

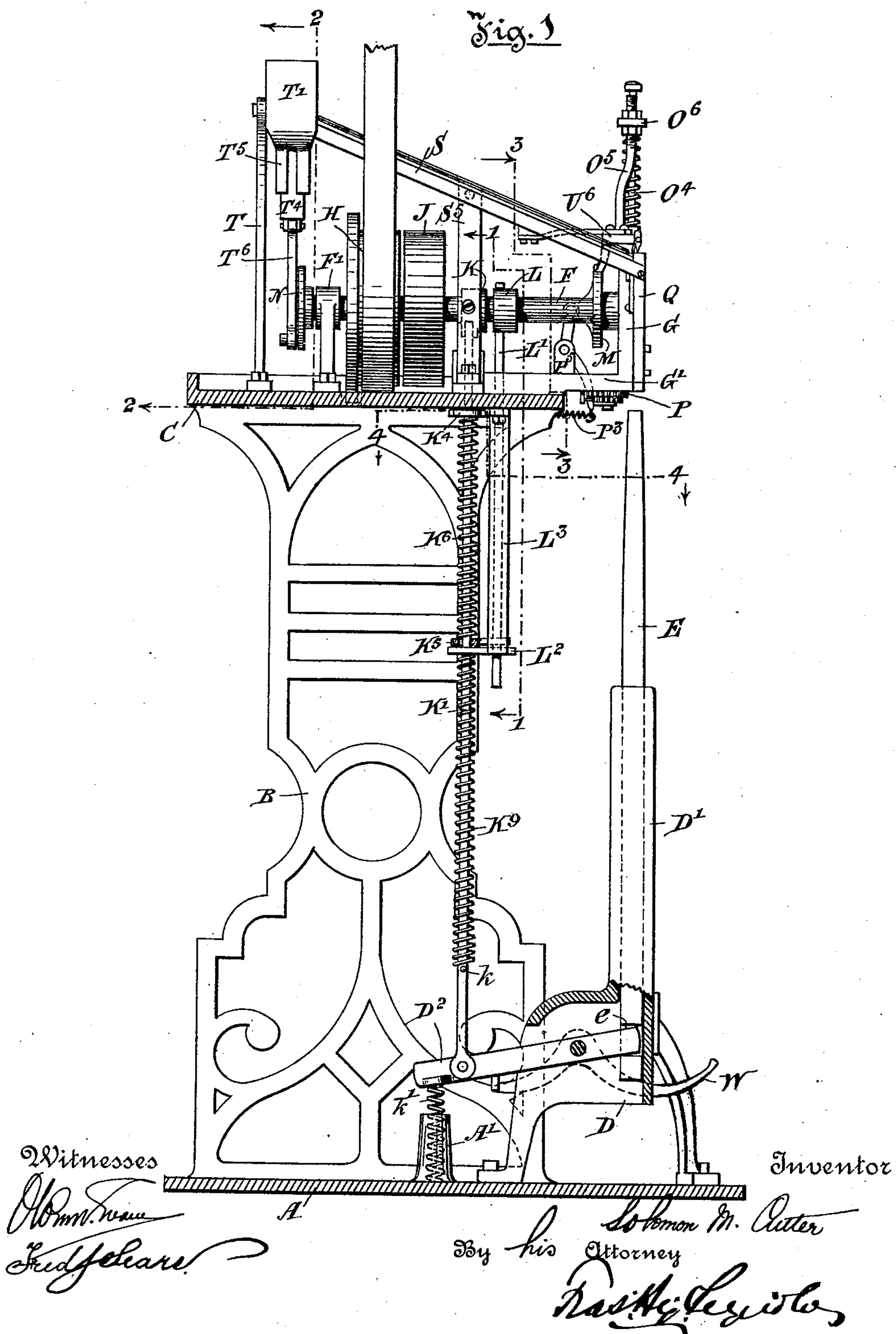
(No Model.)

4 Sheets—Sheet 1.

S. M. CUTTER.
SHOE SLUGGING MACHINE.

No. 457,257.

Patented Aug. 4, 1891.



