Feb. 11, 1958 E. H. DE LA GARRIGUE 2,822,543

NAIL SELECTOR MECHANISM FOR NAILING MACHINES

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FIG. 1.

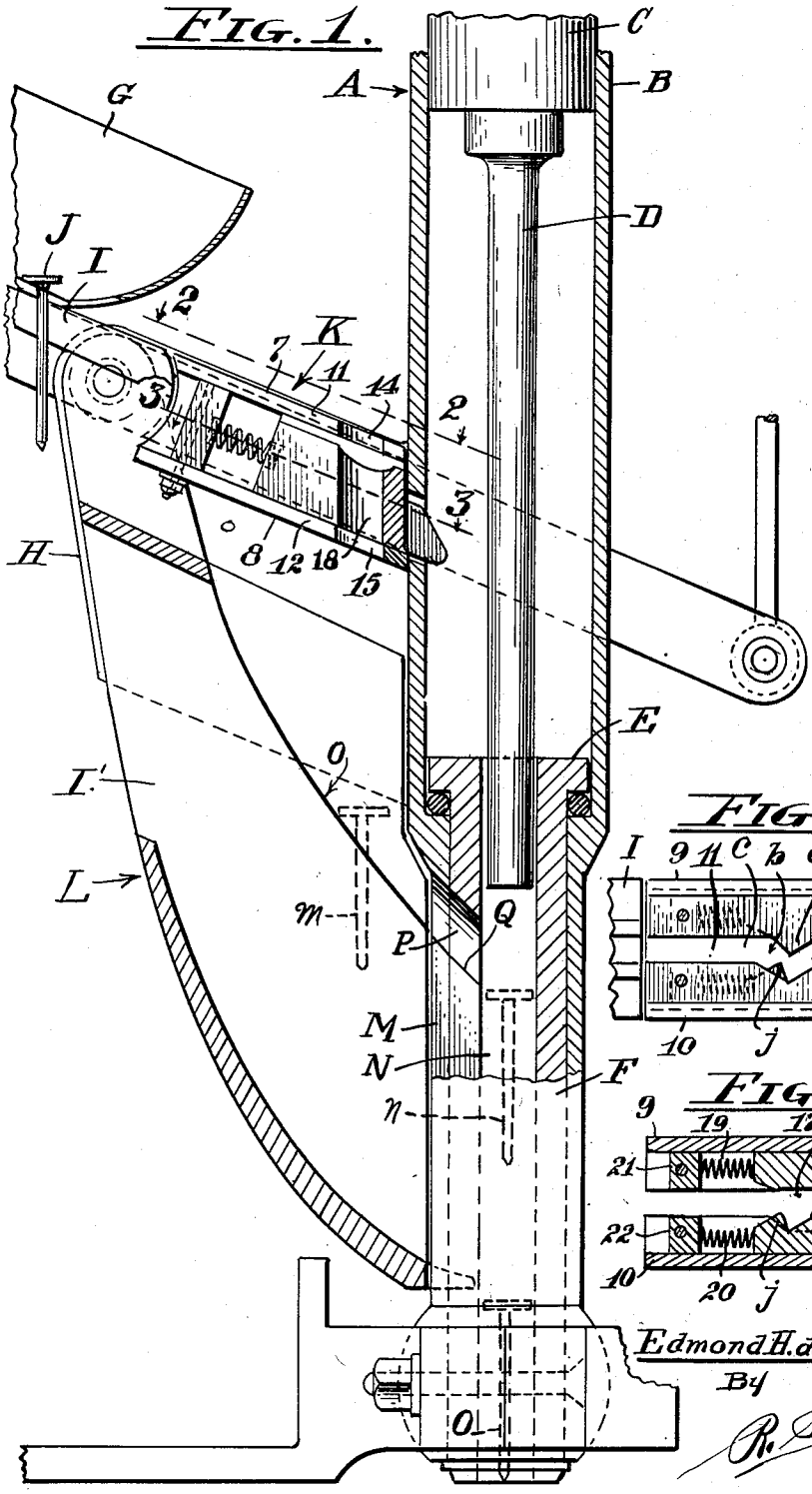


FIG. 2.

FIG. 3.

