3 Sheets—Sheet 1.

M. BRAY.

Machine for Separating and Setting Shoe-Lace Studs.

No. 212,124. **Patented Feb. 11, 1879.**

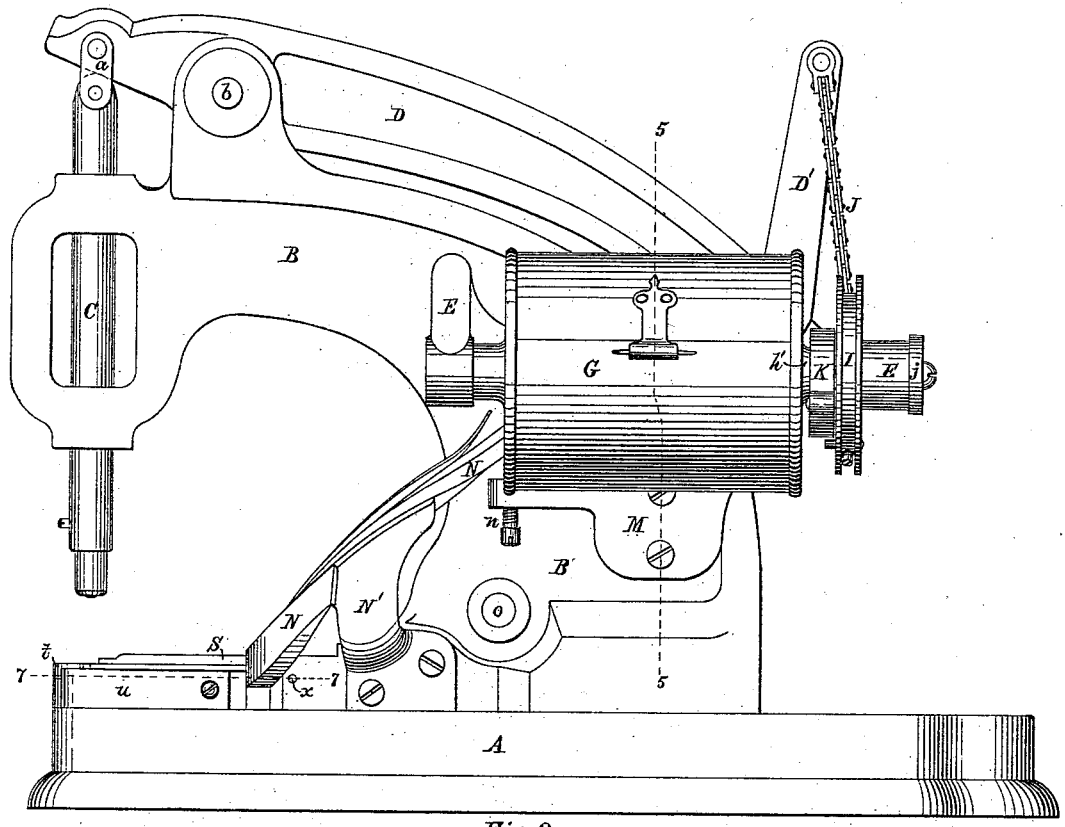

Fig. 2.

