2 Sheets—Sheet 1.

O. R. CHAPLIN.

Boot and Shoe Nailing-Machine.

No. 217,340. Patented July 8, 1879.

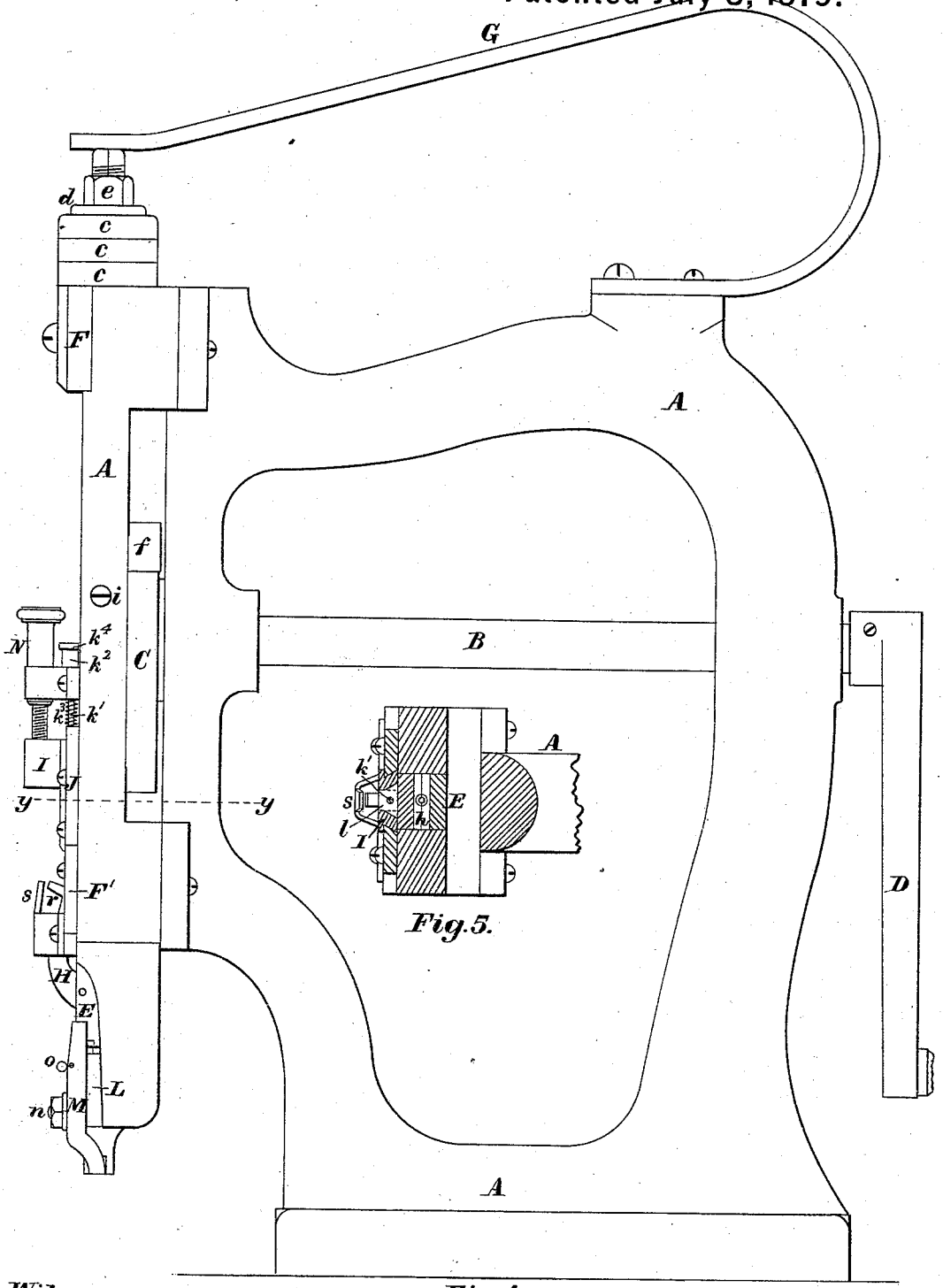

Fig.5.

