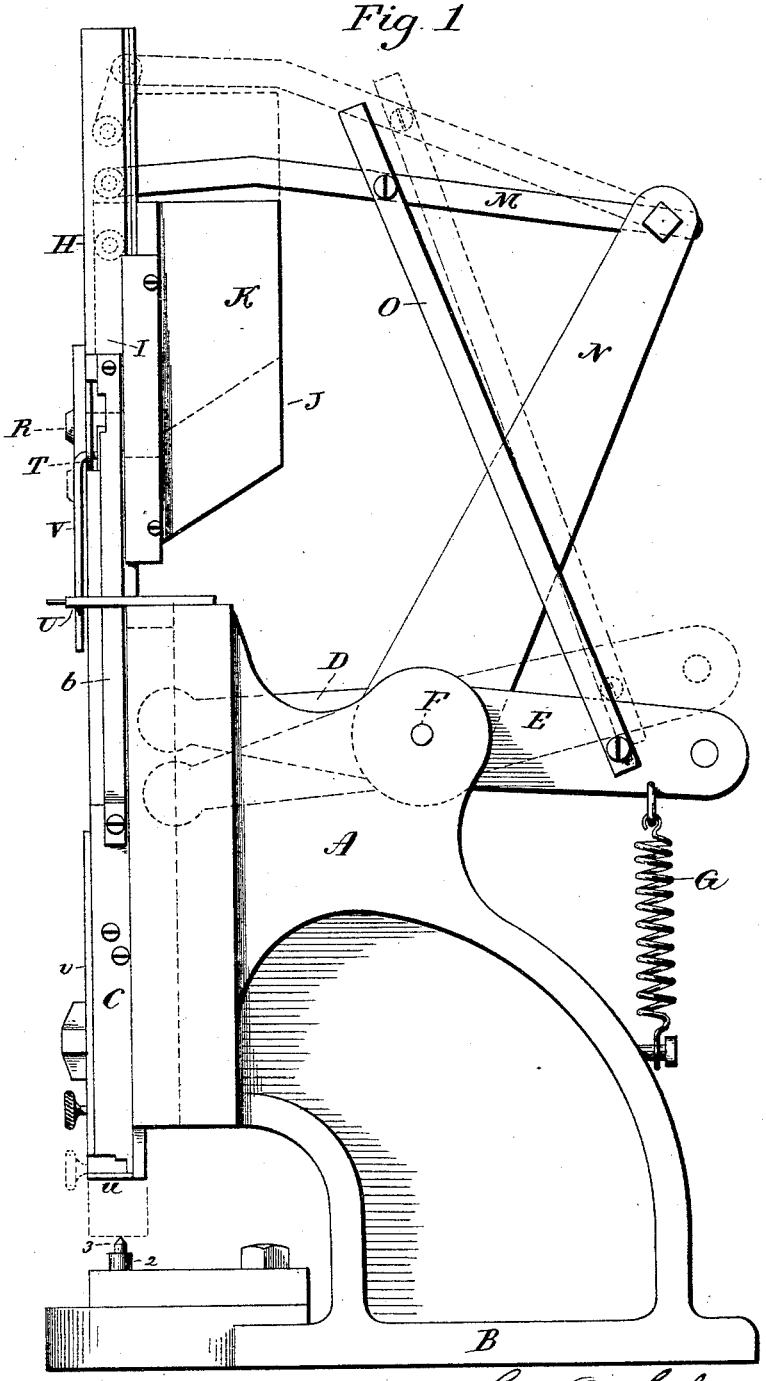
(No Model.) 4 Sheets—Sheet 1.

G. O. SCHNELLER.

MACHINE FOR SETTING LACING STUDS.

No. 459,207. Patented Sept. 8, 1891.

Fig. 1



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(No Model.) 4 Sheets—Sheet 2.

