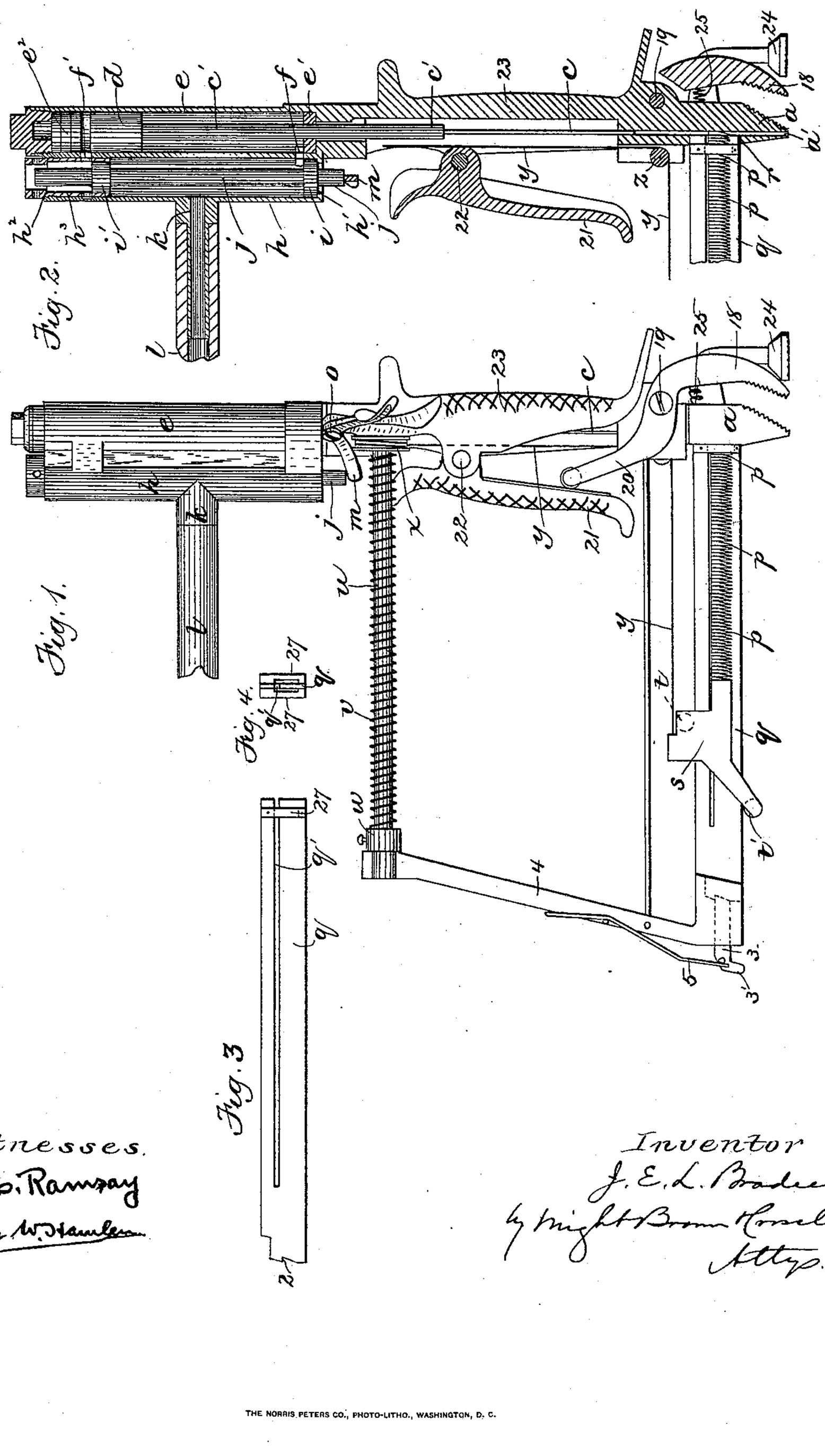
(No Model.) 2 Sheets—Sheet 1.

J. E. L. BRADEEN.

TACKING MACHINE.

No. 451,995. Patented May 12, 1891.



