Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 1

Fig. 1.

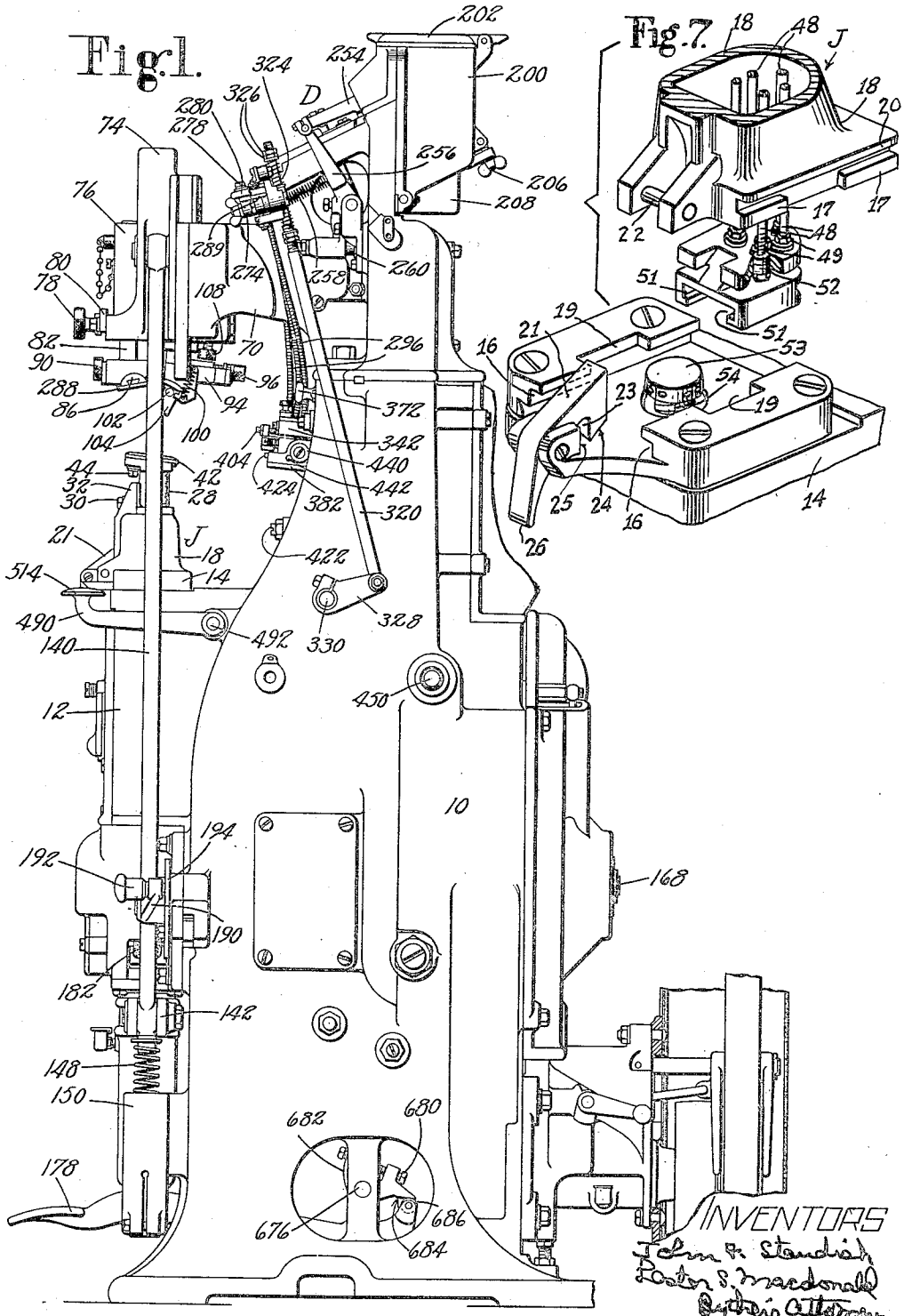


Fig. 7.

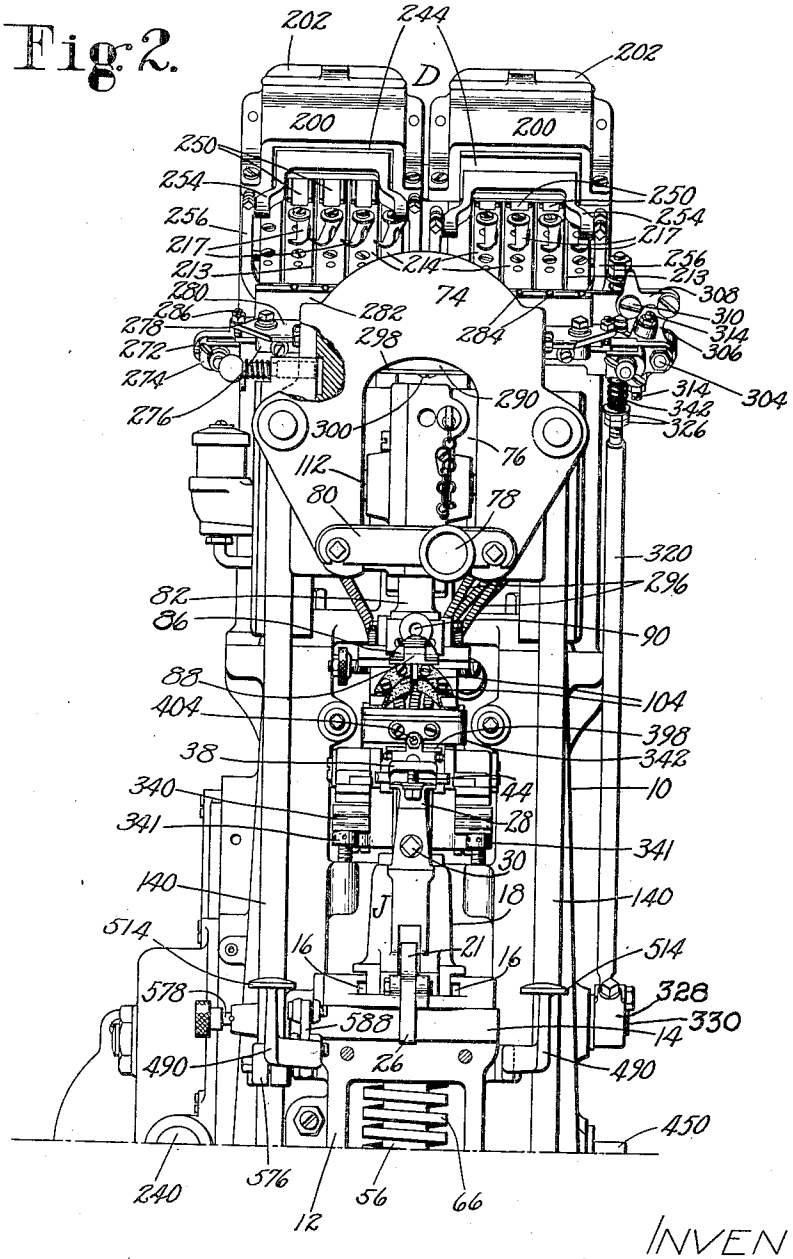
INVENTORS
John F. Standish
Dexter S. Macdonald
By their Attorney
Herbert M. Dawes

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 2

Fig. 2.



INVENTORS

John F. Standish

Foster S. Macdonald

By Their Attorney,

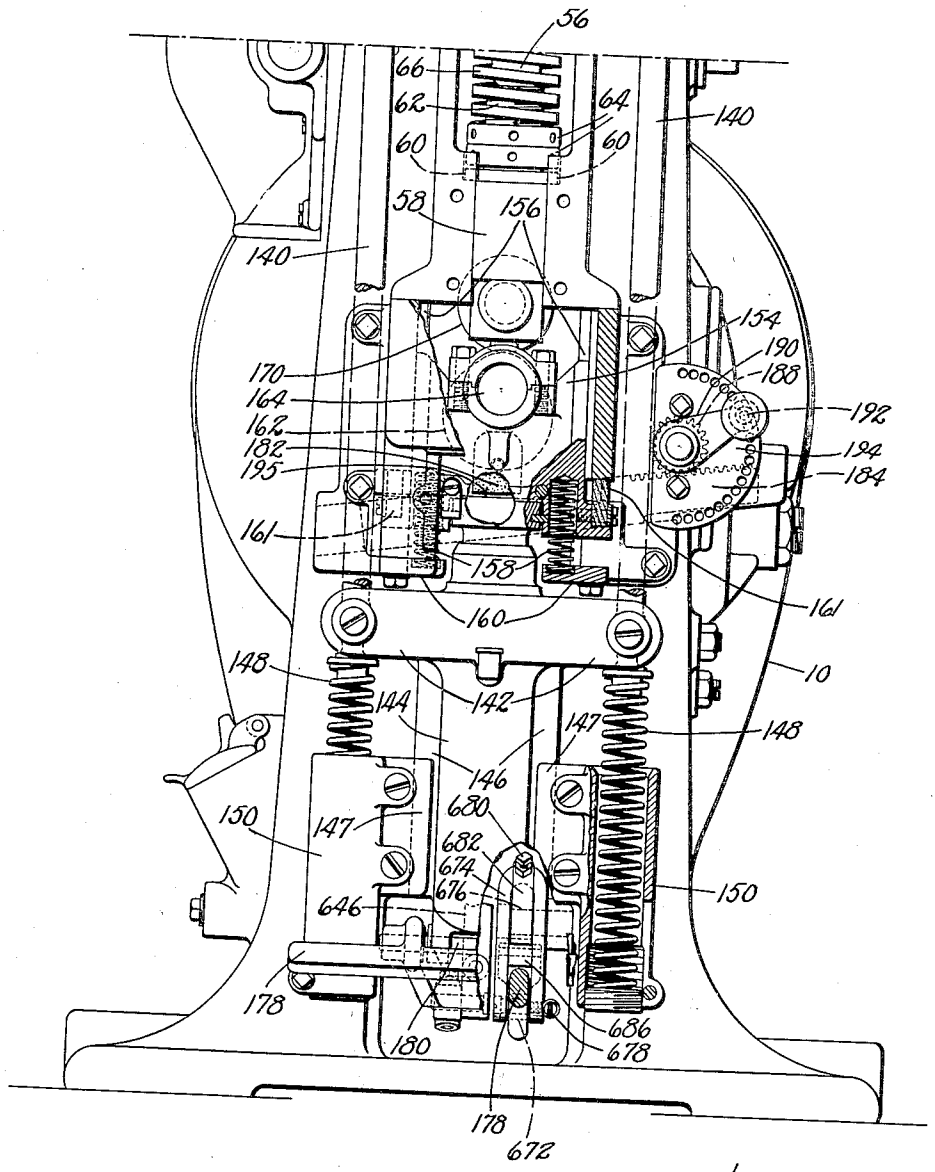
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 3

Fig. 3.



INVENTORS

John F. Standish

Lester S. Macdonald

By their Attorney

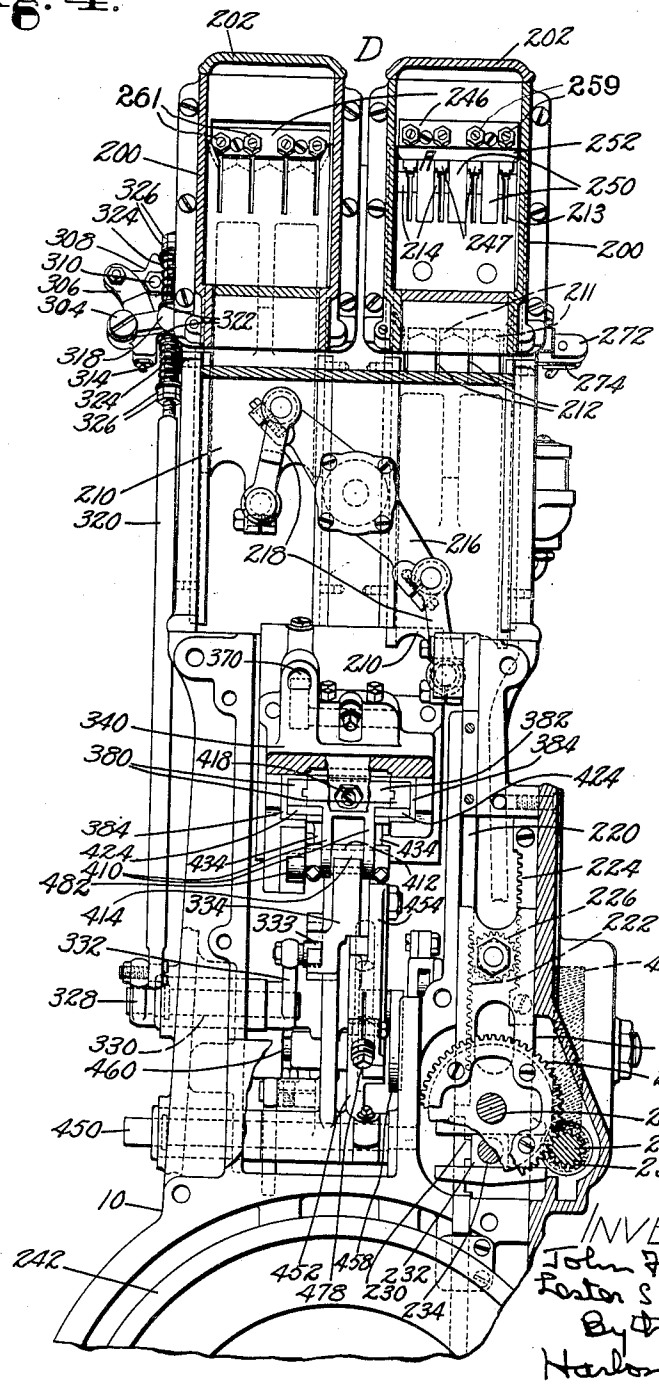
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 4

Fig. 4.



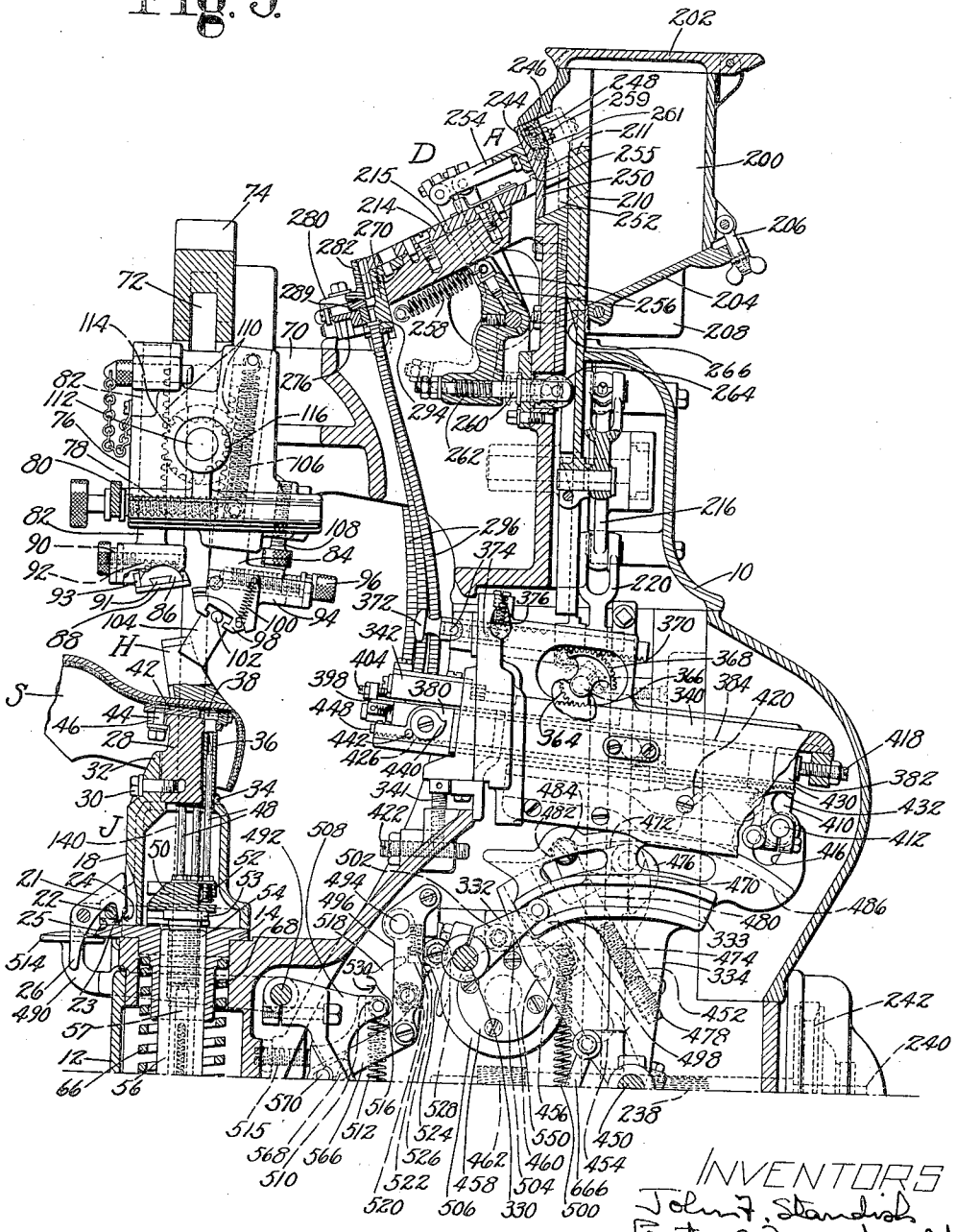
INVENTORS
John F. Standish
Foster S. Macdonald
By their Attorney
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 5

Fig. 5.