G. O. SCHNELLER.

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Fig. 2

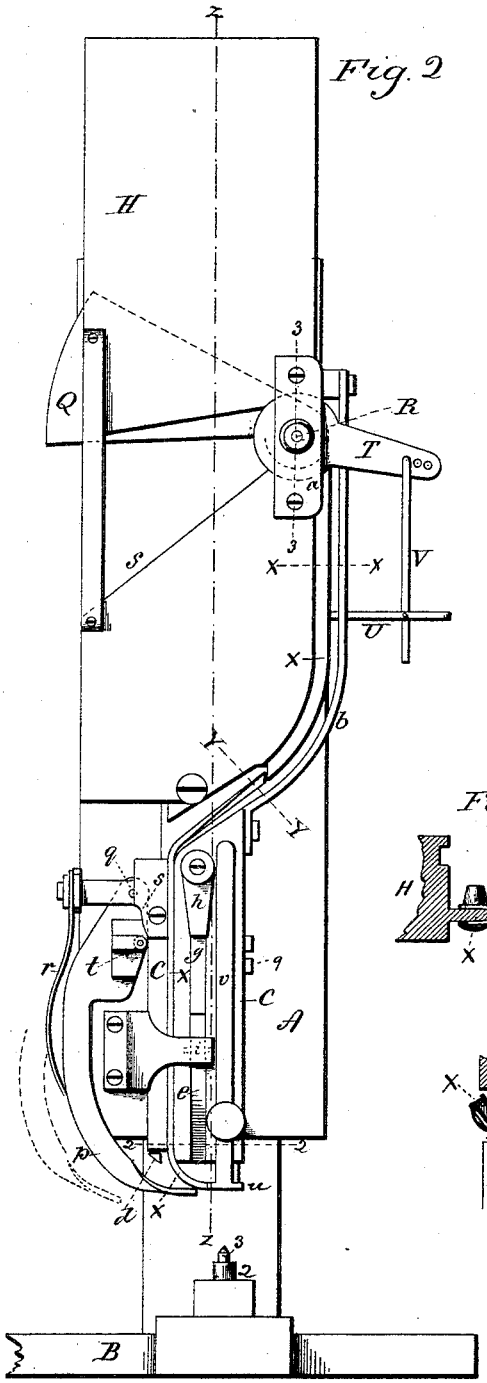

Fig. 3

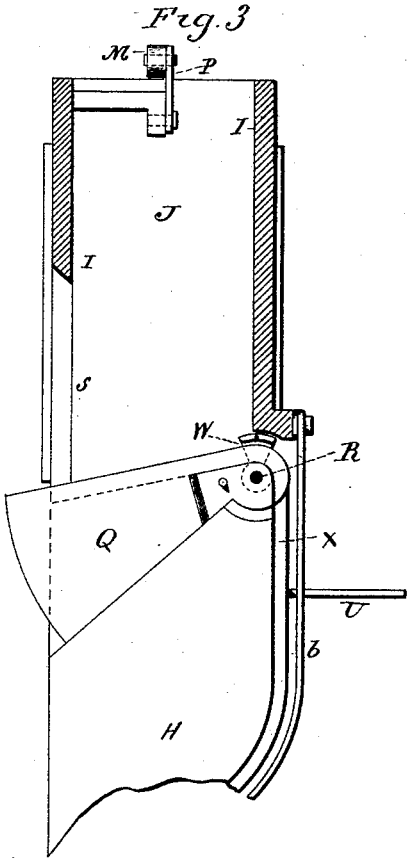

Fig. 5

Fig. 6

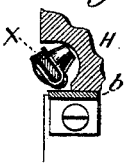

Fig. 4

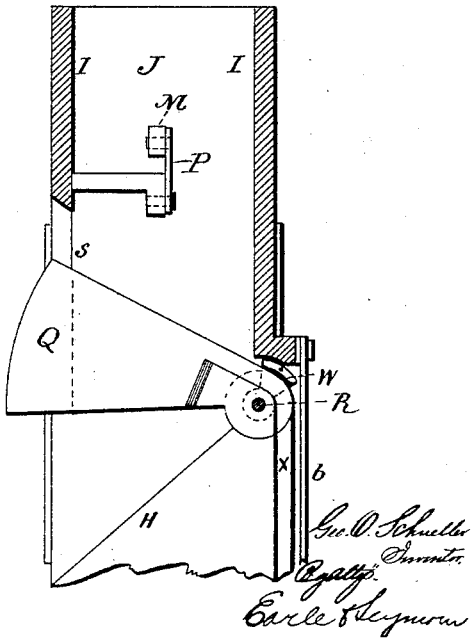

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Fig. 7

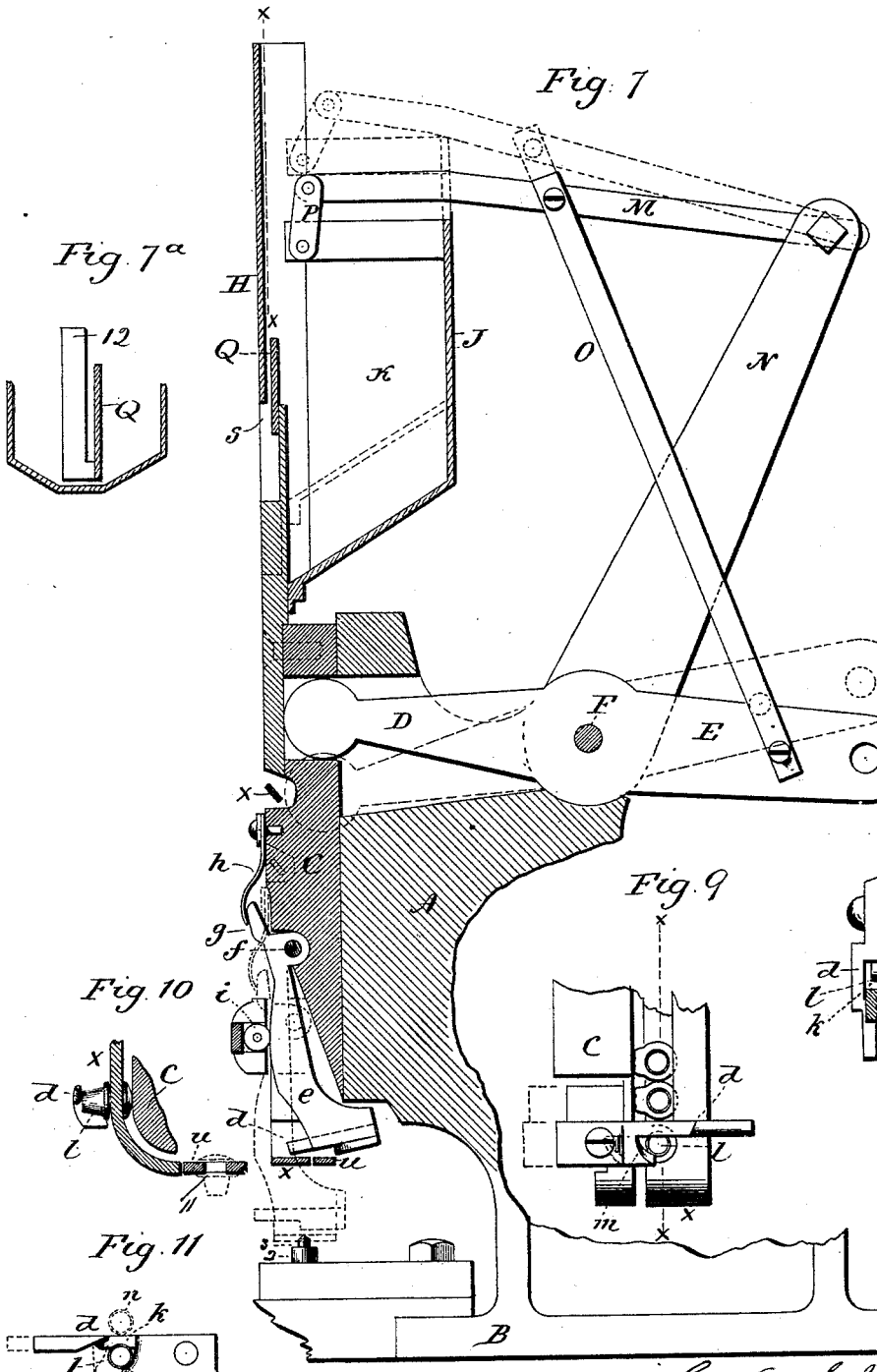

Fig. 7a

Fig. 8

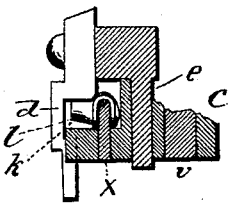

Fig. 9

Fig. 10

Fig. 11

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MACHINE FOR SETTING LACING STUDS.