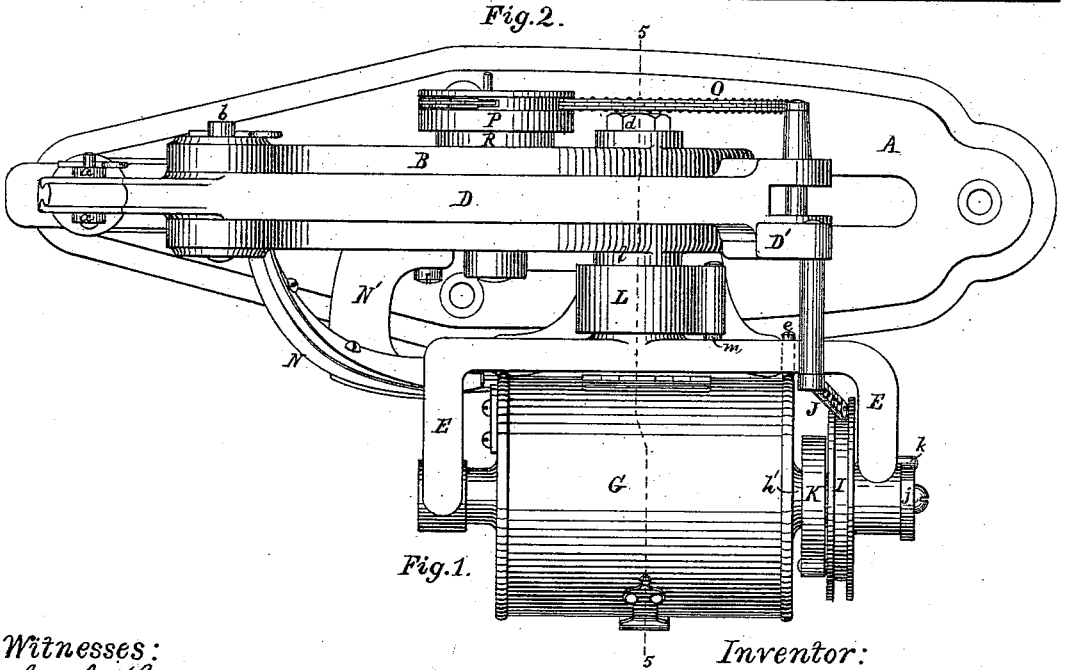

Fig. 1.

Witnesses:
C. A. Hemmenway
C. H. Dodd.

Inventor:
Mellen Bray
by N. C. Lombard,
Attorney.

3 Sheets—Sheet 2.

M. BRAY.

Machine for Separating and Setting Shoe-Lace Studs.

No. 212,124. **Patented Feb. 11, 1879.**

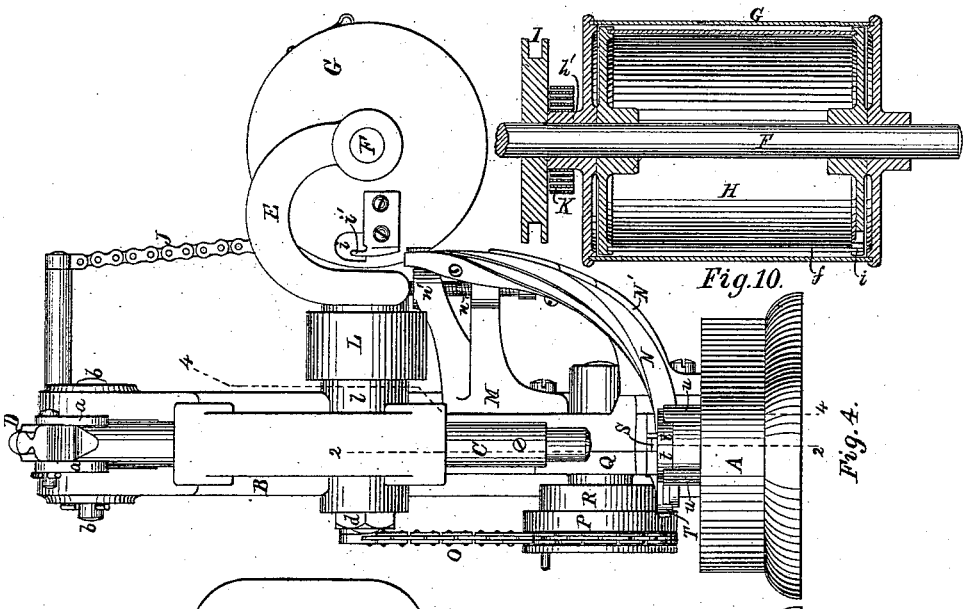

Fig. 10.

