

**F. CHASE.**  
**MACHINES FOR UNITING THE UPPERS AND SOLES OF BOOTS**  
**AND SHOES.**

No. 181,522.

Patented Aug. 29, 1876.

Fig. 1.

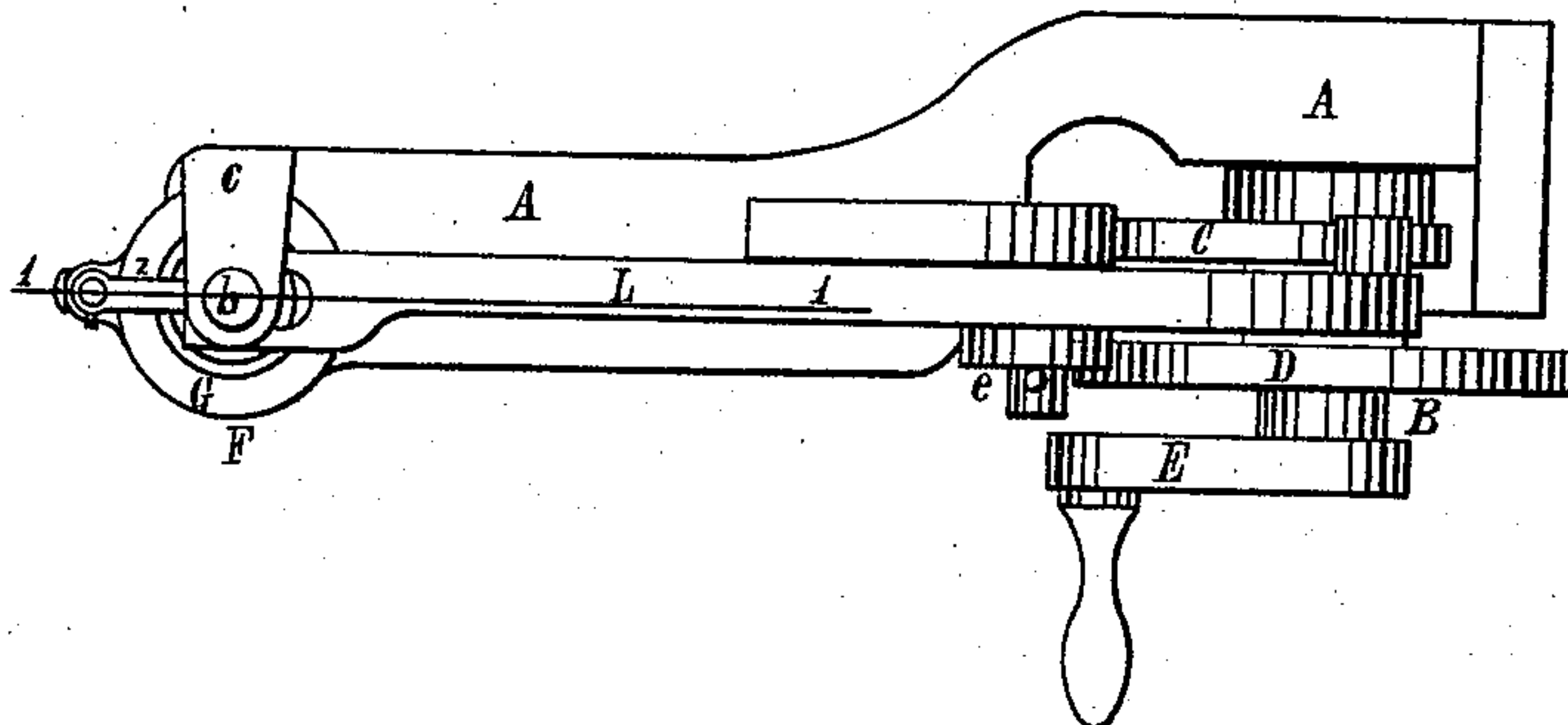
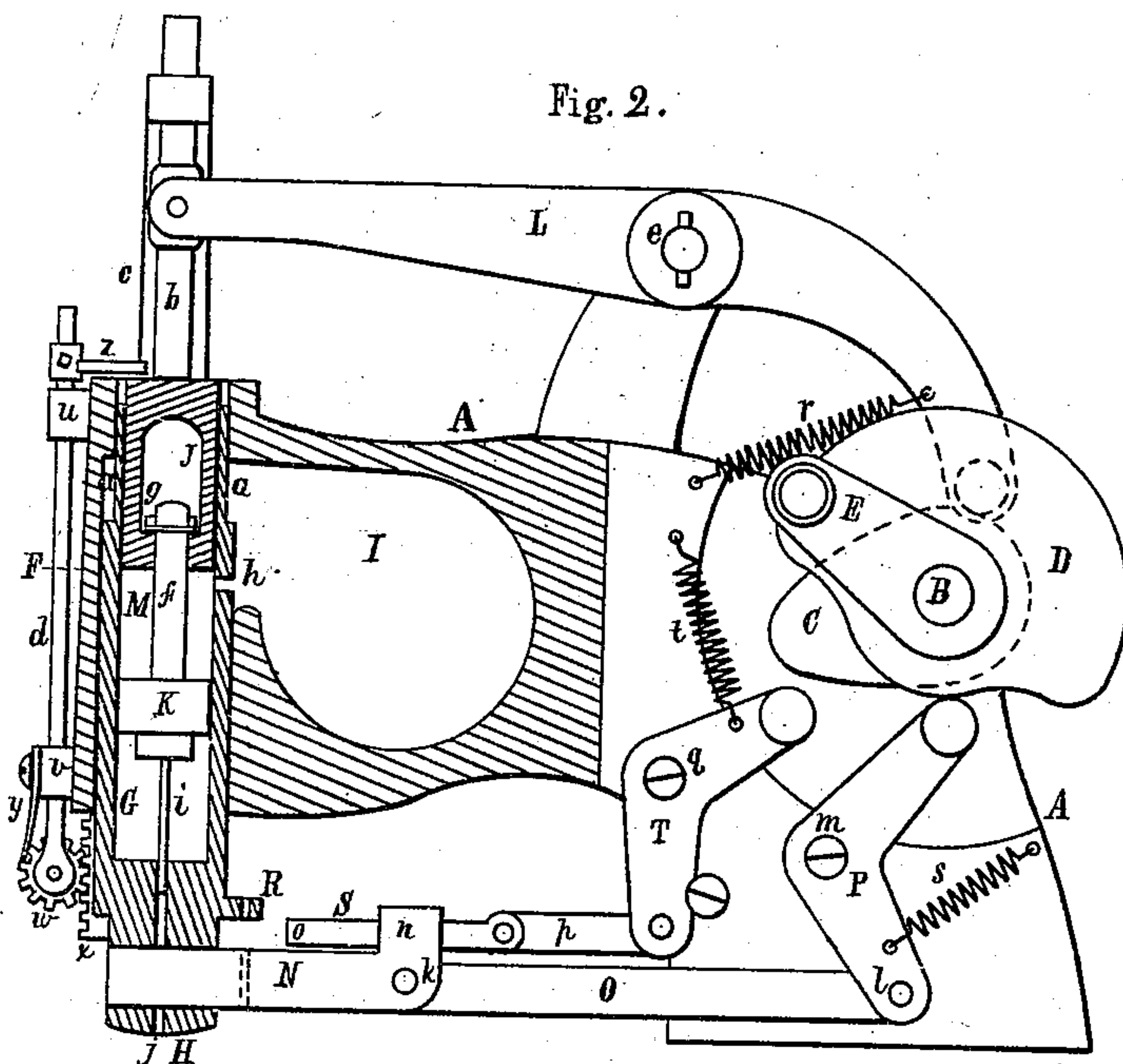


