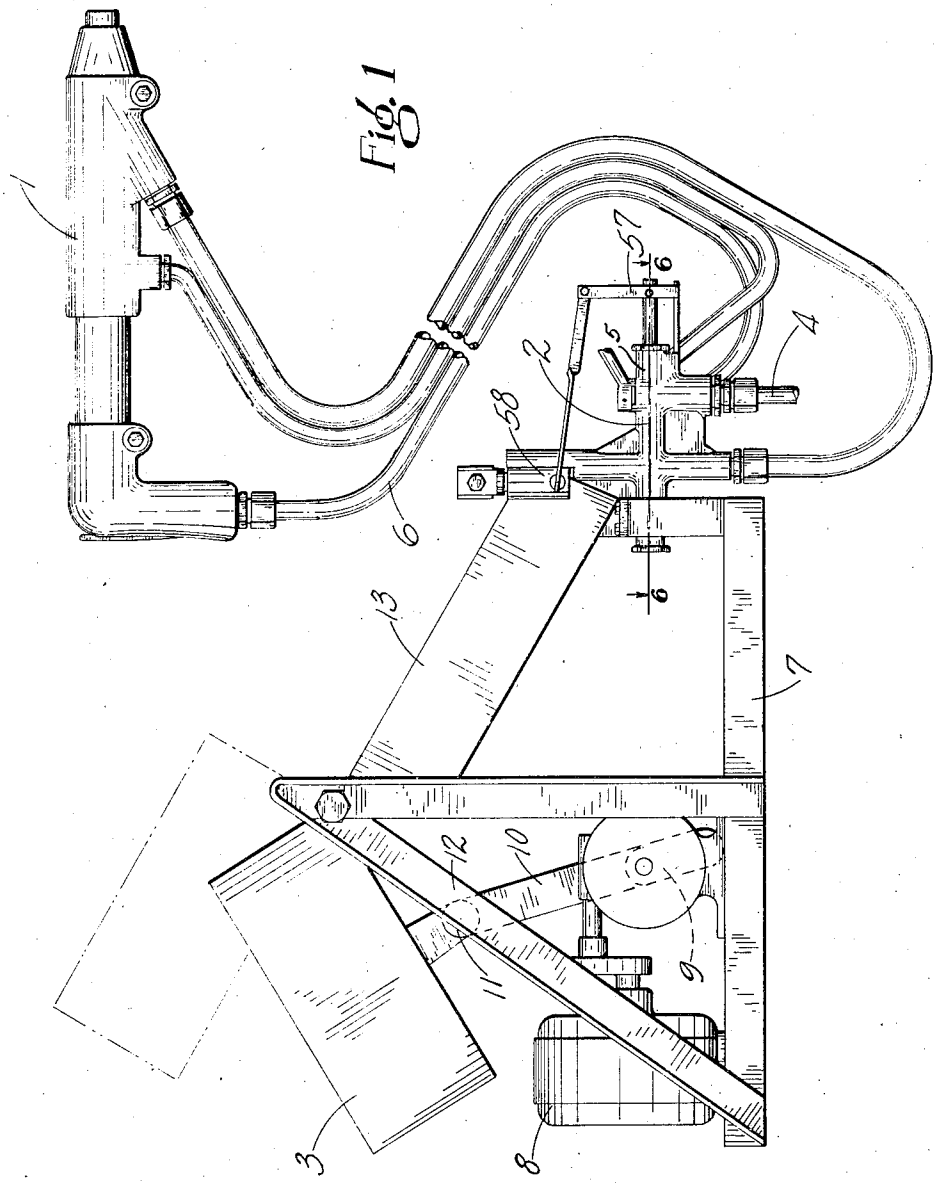
Nov. 13, 1934. J. DE MOOY 1,980,967

NAIL DRIVING DEVICE

Filed Nov. 22, 1930 3 Sheets-Sheet 1

Fig. 1



JOHN DE MOOY
INVENTOR
BY Richey & Watts
ATTORNEY

Nov. 13, 1934. J. DE MOOY 1,980,967

NAIL DRIVING DEVICE

Filed Nov. 22, 1930 3 Sheets-Sheet 2

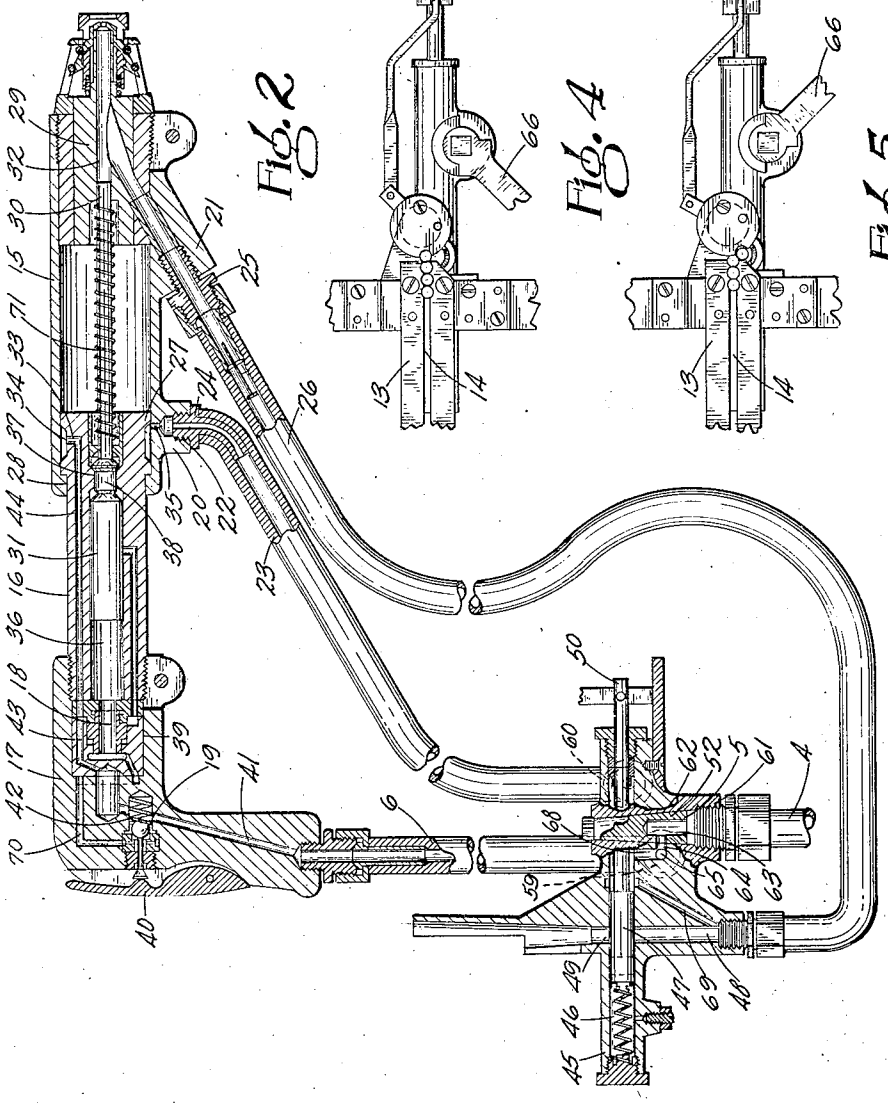


Fig. 2

Fig. 4

Fig. 5