Fig.1.

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O. R. CHAPLIN.

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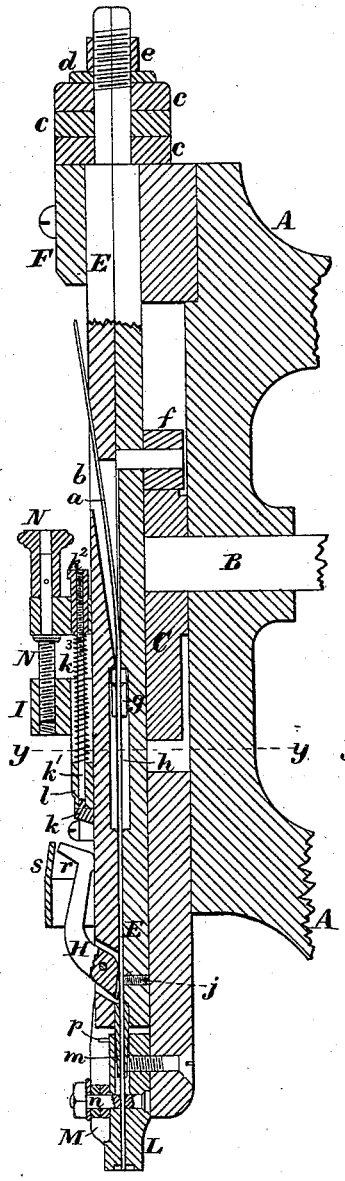

Fig. 3.

