Nov. 24, 1942. K. E. SWANGREN 2,303,005

NAIL HEADING MACHINE

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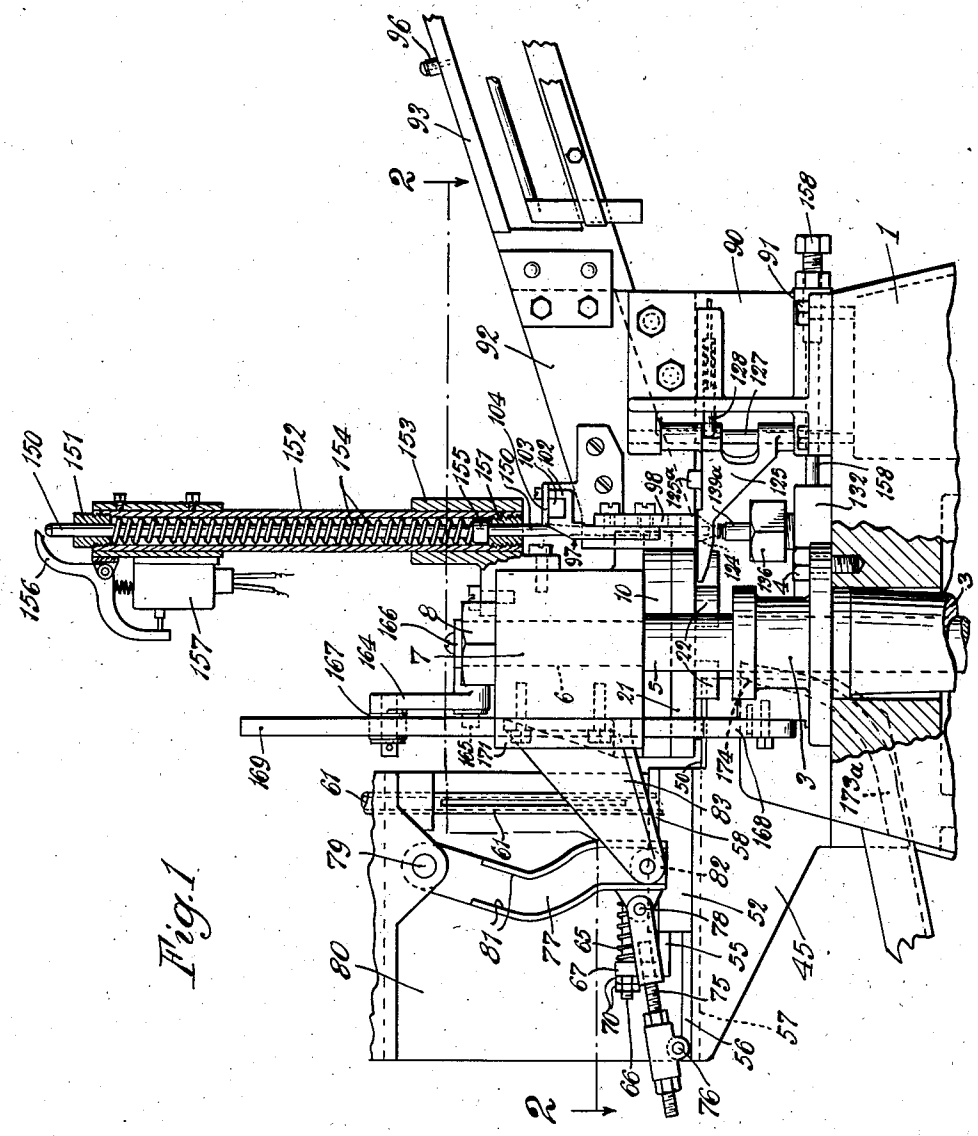


