D. A. SAWYERS.

TACK DRIVER.

APPLICATION FILED JAN. 28, 1908.

905,004. Patented Nov. 24, 1908.

5 SHEETS—SHEET 1.

Fig. 1

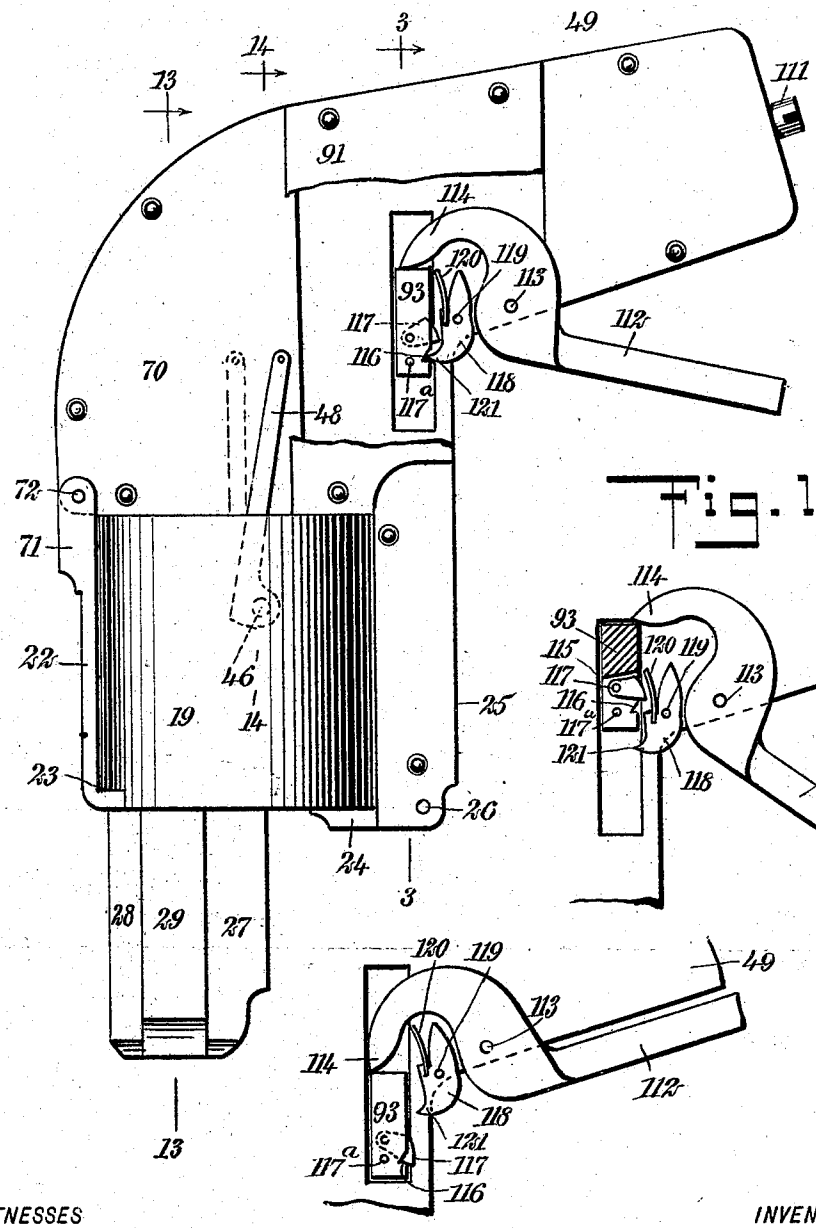


Fig. 17

Fig. 18

WITNESSES

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5 SHEETS—SHEET 2.

