(No Model.) 3 Sheets—Sheet 1.

F. CHASE.

FEEDING MECHANISM FOR BOOT AND SHOE SEWING MACHINES.

No. 314,516. Patented Mar. 24, 1885.

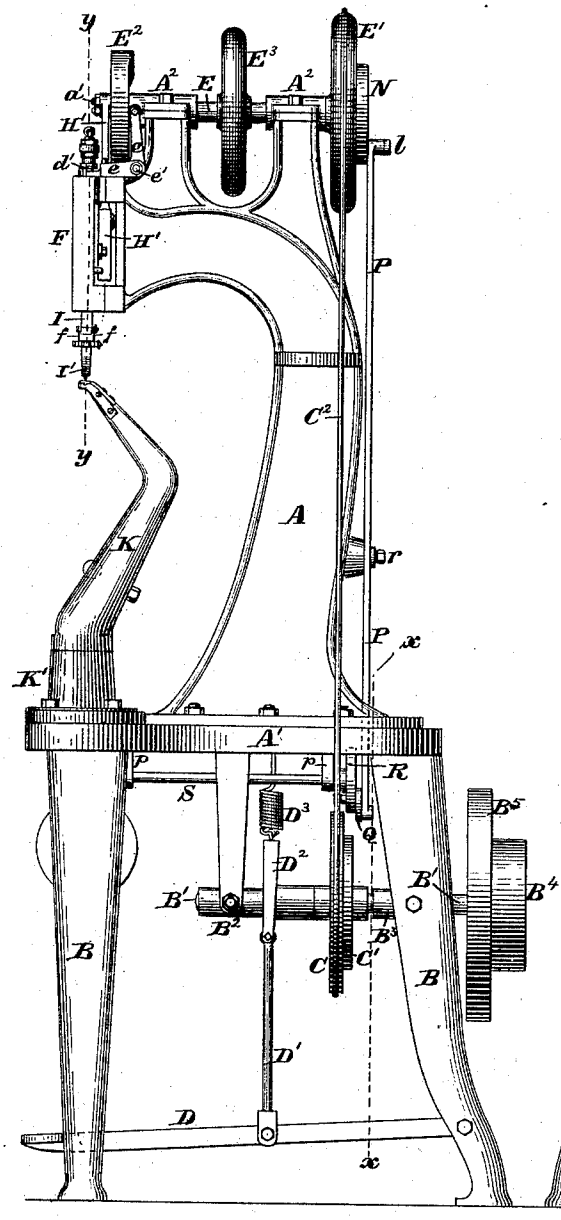

Fig. 1.

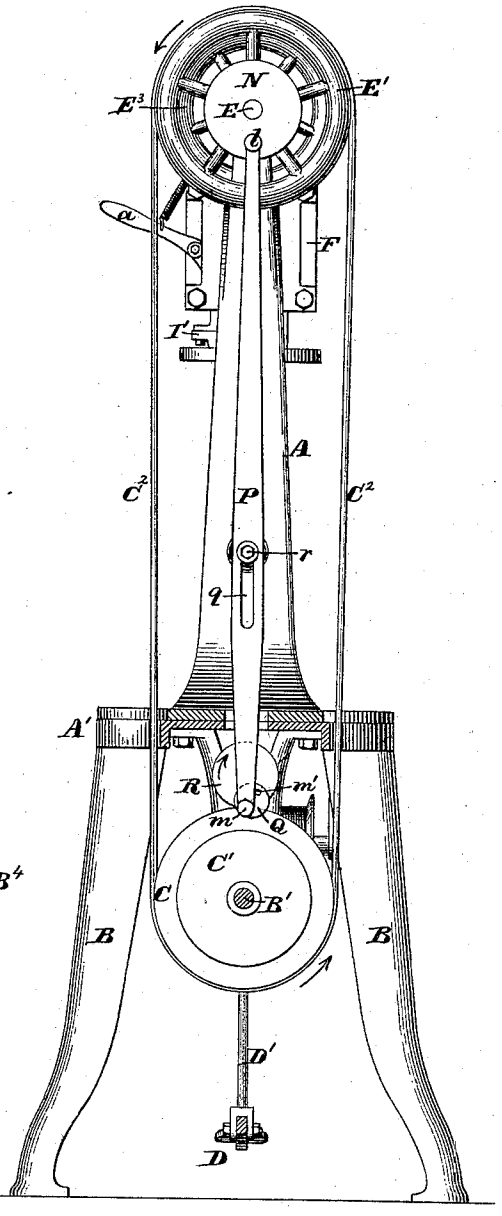

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

F. CHASE.

FEEDING MECHANISM FOR BOOT AND SHOE SEWING MACHINES.