Fig. 1

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Fig. 2

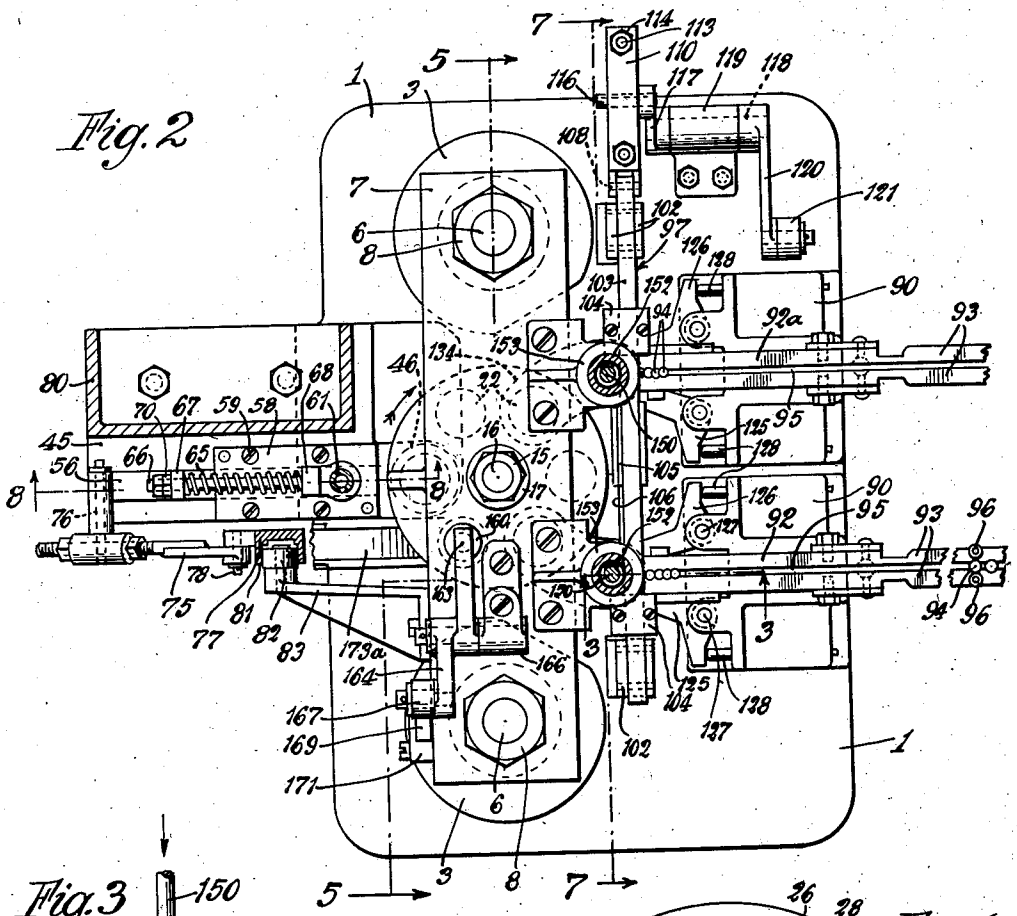


Fig. 3

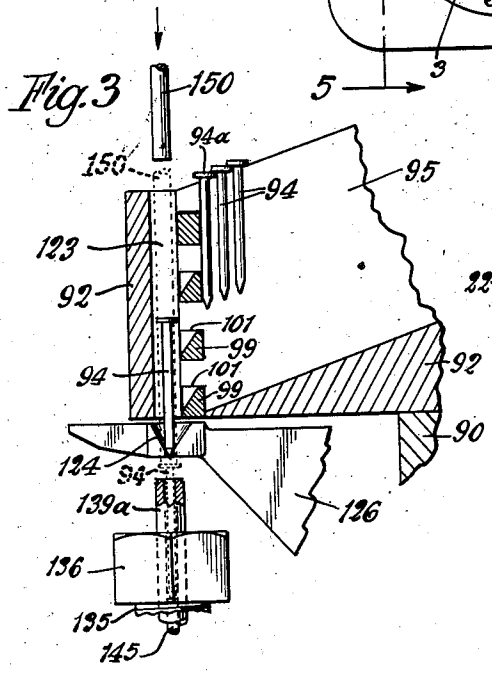
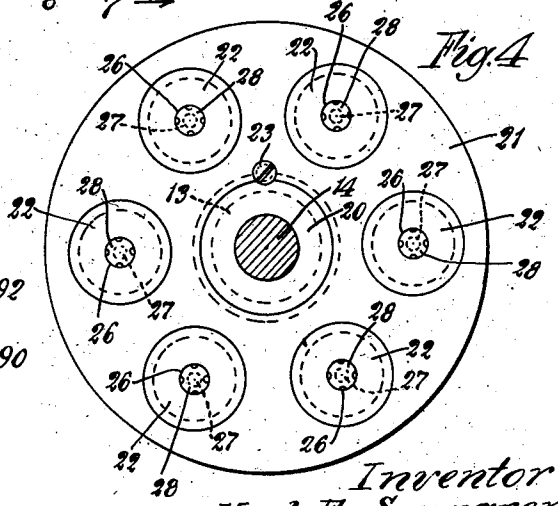


Fig. 4



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Fig. 5

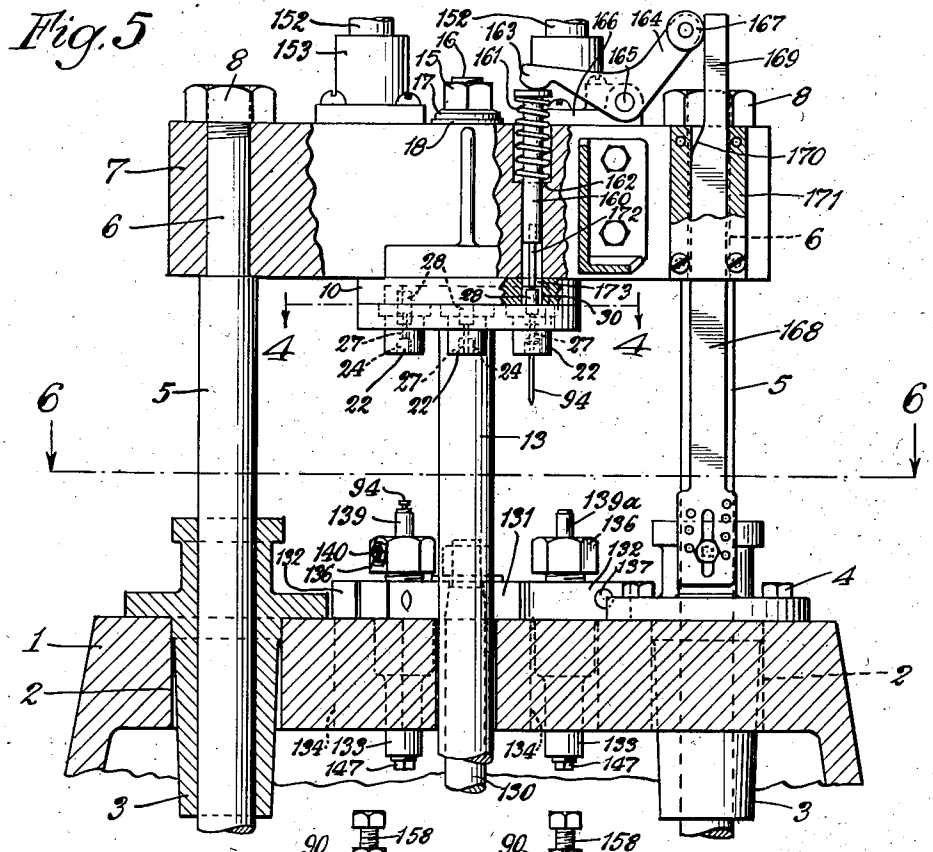
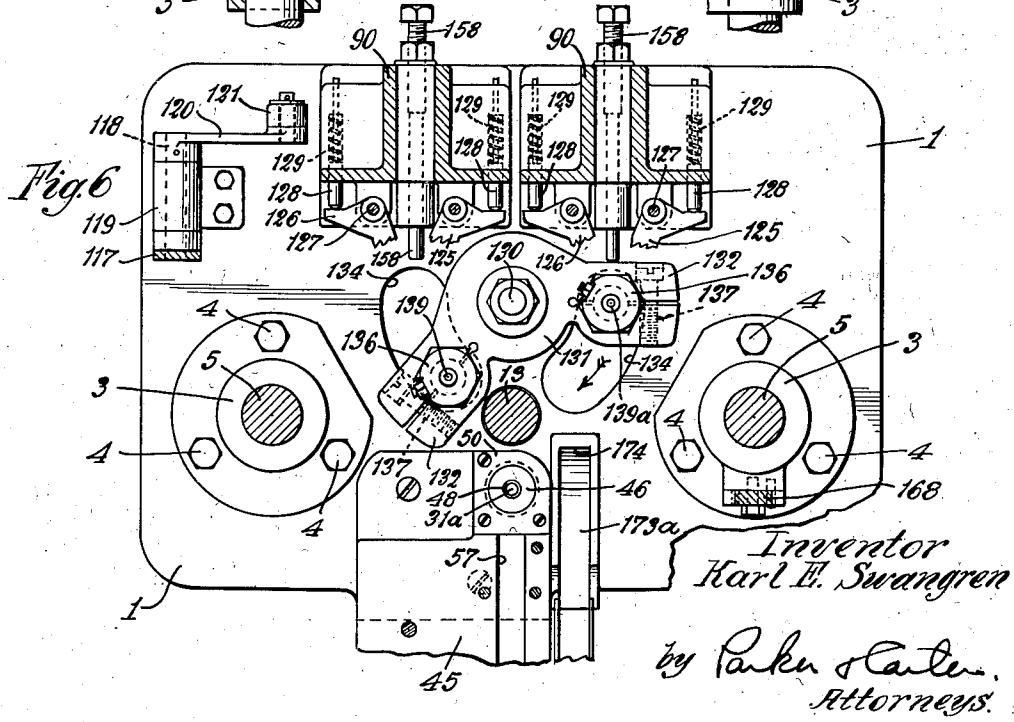


