(No Model.)

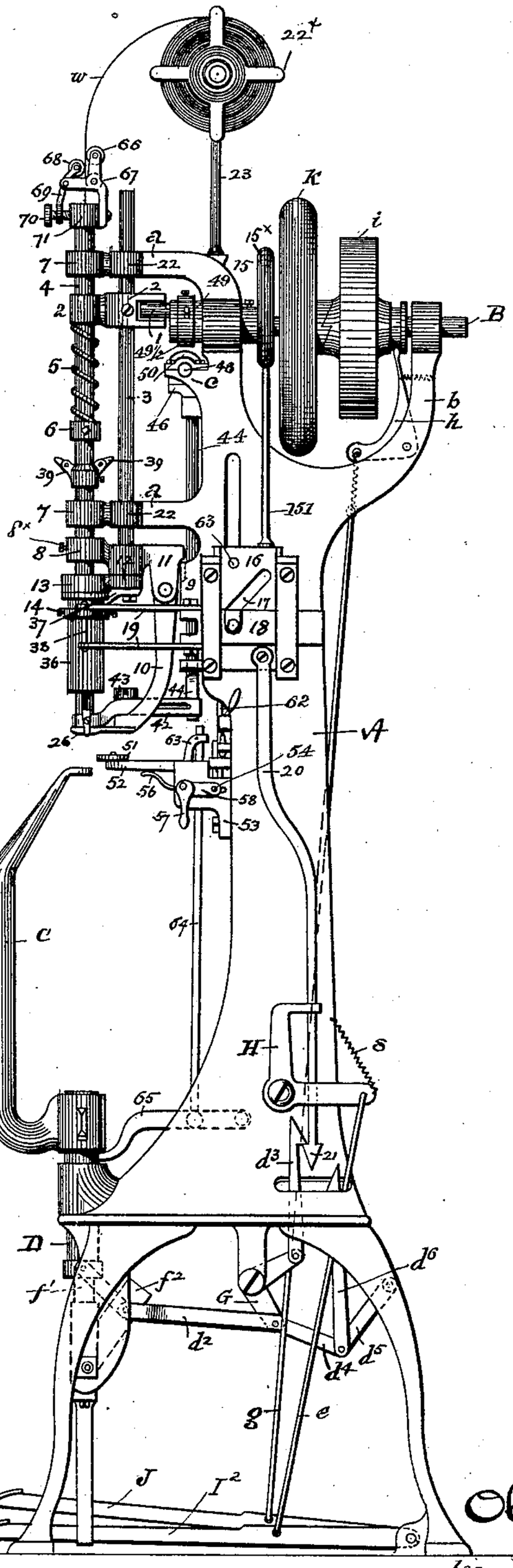
4 Sheets—Sheet 1.

O. E. SEYMOUR.

SHOE NAILING MACHINE.

No. 364,778. Patented June 14, 1887.

Fig. 1.



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C. D. Kerr.

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by Church Howe
Attorney.

(No Model.)

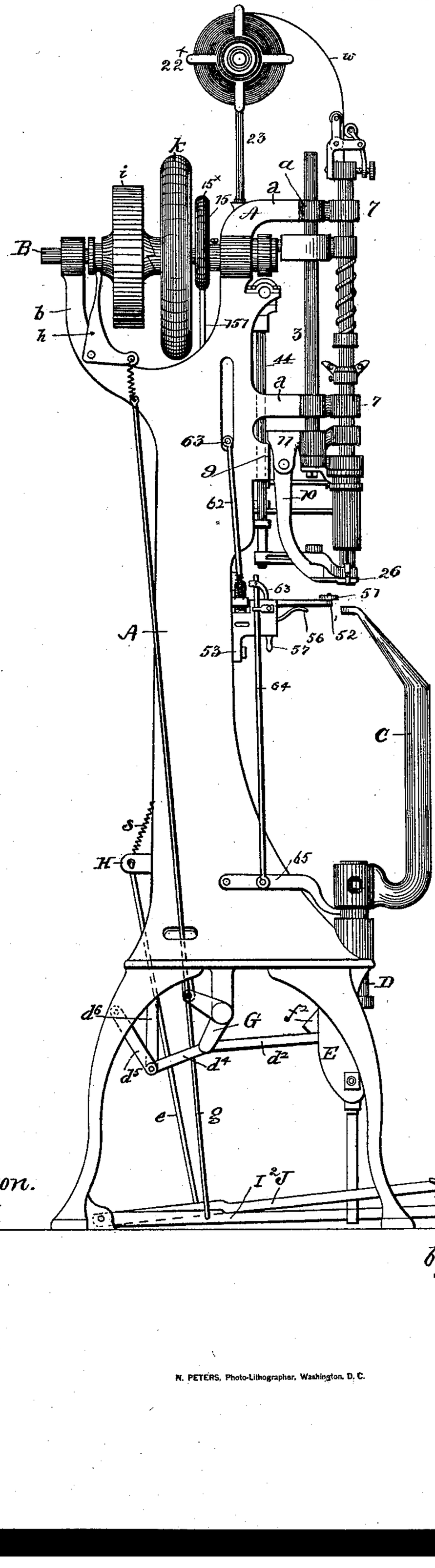
4 Sheets—Sheet 2.

O. E. SEYMOUR.

SHOE NAILING MACHINE.

No. 364,778. Patented June 14, 1887.

Fig. 2



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Attorney.

(No Model.) 4 Sheets—Sheet 3.

O. E. SEYMOUR.

SHOE NAILING MACHINE.

No. 364,778. Patented June 14, 1887.

Fig. 3.