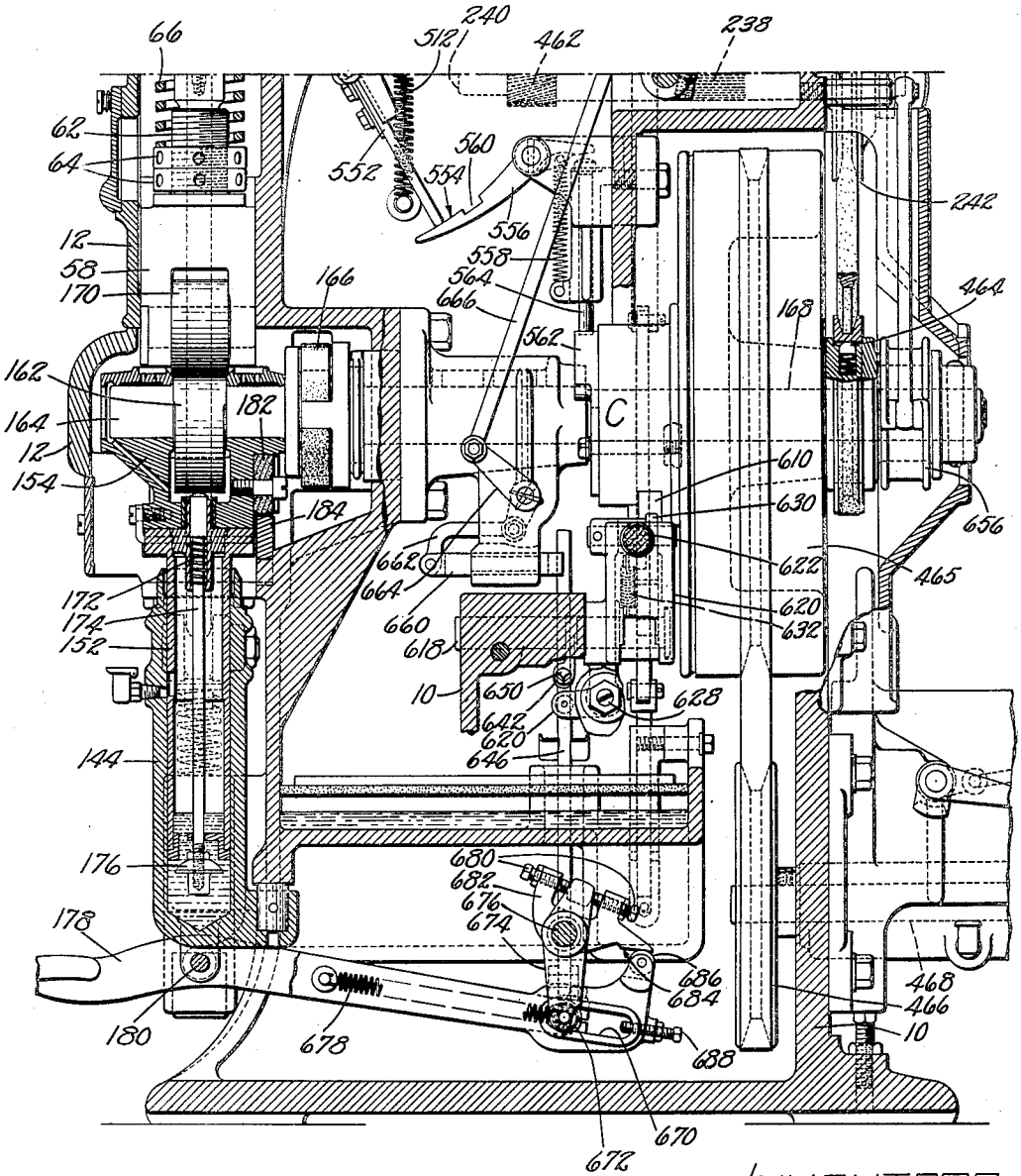
INVENTORS
John F. Standish
Foster S. Macdonald
By their Attorney
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 6

Fig. 6.



INVENTORS
John F. Standish
Foster S. Macdonald
By their Attorney
Harlow W. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 7

Fig. 9.

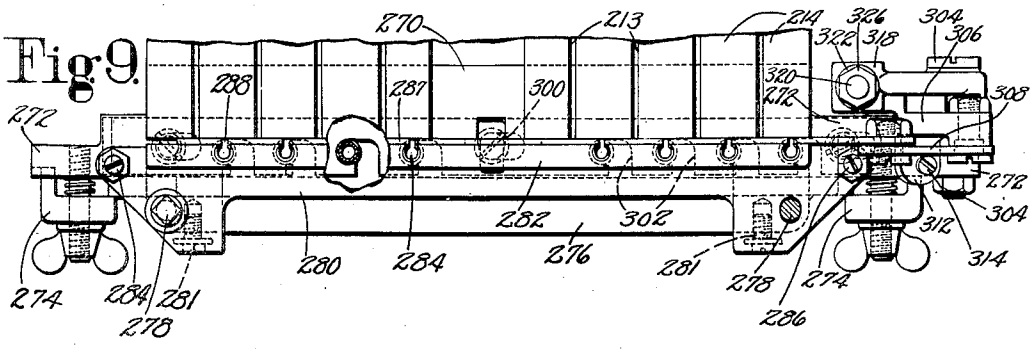


Fig. 10.

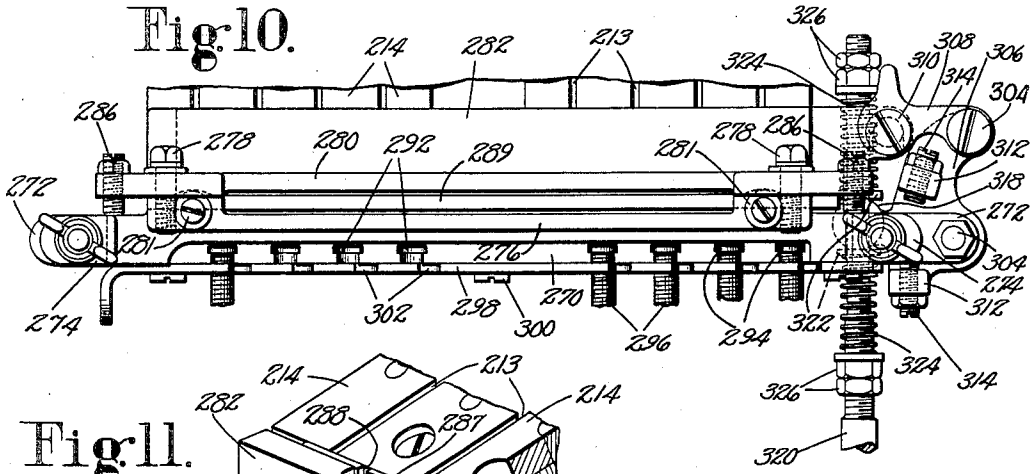


Fig. 11.

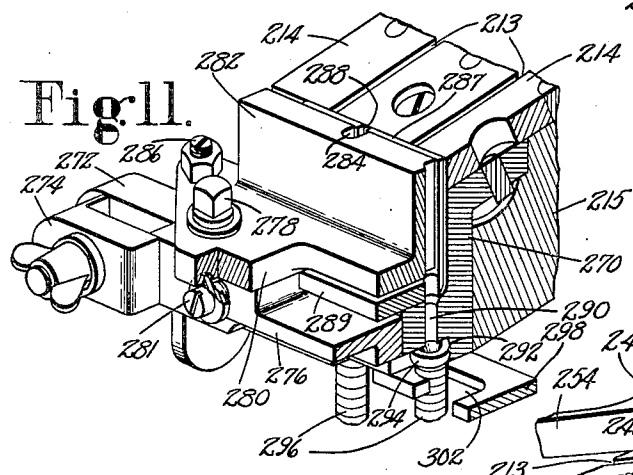
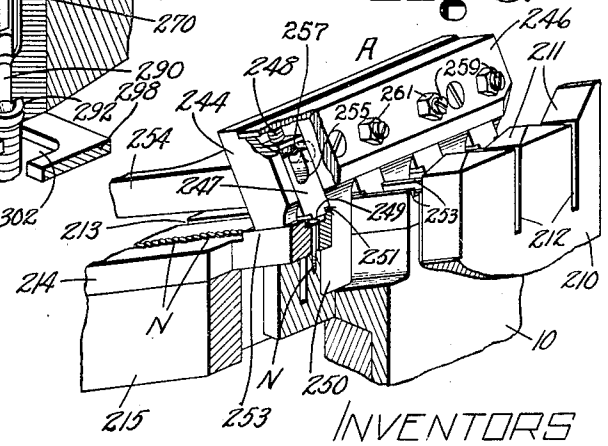


Fig. 8.



INVENTORS

John F. Standish,

Foster S. Macdonald

By their Attorney,

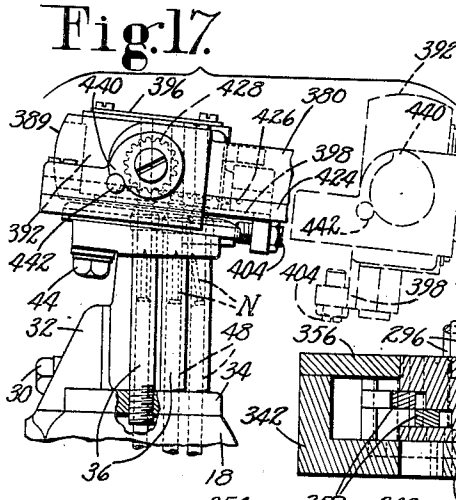
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 8

Fig. 17.



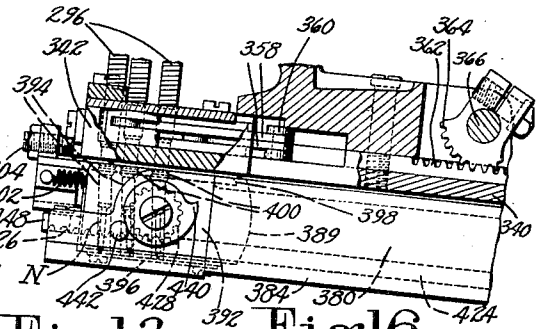


Fig. 13.

Fig. 16.

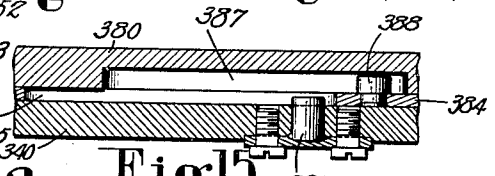


Fig. 15.

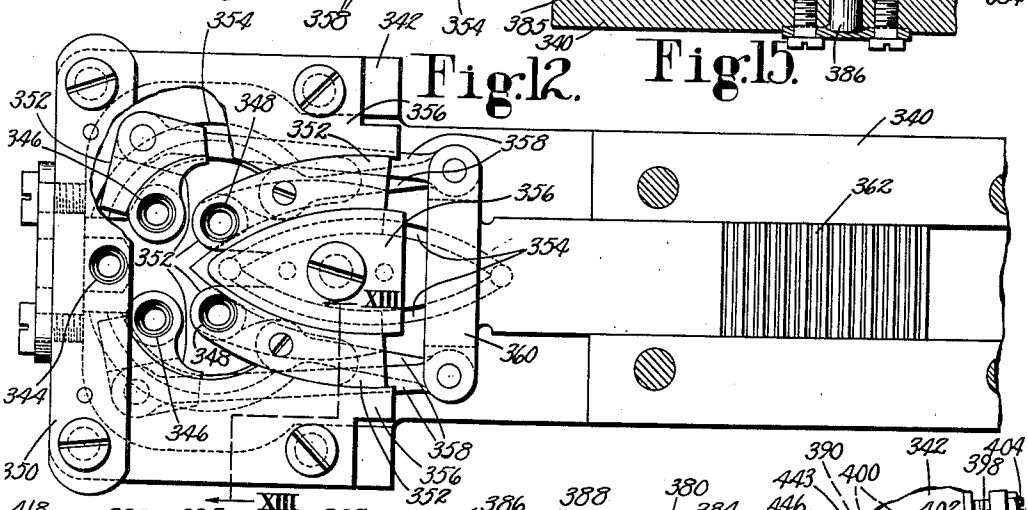


Fig. 12.

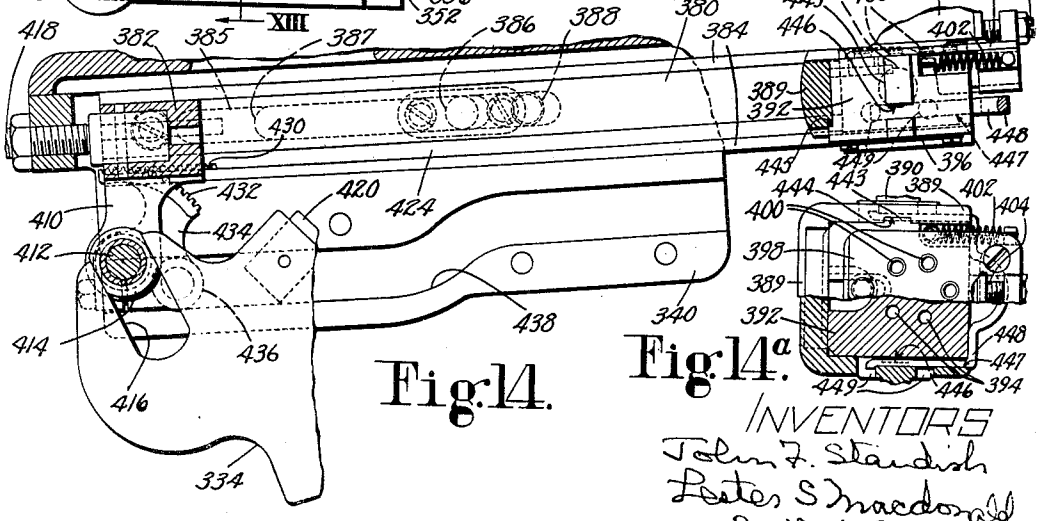


Fig. 14.

Fig. 14a.