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Fig. 12

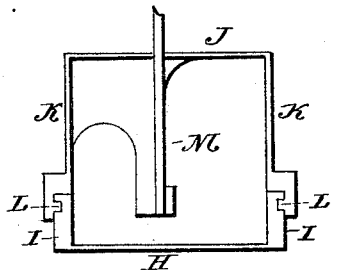


Fig. 13

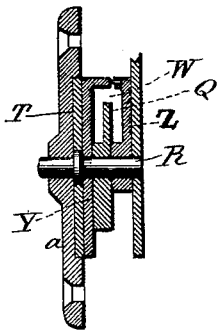


Fig. 14

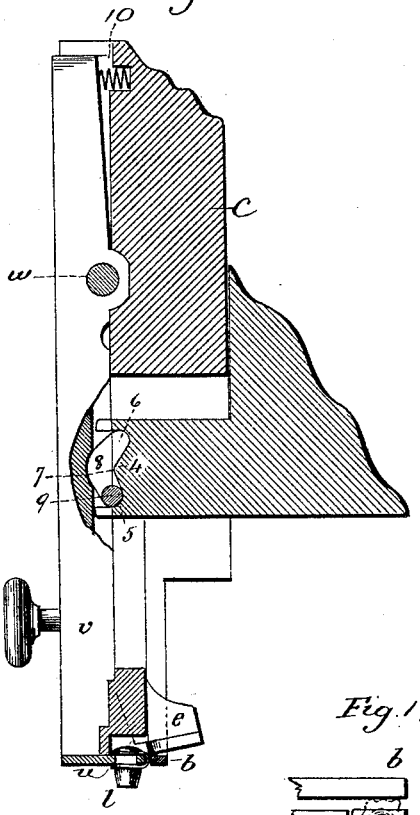


Fig. 15

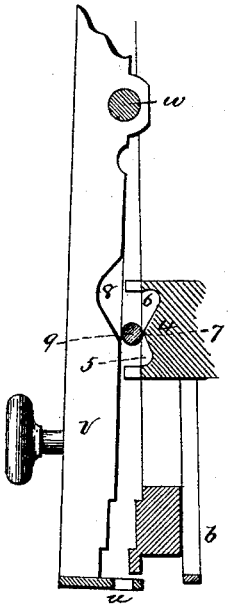


Fig. 16

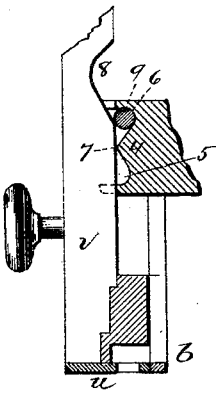
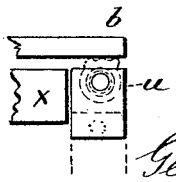


Fig. 17



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UNITED STATES PATENT OFFICE.

GEORGE O. SCHNELLER, OF ANSONIA, CONNECTICUT.

MACHINE FOR SETTING LACING-STUDS.

SPECIFICATION forming part of Letters Patent No. 459,207, dated September 8, 1891.