Fig. 2.



Witnesses;

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# UNITED STATES PATENT OFFICE.

FRANK CHASE, OF BOSTON, ASSIGNOR OF ONE-HALF HIS RIGHT TO  
MARTIN V. B. PAIGE, OF LAWRENCE, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR UNITING THE UPPERS AND SOLES OF BOOTS AND SHOES.

Specification forming part of Letters Patent No. **181,522**, dated August 29, 1876; application filed  
April 3, 1876.

*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 a new and useful Improvement in Sole-Fastening Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

My invention relates to a machine for fastening the uppers to the soles of boots and shoes by nails or similar fastenings, and when hereafter I use the word "nail," or its derivatives, I refer to any fastening which is put in place by driving, as nails, pegs, or short lengths of wire formed for the purpose.

My invention has for its object, first, to regulate the distance of travel of the driving-rod by air under pressure, acting between two pistons; secondly, to press the presser-foot upon the work by compressed air; thirdly, to so locate and operate the nail-carrier that it shall have a rectilinear motion both in feeding and in its movement with the presser-foot; fourthly, to raise the presser-foot, after every stroke, to ease its pressure on the work, with the upward motion of the driving-bar; also, such special contrivances as are hereinafter described.

In the drawings, Figure 1 is a plan view of so much of a sole fastening or nailing machine as is necessary to illustrate my invention. Fig. 2 is a side elevation of machine of Fig. 1, showing such parts in a vertical section on line 1 1 of Fig. 1 as are thus better illustrated.

A is the standard and arm, supporting the working parts of the portion of the machine shown. With or on the shaft B revolve the cams C and D, the application of the motive-power being, as here shown, by means of the crank E. The arm A is formed and bored at F to receive the inclosed sliding cylinder G, which has, as one piece with it, or firmly connected to it, the presser-foot H. I is a chamber, formed in the standard or arm A for containing air under such pressure as the work may require.

The means for supplying air to the chamber

I, and for maintaining its pressure therein, are those well known, and not necessary here to show or describe.