Fig. 2

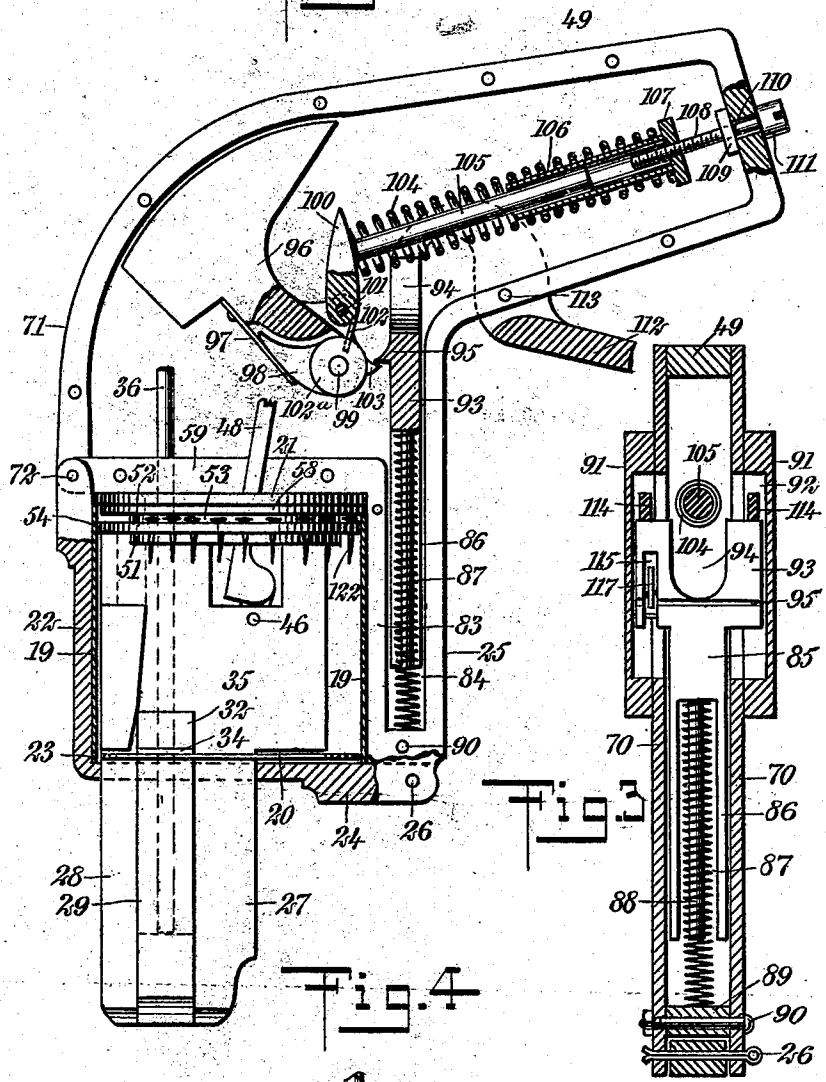


Fig. 3

Fig. 4

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5 SHEETS—SHEET 3.

Fig. 5

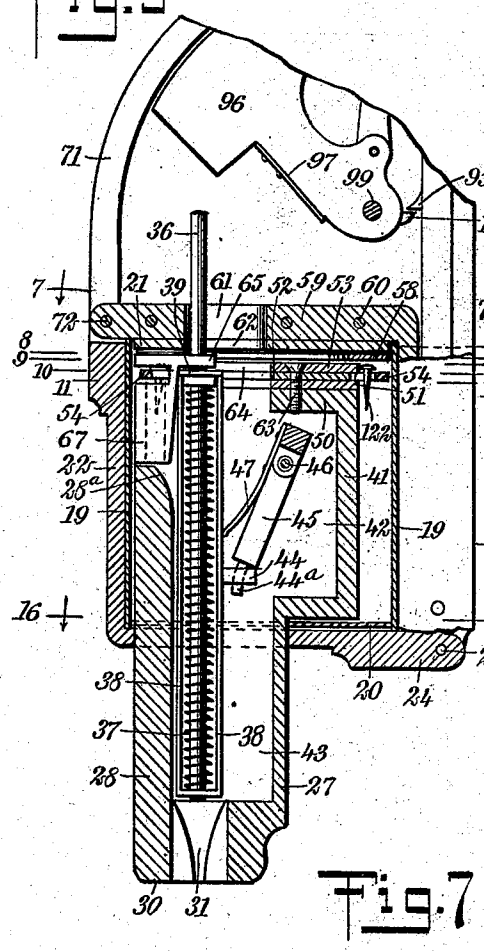


Fig. 6

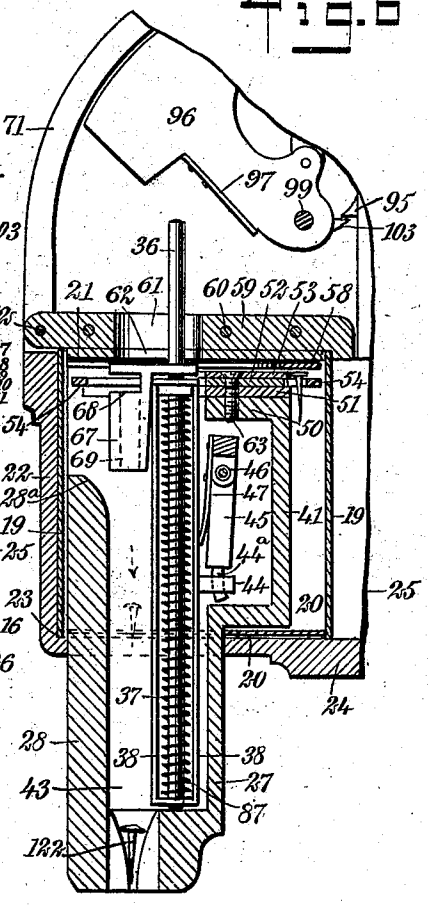
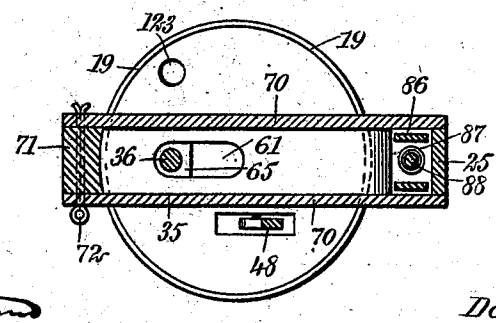


Fig. 7



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5 SHEETS—SHEET 4.