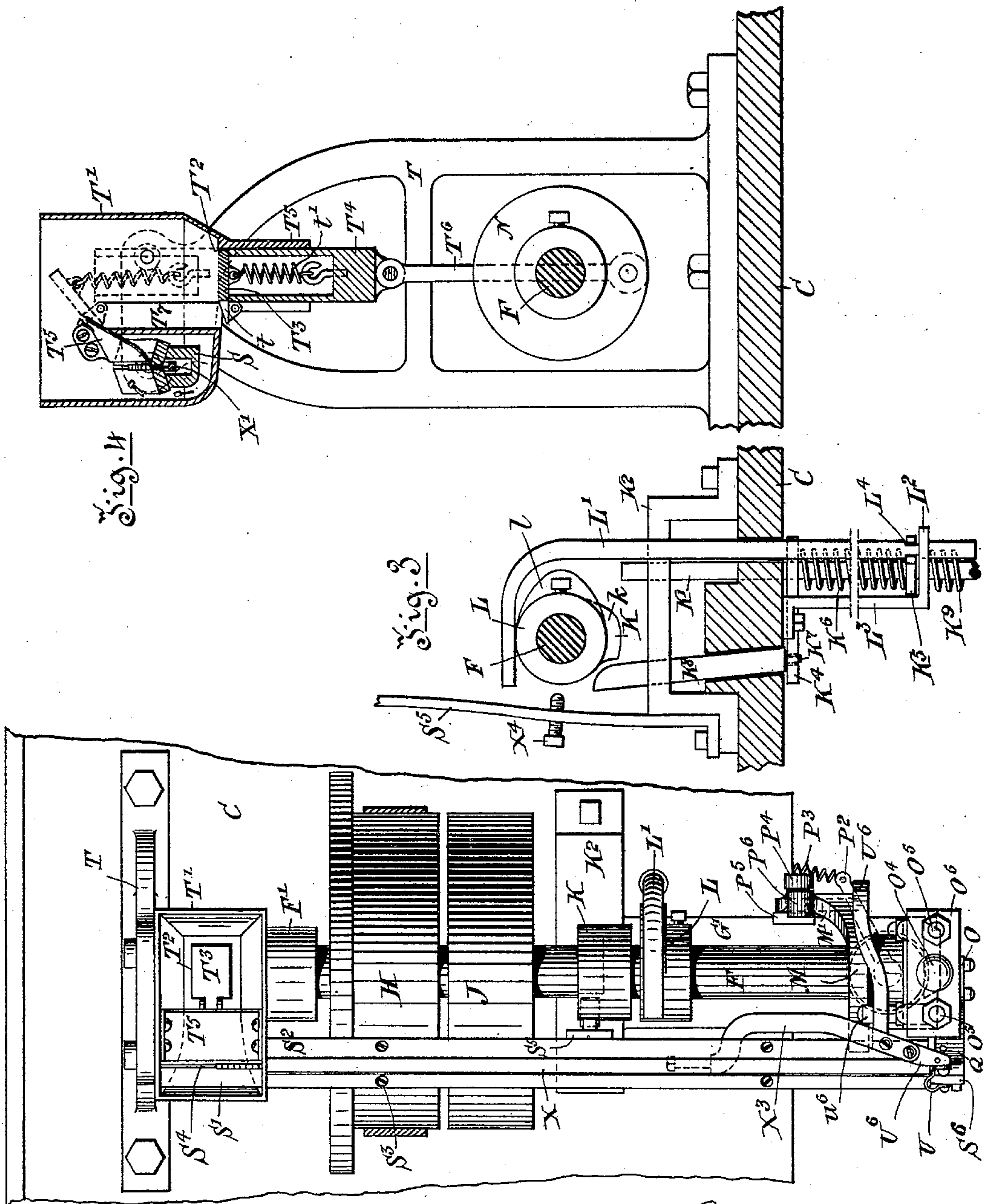
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4 Sheets—Sheet 2.