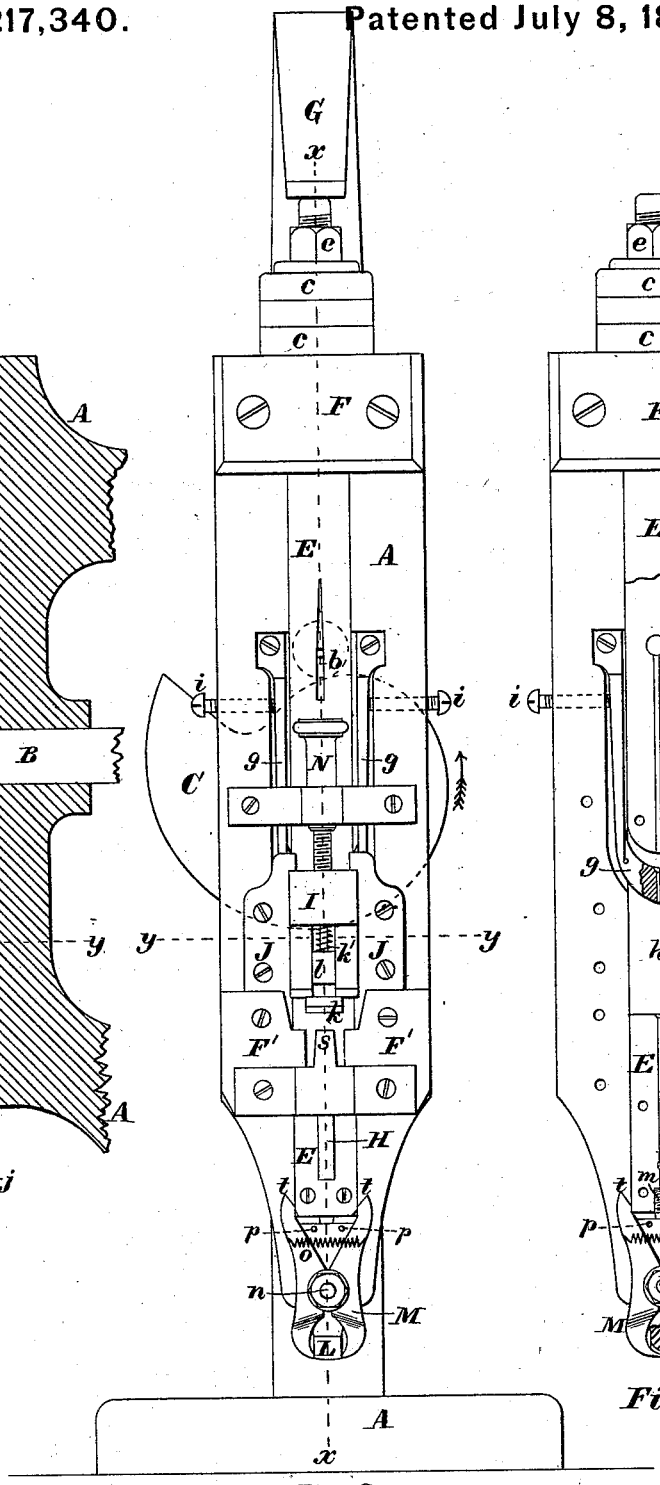

Fig. 2.

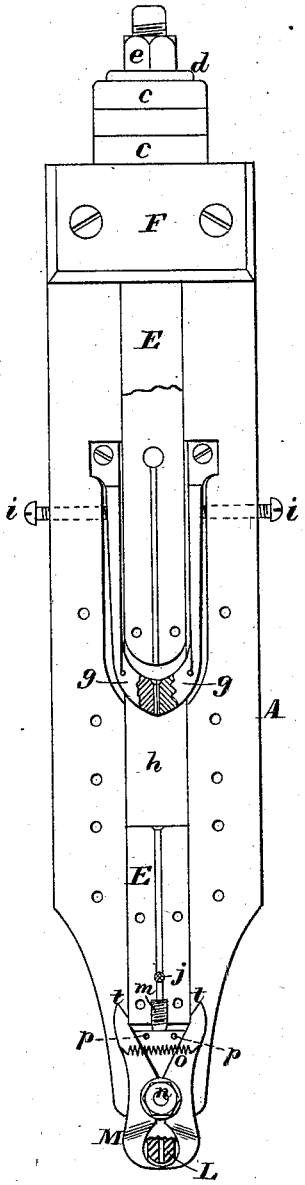

Fig. 4.

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UNITED STATES PATENT OFFICE.

ORRIL R. CHAPLIN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO DANIEL C. KNOWLTON, OF SAME PLACE.

IMPROVEMENT IN BOOT AND SHOE NAILING MACHINES.

Specification forming part of Letters Patent No. **217,340**, dated July 8, 1879; application filed June 9, 1879.

To all whom it may concern:

Be it known that I, ORRIL R. CHAPLIN, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Boot and Shoe Nailing Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of boot and shoe nailing machines in which the nails are cut from the end of a wire; and it consists in a novel combination and arrangement of devices for feeding the wire, driving it into the boot or shoe sole, and severing the driven portion of the wire from the portion outside of the sole, and also to the means of determining the length of wire to be driven, all of which will be best understood by reference to the description of the drawings to be hereinafter given, in which drawings—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a front elevation. Fig. 3 is a partial vertical section on line *x x* on Fig. 2. Fig. 4 is a front elevation with some of the devices removed and broken away in order to better illustrate the devices for holding the wire while the driving-gripers are released; and Fig. 5 is a partial horizontal section on line *y y* on Figs. 1, 2, and 3.

A is the frame of the machine, having mounted in suitable bearings formed therein the driving-shaft B, upon the front end of which is firmly secured the scroll-cam C, and upon its rear end the crank D; or, instead of the crank D, a pulley may be secured thereon, by means of which rotary motion may be imparted to said shaft in an obvious manner.