Fig. 8

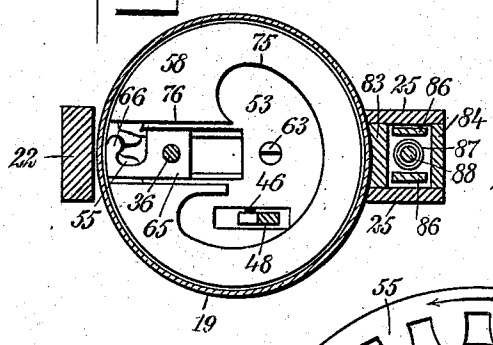


Fig. 9

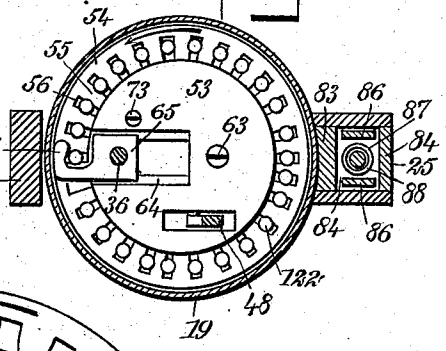


Fig. 10

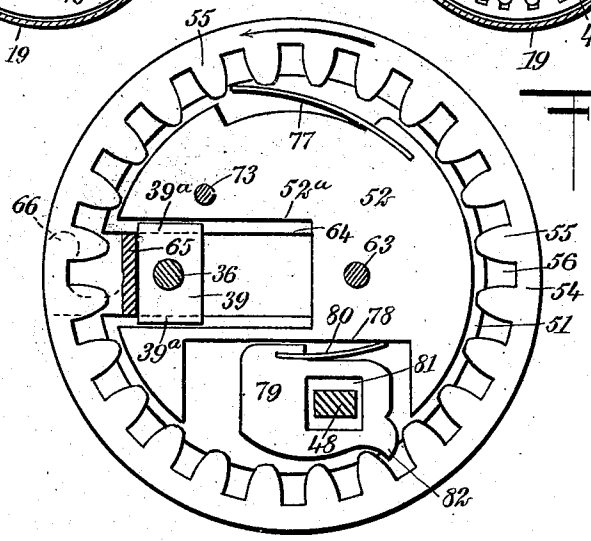
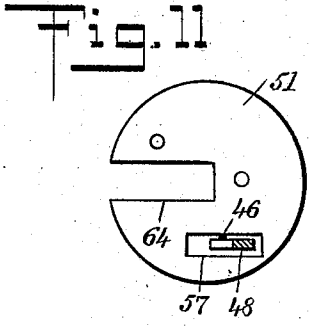


Fig. 11



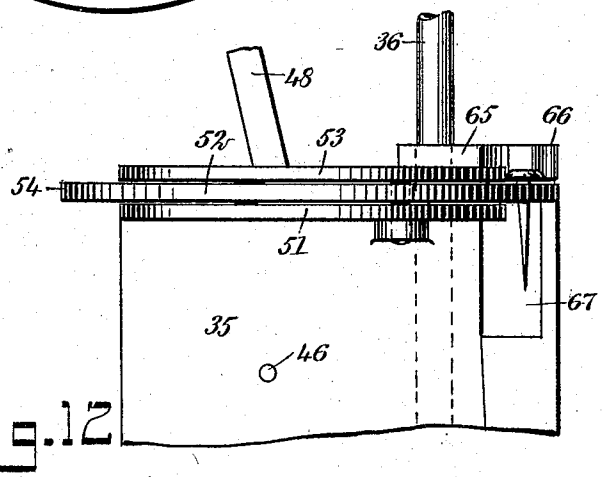


Fig. 12

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5 SHEETS—SHEET 5.