Application filed January 12, 1891. Serial No. 377,474. (No model.)

To all whom it may concern:

Be it known that I, GEORGE O. SCHNELLER, of Ansonia, in the county of New Haven and State of Connecticut, have invented new Improvements in Machines for Setting Lacing-Studs; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters and figures of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of the machine complete; Fig. 2, a front view of the same; Fig. 3, a vertical section through the hopper on line *x x* of Fig. 7, showing a side view of the feeding-blade and a portion of the conductor, with the blade in the down position; Fig. 4, the same as Fig. 3, showing the blade in the up position; Fig. 5, a transverse section through the conductor, cutting on line *x x* of Fig. 2; Fig. 6, a section through the conductor on line *y y* of Fig. 2; Fig. 7, a vertical section cutting on line *z z* of Fig. 2; Fig. 7ª, a modification in the construction of the feeding-plate and hopper; Fig. 8, a transverse section on line 2 2 of Fig. 2, showing a top or plan view of the dog; Fig. 9, a side view of the dog, looking from the left or outside, showing the lower portion of the conductor and representing the studs thereon; Fig. 10, a vertical section on line *x x* of Fig. 9; Fig. 11, an inside view of the dog detached; Fig. 12, a top view of the hopper; Fig. 13, a vertical section through the hub of the blade, cutting on line 3 3 of Fig. 2; Figs. 14, 15, and 16, detached vertical sectional views illustrating the operation of the setter; Fig. 17, a plan view showing the setter and the lower end of the conductor; Figs. 8, 9, 10, 11, 13, 14, 15, 16, and 17 enlarged.

This invention relates to an improvement in machines for setting that class of shoe and similar fastenings commonly called "lacing-studs." These studs are of hook shape and are constructed with a tubular shank of an eyelet-like character, by which they are secured, the tubular shank passing through the material to which they are to be secured and upset upon the reverse side, so as to clamp the material between the body of the hook and the turned-over or upset end of the tubular shank—a common and well-known class of fastenings—the object of the invention being the construction of a machine in which a mass of studs may be placed in a hopper and automatically fed therefrom to the setting devices and the studs set and secured into the material presented to the machine for that purpose; and the invention consists in the construction and combination of elements, as hereinafter described, and more particularly pointed out in the claims.

A represents the frame or body of the machine, supported from or made a part of a base B, which is preferably adapted to be secured to a table. On the face of the body A and in suitable guides is a vertical slide C, to which a vertical reciprocating movement is imparted by means of a two-armed lever D E, hung upon an axis F so as to swing in a vertical plane, the one arm D extending into engagement with the said slide C and the other arm adapted to swing vertically, as indicated in broken lines, Fig. 7, so as to give to the slide C its up and down reciprocating movement. As represented, the upward movement of the slide is produced by a spring G, attached to the arm E, and the downward movement of the slide is produced by a foot-pedal (not shown) attached to the arm E, so that a depression of the foot will cause that arm E to rise and correspondingly force the slide C downward, extending the spring G, and so that when free from the foot the reaction of the spring will return the lever and cause the slide C to rise, and so as to hold the said slide normally in the raised position.

Attached to the face side and upper part of the slide C is a plate H, extending vertically, but so as to move up and down with the said slide. This plate H forms the front of the hopper, and is constructed with a flange I on each side, extending rearward, which forms a part of the two sides of the hopper. The remainder or body of the hopper is composed of a back J, (see Fig. 12,) with two sides K extending forward and joined to the flanges I I of the front by tongues and grooves L, as clearly seen in Fig. 12, and so that the front part and rear part may each receive a vertical movement independent of the other, the said tongues and grooves forming guides for the movement of the rear portion of the hopper. As before stated, the front part of

the hopper H moves up and down with the slide C. A vertical up and down reciprocating movement is imparted to the rear portion of the hopper from the same lever D E that communicates the up and down reciprocating movement to the slide C, and as here represented the movement of the lever D is communicated to the rear part of the hopper through a lever M, hung to an arm N, which extends upward and rearward from the body A, and this lever M is connected with the arm E by a rod O, and the lever M is connected to the rear part of the hopper by a link P, as clearly seen in Fig. 7, and so that as the arm E moves downward it imparts a corresponding downward movement to the rear portion of the hopper, while the same downward movement of the arm E through the other arm D communicates a corresponding up movement to the front portion of the hopper, and on the return of the lever the said parts of the hopper return, their reciprocation being at the same time but in opposite directions. The division of the hopper and independent movement of the two parts, as described, disturb the mass of studs which may be placed in the hopper, so as to insure a constant change of position of the studs which are in the hopper for the more convenient arrangement of the studs upon the stud-delivering or feed device.