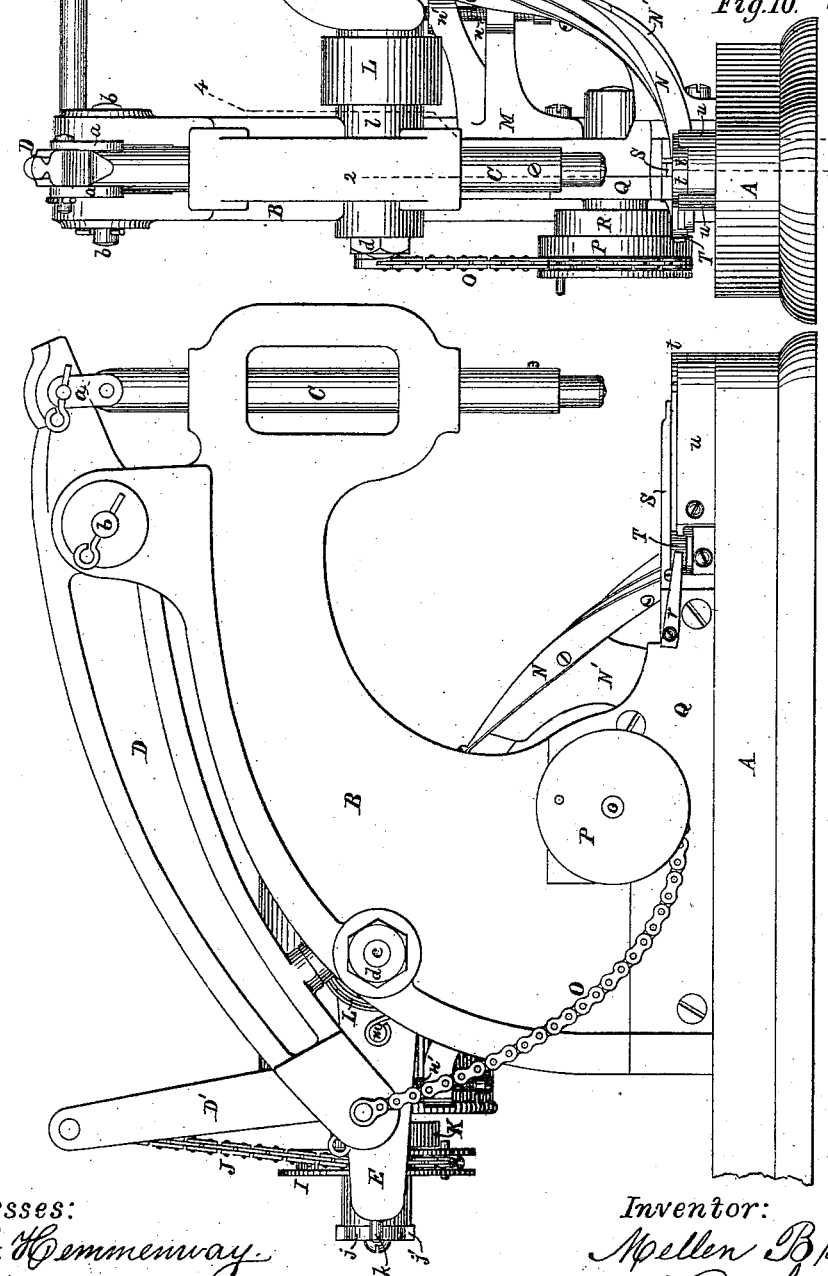

Fig. 4.

Fig. 3.

Witnesses:
E. A. Hemmenway.
C. H. Dodd.

Inventor:
Mellen Bray
by N. C. Lombard.
Attorney.

M. BRAY.

Machine for Separating and Setting Shoe-Lace Studs.

No. 212,124. Patented Feb. 11, 1879.

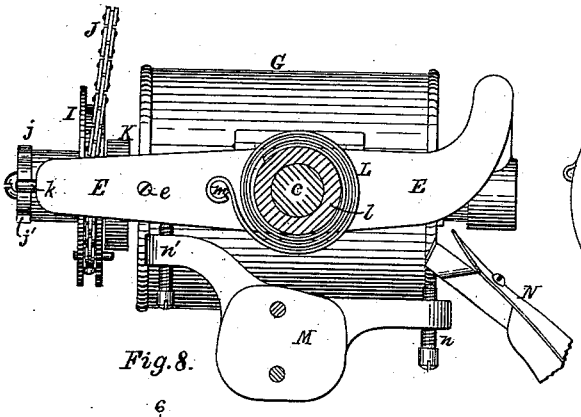

Fig. 8.