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Witnesses

Wm. Row
Fred. Sears

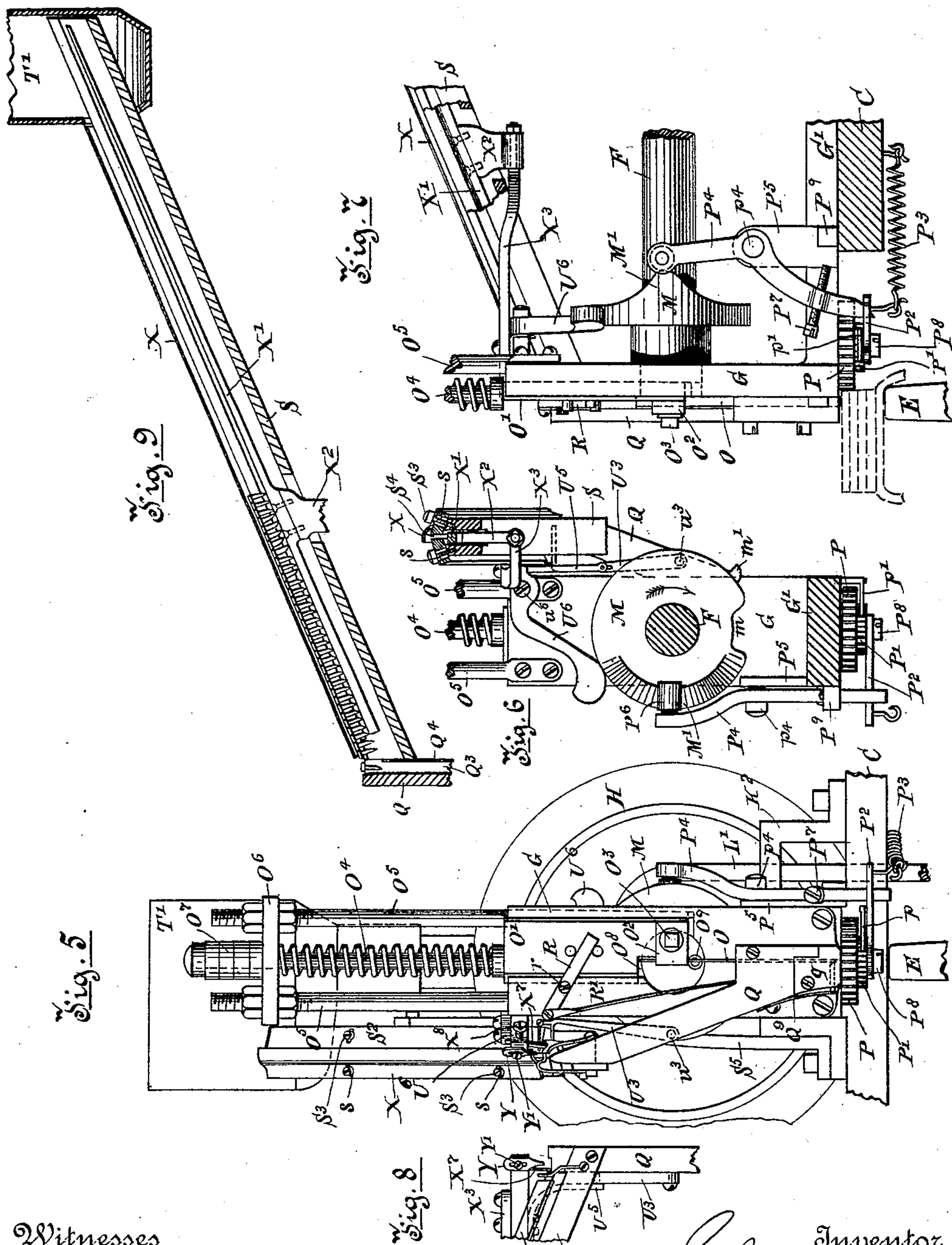
Fig. 2

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S. M. CUTTER.
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Witnesses