On the vertical slide C, or in connection therewith, a feeding-blade Q is hung upon a pivot R (see Figs. 2 and 3) and so as to swing on the said pivot in a vertical plane, as from the position seen in Fig. 2 to that seen in Figs. 3 and 4, and return. The blade is arranged so as to swing through an opening S in the bottom of the hopper and in a plane parallel with the front H of the hopper, as seen in Fig. 7, and the blade Q stands inside and distant from the front H of the hopper slightly more than the thickness of the head of the stud, the blade itself being slightly less in thickness than the width of the opening in the hook of the stud, and so that as the blade works through the mass of studs the studs can only engage or catch upon the upper edge of the blade when they are in a position to bring their heads against the front of the hopper with their open side toward the edge of the blade, and so that the head of the stud may pass between the blade and the front of the hopper, the opening in the hook permitting them so to pass onto the blade that they will be engaged thereby. In the down position, as seen in Fig. 3, the edge of the blade comes substantially below the bottom of the hopper. Then as the hopper moves, as before described, and the blade rises to the position as seen in Figs. 2 and 4, it takes the blade above the mass of studs and will have taken more or less of the studs upon its edge. In the up position, as seen in Fig. 2, the edge of the blade is inclined toward the pivot, and so that the studs which have been engaged will ride down the incline of the blade by their own gravity and pass out through an opening in the hopper at the pivot end of the blade, to be thence transferred to the setting mechanism. The blade, with its pivot, rides up and down with the front part of the hopper, as before described. To impart an up-and-down vibratory movement to the blade under such up-and-down movement of the part of the hopper to which it is hung, the blade is constructed with an outwardly-projecting arm T, (see Figs. 2 and 3,) and this arm is connected to a stationary arm U, which projects from the frame, by means of a rod V, and so that the up-and-down movement of the pivot will, because of the said connection with the stationary arm U, cause the blade to receive a vertical vibratory movement, combined with the up-and-down movement of the part of the hopper to which it is hung.

The hub of the blade is constructed with a concentric passage W through it, (see Figs. 3 and 13,) the edge of the blade continuing through this passage concentric with the axis on which the blade swings, as seen in Fig. 3. The passage W permits the studs, which shall have been taken upon the edge of the blade, to pass from the hopper, and from this hub edge of the blade a conductor X leads vertically downward, the upper end of the said conductor terminating in the periphery of the hub portion of the blade, as seen in Fig. 3, and so that it forms substantially a continuation of the edge of the blade, and so that the studs passing from the edge of the blade will slide onto this conductor X. The conductor is shown in transverse section in Fig. 5.

The construction of the hub is represented in Fig. 13. It is composed of two plates Y and Z, one each side of the blade Q, these plates being recessed to form the passage W, as clearly seen in Figs. 3 and 13, the arm T being secured to the outside plate Y and the outer end of the pivot supported by a bar *a*, secured to the outside of the hopper; but the invention is not to be understood as limited to this particular construction of hub, it only being essential that the blade in its elevated position shall be brought into such relation to the conductor X that the studs which the blade has received may pass onto the said conductor. A guard *b* is arranged outside the conductor X to hold the studs on the conductor and so that they slide freely between the conductor and guard. The studs will be taken upon the blade and delivered therefrom with the axis of the stud horizontal; but it is necessary in this machine that the studs shall be turned so as to bring their tubular shank downward and the axis of the stud vertical when they arrive at the point of setting, and, as represented in Fig. 10, the conductor X is therefore twisted from the plane in which it receives the studs, as represented in Fig. 6, which shows a transverse section of the conductor on line *y y* of Fig. 2, and so that the shank of the stud will turn

upward. The conductor X is carried across the slide C to the opposite side of the setting mechanism, as represented in Fig. 2; thence down, and at the bottom of the slide C is turned inward, as seen in Fig. 10, into a horizontal plane. The stud having its shank turned upward, as before described, passes down to the lower curve of the conductor, as seen in Fig. 10, with its shank outward and horizontal, and arriving at the curve it passes down that curve, bringing it into a vertical position with the shank downward, as represented in broken lines, Fig. 10, which is the position for setting. It will be understood that the conductor moves with the vertically-sliding plate C and the front portion of the hopper. To check the column of studs on the conductor, and so that they will be delivered singly in vertical position, as before described, a dog *d* is arranged to swing across the column of studs, as seen in Figs. 8 and 9. The dog is attached to or made a part of a vertical forward-and-back-swinging lever *e*. (See Fig. 7.) This lever is hung above in the slide C upon a pivot *f*. An arm *g*, extending upward above the pivot, is operated upon by a spring *h*, the tendency of which is to force the dog *d* outward, but yet permit it to be turned inward, as represented in Fig. 7. To impart the inward movement to the lever *e*, the outside or back of the lever *e* is of cam shape and works inside a stationary bearing-piece, (or, as here represented, an anti-friction roller *i*,) and so that as the slide rises to the position seen in Fig. 7 the said bearing-piece *i* will force the lever *e* inward and take the dog *d* to its rear position. Then as the slide C descends the lever *e* passes down and from the bearing *i*, and in so doing the spring *h* reacts upon the said lever *e*, throwing it into the outward position as the slide reaches its down position, and as seen in broken lines, Fig. 7. The dog *d* works to the left of the conductor—that is, upon the side of the conductor from which the shanks of the studs project—as seen in Figs. 8 and 10. On that side of the dog next the conductor a recess *k* is formed, into which the projecting shank of a stud may pass, as seen in Fig. 11, *l* representing the stud. This recess *k* forms a rest *m*, upon which a stud entering the said recess will stop. This is the position of the dog when forward, as in broken lines, Fig. 7, and as also seen in Figs. 8 and 9, and this is the position when the slide is down, as indicated in broken lines, Fig. 7. One of the studs *l* having dropped into the recess *k* of the dog, when the slide C next rises the dog retreats, as before described, and that portion of the dog forward of the recess passes in between the stud in the recess and the next stud above, as represented in broken lines, Fig. 11, *n* representing the next stud above. As the dog thus retreats the stud *l* in the recess is free to pass down on the curve of the conductor into the vertical position represented in broken lines, Fig. 10. Then as the slide next descends the dog returns, bringing the recess *k* again into the line of the column, when the next stud will drop into the recess to be delivered on the next rise of the slide, as before described, and, so continuing, one stud will be delivered into the vertical position at the lower end of the conductor at each reciprocating movement of the slide.