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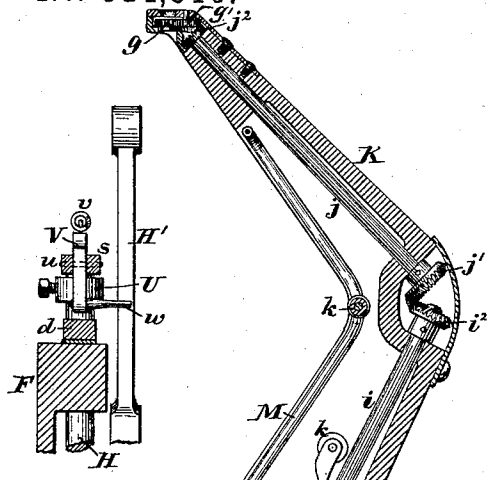

Fig. 6.

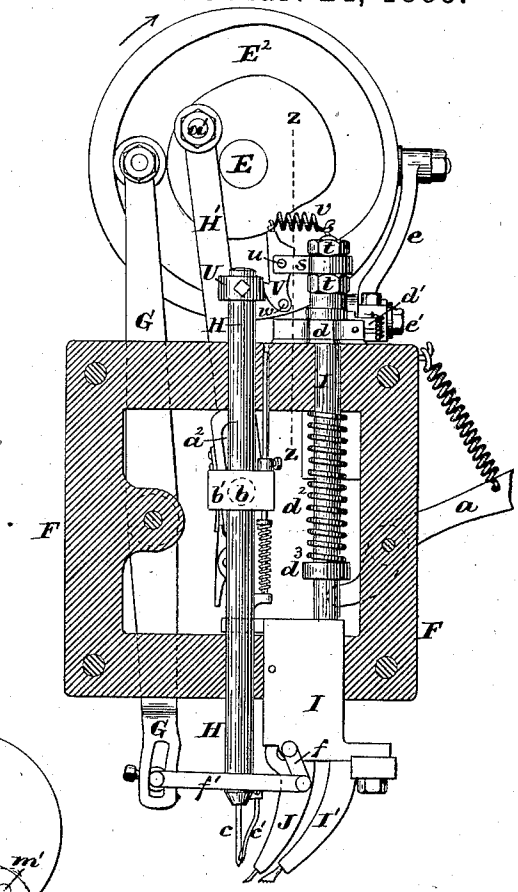

Fig. 5.

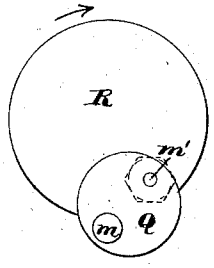

Fig. 4.

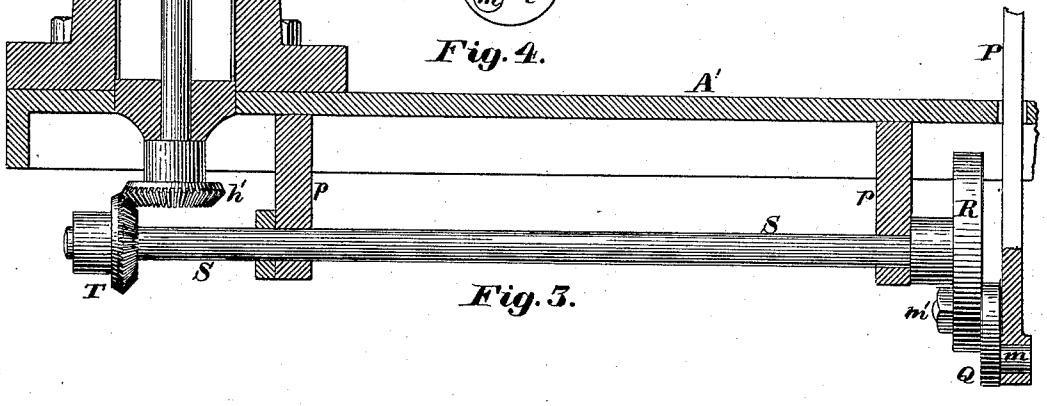

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

F. CHASE.

FEEDING MECHANISM FOR BOOT AND SHOE SEWING MACHINES.