Fig. 6



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NAIL HEADING MACHINE

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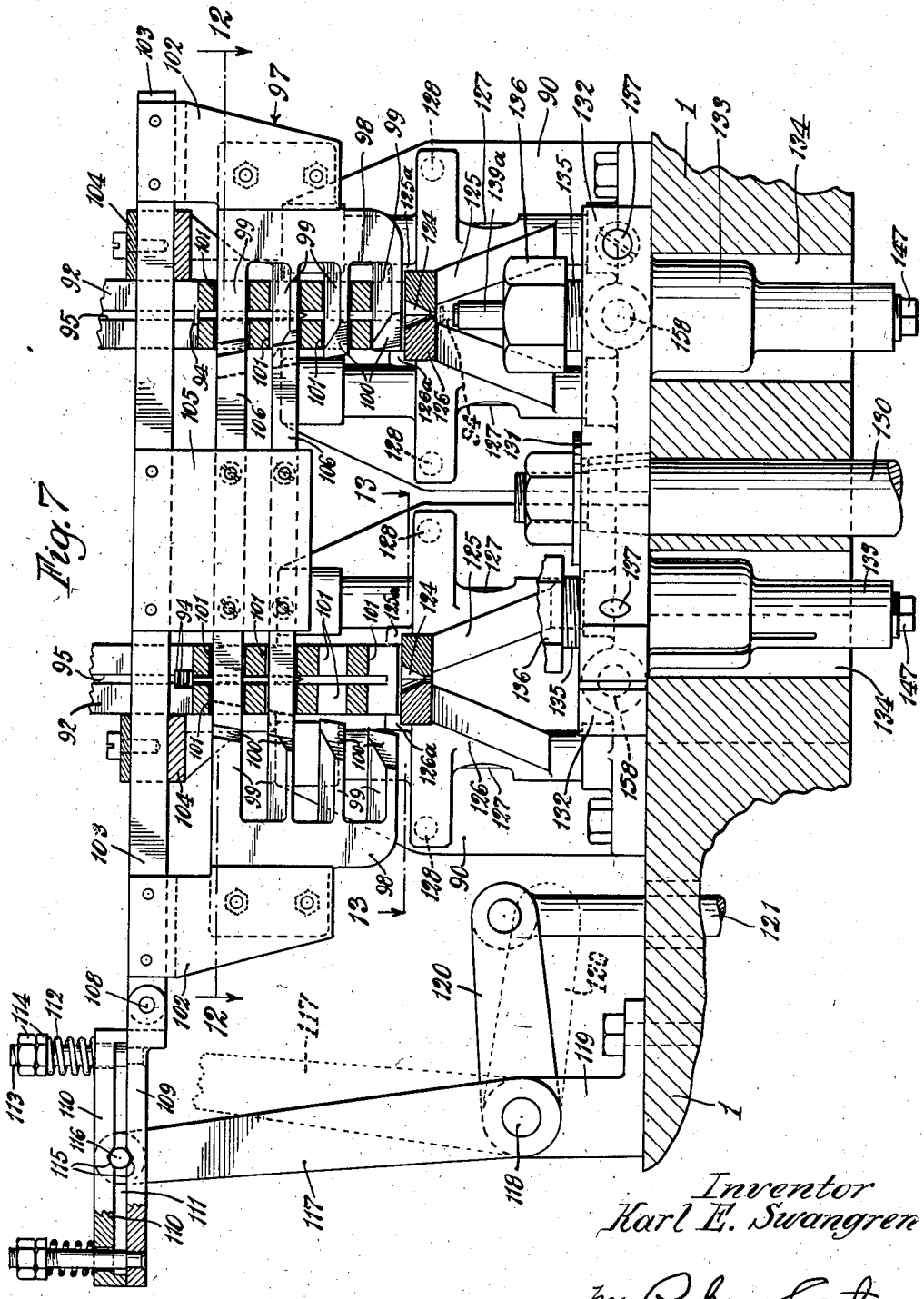


Fig. 7

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Fig. 8

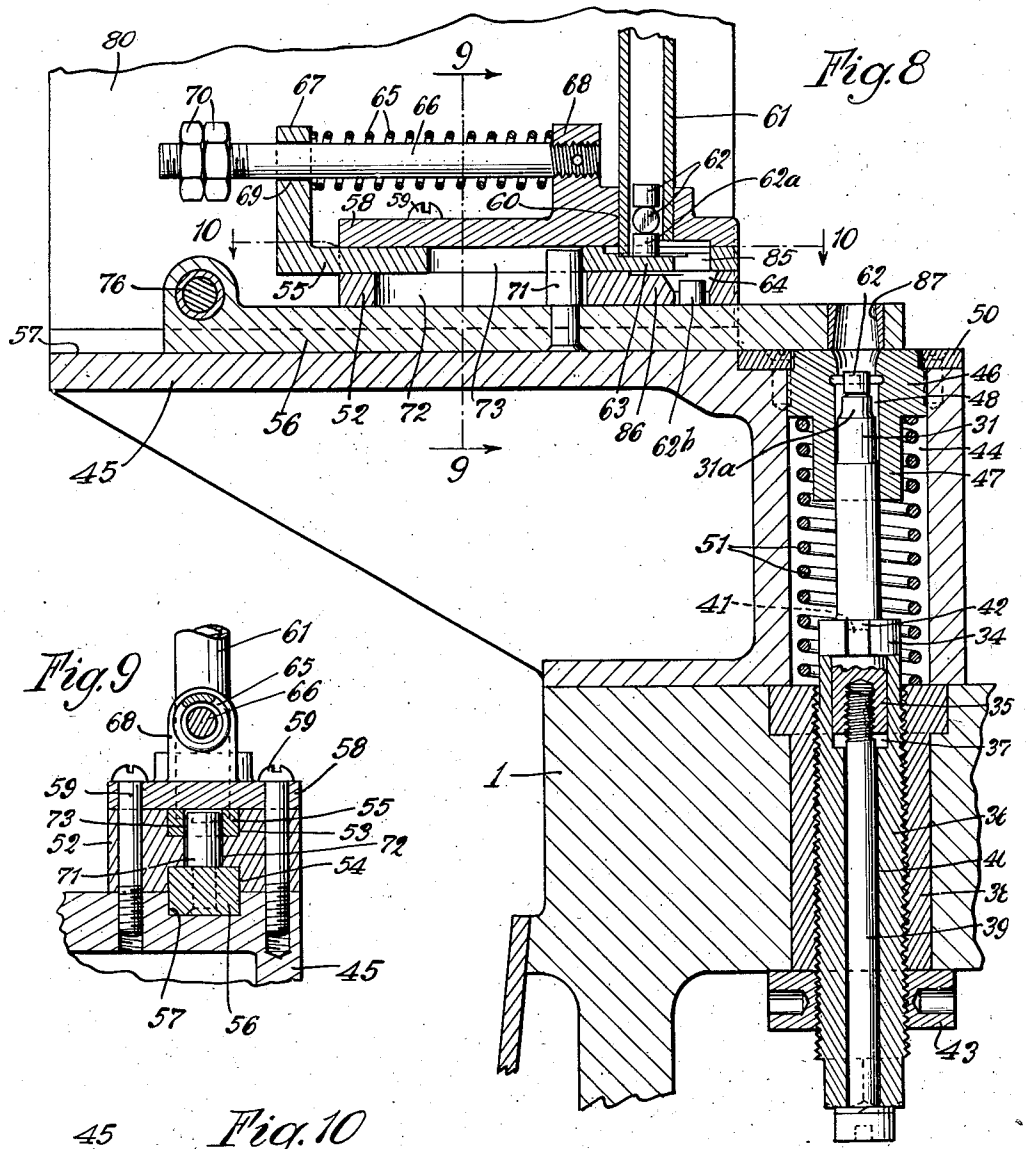
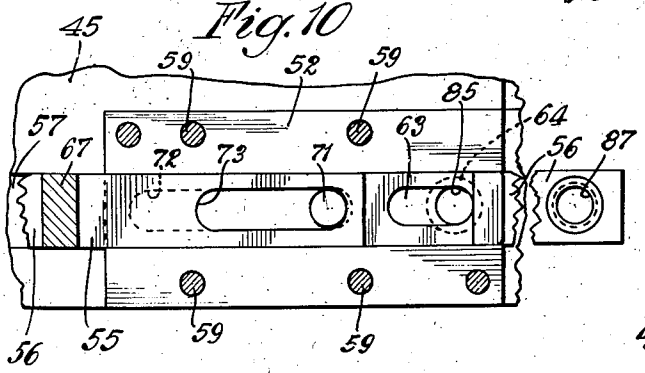