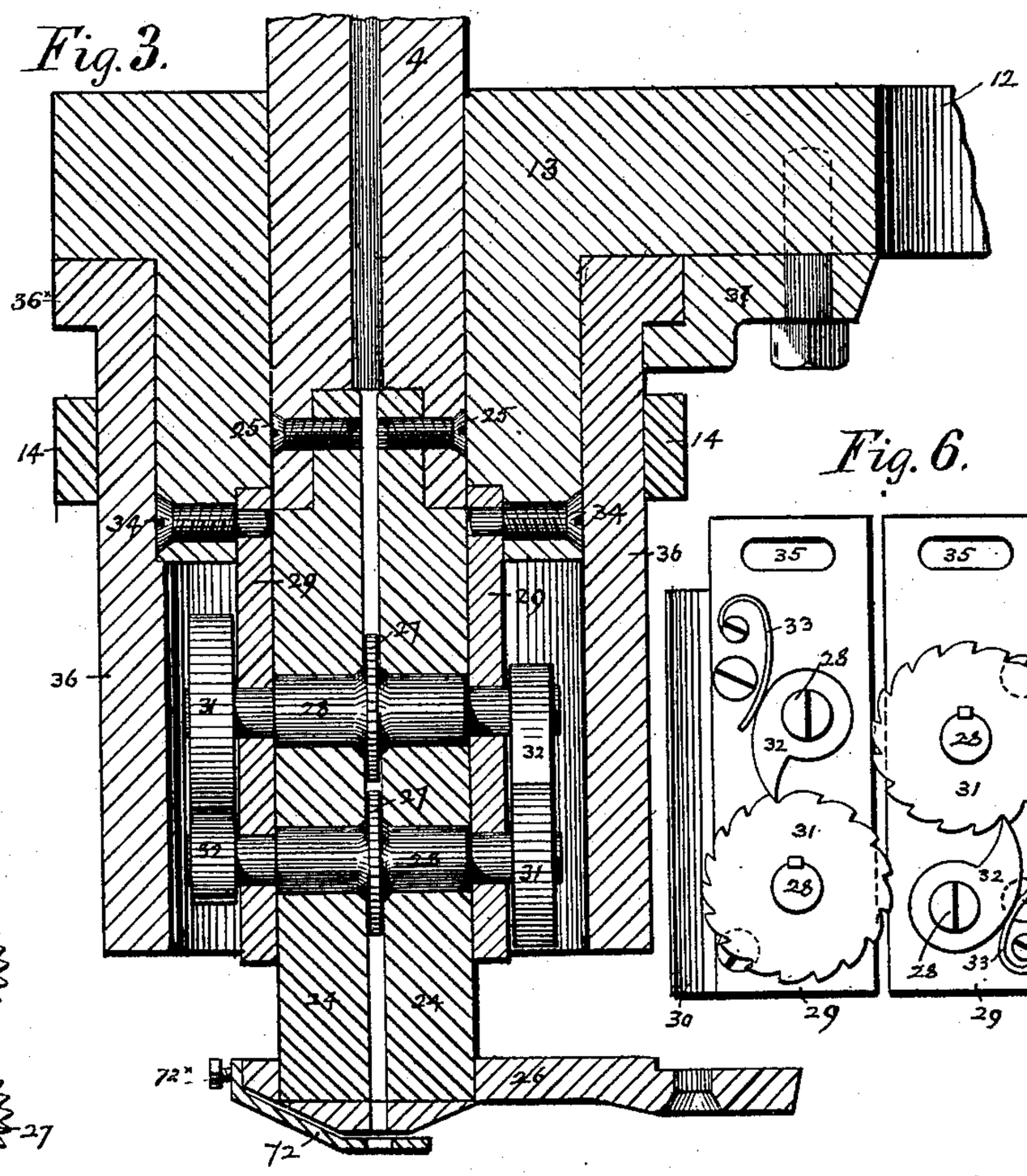


Fig. 14

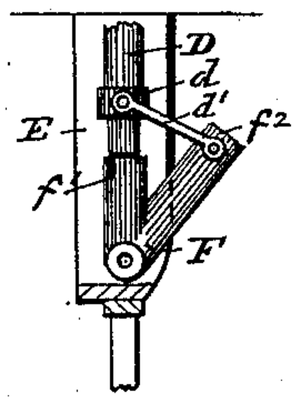


Fig. 6.

Fig. 7.

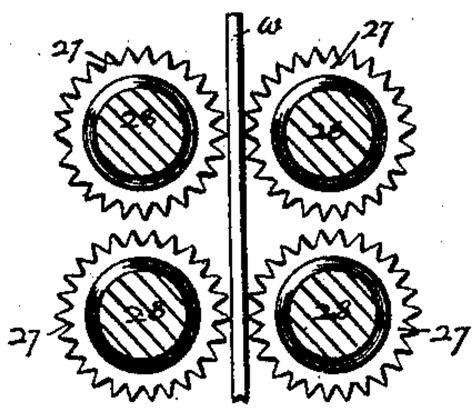


Fig. 11.

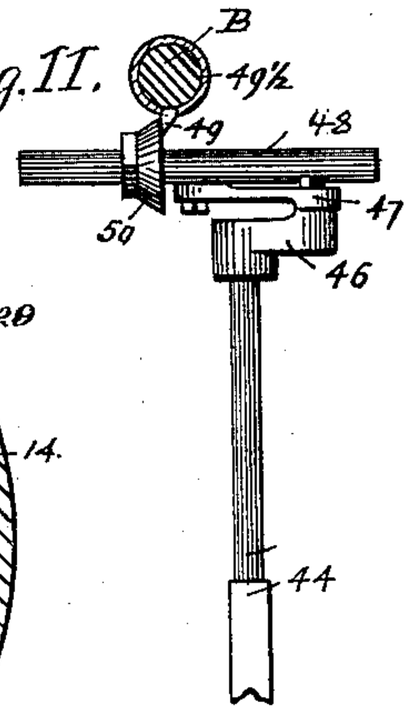
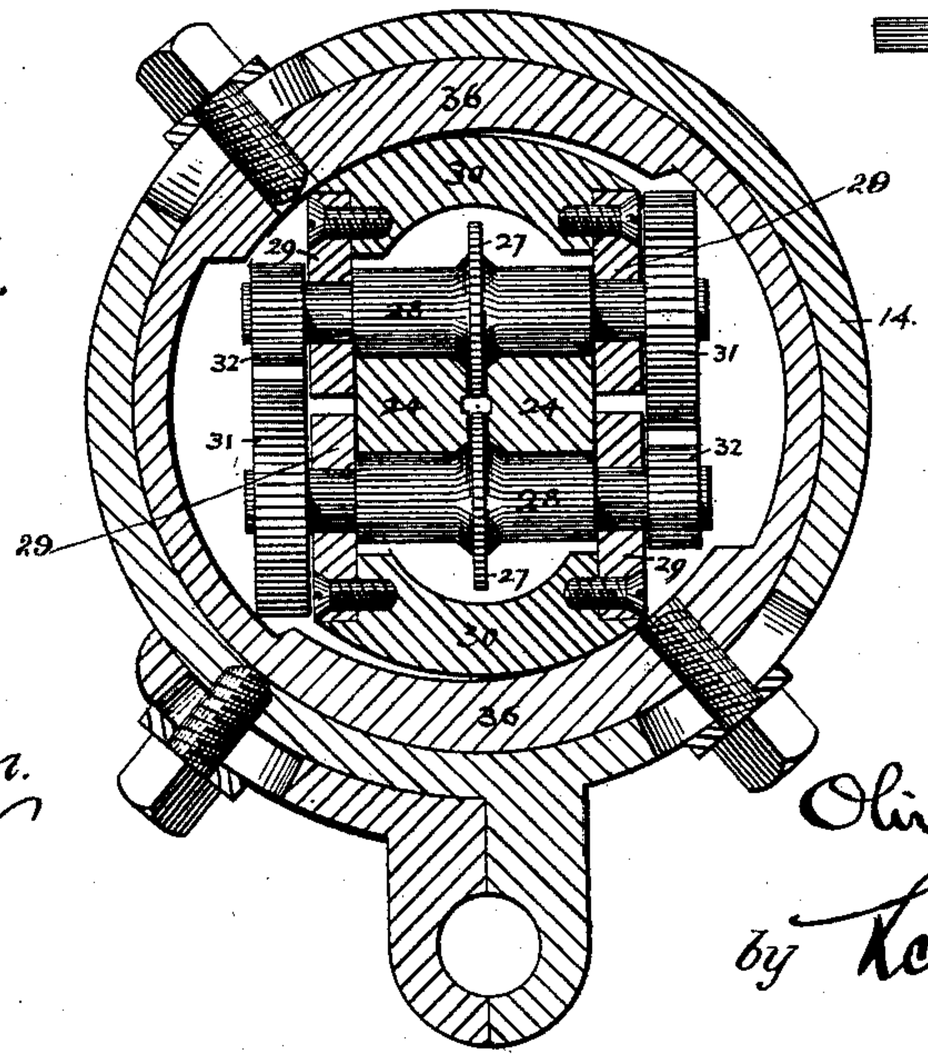