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FIG. 4.

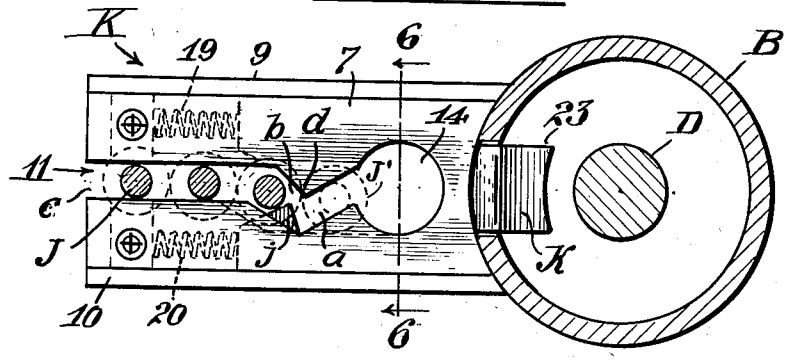


FIG. 5.

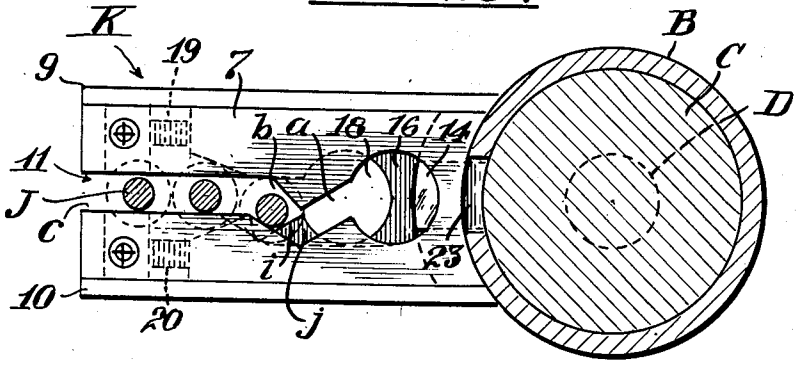


FIG. 6.

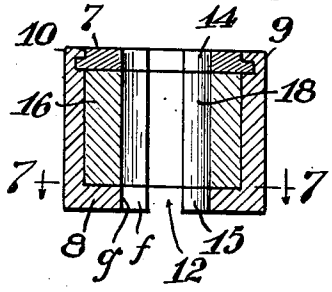
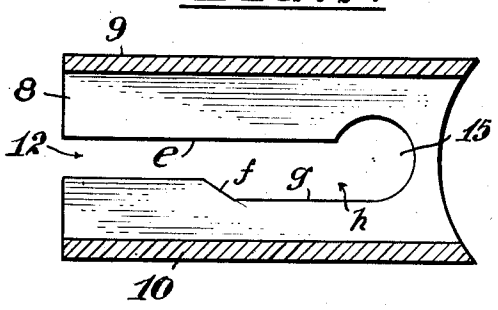


FIG. 7.



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NAIL SELECTOR MECHANISM FOR NAILING MACHINES

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Application March 7, 1956, Serial No. 570,000

4 Claims. (Cl. 1—6)

This invention relates to nail driving machines of the type embodying a cylinder containing a reciprocal fluid operated piston fitted with a nail driving rod and including a nail hopper fitted with a discharge chute through which nails are delivered in a single row, the invention particularly pertaining to a mechanism for selecting the lead nail and delivering it to a position beneath the driving rod.

An object of the invention is to provide a construction whereby the nail selecting mechanism will be actuated in part and controlled by movement of the piston through the medium of a reciprocal element normally extending in the path of the nail driving piston and engageable by the latter on its downstroke to effect retraction of said element and thereby set the nail selecting mechanism in operation.

Another object is to provide a mechanism of the above character which is adapted to be conditioned for handling nails of various sizes.

With the foregoing objects in view together with such other objects and advantages as may subsequently appear, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed, and as illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a view in vertical section partly in elevation of a portion of a nail driving machine showing the invention as applied:

Fig. 2 is a detail in plan and section as seen on the line 2—2 of Fig. 1 illustrating the nail selector embodying the invention:

Fig. 3 is a view in horizontal section taken on the line 3—3 of Fig. 1:

Figs. 4 and 5 are diagrams in plan illustrating the mode of operation of the nail selecting mechanism:

Fig. 6 is a cross section taken on the line 6—6 of Fig. 4: and

Fig. 7 is a section and plan view taken on the line 7—7 of Fig. 6.