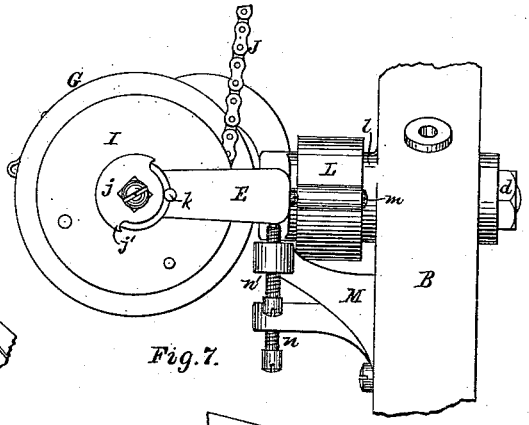

Fig. 7.

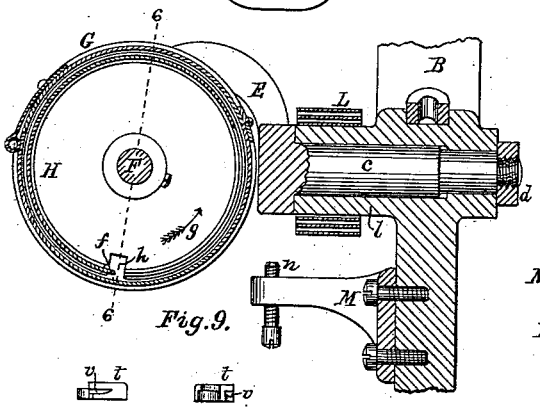

Fig. 9.

Fig. 16.

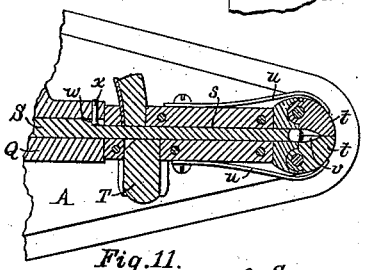

Fig. 11.

Fig. 14.

Fig. 15.

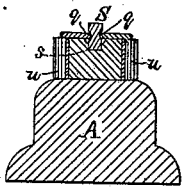

Fig. 12.

Fig. 13.

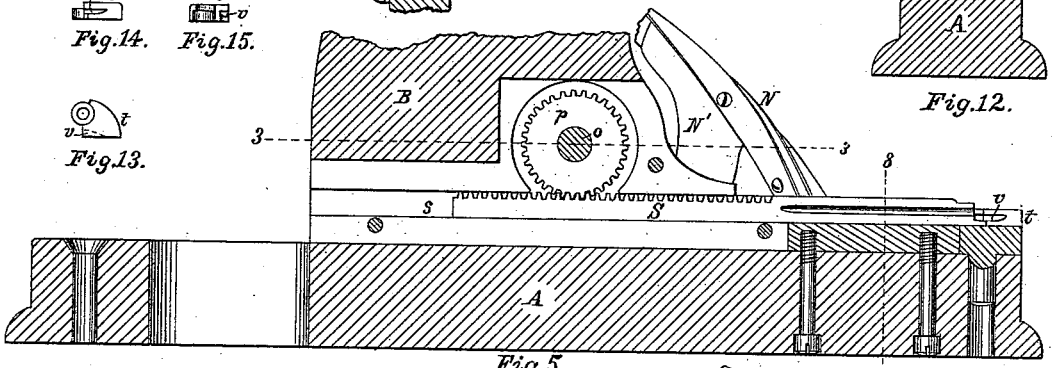

Fig. 5.