Fig. 5.



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(No Model.)

4 Sheets—Sheet 4.

O. E. SEYMOUR.

SHOE NAILING MACHINE.

No. 364,778. Patented June 14, 1887.

Fig. 4.

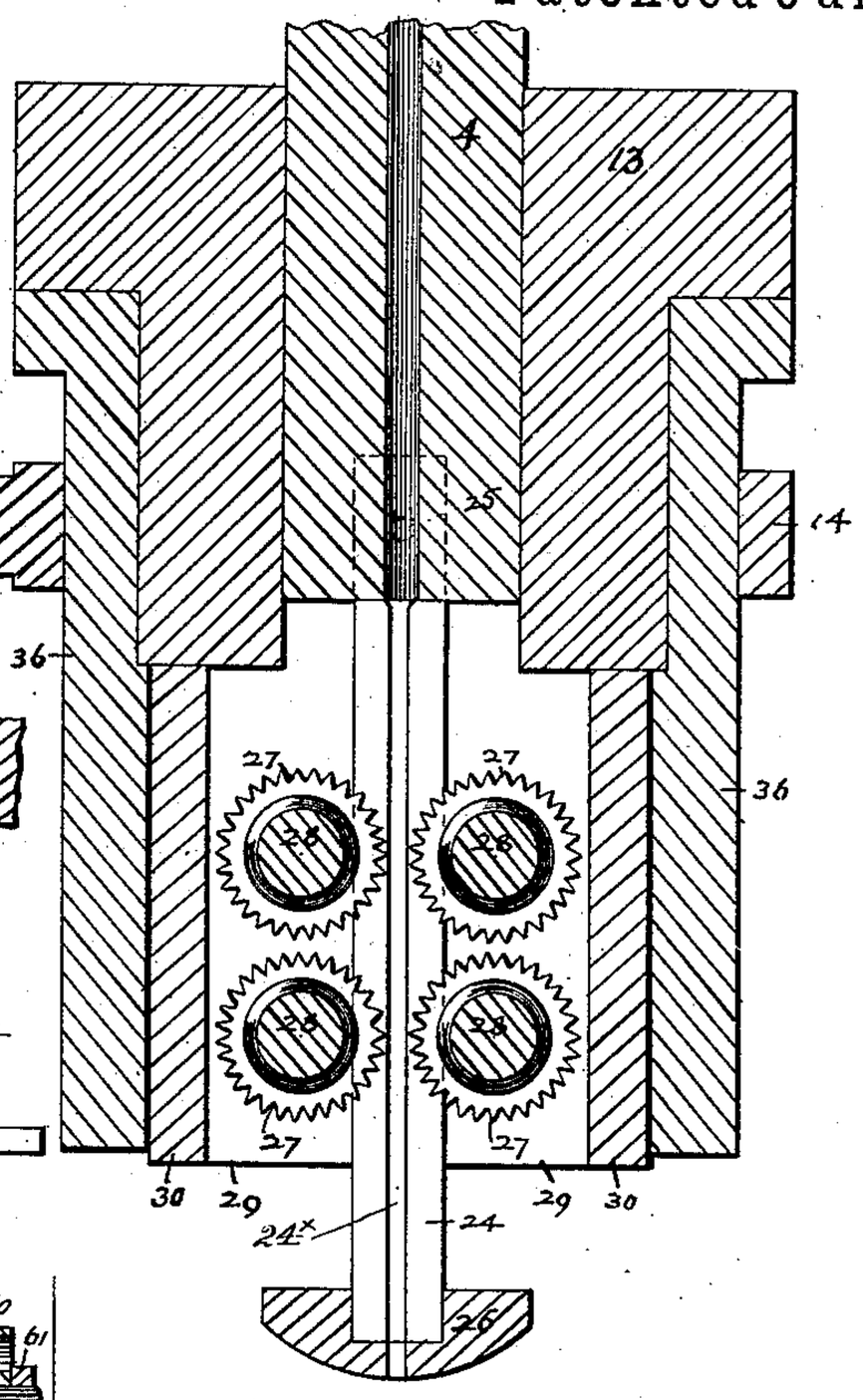


Fig. 13.

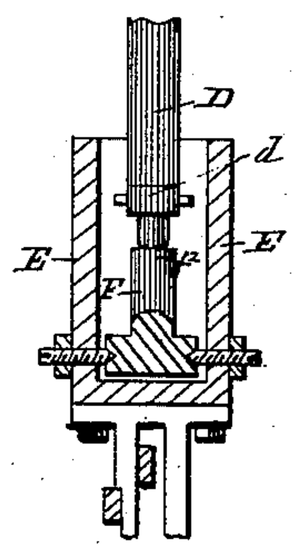


Fig. 15.