INVENTORS

John F. Standish

Lester S. Macdonald

By their Attorney

Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 9

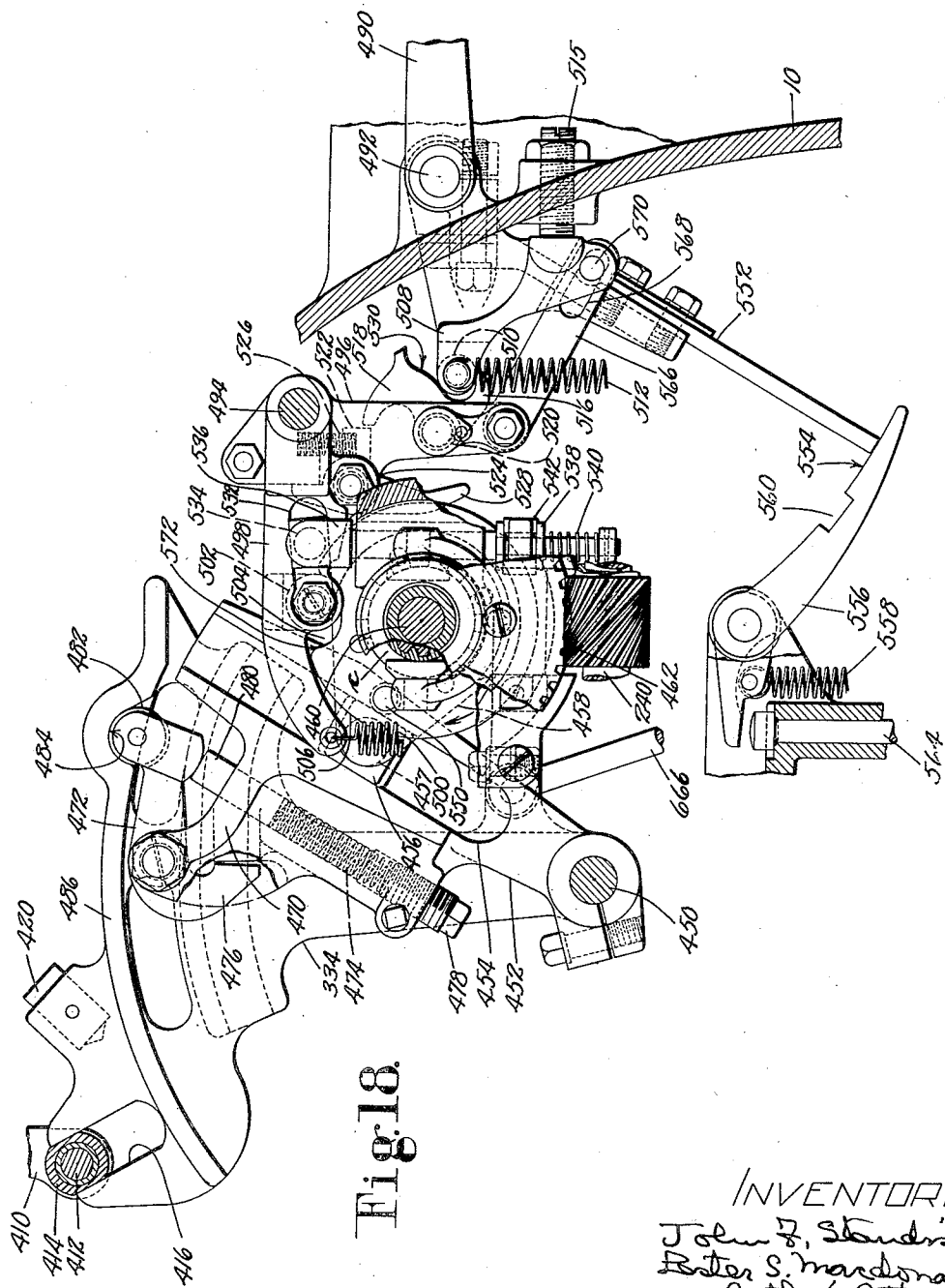


Fig. 18.

INVENTORS
John F. Standish
Foster S. Macdonald
By their Attorney
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 10

Fig. 19.

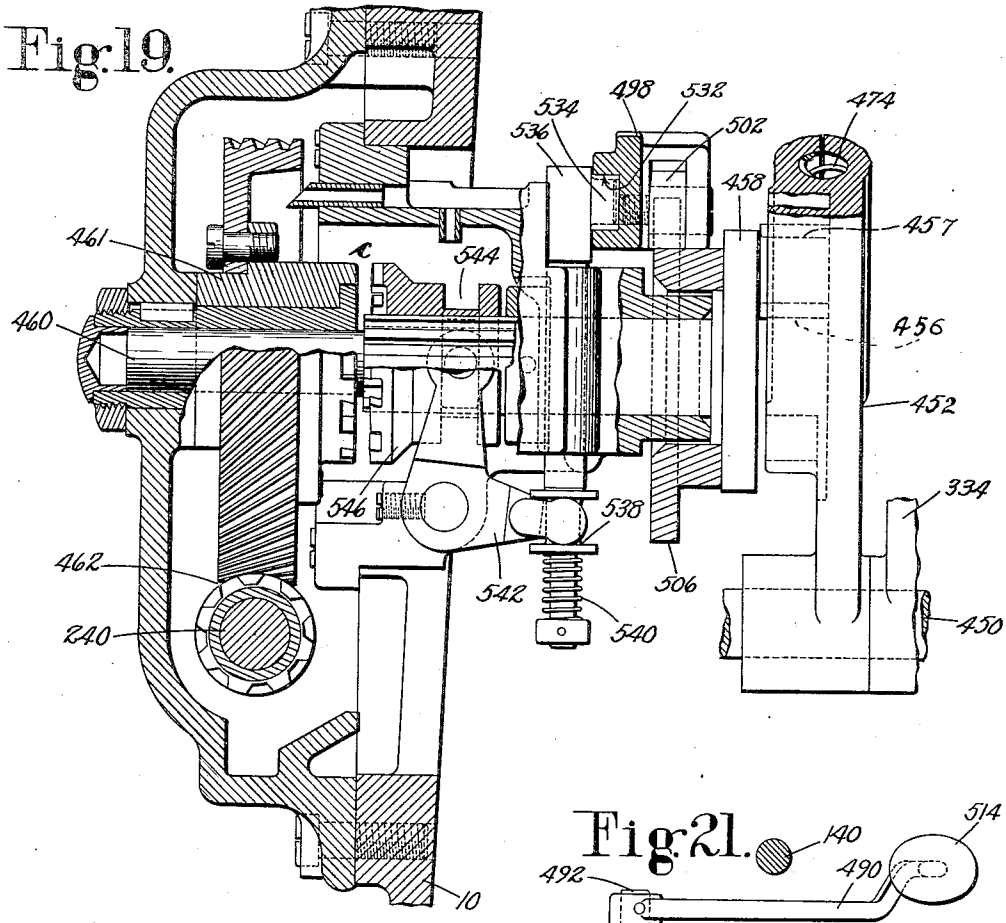


Fig. 20.

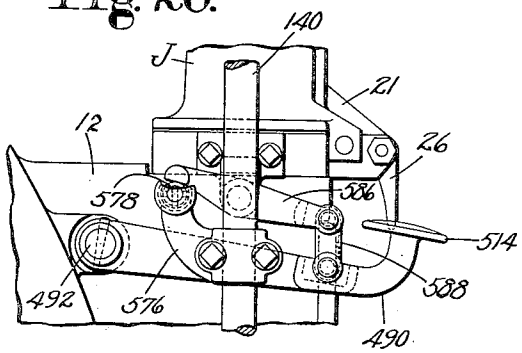
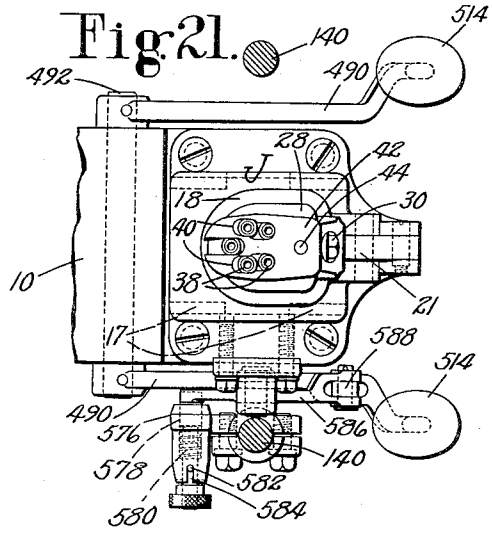


Fig. 21.



INVENTORS
John F. Standish
Boston S. Macdonald
By their Attorney
Harlow M. Davis

Nov. 7, 1939. J. F. STANDISH ET AL 2,178,615

FASTENING-INSERTING MACHINE

Filed May 28, 1937 11 Sheets-Sheet 11

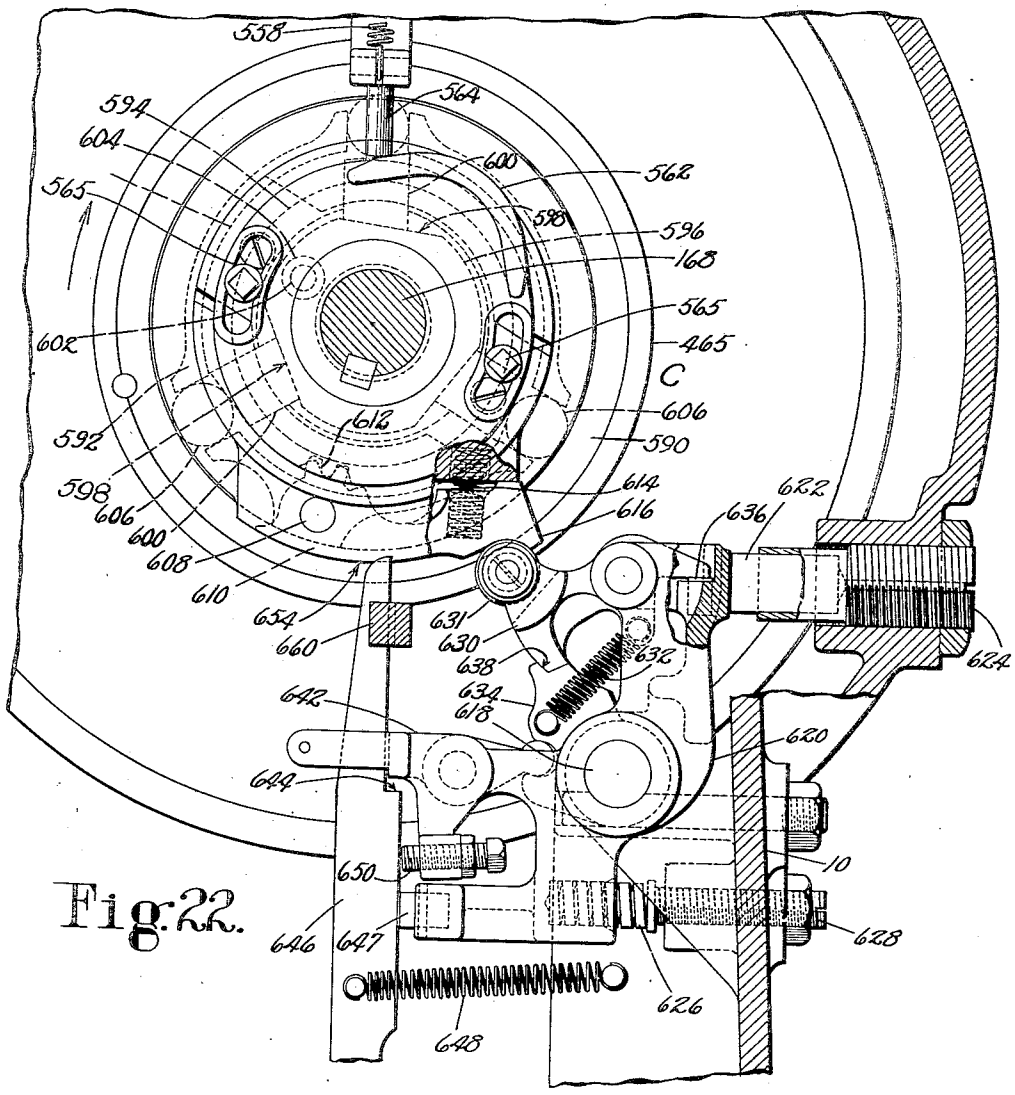


Fig. 22.

INVENTORS
John F. Standish
Lester S. Macdonald
By their Attorney
Harlow M. Davis

Patented Nov. 7, 1939 2,178,615

UNITED STATES PATENT OFFICE

2,178,615

FASTENING-INSERTING MACHINE

John F. Standish, Winthrop, and Lester S. Macdonald, Beverly, Mass., assignors to United Shoe Machinery Corporation, Borough of Flemington, N. J., a corporation of New Jersey

Application May 28, 1937, Serial No. 145,320

125 Claims. (Cl. 1—32)

This invention relates to machines by which fastenings may be applied to work to secure portions thereof to one another. It is more particularly concerned with the attachment of heels to shoes by nails driven through the heel-seats of the shoes into the heels, though it is by no means limited to an organization of this particular character.

The invention has as an object the provision of a fastening-inserting machine which is highly efficient, capable of reducing the acts required of the operator to a minimum without undue complication, which is readily adjustable at every necessary point and which is convenient to operate and maintain. In the attainment of this object, the principal features which are improved are as follows: The work-support or jack is so constructed that it is of ample strength, may be readily mounted and demounted and is securely held in place in the machine, it further having an adjustable top-plate offering equal support to the shoe in all positions. Simple and strong means supports and guides the driver- or fastening-inserting-assembly, and the drivers are individually adjustable vertically, while being maintained at a constant angle about their axes. The tread and the lateral or rear pressure members for the heel are movable one from the other through different distances to apply a greater force by one of them than by the other to the heel to be attached, and there is special retaining means for one of the heel-contacting members. The mechanism by which reaction produced by the insertion of the fastenings is transmitted to the work to clamp it for the inserting operation has been simplified and strengthened, and a plurality of stops or bumpers employed and including a novel adjustment therefor. There is improved mechanism for transferring the fastenings from distributing mechanism to the work-support, this including a novel invertible loader-block with means for separably securing the block in its holder. Actuating mechanism common to both the distributing and loading mechanisms is capable of effecting a full movement of said loading mechanism to predetermined points with minimum frictional wear and provides a safety feature if clogging occurs. The transferring or loading mechanism is controlled through an operator-actuated member by connections which guard against repeated fastening-deliveries for a single actuation of the member, and said member is locked in its fully actuated position, after completion of movement under the power of the machine, to insure delivery. The operator has the choice of manual control of the loading mechanism or its fully automatic action. To avoid operation of the inserting mechanism while the fastening-supplying mechanism is acting, the controlling means for the clutch through which the inserting mechanism is driven is made ineffective, save when the actuating mechanism for the supplying mechanism is in its normal position. That the clutch may not be tripped by the controlling treadle before the treadle-depression has placed the proper preliminary pressure upon the work, a variable resistance is established which compels the necessary treadle-movement.

That portion of the fastening-supplying mechanism by which loads of fastenings are separated from a mass thereof for transfer to the inserting mechanism and the main clutch of the machine are made the subjects of two divisional applications, both filed in the United States Patent Office on October 1, 1937 in the names of John F. Standish and Lester S. Macdonald, and bearing the respective Serial Numbers 166,862 and 166,863.

In the accompanying drawings, illustrating one of the many embodiments which this invention may assume,

Fig. 1 shows the improved machine in side elevation;

Figs. 2 and 3 are, respectively, front elevations of the upper and lower portions of the machine;

Fig. 4 is a broken rear elevation corresponding to Fig. 2;

Figs. 5 and 6 are, respectively, upper and lower vertical longitudinal sections;

Fig. 7, a perspective view of the lower part of the jack, portions of the driver-assembly and of the mounting of the jack, the last containing the driver-actuating plunger, these elements being separated to the positions which they would assume when the jack and driver-assembly are applied to the machine;

Fig. 8 is a broken perspective illustrating the raceway-clearing means;

Fig. 9, a top plan view of the nail-separating mechanism associated with the raceway;

Fig. 10, a front elevation thereof;

Fig. 11, a broken perspective view of one extremity of the separating mechanism;

Fig. 12, a top plan view of the foot-plate and a portion of its adjusting means;

Fig. 13, a vertical sectional detail on the line XIII—XIII of Fig. 12;

Fig. 14, a broken side elevation of the loading mechanism;

Fig. 14a, a broken top plan view of the loader-block, especially bringing out its retaining means;

Fig. 15, a partial longitudinal horizontal section through the loader-slides;

Fig. 16, a detail in broken side elevation, showing the loading mechanism in co-operation with the foot-plate;

Fig. 17, a similar view of said mechanism in cooperation with the jack and including an intermediate position of the loader-block;

Fig. 18, an enlarged view in broken side elevation of the actuating means for the nail-supplying mechanism;

Fig. 19, a partial horizontal section through such actuating means;

Fig. 20, a detail in side elevation of the lever through which the nail-supplying mechanism is controlled by the operator, together with the more closely associated elements;

Fig. 21, a horizontal sectional detail taken just above the jack, and

Fig. 22, a view of the clutch through which the nailing mechanism is operated, this being partly in side elevation and partly in section.