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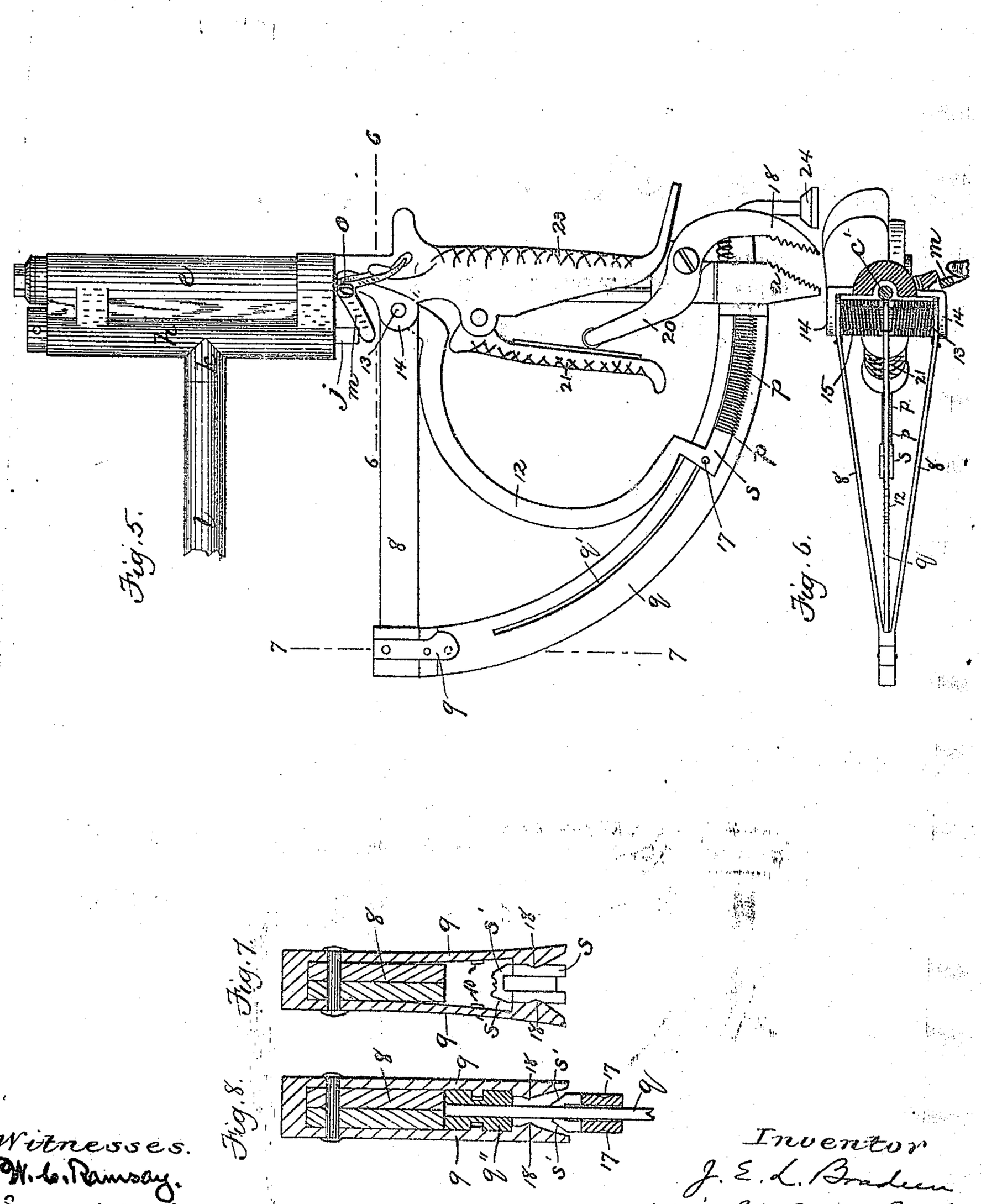

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JOSHUA E. L. BRADEEN, OF SOUTH BERWICK, MAINE, ASSIGNOR OF ONE-HALF TO DAVID CUMMINGS & CO., OF BOSTON, MASSACHUSETTS.

TACKING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 451,995, dated May 12, 1891.

Application filed January 10, 1890. Serial No. 336,516. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA E. L. BRADEEN, of South Berwick, in the county of York and State of Maine, have invented certain new and useful Improvements in Tacking-Machines, of which the following is a specification.