Referring to the drawings more specifically A indicates generally the lower portion of a nail driving machine which embodies a cylinder B fitted with a piston C adapted to be reciprocated by fluid pressure in the manner common in pneumatic hammers, the cylinder B and piston C being attached to a pneumatic actuator (not shown) in a conventional manner. The piston C is fitted with a nail driving stem D on its lower end in the usual fashion which stem D extends into a sleeve E mounted in a tubular lower end extension F of the cylinder B. A conventional nail hopper G is pivotally mounted in the usual manner on a bracket H carried on the cylinder B, which hopper is provided on its under side with a longitudinally slotted nail chute I from which nails J are delivered from the hopper in a row and supported vertically in a dependent position by the heads thereof.

The present invention resides in a selector mechanism indicated generally at K for feeding the nails from the

line thereof one at a time in an upright position to a dependent discharge chute L which leads downwardly on an incline beneath the selector mechanism and opens to a vertically extending side slot M in the sleeve E and in the extension F and leading to the space N interiorly of the sleeve E below the lower end of the pin D when the latter is in a retracted position. The chute L embodies a pair of parallel side walls L', one only of which is here shown, each of which side walls is formed on its inner face with a downwardly curved ledge O leading to an aperture P extending through the extension F and sleeve E at the upper end of the slot M, the aperture P having a downwardly inclined bottom wall Q through which the upper end of the slot M opens to the aperture P, and whereby the nail discharged from the selector K will be delivered in an upright position to the space N as will be later described.

The mechanism K embodies a substantially rectangular housing having top and bottom walls 7 and 8, and side walls 9 and 10, which housing extends at a downward incline between the discharge end of the nail chute I and the cylinder B. The top and bottom walls 7 and 8 are formed with longitudinally extending slots 11 and 12 respectively which slots have open ends presented to and aligned with the discharge end of the chute I so that nails delivered from the latter will enter said slots in their upright positions points downward with their heads supported on the top wall 7, the slot 11 being formed of a width slightly greater than the diameter of the shanks of the nails J and slightly less than the diameter of the nail heads so that the latter will overlie and rest on the margins of the slot. The slots 11—12 extend in alignment with each other at their opposite ends and terminate at their inner ends in axially aligned discharge apertures 14—15 in the top and bottom walls 7—8 adjacent the cylinder B, which apertures have a diameter slightly adjacent the cylinder B, which apertures have a diameter slightly exceeding the diameters of the nail heads so that the latter will pass therethrough.

The slot 11 in the top wall 7 is straight throughout a portion of its length from it open outer end and has a zig-zag formation at its inner end, it having a diagonally extending inner end portion *a* leading from the discharge aperture 14 and leading to an oppositely diagonally extending portion *b* connecting with the inner end of the longitudinally extending open ended portion *c* of the slot. By this arrangement an inclined protrusion *d* is presented in the path of nails advancing along the slot 11.

As shown in Fig. 7 the slot 12 in the bottom wall 8 has the margin *e* thereof opposite the margin of the side of the slot 11 bearing the protrusion *d* extending straight throughout its length while the other margin thereof leads straight from the open end of the slot to a point about midway of its length with its inner end terminating in an incline *f* connecting with a straight portion *g* leading to the aperture 15. The slot 12 thus has a widened inner end portion *h* extending opposite the zig-zag end portion of the slot 11.

Mounted in the housing is a nail feeding slide block 16 guided for reciprocal movement longitudinally of the housing which slide block is formed with a longitudinally extending slot 17 having an open end presented to the discharge end of the nail chute and having its open ended portion aligned with the slots 11—12 in the top and bottom walls 7 and 8. The slot 17 terminates at its inner end in a circular discharge aperture 18 normally axially aligned with the discharge apertures 14—15 in the walls 7 and 8. The slide block 16 is normally maintained in an advanced position under the urge of springs 19—20 which bear between the outer end of the slide block and

abutments 21—22 disposed interiorly of the housing on opposite sides of the slots therein.