The cylinder G is so formed at *a* as to leave an annular space between it and the cylinder in which it slides, and to have a shoulder on the sleeve at *a*, on which the air in chamber I may press, thus operating to press the presser-foot H on the work placed thereunder. Within the cylinder G, bored out for the purpose, are the two pistons J and K. The upper piston J is joined firmly to the rod *b*, which, for further guidance, slides in the arm of stand *c*. The rod *b* is connected to the lever L, which, swinging on the pivot *e*, is operated by the cam C.

The piston K slides freely in the cylinder G, being further guided by the rod *f*, joined to it, and sliding in the bottom of piston J. The rod *f* has as top or pin, *g*, by which, meeting the inner flange of the piston J, the piston K is lifted.

An opening, *h*, in the cylinder G allows air from the chamber I to enter the space M between the pistons, when the piston J passes above the opening *h*.

To the piston K is firmly fastened the driving-rod *i*, which slides in the opening *j* in the presser-foot H.

In the presser-foot slides, at right angles to it and the sleeve, the nail-carrier N, which is connected to the lever P by the rod O, pivoted at *k* and *l*. The lever P is pivoted at *m*, and is operated by the cam D.

To the cylinder G is fastened the holder R, which receives, by known mechanism not necessary here to show or describe, the rod or bar from which the nails are cut, and which is held in the opening shown in the holder R.

Through a projection, *n*, on the nail-carrier N slides a bar, S, which is formed, at the end *o*, as a cutter, to so cut the nails from the nail rod or bar as to both form a proper surface for driving on the head of the nail cut off and form a point for the next nail. The bar S is connected to the lever T by the rod *p*, which is pivoted to each, as shown.

The lever T, pivoted at *q*, is operated by the



cam D. The levers L, P, and T are moved counter to the pressure of the cams thereon by the springs *r*, *s*, and *t*.

In suitable guides or stands *u* and *v* slides the rod *d*, which holds and carries the pinion *w*. This pinion works in a rack, *x*, fastened to the cylinder G and presser-foot H. Fixed to the arm A, as by the stand *v*, is the pawl *y*, which, as a spring or by swinging on a pivot, engages the teeth of the pinion on the upward motion thereof. Instead of the pawl acting directly on the pinion *w*, it might act on a ratchet-wheel, fastened to the side of the pinion. The rod *d*, carrying the pinion, has an adjustable arm, *z*, at its upper end, which projects over, and is raised, together with the rod *d* and pinion *w*, by and at the same time with the last part of the upward movement of the piston J.

The parts of the mechanism being arranged substantially as shown and described, the operation is as follows; The compressed air in chamber I constantly presses on the shoulder *a*, and tends to keep the presser-foot H on the article to be nailed. Compressed air also fills the space M between the pistons. The rod or bar from which the nail is to be cut has been thrust down the opening in the holder R, and opening in the nail-carrier N. On the revolution of the cam D the nail-cutter S moves forward and cuts off a nail, which remains in the opening in the nail-carrier. The cam D then operating on the nail-carrier N carries the nail under the opening *j*. The cam C, revolving with the cam D by means of the lever L, presses the piston J downward, which, passing below the opening *h*, further compresses the air in the space M, and drives the piston K and nail-driver I, and the nail is driven home. The elasticity of the air in space M allows the driving-rod to be stopped when it has gone the proper distance required for the nail to enter the stock sufficiently far. The reverse movements of the nail-carrier, cutter, and piston J take place on the continued revolution of the cams C and D. The piston J, by means of the stop *g*, raises the piston K with driving-rod. The article to be nailed is then carried forward by known mechanism, not necessary here to be described.

Now, the presser-foot H rises or falls accord-

ing to the thickness of the stock on which it rests, and by this movement the rack *x* is carried up and down, and the pinion *w* is revolved thereby; but when the piston J is raised far enough to strike the arm *z*, the pinion *w* is carried upward until it strikes the pawl *y*, when, by means of the pinion which now acts as a lever on the further upward motion of the piston J, the cylinder G and presser-foot H are lifted a slight distance. Thus at every upward stroke the presser-foot is eased from the work, so that the latter may pass under it freely.

By pivoting and connecting the rods O and *p* to the nail carrier and cutter, as shown and described, the nail cutter and carrier may follow the presser-foot in its upward and downward movements, and maintain the same angular position relative thereto.

I claim as my invention—

1. In a sole-fastening machine, the combination of pistons J and K, for operating the driving-rod, one being moved by the other by means of compressed air, all substantially as and for the purpose set forth.
2. In a sole-fastening machine, the presser-foot H, working by the pressure of compressed air, substantially as and for the purpose described.
3. The combination of pistons J and K, cylinder G, and driving-rod *i*, substantially as shown and described.
4. In combination, the nail-carrier N and presser-foot H, having a vertical movement together, all as shown and described.
5. In combination, the nail-cutter S, with holder R and presser-foot H, all having a common movement together, substantially as set forth.
6. The rack *x* and pinion *w*, when arranged to operate in combination with the presser-foot H, substantially as and for the purpose set forth.
7. The pinion *w*, pawl *y*, and rack *x*, all arranged in combination to move the presser-foot, substantially as set forth.

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Witnesses:

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