This invention has for its object to provide a portable tacking-machine adapted to be held and moved about by one hand of an operator for driving metallic staples into the upper and inner sole of a boot or shoe for the purpose of temporarily connecting said upper and inner sole in the operation of lasting.

The invention consists as a whole in an organized hand-machine, in which are combined a supporting-frame having a handle adapted to be grasped by the operator and provided with a throat or channel arranged to guide staples into the work to which the machine is presented, a removable staple-holder or chute arranged to deliver staples to said throat and provided with a spring-impelled feeding device or follower, whereby a row of staples on said chute are pressed forward as fast as they are driven, a driver arranged to pass through said throat and eject staples therefrom one at a time, and a pneumatic operating device for said driver, whereby the driver may be forcibly depressed to drive a staple and raised preparatory to driving another staple.

The invention also consists in the combination, with a portable frame and a staple-holder or chute, a driver, and a driver-operating device carried by said frame, of a pair of pincher-jaws and a fulcrum therefor, said jaws and fulcrum being relatively arranged, as in a pair of lasting-pinchers, one jaw constituting the throat through which the staples are driven and the other being movable toward and from said throat, the arrangement being such that the operator can use the jaws in drawing the edge of the upper over the bottom of the last, and then, while holding the drawn-over portion of the upper in place, can drive a staple through the said combined throat and jaw, and thereby fasten the upper close to the point where it is held by the jaws.

The invention also consists in certain minor improvements incidental to the foregoing, all of which I will now proceed to describe and claim.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of a tacking-machine embodying my invention. Fig. 2 represents a longitudinal section through the handle, the nail-guiding throat, and the pneumatic driving mechanism. Fig. 3 represents a side view, and Fig. 4 an end view, of the detachable staple-holder or chute removed from the machine. Fig. 5 represents a side view of a tacking-machine having a staple-holder or chute of segmental form. Fig. 6 represents a section on line 6 6, Fig. 5, looking downwardly. Fig. 7 represents an enlarged section on line 7 7, Fig. 5. Fig. 8 is a similar view taken through the end of the spring-pressed slide.

The same letters and numerals of reference indicate the same parts in all of the figures.

In the drawings, *a* represents the staple-guiding throat, which is formed on or attached to the frame of the machine and projects downwardly therefrom, so that its lower end, in which the staple-channel *a'* terminates, may be conveniently applied to the surface into which the staples are to be driven, the machine being held by the operator's hand and moved about from point to point to drive the staples wherever they may be desired.

c represents the driver, attached to a driver-bar *c'*, which is adapted to reciprocate and carry the driver back and forth in the staple-channel *a'*. To the driver-bar is attached a piston *d*, which is fitted in a cylinder *e*, affixed to the frame of the machine, and is provided with ports *f f'*, one near its lower and the other near its upper end. Said ports communicate with a valve-cylinder *h*, which contains a double puppet-valve composed of two heads *i i'* and a connecting-stem *j*. The valve-cylinder has an air-inlet *k* about midway between its ends, and said inlet is connected by a flexible tube *l* with a suitable air-compressor adapted to supply compressed air to the valve-cylinder *h*. The valve-heads *i i'* are arranged in such relation to the ports *f f'* that when the valve is at the lower extreme of its movement, as shown in Fig. 2, the lower port *f* will

be in communication with the valve-cylinder *h* and with the air-inlet *k*, so that the compressed air will enter the lower end of the cylinder *e* and force the piston upwardly, thereby raising the driver. When the valve is in the position last described, its stem projects below the lower end of the cylinder *h* and bears upon a lever *m*, which is pivoted at *o* to the frame of the machine. Said lever is arranged to be moved by the operator in the direction required to raise the valve *j*. I have here shown one arm of the lever *m* in such proximity to the handle by which the operator grasps and holds the machine that the thumb of the hand that grasps said handle can move the lever in the direction indicated. When the lever is raised a short distance, the head *i'* rises above the upper port *f'* and the head *i* rises above the lower port *f*, thus cutting off the connection between the compressed-air pipe *l* and the lower port *f* and putting said pipe in communication with the upper port *f'*. The compressed air in the cylinder below the piston is thus permitted to exhaust into the atmosphere through the lower port *f* and the open lower end of the valve-cylinder *h*, and the compressed air from the source of supply is at the same time admitted to the upper portion of the cylinder *e* above the piston *d*. The piston is thus forcibly depressed with the driver-bar and driver, and the latter is caused to drive a staple from the throat *a* into the upper and inner sole, against which said throat is held by the operator.