Fig. 9

Fig. 10



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NAIL HEADING MACHINE

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Fig. 11

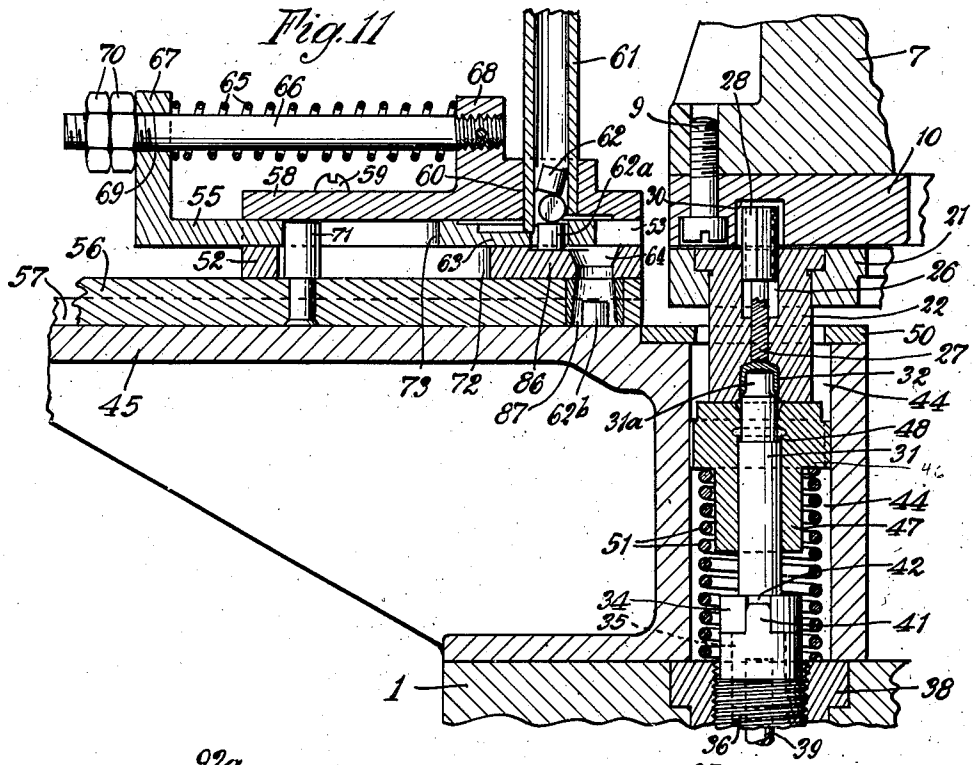


Fig. 12

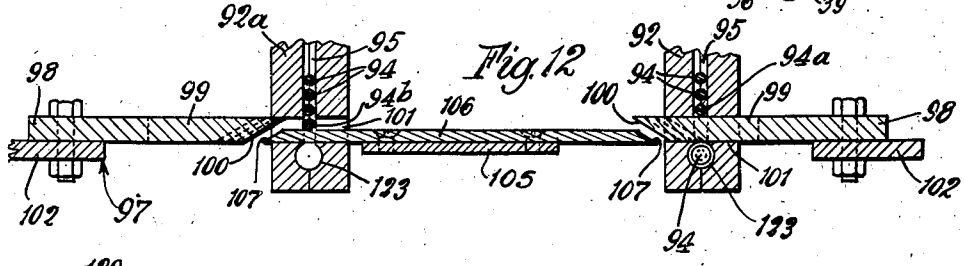
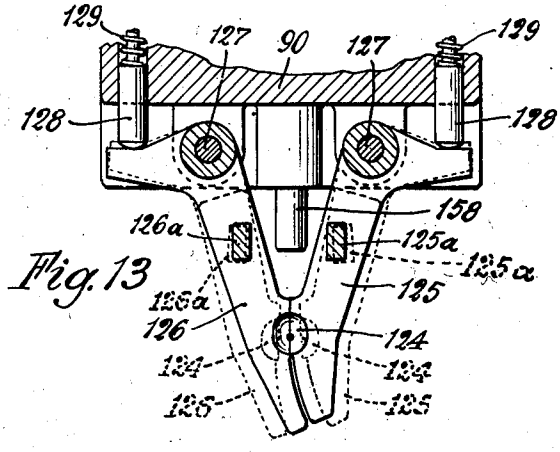