To insure the cutting off of the column, the dog forward of the recess is made of wedge shape, as seen at *o*, Fig. 11. This wedge shape not only insures the passage of the dog between the studs, but its wedge shape or inclination upon its under side serves to give the stud a start in its movement down the curve of the conductor. The operation of the machine is so quick that this wedge-like shape operates as a blow upon the stud, tending to accelerate the delivery of the stud into the vertical position before described.

To insure the passage of the stud into the before-mentioned down position, a finger *p* is hung to the frame of the machine upon a pivot *q*, so as to swing in a vertical plane and upon the same side of the conductor as the dog. This finger extends down and is curved inward in a horizontal plane, and so as to stand in the path of the descending conductor X, as seen in Fig. 2. The finger is provided with a spring *r*, the tendency of which is to force the free end of the finger inward toward the conductor and yieldingly hold it in the path of the said conductor. On the finger side of the slide C a cam *s* is arranged to work against a stud *t* on the said finger below its pivot. This cam operates to impart an outward movement to the finger *p* against its spring *r* as the slide descends, and as represented in broken lines, Fig. 2, and then permits the finger to return under the action of its own spring as the slide rises. This cam is timed, so that the finger may swing inward against the curve of the lower end of the conductor as the conductor rises. Consequently should a stud stop on the conductor after it has passed the dog this finger will strike the said stud and force it to its down position. The conductor X leads down to the stud-setter *u*, as seen in Figs. 10 and 17. The setter, as seen in Fig. 10, forms a continuation of the conductor, and normally stands in a horizontal plane at the lower end of the conductor, as seen in Fig. 16, and so that the stud will pass directly from the conductor onto the setter, as represented in Fig. 10, and as also seen in Fig. 17. The setter *u* is attached to the lower end of a vertical lever *v*, hung in the slide C upon a pivot *w*, and so as to swing outward and inward, as from the position in Fig. 14 to that in Fig. 15, and return. The guard *b* is continued down the whole length of the conductor X and across the end of the setter *u*, as seen in Fig. 17. After a stud has passed onto the setter, as represented in broken lines, Fig. 10, and as also seen in Fig. 14, the slide descends and carries the stud with it.

Below the setter *u* the anvil 2 is arranged, (see Figs. 1 and 2,) the anvil being directly in line with the descending tubular shank of the stud, and it is constructed in the usual manner of constructing the anvil for setting eyelets. It has a stud 3 projecting from its upper end to enter the shank in the usual manner, and so that as the stud is forced thereon the end of the tubular shank will be spread and upset. Before the stud is thus forced downward the material to which the stud is to be attached is placed over the anvil, it being first pierced or not, according to the nature of the material, and then as the stud descends its tubular shank passes through the said material onto the anvil and is there upset, clamping the material between the body of the stud and the upset portion of the shank, as usual in the setting of studs of this character. After the stud has been thus set, it is necessary to withdraw the setter *u* from the stud, so as to permit the stud to be removed with the material. To do this an outward swinging movement is imparted to the setter *u*, as represented in Fig. 15, which takes the setter out from the stud, and so that the material with the stud set therein may be removed. Then as the slide rises the setter returns, ready to receive the next stud. To impart this outward swinging movement to the setter, and so that it may be withdrawn as the slide commences its ascent and returned before the slide reaches its up position, a stationary cam 4 is arranged in the frame of the machine in rear of the lever *v*. This cam consists of two transverse depressions 5 and 6, formed in its face, so as to leave a projection 7 between them, the depressions being the one 5 below and the other 6 above the projection 7. Upon the inside of the lever *v* a recess 8 is formed, which passes the said depressions 5 and 6 and projection 7 in the up-and-down movement of the slide, as from the position seen in Fig. 14, the down position, to that seen in Fig. 15, which represents the slide as having commenced its ascent, thence to the position seen in Fig. 16, the extreme upward movement. The shape of the recess 8 in the lever *v* corresponds to the depressions and projections on the cam when they are in line with each other, as seen in Fig. 14, and so that the recess in the lever and the said depressions together form a V-shaped space. Between the cam and the lever a roller 9 is arranged, which when the slide is in the down position will of its own gravity fall to the bottom of the space between the cam and the lever. The lever is provided with a spring 10, the tendency of which is to yieldingly hold the lever in its inward position. As the slide commences its ascent the lever rides upon the roller 9, causing that roller to ride up from the depression 5 to the projection 7, as seen in Fig. 15, thus operating to force the lever to its outward position, as seen in Fig. 15, and away from the stud, as before described. As the slide continues its up position the lever still operates upon the roller 9, causing it to ride over the projection 7 and toward the recess 6; but as soon as the roller has passed the projection the operation of the spring of the lever *v* will force that roller upward into the depression 6, as seen in Fig. 16, permitting the lever to return to its normal position. The roller 9 will now remain in this depression 6 (the lever preventing its return) until on the next descent of the slide the lever *v* reaches its down position, when the recess 8 in the lever will again come into line with the cam, as seen in Fig. 14. Then the roller 9, of its own gravity, will return to its down position, ready for the next ascent of the lever, as before described. This arrangement produces the outward or releasing movement of the setter as the slide commences its ascent, and returns the setter into its normal position before the slide reaches its up position to bring the setter into line with the conductor, and so that the setter may with certainty receive the next stud presented. The setter is pierced, as at 11, corresponding to the projecting stud 3 of the anvil, and so that the setter may pass onto the stud should occasion require.