JOHN DE MOOY
INVENTOR
BY Richey & Watts
ATTORNEY

Nov. 13, 1934. J. DE MOOY 1,980,967

NAIL DRIVING DEVICE

Filed Nov. 22, 1930 3 Sheets-Sheet 3

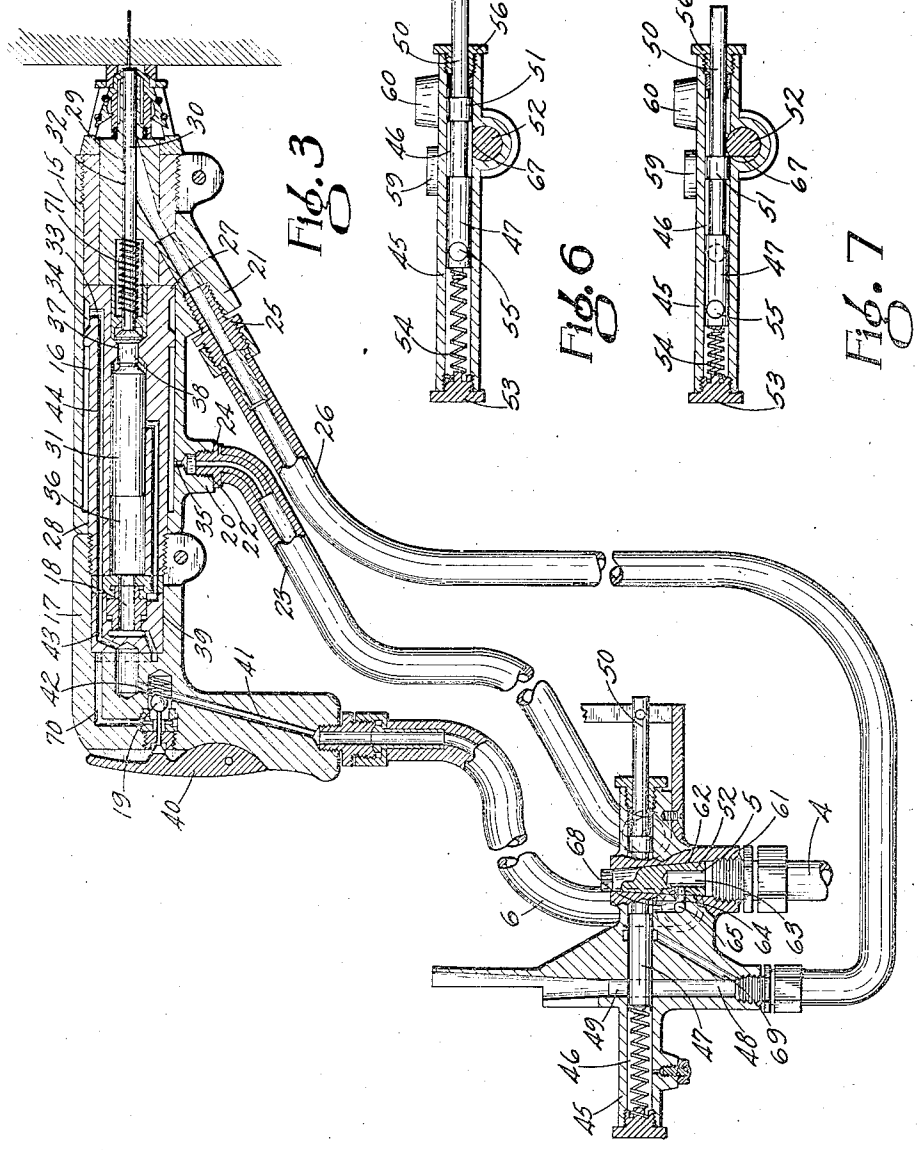


Fig. 3

Fig. 6

Fig. 7

JOHN DE MOOY
INVENTOR
BY Racheny & Watts
ATTORNEY

Patented Nov. 13, 1934 1,980,967

UNITED STATES PATENT OFFICE

1,980,967

NAIL DRIVING DEVICE

John De Mooy, Cleveland, Ohio, assignor to Cleveland Pneumatic Tool Company, Cleveland, Ohio, a corporation of Ohio

Application November 22, 1930, Serial No. 497,500

9 Claims. (Cl. 1—46.1)

This invention relates broadly to fluid operated tools of the percussive type and more specifically to improvements in mail driving apparatus and the feeding mechanism therefor.