Fig. 13



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Fig. 16

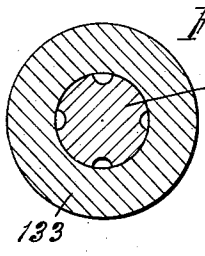


Fig. 14

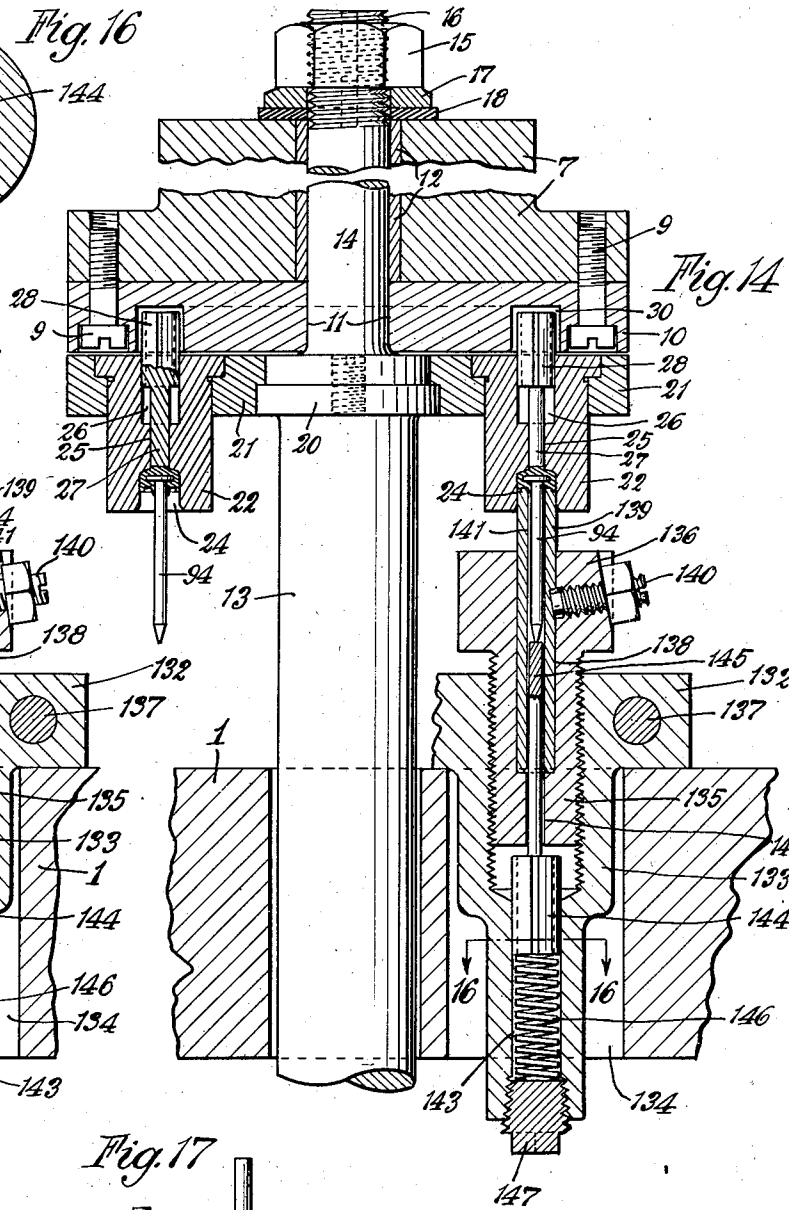


Fig. 15

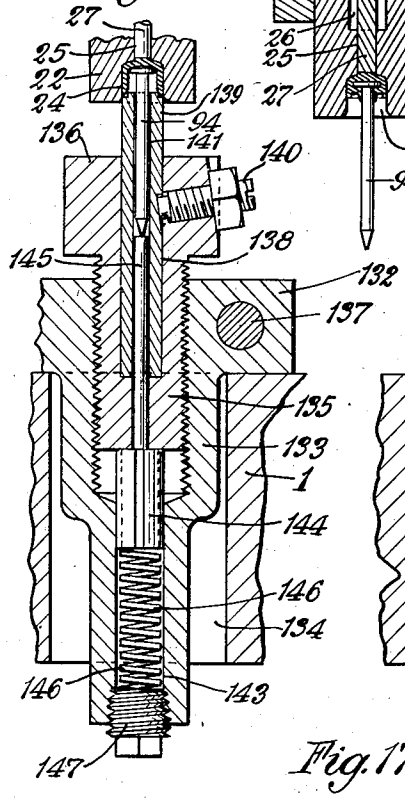
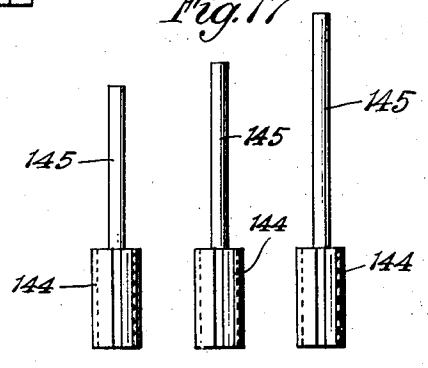


Fig. 17



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Patented Nov. 24, 1942 2,303,005

UNITED STATES PATENT OFFICE

2,303,005

NAIL HEADING MACHINE

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Application January 4, 1941, Serial No. 373,105

17 Claims. (Cl. 10—158)

This invention relates to a method of applying lead heads to nails and to one form of an apparatus suitable for carrying out that method. It has for one object to provide a method of applying to a nail a head of material softer than the nail and for positioning that head about and beneath the nail. Another object is to provide a mechanism for carrying out this method. Another object is to provide a machine of high capacity and one which is readily adjustable for different sizes of nails.

Other objects will appear from time to time throughout the specification and the claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is an elevation with parts broken away and parts in section;

Figure 2 is a horizontal section taken on line 2—2 of Figure 1;

Figure 3 is an enlarged fragmentary vertical section taken on line 3—3 of Figure 2;

Figure 4 is an enlarged horizontal section taken on line 4—4 of Figure 5;

Figure 5 is a vertical section, on an enlarged scale, taken on line 5—5 of Figure 2 with parts omitted;

Figure 6 is a horizontal section taken on line 6—6 of Figure 5;

Figure 7 is a vertical section, on an enlarged scale, taken on line 7—7 of Figure 2;

Figure 8 is a vertical section, on an enlarged scale, taken on line 8—8 of Figure 2;

Figure 9 is a vertical sectional detail taken on line 9—9 of Figure 8;

Figure 10 is a horizontal sectional detail taken on line 10—10 of Figure 8;

Figure 11 is a vertical section, similar to Figure 8, with parts in different position;

Figure 12 is a horizontal sectional detail taken on line 12—12 of Figure 7;

Figure 13 is a horizontal sectional detail taken on line 13—13 of Figure 7;

Figure 14 is a vertical section taken through the die head and punch holder illustrating the forming of the lead head on a nail;

Figure 15 is a fragmentary section similar to Figure 14 with parts in the position which they occupy prior to attaching the lead cup to a nail head;

Figure 16 is an enlarged horizontal sectional detail taken on line 16—16 of Figure 14; and

Figure 17 illustrates interchangeable plunger pins for various sizes of nails.

Like parts are designated by like characters throughout the specification and the drawings.

Referring to the drawings, 1 generally indicates a portion of a frame or housing which is apertured as at 2 to receive a pair of bearing sleeves 3, 3 which may be secured to the frame 1 by suitable securing means 4. Slidably mounted in the bearing sleeves are shafts 5, 5 having reduced end portions 6 adapted to receive a cross head 7. The cross head may be secured to the shafts 5, 5; for example, by nuts 8 screwthreaded upon the reduced portions 6. The shafts 5, 5 and cross head 7 are raised and lowered by any suitable cams and driving means not illustrated in the drawings, since their details form no essential portion of this invention.

Mounted on the lower face of the cross head 7 intermediate the shafts 5, 5—for example, by screws 9—is a circular disc 10 which is apertured as at 11 in alignment with a bearing sleeve 12 in the cross head 7. Rotatably mounted in the bearing sleeve is the reduced portion 14 of a shaft 13 which is itself secured in position in the cross head 7 by a nut 15 screwthreaded upon the screwthreaded end 16 of the reduced portion 14. A washer 17 and a fiber disc 18 are interposed between the nut 15 and the cross head 7.

Mounted upon enlarged flanges 20 formed on the shaft 13 is a dial 21 which carries a plurality of forming dies 22 as illustrated in Figures 4, 5 and 14. The dial 21 is held against rotation with relation to the shaft 13 by a set screw 23; whereas, the forming dies 22 may be pressed into the dial 21.

The forming dies are identical with each other, and the description of one will suffice for all. Each forming die is provided with a cup-shaped cavity 24 in alignment with a bore 25 which communicates with a counterbore 26 of larger diameter.

Slidably mounted in the counterbore 26 and aperture 25 of each forming die 22 is a knockout pin 27, having an enlarged fluted portion 28 adapted, when in raised position as illustrated in Figure 14, to project into a circular groove 30 formed in the fixed plate 10. One of the forming dies 22 is always in alignment with a punch 31 having a reduced portion 31*a* for forming the lead cap 32 as illustrated in detail in Figures 8 and 11.

The dial shaft 13 and cross head 7 are raised and lowered by the shafts 5, 5 as previously pointed out. In addition, each time the shaft 13 is in raised position, it is rotated in the direction of the arrow of Figure 2, one step, to

oring each succeeding die into alignment with the punch 31. Six dies are shown on the dial 21. However, this number may be varied. In this case, each time the cross head 7 is raised the shaft 13 and its associated dial 21 are rotated 60 degrees, or one step.

The punch 31 is provided with a forming head 31*a* which penetrates the die cavity 24 when the die is in lower position as shown in Figure 11. The punch 31 has an enlarged collar 34 and an internally threaded lower portion 35, circular in cross section, which penetrates a corresponding bore 37 in a punch holder 36 which, in turn, is screwthreaded into a bushing 38 supported in the frame 1. The punch 31 is secured to the holder 36 by means of a bolt 39 passing through an aperture 40 in the punch holder 36 and screwthreaded into the portion 35. Rotation of the punch is prevented by means of lugs 41 on the punch holder 36 which penetrate slots 42 in the collar 24 of the punch 31. The punch 31 may be adjusted in relation to the die 22 by means of the screwthreaded punch holder 36 which thereafter is locked in position by a lock nut 43.