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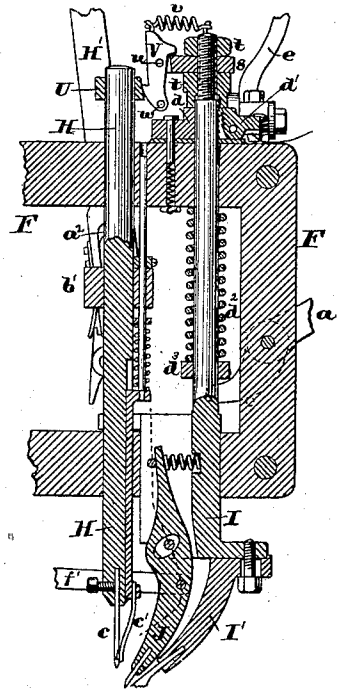

Fig. 7.

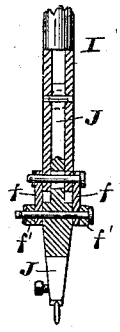

Fig. 8.

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UNITED STATES PATENT OFFICE.

FRANK. CHASE, OF BOSTON, MASSACHUSETTS.

FEEDING MECHANISM FOR BOOT AND SHOE SEWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 314,516, dated March 24, 1885.

Application filed April 4, 1884. (No model.)

To all whom it may concern:

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

My invention relates to that class of wax-thread sewing-machines which are used for sewing the soles to the uppers of boots and shoes; and it consists in means whereby the presser-foot bar is caused to act upon the needle-bar to raise the latter simultaneously with the presser-foot just previous to the feeding of the work, so that the needle will act through the medium of the loop of thread which it carries, and which is attached at its lower end to the work, to raise the latter from contact with the end of the work-supporting horn, thus preventing the friction caused by such contact during the motion of feeding.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a sectional rear elevation of the same, the section being taken on line *x x* on Fig. 1. Fig. 3 is a central vertical section of the work-supporting horn and the table upon which it is mounted. Fig. 4 is an elevation of a crank-disk and eccentric or link connected thereto, to be hereinafter referred to. Fig. 5 is a vertical section on line *y y* on Fig. 1, showing the working parts in elevation; and Fig. 6 is a vertical section on line *z z* on Fig. 5. Fig. 7 is a vertical section in a plane cutting through the centers of the needle and presser bars, and Fig. 8 is a partial vertical section of the presser-bar and feed-point and illustrating the manner of connecting them together. Figs. 3, 4, 5, 6, 7, and 8 are drawn to scales considerably larger than Figs. 1 and 2.

A is the standard of the machine, supported upon and bolted to the top of the table A′, which in turn is supported upon the three legs B B B, two at the front and one at the rear of the machine.

B′ is the driving-shaft, mounted at its front end in the bearing B^2, secured by a suitable hanger to the under side of the table A′, and near its rear end in the bearing B^3, secured to the rear leg B, said shaft having made fast upon it at its extreme rear end the driving-pulley B^4 and fly-wheel B^5.

Mounted loosely upon the shaft B′ is a pulley, C, which, in conjunction with a disk, C′, made fast upon said shaft, and a suitable piece of leather interposed between said pulley and disk, constitutes a friction-clutch, which may be operated by means of the treadle-lever D, link D′, wedge D^2, and spring D^3 in a well-known manner to throw the pulley C into or out of gear with the disk C′ upon the constantly-revolving driving-shaft and start or stop the operation of the machine. Motion is communicated from the pulley C by means of the belt C^2 to the pulley E′, made fast upon the rear end of the cam-shaft E, mounted in bearings A^2 A^2 at the top of the standard A, and carrying at its front end the cam-disk E^2 and near the middle of its length the hand-wheel E^3.