It is among the objects of this invention to provide a portable nail driving apparatus embodying feed mechanism which is organized to effect the delivery of the nail to the discharge orifice of the hammer simultaneously with the actuation of the nail selecting mechanism. It is a further object of the invention to provide a nail feeding mechanism which will obviate the possibility of a plurality of nails being delivered into the feed conduit or into the throat of the nail discharge member. A still further object of the invention is to provide a lock mechanism controlled by the main fluid supply valve to prevent the loading of nails into the feed conduit when fluid supply is shut off.

Further objects and various advantageous features will be apparent from the following detailed description of the preferred embodiment of the invention in connection with the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein;—

Fig. 1 is a diagrammatic elevational view of the nail driving tool and feeding mechanism in assembled relation.

Fig. 2 is a vertical sectional view of the nail driving tool illustrating the position of the machine elements incident to nail driving operation.

Fig. 3 is a sectional view similar to that of Fig. 2 illustrating the position of the machine elements at the completion of the nail driving operation.

Fig. 4 is a fragmentary plan view of the feeding device illustrating the nail selecting mechanism in one position and the main fluid supply valve in its opened position.

Fig. 5 is a fragmentary plan view similar to that of Fig. 4 showing the nail selecting mechanism in its delivery cycle and the main fluid supply valve in its closed position.

Fig. 6 is a sectional view illustrating the feeding mechanism in operative position, the view being taken on a plane indicated by the line 6—6 in Fig. 1.

Fig. 7 is a sectional view similar to Fig. 6 illustrating the locking shoulder on the supply valve retaining the feed mechanism in its closed position.

With reference to the drawings and particularly to Fig. 1 the preferred form of my nail driving mechanism comprises a driving tool 1, a feed control mechanism 2 and a nail supply hopper 3. The driving tool 1 as herein illustrated comprises a pneumatic hammer; however, it is within the scope of the invention to employ other power actuated means, for example, an electrically operated hammer for delivering the blows that are to be transmitted by the driving tool to the nail being driven. In the embodiment herein shown fluid pressure may be transmitted to the device from any suitable source (not shown) through the conduit 4 to a manual throttle valve 5 and thence to the hammer through conduit 6. The nail driving mechanism is secured to a platform or base 7 having mounted thereon the motor 8 which has a driving connection with a crank 9 in the usual manner. The crank 9 is journalled in an arm 10 which is pivotally secured to the nail supply hopper 3, the hopper being fulcrumed on a pin 11 mounted in the bracket 12. The bracket 12 also supports the uppermost end of the inclined trough 13 which is disposed to permit the nails in the hopper 3 to fall into a slot 14 therein, (Figs. 4 and 5) and thus be guided to the feeding mechanism 2.

Referring now to Figs. 2 and 3 the driving tool or hammer comprises generally a sleeve 15 which is adapted to receive one end of a barrel 16 and a handle member 17 by which the tool is supported and controlled. The handle 17 is constructed to house the valvular mechanism 18 of the pneumatic hammer and a manual control valve 19 operable by the trigger 40.

The sleeve 15 is formed with a tapped boss 20 disposed on one side thereof and an angularly extending threaded boss 21 adjacent the nose. The boss 20 is bored as at 22 to effect communication between the chamber in the sleeve 15 and a conduit 23, and is threaded to retain an adapter 24 which supports the flexible conduit 23 communicating with the feeding mechanism 2. The boss 21 is bored to receive one end of a coupling unit 25 fixed to a flexible conduit 26 provided to convey the nails N from the feeding mechanism to the sleeve 15 and nail supporting head. The outer portion of the barrel 16 is formed with a circumferential enlargement 27 shouldered to engage an annular internal flange 28, disposed in the inner end of the sleeve 15. The sleeve 15 is slidably mounted upon the barrel 16, and is held against separation therefrom by the engagement of the shouldered circumferential enlargement 27

with the annular internal flange 28 disposed on the inner end of the shell.