Jack and its mounting

From the front of a frame-column **10** (Figs. 1 and 5) projects a bracket **12** through which is a vertical passage. Upon the top of the bracket rests a supporting and guiding cap **14** having a portion extending down into the passage. At opposite sides of the cap are horizontal ways **15**, **16** receiving projections **17** from a base **18** of a jack J (Fig. 7). The tops of the ways have openings at **19**, and the projections upon the jack-base are so divided that an opposite pair of these may be introduced into the spaces to facilitate the application of the base to the cap. With the base thus introduced, flanges **20**, **20** rest upon the upper surface of the cap. When drawn forward, the jack is retained in place by a latch **21** pivoted upon the cap and engaging a horizontal pin **22** fixed in the base. The surface **23** of the latch which bears against the pin is inclined downwardly and rearwardly, having a tendency to draw the jack firmly against a vertical stop-surface **25** on the cap **14**. The latch is automatically raised for locking engagement with the base by contact of the pin **22** with an inclined latch-surface **24**. A depending tail **26** facilitates the lifting of the latch to release the jack for removal. The base **18** is preferably a hollow casting with an opening at the upper end and upon which rests the body **28** of the jack. This body may consist of a steel forging secured by a screw **30** to an upward extension **32** from the front of the base. The jack-body has extending outwardly from its lower portion a horizontal flange **34**, in which are threaded openings to receive the threaded ends of driver-tubes **36**, here shown as five in number. A plurality of these jack-bodies may be provided, each with its tubes arranged according to a different nailing design. The upper extremities of the tubes have the usual enlargements **38** for engagement with the insole of a shoe being operated upon. These enlargements project into substantially parallel slots **40** (Fig. 21) elongated from front to rear of the machine and formed in a downwardly and rearwardly inclined top-plate **42** of the jack. The plate is shown as secured upon the jack-body by a screw **44** threaded into it and passing through a slot in a forward projection **46** from the body, the screw-head engaging the under side of the projection. As the heels to be attached vary in pitch, the plate **42** may be secured in different positions fore and aft to correspondingly locate the nailings with respect to the rear of the shoes. It will be observed that full support is maintained over the heel-seat by this adjustment, a condition which does not obtain when an adjusting member is employed to shift the work over a stationary jack-top.

Driver-assembly

Movable in the tubes **36** is a set of nail-drivers **48** rising from a plate **50**. The upper ends of the drivers are preferably inclined downwardly and inwardly (Fig. 17) to cause an inward inclination of the nails, so these may be driven away from the heel-wall. To obtain an individual adjustment of the drivers to position their ends at the desired height with respect to the upper ends of the tubes **36**, they may be threaded into sleeves **52**, which are oppositely threaded into the plate **50**. By holding each driver and rotating the sleeve by a wrench applied to its hexagonal lower extremity, the vertical position of said driver may be varied by these right and left threads by as small an amount as may be desired, without changing the relation of its inclined end about the vertical axis. Thus adjusted, it may be clamped in position by a nut **49** carried by the driver-thread above and contacting with the plate **50**. When the jack J containing the gang of drivers **48** is applied to the frame-bracket **12**, slots **51** at the opposite sides of the driver-plate receive a head or enlargement **53** on a screw **54**, which furnishes the vertically adjustable upper portion of a plunger **56** reciprocating in the vertical passage of the frame-bracket **12**. By turning this screw, the relation of the upper ends of the entire gang of drivers to the jack-top may be altered to properly sink the heads of the nails in the insole of the shoe. The screw may be retained as adjusted by a spring latch-pin **57** movable in a bore in the plunger and engaging some one of a series of depressions in the lower end of the screw. The upper portion of the plunger is cylindrical and is guided in a bore in the cap **14**, while the lower squared portion **58** moves in ways in the frame-bracket. This lower portion of the plunger is shouldered at **60** and normally rests on the frame (Fig. 3). Above the portion **58**, the plunger is threaded at **62** to receive a nut and lock-nut **64**, between which and the cap **14** is interposed a compression-spring **66**. A skirt **68** depending from the cap **14** furnishes a portion of the plunger-guide, and extending within the spring holds this out of contact with the movable plunger. The spring acts upon the plunger to maintain the drivers normally lowered in the jack-tubes **36**. By varying the position of the nuts **64** upon the plunger-portion **62**, the depressing force of the spring may be adjusted.

Pressure-head

Projecting from the upper portion of the frame **10** above the jack is a divided arm **70** (Figs. 1 and 5) provided at each side of its outer extremity with a vertical rib **72** to guide a pressure-head **74** of inverted U shape (Fig. 2), acting upon a heel to be attached to clamp this upon the heel-seat of a shoe supported upon the jack J. Movable horizontally in the head is a carrier **76** adjustable from front to rear of the machine by a screw **78** having threaded engagement with the carrier and turning in the head and in a bar **80** secured separably across the arms of the U. In

the carrier is mounted a tread-slide 82 and a rear or lateral slide 84. Upon the lower end of the slide 82 is an abutment-block 86 furnishing a holder for a receptacle plate 88 for engagement with the tread-surface of a heel upon a jacked shoe. The block is mounted in segmental ways upon the slide and may be adjusted in a plane extending from front to rear of the machine by a nut 90 rotatable at the end of the slide 82 and having threaded engagement with a projection from a rack 92 meshing with a gear-segment on the block. It may be desirable to change the plate 88 for others of different thicknesses or contact-areas when the dimensions of the heels to be attached vary. To facilitate this, the plate and block are joined for ready separation by a dovetail-connection 91, while from the front of the plate a projection 93 extends upwardly into a space in the slide 82. During the angular adjustment of the block between its normal limits, the projection remains in the space, and displacement of the plate upon the block is prevented. But, by a sufficient inclination of the block downwardly and forwardly, the projection may be fully withdrawn from the space. This allows the plate to be slipped from its mounting and another substituted, the use of threaded or other clamping means being avoided. The main rear slide 84 is preferably inclined downwardly and outwardly and has movable upon it from front to rear a secondary slide 94 adjustable in this direction by a screw 96 rotatable in the main slide and threaded into the secondary slide. Mounted upon the secondary slide to tilt in the direction of its plane of movement of translation is a segment-block 98, which is yieldably held in its upward and forward extreme of movement by a tension-spring 100 joining it to the slide 94. Variable in position toward and from each other in horizontal ways in the segment-block by a right and left screw 102 are padded contact members 104, 104, forming a fork for contact with the rear of the heel. Such an arrangement of tread and rear abutment members may be adjusted accurately to clamp effectively upon jacked shoes heels of all forms.

The slides 82 and 84 have rack-teeth 110 and are compelled to move together in opposite directions by intermediate gearing carried by the head 74. It has been customary to bias the two slides by a spring, such as is shown at 106, acting to raise normally the rear slide in the head to an extent depending upon an adjustable stop-screw 108, this effect being transmitted to the tread-slide through the gearing. That is, in the descent of the head the tread-slide is held against depression by contact of its abutment with the heel, then as the downward clamping travel of the head 74 continues, the rear slide is lowered until its fork contacts with the heel. Upon further descent of the head, the rear and tread-abutments exert equal balanced forces to hold the heel against displacement. It may, however, be desirable to apply unequal pressures. For example, a slender heel might be crushed and its covering deformed were the force applied to the tread as great as that upon the rear. To overcome such difficulties, the racks of the slides 82 and 84 are herein shown as connected by differential gearing which may cause the abutments to travel through different distances and therefore the application by them of unequal forces. In the present instance, a greater pressure is to be exerted upon the rear of the heel. For this purpose, there is shown as journaled in the head a short shaft 112, upon which are fast two gear-segments, one, 114, meshing with the rack of the slide 82, and the other, 116, of less radius, engaging the rack of the slide 84. When the plate 88 contacts with the tread of a heel to be attached, it exerts through the respective long and short lever-arms, furnished by the two segments, a pressure upon the rear of the heel by the fork 104 greater than that exerted upon the tread. By the proper choice of radii for the segments, the differential may be of the correct magnitude, or it may be reversed to apply the greater force to the tread-surface.

Interconnection of the nail-driving mechanism and pressure-head

The pressure-head 74 and the driver-plunger 56, 58 are interconnected, so the reaction produced by the resistance which the plunger encounters during the driving of the nails into the work is transmitted to the head to force the abutments 88 and 104 against the heel being attached to clamp it in place upon the shoe. Generally, the arrangement is as in Letters Patent of the United States No. 2,033,158, Standish, March 10, 1936, so this portion of the invention will be but briefly described. Depending from opposite sides of the head 74 (Figs. 2 and 3) are rods 140, 140, which, at their lower extremities, are joined to lateral extensions 142 from a cylinder 144 having longitudinal projections 146 guided at their edges against shoulders formed on the frame and beneath gibs 147 secured to said frame. Compression-springs 148 at opposite sides of the cylinder are interposed between the extensions and supporting sockets 150, preferably formed integrally with the gibs, the springs holding the cylinder, rods and head normally elevated, with the heel-clamping members spaced to the maximum extent from the jack. In the cylinder is movable a tubular piston 152 (Fig. 6) secured to the under-side of a bearing-block 154 guided at 156 for vertical movement in the frame. The block is normally raised by springs 158 seated in bores in its under side and resting upon brackets 160 attached to the frame, bumpers 161, 161 absorbing the shock at the termination of its upward travel. Rotatable in the block is a cam 162, the shaft 164 of which is joined by an Oldham coupling 166 to the main driving shaft 168 of the machine. Upon the top of the cam rests a roll 170 rotatable upon the portion 58 of the driver-plunger. Against the bottom of the cam is forced by a spring 172 the head of a rod 174 guided in the block and piston and carrying a valve 176, which, when released by the cam, will close the passage through the piston. When the machine operates, the cam makes a complete turn. It first allows the spring 172 to raise the valve 176 and close the piston-passage. It then, by its action upon the roll 170, raises the drivers 48 to insert in the work the nails which they carry. The resistance which this action offers, together with that of the spring 66 to compression and the weight of the parts elevated, minus the lifting effect of the springs 148 and 158, produces a reaction, lowering the cam and bearing-block, and this motion is communicated through the rods 140 to the head 74 to exert a clamping effect upon the jacked work. Since that portion of the reactive effect coming from the spring 66 and the movable parts upon which it acts is immediately felt, this pressure is applied before the insertion of the nails begins. For this reason, there is a substantial initial clamping action, and because the resistance of

the spring is adjustable by the nuts 64, this may be varied as desired. The preliminary lowering of the head, until the abutment members 88 and 104 contact with the work, and the starting of the power-cycle of the machine is caused by depression of a treadle 178 fulcrumed at the bottom of the frame and connected to the cylinder 144 at 180. The action of the treadle will be described later in connection with the driving mechanism. To avoid an overthrow of the block 154 by the cam, with resulting excessive pressure upon the work, said block has secured to it a bumper 182 for contact with a stop-plate 184 carried by the frame of the machine. To permit the extent of movement of the block to be correctly determined, the plate 184 may be movable in inclined ways transversely of the machine by a pinion 188 meshing with rack-teeth upon the plate (Fig. 3). The pinion is rotatable by the operator through an arm 190, said arm carrying a spring latch-pin 192, which, by engagement with some one of a series of index openings arranged in an arc in a retaining plate 194 attached to the frame of the machine, holds the arm, pinion and plate in their adjusted positions. The edge-portion 195 of the plate engaged by the bumper is horizontal and is raised or lowered by the movement of said plate.

Nail-supply in the distributor

The nails or other fastenings to be driven from the jack into the supported work may be of different characters. The illustrated machine has a distributing mechanism D arranged for the delivery of two kinds of nails. Mounted side by side at the top of the frame 10 are two nail-pots or receptacles 200, 200 (Figs. 1, 2, 4 and 5), which may be generally the same. Each has a hinged cover 202 for the top and a hinged, downwardly and forwardly inclined bottom 204, the latter being held normally closed by swinging bolts 206. The bottom closure may be lowered between opposite side walls 208, 208, then furnishing a downwardly and rearwardly inclined chute over which the receptacle may be emptied when the nails are changed. Guided to reciprocate vertically in each receptacle, between the front wall and the hinge of the bottom 204 and receiving nails from said bottom when raised, is an elevating slide 210 operating through the thus-formed space. At the top of each slide is a series of V-shaped depressions 211 continued by downwardly extending slots 212. These are adapted to lift successively nails from the mass in the receptacle to points just above raceway-slots 213 formed between the edges of spaced, downwardly inclined plates 214 attached to a bed-piece 215. The slots receive the shanks of the nails with the heads resting upon the plates, so said nails are conducted under the influence of gravity to be delivered in groups or loads at the end of the raceway. Eight of the nail-conducting slots are illustrated in Fig. 2, and those from which delivery is not to be made are blocked by positioning across them hooks 217 pivoted upon the upper faces of the plates 214.

To divide the burden of lifting the nails from the receptacles, the slides 210 are preferably operated alternately. Fulcrumed at the rear of the frame is an equal-armed lever 216 having the ends of its arms connected to the respective slides by links 218. One of these links is also pivoted to the upper extremity of a slide 220 guided for vertical reciprocation in the frame. A rack 222 is formed upon the slide, and spaced from it, fast upon the frame, is an opposite rack 224. Between and meshing with the two racks is a pinion 226 rotatable upon a vertically movable actuating slide 228. Upon the last-mentioned slide is a horizontal guideway 230 in which travels a block 232 carried by a crank-pin 234 projecting from one side of a gear 236 upon a short shaft 237 journaled at the rear of the frame. The gear is driven continuously during the operation of the machine through a pinion 238 fast upon a horizontal shaft 240, which is, in turn, rotated through belt-gearing 242 from a constantly driven pulley on the main shaft 168 (Fig. 6). As the pinion 226 travels up and down under the influence of the slide 228, it is compelled to turn about its axis by its engagement with the stationary rack 224 and, because of its engagement with the rack 222, carries the slide 220 with it, oscillating the lever 216. This raises one of the nail-elevators 210 and simultaneously lowers the other to make alternate delivery from the two receptacles to the corresponding raceways.

Raceway-clearers

Instead of the nails being received from the elevators by the raceway-slots, they may pass upon the plates 214 and lie across the slots 213, blocking them. To remove these nails and return them to the receptacles, there rests upon the upper extremity of each raceway a reciprocatory clearer A (Figs. 4, 5 and 8). This clearer has two portions. One of these consists of a bar 244 extending across the upper surface of the raceway and having movable in vertical ways at its rear face beneath a cover-plate 246 a series of slides 247 operating over the respective raceway-slots and each yieldable against a spring 248 interposed between it and an angular extension of the cover-plate. The operating end of each slide has at its center a projection 249, at each side of which is a shoulder 251. The shoulders travel just above the tops of walls 253, 253 extending along the raceway-plates 214 and rising sufficiently above the upper surfaces of said plates that the projections 249, as they enter between the walls, shall still clear the heads of the nails N hanging in the slots. The walls are at least as long as the distance of travel of the clearer A. Through a longitudinal slot 255 in each slide extends an eccentric end-portion 257 of a screw 259 threaded through the cover-plate 246. A lock-nut 261 retains the screw against accidental rotation. The eccentric end 257 serves as a stop for the slide under the influence of the spring 248, and by turning the screw 259, the height of the projection 249 may be adjusted to make sure that it will not engage the hanging nails. The other portion of each clearer has spaced fingers 250 depending from the bar and movable through spaces between the raceway-plates 214 into openings in the front wall of the nail-receptacle. These fingers rest at their lower ends upon the frame to support the bar, determining its path parallel to the nail-supporting surface of the raceway, and are adapted to sweep back into the receptacle nails which may be displaced from the raceway by the slides 247 to fall into pockets 252 in the raceway-wall. Each clearer-bar is attached at each end to an arm 254 pivoted on the upper end of a lever 256 fulcrumed beneath the raceway. The clearer is urged normally forward by a spring 258 uniting the lever to the frame. The lower arm of each lever has a horizontal extension in which a plunger 260 is yieldable against a spring 262. A

roll 264 upon the plunger receives contact of a cam-projection 266 from the forward side of the corresponding elevating slide 210. This contact occurs while the slide is descending and is below the upper raceway-surface. It causes the lever to be turned clockwise (Fig. 5) to move the clearer in and remove accumulated nails from the top of the raceway and from the pockets 252, returning them to the receptacle. If clogging occurs, compression of the spring 262 by the plunger allows the lever to remain stationary and prevents breakage. Because the heads of the nails in the slots are below the upper edges of the walls 253, the crossed nails lying upon these walls are supported clear of the heads, and when swept back into the receptacles by the shoulders 251 of the clearers, these will not engage and carry with them the hanging nails. The projections 249 of the clearers extend sufficiently below the shanks of the crossed nails that continued engagement with them is insured, and there is no possibility that the slides 247 will yield against their springs and jump over the nails. If, however, nails become wedged so positively that a slide might be broken instead of effecting the clearing, it will yield against its spring 248 and thus avoid injury.