Wm. H. Wane
Fred Sears

Inventor
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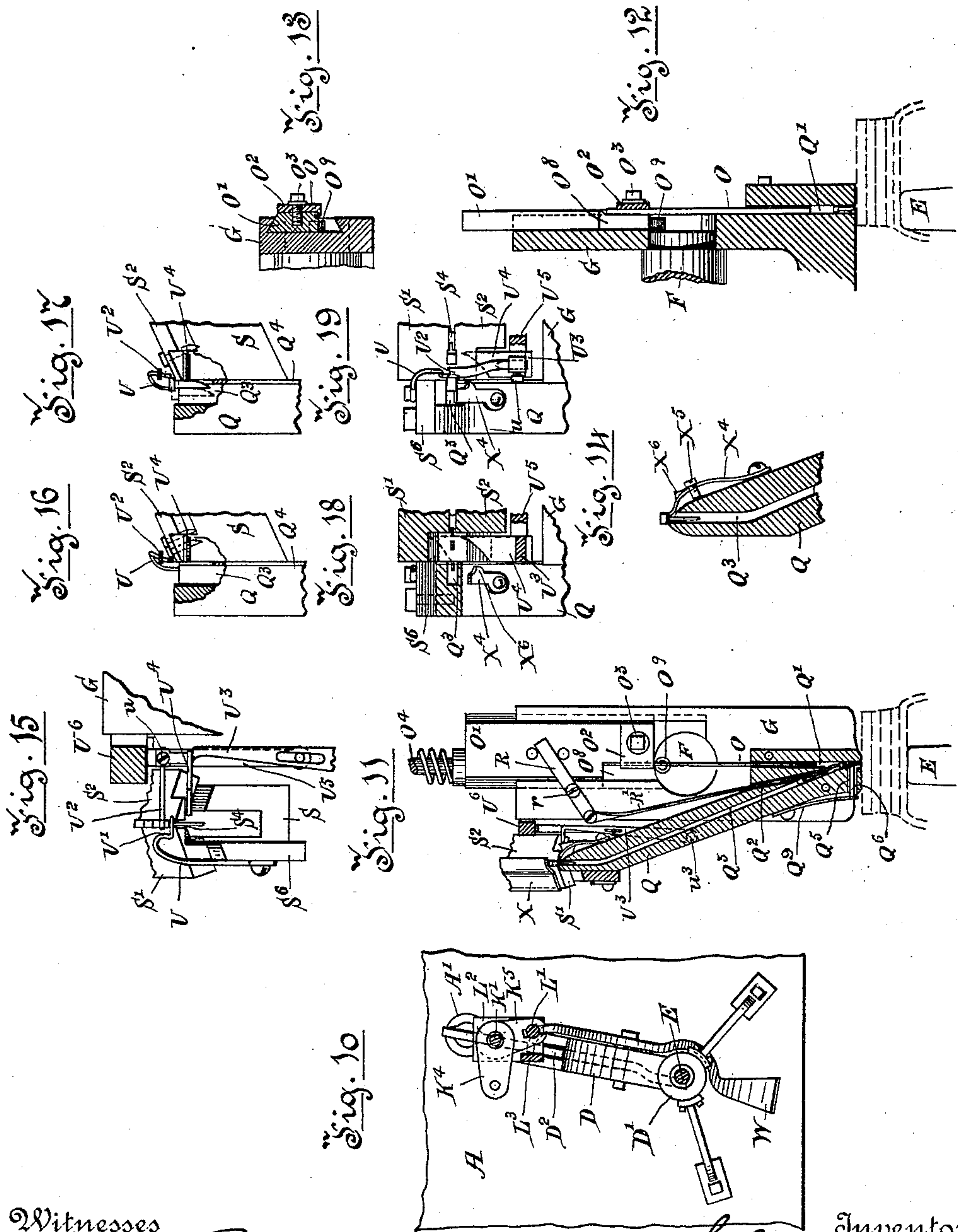
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Witnesses

Wm. W. W.

Fred. J. Sears

Inventor

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Russell H. Reynolds

UNITED STATES PATENT OFFICE.

SOLOMON M. CUTTER, OF QUEBEC, CANADA, ASSIGNOR TO WILLIAM ALFRED MARSH, OF SAME PLACE.

SHOE-SLUGGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 457,257, dated August 4, 1891.

Application filed January 21, 1891. Serial No. 378,602. (No model.)

To all whom it may concern:

Be it known that I, SOLOMON MARCELLA CUTTER, of the city of Quebec, county and Province of Quebec, Canada, have invented certain new and useful Improvements in Boot and Shoe Slugging Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to machines for inserting "slugs" into the faces of heels of boots and shoes to improve their wearing capacity.

The invention embraces, first, a general combination of parts producing a perfect working-machine, and, secondly, the addition of parts which act as safeguards against any interruption to the working that might arise from the clogging or too rapid feeding of the slugs.