The outer end of the sleeve 15 is provided with a nail supporting or guiding head 29 of the usual type which holds and aligns the nail until the head thereof is engaged by a driver 30 coordinated with a piston 31 in the barrel 16. A helical expansion spring 71 encompasses the driver 30 and has one end seated in a bore 32 in the head 29, the opposing end engaging a corresponding aligned bore in the opposing face of the barrel 16.

The circumferential enlargement 27 on the barrel 16 has an annular recess 34 about its periphery which registers, at the outer limit of the sliding movement between the barrel 16 and the sleeve 15, with a duct 35 in the boss 20. The barrel 16 has an axially disposed piston chamber 36 mounting a piston 31. The forward end of the piston chamber is counter-bored as at 37 for the reception of anvil block 38 intended to transmit the impact of the piston 31 to the driver 30. The opposing end of the barrel 16 is threaded into the tapped and threaded end of the control handle 17.

Mounted within the bore 39 of the handle 17 is the valvular mechanism 18 for distributing motive fluid to the opposite ends of the cylinder 36 to reciprocate the piston 31, and a control valve mechanism 19, operable by the lever 40 to control communication between the intake passage 41 and the valvular mechanism 18. The annular recess 34 is in fluidic communication with the intake passage 41 through a plurality of recesses and passages 42 in the handle, duct 43 in the valve chest, and the longitudinal vein 44 in the barrel 16. The valve mechanism 18 is of a conventional type for continuously effecting reciprocation of the driving piston so long as motive fluid is supplied to the tool. Such valve constructions with their associated passages are old in the art and per se form no part of the present invention. The illustration in the drawings of the valvular mechanism is a conventional one which in practice may take any of those forms which have been found practicable for pneumatic tools employing a continuously reciprocating piston.

The feed control mechanism 2 comprises a casting having a horizontally disposed tubular body portion 45 having a piston chamber 46, within which is reciprocatively mounted a piston 47, and a vertically disposed tubular portion 48 intermediate the ends of the body portion 45 having a bore 49 which traverses the piston chamber 46. The piston 47 is formed with a shank or stem 50 having an annular flange 51 (Figs. 6 and 7) fitting snugly within the chamber 46 and is adapted to engage a tapering valve stem 52 which secures the piston 47 against movement when the tool is not operating. Between a closure member 53 and the piston 47 is disposed a spring 54 adapted to normally hold a transverse passage 55 in the piston in alignment with the vertical bore 49. The stem 50 extends exteriorly of the body portion 45 through the plug 56 and has its outermost end pivoted to an arm 57 which controls the feeding mechanism 58 (Fig. 1).

The tubular body portion 45 is formed with horizontally extending bosses 59 and 60 and the depending boss 61. The boss 60 is adapted to receive an end of the conduit 23, and is bored to effect communication between said conduit and the interior of the chamber 46. The boss 59 is bored to effect fluidic communication between the source of supply and handle of the driving tool through the conduit 6. The boss 61 is bored to receive one end of the main fluid supply conduit 4.

The body portion 45 of the feeding mechanism has the vertical bore 62 extending therethrough and is adapted to receive the tapering valve stem 52. The stem 52 is provided with an axial passage 63 and a lateral passage 64 which effects communication between the fluid supply conduit 4 and the bore 65 in the boss 59 which in turn communicates with the conduit 6. The opposite end of the valve stem 52 has the hand lever 66 secured thereto. The valve stem is provided with a flat face 67 (Figures 6 and 7) which will permit the annular enlargement 51 to move freely in the chamber 46 when the mechanism is in operation and pressure fluid is passing into the feeding mechanism 2. A bypass 68 leads pressure fluid from the bore 65 to the piston chamber 46, and a diverging passage 69 transmits such pressure fluid to the bore 49 whereby it is adapted to conduct a nail through the conduit 26 to the driving head 29 of the hammer.