Separation of groups or loads of nails

From the series of nails hanging in the raceway-slots, successive loads are picked off. To the forward extremity of the bed-plate 215 of each distributor-section, a supporting member 270 is attached, this having at its ends projections 272, 272 (Figs. 9, 10 and 11). Secured to these projections by clips 274, which render removal easy, is a secondary supporting member 276, upon which rests and is secured by screws 278 end-projections from the horizontal portion 280 of a substantially vertical wall 282 spaced from the ends of the two raceways. To allow the spacing of the wall to be adjusted, the screws 278 pass through slots in the portion 280, and screws 281 threaded into the support 276 have flanges turning in slots in the under side of said portion 280. By the screws 281, the wall may be positioned accurately, while the screws 278, when tightened, secure it in place. By this means, the mechanism may be arranged to act effectively upon nails having shanks differing in diameter. Extending for the full height of the inner face of the wall 282 is a depression 284 situated between each pair of raceway-slots 213 and spaced similarly thereto. These depressions have sufficient transverse area to pass the heads of the nails to be delivered. Screws 286 threaded through the extensions of the wall-portion 280 and contacting with the primary support, facilitate the proper positioning of the upper edge of the wall 282 and therefore the tops of the depressions 284. This adapts the mechanism to best act upon nails the heads of which are of different thickness, considered longitudinally of the shanks. Between the end of the raceway and the wall 282, a nail-separating plate 287 is movable, it being provided with a horizontal portion 289 resting upon the primary support 276 and guided at its outer edge by a surface upon the secondary support 276. In the separating plate 287 are vertical slots 288, one for each depression 284 and correspondingly spaced. These slots are large enough transversely to admit the shank of a nail while retaining the head upon the upper edge of the plate. When the plate-slots are carried from registration with the raceway-slots into registration with the wall-depressions, a nail at the end of the series in each raceway-slot which has entered the plate-slot and is held by its head with the shank resting against the wall 282, will be received by the depression, falling through it and through the opening which terminates the depression in the portion 280. Alined with this opening is a passage 290 through the support 270, this being of a diameter sufficient to freely pass the nail-heads. About its lower end is a recess 292, opening through the front of the support to receive an annular flange 294 upon the upper extremity of a flexible nail-conducting tube 296. The entire set of tubes is releasably locked in place by a sliding plate 298 carried at the under side of the support 270 by slot-and-screw connections 300. This plate has angular openings 302, one for each tube, which, in one position, will admit the tubes to the recesses 292 and then, when moved longitudinally, will be forced against said tubes beneath the flanges to secure them in place. In each raceway-slot 213, a series of nails will hang with the heads overlapping the edges of the plates 214, and the forward nail in the slot 288 of the separating plate 287, it being held against advance by the unbroken portion of the wall 282. Upon moving the plate 287 longitudinally to bring its slots into registration with the wall-depressions 284, an entire load of nails, one from each open raceway-slot, will enter the depressions and be delivered through the passages 290 and the tubes 296. The remainder of the series in the raceway-slots will be cut off from delivery until return of the plate 287 to its normal position. It should be noted that by releasing the secondary support 276 from its clips 274, all the nail-separating elements 280, 282, 287 and 289 may be removed with it as a unit, together with the adjusting means 278, 281 and 286. This gives free access to the ends of the raceways and to the separating means.

To effect the reciprocation of the separating plate 287, there is fulcrumed at 304 on one of the support-extensions 272, a lever 306, upon an upwardly extending arm of which a connecting link 308 is pivoted. A hook extending from the inner end of this link may be swung into and out of engagement with a stud 310 upon the separating plate. Said plate may thus be freed readily from its actuating connections for removal or to stop its operation. The lever 306 has projecting forwardly from it spaced lugs 312, 312 through which screws 314, 314 are threaded, they extending toward each other and being respectively movable into contact with upper and lower edges of the adjacent support-projection. The lever 306 also has a horizontally extending arm provided with a rounded inner end 318 through which passes a vertical actuating rod 320. About the rod and engaging opposite sides of the lever-end 318 are short, flanged sleeves 322, 322, which are urged toward each other against the lever-end by helical springs 324, 324. The springs surround the rod and at the outer extremities abut against pairs of nuts and lock-nuts 326, 326 threaded upon the rod. This rod 320 is reciprocated once for each nail-delivery by connection to an arm 328 fixed upon the outer end of a spindle 330 turning at one side of the frame (Fig. 1). The spindle has upon its inner extremity an arm 332, upon which is a roll lying in a cam-groove 333 in a lever 334 (Fig. 5) forming a part of the actuating mechanism of the nail-supplying means and which is oscillated as will later appear. The oscillation of the lever reciprocates the rod 320 and, through the springs 324, yieldably rocks the

lever 306. This, in turn, reciprocates the separating plate 287 to an extent allowed by the engagement of the ends of the screws 314 with the edges of the support at 272 to pick off loads of nails, as has already been described. The interposition of the springs in the connections prevents injury to the mechanism if clogging occurs, and adjustment of the screws 314 determines the extent of movement of the separating plate in each direction.

Foot-plate

Mounted within the frame 10 is a casing 340 inclined downwardly and rearwardly from the front of the machine and located behind the jack J (Fig. 5). Support of the forward end of this casing upon screws 341 threaded into the frame assists in adjusting the height of the casing and the path of the loading mechanism which it carries with respect to the top of the jack. At the upper, forward portion of the casing is supported a foot-plate 342, at which the nail-tubes 296 terminate (Fig. 16). The lower extremities of the tubes are received by passages 344, 346 and 348 (Fig. 12). The passage 344 for the nail at the rear of the heel to be attached is in a crossbar 350 secured to the plate, while the other four passages are arranged movably in pairs in blocks 352, each pair of blocks having curved flanges 353 (Fig. 13) traveling in guideways 354 curved outwardly from each other in the plate 342, the breast-blocks being further guided by curved openings in a sectional cover-plate 356. The contour and extent of these guideways is such that as the blocks are shifted along them, the delivery-ends of the nail-tubes may be caused to assume positions corresponding to all the nailing designs which are to be employed. Each block is joined by a link 358 to the transversely extended end 360 of an actuating rack 362 guided in the upper portion of the casing 340. The pairs of links for the forward and rear blocks lie in planes one above the other. To move the rack, there meshes with it a gear-segment 364 fast upon a short shaft 366 journaled across the casing, and extending from the opposite side of the shaft is a segment 368 having a greater radius than the segment 364. The segment 368 meshes with a rack 370 arranged to slide at the top of the casing and actuated by a finger-piece 372. One side of the rack 370 may bear a series of designations 374 corresponding to different nailing designs. A spring-pressed pin 376 engaging any one of a series of depressions at the upper edge of the rack 370 fixes both racks in the proper positions to give a chosen arrangement when the corresponding designation is in sight just at the front of the casing. The differential-gearing 364, 368 reduces the distance through which the operator-actuated rack 370 must be moved to obtain the necessary travel of the rack 362 joined to the blocks.

Loader-block and its mounting

From the foot-plate 342 to the jack J, the nails are transferred by reciprocatory loader mechanism (Figs. 4, 5 and 14 to 17). In the casing 340 is mounted a main carrier-slide having spaced side-pieces 380, 380, united at their rear extremities by a crossbar 382. This slide is movable telescopically within two channel-shaped auxiliary carrier-slides 384, 384 guided at opposite sides of the casing. Into longitudinal slots 385 in the auxiliary slides project pins 386 (Fig. 15) fixed on the casing, while into longitudinal slots 387 in the opposite sides of the main slide extend pins 388 from the auxiliary slides. Carried by a frame 389 trunnioned at 390 at the forward extremity of the main slide is an invertible loader-block 392, in which are nail-receiving passages 394, arranged according to the particular nailing design which is in use and closed at one side by a plate 396. Upon the opposite face of the block a nail-retaining shutter 398 is guided, it having openings 400 which correspond to the block-passages but are held normally out of alinement therewith by tension-springs 402 joining the shutter to the block. An outward projection from the shutter has a screw 404 threaded through it and which, in the reciprocation of the slide 380, contacts either with the foot-plate 342 or with the jack J to open the shutter against the force of the springs. In the first instance, it admits nails from the tubes 296 and the foot-plate-passages, and in the second, it frees the contained nails for deposit in the jack-tubes 36.

The loader-slide and loader-block are actuated in the following manner. Depending from the bar 382 of the main slide are short arms 410 spaced from each other, and in these a horizontal spindle 412 is mounted to rotate. About this spindle, between the arms, turns a block 414 lying in a slot 416 opening through the top and at one side of the lever 334. As this lever is oscillated, the slide 380 is reciprocated between its extreme positions through the action of the slot. The rearward limit is fixed adjustably by contact of the end of the slide with a screw 418 threaded through the casing 340, while the forward limit is similarly determined by engagement of a bumper 420 upon the lever 334 with a screw 422 threaded in the frame. Starting from its rearward position, the main slide moves out through the auxiliary slides 384, the latter remaining at rest until the rear extremities of the slots 387 strike the pins 388, when the slides travel together to the extent permitted by the pins 386. By this telescopic arrangement, the loader-block receives proper support for its full advance between the foot-plate and the jack without requiring excessive extension at the rear of the frame. Between the slides 380 and 384, bars 424 are movable. At the ends of the bars, below the loader-block 392, are rack-teeth 426 meshing with pinions 428 fixed upon the trunnions 390. At the opposite or rear extremities, the bars are provided with rack-teeth 430 meshing with gear-segments 432 upon levers 434 secured to the spindle 412. A roll 436 upon a depending arm of each lever operates in a cam-groove 438 at one side of the casing 340. The cam-groove is so formed that during the passage of the loader-block between the foot-plate and the jack, and the reverse, the levers 434 turn said block in opposite directions through 180° about an axis intersecting the plane of its transferring travel. As a result of this, the block, with the shutter 398 held open by contact of the screw 404 with the foot-plate, first presents its passages 394 to receive a load of nails. As the block leaves the foot-plate, the springs 402 close the shutter, and the levers 434 invert the block, so that, when it comes above the jack, the shutter is at the under side. Then, engagement of the screw 404 with the rear of the jack opens the shutter, and the nails fall into the jack-tubes 36. A projection from a disk 440 fixed upon one of the trunnions 390 engages a pin 442 projecting from the slide 380 to determine the angular relation of the loader-block when it delivers to the jack-passages. At the opposite extremity of travel, con-

tact of the loader-block with the under side of the foot-plate furnishes a stop for the former. The extreme positions of the loader-block are illustrated in Figs. 16 and 17, and an intermediate position is shown in dash-lines in connection with Fig. 17. It should be observed that but one shutter is required, the opposite side of the block being permanently closed by the plate 396.

To permit the loader-block 392 to be located properly in its frame and to be changed readily for the provision of passages 394 arranged in the chosen nailing design, it has at its opposite sides vertical ribs 443 (Figs. 14 and 14a), which are received by slots 444 at opposite sides of the frame. When the block is seated vertically by upward movement against a shoulder 445 upon the frame, grooves 446 lying transversely of the ribs come into registration with grooves 447 extending longitudinally of the frame. Movable in the grooves 447 to enter the slots is a resilient retaining member 448 in the form of a U, with its yoke outside the block and frame. At the ends of its arms are enlargements which may occupy either of two pairs of opposed depressions 449, 449 opening from the grooves 447. When the enlargements are in the inner depressions, the arms of the member 448 are in both the grooves 446 and 447, and the loader-block is locked in its frame. When the member is drawn outwardly until stopped by the entrance of its enlargements into the outer depressions, it leaves the grooves 446, and the block is freed for removal. The member 448 remains constantly in place in the frame.

Actuation of the nail-supplying means

There have been described the separation of a load of nails from the raceway-slots 213 by reciprocation of the plate 287, and their delivery by the loader-block 392 to the jack-tubes 36 under the influence of the cam-groove 333 and the slot 416, respectively, these being in the secondary lever 334. Considering now the action of this lever, it turns about a spindle 450 extending transversely near the rear of the frame 10 (Figs. 5 and 18). Secured to the spindle is a primary actuating lever 452 provided with a longitudinal groove 454 in which moves a block 456 turning upon a crank-pin 457 projecting from one side of a disk 458 fast upon a shaft 460, this shaft being journaled in the frame above and in front of the spindle. Through a clutch *c* of the jaw-type (Fig. 19), this shaft may be left at rest or be driven from a sleeve 461 surrounding the shaft and maintained in continuous rotation by worm-gearing 462 from the shaft 240. This shaft 240 has already been described as driven by belt-gearing 242 from a constantly driven pulley of the machine. The driving means preferably includes a friction device 464 (Fig. 6), so if there is undue resistance set up in the driven mechanism, the friction will slip and prevent breakage. The above-mentioned pulley, designated as 465, is shown as arranged to impart rotation through a clutch C (Fig. 22) to the shaft 168, said pulley being driven by belt-gearing 466 from a shaft 468 to which power is applied. Pivoted upon a lateral extension 470 from the lever 452 is an arm 472 forced outwardly by a spring 474 to an extent permitted by engagement between a depending portion 476 of the arm and a lug upon the lever. The spring is contained in a bore in the lever between a compression-adjusting screw 478 and a plunger 480 movable in the bore and contacting with the under side of the arm. At its upper side, the arm has turning upon it a roll 482. As the lever 452 is oscillated by the revolution of the crank-pin 457 and the reciprocation of the block 456 along the groove 454, the roll 482 may either rest in a depression 484 in a lateral flange 486 at the top of the lever 334 or may ride out of the depression and travel along the flange in either direction, compressing the spring 474. In the first instance, the secondary lever 334 is oscillated with the primary lever 452 to produce the separator- and loader-movements, as already described. When the loader-travel is terminated by the stops 418 and 422 in its opposite extremes of travel at the foot-plate and jack, respectively, the roll 482 will leave the depression 484 and advance upon the flange, so the arm 334 may remain at rest. When the movement of the primary lever 452 is reversed in its oscillation, the roll 482 again enters the depression 484 and carries the secondary lever with it. This correspondingly reverses the travel of the nail-delivering elements. The automatically releasable connection between the primary and secondary levers not only provides for the exact bringing to rest of the latter lever, while the oscillation of the former continues, but also guards against injury to the elements if an obstruction, such as misplaced nails, is encountered at any point.

Control of the nail-supplying means

The actuation of the separator-plate 287 and the loader-block 392, as above described, may be either under the direct control of the operator or may be caused as an incident to the operation of the machine. In the first instance, the operator may depress with his right or left hand either of two lever-arms 490, 490 situated at opposite sides of the jack J and both fast upon a horizontal spindle 492 rotatable in the frame (Figs. 5, 18, 20 and 21). This will cause the engagement of the clutch *c* by the following connections. Fulcrumed upon the frame at 494 is a lever 496 having a long, generally horizontal arm 498. Joined to the rear of this arm and to the frame is a tension-spring 500 which draws a roll 502 upon the arm into a normal position within a peripheral depression 504 in a cam-disk 506 secured to turn with the crank-disk 458. There projects rearwardly from the spindle 492 an arm 508, at the end of which a roll 510 is rotatable. A tension-spring 512, connecting the arm 508 to the frame, holds the roll 510 down and hand-pads 514 upon the lever-arms 490 raised. The movement in this direction is limited by a stop-screw 515 threaded through the frame. The arms 490 and 508 furnish a starting lever for the nail-supplying mechanisms. Referring to Fig. 18, it will be seen that the roll 510 engages a tail 516 upon a contact member 518 pivoted upon the lever 496 and holds it to the left against the force of a torsion-spring 520. The upper hooked end of the member 518 is then opposite a lug 522 projecting forwardly from a second contact member 524 pivoted on the lever 496 above the member 518. A compression-spring 526 interposed between the lug 522 and the lever 496 urges the upper extremity of the member 524 against the lever, with a depending tail 528 in the position shown in Fig. 18. Upon depression of either of the hand-pads 514, the roll 510 is moved up a cam-surface 530 upon the contact member 518. This forces said member against the lug 522 of the member 524 and turns the lever 496 clockwise

about its fulcrum 494. Extending into a groove 532 at one side of the lever-arm 498 is a lateral projection 534 from one extremity of a slide 536 (Fig. 19) guided in the frame adjacent to the shaft 460. Upon the reduced opposite end of the slide is a flanged sleeve 538 held against a portion of the slide of greater diameter by a spring 540, contacting with the sleeve and with a collar secured to the slide. Between the flanges of the sleeve lies the forked end of one arm of a bell-crank-lever 542 fulcrumed on the frame, the opposite end of which lever is forked to enter opposite sides of a circumferential groove 544 in a driven member 546 of the clutch *c*. This member is splined to the shaft 460, so it may be shifted into and out of engagement with a complemental portion of the clutch which is formed upon the inner end of the sleeve 461. If the ends of the opposite clutch-projections strike one another, instead of interengaging, the spring 540 will yield, so the slide 536 and the chain of elements which caused its movement are unaffected by the checking of the lever 542. Then when the projections on the clutch-sleeve 461 reach the proper points to mesh, the spring effects the engagement by its action on the member 546. It will be observed that depression of a hand-pad upon either of the lever-arms 490 does two things. The elevation of the lever-arm 498 frees the shaft 460 for rotation by lifting the roll 502 from the depression in the disk 506, and, by its action upon the slide 536, it engages the sections of the clutch *c* to cause the rotation of the shaft 460. The lever 496 is temporarily locked in its actuated position by contact of the circular periphery of the disk with the roll, so this rotary movement continues through 360° to produce a complete operating cycle of the nail-supplying mechanism. At the end of the cycle, the lever 496 is unlocked, by the entrance of the roll into the disk-depression, so it may assume its initial position. A projection 550 from the side of the disk 458 strikes the tail 528 of the contact member 524, rocking said member anti-clockwise, as viewed in Fig. 18. The lug 522 is thereby lifted above the engaging end of the member 518. This releases the arm 498 of the lever 496, and when the depression 504 again reaches the roll 502, said roll is drawn into said depression by the spring 500. The groove 532 in the lever-arm actuates the slide 536, and the lever 542 disengages the clutch *c*. The nail-supplying elements therefore come to rest in their normal positions. This will be true, regardless of whether the operator continues to hold down the lever-arm 490, because when the contact members 518 and 524 were separated by the action of the disk-projection 550, manual control was lost. It is not restored until the lever-arm has been released by the operator and has returned to normal, this permitting the member 518 to attain its initial position under the influence of the spring 520. Continued deliveries for a single lever-depression are thus guarded against.