The general combination includes a vertically-operating driver; a horn automatically adjustable vertically and mechanism for effecting the automatic adjustment; mechanism for feeding the work; an expansible guideway for the slugs, formed, preferably, of a raceway portion leading to a chute, through which they travel to a position beneath the driver; a pot, preferably of plunger form, and operating mechanism from which the slugs are supplied to said guideway; an escapement device and operating means for controlling the feed of the slugs; a "placer" and "holder" whereby the slug is set in proper position to be driven, being preferably used where the machine is high-speeded, and the whole being arranged upon a suitable frame and table and being operated through cams and like mechanism on a suitable driving-shaft.

The safeguards referred to consist, first, of a removable cover for the raceway portion of the guideway to prevent any possibility of foreign articles coming in contact with the heads of the slugs which travel outside, or of their being knocked out; secondly, an agitating-rod within the raceway extending the full length of same beneath the points of the slugs and adapted to be thrown at regular intervals against same, so as to free any that may possibly stick; thirdly, an adjustable projection from the main support (slightly flexible) of such raceway, against which one of the cams on the driving-shaft strikes and

causes a vibration of the raceway, thus also avoiding any possibility of the slugs clogging; fourthly, an adjustable spring-retainer parallel with the mouth of the chute, down which the slugs pass to the driver, for holding back the last slug which has passed the escapement while another is being driven, together with an opener for acting on such retainer to release the slug, and, lastly, a knocker for impelling same down the chute should there be any tendency to stick at the top. For full comprehension, however, of the invention, reference must be had to the annexed drawings, in which like symbols indicate corresponding parts, and where—

Figure 1 is a vertical elevation of the machine, showing the base-plate, table, and the base of the horn-support in section. Fig. 2 is a plan view, to a larger scale than Fig. 1, of the operating parts above the table. Fig. 3 is a transverse section, enlarged, on line 1 1, Fig. 1, and looking in the direction indicated. Fig. 4 is a transverse section on line 2 2, Fig. 1, looking in the same direction as Fig. 3. Fig. 5 is a face view, also enlarged, of the parts carried by the table. Fig. 6 is a transverse section on line 3 3, Fig. 1, looking in the direction indicated. Fig. 7 is a vertical elevation of a portion of the parts carried by the table, looking from the opposite side to that seen in Fig. 1. Fig. 8 is a detail side view of parts in the vicinity of the junction of the raceway and chute, including portions of these latter. Fig. 9 is a longitudinal vertical section of raceway, supply-pot, and a portion of the chute. Fig. 10 is a horizontal section on line 4 4, Fig. 1, looking down. Fig. 11 is a face view of the head in which the driver works, showing the chute in section. Fig. 12 is a vertical section of such head and the foot of the chute, showing driver and its cross-head in side elevation, the clamp for holding the driver in place being also shown in section. Fig. 13 is a horizontal section of said head, cross-head, driver, and clamp. Fig. 14 is a detail section, enlarged, of the upper portion of the chute, showing spring-retainer. Fig. 15 is an end view, full size, of the raceway, the chute being removed, showing the escapement device in elevation. Figs. 16 and 17 are side views, partly broken away, of the

adjoining ends of the raceway and chute, showing the main part of the escapement in section; and Figs. 18 and 19 are respectively a horizontal section and a plan of the same parts, the escapement device being shown in section in the one case and in plan in the other.

The main frame of the machine comprises a base-plate A, open-work sides B, and table C. A foot D, carrying a vertical sleeve D' to receive the horn E, and being hollow to allow a lever D² to be pivoted therein, so that one of its arms will engage in a notch *e* in the side of the horn near its lower end and the other arm will project out from it, is bolted to the base-plate A, toward the front of the machine.

The driving-shaft F of the machine is horizontal and has its bearings in the standard F', bolted on top of the table near the rear and in the vertical head G, (where the driver is located,) carried by a neck portion G', cast on top of the table and projecting out beyond its front edge.

A tight and a loose band-pulley, respectively lettered H and J, and three cams K, L, and M are mounted on the driving-shaft F in succession between the standard F' and the head G, and a crank-disk N is set on the shaft's rear end.

The clutch mechanism for throwing the power on and off is not shown, as it can be of any ordinary kind.