The slot 17 in the slide block has a straight margin *h* on the side thereof aligned with the side of the slot 11 in the top wall 7 bearing the projection *d* and has its opposite margin formed with a diagonal portion *i* which which aligns with the adjacent diagonal margin of the inner end portion of the slot 11 when the slide block is in its innermost position. An angular projection *j* protrudes into the zig-zag portion of the slot 11 at the base of the diagonal wall *i* which projection *j* terminates opposite the projection *d* on a plane in continuation of the adjacent margin of the straight outer end portion of the portion *c* of the slot 11. The outer margin of the projection *j* extends diagonally to the outer end of the slide block. The projection *j* co-operates with the inclined outer face of the projection *d*, when the slide block is in its advanced position, to form an abutment for the leading nail of the line of nails as shown in Fig. 4.

The inner end of the slide block 16 is formed with a projection 23 which extends into the cylinder A in the path of travel of the piston C, the projection being formed with an inclined beveled upper face *k* adapted to be engaged by the lower end of the piston on downstroke of the latter to thereby effect retraction of the slide block 16 in opposition to the springs 21—22.

On retraction of the slide block, which occurs on downward movement of the piston B when the lower end of the piston meets and retracts the projection 23 the lead nail J is forced rearwardly a trifle until the projection *j* passes beyond the inclined portion *b* of the slot 11, whereupon the nail will be positioned in front of the projection *j* into the diagonal portion *b*.

On advance of the slide block 16, which occurs when the piston B, on its upstroke, passes the projecting element 23, the projection *j* will advance the selected nail into the end portion *a* of the slot 11, as indicated in dotted lines J' in Fig. 4. The succeeding nail will be obstructed by the projection *j* and prevented from advancing. A repeated operation will cause a succeeding nail to abut and advance the previously advanced nail and effect its discharge through the then aligned apertures 14—15—18 into the trough L from whence the nail is delivered in the usual manner into driving position within the sleeve E beneath the then retracted rod D; the nail falling from the selector K into the chute L in an upright position with the head thereof uppermost whereby the nail head will be deposited on the inclined ledges O with the shank of the nail depending between the side walls L' of the trough L as indicated by the dotted lines *m* in Fig. 1. The nail will then slide downwardly with its head supported on the trough L and will be delivered upright through the aperture P and slot M into the space N as indicated by the doted lines *n* in Fig. 1, and will then fall to the lower end of the space N where the nail will be disposed with its point imposed on the part to be nailed as indicated at *o* in Fig. 1 in the manner common to nailing machines of the type to which the present invention pertains.

Each reciprocal movement of the piston C thus effects delivery of a single nail to driving position.

The top wall 7 is in the form of a detachable slide plate and is subject to removal and replacement and whereby on its removal access may be had to the slide block 16 so that it may be removed and replaced. By this arrangement the device is capable of adaption for use with various sizes of nails by providing interchangeable top walls or plates 11 and slide block 16 having slots and apertures of various sizes according to the size of nails to be worked.

While I have shown and described a specific embodiment of the invention I do not limit myself to the exact details of construction set forth, and the invention embraces such changes, modifications and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

I claim:

1. In a nail selector mechanism for nailing machines of the type embodying a cylinder having a reciprocal piston therein carrying a nail driving pin and including a nail hopper fitted with a discharge chute through which nails are delivered from the hopper in a row with the nails disposed upright and supported by their heads; a housing extending between the discharge end of said chute and said cylinder, said housing having top and bottom walls formed with longitudinally extending slots, said slots having open ends presented to the discharge end of said chute for the reception of nails discharged therefrom and said slots having a width slightly exceeding the diameter of the nail delivered thereto and leading to circular apertures having a diameter slightly exceeding the diameters of the heads of said nails; means in said housing for delivering the nails one at a time to said apertures including a projection extending into the said cylinder in the path of said piston for actuating said last named means directly by said piston whereby on downstroke of the latter a nail will be selected from the row thereof and delivered to said apertures; and means for receiving a nail discharged from said apertures and delivering it into a driving position beneath said rod.