I have represented the front plate of the hopper as arranged in the same plane of and so near the feeding-blade Q as to cause the blade to engage the studs with their tubular shanks all projecting in one direction, so as to be properly delivered; but this construction of the hopper is not essential, as the blade may be constructed with a plate as a part of itself, which will perform the office of the front portion of the hopper which I have described. This modification is represented in Fig. 7ª, in which 12 represents the plate attached to or made as a part of the blade, and so that the studs can only pass onto the edge of the blade with their shanks in one direction. In this modification the upper edge of the plate 12 should be thicker than the opening in the studs, so that it may not engage the studs. With this arrangement the hopper may be made, as represented in Fig. 12, so that the blade will pass substantially through its center. The blade with its plate may be thus employed in a hopper made in a single part, movable or immovable. I prefer, however, in all cases to make the hopper in two parts, as I have described, because of the more general disturbance which it gives to the mass of studs in the hopper.

It will be understood that the two-part hopper and the feeding-blade, with the conductor, may be employed in combination with other stud-setting mechanism—such, for illustration, as many of the machines of this class heretofore patented.

It will also be understood that the setting mechanism of this invention may be employed in combination with many of the hoppers and stud-delivering devices in pre-existing machines. It will also be understood that the hopper may be made without division, as rep-

resented in Fig. 7ª, the whole hopper receiving a vertical reciprocating movement and the blade hung in the reciprocating hopper, as described, so that by such vertical reciprocating movement it will also receive its vertical vibratory movement. It will also be understood that the front vertically-moving portion of the hopper, with the feeding-blade hung thereto, may be employed without the necessary movement of the other or rear portion of the hopper—that is to say, the rear portion of the hopper may remain stationary, the position in broken lines, Fig. 7, illustrating such position of the rear portion of the hopper.

I claim--

1. In a machine for setting lacing-studs, the combination of a hopper made in two parts, both parts arranged to move vertically each independent of the other, mechanism substantially such as described for imparting vertical reciprocating movement to the said two parts of the hopper, but in opposite directions, a vertical vibrating feeding-blade arranged to work up and down within the hopper and adapted to take upon its upper edge one or more of the studs from the mass in the hopper, and a conductor having its upper end arranged in line with the upper edge of the said blade and so as to form a continuation of that upper edge, with a stud-setting mechanism, the said conductor leading to the said setting mechanism so as to successively deliver the studs from the hopper to the said setting mechanism, substantially as described.

2. In a machine for setting lacing-studs, the combination of a hopper adapted to receive a mass of studs, a vertical vibrating blade hung upon a pivot and so as to work up and down through the mass of studs, the upper edge of the said blade adapted to take one or more of the studs from the said mass, the hub of the blade constructed with a passage through it and the edge of the blade continued through the said passage concentric with the axis upon which the blade vibrates, so that the studs may run on the edge of the blade through the hub, and a setting mechanism adapted to receive and set the studs, with a conductor corresponding to the edge of the said blade and starting tangentially from the said concentric portion of the blade and adapted to receive the studs from the edge of the blade and take them to the said setting mechanism, substantially as described.

3. In a machine for setting lacing-studs, the combination of a hopper composed of two parts, each part vertically guided and each adapted to receive independent reciprocating movements, mechanism substantially such as described to impart reciprocating movement to each of the said two parts of the hopper in opposite directions, a blade hung upon a pivot on one of the said parts of the hopper, and upon which pivot the said blade is adapted to vibrate in a vertical plane, the said blade partaking of the vertical reciprocating movement of the part of the hopper to which it is hung, mechanism substantially such as described to impart the vertical vibratory movement to said blade in addition to the said vertical reciprocating movement, the upper edge of the said blade being adapted to work through a mass of studs placed in the hopper and take thereon one or more of the studs from the mass, a conductor forming a continuation of the upper edge of the said blade and adapted to receive therefrom the studs so taken by the blade from the mass, and a stud-setting mechanism substantially such as described, the said conductor leading from the said blade to the said setting mechanism, substantially as described.

4. In a machine for setting lacing-studs, the combination of a hopper made in two parts, one of the said parts arranged to reciprocate vertically, mechanism for imparting vertical reciprocating movement to said one part of the hopper, a feeding-blade hung upon a pivot to the said reciprocating part of the hopper and so as to vibrate in a vertical plane and also to partake of the reciprocating movement of the said part of the hopper, the said blade adapted to swing up and down through the mass of studs in the hopper, and a setting mechanism with a conductor leading from said blade to said setting mechanism, the said conductor forming substantially a continuation of the edge of the blade and so as to receive studs therefrom, substantially as described.