When either of the hand-lever-arms has been fully actuated by the operator, it is locked in this position until the termination of an operating cycle of the machine. Extending downwardly and rearwardly from the controlling lever-arm 508 is an arm-extension 552, the end of which swings in contact with an arcuate surface 554 of a lever 556 (Figs. 6 and 18) fulcrumed upon the frame above the main shaft 168. A tension-spring 558 holds the lever 556 in engagement with the arm. At the termination of the feed-controlling movement of the lever-arm 508, its extension reaches a depression 560 in the surface 554, which receives it and retains the hand-lever against reverse movement. This locking of the lever in its active position continues until the clutch C has caused a single rotation of the main shaft, which drives the work-pressing and nail-driving shaft 168 of the machine through a complete operating cycle. Rotatable with the driven section of the clutch is a cam 562 (Fig. 22). Just before the completion of the rotation of shaft 168, the cam engages and forces up a vertical plunger 564 movable in the frame. The head of the plunger tilts the lever 556 clockwise (Fig. 18), releasing the lever-arm-extension 552, so the controlling lever-system is returned to normal by the spring 512. The time at which this occurs may be altered by adjustment of the attachment of cam 562 to the driven section of the clutch by slot-and-screw connections 565.

The operator may strike the pad 514 of the clutch-controlling hand-lever so quickly that it will not be depressed sufficiently to remove the roll 502 from the cam-depression 504 or carry the lever-arm 552 to the depression 560, yet the movement of the slide 536 by the cam-groove 532 will engage the clutch *c*, so the shaft 460 will start in rotation. To insure full movement of the arms 490 and 508, 552 of the operator's hand-lever, there is pivoted to the lower extremity of lever 496 a link 566 in which is a longitudinal slot 568 receiving a laterally projecting pin 570 on the lever-arm 552. Any movement of the lever-arm 508 which has engaged the clutch *c* will carry the roll 502 close to the throat of the depression 504, at each side of which depression is a rounded edge 572. As the shaft 460 and the disk 506 are rotated by the clutch, one of these edges will cam the roll 502 fully from the depression. The lower end of the slot 568 in the link 566 at this time lies close to the pin 570. Contact of the link with this pin turns the lever-arms 490 and 508, 552 clockwise (Fig. 18), so the operator's lever is shifted under the power of the machine to its fully actuated position, at which the roll 510 completes its movement to carry the contact member 518 below the lug 522 and brings the end of the arm 552 opposite the locking depression 560.

The operation of the nail-supplying mechanism may be made independent of manual control by the operator, being effected instead as a result of the action of the work-pressing and nail-driving mechanisms. Secured upon one of the side-rods 140 is a bracket 576 (Figs. 20 and 21), and guided in this bracket for horizontal movement is a headed contact-pin 578, urged inwardly by an expansion-spring 580 which surrounds it. When a lateral projection 582 from this pin rests against the outer end of its guide, said pin is in an inactive position. When, however, the pin is rotated, so the projection may enter a slot 584 in the bracket, the end of the pin lies beneath one arm of a lever 586 fulcrumed upon the frame-bracket 12. The opposite arm of the lever is joined by a link 588 to one of the forward arms 490 of the hand-lever. The vertical relation of the inwardly positioned pin 578 to the end of the lever 586 is such that after the operator has released the treadle 178 to allow the pressure-head 74 to rise at the end of an operating cycle, final elevation of the bracket 576 by the side-rod 140 causes the pin to engage and tilt the lever 586 clockwise (Fig. 20). This actuates the control-

ling lever 496 as though the lever-arm 490 had been moved manually, and the nail-supplying means goes through its operating cycle to deliver a load of nails to the jack. This automatic controlling means substantially increases the speed of operation, since it not only relieves the operator of a governing act but also furnishes a stimulus, in that he must remove the completed work from the jack while the pressure-head is rising, to clear the way for nail-delivery to the tubes 36.

Main clutch and its control

The rotation of the shaft 168, through which the work-pressing and nail-driving mechanisms are operated, is governed by the treadle 178, which controls the clutch C. As illustrated in Fig. 22, this clutch is of the Horton type, it being shown as having a ring 590 carried by the pulley 465 which furnishes the driving element, turning in the direction indicated by the arrow. Within the ring are arranged concentrically a roll-cage 592 and a wedge-cage 594, the former cage turning about the latter. The wedge-cage is keyed to the shaft 168, which is the driven element. Free to play radially about the shaft is an abutment-ring 596 provided at its periphery with three inclined surfaces 598. With these surfaces contact complementally inclined surfaces upon wedge members 600 mounted to move radially in ways in the cage 594. A projection 602 from the wedge-cage lies in an opening 604 in the abutment member with considerable clearance, holding these elements in approximately the correct relation but with a capacity for relative movement. The outer ends of the wedges are inclined oppositely to the inner, so the surfaces converge, lying at substantially the same angle to a median plane, and engage rolls 606 movable radially in ways in the cage 592. Attached to the driving roll-cage by a pivot 608 is a clutch-lever 610, which has toothed engagement at 612 with the wedge-cage which is to be driven. An expansion-spring 614 interposed between the wedge-cage and the lever exerts a force tending to throw a radially projecting end 616 of said lever outwardly. When this is permitted, relative movement between the roll-cage and wedge-cage is caused by the engagement of the lever 610 with both. This results in the inner ends of the wedges being forced against the abutment-surfaces 598 and the outer surfaces against the rolls, which are urged against the ring 590. The pulley 465 and shaft 168 are thus clutched together, so the shaft is driven. The abutment member 596 turns with the wedges, and its capacity for adjusting itself in all directions radially creates equal pressure of all the rolls upon the ring and insures uniformly firm engagement with minimum wear. When, in use, repeated driving contact of the rolls with the outer ends of the wedges deforms the latter, said wedges, because of the inclination of both ends, may be reversed, and their life thus doubled.

The driving action of the clutch C is normally prevented by holding the end 616 of the lever 610 in against the force of the spring 614 to so retain the cages that the wedges are out of clutching engagement. Fulcrumed at 618 on the frame 10 is a carrier-lever 620, which is normally held against a bumper 622 backed by an adjusting screw 624 threaded through the frame. The carrier-lever is urged against the bumper by an expansion-spring 626 adjustable by a screw 628 as to the force exerted. Supported by the carrier-lever is a chain of three successively acting levers. At its upper extremity, a contact-lever 630 is pivoted, this having rotatable upon it a roll 631 drawn into the path of the lever-end 616 by a tension-spring 632. This spring joins the lever 630 to a latching lever 634, which turns about the pivot 618 of the carrier-lever. The action of the spring 632 is to hold the lever 630 normally against a stop 636 upon the carrier-lever, while the lever 634 is drawn against the lever 630 at 638. Under these conditions, the roll 631 of the lever 630 is in the path of the clutch-lever-end 616. The clutch-lever is thereby held in to disengage the clutch. To withdraw the roll 631 and allow the spring 614 to produce engagement of the clutch, an actuating lever 642 is fulcrumed upon the carrier-lever 620. This lever 642 at its rear extremity has a rounded end occupying a depression in a short, forwardly extending arm of the intermediate latching lever 634. An opposite arm is arranged for engagement at its under side with a shoulder 644 near the upper end of a bar 646 rising from the treadle 178. The shoulder of the bar is drawn yieldably beneath the lever against a bumper 647 upon the carrier-lever 620 by a tension-spring 648 connecting it to the frame. A screw 650 threaded through a depending portion of the lever 642 bears against the bar below the shoulder to release the bar from actuating engagement with the lever when the latter is rotated in a clockwise direction.

Upon depression of the treadle, the bar 646 is elevated, and its shoulder 644 turns the lever 642. The spring 648 yields, allowing the bar to be displaced to the left by the screw 650, so the shoulder 644 is disengaged from the lever 642 and the clutch freed from control by the treadle. During the elevation of the bar the lever 634 is tilted anticlockwise against the spring 632, so at 638 it releases the lever 630. This last-mentioned lever is now free to turn anticlockwise, such movement being very abruptly produced by the spring 614 overcoming the spring 632. The lever 610 therefore assumes a position in which the clutch C is engaged by the relative rotary movement of the wedge- and roll-cages, so the lever 610 in its revolution leaves the roll 640. As soon as this occurs, and because the lever 642 has released itself from the bar 646, the lever 630 may be turned against its stop 636 by the spring 632, and the lever 634 shifted simultaneously to reestablish the engagement between the two levers at 638. The lever 630 and its roll 631 are thereby locked in their normal relation. The engagement of the lever 634 with the lever 642 has returned the latter to its initial position. As the clutch approaches the end of its rotation, the edge 654 of the lever 610 strikes the roll and acts as a cam to gradually disengage the clutch. Before the lever-end 616 reaches the roll, the disengagement is completed, and the contact of the end with the roll stops the rotation of the shaft 168 at a definite point. The arresting engagement of the roll with the lever-end is cushioned by the rotation of the entire controlling lever-system, the carrier-lever 620 yielding against the spring 626, which then restores it to its initial position against the bumper 622. A brake 656 (Fig. 6) may exert a constant retarding effect upon the shaft to assist in bringing it promptly to rest. When the operator releases the treadle, the clutch-controlling system is restored to normal, the spring 648 carrying the bar 646 against the stop-screw 650

as the shoulder 644 of said bar assumes its initial position below the lever 642.

Obviously, the nail-driving operation should not take place while the nail-supplying elements are acting. This is rendered impossible by making the clutch-controlling bar 646 ineffective. As shown in Fig. 6, there is guided adjacent to it for movement horizontally upon the frame, a bar-displacing wedge member 660. A link 662 unites this wedge to a bell-crank-lever 664 fulcrumed upon the frame and joined to a long link 666. As appears in Fig. 5, this link is articulated to the secondary actuating lever 334. As soon as this lever leaves its normal position upon depression of a lever-arm 490, the wedge is thrust against the edge of the bar 646 above the shoulder 644, displacing said bar laterally and carrying said shoulder from beneath the portion of the lever 642 which it would engage upon elevation. Here, it is retained until the lever 334 returns to its initial position, so, if the treadle is depressed during the operation of the nail-supplying mechanism, the movement of the bar will be idle.

Adjustment of preliminary pressure

In the present apparatus, similarly to the machine of the previously mentioned patent, when the operator lowers the treadle 178, it first draws down the cylinder 144 through the connection 180 and by the side-rods 140 lowers the head 74 to clamp a shoe and applied heel upon the jack J. When the downward movement of the head is stopped by the work, the fulcrum of the treadle, which has been at the rear, shifts to the connection 180, and the inner end of the treadle rises to elevate the bar 646 and trip the clutch C. Some operators produce the treadle-depression so quickly in applying preliminary pressure that the clutch will be engaged before the force is adequate to hold the work upon the jack against the displacing effect of the inserted nails. When this occurs, the nails will not be properly driven. To overcome this, means in preferably provided for compelling the application by the head 74 of a substantial pressure before the clutch can be engaged. As is illustrated in Fig. 6, the treadle-lever has at its inner end a longitudinal slot 670 to receive a roll 672 carried at the lower end of the clutch-bar 646. The roll-journal is also connected to the depending end of a lever 674 fulcrumed by a spindle 676 upon the frame. A tension-spring 678, joining the lever 674 to the treadle, holds the roll 672 normally toward the forward end of the slot. Above its fulcrum, the lever 674 extends between the ends of opposite screws 680, 680 threaded through the spaced arms of a lever-section 682, angularly adjustable by the screws about the spindle 676. A surface 684 upon the lever-section contacts with a roll 686 rotatable upon an upstanding portion of the treadle. By altering the positions of the screws 680, the roll 672 may be caused to assume different normal positions along the slot 670, the engagement of the roll 686 with the surface 684 limiting the forward movement of the roll 672 under the influence of the spring 678. As the treadle, turning upon its fulcrum 188, lifts its rear extremity, it first encounters a relatively great resistance, because the lower wall of the slot 670 in its action upon the roll 672 to overcome the spring 678, is inclined downwardly from the roll, and there is a considerable component of the applied force which is ineffective. But as the slot-wall approaches the horizontal, the effective force rapidly increases, and finally the clutch-bar 646 is lifted to start the nail-driving action. The extent of movement of the lever 674 in this direction is variably limited by a stop-screw 688 threaded through the end of the treadle-lever into the slot 670. By adjusting the angle of the lever 674 and the position of the roll 672 in the slot by means of the screws 680, the initial resistance offered to the depression of the treadle may be altered, so that sufficient pressure upon the work is insured without imposing upon the operator an undue burden.

Operation of the machine

In using this apparatus, the operator applies to the jack-base 18 a body 28, in which are mounted nail-tubes 36 arranged in accordance with the nailing design which it is desired to employ for the work in hand. The top-plate 42 is adjusted to correctly space the inserting points of the nails from the rear of the shoe. A loader-block 392, the nail-passages 394 of which correspond in arrangement to the jack-tubes, is placed upon the slide 380, and the delivering passages of the nail-tubes 296 are correspondingly adjusted at the foot-plate 342 by shifting the finger-piece 372. Nails of the chosen lengths will have been supplied to the two receptacles 200, the connections from the raceway-slots 213 through the foot-plate to the loader-block being such as to cause their delivery to the jack-tubes in the proper relation as to length. The loader-block is initially beneath the foot-plate, and its passages contain a load of nails N with their points resting upon the plate 396. The pressure-head 74 being raised, and the drivers 48 retracted, the operator presses down upon one of the lever-pads 514. Through the action of the starting or hand-lever 490, 508 upon the non-repeating contact members 518 and 524, the controlling lever 496 is shifted to engage the clutch *c* of the nail-supplying means and to withdraw the roll 502 from the depression in the disk 506 rotatable by the clutch, which remains engaged until the roll again enters the depression after the disk has turned through 360°. Connection between the controlling lever and the hand-lever through the link 566, applies the power of the machine to insure full depression of said hand-lever to a point at which it is locked by the lever 556 until the end of the operating cycle of the machine. The engagement of the clutch *c* results in the primary actuating lever 452 being driven by the crank-pin 457, and this, by the roll-connection 482, yieldably oscillates the secondary actuating lever 334, the connection enabling the primary lever to continue in motion after the secondary lever has reached its opposite extremes of oscillation. By the connection to the loader-slide 380 at 416, the secondary lever advances this slide with the loader-block and its contained nails, said slide first moving alone and then with the support of the telescoping auxiliary slides 384. Upon leaving the foot-plate, the spring-actuated shutter 398 of the loader-block is closed, and by the cam-groove 438 and the interposed gearing, the block is turned upon the trunnions 390 through 180°. It therefore arrives over the jack J with the shutter-side down, and contact of the shutter with the jack opens the loader-block-passages, the contained nails falling into the jack-passages, resting points up upon the ends of the drivers 48. Movement of the secondary lever 334 in the opposite

direction returns the loader-block to its initial position, it being again inverted and presented to the foot-plate to receive the succeeding load of nails. While the lever 334 was making the just-described oscillation, the cam-groove 333, through the connections including the rod 329, shifts the slots 288 in the separator-plate 287 of the distributor D into registration with the raceway-slots 213, so they receive the terminal-nails of the series in the last-mentioned slots. In its receiving position, the separator-plate is retained until the time of completion of the oscillation of the lever 334 approaches. Then, the plate is restored to its normal position, at which it registers with the wall-depressions 284. Through these, the nails fall and are delivered through the foot-plate to the loader-block-passages, which are now waiting, with the shutter 398 open, to receive them. Thus, the nail-supplying mechanisms are made ready for the next operation of the machine. The slides 210 of the distributor are continually elevating nails from the receptacles 209 to the raceway-slots, and the clearers 247, 250 are constantly returning to the receptacles nails which are not received by the slots.