In operation the driving apparatus is assembled and the parts are initially positioned as illustrated in Figure 2. The throttle valve 5 is rotated so that the lateral passage 64 is in communication with the passage 65. Fluid under pressure passes from the supply conduit 4 through a passage in the valve stem 52 communicating passage 65 into conduit 6, where it is lead to the handle 17. When the pressure fluid reaches the handle of the hammer it is conducted through passages 41, 42 and 43 and vein 44 to the annular recess 34 in the barrel enlargement 27, which is in registration with the port 35. Pressure fluid passes through the port 35 and conduit 23 to the right side of the piston chamber 46 between the front face of the piston head 51 and the plug 56 and acts upon the piston head 51 with sufficient force to overcome the spring 54 and hold the piston 47 in the position shown in Figures 2 and 7. At this position of the piston 47 pressure fluid is transmitted through the bypass 68 into chamber 46, from which it passes through the passage 69 to the bore 49 where it is effective to drive a nail disposed in the feed passage 49 through the conduit 26 to the guiding head 29 of the hammer.

The guiding head of the driving tool is then brought against the work and the barrel 16 is moved forward within the sleeve 15. The annular recess 34 is moved out of alignment with the port 35 and fluid pressure is relieved from the face of the flange 51. The driver 30 is brought into engagement with the head of the nail disposed within guiding head member 29. This is the position of the elements prior to the actual driving operation.

The operator then presses the lever 40 and opens the valve 19 and fluid under pressure is permitted to pass through the conduit 70 to the valvular mechanism 18 to reciprocate the piston 31. The nail is driven into the work by the driver which cooperates with the piston 31 through the anvil 38 (Fig. 3).

When the pressure is relieved in the space between the front face of the flange 51 and the plug 56 the spring 54 moves the piston 47 forward aligning the passage 55 therein with the vertical bore 49. The forward movement of the stem 50 of the piston 47 rocks the arm 57 and is effective to cause the nail selecting device to drop a nail into the bore 49. The nail takes a position some-

what below the point where the passage 69 converges with the bore 48.

Upon completion of the driving operation the operator relieves the pressure on the handle member 17 and the barrel of the hammer assumes the position shown in Figure 2. The spring 71 moves the barrel outward and at the same time draws the tappet out of the nose of the driving tool to allow another nail to be transmitted thereto and the cycle of operation is repeated.

When the hammer is not in operation the throttle valve 5 is moved to shut off the flow of pressure fluid to the device. During this movement the shoulder 67 on the valve stem 52 engages the flange 51 and locks the piston 47 in retracted position, thereby preventing the spring 54 from moving the piston 47 after pressure is relieved from the front face of the flange 51 and dropping a second nail into the bore 49.

It will be apparent from the foregoing description that I have provided a feeding device for a nail driving apparatus wherein it is normally impossible to feed more than one nail into the nose of the driving tool at one time, and which is automatic throughout its operation.

Although the foregoing description is necessarily of a detailed character in order to completely set forth this invention, it is to be understood that the specific terminology is not intended to be restrictive or confining and it is to be further understood that various rearrangements of parts and modifications in structural detail may be resorted to without departing from the scope and sphere of the invention as herein claimed.

I claim:

1. An apparatus for driving nails comprising, in combination, a nail feeding mechanism operable by motive fluid, a driving tool having connection therewith for operating said tool and said nail feeding mechanism, a guide head comprising a sleeve, a barrel slidable within said sleeve, and means operable by that part of the barrel within the sleeve upon movement of the barrel for controlling the supply of motive fluid to said nail feeding mechanism.

2. An apparatus for driving nails comprising in combination, a nail feeding mechanism, having a piston chamber, a piston disposed therein, a driving tool having a connection with said nail feeding mechanism, and means associated with said nail feeding device for positively holding said piston in a fixed position, said means comprising a throttle valve having a stem adapted to contact with said piston.