Fig. 13

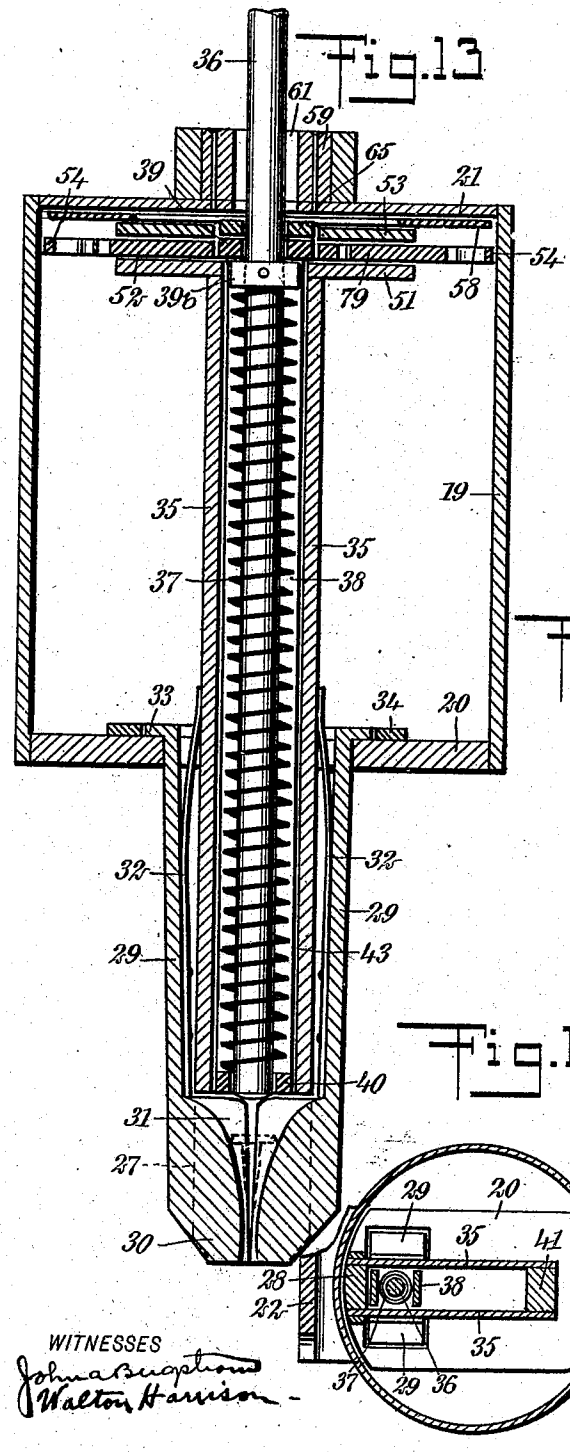


Fig. 14

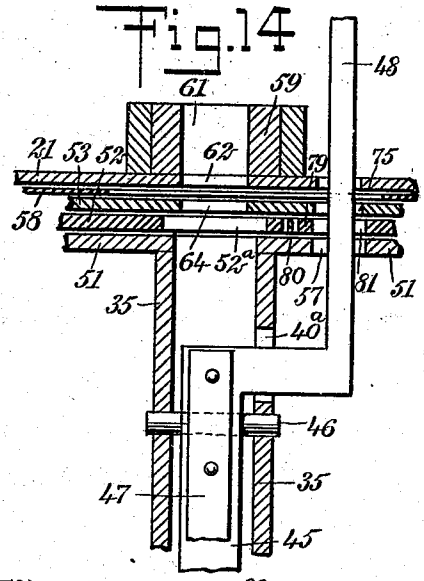


Fig. 15

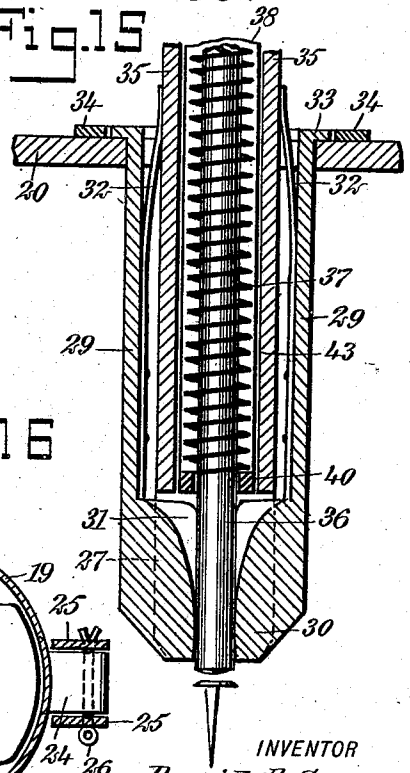


Fig. 16

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UNITED STATES PATENT OFFICE.

DAVID ALLEN SAWYERS, OF UNIONVILLE, IOWA.

TACK-DRIVER.

No. 905,004. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed January 28, 1908. Serial No. 413,092.

To all whom it may concern:

Be it known that I, DAVID ALLEN SAWYERS, a citizen of the United States, and a resident of Unionville, in the county of Appanoose and State of Iowa, have invented a new and Improved Tack-Driver, of which the following is a full, clear, and exact description.