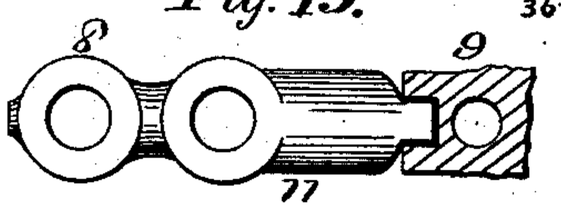


Fig. 16

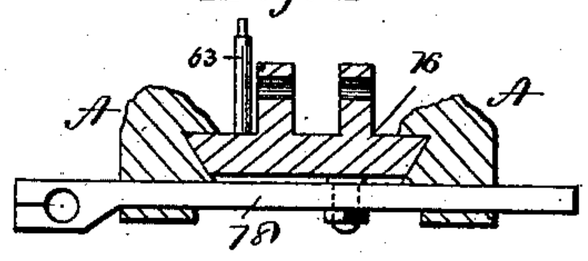


Fig. 9.

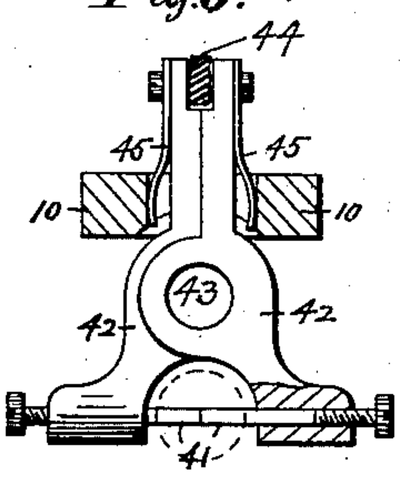


Fig. 10.

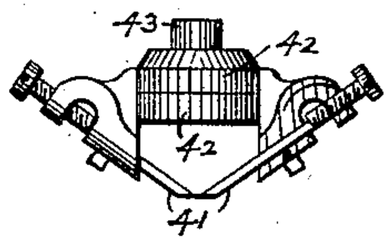


Fig. 17.

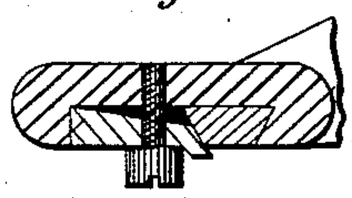


Fig. 12

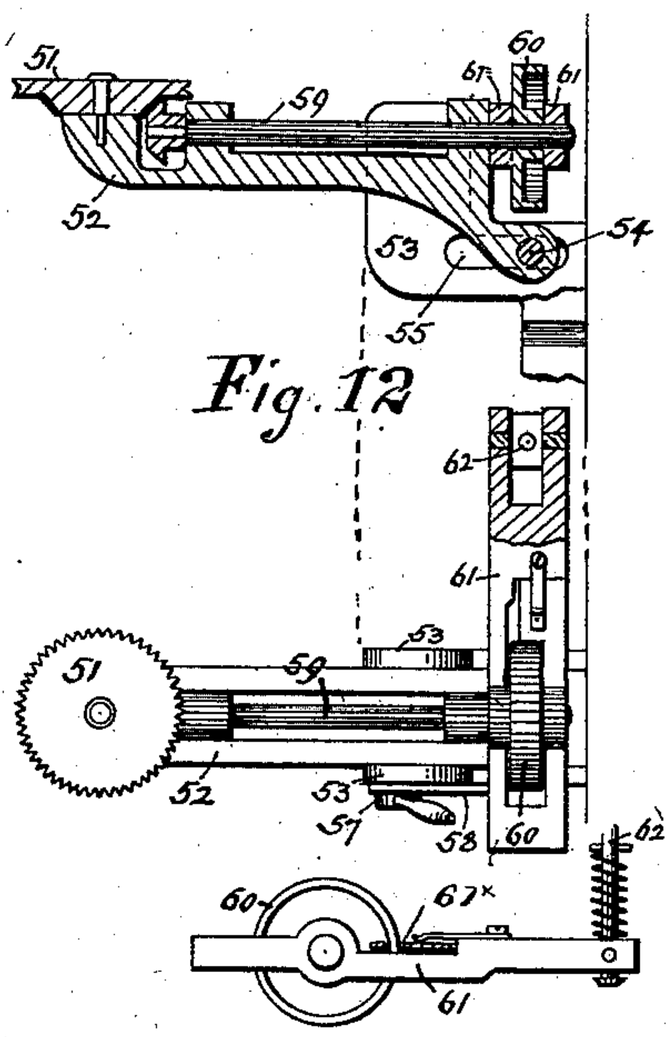
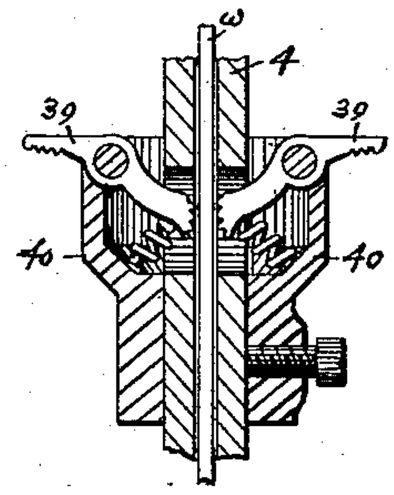


Fig. 8.



Witnesses:

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C. D. Kirr.

Inventor:

Oliver E. Seymour

by Lou Hosea

Attorney.

UNITED STATES PATENT OFFICE.

OLIVER E. SEYMOUR, OF CINCINNATI, OHIO, ASSIGNOR TO THE WIRE GRIP FASTENING COMPANY, OF CHICAGO, ILLINOIS.

SHOE-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 364,778, dated June 14, 1887.

Application filed January 25, 1886. Serial No. 189,613. (No model.)

To all whom it may concern:

Be it known that I, OLIVER E. SEYMOUR, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful Improvements in Shoe-Nailing Machines, of which the following is a specification.