To the front upper portion of the standard A is secured the removable plate F, having pivoted to its rear side the feed-lever G and the presser-foot lifter *a*, and being provided with bearings for the needle-bar H and the presser-foot bar I. The needle-bar may be vertically reciprocated in any well-known manner, provided that the means for imparting said reciprocation shall not prevent the needle-bar from being raised by a secondary device to a point above that to which it is carried by the reciprocating mechanism. In the present instance the desired reciprocation is imparted to the needle-bar by means of the pitman or connecting-rod H′, attached at its upper end to the crank-pin *a′*, and provided at its lower end with the slot a^2, Fig. 5. A stud (indicated by a dotted circle at *b*, Fig. 5) is set in the block *b′*, secured upon the needle-bar, and projects from the rear of said block into the slot a^2, and thus when the connecting-rod H′ has reached its highest position the slot a^2 will permit the needle-bar to be still further raised if acted upon by a secondary means, as will be hereinafter described. The needle-bar carries at its lower end the barbed needle *c*, and a cast-off, *c′*, is arranged to work in conjunction therewith in a well-known manner. The presser-foot bar I carries at its lower end the presser-foot I′, adjustably secured thereto, and is provided near its upper end and just above its upper bearing with the block *d*, loosely

surrounding said bar and carrying the pawl d', which is adapted to engage with a series of ratchet-teeth formed upon the side of the presser-bar, as shown in Fig. 7. A bell-crank lever, e, Figs. 1 and 5, is pivoted at e' to the main frame, and carries at the upper end of its vertical arm a small roll, which is acted upon by a cam formed by a rib projecting rearwardly from the edge of the cam-disk E^2, the horizontal arm of said lever being provided with a toe, which lies beneath the outer end of the pawl d', and acts at the proper time to raise said pawl and bring it in contact with the teeth upon the presser-bar, and then by a continuation of its movement to raise the presser-foot from the work. A downward pressure is given to the presser-foot by the spring d^2, acting upon the collar d^3 in a well-known manner.

J is the feed-point lever carrying at its lower end a suitable feed-point, and connected to the lower end of the presser-bar by a pair of short links, f, motion being imparted from the feed-lever G to said feed-point by means of a link or pair of links, f', as shown in Fig. 8. The feed-lever G receives motion from the cam E^2 by means of a roll mounted at the upper end of said lever and working within a path in the front face of said cam.

K is the work-supporting horn, mounted at its lower end in the socket K', secured upon the table A', said horn carrying in its upper end or tip the whirl g, Fig. 3, of the usual construction.

In the lower end of the horn K is mounted a vertical shaft, L, carrying at its upper end the bevel-gear-wheel h, and at its lower end the bevel gear-wheel h'. The rotary motion of the shaft L is imparted to the whirl g through the medium of the bevel gear-wheel i', inclined shaft i, bevel-gears i^2 and j', inclined shaft j, bevel-pinion j^2, and combined bevel and spur pinion g', all as shown in Fig. 3.

M is a steam-pipe placed in the hollow of the horn, and $k\ k\ k$ are small pulleys to guide the thread on its way to the whirl.

The foregoing description relates to mechanism which is not of my invention, a greater portion of it being well known, and hence does not require a more extended explanation.

To the rear end of the shaft E is secured the disk N, Figs. 1 and 2, carrying the crank-pin l, to which is connected the upper end of the long connecting-rod P, the lower end of which is attached by a pin, m, to the eccentric or link Q, pivoted in turn by a pin, m', to the crank-disk R, mounted upon the rear end of the horizontal shaft S, arranged to revolve in bearings $p\ p$, secured to the under side of the table A, Fig. 3, and carrying at its front end the bevel gear-wheel T, which engages with the bevel gear-wheel h' before mentioned. The crank-disk R and link Q pivoted thereto are shown in elevation at Fig. 4 detached from the other parts. The connecting-rod P is provided with a longitudinal slot, q, Fig. 2, somewhat below the center of its length, through which slot passes the stud r, screwed into a boss projecting from the rear of the standard A, and hence said connecting-rod may have a combined reciprocating and swinging motion, with the stud r as a guide or fulcrum. As the disk N revolves and imparts motion to the connecting-rod P, (the stud r being located nearer to the lower than to the upper end of said rod,) the pin m at said lower end will be caused to describe an oval or egg-shaped path about the axis of the shaft S, the longest diameter of said oval being a vertical line, and the end of the rod P being connected by the link Q to the disk R, the latter will be rotated, together with the shaft S, in a direction opposite to that in which the shaft E is revolving, and will rotate once to every revolution of the shaft E, but with a speed which will be alternately increased and diminished twice during each revolution. At the time when the connecting-rod P is near the middle of its stroke, moving either upward or downward, the shaft S will be moving at one of its fast speeds, and when the rod P is near its highest or lowest position the shaft S will be moving at one of its slow speeds. The motion of the shaft S is communicated to the shaft L by the bevel gear-wheels T and h' before mentioned, and thence to the whirl g by the various gear-wheels and inclined shafts previously referred to. The link Q compensates for the difference between the oval path of the pin m and the circular path of the pin m', and is made of such a length that, when the rod P is in its highest or lowest position, the pin m' will be at one side of the center line of said rod, as in Figs. 2 and 4, so that the pin m' may always follow the pin m at a greater or less angular distance therefrom, and thus prevent any jamming or any tendency of the disk R to turn in the wrong direction, as might be the case were the link Q shortened so as to be in line with the rod P when in its highest or lowest position.