My invention relates to mechanism for driving tacks, nails and the like, my more particular object being to produce a tack driver provided with an improved form of magazine for holding the tacks, and further provided with means under control of a trigger and a lever actuated directly by the operator for discharging the tacks one at a time and driving them as discharged.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the tack driver complete, one of the side plates being broken away for the purpose of showing the trigger and its associated parts, this view showing the muzzle as pointing downwardly, thus being in the position it occupies when in action; Fig. 2 is a view partly in section and partly in elevation, showing the revolving magazine for holding the tacks, and also showing the hammer used for driving the tacks and the various mechanisms associated with the hammer for controlling it; Fig. 3 is a section upon the line 3—3 of Fig. 1, looking in the direction of the arrow and showing a part of the mechanism used for retracting the trigger and for manipulating the hammer; Fig. 4 is a detail showing the member which I designate as a dislodger and used for dislodging the tacks from the magazine; Fig. 5 is a section through the nozzle of the tack driver, this view showing the plunger used for driving the tacks, the spring for propelling the plunger, and further showing part of the means used for moving the plunger into and out of position after each tack is driven, the plunger as here shown being in the proper position to drive a tack; Fig. 6 is a section similar to Fig. 5 but showing the plunger as removed from the position it occupies in driving a tack, the removal being for the purpose of allowing another tack to drop down into the nozzle and ready to be driven; Fig. 7 is a section upon the line 7—7 of Fig. 5, looking in the direction of the arrow and showing the cylinder containing the magazine and various other parts; Fig. 8 is a section through the cylinder upon the line 8—8 of Fig. 5, looking in the direction of the arrow and showing the dislodger occupying its outermost position as if ready to engage a tack; Fig. 9 is a section upon the line 9—9 of Fig. 5, looking in the direction of the arrow, and showing the magazine or tack wheel as loaded with tacks, one of which is about to be dislodged; Fig. 10 is an enlarged plan view, parts being in section on the line 10—10 of Fig. 5, of the magazine or tack wheel, together with the means for actuating it step by step and holding it firmly in position after each step; Fig. 11 is a detail, a part being in section on the line 11—11 of Fig. 5, of a slotted plate employed in the cylinder and disposed immediately adjacent to the magazine, this plate being provided with a slot for permitting lateral movement of the plunger and its accompanying parts; Fig. 12 is an enlarged detail view exhibiting the edge of the magazine, and also showing its accompanying parts; Fig. 13 is an enlarged fragmentary section, on the line 13—13 of Fig. 1, through the cylinder, plunger and the nozzle; Fig. 14 is a fragmentary section upon the line 14—14 of Fig. 1, showing particularly the mounting of the hand lever used for turning the magazine and for actuating the plunger in its movement lateral to its axis; Fig. 15 is a fragmentary section through the nozzle and its accompanying parts, showing the plunger extended to its limit as in driving a tack; Fig. 16 is a cross section upon the line 16—16 of Fig. 5, looking in the direction of the arrow and showing the plunger cage carrying the spring plunger and adapted to move in a lateral direction within the chute; Fig. 17 is a fragmentary detail showing how the trigger operates the slide, and also showing the safety mechanism for preventing the sudden stoppage of the slide in its movement toward the plunger, yet allowing the slide to be partially retracted and held by the detent when in normal position of inactivity; and Fig. 18 is a fragmentary elevation showing the trigger as drawn back to its full limit and showing the slide occupying a corresponding position, the detent now guarding the notch of the slide so as to prevent the detent from engaging this notch when the slide is afterward allowed to resume its normal position.

A cylinder 19 is secured rigidly in position and is provided with substantially cylindrical heads 20, 21 secured rigidly to the cylinder in order to prevent the entrance of dust and to prevent disarrangement of the parts hereinafter described and contained within the cylinder. A rib 22 is bent into substantially L shape and a portion of this rib extends through a slot 23 in the cylinder. This rib is provided with a thickened portion 24 which is connected with plates 25 by aid of a bolt 26. A box 27 is disposed opposite a bar 28 and disposed intermediate these two members are a pair of jaws 29 adapted to have a slight play toward and from each other. These jaws are together so shaped as to form a nozzle 30 having a substantially conical outlet 31 through which the tacks are to be passed as hereinafter described.

A pair of leaf springs 32 are connected one with each of the jaws 29 which are of proper conformity for this purpose, as will be understood from Fig. 13. These leaf springs extend upwardly and tend to press toward each other. The jaws 29 extend into the cylinder head 20 and are provided with flanges 33 which project in opposite directions so as to prevent the removal of the jaws. Lugs 34 are disposed adjacent to the flanges 33 and serve to prevent accidental dislodgment of these flanges and consequently of the jaws 29.

Two plates 35, made substantially alike, are so spaced apart that a plunger 36 and certain accompanying parts are placed between them. A spiral spring 37 encircles the plunger 36 which has the form of a longitudinal cylindrical rod. Two flat bars 38 are disposed intermediate the plates 35 (see Fig. 16) and placed upon opposite sides of the spiral spring 37. Mounted upon the plunger 36 is a set collar 39^b which may be adjusted relatively to the plunger so as to regulate the tension of the spring 37. These bars 38 are connected together at their tops by a fastening 39 which encircles the plunger 36, and are connected at their bottoms by a fastening 40 which serves as a bearing through which the plunger 36 is adapted to play. The fastenings 39, 40 are each substantially rectangular in outline. The bars 38 together with the fastenings 39, 40 at the ends thereof and the spiral spring 37 disposed intermediate the bars 38, together constitute a cage which is slidable, in a lateral direction, in relation to the plates 35.