5. In a machine for setting lacing-studs, the combination of a vertically-reciprocating slide carrying the mechanism for setting the stud, a hopper attached to said slide and so as to reciprocate vertically therewith, a blade hung in the said vertically-reciprocating hopper and so as to vibrate in a vertical plane up and down through the mass of studs in the hopper, but also so as to partake of the vertical reciprocating movement of the hopper, and a connection from the said blade to a stationary point in the machine, whereby under such vertical reciprocating movement of the hopper a vertical vibratory movement will be imparted to the said blade, with a conductor forming a continuation of the upper edge of the said blade and leading to the said setting mechanism, substantially as described.

6. In a machine for setting lacing-studs, the combination of a vertically-reciprocating slide carrying the setting mechanism, a hopper composed of two parts vertically divided, one of said parts attached to or made as a part of the said vertical reciprocating slide and so as to reciprocate therewith, the second part of said hopper arranged in guides so as to receive a vertical reciprocating movement, mechanism substantially such as described to impart reciprocating movement to said second part of the hopper, a blade hung to the said first part of the hopper so as to partake of its vertical reciprocating movement, connection from the said blade to a station-

ary point in the machine, whereby the vertical reciprocating movement of the said blade will cause it to receive a vibratory movement in the same vertical plane, the upper edge of the blade being adapted to work through the mass of studs in the hopper and take therefrom one or more of the studs, and a conductor forming a continuation of the upper edge of the said blade and leading therefrom to the said setting mechanism, substantially as described.

7. In a machine for setting lacing-studs, the combination of a vertically reciprocating slide C, a setter *u* at the lower end of the vertical lever *v*, the said lever hung upon a pivot in the said slide and so as to swing outward and inward, a spring the tendency of which is to yieldingly hold the said setter in its normal position, a hopper to contain a mass of studs, and a conductor leading from said hopper and terminating at the said setter, so as to present the studs to said setter with the tubular shank downward, the said setter in its normal position forming a continuation of said conductor, with mechanism substantially such as described to impart the outward swinging movement to said setter-lever, substantially as described.

8. In a machine for setting lacing-studs, the combination of a vertically-reciprocating slide C, a vertical lever *v*, hung upon said slide, carrying the setter *u* at its lower end, a spring the tendency of which is to hold the said setter in its inward or normal position, the stationary cam 3 in rear of said lever, having the cavities 5 and 6 formed in its face producing a central projection 7, the corresponding face of said lever constructed with a recess 8, adapted to work up and down in front of said cam, a roller 9 between the said cam and said lever, and a hopper, with a conductor leading from said hopper to said setter *u*, the said setter *u* in its normal position forming a continuation of said conductor, substantially as described.

9. In a machine for setting lacing-studs, the combination of a vertically-reciprocating slide carrying the setter, a hopper, a conductor X, leading from the said hopper to said setter, the dog *d*, mechanism substantially such as described to impart to said dog a vibratory movement across said conductor, the said dog constructed with a recess *k*, adapted to receive a single stud from the column on the conductor when the said recess is in line with said conductor, the said recess opening below for the escape of the said stud when the said opening of the dog is withdrawn from the column on the conductor, that part of the dog forward of the recess constructed to pass between the stud in the recess and the next stud above in the column, and whereby the said dog serves to successively cut off and deliver the studs, substantially as described.

10. In a machine for setting lacing-studs, the combination of a vertically-reciprocating slide carrying the setting mechanism, a hopper, a conductor leading from the said hopper downward, its lower end curved inward so as to turn the studs from a horizontal to a vertical plane with the shank downward, and so present the stud to the setter, the finger *p*, hung upon a stationary pivot and so as to swing in a plane parallel with the plane of the said slide, the end of the finger extending into the path of the said curved portion of the conductor, and a cam *s*, moving with said slide and adapted to impart to the said finger an outward swinging movement, with a spring the tendency of which is to impart to the said finger an inward swinging movement, substantially as and for the purpose described.

11. In a machine for setting lacing-studs, the combination of the vertically-reciprocating slide C, the lever *v*, hung in said slide and so as to swing outward and inward and carrying the setter *u* at its lower end, a spring the tendency of which is to hold the setter inward in its normal position, mechanism substantially such as described to impart outward swinging movement to said lever and setter, a hopper, a conductor leading from said hopper to said setter and adapted to successively present the studs to said setter, a lever *e*, hung in said slide and so as to swing outward and inward, a spring the tendency of which is to force and yieldingly hold the said lever in its outward position, and mechanism substantially such as described to impart to said lever an inward swinging movement, the said lever *e* provided with a dog *d* at its lower end and so as to swing across the said conductor above the point of delivery of the studs, the dog constructed with a recess *k* in line with the said conductor when in the outward position, the dog forward of the said recess being adapted in its rear movement to pass between a stud in said recess and the next stud above in the column on the conductor, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GEORGE O. SCHNELLER.

Witnesses:
A. T. TERRELL,
W. F. OSBORNE.