As a means of reducing the wear upon the stud r, a block may be mounted thereon and fitted to the slot q so that the rod P will slide upon said block and the latter will oscillate upon the stud r.

The above-described mechanism for operating the whirl should be so adjusted that when the latter is moving at its highest speed it will be operating to draw the thread around the needle preparatory to the formation of the loop, and thus perform its function in a minimum period of time, and in as effectual a manner as by means of an oscillating or an intermittently-rotating motion, while the various gear-wheels employed to transmit motion to said whirl will run much more smoothly than when the motion is being constantly reversed, as is the case with the oscillating motion, and the sudden starting and stopping consequent upon an intermittent rotation in the same direction is entirely obviated.

The mechanism for imparting a variable speed to whirl above described forms the sub-

ject-matter of another application of mine filed December 1, 1884, and numbered 149,362.

My invention relates to a means of automatically raising the needle-bar simultaneously with the presser-foot to relieve the pressure of the work upon the horn, and thereby facilitate the feeding of the work; and it consists in attaching to the presser-bar I at its upper end a short hooked lever or dog, V, pivoted at *u* to an arm, *s*, adjustably secured by means of the nuts *t t* to the upper end of the presser-bar I, said dog being adapted by its hook to engage with the collar U, secured upon the needle-bar at its upper end, the hook being pressed against said collar by the action of the spring *v*, all as shown in Figs. 5 and 6.

In the lower end of the dog V is set a pin, *w*, which projects toward the cam E^2 and intercepts the plane of motion of the connecting-rod H′, so that the lateral movement of the rod will cause it to strike said pin and disengage the dog from the collar U. As the needle-bar reaches the top of its stroke, the needle having drawn the loop up to its fullest extent with the thread taut, the hook of the dog V will snap beneath the collar U. The presser-foot is then raised, and by means of the dog V carries the needle-bar up with it, and raises the work by means of the loop of thread connecting it with the needle, thus relieving all pressure of the work upon the horn preparatory to feeding. The feed point then acts upon the work, and the presser-foot then descends to its former position, while the continued lateral movement of the connecting-rod H′ causes the disengagement of the dog V, as before mentioned, and allows the needle-bar to descend.

It is obvious that the dog V may be connected to the presser-bar at any other convenient point, and that other means may be employed to effect the disengagement of said dog.

In the machine illustrated in the drawings the stroke of the needle-bar is automatically varied in length according to the thickness of the sole or work being sewed by means of a device working in conjunction with the connecting-rod H′. This device forms no part of my invention.

Heretofore a considerable difficulty has been found in effecting the proper feeding of the work, inasmuch as the downward pressure of the feed-point will cause a considerable friction between the work and the horn. The inner surface of the sole has various inequalities, and the needle often acts to press the leather more or less into the cavity above the whirl at the tip of the horn, all of which tends to retard the feeding of the work and produce stitches of irregular lengths.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination of a reciprocating needle-bar, co-operating feeding and stitch-forming mechanism, a presser-bar, and means whereby it is adapted to be automatically raised to relieve the pressure on the work during the operation of feeding, a spring-actuated dog pivoted to said presser-bar and adapted to engage with a shoulder upon the needle-bar, and means of disengaging said dog from the needle-bar, substantially as and for the purposes described.

2. The combination of the reciprocating needle-bar H, co-operating feeding and stitch-forming mechanism, the presser-bar I, and means whereby it is adapted to be automatically raised to relieve the pressure on the work during the operation of feeding, the spring-actuated dog V, pivoted to the presser-bar I, and adapted to engage with a shoulder upon the needle-bar, the pin *w*, set in the dog V, and the connecting-rod H′, adapted by its lateral motion to act upon the pin *w* to disengage the dog V from the needle-bar, substantially as and for the purposes described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 26th day of March, A. D. 1884.

FRANK. CHASE.

Witnesses:
N. C. LOMBARD,
WALTER E. LOMBARD.