The box 27 is provided with an enlarged portion 41 (see Fig. 5). This enlarged portion has a large compartment 42 merging into a smaller compartment 43. Disposed within the compartment 42 and secured upon one of the bars 38 is a loop 44. An arm 45 is mounted rigidly upon a rocking shaft 46 and is provided with a portion 44^a extending through the loop 44. A leaf spring 47 is mounted rigidly upon the arm 45 and presses against the bar 38 upon which the loop is secured.

When the arm 45 is rocked in a contra-clockwise direction according to Fig. 6, the leaf spring 47 is pressed closely against the arm 45 by the bar 38, and this bar, together with its accompanying parts constituting the cage, is drawn to the right according to this figure. When, however, the arm 45 is allowed to resume its normal position, the leaf spring 47, in its effort to move away from the arm 45, presses the cage toward the left according to Fig. 5. This is because the spring 47 in tending to move away from the arm 45 after compression forces the arm 45 and the cage to the left of it into such positions that the parts are as nearly as possible in equilibrium, which necessarily moves both the cage and the arm 45 to the left.

An arm 48, integral with the arm 45, extends upwardly from the rocking shaft 46 and is bent so as to pass through a slot 40^a in one of the plates 35. This arm 48 is adapted to be rocked either by hand or power; in the present instance I prefer to operate it by hand. A handle 49, somewhat similar to the handle of a revolver is provided for the purpose of manipulating the entire device. A lug 50 (see Figs. 5, 6) constituting a portion of the box 41 supports a plate 51, and resting upon this plate is another plate 52 of slightly smaller diameter. Resting upon the plate 52 is a plate 53 having a diameter substantially equal to that of the plate 51. A magazine 54 is made substantially in the form of a ring (see Fig. 10) provided with teeth 55 extending radially inward and separated by spaces 56. The teeth 55 rest upon the outer edge of the plate 51, while the plate 53 prevents the magazine from moving away from the plate 51, thus holding the magazine steadily in position and enabling it to turn after the manner of a cylinder in a revolver.

The fastening 39 is provided with flanges 39^a, as will be understood from Fig. 10. These flanges project into a slot 52^a in the plate 52, thus enabling the fastening 39 to serve as a slide which may be moved toward the right and left, according to Fig. 10. The plate 51 is provided with a slot 57 in order to permit the arm 48 to extend through it. A disk 58 (see Fig. 8) is provided with an opening 75 to accommodate the various moving parts. A rib 59 is disposed directly across one end of the cylinder 19 and is made in halves connected together by bolts 60, as will be understood from Fig. 6. This rib is provided with a slot 61 and is secured to the cover 21 which is provided with a similar slot 62. These two slots are practically continuations of each other and may be considered as a single slot through which

extends the plunger 36, as will be understood from Fig. 6.

A screw 63 extends through the plates 51, 52 and 53, and into the portion 50 of the box 41, so as to hold the plates firmly thereupon. The plate 53 is provided with a slot 64 which registers with the slot 62, as will be understood from Fig. 14.

A slide 65 is mounted upon the fastening 39 and is engaged by the plunger 36 so that when the plunger moves in a direction lateral to its axis, it carries with it the slide 65. This slide is provided with a hook 66 and with a guiding portion 67, the hook and guiding portion being separated by a slot 68 (see Fig. 4). The slide 65, hook 66 and guiding portion 67 together constitute what I call the dislodger, its purpose being to disengage the tacks or nails one at a time from the magazine in order that they may glide downwardly into position to be driven. The manner in which the slide 65 is fitted upon the plunger 36 may be understood from Fig. 13.

The rib 28 is provided with a beveled surface 28^a (see Fig. 6) to guide the tacks or nails as they drop from the magazine. Handle walls are shown at 70 and aid in inclosing various working parts. The rib 22 is provided with a thickened portion 71, and this is connected with the handle walls 70 by a bolt 72. The bolts 72, 26 are easily removed for the purpose of aiding access to the parts.

A screw 73 (Figs. 9 and 10) is inserted through the plates 51, 52, 53, and assists the screw 63 in holding these plates firmly together. The plate 58 is provided with a slot 76 merging into the opening 75 as will be understood from Fig. 8. The slot 76 is to accommodate the slide 65 and its accompanying parts. A spring pawl 77 is mounted upon the plate 52 (see Fig. 10) and is adapted to engage successively the teeth 55 so as to prevent retrogression of the magazine 54. The plate 52 is provided with an opening 78 and resting loosely within this opening is a slide 79. A leaf spring 80 is mounted upon this slide and presses against the plate 52. The slide 79 is provided with a pawl 82 integral with it, and this pawl successively engages the teeth 55 for the purpose of turning the magazine 54 step by step. The slide 79 is provided with a slot 81 for accommodating the arm 48. As the arm 48 is worked by hand or otherwise, the slide 79 is reciprocated, the result being that the pawl 82 engaging the teeth 55, one at a time, turns the magazine step by step, the spring pawl 77 meanwhile clicking into proper position after each tooth has passed it.