E is the driving-bar, made rectangular in cross-section, and divided longitudinally into two equal parts, which are secured together by screws, so as to form a rigid bar, said bar being fitted to and adapted to be moved up and down in a vertical groove formed for the purpose in the front face of the frame-head, where it is retained by the caps F and F′, as shown.

In the inner face of each of the parts of the bar E is formed a semicircular groove, extending from the lower end of said bar upward for about two-thirds (more or less) of the length of said bar, which, when said parts are secured together, form a circular tube, through which the wire *a*, from which the nails are to be cut, passes to the shoe, said wire being introduced to said tube through the slot *b*, cut through the front part of the bar E, as shown in Figs. 2 and 3.

That portion of the bar E which projects above the frame-head is turned round to receive a series of leather washers, *c c*, metal washer *d*, and the threaded nut *e*, which clamps the washers *c c*, and holds them in position.

The bar E is raised up by the action of the cam C upon the anti-friction roll *f*, mounted upon a stud set in the back side thereof, and is again forced downward with a sharp, quick blow, when the scroll-cam is revolved far enough for the roll *f* to drop off from the point of the cam by the tension of the spring G.

Upon either side of the bar E is placed a spring-jaw, *g*, the movable end of which projects into a slot, *h*, cut through the center of the bar parallel with its line of division, each of said jaws having formed in the inner face of its movable end a semicircular groove, so that said jaws embrace, partially surround, and gripe the wire placed between them to hold it in position when the driving-griper is released therefrom and is moving upward with the bar E, the tension of the spring-jaws *g g* being regulated by means of the set-screws *i i*.

The front portion of the bar E has pivoted thereto the griping-jaw lever H, which plays through a slot cut therein for the purpose, moving in a plane at right angles to the plane of division of said bar, and engaging by its short arm or toe with the wire to be driven, which it partially surrounds by virtue of a vertical serrated groove formed therein, pressing it hard against the serrated or roughened inner end of the screw *j*, set in the rear portion of the bar E, as shown in Fig. 3, said lever and screw co-operating to gripe the wire with sufficient firmness to compel said wire to move with the bar E when it descends and force it into the sole of the shoe the desired distance.

The lever H is made to gripe the wire *a* by the upper end of its long arm being thrown outward by the inclined lower end of the block *k*, provided with the stem or rod *k*′, extending

upward therefrom through block l, fitted to slide vertically in bearings formed in the cross-head I, which in turn is fitted by dovetailed bearings to the slides J, said stem or rod k^1 being provided at its upper end with an enlargement or head, k^2, and is surrounded between said head and the block l by a spiral spring, k^3, which serves to hold the block l in its lowest position in contact with stops to limit its downward movement, and the block k in its extreme upper position, and bearing against the same stops (not shown) to limit its upward movement.

A small tube, m, is screwed or otherwise secured into the lower end of the bar E, to serve as a prolongation of the guideway for the wire a, and prevent it from crippling when it is being driven into the boot or shoe sole, said tube playing into and out of the vertical hole formed in the nose-piece L, secured in a fixed position to the lower end of the frame-head, as shown.

M is a pair of cutting-nippers pivoted together and to the nose-piece L by the bolt n, provided with a transverse hole, through which the wire a passes to reach the shoe-sole, said cutters being so arranged relative to the driving-bar E that the last part of the downward movement of the bar E, after the wire has been driven into the sole and the gripe of the lever H upon the wire is released, shall cause the cutting-nippers to close upon and sever the wire just above the surface of the sole by said bar entering between the long upper arms of the nipper-levers and forcing them apart, the spring o drawing said arms toward each other again and opening the cutters, when the bar E is again moved upward, the pins p p limiting the inward movement of said arms, and consequently the amount of opening to be given to the cutters.

The mechanism for supporting the boot or shoe and for feeding the same, forming no part of my present invention, is not shown.