The punch 31 projects into an aperture 44 of a base 45 which is mounted on the frame 1. Positioned in the aperture 44 is a sliding collar 46 having a reduced portion 47 and a center bore 48 which receives the punch 31. Normally, the collar 46 is held in uppermost position against a stop 50 by a spring 51, one end of which rests upon the bushing 38 and the other end bears against the collar 46. However, when one of the dies 22 is lowered, it engages the upper face of the collar 46 and moves it downwardly into the position of Figure 11 against the compression of the spring.

The means for feeding a slug into the bore 48 of the sliding collar 46 each time the cross head 7 makes an excursion will now be described.

Mounted on the upper face of the base 45 is a block 52 which is grooved as at 53, 54 to receive the sliding bars 55, 56, respectively. The lower slide 56 is partially received in and guided by a groove 57 formed in the base 45. The upper slide 55 is retained in position by a cover plate 58 through which screws 59 pass to secure the assembly upon the base 45. Supported in an aperture 60 in any suitable manner is a feed tube or magazine 61 which retains and guides and feeds the slugs 62. The feed tube 61 may be connected to and constantly kept full of lead slugs by any suitable hopper or other means with agitating means, if desired, the details of which are not illustrated, since they form no essential part of the present invention.

When the parts are in the position illustrated in Figure 8 with the cross head 7 in uppermost position, the lowermost slug 62*a* in the feed tube rests upon a shelf 63 of the slide 55; another slug 62*b* lies upon the lower slide 56 and has previously been dropped into an aperture 64 in the block 52. The upper slide 55 is normally held in the position shown in Figure 8 by means of a spring 65 surrounding a stud 66, the spring being compressed between an offset 67 on the slide 55 and an abutment 68 formed on the cover plate 58. The stud 66 is secured in the abutment 68 and passes through an aperture 69 in the offset 67. The outer end of the stud 66 is screwthreaded to receive lock nuts 70 which serve as stops for the slide 55 when the parts are in the position illustrated in Figure 11. Movement of the upper slide 55 is limited by means of a pin 71 fastened to the lower slide 56 and projecting through an elongated slot 72 in the block 52 and into a slot 73 in the upper slide 55.

When the parts are in the position of Figure 8, the pin 71 is in engagement with the right-hand end of the slot 73 and thus holds the upper slide 55 against the compression of the spring 65.

The lower slide 56 is controlled by an adjustable link structure 75, one end of which is pivotally connected to a pin 76 carried on the slide, the other end being pivoted as at 78 to a cam lever 77 which, in turn, is pivoted as at 79 to a support 80. The support also may serve to support the upper end of the feed tube 61 and carry a hopper for the slugs 62. The cam lever 77 is actuated by a roller 82 confined in the space between the walls 81 of the cam 77 and carried by a bracket 83 secured to the cross head 7.

As the cross head descends the roller 82 rotates the cam lever 77 to the right, to the position illustrated in Figure 1, thus moving the lower slide 56 from the position of Figure 8 to the position of Figure 11. As the slide 56 and pin 71 move to the left, the spring 65 causes the upper slide 55 to follow until it is arrested by the lock nuts 70 on the pin 66. An aperture 85 at the end of the shelf 63 is now in alignment with the feed tube 61 and the lower slug 62*a* then drops upon the portion 86 of the block 52. The lower slide continues to move to the left, as shown in Figure 11, the slot 73 permitting such free movement, until the aperture of the bushing 87 in the slide 56 comes into alignment with the aperture 64, whereupon the slug 62*b* drops upon the bottom of the groove 57 in the base 45.

Referring to Figures 8 and 11, it will be seen that, as the cross head 7 descends, one of the dies 22 on the dial 21 engages the sliding collar 46 and moves it against the compression of the spring 51 until the reduced portion 31*a* of the punch 31 penetrates the cavity of the die 22. Assuming that a slug 62 has previously been deposited in the aperture 48 and supported on top of the punch as shown in Figure 8, the lead slug first enters the die cavity and thereafter is pressed into the shape of the cap 32. This also causes the knockout pin 27 to be pushed upwardly until its fluted head 28 projects into the circular channel 30 of the disc 10.

As the cross head 7 rises, the sliding collar 46 is returned, by means of the spring 51, to initial position and the cup-shaped member 32 remains within the cavity of the die 22, being frictionally held therein.

Furthermore, the roller 82 imparts retrograde rotation to the cam lever 77 and returns the lower slide 56 and upper slide 55 to starting position, shown in Figure 8. The lower slide, as it is moved to the right, carries along the slug 62*b*, closes the bottom of the aperture 64 and finally moves the upper slide 55 by means of the pin 71 to initial position; whereupon, the slug 62*b* drops into the aperture 48 of the sliding collar 47 and rests upon a punch 31.

The upper slide also carries the slug 62*a*, which had been resting upon the portion 86 of the block 52, to the right until finally the aperture 85 is in alignment with the aperture 64 in the block 52; whereupon, the slug drops and assumes the position of slug 62*b* of Figure 8.

As previously pointed out, the dial 21 is rotated one step—in this case, 60 degrees—when the cross head reaches its uppermost position and the next succeeding die is positioned in proper alignment with the punch 31.

The next step of positioning the nail and forming the lead cup about the head of the nail will now be described.

Referring to Figures 1, 2, 3 and 7, a pair of brackets 90, 90 is mounted upon the frame 1; for example, by bolts 91. Secured to the brackets are feed tracks 92 and 92a, respectively, each of which is connected to a track extension 93 leading to any suitable source of supply of nails. The means for placing the nail on the inclined track are not illustrated, since they form no essential part of the present invention.

The inclination of the tracks 92, 92a and 93 is such that the nails 94 descend by gravity and are supported only by their heads which rest on the upper inclined face of the feed track; whereas, the nail shanks depend into a groove or channel 95 formed in the feed tracks. In order to prevent nails with oversize heads from reaching the head-forming mechanism, a pair of gauging rollers 96 is provided on each track extension 93 which prevent any oversized nail head from passing. Such nails may then be removed manually, or otherwise.

Preferably, there is a continuous row of nails in each feed track; the lowermost nail of each comes to rest against the fingers of a feed mechanism generally indicated by 99 which functions to separate one nail alternately from each of the feed tracks 92 and 92a, as shown in Figures 2, 3, 7 and 12.

The nail-feeding mechanism 97 includes plates 98 having fingers 99 with beveled ends 100. The ends of the fingers 99 taper, as shown particularly in Figures 7 and 12, and are slidably received in suitable slots 101, in the lower ends of the tracks 92 and 92a. The plates 98 are mounted on brackets 102 with the fingers 99 facing toward each other. The brackets 102, in turn, are secured to a bar 103 mounted for reciprocation in bearing members 104, each of which is fastened to each of the feed tracks 92 and 92a. Intermediate the brackets 102 the bar 103 carries a plate 105, to which a plurality of bars 106 are mounted, the ends of which come in close proximity to the tapered ends 100 of the fingers 99. The bars 106 are of less thickness than the fingers 99, as illustrated in Figure 12, and the ends are beveled as at 107 to provide a space sufficient for a nail shank to pass through. The ends of the bars 106 also move into the slots 101, as shown in Figure 12.

Pivoted to the end, as at 108, of the bar 103 is a safety link comprising a lower member 109, which is pivoted to the bar 103 and an upper bar 110 having lugs to provide a space 111. The bar 110 is held in position by means of springs 112 about bolts 113 having lock nuts 114 to adjust the tension of the springs. Both members 109 and 110 are notched as at 115 to receive a pin 116 on an arm 117 which is secured to a shaft 118 mounted in a bracket 119. The shaft 118 carries a second arm 120, which is pivotally connected to a rod 121. Any suitable mechanism may be employed for rocking the lever structure in sequence from the full line position to the dotted line position, and vice versa, shown in Figure 7. The mechanism, however, has not been shown in the drawings since its details form no essential part of the present invention.