A rib 83 is connected rigidly with the stationary cylinder 19 and is separated from the rib 25 by a space 84. A plate 85 (see Fig. 3) is provided with flat guide-rods 86 integral therewith and extending therefrom, and intermediate these guide-rods is a spiral spring 87, into which extends a cylindrical rod 88, this rod being mounted upon the plate 85. A spacing sleeve 89 is disposed intermediate the handle walls 70 and encircles the middle portion of a bolt 90, which aids in holding these walls together.

Housings 91, provided with apertures 92, are mounted upon the handle walls 70, and mounted within these housings is a slide 93, which is provided with a slot 94 and with a tooth 95 (see Figs. 2 and 3). A hammer 96 is provided with a leaf spring 97, and engaging this leaf spring is a lug 98, mounted upon a pivot pin 99. An arm 100 is mounted upon the hammer 96 by aid of a pivot pin 101 and is provided with a spring 102, which engages a rocking sleeve 102^a on the pivot pin 99. When the arm 100 is pressed toward the left (according to Fig. 2) by the action of the spring 104, it tends to turn both the sleeve 102^a and the hammer 96 upon the pin 99 as a center. Owing, however, to the action of the springs 102 and 97 the hammer strikes a so-called "spring blow."

The rocking sleeve 102^a is provided with a tooth 103 disposed partially within the path of travel of the tooth 95. A spiral spring 104 is disposed partially within the slot 94, so as not to interfere with movements of the slide 93. Extending into the spiral spring 104 is a cylindrical guide rod 105 which engages the arm 100. The rod 105 extends also into a guiding sleeve 106 provided with a cap 107. This cap is provided with a central perforation threaded internally, and fitted into this perforation is a screw 108. A nut 109 encircles this screw and the screw extends through an aperture 110 and is provided with a nut 111 whereby it may be turned. By turning the nut 111 the degree of tension of the spring 104 can be regulated at will.

A lever 112, serving as a trigger, is mounted upon a pivot pin 113 and is provided with a pair of arms 114 which engage the rear end of the slide 93. This slide is provided with a slot 115 (see Figs. 3 and 17) and is also provided with a notch 116. A guard 117 is pivotally mounted within the slot 115 and is adapted to move into such position as to practically close the notch 116. The slide 93 is further provided with a stop pin 117^a (see Fig. 17) against which the guard 117 may lodge, and when thus lodged (see Fig. 18) the guard 117 projects in such manner as to close the notch 116, or at least to render it, for the time being, inoperative.

A pawl 118 (see Figs. 1, 17 and 18) is mounted upon a pin 119 and is provided with a leaf spring 120. The slide 93 is adapted to move bodily in relation to this pawl. The point of the pawl is shown at 121 and is adapted, upon proper occasion, to enter the notch 116. This can only occur,

however, when the guard 117 is swung backward, or in other words, occupies the position indicated in Fig. 1.

One position of the parts just described is shown in Fig. 17. The slide 93 now occupies its uppermost position. When the trigger 112 is pulled, the arms 114 cause the slide 93 to travel downward. The point 121 clicks into the notch 116 for a partial movement of the trigger. The parts may be left in this position for any length of time (see Fig. 1).

The position shown in Fig. 2 may be considered as the normal position. Suppose, now, that the trigger 112 be pulled still further. The guard 117 encounters the point 121, and as the slide 93 travels downwardly the guard necessarily swings to its upward limit until grounded by the point 121. As this point yields slightly according to the action of the spring 120, the guard 117 springs quickly below the point 121 so that when the trigger 112 reaches the limit of its travel, the parts occupy the position indicated in Fig. 18. If, now, pressure of the hand upon the trigger 112 be relaxed, the slide 93, acting in accordance with pressure of the spring 87, tends to move upward. The point 121 is now unable to click into the notch 116 owing to the position of the guard 117, as will be understood from Fig. 18. The net result is that in this apparatus, as in an ordinary revolver, a partial pull of the trigger brings the hammer into the position commonly designated as half-cocked, whereas a quick pull of the trigger causes the hammer to be drawn back and released. In pulling the trigger back a little way (see Fig. 17) so that the point 121 lodges in the notch 116, the hammer 96 (see Figs. 5 and 6) is drawn backward far enough to completely disengage the plunger 36. When, however, the stroke of the trigger is complete, the hammer 96 swings back until the tooth 95 passes clear of the tooth 103, thereby releasing the hammer which strikes the plunger 36 and drives it endwise, compressing the spring 37. The cover or head 21 is provided with a hole 123 through which tacks 122 are inserted into the magazine. This hole is in such position as to come into registry with each of the slots 56 in succession as the magazine is turned.