The operation of my invention is as follows, viz: The wire a being inserted in the tube in the center of the bar E in the position shown in Fig. 3, and the different parts of the machine being in the positions represented in the drawings, if the cam C be revolved in the direction indicated by the arrow, the bar E is moved upward, carrying with it the lever H and fixed jaw-screw j, while the wire a is held in a fixed position by the gripe of the spring-jaws g g till the upper end of the lever H is thrown outward by coming in contact with the inclined lower end of the block k, which causes the short arm or toe of the lever H to gripe the wire a with sufficient force to cause it to be moved upward with the bar E, regardless of the friction of the jaws g. As the bar continues to move upward, the upper end of the lever H passes across the outer surface of the block k, which cannot move upward, and onto the front face of the block l, which moves upward with the lever H and bar E till they have reached the highest points of their upward movement and descends with them till the nail is driven, serving to maintain the gripe of the lever H upon the wire till it is driven into the shoe to the desired depth. The upward movement of the bar E causes an increased tension of the spring G, which, reacting upon said bar E when the toe of the cam C passes from under the anti-friction roll f, causes said bar to be forced downward with a sharp, quick blow, carrying with it the wire a, and forcing it into the sole of the boot or shoe to the desired depth. In the descent of the bar E the block l moves with it till said block comes in contact with shoulders or stops (not shown) in the lower end of the cross-head I, when its downward motion ceases, and the lever H moves off from it and rests upon the block k, which then moves downward with said lever and the bar E, compressing the spring k^3 till the collar or shoulder k^4 on the head k^2 comes in contact with the upper side of the bearing in which the head k^2 reciprocates, and prevents farther downward movement of the block k, when the lever H passes off from said block, thus releasing the gripe upon the wire, the lever H having its upper end thrown inward by the inclined surface r thereof coming in contact with the stationary lug s. A further downward movement of the bar E causes its lower end to come in contact with the inclined surfaces t t on the upper ends of the nipper-levers M, causing the cutting ends thereof to close upon and sever the wire, as before described.

The length of the wire to be driven and severed at each revolution of the cam C is determined by the positions of the blocks k and l relative to the upper end of the lever H, and may be adjusted at will by the thumb-screw N acting upon the cross-head I to move it up or down in the slides J.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The driving-bar E, made in two parts, divided longitudinally, and provided with a central longitudinal tube or passage, through which the wire to be driven is fed to the boot or shoe sole, substantially as described.

2. The driving-bar E, made in two parts, and provided with a central longitudinal tube or passage, through which the wire to be driven is passed, in combination with a pair of spring-jaws, g g, constructed, arranged, and adapted to operate substantially as and for the purposes described.

3. The combination of the driving-bar E, made in two parts, and provided with a central longitudinal tube or passage for the wire to be driven, the lever H, screw-jaw j, and the block k, all constructed, arranged, and adapted to operate substantially as and for the purposes described.

4. The combination of the cam C, bar E, provided with a central longitudinal tube or passage for the wire to be driven, the lever H, and screw j, mounted in said bar and moving therewith, the blocks k and l, and the adjustable cross-head I.

5. The combination of the adjustable cross-head I, block *l*, fitted to and adapted to be reciprocated in said cross-head, and the block *k*, provided with stem or rod k^1, head k^2, and collar or shoulder k^4, all constructed, arranged, and adapted to co-operate substantially as and for the purposes described.

6. The combination of the bar E, provided with the anti-friction roll *f*, the cam C, spring G, mechanism for clamping the wire to be driven to the driving-bar, and the cutting-nippers M, arranged as set forth, and adapted to be operated by the downward movement of the bar E, substantially as described.

7. The combination, with the bar E, lever H, and screw-jaw *j*, set therein, of the block *k*, for moving the lever H in one direction, and the lug *s*, for moving it in the opposite direction, substantially as described.

Executed at Boston, Massachusetts, this 7th day of June, A. D. 1879.

ORRIL R. CHAPLIN.

Witnesses:
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E. A. HEMMENWAY.