The lower valve-head *i* is larger than the upper head *i'*, and presents greater area to the air-pressure in the cylinder *h*, so that when the operator releases the lever *m* the air-pressure in the cylinder will force the valve downwardly to the position shown in Fig. 2, thus admitting the compressed air to the cylinder *e* through the lower port *f* and causing the elevation of the piston, with the driver-bar and driver, the air above the piston escaping at the same time through the upper port *f'* and the open upper end of the valve-cylinder *h*.

The staples *p* are supplied to the throat *a* by means of a staple-holder or chute *q*, which is constructed to be detachably applied to the machine and to hold a row of staples so that they can enter the channel *a'* one at a time. Said chute is a bar having a longitudinal slot *q'*, which is open at one end of the bar and is formed to receive the backs of the staples or the parts that connect the legs thereof, said legs hanging downwardly at the opposite sides of the bar. The throat *a* has a socket *r*, Fig. 2, formed to receive the end of the chute containing the open end of the slot *q'*.

s represents a spring-impelled feeding-slide, which is movable upon the chute and is adapted to press the row of staples forward toward the throat *a*. In the construction shown in Fig. 1 the chute or staple-holder is straight, and the feeding-slide *s* is provided with rollers *t t'*, arranged to run the one on the upper and the other on the lower edge of the chute. The spring *v*, which impels the slide, is mounted on a bar or rod *u*, and is of spiral form. One end of said spring is attached to a collar *w*, which is affixed to said rod, and the other end is attached to a pulley *x*, which is mounted to rotate loosely on the rod *u*. A cord *y* is attached to said pulley and passes under a pulley *z* to the upper portion of the feeding-slide, to which said cord is attached. When the slide *s* is moved back to the outer end of the chute *q*, the pulley *x* is rotated by the cord *y*, and the spring is "wound up" or put under increased tension, so that its tendency is to rotate the pulley in the opposite direction and impel the slide through the cord *y* toward the throat *a*, and thereby force the staples into said throat as fast as they are driven until the supply is exhausted.

The chute, formed as shown in Fig. 1 and in detail in Fig. 3, has a shoulder 2 at its outer end, which is engaged by a spring-pressed latch 3 in an arm 4, attached to the bar or rod *u*, said latch being movable endwise in a socket or guide in the arm 4 and pressed inwardly into engagement with the shoulder 2 by a spring 5, engaged with the arm 4 and bearing on the rear end of the latch 3. The arm 4 has a socket formed to receive the rear end of the chute *q*. The forward end of the chute is first inserted in the socket *r*, and the rear end is then swung upwardly into the socket in the arm 4 and secured therein by the latch 3. When it is desirable to remove the chute, the latch 3 is drawn back, whereupon the rear end of the chute may be swung downwardly out of the socket in the arm 4 and the forward end withdrawn from the socket *r*.

The chute, when removed from the machine, may be loaded with staples by engaging its forward end with a staple-making machine having devices to feed the staples forward into the slot *q'* as fast as they are made.

Two or more chutes may be provided for each machine, so that while one chute is supplying the staples to the driving devices another may be receiving its charge of staples.

In Fig. 5 I show the chute *q* made in segmental form and detachably secured at its rear end to a bar or arm 8, forming a part of the supporting-frame. To said arm are attached spring-ears 9 9, the inner sides of which have inwardly-projecting studs 10 10, which spring into recesses formed in the sides of an enlargement *q''* on the chute *q* at the rear end thereof. The feeding-slide *s* in this case is formed on the outer end of an arm 12, which is attached to a shaft 13, which is journaled in ears 14 14 on the frame of the machine. On said shaft is a spring 15, which is attached at one end to the shaft and at the other end to the arm 12, said spring being arranged to exert pressure on the arm 12 in the direction required to press the slide *s* toward the throat *a*, the slide being adapted to move back and forth in the arc of a circle on the segmental chute. The rear end of the slide is made

wedge-shaped, as shown at *s' s'*, Figs. 7 and 8, and when the slide is moved back it enters the space between the ears 9 9 and forces said ears apart, as shown in Fig. 7, thereby releasing the chute *q*. The slide *s* has recesses 17 17, which are engaged by projections 18 18 on the ears 9 9, the slide being thus held in said ears until the chute is reinserted between them.