The operator now places a shoe S upon the jack J and applies to its heel-seat a heel H. The treadle 178 is then depressed. First, this treadle turns upon a fulcrum furnished by the roll 672, and the cylinder 144 and the side-rods 140 are lowered, the latter drawing down the pressure-head 74. The plate 88 first contacts with the tread-surface of the heel H, and then through the differential-gearing 114, 116, the fork 104 is lowered into engagement with the rear of the heel to clamp it with greater force than is exerted by the tread-plate, injury to the heel and its covering being thereby avoided. When downward movement of the treadle is thus stopped, and preliminary pressure upon the work is created, the fulcrum of the treadle shifts, it now turning upon the connection 180 to lift the roll 672. The elevation of the roll and the connected clutch-bar 646 at first encounters considerable resistance because of the inclination of the treadle-slot 670, along which the roll is to be shifted. This compels the operator to put upon the work a sufficient pressure to resist initially the inserting force to be applied to the nails. As the slot 670, in the continued depression of the treadle, reaches an approximately horizontal position, the movement of the roll along the slot and upward is completed, raising the bar 646. If the secondary actuating lever 334 of the nail-supplying mechanisms is at rest, so it is certain that the loader-block will not be in action, the bar will be released from the wedge 660 joined to the lever, and the chain of levers 642, 634 and 630 is shifted to free the lever 610 of the clutch C and cause the main shaft 168 of the machine to make a complete rotation. The cam-shaft 164 is rotated in its vertically movable carrier-block 154 by way of the coupling 166, so it turns through 360°. This at once closes the valve 176, so the cylinder 144 and its piston 152 depending from the block 154 are connected to move together, and contact of the cam 162 with the roll 170 forces up the plunger 56, and the drivers 48 are reciprocated to insert the nails. The reaction produced by the nail-driving operation is communicated through the block, the piston, the cylinder and the side-rods 140 to the head 74, which is thus caused to clamp the work upon the jack with a final pressure proportionate to but exceeding that required to drive the nails. Regardless of the actuation of the treadle, the clutch C will be disengaged by the action of the lever 642 when its single rotation is completed, and the chain of controlling levers is restored to normal by the spring 632. As the driven member of the clutch C approaches the end of its travel, the cam 562 swings the locking lever 556 to release the starting lever controlling the operation of the nail-supplying means, so this may be again set in operation. As the cam 162 returns to its initial position, it allows the driver-plunger 56 to be lowered by its spring 66 and the block 154 to be raised by the springs 158, relieving the work of the pressure applied under the power of the machine. The valve 176 is finally opened, freeing the cylinder 144 from the piston 152. When the operator releases the treadle, the springs 148 elevate the cylinder, the side-rods 140 and the pressure-head 74, and the completed work is removed from the jack. If, instead of utilizing one of the hand-levers 490 to initiate the delivery of nails to the jack, the operator had released the pin 578, so ascent of the side-rods exercises control over the nail-supplying means, he will be relieved of the necessity for depressing the lever. But he must act quickly in taking the heeled shoe from the jack as the pressure-head rises and before the loader-block makes its delivery.

Reference is made in the detailed description and claims to an operator's lever or starting member. This does not, in any case, imply that this member is necessarily actuated manually. It may, instead, produce its effect as an incident to an act of the operator which is primarily for another purpose.

Having described our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. In a fastening-inserting machine, a frame, a pressure-head carried thereby, there being horizontal walls beneath the head furnishing ways with openings through the walls between their ends and into the ways, and a work-support for co-operation with the head, said work-support having projections arranged to pass through the wall-openings and to be received by the ways.

2. In a fastening-inserting machine, a frame, a pressure-head carried thereby, there being horizontal walls beneath the head furnishing ways with openings through the walls into the ways, and a work-support for co-operation with the head, said work-support having projections arranged to pass through the wall-openings and to be received by the ways and also having flanges situated above the projections and resting upon the walls.

3. In a fastening-inserting machine, a frame, a pressure-head carried thereby, there being horizontal walls beneath the head furnishing ways with openings through the walls into the ways and a vertical wall outside the ways, a work-support for co-operation with the head, said work-support having projections arranged to pass through the wall-openings and to be received by the ways, and means for drawing the work-support against the vertical wall.

4. In a fastening-inserting machine, a frame, a pressure-head carried thereby, a work-support mounted upon the frame for co-operation with the pressure-head, and a latch movable upon the frame and having an inclined retaining surface urged toward a surface of the work-support which it engages and an inclined elevating surface, contact of the jack with the elevating sur-

face displacing the latch to effect the locking of said jack.

5. In a fastening-inserting machine, a frame, a pressure-head carried thereby, a work-support mounted upon the frame for co-operation with the pressure-head, and a latch movable upon the frame and having an inclined surface receiving contact of a surface upon the work-support to cause the latch to act and having an inclined retaining surface urged toward a surface of the work-support which it engages.

6. In a fastening-inserting machine, a frame, a pressure-head carried thereby, there being horizontal walls beneath the head furnishing ways with openings through the walls into the ways and a vertical wall outside the ways, a work-support for co-operation with the head, said work-support having projections arranged to pass through the wall-openings and to be received by the ways, and a latch pivoted for movement upon the frame and provided with means for retaining the work-support and for urging it toward the vertical wall.

7. In a heel-attaching machine, a jack comprising a base, a body secured to the base and provided with a flange resting upon the base and in which are threaded openings, and driver-tubes threaded into the flange and rising above the body.

8. In a heel-attaching machine, a jack comprising a body, driver-tubes secured against lateral adjustment in the body, and a top-plate variable in position upon the body and provided with slots into which the tubes extend.

9. In a heel-attaching machine, a jack comprising a body, driver-tubes rising from the body and fixed against movement thereon, and a top-plate variable in position upon the body and provided with slots into which the tubes extend and remain fixed during the variation in the position of the top plate.

10. In a heel-attaching machine, a jack comprising a slotted body, driver-tubes rising from the body and fixed against movement thereon, a top-plate resting upon the body and provided with substantially parallel slots extending from front to rear of the machine into which the tubes extend, and a screw threaded into the top-plate from the under side and passing through the slot in the body with its head engaging a surface upon said body.

11. In a heel-attaching machine, a frame in which is a vertical passage, a cap provided with horizontal ways and having a skirt extending into the passage, there being a bore through the cap, a jack carried by the cap in the ways, a driver-plunger guided in the bore, and a spring resting against the cap and surrounding the skirt, said spring acting to depress the plunger.

12. In a heel-attaching machine, a frame in which is a vertical passage, a cap provided with horizontal ways and having a skirt extending into the passage, there being a bore through the cap, a jack carried by the cap in the ways, a threaded driver-plunger guided in the bore, a nut upon the plunger-thread, and a spring interposed between the cap and nut about the skirt.

13. In a heel-attaching machine, a frame in which is a vertical passage, there being ways at the opposite sides of the passage, a plunger movable in the passage, a screw threaded into the upper end of the plunger and having a head movable between the ways, and a jack provided with projections received by the ways and containing a gang of drivers and a driver-plate, the plate having slots to receive the head of the screw.

14. In a heel-attaching machine, a frame in which is a vertical passage, there being ways at the opposite sides of the passage and openings through the tops of the ways, a plunger movable in the passage, a screw threaded into the upper end of the plunger and having a head movable between the ways, and a jack provided with projections arranged to pass through the openings in and to be received by the ways, said jack containing a gang of drivers and a driver-plate, the plate having slots to receive the head of the screw.

15. In a heel-attaching machine, a reciprocatory driver-plate, sleeves having threaded engagement wtih the plate, and drivers having oppositely threaded engagement with the sleeves.

16. In a heel-attaching machine, a plunger, a driver-plate carried by the plunger and provided with threaded openings, sleeves threaded into the openings and being internally threaded oppositely to the plate-openings, and drivers provided with inclined upper ends and being threaded into the sleeves.

17. In a heel-attaching machine, a reciprocatory driver-plate, sleeves having threaded engagement with the plate, drivers having oppositely threaded engagement with the sleeves, and nuts rotatable upon the driver-threads and contacting with the plate.

18. In a heel-attaching machine, a jack, a movable pressure-head co-operating therewith, a holder adjustable upon the head between normal limits, a heel-contact member mounted upon the holder, and means for retaining the contact member on the holder in the normal positions of said holder and for releasing the member when the holder is beyond its normal limits.

19. In a heel-attaching machine, a jack, a movable pressure-head co-operating therewith, a block adjustable upon the head, and a heel-contact-plate movable laterally of the block, the block and plate being provided with a co-operating space and projection retaining the plate against separation from the block in certain positions only of the latter.

20. In a heel-attaching machine, a jack, a movable pressure-head co-operating therewith, a block angularly adjustable upon the head and having a space, and a tread-contact-plate movable laterally of the block and being provided with a projection movable in the space, there being dovetail connections between the block and plate permitting lateral movement of the latter and its separation at the dovetail connections when the plate-projection is withdrawn from the block-space.

21. In a machine for operating upon shoe-heels, pressure mechanism comprising members for contact with the tread and lateral surface of a heel, and means for connecting the members to transmit the movement of one to the other through distances differing in extent for the respective members.

22. In a machine for operating upon shoe-heels, pressure mechanism comprising members for contact with the tread and lateral surfaces of a heel, and means for connecting the members to transmit the movement of one to the other and to apply different degrees of pressure to the tread and lateral surfaces of the heel.

23. In a machine for operating upon shoe-heels, pressure mechanism comprising members for contact with the tread and lateral surface of

a heel, and a connecting device between the members acting through lever-arms of different lengths.

24. In a machine for operating upon shoe-heels, pressure mechanism comprising members for contact with the tread and lateral surface of a heel, racks by which the members are carried, and a gear meshing with each rack and connected to turn together, said gears having different radii.

25. In a machine for operating upon shoe-heels, pressure mechanism comprising members for contact with the tread and lateral surface of a heel, racks by which the members are carried, and gears meshing with the racks and connected to turn together, the gear engaging the rack of the tread member having the greater radius.

26. In a heel-attaching machine, a movable pressure-head, two slides movable in the head, one of said slides carrying a heel-tread-abutment and one a rear abutment, and differential gearing connecting the slides.

27. In a heel-attaching machine, a movable pressure-head, two slides movable in the head, one of said slides carrying a heel-tread-abutment and one a rear abutment, there being racks upon the slides, a shaft rotatable in the head, and two gear-segments fast upon the shaft and meshing with the respective racks, one of said segments having a greater radius than the other.

28. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including an hydraulic cylinder, and compression-springs interposed between opposite sides of the cylinder and the frame.

29. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including an hydraulic cylinder guided upon the frame, a member attached to the frame at each side of the cylinder and provided with a gib-portion by which the cylinder is guided and with a socket-portion, and a spring seated in each socket-portion and acting upon the cylinder.

30. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including an hydraulic cylinder guided upon the frame, a member attached to the frame at each side of the cylinder and provided with a gib-portion by which the cylinder is guided and with a socket-portion, a spring seated in each socket-portion and acting upon the cylinder, and means adjustable in position in the socket-portions for varying the resistance of the springs.

31. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including a bearing-block guided upon the frame, a cam rotatable upon the block, spaced compression-springs seated in the block, and brackets secured to the frame and upon which the springs rest.

32. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including an hydraulic cylinder guided upon the frame, a bearing-block guided in the frame, a cam rotatable upon the block for actuating the inserting and pressing mechanisms, compression-springs interposed between opposite sides of the cylinder and the frame, compression-springs seated in the block, and a bracket secured to the frame and upon which the last-mentioned springs rest.

33. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, a slide movable upon the frame and providing a stop for the connected mechanisms, gearing for moving the slide, and index means associated with the gearing for fixing the slide in predetermined positions.

34. In a fastening-inserting machine, a frame, fastening-inserting mechanism carried thereby, work-pressing mechanism movable upon the frame, means for connecting the two mechanisms to move together, said means including an hydraulic cylinder guided upon the frame, a bearing-block guided in the frame, a cam rotatable upon the block for actuating the inserting and pressing mechanisms, springs against which the bearing-block is urged by the cam, a stop for the bearing-block when moved under the influence of the cam, and bumpers carried by the bearing-block and effective when the block is moved by the springs.

35. In a heel-attaching machine, inserting mechanism, mechanism for transferring nails to the inserting mechanism, the inserting and transferring mechanisms being provided with passages arranged in accordance with a particular nailing design which may be changed to different designs, mechanism for delivering nails to the transferring mechanism, said delivering mechanism comprising a plate in which are ways, members guided in the ways and having nail-delivering passages, and means arranged to shift the members simultaneously along the ways, the contour of said ways positioning the members in relations corresponding to the different nailing designs of the inserting and transferring mechanisms.

36. In a heel-attaching machine, a foot-plate provided with curved ways, blocks guided in the ways and having passages, tubes terminating in the passages, and connections to the blocks arranged to move them along the ways into positions corresponding to different nailing designs.

37. In a heel-attaching machine, a foot-plate provided with curved ways, blocks having curved flanges extending into the ways, a member arranged for reciprocation by the operator, and links joining the member to all the blocks.

38. In a heel-attaching machine, a foot-plate provided with curved ways, front and rear pairs of blocks guided in the ways and having passages, tubes terminating in the passages, a member arranged for reciprocation by the operator, and links joining the member to all the blocks, the links for the pairs of blocks lying in planes one above the other.

39. In a heel-attaching machine, a foot-plate comprising members in which are nail-delivering passages and which are movable to positions corresponding to different nailing designs, a member arranged for movement by the operator, and connections between the operator-controlled member and the delivery members arranged to transmit to said delivery members movement

differing in extent from that of the operator-controlled member.

40. In a heel-attaching machine, a foot-plate comprising members in which are nail-delivering passages and which are movable to positions corresponding to different nailing designs, an actuating member joined to the delivery members, a member arranged for movement by the operator, and connections between the operator-controlled member and the actuating member including differential gearing.

41. In a heel-attaching machine, a foot-plate comprising members in which are nail-delivering passages and which are movable to positions corresponding to different nailing designs, a movable rack joined to the delivering members, a rack movable by the operator, a shaft journaled between the racks, and two gears of different radii fixed to the shaft and meshing with the respective racks.

42. In a heel-attaching machine, a foot-plate comprising members in which are nail-delivering passages and which are movable to positions corresponding to different nailing designs, a movable rack joined to the delivering members, a rack movable by the operator, a scale upon the last-mentioned rack having graduations corresponding to different nailing designs, and index means associated with the scale.

43. In a fastening-inserting machine, a frame, fastening-supplying mechanism and fastening-inserting mechanism carried by the frame, a casing mounted upon the frame, loading mechanism reciprocating in the casing between the supplying mechanism and the inserting mechanism, and means arranged to vary the height of the casing.

44. In a fastening-inserting machine, inserting mechanism, fastening-supplying mechanism, a fastening-transferring device movable between the two mechanisms, and two movable members upon which the transferring device is carried, one of said members being extensible beyond the other and having the transferring device mounted upon it.

45. In a fastening-inserting machine, inserting mechanism, fastening-supplying mechanism, a fastening-transferring device movable between the two mechanisms, a main carrier for the transferring device, an auxiliary carrier upon which the main carrier is movable, and means for moving the main carrier along and with the auxiliary carrier.

46. In a fastening-inserting machine, inserting mechanism, fastening-supplying mechanism, slides telescopically arranged, and a device carried by one of the slides for transferring fastenings from the supplying mechanism to the inserting mechanism.

47. In a heel-attaching machine, a frame, nailing mechanism mounted thereon, an auxiliary slide movable upon the frame toward and from the nailing mechanism, a main slide movable longitudinally of the auxiliary slide, and a loader-block presented by the main slide to the nailing mechanism.

48. In a heel-attaching machine, a frame, nailing mechanism mounted thereon, two auxiliary slides spaced from each other to move upon the frame, a main slide movable between the auxiliary slides, actuating means engaging the main slide between the auxiliary slides, and a loader-block presented by the main slide to the nailing mechanism.

49. In a heel-attaching machine, a frame, nailing mechanism mounted thereon, an auxiliary slide movable upon the frame toward and from the nailing mechanism, there being means for limiting the travel of the auxiliary slide, a main slide movable longitudinally of the auxiliary slide, there being means for compelling the movement of the auxiliary slide with the main slide, and a loader-block presented by the main slide to the nailing mechanism.