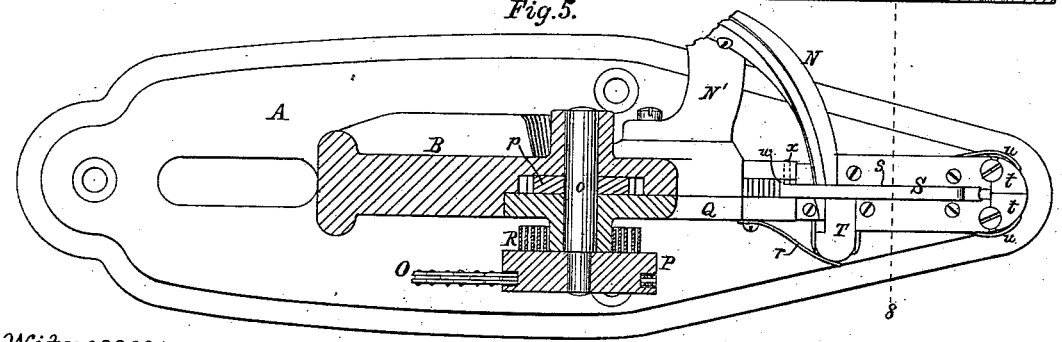

Fig. 6.

Witnesses:
C. A. Hemmenway.
C. H. Dodd.

Inventor:
Mellen Bray
by N. P. Lombard,
Attorney.

UNITED STATES PATENT OFFICE.

MELLEN BRAY, OF NEWTON, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR SEPARATING AND SETTING SHOE-LACE STUDS.

Specification forming part of Letters Patent No. **212,124**, dated February 11, 1879; application filed March 19, 1878.

To all whom it may concern:

Be it known that I, MELLEN BRAY, of Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Separating and Setting Shoe-Lace Studs, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to certain improvements in separating and setting devices, whereby shoe-lace studs provided with hook-heads or eccentric necks to receive the lacing-cord can be automatically separated, arranged in regular order, and fed separately in successive order between the setting-tools, with their hooked heads always in the same direction; and it consists in certain combinations and arrangements of devices, the novel features of which will be best understood by reference to the description of the drawings and the claims.

Figure 1 of the drawings is a plan of my improved stud-setting machine. Fig. 2 is a side elevation. Fig. 3 is an elevation of the opposite side. Fig. 4 is a front-end elevation. Fig. 5 is a partial vertical section on line 2 2 on Fig. 4. Fig. 6 is a horizontal section on line 3 3 on Fig. 5. Fig. 7 is a partial rear elevation. Fig. 8 is a section on line 4 4 on Fig. 4, showing the hopper in elevation. Fig. 9 is a vertical transverse section through the hopper and a portion of the frame on line 5 5 on Figs. 1 and 2. Fig. 10 is a longitudinal section of the hopper on line 6 6 on Fig. 9, looking away from the frame of the machine. Fig. 11 is a partial horizontal section on line 7 7 on Fig. 2. Fig. 12 is a vertical section on line 8 8 on Figs. 5 and 6. Figs. 13, 14, and 15 are, respectively, a plan, side elevation, and end view, of one portion of the pivoted stud support or anvil; and Fig. 16 is a transverse section of the inclined roadway or chute.

A is the bed of the machine, from the rear portion of which rises the goose-neck B, extending forward over the bed A, and having mounted in its front end the setting-plunger C, connected, by the link *a*, to the forward end of the lever D, and adapted to be moved vertically thereby, for the purpose of setting or clinching a stud in the material in a well-known manner.

The lever D is pivoted at *b* to the upper side of the goose-neck B, and its long arm extends toward the rear of the machine, and is forked, as shown in plan in Fig. 1, to receive the upper end of a connecting-rod, (not shown,) the lower end of which connects with the rear end of a treadle-lever, (not shown,) by means of which the setting-plunger is made to move endwise in its bearings in a well-known manner.

E is a forked frame, provided at or near the center of its length with a journal, *c*, fitted to a bearing in the goose-neck B, and held therein by the nut *d*, as shown in Fig. 9, and provided in the ends of each of its forks with a bearing to receive the shaft F, upon which is loosely mounted the cylindrical hopper G, which is secured in a fixed position in the frame E, so that it cannot revolve with the shaft F, by means of the set-screw *e*, one portion of said hopper being hinged to the other, so that it can be opened to permit the introduction of the studs.