My invention relates to that class of shoe-nailing machines adapted to drive a properly-prepared wire through the sole and upper of a boot or shoe and cut the same off in lengths corresponding with the thickness of the material operated upon; and it consists in certain features of construction, hereinafter more fully detailed and pointed out in the claims, whereby the mechanism is simplified and rendered more efficient and certain in operation by reason of the better application of the driving power to the several operations and the improved construction of the media through which the power is applied, and whereby also the manual control of the machine and its work are facilitated and the machine as a whole rendered more durable and its parts more easily and conveniently removed for repairs or adjustment and replaced for action.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figures 1 and 2 are side elevations taken from opposite sides of the machine complete; Figs. 3 and 4, axial sections of the "driving-head" in vertical cross-planes, showing the construction and functional relations of the parts concerned in the wire-driving action; Fig. 5, a horizontal section of the driving-head, taken through the external rotating collar; Fig. 6, a side elevation of the pair of movable frames containing the wire-engaging wheels and their ratchets; Fig. 7, a diagram elevation of the wire-engaging wheels detached, showing their functional relation to the wire; Fig. 8, a detail axial section of the collar containing the detents, to prevent any backward slipping of the wire in the spindle; Figs. 9 and 10, a plan and front elevation, respectively, of the pivoted jaws carrying the cutting-chisels; Fig. 11, a detail elevation of the mechanism for actuating the chisel-jaws; Fig. 12, a longitudinal section and a plan view, respectively, of one form of the feeding mechanism (being the same exhibited in Figs. 1 and 2) with a detached rear elevation of the clutch-bar and mechanism for driving the feed-shaft; Figs. 13 and 14, front and side views, respectively, of the pivoted base block for maintaining the horn at different elevations; Fig. 15, a plan view of the head or bracket connecting the wire spindle with the depending arm and "nose-plate;" Fig. 16, a horizontal section of the cross-head employed in operating the horn-lifting mechanism and imparting motion to the feed device and the wire-engaging mechanism; Fig. 17, a detail cross-section through one of the cutting-chisels and its holding-matrix, showing the construction for adjustably securing the same.

Referring now to the drawings, A designates the main supporting-frame, having forward projections, *a a*, and B, a counter-shaft receiving power from the usual sources and transmitting it to the machine.

The shaft B terminates at its forward end in a crank, whose wrist 1 actuates (by means of a sliding block or roller) a yoke, 2, secured upon a vertical rod, 3, which is thus reciprocated vertically in guide-loops 22 22 of the projections *a a* of the frame constituting its bearings. The yoke 2 is extended beyond the rod 3, and embraces loosely a hollow vertical rod or spindle, 4, arranged parallel with the rod 3 in guide-loops 7 7 of the projections *a a*, the said rod, with its attached steel bars 24, to be described, constituting the hollow spindle or wire-carrier, through which the wire *w* for nailing plays. Around the spindle 4, beneath the yoke 2, and bearing against a fixed adjustable collar, 6, secured to the spindle below, is arranged a coiled spring, 5, through which the downward movement of the yoke 2 is transmitted to the spindle or wire-carrier 4. It will be thus seen that the movement of the yoke 2 gives a simultaneous movement to both the rod 3 and the spindle 4, with the difference that the thrust of the rod 3 is positive to its fixed limit, while that of the spindle 4, being derived through the spring 5, may be variable, and is in fact so, according to the thickness of the material nailed, as will be more fully explained hereinafter. To the rod 3, at its lower end, is secured the rear end, 12, of the driving-head 13. This head 13, embracing the spindle 4 loosely and carrying at its

lower end the wire engaging and driving devices, to be described, is reciprocated positively by the rod 3; but the spindle 4, deriving its downward motion by the spring 5, acted upon by the yoke 2, is arrested in its downward movement sooner or later, according to the varying thickness of the material on the horn C. The spindle 4 has fastened to it, by a set-screw, $8^{\times}$, a cross-head, 11, having a loop, 8. This cross-head 11 is acted upon by the wire-driving head, 13, as the latter is lifted, and lifts the spindle 4. The head 13, as will be described, also prevents the rotation of the spindle 4. When the lower end of the spindle 4, in its descent, strikes the material placed upon the horn C to be nailed, the farther movement of the spindle is arrested; but the wire-driving head 13 continues its movement to its prearranged limit, and by its wire engaging and driving devices, to be described, carries the wire through the spindle into the material.

The wire-driving devices, held in position by the head 13, will be more clearly understood by referring to the sectional and detail views, Figs. 3, 4, 5, 6, and 7 of the drawings.

The spindle 4 is hollow axially throughout, as already indicated, and carries the wire *w*, entering at the top from a suitable reel or bobbin, $22^{\times}$, mounted upon a standard, 23, secured at the top of the machine-frame A. I also provide, in connection with the bobbin and the spindle or carrier, a straightening device, which I will describe later.

The spindle 4 is terminated below by two rectangular steel bars, 24, secured thereto by screws 25, arranged parallel with each other and extending downward to and seated in a nose-piece, 26, attached to and carried by the depending arm 10. The bars 24 are spaced apart sufficiently to practically extend the central opening of the spindle downward, and shallow longitudinal recesses $24^{\times}$ are cut in the opposite faces of the bars, as shown in Fig. 4, to further receive and guide the wire in its downward movement. The arm 10, carrying the nose-piece 26, is attached to the cross-head or bracket 11, operating vertically in guides 9 upon the main frame. The cross-head 11, extended forward and embracing loosely the rod 3 above the wire-driving head 13, has at one end a loop, 8, to embrace the spindle 4, a set-screw, $8^{\times}$ connecting the said loop and spindle.

The wire-drivers consist of four toothed spur-wheels, 27, arranged centrally and rigidly upon shafts 28, journaled in pairs arranged one above another in moving frames, each frame consisting of two rectangular side pieces, 29, held by a curved back, 30. The shafts 28 are journaled between and through the side pieces, 29, and at each projecting end is secured a ratchet-wheel, 31, or pawl 32—these being arranged alternately upon the shafts in such a manner that upon one end of each shaft is a ratchet and upon the other a pawl—each pawl engaging with the engaging-wheel upon the corresponding end of the adjacent shaft of its pair. Each pawl is provided with a spring, 33, to keep it in engagement with its ratchet-wheel. The frames are placed at opposite sides of the bars 24, so that the side pieces, 29, are guided against the same as they move toward each other or apart, bringing the toothed wheels 27 between the bars, the wheels of the two frames being opposite each other in pairs, as indicated in Figs. 4 and 7, their toothed peripheries entering the vertical wire-space between the bars 24.

The frames are suspended upon the head 13 by screws 34, which project through into horizontal slots 35 of the side pieces, 29, the connection being such as to allow a horizontal movement of the frames toward and from each other guided upon the bars 24, but preventing vertical displacement. This interhorizontal movement of the frames brings opposite wheels, 27, closer together in the wire cavity between the bars 24, so that the wire may be engaged between the faces of the toothed wheels, or draws the wheels apart to release the wire. The engaging movement takes place (by means hereinafter described) at the beginning of the downward stroke of the wire-driving head 13, and is effected by a sleeve, 36, surrounding the toothed wheel-frames, as follows: The sleeve 36 is held by a cleat, 37, secured to the extension 12 and engaging loosely under a flange, $36^{\times}$, constituting the head of the sleeve 36. That portion of the internal periphery of the sleeve 36 which surrounds the frames below the head 13 is formed in two opposite eccentric surfaces, as shown in Fig. 5, which in each partial rotation of the collar act upon the curved backs 30 of the toothed wheel-frames to force them together. When so forced together, which movement occurs when the spindle-head 13 is beginning its downward stroke, the teeth of the wheels 27 bite into the wire, and as the wheels are prevented by their ratchets from rotating backward they carry the wire downward with the thrust of the head; but when the eccentric surfaces of the sleeve 36 release the wheel-frames 29 30, (which occurs when the head 13 is beginning its upward movement,) the wheels 27 being permitted to rotate freely backward in the opposite direction, their teeth-points roll upon the wire and force the containing-frames outward. This partial rotation of the sleeve 36 is effected by means of a collar, 14, held externally upon the sleeve 36 by set-screws actuated through the following intervening mechanism by an eccentric, 15, upon the main driving-shaft B.