From the foregoing it will be seen that the operator is enabled to hold the machine in one hand and present the throat *a* at any point where it is desirable to insert a fastening in the edge of a boot or shoe upper, during the operation of lasting, the fastening being driven by each upward movement of the valve of the pneumatic driving device.

I have here shown the throat *a* formed as a jaw which is serrated at one side, and in connection therewith I show a movable jaw 18, which is pivoted at 19 and has an arm or lever 20 arranged to be acted upon by a lever 21, which is pivoted at 22 to the supporting-frame, said lever 21 being located in such relation to the part 23 of the frame which serves as the handle of the machine that the operator can grasp said handle and move the lever 21 in the direction required to close the jaw 18 upon the throat or jaw *a*.

24 represents a foot which is attached to the frame of the machine, and is arranged in such relation to the jaws *a* and 18 that it is adapted to serve as a fulcrum-bearing on the inner sole while the upper is being drawn by said jaws over upon the bottom of the inner sole, the relative arrangement of the jaws *a* and 18 and foot 24 being the same as that of the jaws and foot or fulcrum of an ordinary pair of lasting-pinchers.

The operator is enabled by the described jaws and foot to draw the edge of the upper over upon the bottom of the sole and then fasten said edge to the inner sole by operating the driving mechanism, as above described, while the edge is being held by the jaws, the fastening being driven through the fixed jaw close to the point where the upper is grasped by the two jaws. A spring 25, interposed between the jaws *a* and 18, normally forces the latter back, as shown.

My invention is not limited to the use of the jaws and foot, and the machine can be used without the same. When the jaws and foot are not used, the cylinder *e* may be utilized as the handle of the machine, in which case the handle portion 23 will not be required.

The forward portion of the chute *q* is provided with side pieces 27 27, which extend across the slot *q'* and hold the divisions of the chute formed by said slot so that neither can spring away from the other. Said pieces 27 are cut away at their inner sides, as shown in Fig. 4, to permit the legs of the staple to pass them.

Referring to the construction shown in Fig. 1, the latch 3 has a downwardly-projecting lug 3', with which the roller *l'* on the slide *s* comes in contact when the slide is moved to the rear end of the chute. Said roller engages the outer edge of the arm 4, and thereby holds the slide in its retracted position while the chute is being removed and another inserted, and at the same time the slide bears against the lug 3', and thereby retracts the latch 3 and holds it retracted.

The described machine may be used for any operation in which it is desirable to drive independent metallic fastenings at various points, according to the discretion of the operator, and, although I have particularly described its use in lasting boot and shoe uppers, I do not limit it to such use, but may use it for tacking on tap-soles or for other like purposes.

When the valve of the pneumatic operating device is at its lowest point, one side of its lower head *i* bears on an inwardly-projecting seat or lip *h'* at the lower end of the cylinder *h* and prevents any escape of air through that end of the cylinder. At the upper end of the cylinder is another seat h^2, which co-operates in like manner with the head *i'* in preventing the escape of air through the upper end of the cylinder when the valve is at its highest point. The cylinder *h* is internally reduced in diameter at its upper portion to correspond with the reduced diameter of the upper head *i'*, said reduction being effected in this case by a lining-tube h^3 inserted in the cylinder, the upper port *f'* being formed partly in said tube. The seat h^2 may be omitted, as the valves *i i'* only remain raised while the operator holds the lever *m*. Hence the valve *i'* seldom reaches the seat h^2.

e' e² represent yielding buffers or washers in the ends of the cylinder *e* to cushion the piston as it reaches the ends of its stroke. The washer *e'* is annular and serves as a packing to prevent the leakage of air around the driver-bar *e'*.