Within the hopper G is placed a second cylinder, H, having a portion of its cylindrical shell or casing cut away upon one side for the whole of its length between its two heads, the sides of said opening being straight and parallel to the axis of said cylinder.

The cylinder H is firmly secured upon the shaft F, and vibrates around its axis, moving through an arc of about ninety degrees, more or less, as said shaft is turned, as will be described.

The shell or casing of the cylinder H is made of a thickness slightly less than the height of the groove in the stud-head, which is cut to form its neck, and of such an exterior diameter that when placed with the hopper G there shall be a space between the outside of the cylinder H and the inside of the hopper of slightly greater width than the thickness of the outer collar of the hook-head of the stud, the whole being so arranged that when the cylinder H is vibrated about its axis, so that the edge *f*, which forms one side of the opening in said cylinder, moves from the position shown in Fig. 9, moving in the direction indicated by the arrow *g*, to a point about on a level with the center of the shaft F, passing through the mass of studs placed in the hopper, (not shown,) one or more of said studs may be picked up and carried upward by the edge *f*, hanging by their necks thereon, with

their tubular shanks all pointing toward the center of the hopper.

One of the heads of the cylinder H has formed therein, directly opposite the edge *f*, an opening, *h*, of such form as will permit the passage through the same of a stud when presented thereto in the proper position, but not otherwise.

The head of the hopper immediately contiguous to the cylinder-head just referred to, is also provided with an opening, *i*, into which projects the tongue or lip *i'*, in such a position as to form an extension of the edge *f* of the cylinder H when it is moved into its extreme highest position relative to the hopper G, all so arranged that when the hopper and cylinder are tilted into an inclined position the studs which have been picked up by the edge *f* of the cylinder H, and are hanging thereon by their necks, will be discharged through the openings *h* and *i*, with their shank ends all in one direction, and with the hook sides of their heads downward.

The shaft F has firmly secured thereon the grooved wheel or disk I, to the edge of which is secured one end of the chain J, which, after being wound partially around the wheel I, has its other end secured to arm D', connected to or forming a part of the lever D, as shown. The disk I has set therein a pin, to which is secured the outer end of the coiled spring K, the inner end of which is attached to the hub *h'* of one of the heads of the hopper, in such a manner that the tension of said spring tends to hold the cylinder H in the position shown in Fig. 9, with the edge *f* at the bottom of the hopper.

The shaft F has also secured thereon a collar, *j*, having a portion of its periphery cut away or reduced, so as to form a shoulder, *j'*, which comes in contact with the pin *k*, set in the frame E, to limit the movement of the cylinder H about its axis in the direction indicated by the arrow.

L is a flat coiled spring, of greater power than spring K, wound around the hub *l* of the goose-neck B, and having its inner end secured thereto and its outer end engaging with a pin, *m*, set in the frame E, in such a manner that the tension of said spring shall tend to hold the hopper in a horizontal position, and serve to return it to such position as the rear end of the lever D descends after said hopper has been tilted into an inclined position by the upward movement of the rear end of said lever D.

M is a stand, secured to the side of the goose-neck B, and provided with two projecting arms, in the outer end of each of which is fitted an adjustable stop-screw, *n* and *n'*, adapted to limit the motion of the frame E around its axis in either direction.

N is an inclined chute or roadway, secured to and supported by the stand N', and having an L-shaped groove, twisted spirally about ninety degrees, and adapted to receive the studs as they are discharged from the hopper with their axes in a horizontal position, and gradually turn them into a vertical, or nearly vertical, position, with their tubular shanks upward, connection between said chute and the hopper being established every time the hopper is tilted into an inclined position till the frame E rests upon the screw-stop *n*.

The chute N is also curved, so that its lower end is at right angles, or nearly so, to its upper end, by means of which and the twist in the path down which the studs slide by the action of gravity thereon, the studs, though discharged from the hopper into said chute with their axes in a horizontal position and the hook sides of their heads downward, are presented at the foot of said chute with their axes vertical, with the hook sides of their heads toward the front of the machine.

O is a chain or other flexible connection, attached by one end to rear end of the lever D, and by its other end to the grooved wheel or disk P, after being wound partially around the same.

