrance of the nipple between the guides 13 and 14.

The arm 25 of the Y-shaped lever 9 is turned forward, as indicated at 26, and has adjustably carried thereby a block 27, and adjustable by means of the turn screw 28. The block is horizontally supported to have an adjustable movement by means of the screw 29.

The member 20 has in its front face a V-shaped vertical notch 30, with the beveled faces 31 and 32 on either side of the nipple 33 while it is being drilled. The rear face of the member 20 is provided with the beveled portion 34, terminating in the flat face 35 against which the block 27 bears and firmly clamps the nipple against the plate 13 while being drilled. Pivotally connected to the arm 26, at 36, is a link 37 which has its opposite end pivotally connected at 38 to the block 39, carried by the leaf spring 40 and rigidly supported by the stud 41 on the base 1, whereby there is maintained a spring tension on the arm 26 and the link connection 37 compensates for the increasing pressure of the spring.

The nipples to be acted upon are fed to the fixture from the chute 42 by means of the member 43 which is controlled and timed with the fixture by having the rod 44 connected to the stem 11 by the screw 45. The opposite end of the rod is connected to the lever 46, to which the member 43 is connected, all of which is shown and described in the application Serial No. 629,718 filed April 3, 1923, and, therefore, needs no further description.

The lever 20 can be adjusted to the right or left by having the stud or pivot member 21 in the form of an eccentric, as shown in dotted lines in Fig. 2.

Carried by the groove 48 in the base 1 in rear of the guide and clamped plate 20, is a gauge bar 49, which serves as a support for the lower end of the nipple. This bar is tapered and held by the screw 50, so that the nipples may be held in different positions for drilling the transverse opening at different points relative to their ends.

In operation, the nipples are fed to the fixture from the chute 42, one during each reciprocation of the bar 7, and controlled through the medium of the member 43, as heretofore described. The nipples as they pass from the chute in a vertical position enter the space between the guide 13 and portion 15 of the guide 14 and assume a vertical position, the nipple at the same time being clamped between the guide 13 and the clamping lever 20, as shown in Fig. 2 of the drawings.

The drill is fed forward, as heretofore described, and moves the rod 7 to the right (Fig. 2) so that the feed plate 18—having just pushed a nipple into position—is moved backward to allow another nipple to be discharged from the chute. Simultaneously with this movement, the block 27 engages the projection at the rear face of the clamping lever 20 and firmly clamps the nipple between it and the guide plate 13 and holds it while being drilled. The drill, having completed its drilling operation, starts back and the rod 7 is drawn to the left (Fig. 2). The first part of this movement throws the block 27 from engagement with the rear edge or projection of the clamping lever 20 and relieves the same of the pressure thereon. The spring 22, however, holds the lever in the position shown in Fig. 2, so that the nipple is still held by the lever in vertical position. By this time the feed plate 18 has engaged the second nipple and forced it outward against the nipple being held by the lever 20, thus forcing said nipple from the machine and simultaneously placing the second nipple in position. By this time, the drill has again started forward and the member 9 is being rocked upon its pivot—to withdraw the feed plate 18—and at the same time the block 27 engages the clamping member 20, so that when the drill starts on its drilling operation the nipple is firmly clamped.

Having thus described our invention, what we claim as new and desire to secure by Letters-Patent, is:

1. The combination with a drilling machine, of a work support, a guide carried by said support, a clamping member adjacent said guide, and means operated by the drilling machine for operating the clamping member during the forward movement of the drill for holding the nipple and means carried by the clamping member for discharging the nipple on the rearward movement of the drill.

2. The combination with a drilling machine, of a work support, a guide carried by the support, a clamping member adjacent said guide, means for operating said clamping member on the forward movement of the drill, and means carried by the clamping member for discharging the nipple from the clamping member and simultaneously placing another member in position on the rearward movement of the drill.

3. The combination with a drilling machine, of a work support, a guide carried by said support, a clamping member adjacent said guide, means for locking said clamping member on the forward movement

of the drill, and means carried by the clamping member for forcing another nipple in position behind the clamping member which simultaneously forces the previously drilled nipple from the clamping member upon the rearward movement of the drill spindle.

4. The combination with a drilling machine, of a work support, a guide way for two nipples, means for clamping one of the nipples on the forward movement of the drill, and means carried by the clamping means and operated during the rearward movement of the drill for engaging the nipple and forcing it into clamping position and forcing the previously drilled nipple from the clamping means.

5. The combination with a drilling machine, of a work support, a guide way for two nipples, a pivoted clamping member for one of said nipples on the forward movement of the drill, and means carried by the clamping means and operated by the rearward movement of the drill for forcing the other nipple behind the clamping member and simultaneously forcing the previously drilled nipple from the clamping member.

6. The combination with a drilling machine, of a work support, a guide way for two nipples, a pivoted clamping member for one of said nipples, means for locking said clamping member on the forward movement of the drill spindle, and means for releasing the clamping means on the rearward movement of the drill and said clamping member simultaneously engaging the other nipple and forcing it behind the clamp and simultaneously forcing the previously drilled nipple from the clamping member.

7. The combination with a drilling machine, of a work support, a guide for two nipples, a pivoted clamping member holding one of said nipples against the guide, a Y-shaped lever operated by the drilling machine and having one arm locking the clamping member during the forward movement of the drill, and the other arm of the lever engaging the other nipple and forcing it into position in respect to the clamping and simultaneously forcing the first nipple from the clamp during the rearward movement of the drill.