I claim—

1. In a tacking-machine, the combination of a portable or hand-controlled frame having a throat containing a channel for the independent fastenings, a cylinder attached to said frame and provided with upper and lower ports at or near its ends, a valve-casing secured to one side of said cylinder and communicating with said ports and having a compressed-air inlet opening thereto between said ports, a vertically-disposed double valve in said casing designed to open and close said ports simultaneously, a vertically-disposed piston in said cylinder, a driver-bar and driver connected with the piston, the said driver being arranged to enter the throat, and a lever engaging the lower end of the rod of said double valve, whereby the operator may raise the valve to close said lower port and open said upper port and cause the operation of the driver, as set forth.

2. In a tacking-machine, the combination of

a cylinder having upper and lower ports *f f'*, a piston in the cylinder between said ports, a driver-bar and driver carried by said piston, a vertically-disposed valve-cylinder communicating with the ports *f f'* and having one end reduced in diameter, an air-inlet communicating with said valve-casing between the ports *f f'*, and a double valve composed of the larger head *i*, the smaller head *i'*, and the stem *j*, the arrangement being such that the valve is normally held by the increase of air-pressure on its larger head in position to admit air to the cylinder through the port *f*, and thereby normally hold the piston and driver in their retracted position, the said valve being movable by the operator from its normal position to cause the depression of the driver, as set forth.

3. In a tacking-machine, the combination of a cylinder having ports *f f'*, a piston in the cylinder between said ports, a driver-bar and driver carried by said piston, a valve-cylinder communicating with the ports *f f'* and having one end reduced in diameter, an air-inlet communicating with said valve-casing between the ports *f f'*, and a double valve composed of the larger head *i*, the smaller head *i'*, and the stem *j*, the arrangement being such that the valve is normally held by the increase of air-pressure on its larger head in position to admit air to the cylinder through the port *f*, and thereby normally hold the piston and driver in their retracted position, and an operating-lever, as *m*, on the supporting-frame, whereby the operator may move the valve from its normal position, as set forth.

4. In a tacking-machine, the combination of a hand-controlled supporting-frame having a throat, a driver and operating devices therefor carried by said frame, a removable chute or staple-holder secured at its inner end to said frame, the arm having a spring-latch at its free end supporting the outer end of said chute, whereby the latter is detachably secured to the frame, the coil or spiral spring, the shaft or rod therefor, and the feeding-slide adapted to move on said chute and connected with said spring, substantially as set forth.

5. In a tacking-machine, the combination of a hand-controlled supporting-frame having a throat, a driver and operating devices therefor carried by said frame, a chute or staple-holder removably or detachably secured at its inner and outer ends, the coil or spiral spring, the shaft or rod therefor, and the feeding-slide adapted to move on said chute and connected with said spring, substantially as set forth.

6. In a tacking-machine, the combination of a hand-controlled supporting-frame having a throat, a driver, operating devices therefor carried by said frame, a chute or staple-holder removably secured to said frame, the rod *u*, the coil or spiral spring thereon, the loose pulley, the slide moving on said chute, and the cord connected to said pulley and slide, whereby the latter is impelled forward, substantially as set forth.

7. In a tacking-machine, the combination of a hand-controlled supporting-frame having a throat, a driver and operating devices therefor carried by said frame, a detachable chute or staple-holder, a socket *r* in the throat to receive the delivering end of said chute, a locking device or latch on the frame, whereby the rear end of said chute is detachably held, and a spring-impelled feeding-slide movable on said chute and formed at its rear portion to displace the said locking device or latch and thereby release the rear end of the chute, as set forth.

8. In a tacking-machine, the combination of a hand-controlled supporting-frame having a handle portion 23 and a throat *a*, formed as a jaw, a driver and operating mechanism therefor carried by said frame, a pivoted jaw 18, arranged to co-operate with the throat and provided with an arm 20, a foot or fulcrum attached to the frame and arranged as described relatively to said throat and pivoted jaw, and a lever 21, pivoted to the handle-frame and arranged to act on the arm 20, substantially as set forth.

9. In a tacking-machine, the combination of a hand-controlled supporting-frame having a handle portion 23 and a throat *a* formed as a jaw, a driver and operating mechanism therefor carried by said frame, a pivoted jaw 18, arranged to co-operate with the throat and provided with an arm 20, and a lever 21, pivoted to the handle portion of the frame and arranged to act on the arm 20, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 23d day of December, A. D. 1889.

JOSHUA E. L. BRADEEN.

Witnesses:
CHARLES C. HOBBS,
FRANK P. WILLARD.