The operation of my device is as follows: The operator grasps the machine by the handle and places it nozzle downward, as indicated in Fig. 2. He next grasps the arm 48 and presses it first to the left and then to the right, according to this figure. Each time he does this, the magazine travels one step and brings a different slot 56 successively into register with the hole 123. He drops through the hole the members to be driven, in this particular instance we will say the tacks 122. A separate tack is dropped in after each complete movement of the arm 48. In this way the magazine is filled. Now, in order to drive the tacks, the arm 48 is given a complete double movement back to its starting point. The operator then pulls the trigger 112 back to its limit and releases it, allowing it to return to its extreme forward position. The double movement of the arm 48 causes several distinct operations to take place. First, by moving the dislodger slide 65, the hook 66 pulls the tack radially inward toward the center of the magazine 54 and causes the release of the tack, as will be understood from Figs. 6 and 12. The tack glides downwardly and lodges in the lower end of the nozzle, as will be understood from Fig. 6. The cage, comprising bars 38 and fastenings at the ends thereof, is moved in a lateral direction (see Figs. 5 and 6) by the arm 45 which is controlled directly by the arm 48 as will be understood from Fig. 14. The movement of the dislodger and the movement of the cage are thus caused by a single movement of the arm 48. As above explained, this swinging movement of the arm 48 moves the slide 79 (see Fig. 10) and turns the magazine one step. Suppose, now, that the tack has been dislodged, as indicated in Fig. 6, and that the arm 48 has been allowed to turn to its normal position. This leads the cage to the left, according to Fig. 5, so that the plunger 36 moves out over the tack now lodged in the nozzle. The operator next pulls the trigger to its limit, the result being that the hammer 96 is raised and released, striking the plunger 36 and driving the tack. If it should happen that the tack is now completely driven, the operator merely gives a second pull of the trigger. This does not move the magazine, and consequently does not dislodge any other tack, but simply allows the plunger to strike the same tack a second time. The operator, by pulling the trigger any number of times in succession, without moving the arm 48, can cause the plunger to strike a tack a corresponding number of times. As the machine is most commonly used, for instance, in tacking down a carpet, the operator merely directs the muzzle to the point where he wishes to drive a tack, and then moves the arm 48 one complete double stroke and pulls the trigger. He repeats this simple cycle of operations for each tack driven.

While for convenience and simplicity I show merely one form of the device, I do not limit myself to this particular construction. While in this instance the movements of the arm 48 and of the trigger are entirely independent of each other, I do not wish because of this fact to so limit my construction as to prohibit the use of these parts in

other relations as desired, the scope of my invention being commensurate with my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination of a revoluble magazine provided with teeth separated by slots and adapted to support fastening members to be driven, a dislodger movable bodily in relation to said magazine for the purpose of dislodging said fastening members in succession, a plunger for driving said fastening members, and means for moving said plunger out of and into alinement with said fastening members.

2. The combination of a casing provided with a chute, a cage mounted within said chute, a plunger slidably mounted within said cage, means for moving said cage so as to move said plunger into and out of said chute, and means for dropping into said chute in succession the fastening members to be driven.

3. The combination of a chute, a cage movable bodily in relation thereto, a plunger carried by said cage and movable relatively to the same, means for actuating said plunger for the purpose of driving the members to be driven, and mechanism for dropping said members one at a time into said chute.

4. The combination of a chute, a cage mounted therein and movable relatively thereto, a plunger carried by said cage, means controllable at will for actuating said cage for the purpose of moving said plunger into and out of position relatively to said chute, and means controllable at will for moving said plunger relatively to said cage when said cage occupies a predetermined position relatively to said chute.

5. The combination of a casing, a magazine revolubly mounted therein, a slide provided with a member for turning said magazine step by step, a spring to prevent retrogression of said magazine after each movement thereof, a slide provided with a hook and movable relatively to said magazine for the purpose of dislodging therefrom the fastening members to be driven, a cage disposed adjacent to said slide, a plunger slidably mounted within said cage and movable bodily therewith, said plunger being connected with said hook, means controllable at will for shifting the position of said cage and said plunger relatively to the fastening members to be driven, and means controllable at will for actuating said plunger so as to strike said fastening members.

6. The combination of a revoluble magazine for supporting fastening members to be driven, a dislodger movable bodily in relation to said magazine for the purpose of dislodging said fastening members therefrom, a plunger for driving said fastening members, and mechanism co-acting with said dislodger for moving said plunger out of and into alinement with said fastening members.

7. The combination of a revoluble magazine for supporting fastening members to be driven, a dislodger mounted to slide relatively to said magazine for the purpose of displacing said fastening members held thereby, a plunger for driving said fastening members, said plunger being mounted to slide, and means for moving said plunger out of and into alinement with said fastening members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID ALLEN SAWYERS.

Witnesses:
C. W. TAYLOR,
E. M. PHILLIPS.