The wheel or disk P is made fast upon a short shaft, *o*, mounted in bearings in the goose-neck B and the detachable plate Q, and is connected by a pin set therein with the outer end of the coiled spring R, the inner end of which is made fast to the hub of the plate Q, in such a manner that the tension of said spring tends to wind the chain O upon the wheel P.

The shaft *o* has secured thereon the small gear-wheel or pinion *p*, the teeth of which engage with corresponding teeth formed in the upper side of the feed-plunger S, as shown in Figs. 5 and 6.

The feed-plunger S is fitted to and reciprocates in a groove or channel, *s*, formed in the bed A, and extending past the foot of the inclined chute N, and at right angles, or nearly so, thereto, that portion of said groove which lies in front of the foot of the chute N being contracted at its top, so as to form upon each side thereof an inwardly-projecting lip, *q*, each overhanging the wider portion of the groove immediately beneath said lip a distance equal to one-half the difference between the diameter neck of the stud and the largest diameter of the head; in other words, the groove beneath the lips being made of just sufficient width to allow the free passage of the outer collar of the stud-head, and the outer portion of said groove, or the space between the lips *q q* being just sufficient to allow of the free passage of the neck of the stud, and located central, with the wider portion directly beneath said lips, by which arrangement the stud is guided from the foot of the inclined chute to a position under the setting-plunger C, with the hook side of its head toward the front of the machine, the form of the groove, in connection with the neck of the stud located eccentrically to the outer head or collar, effectually preventing the stud from turning on its axis while being fed forward.

T is a sliding block, moved in one direction

by the spring *r*, and in the other by the feed-plunger S, and adapted to move across the channel *s* when the feed-plunger is drawn back to the rear side of the chute N, to form an abutment, to prevent more than one stud from entering the channel *s* in front of the feed-plunger S at the same time.

The front end of the channel *s* is closed by an abutment, consisting of two blocks, *t t*, pivoted to the bed A, one upon each side of the channel *s*, and held in contact with each other at the center of said channel by the springs *u u*, which yield to allow said blocks to open and move about their pivots when it is desired to withdraw a stud from under the setting-plunger either before or after it has been set.

The inner rear corner of each of said blocks *t t* is channeled or grooved, as seen at *v* in Figs. 14 and 15, and in dotted lines in Fig. 13, so that the outer collar of the hook-head may pass under the upper portions of said blocks, and the inner collar or head may rest upon the upper surface thereof while the stud is being clinched, said blocks serving as an anvil, to receive the blow of clinching the same.

The feed-plunger S is provided with a shoulder, *w*, which engages with the pin *x*, set in the frame or bed A, to limit the forward motion of the plunger.

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

1. In a machine for setting hook-headed shoe-lace studs, a hopper, into which the studs are placed in bulk, in combination with a straight-edged bar or plate extending across the interior of said hopper, and adapted to be moved up and down in a path parallel with a portion of the inner surface of the hopper, and to pick up one or more of the studs by their necks with their shanks all in the same direction, substantially as and for the purposes described.

2. The combination of a hopper, into which the studs are placed in bulk, and adapted to be vibrated from a horizontal to an inclined position, and a straight-edged bar or plate extending across the interior of said hopper, and adapted to be moved up and down in a path parallel with a portion of the inner surface of the hopper, and to pick up one or more of the studs by their necks with their shank ends all in one direction, and to be tilted into an inclined position with said hopper, substantially as described.

3. The combination, with a hopper, into which the studs are placed in bulk, and a device adapted to pick up one or more studs by their necks with their shanks all in one direction, and to be tilted into an inclined position with said hopper, of an inclined chute or roadway having a groove or channel of an L shape, as shown, adapted to guide said studs toward the setting-tools and deliver them in a uniform position, substantially as described.

4. In a machine for setting hook-headed shoe-lace studs, the combination of a hopper, into which said studs are placed in bulk, a thin straight-edged bar or plate extending across within said hopper, and adapted to be reciprocated therein in a path parallel to the inner surface of one side of said hopper to pick up by their necks one or more of said studs with their shank ends all in one direction, and then to be tilted into an inclined position with said hopper, and an inclined chute or a roadway provided with a spiral L-shaped groove, adapted to turn the studs from a horizontal to a vertical position, substantially as described.