50. In a heel-attaching machine, a frame, nailing mechanism mounted thereon, an auxiliary slide movable upon the frame toward and from the nailing mechanism, a projection from the frame extending into a slot in the auxiliary slide, a main slide movable upon the auxiliary slide, there being a projection extending from the auxiliary slide into a slot in the main slide, and a loader-block presented by the main slide to the nailing mechanism.

51. In a heel-attaching machine, a frame, nail-inserting mechanism mounted thereon, a block for supplying a load of nails to the inserting mechanism, a slide carrying the block and movable upon the frame, there being a depending portion from one extremity only of the slide, and a lever fulcrumed upon the frame and acting upon the depending portion.

52. In a heel-attaching machine, a frame, nail-inserting mechanism mounted thereon, a block for supplying a load of nails to the inserting mechanism, a slide carrying the block and movable upon the frame, said slide having a depending portion, a block pivoted upon the depending portion, and a slide-actuating lever fulcrumed upon the frame and having a slot to receive the block.

53. In a heel-attaching machine, a frame, nail-inserting mechanism mounted thereon, a block for supplying a load of nails to the inserting mechanism, a slide carrying the block and movable upon the frame, said slide having a depending portion, a lever fulcrumed upon the frame and acting upon the depending portion, an adjustable stop for the slide upon oscillation of the lever in one direction, and an adjustable stop for the lever upon its oscillation in the opposite direction.

54. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism, a fastening-transferring member movable between the mechanisms, and means for inverting the transferring member, the movement of inversion taking place about an axis intersecting the plane of the transferring travel.

55. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism, a fastening-transferring member movable between the mechanisms, a gear for turning the transferring member, a rack meshing with the gear and mounted to travel with the transferring member and to reciprocate thereon in the direction of travel, and means for reciprocating the rack during such travel.

56. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism, a fastening-transferring member movable between the mechanisms, a gear for turning the transferring member, means rotatable about an axis coinciding with that of the gear for limiting the turning movement of the transferring member, a rack meshing with the gear, and means for reciprocating the rack.

57. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon trunnions extending transversely of the slide and mov-

able thereby between the two mechanisms, and means for turning the block on its trunnions.

58. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon the slide and movable thereby between the two mechanisms, a rack movable longitudinally of the slide, a gear carried by the block and meshing with the rack, and means for reciprocating the rack.

59. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon the slide and movable thereby between the two mechanisms, a rack movable upon the slide, a gear carried by the block and meshing with the rack, and an actuating gear meshing with the rack.

60. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon the slide, a rack provided with teeth at its opposite sides, a gear carried by the block and meshing with teeth at one side of the rack, and an actuating gear meshing with the teeth at the opposite side of the rack.

61. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon the slide and movable thereby between the two mechanisms, a gear carried by the block, a rack movable upon the slide and meshing with the gear, a gear turning upon the slide and meshing with the rack, and means fixed relatively to the slide for oscillating the gear on said slide.

62. In a heel-attaching machine, nail-inserting mechanism, nail-supplying mechanism, a slide, a nail-holding block rotatable upon the slide and movable thereby between the two mechanisms, a gear carried by the block, a rack movable upon the slide and connected to the gear to rotate it, a gear turning upon the slide and meshing with the rack, said gear having a projection, and a stationary member provided with a cam-groove acting upon the projection.

63. Nail-loading mechanism comprising a movable carrier provided with a slot, a loader-block mounted in the carrier and having a rib lying in the slot, there being registering grooves in the carrier and rib, and a retaining member extending into the grooves and being movable to release the loader-block.

64. Nail-loading mechanism comprising a movable carrier provided with a slot, a loader-block mounted in the carrier and having a rib lying in the slot, there being registering grooves in the carrier and rib, a retaining member extending into the grooves and being movable to release the loader-block, and means arranged to limit the retaining and releasing movements of the member.

65. Nail-loading mechanism comprising a movable carrier-frame provided at its opposite sides with transverse slots, a loader-block mounted in the frame and having opposite ribs lying in the slots, there being at the opposite sides of the frame and in the ribs registering grooves, and a U-shaped retaining member having arms extending into the grooves.

66. Nail-loading mechanism comprising a movable carrier-frame provided at its opposite sides with transverse slots, a loader-block mounted in the frame and having opposite ribs lying in the slots, there being at the opposite sides of the frame and in the ribs registering grooves, and a resilient U-shaped retaining member movable in the grooves and having portions arranged to enter either of two pairs of depressions in the frame.

67. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism cooperating therewith, primary and secondary oscillatory actuating members for the supplying mechanism, there being automatically releasable connections between the members, and driving means for the primary member.

68. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism cooperating therewith, primary and secondary oscillatory actuating members for the supplying mechanism, means for limiting the travel of the secondary member in both directions, there being automatically releasable connections between the members permitting the continued movement of the primary member when the secondary member is stopped by the limiting means, and driving means for the primary member.

69. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism cooperating therewith, primary and secondary actuating members therefor, one of said members being provided with a depression and the other with a yieldable projection which may enter or leave the depression, and driving means for the primary member.

70. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism cooperating therewith, two actuating members therefor, one of said members being provided with a depression and the other with a yieldable projection which may enter or leave the depression and ride upon the surface of the other member in opposite directions, and driving means for one of the members.

71. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism coperating therewith, primary and secondary oscillatory actuating members for the supplying mechanism, the secondary member having a depression in its surface, an arm pivoted upon the primary member and provided with a roll, a spring interposed between the primary member and the arm for urging the roll against the surface of the secondary member to enter the depression, and means for driving the primary member.

72. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying mechanism cooperating therewith, primary and secondary oscillatory actuating members for the supplying mechanism, there being a slot in the primary member and automatically releasable connections between the members, and a revoluble crank-pin entering the slot.

73. In a fastening-inserting machine, fastening-inserting mechanism, fastening-supplying means co-operating therewith and comprising distributing mechanism provided with a movable fastening-separating member and movable fastening-transferring mechanism, primary and secondary oscillatory actuating members for the supplying means, there being automatically releasable connections between the members, and driving means for the primary member.

74. In a heel-attaching machine, nailing mechanism, a nail-distributor having a movable nail-separator, a movable loader receiving nails from the distributor and delivering them to the nailing mechanism, an oscillatory actuating lever, and connections to the lever to move both the nail-separator and the loader.

75. In a heel-attaching machine, nailing mechanism, a nail-distributor having a movable nail-separator, a movable loader provided with an invertible loader-block receiving nails from the distributor and delivering them to the nailing mechanism, an oscillatory actuating lever, and connections to the lever to move both the nail-separator and the loader and to cause the inversion of the loader-block.

76. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member, and means for rendering the starting member ineffective after its governing movement until said member has returned to its initial position.

77. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member, connections arranged to transmit the movement of the starting member to the actuating mechanism, and means acting upon the connections for rendering the starting means ineffective.

78. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member, connections arranged to transmit the movement of the starting member to the actuating mechanism, and means movable by the actuating mechanism and acting upon the connections for rendering the starting means ineffective.

79. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, and connections to the controlling lever for shifting the clutch.

80. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, and two contact members upon the controlling lever, one of which is movable by the other, such movement being communicated to the clutch.

81. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, two contact members upon the controlling lever, one of which is movable by the other, such movement being communicated to the clutch, and means movable by the clutch for disengaging the contact members.

82. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, connections to the controlling lever for shifting the clutch, and means acting upon the controlling lever for maintaining the engagement of the clutch during an operating cycle of the fastening-supplying mechanism.

83. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, and connections to the controlling lever including a spring for shifting the clutch.

84. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, a slide movable by the controlling lever, and yieldable means for transmitting the movement of the slide to the clutch.

85. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, a slide movable by the controlling lever, a lever for shifting the clutch, and a spring transmitting movement of the slide to the clutch-shifting lever.

86. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever, and two contact members pivoted upon the controlling lever, one of said members being engaged by the starting lever and the other being urged thereby into engagement with the controlling lever to shift the clutch.

87. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever, two contact members pivoted upon the controlling lever, one of said members being engaged by the starting lever and the other being urged thereby into engagement with the controlling lever to shift the clutch, and means movable by the clutch for disengaging the contact members from each other.

88. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member and including means by which movement is yieldably transmitted to the supplying mechanism, and means for rendering the starting member ineffective after its governing movement until said member has returned to its initial position.

89. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch, means for transmitting power from the clutch to the supplying mechanism and arranged for disengagement at the termination of movement of said supplying mechanism, an operator's starting lever, and connections to the lever for shifting the clutch.

90. In a heel-attaching machine, fastening-

inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a member movable by the operator to start the operation of the supplying means, and means for locking the starting member in its active position until the completion of an operating cycle of the machine.

91. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member, means for rendering the starting member ineffective after its governing movement until said member has returned to its initial position, and means for locking the starting member in its active position.

92. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, actuating mechanism for the fastening-supplying mechanism governed by the starting member, means for rendering the starting member ineffective after its governing movement until said member has returned to its initial position, means for locking the starting member in its active position, and means acting at the end of an operating cycle for releasing the lock.

93. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever for controlling the clutch of the supplying mechanism, a main clutch through which the inserting mechanism is operated, a lock for the starting lever, and means carried by the main clutch for releasing the lock.

94. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever for controlling the clutch of the supplying mechanism, a main clutch through which the inserting mechanism is operated, a lock for the starting lever, a member carried by the main clutch for releasing the lock, and means arranged to mount the member in different positions circumferentially of the clutch.

95. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever for controlling the clutch, and a locking lever retaining the starting lever in its active position.

96. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever for controlling the clutch, a locking lever retaining the starting lever in its active position, a main clutch through which the inserting mechanism is operated, and a member movable by the main clutch and engaging the locking lever to release the starting lever.

97. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a clutch through which the fastening-supplying means is moved, an operator's starting lever, a controlling lever movable by the starting lever, means for locking the controlling lever in its active position, and connections to the controlling lever for shifting the clutch.

98. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, and means movable under the power of the machine for completing the movement of the member.

99. In a fastening-inserting machine, movable fastening-supplying mechanism, a clutch through which power is applied to the supplying mechanism, an operator's starting lever, a member movable thereby and also moved upon engagement of the clutch, and connections to the member for moving the starting lever.

100. In a fastening-inserting machine, movable fastening-supplying mechanism, a clutch through which power is applied to the supplying mechanism, an operator's starting lever, a controlling lever for the clutch acted upon by the starting lever, and connections to the controlling lever for moving the starting lever.

101. In a fastening-inserting machine, movable fastening-supplying mechanism, a clutch through which power is applied to the supplying mechanism, a cam rotatable by the clutch, an operator's starting lever, a controlling lever movable thereby to engage the clutch and thereafter being movable by the cam, and connections between the levers for transmitting the last-mentioned movement to the starting lever.

102. In a fastening-inserting machine, movable fastening-supplying mechanism, a clutch through which power is applied to the supplying mechanism, a disk rotatable by the clutch and provided with a depression, an operator's starting lever, a clutch-controlling lever having a roll engaging the disk and movable into and out of the depression, and connections between the controlling and starting levers acting to move the starting lever when the roll leaves the depression.

103. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, means movable under the power of the machine for completing the movement of the member, and means for rendering the operator-actuated member ineffective at the end of its controlling movement.

104. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, means movable under the power of the machine for completing the movement of the member, and means for locking the member in the position to which it is thus moved.

105. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, means movable under the power of the machine for completing the movement of the member, means for locking the member in the position to which it is thus moved, and means for rendering the member ineffective at the time it is thus locked.

106. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, means movable under the power of the machine for completing the movement of the member, means for locking the member in the position to which it is thus moved, and means for

releasing the member at the termination of the operating cycle of the machine.

107. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, and means arranged to move the member from its normal position under the power of the machine.

108. In a fastening-inserting machine, movable fastening-supplying mechanism, a member movable by the operator to control the supplying mechanism, and a member movable into and out of active position and arranged to transmit the motion of an element of the machine to the operator-actuated member.

109. In a heel-attaching machine, fastening-inserting mechanism, movable means for supplying fastenings to the inserting mechanism, a starting member movable by the operator, an actuating mechanism for the fastening-supplying mechanism governed by the starting member, and a device adjustable upon a movable element of the machine into a position in which it may contact with the starting member.

110. In a heel-attaching machine, nailing mechanism, a pressure-head movable into cooperation with the nailing mechanism, side-rods by which the pressure-head is moved, means for supplying nails to the nailing mechanism, actuating means for the supplying means, and means made effective by movement of one of the side-rods for controlling the actuating means.

111. In a heel-attaching machine, nailing mechanism, a pressure-head movable into cooperation with the nailing mechanism, side-rods by which the pressure-head is moved, means for supplying nails to the nailing mechanism, actuating means for the supplying means, an operator's starting lever for controlling the actuating means, and a contact member adjustable upon one of the side-rods into and out of a position in which it may engage the starting lever.

112. In a heel-attaching machine, nailing mechanism, a pressure-head movable into cooperation with the nailing mechanism, side-rods by which the pressure-head is moved, means for supplying nails to the nailing mechanism, actuating means for the supplying means, an operator's starting lever for controlling the actuating means, a contact-pin movable upon one of the side-rods into and out of the plane of the starting lever, a spring urging the pin into one position, and means for retaining the pin in the opposite position against the force of the spring.

113. In a heel-attaching machine, fastening-inserting mechanism, fastening-supplying mechanism, a clutch through which the inserting mechanism is operated, a member movable by the operator for controlling the clutch, and means movable by the fastening-supplying mechanism for rendering idle the controlling movement of the member.

114. In a heel-attaching machine, fastening-inserting mechanism, fastening-supplying mechanism, a clutch through which the inserting mechanism is operated, a bar movable by the operator for controlling the clutch, and means movable by the fastening-supplying mechanism for displacing the bar.

115. In a heel-attaching machine, nailing mechanism, loading mechanism movable to deliver nails to the nailing mechanism, actuating mechanism for the loading mechanism, a clutch through which the nailing mechanism may be operated, a clutch-controlling member, and connections to the actuating mechanism for moving the controlling member.

116. In a heel-attaching machine, nailing mechanism, loading mechanism movable to deliver nails to the nailing mechanism, actuating mechanism for the loading mechanism, a clutch through which the nailing mechanism may be operated, a bar movable longitudinally to control the clutch, and connections between the bar and actuating mechanism to move said bar laterally.

117. In a heel-attaching machine, nailing mechanism, loading mechanism movable to deliver nails to the nailing mechanism, an actuating lever for the loading mechanism, a clutch through which the nailing mechanism is operated, a reciprocatory clutch-controlling bar, a wedge contacting with the bar to displace it laterally, and a linkage joining the lever to the wedge.

118. In a heel-attaching machine, nailing mechanism, a clutch through which the nailing mechanism is operated, a member movable by the operator to control the clutch, a nail-distributor having a movable nail-separator, a movable loader receiving nails from the distributor and delivering them to the nailing mechanism, an oscillatory actuating lever, and connections to the lever to move both the nail-separator and the loader and to render the clutch-controlling member ineffective.

119. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, and a lever having a portion movable longitudinally of the treadle and contacting therewith to resist its movement about its connection to the pressure-head.

120. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, a lever having a portion movable longitudinally of the treadle and contacting therewith to resist its movement about its connection to the pressure-head, and means arranged to vary the point of contact between the lever and the treadle longitudinally of the lever.

121. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, a lever having a portion movable longitudinally of the treadle, and a spring joining the lever and treadle and resisting movement of said lever.

122. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle, connections to the treadle to move the pressure-head,

connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, and a lever having a portion movable longitudinally of the treadle and contacting therewith to resist its movement about its connection to the pressure-head, said lever having two sections angularly adjustable with relation to each other and arranged to vary the point of contact with the treadle.

123. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle in which is a longitudinal slot, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, a lever fulcrumed about an axis fixed relatively to the treadle and having a portion extending into the slot, and a spring connecting said portion to the treadle.

124. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle in which is a longitudinal slot, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, a lever fulcrumed about an axis fixed relatively to the treadle and having two sections, one section carrying a roll movable in the slot and the other section being provided with opposite screws between which the former section extends, and a spring connecting said former section to the treadle.

125. In a heel-attaching machine, a jack provided with nailing mechanism, a pressure-head movable toward and from the jack, actuating means for the nailing mechanism and pressure-head and including a clutch, a treadle in which is a longitudinal slot, connections to the treadle to move the pressure-head, connections to the treadle to control the clutch, each of these connections serving as a fulcrum for the treadle, a lever fulcrumed about an axis fixed relatively to the treadle and having two sections, one section carrying a roll movable in the slot and the other section being provided with opposite screws between which the former section extends and by which the angle of said former section may be varied, there being contact between the other section and the treadle whereby movement of the lever is limited, and a spring acting to maintain such limiting contact.

JOHN F. STANDISH.
LESTER S. MACDONALD.