Assuming that the parts are in the position of Figure 12, the nail shank of the lowermost nail, indicated by 94a, depending in the groove of the feed track 92, contacts the fingers 99 associated with said feed track. The lowermost nail shank 94b in the track 92a is arrested by the bars 106 and is positioned within the space defined by the apertures 101. As the lever structure 117—120 is moved to the dotted line position of Figure 7, it moves the bars 106 and fingers 99 to the right, referring to Figure 12, causing the beveled faces 100 of the fingers 99 associated with the feed track 92a to force the nail shank 94b past the slot defined by the beveled faces 100 and 107 along the slot 95 of the feed track; whereupon, the nail drops into an aperture 123. The fingers 99 associated with feed track 92a now close the end of the slot 95 in the track 92 and arrest the succeeding nail shank. At the same time, the fingers 99 of the track 92 are moved to the right and clear the slot 95 of said track; whereupon, the lowermost nail 94a slides by gravity against the blades 106.

During the next cycle of operation, the levers 117, 120, and, consequently, the feeding mechanism 97, are moved back to the initial or full line position, and the nail shank 94a is guided and forced through the channel between beveled ends 100 and 107 of fingers 99 and bars 106, cooperating with feed track 92, respectively, and drops into the aperture 123 of said track.

As a nail drops into either of the apertures 123 of the nail tracks 92 or 92a, it is received in a tapered cavity 124 formed in a pair of fingers 125, 126, shown in detail in Figures 1, 3 and 13, and held particularly within the cavity 123, as shown in Figure 3.

The fingers are pivoted as at 127 to suitable bearings on the base 90. The mechanisms associated with the feed tracks 92 and 92a are identical, and a description of one will suffice. Normally, the fingers 125 and 126 are held in the full line position of Figure 13 by plungers 128 and springs 129. Lugs 125a and 126a on the fingers are adapted to engage the outer face of the nail chute and stop the fingers, as shown in Figure 1.

Referring to Figures 1, 6, 7 and 14, a shaft 130, mounted in suitable bearings in the frame 1, carries a punch holder 131 having two split arms 132 with downwardly projecting bosses 133. Slots 134 are provided in the frame in order to permit a rocking movement of the punch holder 131. The bosses 133 are threaded to receive the threaded shank 135 of a bolt, shown with a hexagon head 136, adapted to receive a tool whereby the bolt may be adjusted in relation to the punch holder. Clamping screws 137 lock the parts in proper position. Positioned in a counterbore 138 is a punch 139, held against displacement by a locking member 140. In alignment with an aperture 141 in the punch 139 is an aperture 142 in the bolt 135. An aperture 143 of larger diameter is formed in the boss 133 of the punch holder and adapted to receive a plunger 144 having a pin 145. A spring 146, compressed between a screwthreaded plug 147 and the plunger 144, normally holds the plunger in the position of Figure 15. The punch holder is of such shape that when it assumes the position of Figure 6, the punch 139 is in alignment with one of the dies 22 on the dial 21; whereas, the punch 139a is in alignment with the aperture 123 of the feed rack 92. As the shaft 130 and punch holder 131 are rotated through an arc in the direction of the arrow of Figure 6, the punch 139a is brought into alignment with one of the dies 22 and the punch 139, and into alignment with the aperture 123 of the feed rack 92a. Any suitable mecha-

nism, not shown, may be employed to rock the shaft 130 back and forth.

Means for inserting a nail into the punch 139 or 139a will now be described.

In the position in which the parts are shown in Figures 1 and 3, the punch 139a is in position to receive a nail 94 which has been positioned in the aperture 123 of the feed track 92.

In alignment with the aperture 123 of the track 92 is a stem 150 which is slidably mounted in bearings 151, carried by a tube 152 which, in turn, is supported on a bracket 153 upon the cross head 7. An identical structure is positioned in alignment with the aperture 123 of the feed track 92a. The stem is normally held in the position shown in Figure 1 by a spring 154 compressed between a collar 155 on the stem 150 and the upper bearing 151. The stem projects above its upper bearing in close proximity with an actuating lever 156 of a limit switch 157 which controls the motor for driving and actuating the mechanism above referred to.

When the cross head 7 descends, the stem 150 is moved from the full line position of Figure 3 to the dotted line position of that figure. During this movement, the stem engages the head of the nail and pushes it downwardly into the punch 139a. Obviously, the nail and stem 150 force the fingers 125, 126 apart to the dotted line position of Figure 13 to release the nail. In the lowermost position of the cross head 7, the nail head has cleared the fingers 125, 126 and, as the cross head and stem 150 are raised, the fingers are returned to their normal position by the spring plungers 128.

In order to align the punch 139 and 139a, there is provided an adjustable stop pin 158 in each base 90 for the two arms 132 of the punch holder 131.

When the cross head 7 is in raised position, the punch holder 131 is rocked so as to bring the punch 139a into alignment with one of the dies 22, which contains a lead cup 32. During the succeeding descent of the cross head 7, the die 22 is penetrated by the punch 139a and the lead cup is pressed about the nail head. As the cross head rises, friction holds the lead cup in the cavity of the die and the nail is withdrawn from the punch 139a, and thus is carried by the dial to the position of discharge below described.

Figure 14 illustrates the step of pressing and forming the lead cap about a nail when the punch 139 is in position as illustrated in Figure 6. Figure 15 illustrates the position of the nail 94 before the cup is closed by the die 22. The plunger pin 145 normally holds the nail head a predetermined distance above the punch. As the die 22 assumes its lowermost position, it depresses the nail and plunger 144 against the compression of the spring 146, which, as the die is raised, assists in pushing the nail upwardly and prevents the formed cap from becoming loose in the die cavity.

Means for dislodging the lead-capped nail from the die are as follows:

Referring to Figures 1, 2 and 5, a knockout plunger 160 is mounted in a bearing aperture in the cross head 7 and is normally thrust upwardly by a compression spring 161, one end of which engages the head of the plunger 160, and the other end, a seat 162 in the cross head T. Upward movement of the plunger 160 is limited by engagement with a camming portion 163 of a bell crank lever 164, which is pivoted as at 165 on a bearing 166, mounted upon the upper face of the cross head 7.

The bell crank 164 is actuated to depress the knock-out plunger by means of a roller 167 pivoted to the bell crank and a camming bar 168 with a reduced upper portion 169 and an inclined face 170. The camming bar 168 is adjustably mounted on one of the bearing sleeves 3 and held in proper alignment by a guiding block 171 fastened to the cross head 7. Secured in the lower end of the knockout plunger 160 is a shearing pin 172 which is in alignment with an aperture 173 in communication with the slot 30 of the disc 10.

When the dial 21 is at rest, one of the dies 22 is always in alignment with the knockout plunger 160. In the uppermost position of the cross head 7, the plunger 160 and its shearing pin 172 are in raised position and above the knockout pin 27, 28, associated with the die 22.

As the cross head descends, the roller rides upon the inclined face 170 and rotates the bell crank lever 164 counter-clockwise from the position shown in Figure 5, thus pushing the knockout plunger 160 downwardly. The shearing pin 172, in turn, engages the head 28 of the pin 27 and forces the lead head of the nail out of the cavity of the die 22. As the nail is dislodged, it drops into a chute 173a which conveys the nail into any suitable receptacle. Preferably, the chute is provided with an inclined upper portion 174 adapted to engage and tilt the nail in order to break the bond between the nail cap and die cavity. During the upward movement of the cross head 7, the knockout mechanism is restored to initial position.