The eccentric 15, by an ordinary strap, $15^{\times}$, and rod 15′, vertically reciprocates a cross-head, 16, which by an inclined slot, 17, engaging a stud or pin upon a sliding bar, 18, held in guides upon the frame, reciprocates the sliding bar horizontally. To the end of the sliding bar 18 are pivoted two horizontal connecting-rods, 19, spaced apart sufficiently to maintain between them a vertical pin, 38,

which enters loosely a hole in the collar 14, permitting the latter to play vertically with the sleeve 36 as the wire-driving head 13 is reciprocated. Thus with each revolution of the main shaft B and each reciprocation of the spindle 4 and its wire-driving mechanism, the sleeve 36 is partially rotated and the wire-driving wheels 27 are thereby thrust together to engage the wire *w* between the bars 24 and carry it down with the thrust of the driving-head 13. There is also added to the spindle 4 a pair of pivoted spring-held detents, 39 39, (see Fig. 8.) pivoted upon a collar, 40, attached to the spindle above the projection 7 and operating through opposite slots in the spindle to prevent the wire from moving upward during the independent upward movement of the wire-driving head 13.

All the mechanism directly concerned in the driving of the wire having been now described, a more comprehensive description of the principal function of the machine will now be possible.

The wire *w* passes from its reel entirely through the spindle 4 to the extreme under surface of the nose-piece 26, and is carried downward with the spindle 4 by the grippers 39 and the wheels 27 to the limits of its movement, to wit, until the spindle is arrested by contact of the nose-piece with the upper surface of the material resting upon the horn C. This arrest is permitted by the coiled spring 5 of the spindle-4 with the driving-yoke 2. To this limit all parts move in unison, receiving power from the same driving source—to wit, the yoke 2; but the driving-head 13, carrying its independent mechanism for engaging the wire in its downward thrust, continues positively on to the full predetermined limit of movement, carrying the wire with it. The wire-driving devices consist, essentially, of the wheels 27, their carrying-frames, and the cross-head 13, and means to hold the wheels while the spindle is descending to drive the wire into the material. The wire is thus forced out beyond the face of the nose-piece 26, through the material, to the surface of the horn C, and is then cut off at the upper surface of the material by mechanism now to be described.

The wire-cutting devices, Figs. 9, 10, consist, in the first place, of a pair of bevel-edged cutting-chisels, 41 41, mounted adjustably in jaws 42 42, joined by a common pivot, 43, to the arm 10, just in rear of the engagement of the nose-piece 26 with the bars 24. The chisels 41 are inclined, so that their lower beveled edge surfaces are in the same horizontal plane and are moved together edge to edge horizontally at the lower surface of the nose-piece by the twisting engagement of a rectangular or oval sectioned cam-rod, 44, vertically journaled in the frame A and engaging between rear projections of the pivoted jaws 42. The chisels are normally held apart by springs 45 45, attached to the rear projections of the jaws 42 and engaging against the sides of a slot in the arm 10, through which the said jaw projections pass.

The rod 44, Fig. 11, carries a crank, 46, at its upper end, pivotally connected by a link, 47, to a sliding bar, 48, held in bearings *c* of the main frame below and across the line of the shaft B. A pin or dog, 49, set radially in the periphery of an adjustable collar, 49½, on the shaft B, engages a conical collar, 50, upon the sliding bar 48, and compels a limited movement of said bar, which, by the link-and-crank connection, partially rotates the rod 44, and operates the cutting-chisels, as described. After the dog 49 has passed over and beyond the collar 50 the springs 45 restore the parts to their normal position. This action of the cutters is arranged to take place as soon as the limit of the driving movement of the head 13 is reached, but always at the surface of the material, the cutting-arms 42 being carried vertically up and down upon the rod 44 as the spindle 4 is reciprocated.

The devices for feeding the work forward on the horn, in the form shown in Figs. 12 and 13, consist, essentially, of a horizontal feed-wheel, 51, arranged upon a support adapting it to be adjusted to the horn in its movements, as follows: The feed-wheel 51, having a toothed periphery and a line of bevel-gear teeth at its under side, is pivotally mounted at the end of an adjustable bracket, 52, held between the two cheeks of a fixed bracket, 53, upon the main frame A. It is so held by the engagement of a stud, 54, projecting at either side of a rear extension of the bracket 52 in horizontal slots 55 of the cheeks of the fixed bracket 53. The forward end of the adjustable bracket 52 is upheld by a spring, 56, (see Fig. 1,) from the fixed bracket. The bracket 52 is adjustable horizontally forward by means of an eccentric, 57, pivoted to the fixed bracket 53, and connected by a strap-link, 58, with the stud 54 of the movable bracket. The turning of the eccentric 57 by its handle draws the movable bracket 52 forward or backward, as the case may be, and as the work on the horn bears with its edge against the periphery of the wheel 51, the work is moved so as to change its position relative to the wire-aperture of the spindle 4, and brings the line of nailing nearer to or farther from the edge of the work. The feed-wheel 51 is rotated intermittently by a bevel gear connection with a horizontal shaft, 59, journaled in the movable bracket 52 and carrying at its rear end a clutch-wheel, 60, operated by a horizontal clutch-bar, 61, pivoted upon the shaft 59 and operated by a link, 62, (see Fig. 2,) connecting with a pin or stud, 63, projecting rearward from the cross-head 16 (see Fig. 1) through a vertical slot in the main frame A. Each time the cross-head 16 rises the dog 61× of its clutch-bar 61 is moved, and by its engagement with the rim of the wheel 60 partially rotates it, and motion is transmitted through the shaft

59 and bevel-gears to the feed-wheel 51. The feed-wheel 51 is moved downward to accommodate the movements of the horn by an adjustable dog, 63, held upon a connecting-rod, 64. The dog is curved to project over the side of the fixed bracket 53, and rests upon the movable bracket 52. The connecting-rod 64 is actuated by a lever, 65, with which it is connected, pivoted below to the main frame A, and extending outward and engaging beneath the butt or hub of the horn C. Thus when the horn descends, the feed devices are likewise carried downward against the resistance of the spring 56, by which they are again raised when the horn is elevated, and the feed-wheel 51 is thus always maintained in the same relation to the tip of the horn, enabling the work to be adjusted to the horn in its lowered position in exact relations to the feed, and then thrown up into working position while retaining such adjustment.