8. The combination with a drilling machine, of a work support, a guide for two nipples, a clamping member holding one of said nipples against the guide, a Y-shaped lever operated by the drilling machine having one arm locking the clamping member during the forward movement of the drill, and the other arm engaging the other nipple on the rearward movement of the drill and forcing it into position in respect to the clamping member, and simultaneously discharging the drilled nipple from the machine.

9. The combination with a drilling machine, of a work support, a guide for the nipple, an adjustable plate for supporting the nipples and raising and lowering the same in respect to the guide, a clamping member for clamping a nipple to the guide, means for locking said clamping member, and means for releasing the locking means and simultaneously forcing the nipple behind the clamping member and forcing the previously drilled nipple from the drilling position.

10. The combination with a drilling machine, of a work support, a guide for the nipples, a pivoted clamping member having a V-shaped cut to hold the nipple, a spring normally holding the clamping member in engagement with the nipple, a Y-shaped lever having one arm engaging the clamping member and forcing the clamping member into tight engagement with the nipple, a spring having a link connection with the Y-shaped lever, means carried by the other arm of the lever for engaging a nipple and forcing it opposite the V-shaped cut and simultaneously forcing the previously drilled nipple from the clamping member.

11. The combination with a drilling machine, of a work support, a guide for the nipples, a pivoted clamping member having a V-shaped cut to hold the nipple against the guide, a pivoted Y-shaped lever operated by the drilling machine and having one arm engaging the clamping member when rocked in one direction and the other arm feeding a nipple to the clamping member, which in turn forces the drilled nipple from the fixture when the lever is rocked in the opposite direction.

12. The combination with a drilling machine, of a work support, a guide for the nipples on the support, a pivoted spring pressed clamping member having a V-shaped cut to hold the nipple and a beveled outer end, and means for forcing a nipple against the beveled end and the clamping member out and placing the nipple opposite the V-shaped cut and simultaneously forcing the drilled nipple from the clamping member.

13. The combination with a drilling machine, of a work support, a guide on the support, a pivoted clamping member having a V-shaped cut to hold the nipple and having a beveled outer end, and means for forcing the clamping member against the nipple, means for forcing a nipple against the beveled end of the clamping member and forcing it out and placing the nipple opposite the V-shaped cut, said nipple simultaneously forcing the drilled nipple from the clamping member.

14. The combination with a drilling machine of a work support, a guide on the support, a pivoted clamping member having a

V-shaped cut to receive the nipple and a beveled outer end, a pivoted Y-shaped lever continuously oscillating, one arm carried by the lever engaging the clamping member and forcing it towards the guides, and the other arm of the lever engaging a nipple and forcing it against the beveled end of the clamping member and forcing it out and forcing the drilled nipple from the clamping member and placing the new nipple in position.

15. The combination with a drilling machine, a cam operated drill, of a work support, a guide carried by the support, a clamping member adjacent said guide, means for operating said clamping member and operated by the drill operating cam on the forward movement of the drill, and means carried by the clamping member for discharging the nipples from the clamping member and simultaneously placing another member in position on the rearward movement of the cam operated means.

16. The combination with a drilling machine, a cam operated drill, of a work support, a guide carried by the support, a clamping member adjacent said guide, means connected with the cam drill operating means for operating said clamping member on the forward movement of the drill, and means carried by the clamping member for discharging the nipples from the clamping member and simultaneously placing another in position on the rearward movement of the cam drill operating means.

17. The combination with a drilling machine of a pivoted member, a cam driven by the drilling machine and cooperating with the pivoted member for operating the same, a support, a guide carried by the support, a clamping member adjacent said guide, means connected to the pivoted member for operating said member on the forward movement of the drill, and means carried by the clamping member for discharging the nipples from the clamping member and simultaneously placing another nipple in position on the rearward movement of said pivoted member.

18. The combination of a drilling machine, a drill carried thereby, a vertically disposed member pivoted at its lower end and having its upper end connected to the drill spindle, a cam for operating said pivoted member, a support adjacent the drilling machine, a guide carried by the support, a clamping member adjacent said guide, a rod connected to the pivoted member for operating said clamping member on the forward movement of the drill, and means for discharging the nipples from the clamping member and simultaneously placing another nipple in position on the rearward movement of the drill.

19. The combination with a drilling machine, of a support adjacent thereto, a guide for two nipples, a pivoted clamping member for said nipples on the forward movement of the drill, and means carried by the pivoted clamping member for forcing the other nipple behind the clamping member and simultaneously forcing the previously drilled nipple from the clamping member on the rearward movement of the drill.

20. The combination with a drilling machine, of a support adjacent thereto, a guide for two nipples, a pivoted clamping member for said nipples on the forward movement of the drill, and a rigid arm carried by the pivoted clamping member for forcing the other nipple behind the clamping member and simultaneously forcing the previously drilled nipple from the clamping member on the rearward movement of the drill.

21. The combination with a drilling machine, of a support adjacent thereto, a guide way for two nipples, a pivoted clamping member for one of said nipples, a pivoted member adapted to operate the clamping member, and a rigid arm carried by the pivoted member for forcing the other nipple behind the clamping member and simultaneously forcing the previously drilled nipple from the clamping member on the rearward movement of the drill.

22. The combination with a drilling machine, of a support adjacent thereto, a guide way for two nipples, a pivoted clamping member for one of said nipples, a pivoted member for holding said clamping member, and a rigid arm carried by the pivoted member whereby on the rearward movement of the drill the clamping member is released, and the rigid member forcing the other nipple behind the clamping member and simultaneously forcing the previously drilled nipple from the clamping member.

In testimony whereof, we affix our signatures.

HARRY T. KINGSBURY.
EDWARD J. KINGSBURY.