2. In a nail selector mechanism for nailing machines of the type embodying a cylinder having a reciprocal piston therein carrying a nail driving pin and including a nail hopper fitted with a discharge chute through which nails are delivered from the hopper in a row with the nails disposed upright and supported by their heads; a housing extending between the discharge end of said chute and said cylinder, a reciprocal slide block in said housing having an integral projecting outer end portion formed with an inclined upper face extending into said cylinder beneath and in the path of travel of said piston when said slide block is in its advanced position, spring means for advancing said slide block and yieldably opposing retraction thereof, said housing having a bottom wall formed with a discharge aperture, means actuated by reciprocation of said slide block for delivering nails one at a time to said discharge aperture; a sleeve carried by the lower end of said cylinder encompassing a space in which said driving pin operates, said sleeve being formed with a longitudinally extending side wall slot, and means for delivering nails from said discharge aperture through said side wall slot into a driving position within said space beneath said driving pin.

3. In a nail selector mechanism for nailing machines of the type embodying a cylinder having a reciprocal piston therein carrying a nail driving pin and including a nail hopper fitted with a discharge chute through which nails are delivered from the hopper in a row with the nails disposed upright and supported by their heads; a housing interposed between the discharge end of said chute and said cylinder having top and bottom walls formed with longitudinally extending slots having open ends presented to the discharge end of said chute to receive nails delivered therefrom and having their outer ends terminating in discharge apertures said slots having a width slightly exceeding the diameter of the shank of a nail delivered thereto and said apertures having a diameter slight exceeding the diameter of the head of said nail; the slot in said top wall having the end portion thereof uniting with the discharge aperture having a zigzag formation; and a slide block reciprocally mounted in said housing for movement longitudinally thereof formed with a longitudinal slot having an open end presented toward said nail chute and formed with a discharge aperture at its other end complementary with the apertures in said top and bottom walls, spring means normally maintaining said slide block in its advanced position with its discharge aperture axially aligned wth the other apertures, said slide block having an integral

forward end projection extending into said cylinder in the path of said piston whereby downstroke of said piston will effect retraction of said slide block in said housing; the slide block slot being formed with the nail receiving end portion thereof aligned with the slots in the top and bottom wall of said housing and having an offset intermediate portion formed with projections co-operable with the zig-zag portion of the slot in the housing top wall on reciprocation of the slide block to select and advance the leading nail of the line of nails delivered from said chute to said housing and then advance the nail to discharge through said apertures on forward movement of said slide block while holding the succeeding nail in the line against advance.

4. In a nail selector for nailing machines of the type embodying a cylinder having a reciprocal piston therein, a rectangular housing disposed at an inclination with its lower end abutting said cylinder, said housing having parallel top and bottom walls formed with longitudinally extending slots opening in alignment at one end of said walls and terminating at their other ends in opposed discharge apertures, said slots having a width slightly less than the diameter of the head of a nail to be seleced and said discharge apertures having a diameter slightly exceeding the diameter of the nail head, means for feeding nails in a row to the open ends of said slots with the heads thereof seating on said top wall and with the shanks thereof depending through said slots; the slot in said top wall having a zig-zag formation at its inner end; a slide block reciprocally mounted between said top and bottom

walls for movement longitudinally thereof, said block being formed with a longitudinal slot having an open end aligned with the slots in the top and bottom walls and presented to the open ends of the latter, said block being formed with a discharge aperture at the inner end of the slot therein axially aligned with the discharge apertures in said top and bottom walls when said block is in its advanced position, spring means normally disposing said block in its advanced position, a projection on the forward end of said block extending into said cylinder in the path of said piston whereby down-stroke of said piston will effect retraction of said slide block in said housing; the slot in said slide block being formed with an offset intermediate portion opposite the zig-zag portion of the slot in said top wall, an angular projection in said off-set portion protruding opposite the said zig-zag portion normally obstructing the passage of a nail therealong and adapted on retraction of said block to clear said zig-zag slot portion and a diagonal marginal portion on said off-set portion of the slot in said block at the inner end of the latter normally clear of said zig-zag slot portion but on retraction of said slide block obstructing the passage of a nail along said zig-zag slot portion.

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