3. In combination, a power operated driving tool and a nail feeding mechanism for feeding a nail thereto, said driving tool having a barrel and a sleeve, said barrel having a part slidable within said sleeve and adapted for one position of adjustment to operate said nail feeding mechanism and for another position of adjustment to render said nail feeding device inoperative, said first position of adjustment occurring only when said driving tool is in inoperative position.

4. Apparatus for driving nails comprising, in combination, a power operated driving tool, a manual throttle valve for controlling the passage of motive fluid to said power tool, means for feeding a nail thereto including a conduit leading to the driving tool, release mechanism connected with said conduit having a plunger valve controlling a nail passage to said conduit, and control means associated with the driving tool for effecting movement of the plunger valve to admit fluid under pressure to said conduit to propel a nail therealong, said control means including relatively movable members in said power operated driving tool and being operable upon relative movement of said members.

5. Apparatus for driving nails comprising, in combination, a power driven tool having a guiding head and a barrel relatively reciprocable, a piston in said barrel, means including a throttle valve for controlling the passage of motive fluid to said piston, a nail feeding mechanism having a conduit for conducting a nail to said guiding head, said mechanism having a plunger valve controlling a nail passage in said conduit, a conduit for supplying motive fluid to said plunger valve to operate the same, and means associated with said guiding head and barrel for controlling the passage of motive fluid to said plunger valve and operable upon relative reciprocation of said barrel and guiding head.

6. In a nail driving apparatus, in combination, a pneumatic hammer including a part relatively movable toward the work into nail driving position, and away from the work into inoperative position, a nail feeding mechanism, a conduit for conveying nails from said feeding mechanism to the hammer, said nail feeding mechanism including means for depositing nails individually in said conduit, and means controlled by said relatively movable part of the hammer for admitting motive fluid into said conduit to convey a nail to said hammer when said part approaches inoperative position, and to cut off the motive fluid from said conduit in the initial movement of said part to nail driving position.

7. In a nail driving apparatus, in combination, a pneumatic hammer, a guiding head for positioning nails to be driven slidably associated with said hammer in such a manner that the guiding head may be engaged with work and the hammer moved toward the work into nail driving position or away from the work into inoperative position, a nail feeding mechanism, a conduit for conveying nails from said feeding mechanism to said guiding head, and means controlled by the relative positions of said hammer and guiding head for admitting pressure fluid into said conduit to convey a nail to said hammer when said hammer is in inoperative position and to shut off the pressure fluid from said conduit when said hammer is in nail driving position.

8. In nail driving apparatus, in combination, a pneumatic hammer, a nail feeding mechanism including a conduit, a piston slidable across the conduit and arranged in one position to close the same and in another position to open the conduit to permit a nail to be deposited therein, means controlled by the position of said piston for admitting pressure fluid into said conduit to convey a nail therethrough to said hammer when said piston is in position closing said conduit, means carried by said hammer comprising a relatively movable barrel and sleeve for controlling the position of said piston, and a main supply valve for controlling the supply of pressure fluid to said hammer and said feeding mechanism and arranged when closed to lock said piston against movement.

9. In a nail driving mechanism, in combination, a pneumatic hammer comprising a barrel, a slidable guiding head for positioning a nail to be driven, a spring normally urging said guiding head away from said barrel, a nail feeding mechanism comprising a conduit communicating with

said guiding head, a piston slidable across said conduit and having an aperture therethrough adapted to be aligned with said conduit to permit nails to be deposited therein in one position, said piston in another position being arranged to close said conduit, means controlled by said piston for admitting pressure fluid into said conduit to convey a nail to said guiding head when said piston is in said conduit closing position, and a valve controlled by said barrel and guiding head to admit pressure fluid to said piston to move the same into conduit closing position when said guiding head is moved away from said barrel.

JOHN DE MOOY.