The devices for controlling the vertical position of the horn C are as follows: The horn proper, C, is mounted on a vertical stud or shaft, D, to which it is adjustably secured by a wedge-key actuated by a set-screw. The shaft or stud D is journaled vertically in the frame A near the base, with provision for a pivotal movement, and extends through the same into a yoke, E, below. (See Fig. 14.) Beneath the stud D, at the bottom of the yoke E, is a pivoted base-block, F, having two steps or abutments, f' f^2, (see Figs. 1, 2, and 15,) of different heights, which may be brought alternately beneath the stud D by oscillating the base-block F upon its pivot, thus giving a bottom support for the horn at either of two different elevations. The stud D has near its lower end a collar, d, with projections at opposite sides, by which short links d' connect it with the rear or highest abutment, f^2. The latter is again connected by a similar link or links, d^2, to the lower arm of a bell-crank, G, whose upper or horizontal arm is provided with a vertical link, d^3, having a hook-shaped head. The lower arm of the bell-crank G is also joined to a link, d^4, and the latter to a similar link, d^5, pivoted to the frame, the two latter links forming a toggle-joint centrally connected to an upright link, d^6, having a hooked head similar to d^3. The links d^3 and d^6 are maintained in an approximately-vertical position in such relation that the depending rod 20, having a double-hook head, 21, at its lower end and secured at its upper end to the cross-head 16, may engage one or the other of the links d^3 or d^6, according to the temporary lateral position of said rod 20 as controlled by the following mechanism: The lower portion of the rod 20 passes through a loop in the vertical arm of a bell-crank, H, pivoted to the frame A, and the lower or horizontal arm of the bell-crank H is connected by a link, e, with a foot-lever, I^2. The horizontal arm of the bell-crank H is also upheld by a spring, s, from the frame A. The pivotal oscillations of the bell-crank H in one direction by the spring s, and in the other by the foot-lever I^2 and connecting-link e, shifts the rod 20 so as to engage its double hook 21 with the hooked heads of the links d^3 d^6 alternately. In the normal position of rest, as shown in Figs. 1 and 2, the spring s holds the bell-crank H up and engages the rod 20 with the link d^3 and brings the lower abutment, f', beneath the horn, which is then in its lowest position. By forcing down the foot-lever I^2, the bell crank H throws the rod 20 to the right, when the hook-head 21 engages beneath the hook-head of the link d^6 and raises the same, and by the toggle-connections forces the abutment-block F over to engage the abutment f^2 beneath the horn, the horn being raised by means of the links d' and collar d. Thus it will be seen that the horn is both raised and lowered by the positive action of the main shaft, and consequently only in certain positions of the wire-driving mechanism. The foot-lever connections have only the function of placing the mechanism in such condition as to enable the horn to be raised or lowered by the revolution of the main shaft at the next occurring point where the situation of the driving mechanism would permit. Thus, if work is on the horn when the foot-lever is moved, the horn still remains elevated until the immediate nailing is completed. The same action in reverse occurs when the horn is to be raised, so that no accident can occur from this cause during the operation of the machine.

Adjacent to the foot-lever I^2 is a similar foot-lever, J, connected by a link, g, with a bell-crank, h, at the top of the machine. The bell-crank is a pulley-shifter and engages in a grooved hub of a normally loose belt-pulley, i, and moves it into engaging clutch-connection with the hub of the fly-wheel K against the force of a retractile spring connecting the arm of the shifting device h with the machine-frame A. The treadles I^2 J move against the vertical rack-bars and engage beneath suitable projections, holding them in ultimate positions.

The wire being wound upon a reel, $22^\times$, as described, acquires a circular "set," which it is desirable to remove in order to lessen its friction in the spindle 4. This I accomplish by passing the wire through a straightening device arranged at the top of the spindle. It consists of two idler-wheels, 66 and 67, pivoted one above the other in a suitable frame attached to a collar, 71, secured to the top of the spindle 4. Opposite the interval between these wheels 66 and 67 is a third idler-wheel, 68, supported upon a pivoted arm, 69, by which it is adjustable by means of an adjusting-screw, 70, in relation to the vertical path of the wire over wheels 66 and 67. By proper adjustment of the wheels the bend or set of the wire is removed as it passes between the wheels.

I employ at the lower surface of the nose-plate 26 a steel wear-plate, 72, held at the forward end by a set-screw, $72^\times$, by which the

wear of the cutting-knives upon the surface of the stock is prevented. The elasticity of the plate permits it to rest ordinarily against the nose-plate when the latter strikes the stock; but the operation of the knives takes place immediately above the wear-plate, thus protecting the stock at all times from injury.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a shoe-nailing machine, the combination of a hollow spindle carrying the wire, with a separate driving-spindle, 3, and its attached head 13, and the frames and rollers 27, constituting the wire-driving devices, both spindles reciprocating vertically in bearings upon the supporting-frame, substantially as set forth.

2. In a wire-nailing machine, the hollow spindle carrying the wire, it having prolongations 24, and the independent driving-spindle 3, its attached head 13, the frames 29, having backs 30, the rolls 27, their attached gear, and the pawls 32, combined with the yoke attached to the spindle 3, the collar 6, attached to the spindle 4, and the interposed spring 5, and with means to operate the said spindle, whereby the movement of the spindle 3 is made positive for a given distance and the movement of the spindle 4 is made variable according to the thickness of the material at the top of the horn, substantially as described.

3. The combination of the frame A and shaft B, carrying the crank-pin 1, the spindles 3 4, yoke 2, embracing both spindles and rigidly fastened to the driving-spindle 3, the spring 5, and adjustable collar 6, the cross-head 11, embracing both spindles and rigidly fastened to the wire-spindle 4, and the wire-driving head 13, embracing both spindles and rigidly attached to the driving-spindle 3, as set forth.

4. The wire-carrying spindle 4, its attached cross-head 11, the bracket and nose, and the guide for the cross-head, combined with the spindle 3, its attached cross-head 13, and connected devices to engage and feed the wire in the spindle 4 after its arrest, substantially as described.

5. The wire carrying spindle 4, its attached cross head 11, the bracket and nose, and the guide for the cross-head 13, and connected devices to engage and feed the wire in the spindle 4 after its arrest, and with the spring 5, yoke 2, and means to move the said spindle, substantially as described.