Figure 17 illustrates various sizes of plunger pins comprising parts 144, 145 for the punch 139 and 139a. They are interchangeable to accommodate various lengths of nails for which the machine is adaptable.

Although there is shown an operative form of the device, it will be understood that many changes in the form, shape and arrangement of parts might be made without departing from the spirit of this invention, and it is wished that the showing be taken as, in a sense, diagrammatic.

The use and operation of this invention are as follows:

In the machine of this invention in one operation of its cross head 7 and dial 21 with its dies 22, it simultaneously forms a cup-shaped member 32 from a lead slug 62, 62a or 62b; presses that lead cup 32 about the head 94a of a nail 94 which, the cup 32 having been formed in a previous operation, discharges a completed capped nail. It also feeds a new slug 62 into the cavity 48 of the punch collar 46 and furthermore feeds a nail into one of the punches 139 or 139a, which is positioned, during the cycle of operation, in alignment with a die 22 for the succeeding operation.

During each operation of the cross head, the cam lever 77 is actuated by the roller 82 which moves the sliding members 55, 56 in order to pick up a new slug 62 from the feed tube or magazine 61 and to deliver a slug to the punch for the succeeding forming and capping operation. At or near the uppermost position of the cross head 7, the dial 21 is rotated one step in order to align an empty die 22 with the punch 31, and, simultaneously, to align one of the formed lead cups 32, adhering in the cavity of the dies, with either one of the punches 139 or 139a which contains a

nail, and, finally, to align a die carrying a finished nail with the knockout mechanism, including the knockout plunger 160. The plunger 160 is provided with a shearing pin 172 which prevents damage of the plunger 160, should the knockout plunger fail to lift.

During each cycle of operation, the punch holder 131, supporting the punches 139 and 139a, is rotated either clockwise or counter-clockwise to align, for example, the punch 139 with a die and the punch 139a with the nail-feeding mechanism. At the succeeding operation, the position and function of the punches 139 and 139a are reversed.

Finally, during each operation the nail-feeding slide 103 is actuated by levers 117, 120 to feed a nail into one of the punches 139, 139a, whichever one is in nail-receiving position. Should a nail fail to enter the punch, due to malformation or to any other cause, the stem 150 will actuate the limit switch lever 156 and stop the machine.

I claim:

1. In combination in an apparatus for forming and applying lead heads to the heads of nails, a movable die carrier, and means for moving it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyor, a die in said carrier, and means for releasing said nail-holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank.

2. In combination in an apparatus for forming and applying lead heads to the heads of nails, a rotary die carrier, and means for rotating it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyors, a die in said carrier, and means for releasing said nail-holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank.

3. In combination in an apparatus for forming and applying lead heads to the heads of nails, a movable die carrier, and means for moving it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyor, a die in said carrier, and means for releasing said nail-holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank, means for separating the two dies and for withdrawing the nail with the attached lead head.

4. In combination in an apparatus for forming and applying lead heads to the heads of nails, a rotary die carrier, and means for rotating it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyors, a die in said carrier, and means for releasing said nail holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank, means for separating the two dies and for withdrawing the nail with the attached lead head, and means for discharging the nail and head from the forming die.

5. In combination in an apparatus for forming and applying lead heads to the heads of nails, a movable die carrier, and means for moving it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a plurality of nail-conveying means, means for directing nails therealong, a plurality of nail-supporting means, one positioned to cooperate with each of said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyors, a plurality of dies in said carrier, one for each of said nail conveyors, and means for moving said carrier to bring said dies alternately toward and from said carriers, and means for releasing said nail-holding means to deposit nails in said last mentioned dies, means cooperating with the dies of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said dies into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its dies toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank.

6. In combination in an apparatus for forming and applying lead heads to the heads of nails, a rotary die carrier, and means for rotating it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a plurality of nail-conveying means, means for directing nails therealong, a plurality of nail-supporting means, one positioned to cooperate with each of said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyors, a plurality of dies in said carrier, one for each of said nail conveyors, and means for moving

said carrier to bring said dies altenately toward and from said carriers, and means for releasing said nail-holding means to deposit nails in said last mentioned dies, means cooperating with the dies of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said dies into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its dies toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank.

7. In combination in an apparatus for forming and applying lead heads to the heads of nails, a rotary die carrier, and means for rotating it, a plurality of forming dies positioned therein, means for conveying slugs to said dies, a plurality of nail-conveying means, means for directing nails therealong, a plurality of nail-supporting means, one positioned to cooperate with each of said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyors, a plurality of dies in said carrier, one for each of said nail conveyors, and means for moving said carrier to bring said dies alternately toward and from said carriers, and means for releasing said nail-holding means to deposit nails in said last mentioned dies, means cooperating with the dies of said first mentioned die carrier for forming a lead slug positioned within said die into a cup-shaped member, means for moving said first mentioned die carrier to bring said dies into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its dies toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank, means for separating the two dies and for withdrawing the nail with the attached lead head, and means for discharging the nail and head from the forming die.

8. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails.

9. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails, said heading die carrier being mounted for rotation, and said slug feeding means being mounted for reciprocation.

10. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, said means including a reciprocating slide provided with a feeding opening for each of said nail guiding means, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails.

11. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, said means including a reciprocating slide provided with a feeding opening for each of said nail guiding means, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails, said heading die carrier being mounted for rotation, and said slug feeding means being mounted for reciprocation.

12. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a plurality of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails.

13. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a plurality of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails, said heading die carrier being mounted for rotation, and said slug feeding means being mounted for reciprocation.

14. In combination in an apparatus for forming and applying lead heads to the heads of nails, a movable die carrier, and means for moving it, a plurality of downwardly facing forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail-guiding means, and a movable die carrier positioned adjacent said nail conveyor, a die in said carrier, and means for releasing said nail-holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a downwardly facing cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead cup is crimped about and beneath the head of a nail and along its shank.

15. In combination in an apparatus for forming and applying lead heads to the heads of nails, a rotary die carrier, and means for rotating it, a plurality of downwardly facing forming dies positioned therein, means for conveying slugs to said dies, a nail-conveying means, means for directing nails therealong, a nail-supporting means positioned to cooperate with said nail guiding means, and a movable die carrier positioned adjacent said nail conveyors, a die in said carrier, and means for releasing said nail-holding means to deposit nails in said last mentioned die, means cooperating with the die of said first mentioned die carrier for forming a lead slug positioned within said die into a downwardly facing cup-shaped member, means for moving said first mentioned die carrier to bring said die into alignment with said nail-holding die, and means for moving said first mentioned die carrier with its die toward said nail-carrying die, whereby a lead

cup is crimped about and beneath the head of a nail and along its shank.

16. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, said feeding means including a die carrying member, a plurality of dies in said member, means for rocking said member to move each of said dies alternately toward and away from one of said nail guiding means, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails.

17. In combination in a nail heading machine, a heading assembly including a plurality of heading dies, a movable carrier therefor, a pair of nail guiding means adapted to convey nails toward said dies and toward said carrier, means for feeding nails alternately from said nail carriers to a heading die, said feeding means including a die carrying member, a plurality of dies in said member, means for rocking said member to move each of said dies alternately toward and away from one of said nail guiding means, means for conveying lead slugs to said dies, and means for forming said slugs about the heads of said nails, said heading die carrier being mounted for rotation, and said slug feeding means being mounted for reciprocation.

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