5. The combination of the cylindrical hopper G, mounted in a horizontal position, and adapted to be intermittently tilted endwise from said horizontal to an inclined position, and back again to said horizontal position, and the inner cylinder, H, having a portion of one side of its cylindrical shell cut away, and adapted to be intermittently oscillated about its axis within said hopper, and to pick up one or more of said studs by their necks, said studs resting on the edge *f* of the shell of the cylinder H, with their shank ends all pointing toward the center of the hopper, substantially as and for the purposes described.

6. The pivoted frame E, cylindrical hopper G, and inner cylinder, H, having a portion of its shell cut away to form the thin straight-edge, *f*, all arranged and adapted to operate in combination, as set forth, to separate the studs, arrange them in the same regular order and position, and discharge them successively from said hopper, substantially as described.

7. The combination of the hopper G, straight-edged bar or plate *f*, frame E, disk or wheel I, chain J, lever D, and the spring K, all constructed, arranged, and adapted to operate substantially as and for the purposes described.

8. The combination of the hopper G, straight-edged bar or plate *f*, frame E, disk or wheel I, spring K, chain J, lever D, pin or lug *k*, and the collar *j*, having a portion of its periphery cut away to form the stop-shoulder *j'*, all arranged and adapted to operate substantially as and for the purposes described.

9. The combination of the pivoted frame E, hopper G, straight-edged bar or plate *f*, disk I, chain J, spring K, lever D, pin *k*, stop-collar *j*, and the coiled spring L, of greater power than the spring K, all arranged and adapted to operate substantially as and for the purposes described.

10. In a machine for setting hook-headed shoe-lace studs, the combination of a hopper, into which the studs are placed in bulk, a straight-edged bar or plate adapted to be moved up and down in said hopper in a path parallel with a portion of the inner surface thereof, and pick up one or more of said studs by their necks with their shank ends all in one direction, and to be tilted with said hopper into an inclined position, an inclined chute provided with a spiral L-shaped groove adapted to turn the studs from a horizontal to a vertical position, and deliver them at its lower

end in a uniform position, and a horizontal roadway provided with an L-shaped groove adapted to guide the studs from the foot of the inclined chute into a uniform position under the setting-plunger, substantially as described.

11. In combination with a vertically reciprocating plunger adapted to clinch the tubular shank of a shoe-lace stud, a horizontal channel or roadway of suitable cross-section to guide said studs by their necks and outer collars or heads, and prevent them from being turned therein, a reciprocating plunger adapted to feed said studs along said channel to a position under said clinching-plunger, the pivoted blocks *t t*, provided with channels or recesses *v*, and held in position by the springs *u u*, substantially as and for the purposes described.

12. In combination with the horizontal channel or guideway *s*, the inclined chute or roadway N, opening into said channel at right angles, or nearly so, thereto, and the feed-plunger S, adapted to be reciprocated in said channel *s*, and to feed a stud from the foot of said inclined chute to a position beneath the clinching-plunger, the sliding block T, adapted to be moved across the channel *s* just forward of the inclined chute N by the spring *r*, and to be moved back by the forward motion of the feed-plunger, substantially as described.

13. The combination, in a stud-setting machine, of a hopper pivoted at or near the middle of its length, and adapted to be vibrated from a horizontal to an inclined position, and vice versa, and an inclined chute or roadway, with which said hopper makes a connection when in an inclined position, and two adjustable stops, to limit the movement of said hopper about its pivotal axis in either direction, substantially as described.

14. The combination of the clinching-plunger C, lever D, chain O, disk or wheel P, shaft *o*, spring R, tooth gear or pinion *p*, and the feed-plunger S, provided with a series of teeth upon one of its sides, all arranged and adapted to operate substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 16th day of March, A. D. 1878.

MELLEN BRAY.

Witnesses:

N. C. LOMBARD,

E. A. HEMMENWAY.