6. In a nailing-machine, the vertically-reciprocating hollow spindle 4, the spindle 3, moving parallel to it, its attached cross-head 13, toothed wheels 27, to engage the wire, and the carrying-frames for the said wheels, combined with the sleeve 36, having eccentric inner faces and adapted to move the carrying-frames toward the wire when it is to be fed and driven into the stock, the wheels at such time being locked against rotation, the movement of the frames away from the wire taking place while the spindle 3 is rising, at which time the wheels are free to rotate over the wire, substantially as described.

7. In combination, the spindle 4, its attached parallel bars 24, the toothed wheels 27, acting between the bars, and their carrying-frames, with side pieces, 29, guided upon the exterior of the bars, substantially as set forth.

8. In combination with the wire-carrying spindle, the toothed wheels 27, journaled in movable frames, and the ratchets and pawls 31 32, arranged upon the projecting shafts of the wheels, substantially as set forth.

9. In combination with the wire-carrying spindle, the toothed wheels operating as described, their containing-frames guided as described, having curved backs, and the surrounding collar 36, having inner cam-surfaces bearing against the backs of the frames, substantially as set forth.

10. In combination with the spindle 4, the independent head 13, movable wheel-frames 29 30, engaging-wheels 27, journaled therein, the eccentric collar 36, and means, substantially as described, for imparting semi-rotation to the collar, substantially as set forth.

11. The combination of the wire-spindle 4, the driving-spindle 3, the head 13, and its wire-engaging devices, the flanged collar 36, and the supporting-lug 37, substantially as set forth.

12. The combination of the spindles 3 and 4, the wire-driving head 13, collar 36, and contained mechanism, the embracing-loop 14, and mechanism, substantially such as described, for imparting semi-rotation to the collar while permitting the free vertical movement of the head and collar, as set forth.

13. The combination of the collar 36 and its rotating loop 14 with the rods 19, pin 38, bar 18, slotted cross-head 16, strap-connection, and eccentric 15, substantially as set forth.

14. The combination of the spindle 4, collar 40, and pivoted spring-held detents 39, substantially as set forth.

15. The wire-carrying spindle and means to drive the wire, the levers 42, and their attached cutters 41, combined with a rod, 44, co-operating with the said levers, and with means, substantially as described, to oscillate the said rod and actuate the said levers, as set forth.

16. In combination with the wire-carrying spindle, the depending arm 10, its attached nose-plate, the cutter-carrying jaws 42, also mounted on the said arms, the actuating-shaft, a horizontally-moving shaft having a crank-connection with said cutter-actuating shaft and arranged adjacent to and across the axis of the main shaft, and the cam or pin upon the main shaft engaging said horizontal shaft intermittently and actuating the cutters, substantially as set forth.

17. The combination, with the supporting-frame A, main shaft B, projections *a a*, spindles 4 3, and their driving connections, of the vertical cutter-actuating shaft 44, guided in

suitable projections adjacent to the vertical column of the main frame A, in rear of the wire-spindle 4, and the cross-shaft 48, journaled above the shaft 44, across the main frame and immediately beneath the main driving-shaft, substantially as set forth.

18. The combination, with the cutting lever jaws 42, of vertical shaft 44, crank 46, link 47, horizontal shaft 48, collar 50, pin 49, and main shaft B, substantially as set forth.

19. The combination of the depending arm 10, cutter-jaws 42, pivot 43, opening rod 44, and springs 45, substantially as set forth.

20. The combination of the spindle, nose-plate, and cutting devices with the wear-plate 72, substantially as set forth.

21. The wire carrying spindle, wire-driving mechanism, the horn and means to lift it, and the feeding device pivoted to rise and fall, combined with a spring to lift the feeding device, a finger to depress the feeding device, and with connections between the said finger and the horn, whereby the movement of the horn directly moves the feeding device with it, substantially as described.

22. The pivoted arm 52, the feed-wheel, the shaft 59, and gear thereon to move the feed-wheel, combined with means to rotate the said shaft to actuate the said feed-wheel, substantially as described.

23. In a shoe-nailing machine of the character described, in combination with a vertically-movable horn, a pivoted base-block having resting surfaces f' f^2 for the horn at different elevations and adjustable to ultimate positions to support the horn at either of said elevations, substantially as set forth.

24. The combination of the movable horn, the pivoted base-block having two surfaces, f' f^2, and mechanism, substantially as described, connecting with the main driving-shaft, whereby the horn is lifted or depressed and the base-block shifted to support the same simultaneously and automatically by the operation of the machine, as set forth.

25. The combination of the horn C, base-block F, connecting-rod d', connecting rod d^2, bell-crank G, link d^3, lifting-rod 20, cross-head 16, and eccentric 15, as set forth.

26. The combination of the horn, its abutment-block, connecting-rods d' d^2, bell-crank G, and hook-link d^3, the lifting-rod 20 and its actuating mechanism, with the toggle d^4 d^5 and the hooked link d^6, substantially as set forth.

27. The combination of the hook-links d^3 d^6 and their connected mechanism, and the lifting-rod 20 and its actuating mechanism, with the bell-crank H, spring S, link e, and foot-lever I^2, substantially as set forth.

28. In a shoe-nailing machine, a spindle, 4, carrying the wire in an axial perforation and having the prolongations 24 at its lower end, and the nose 26 and the spindle 3, having a uniform vertical throw, and the frames attached to the spindle 3, and provided with wheels to engage the wire between the said prolongations, combined with means, substantially as described, for driving both spindles simultaneously from the driving-shaft and permitting the arrest of the wire-carrying spindle at a variable limit, according to the thickness of material operated upon, as set forth.

29. In a nailing-machine, the combination of the following instrumentalities, viz: the spindle 3, means to reciprocate it longitudinally with a uniform extent of stroke, a cross-head attached to the said spindle, frames carried by the said cross-head, and wire-gripping rollers mounted in the said frames and locked against rotation during the descent of the said spindle, a wire carrying spindle, 4, having extensions 24, terminated by a nose, leaving slots above the nose to thus permit the rollers engaging the wire at opposite sides to slide in the slots in the direction of the length of the spindle 4, a horn to support the stock, means to drive the spindle 4 and permit it to stop when the nose of the spindle is arrested by the work on the horn, and means, carried by the spindle 4, but located above the rollers which feed the wire, for preventing backward movement of the wire while the wheels are being moved backward over the wire, the wheels at such time rotating, the combination being and operating substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

OLIVER E. SEYMOUR.

Witnesses:
L. M. HOSEA,
C. D. KERR.