In vertical lines with the cams K and L, which have the respective "rises" *k* and *l* on their peripheries, are respectively arranged rods K' and L', the former extending from a bridge-piece K² (shown in Fig. 3) down to the lever D², to which it is pivoted, passing freely through such bridge-piece and the table, and the latter—that is, the rod L'—having its upper end bent horizontally to lie on the cam L, while its main length extends down through the table and through a ledge L² on the end of a hanger L³, bolted to the under side of the table. Two clamp-plates K⁴K⁵, (shown in plan in Fig. 10,) each perforated at one end to fit loosely the rod K', are located on same, so as to be pressed by a coiled expansion-spring K⁶, encircling such rod between them respectively upward and downward against the table and the ledge L², and the outer ends of each (the plates) are in the one case K⁴ perforated to receive a pin projection K⁷ at the lower end of a bar K⁸, (shown in Fig. 13,) passing freely through the table, neck portion G', and bridge K² in vertical line with cam K and adapted to be depressed by same, and in the other case K⁵ the end is forked to loosely fit notches L⁴ on the rod L' and adapted to be raised by same. Another coiled expansion-spring K⁹ encircles the rod K' between the bottom of the ledge L² and pins *k*, located near the lower end of the rod, and a third coiled expansion-spring *k'* is arranged in a recessed boss A', cast on the base-plate A at a point beneath the end of lever D², so that it can bear upward against same. The func-

tions of these rods, springs, and clamps will be fully set forth in a description of the operation of the machine to be given farther on.

The relative location of the horn, driver, and work-feeding mechanism is seen in Figs. 5, 6, 7, 11, 12, and 13, the driver O, a comparatively thin strip of steel oblong in cross-section, being secured, as shown particularly in Figs. 12 and 13, edgeward to a dovetailed cross-head O', working vertically in the face of the head G, which is dovetail-grooved to receive it, by a clamp O² and screw O³, its (the driver's) axis being in line with that of the horn, while the work-feeding mechanism proper, consisting of a serrated wheel P, ratchet-wheel P', and lever P², carrying a spring-pawl *p*, is mounted on a stud P⁸, beneath the head G, as shown in Figs. 5, 6, and 7, a second pawl *p'* (shown in Fig. 6) being carried by the head to engage the ratchet P' and avoid back motion. The cross-head O' receives a vertical reciprocal movement from a spring-plunger O⁴ above it and a roller O⁹ below it, carried on the front end of the driving-shaft F, which passes through the head G as far as to be flush with the back of the dovetail groove for such cross-head, as shown in Fig. 12. The spring-plunger O⁴ is held in place by two rod-supports O⁵ O⁵, projecting up from the back of the head G and carrying a cross-piece O⁶, through which the plunger-rod passes, suitable washers O⁷ being provided to prevent jarring. The cross-head O' is cut away at its lower left-hand corner, as shown at O⁸, so that as soon as the roller O⁹ passes out of the vertical axis of the driver this latter can be driven down by the plunger O⁴. This arrangement for raising the plunger secures a steadier movement of same, as the bearing-point of the roller O⁹ comes directly upon the cross-head itself, whereas when a cam is used a roller projection from the face of the cross-head is required for such cam to work on.

The lever P² of the work-feeding mechanism is connected by a coiled retractile spring P³ with the table, as shown in Fig. 7, and a lever P⁴ is pivoted at *p*⁴ to a projection P⁵ on a neck portion G', so that its upper arm, carrying a roller P⁶ at its end, will be held in contact with the face of cam M, which has a rise M' on it adapted to act on the lever to throw its lower arm outward and thus operate the lever P². An adjusting-screw P⁷, whereby the feed can be lengthened or shortened, is carried by the lower arm of the lever P⁴ and adapted to make contact with a stop P⁹ on the projection P⁵.

Figs. 5, 7, and 11 show clearly the chute portion Q, leading from the raceway portion of the slug-guideway to the driver. It is formed, preferably, of a separate block of metal with a widened foot portion secured to the face of the head G and having three grooves milled in its rear or inner face, which are transformed into channels Q' Q² Q³ by the face of the head G for the lower portion and

by a separate backing plate Q^4 for the remaining upper portion. These channels are about five thirty-seconds of an inch in lateral depth and one-sixteenth of an inch in width, the driver O , which has one edge in contact with the face of head G , being of such section as to find easy movement in one Q' of them, which is made vertical for it to work in. The main portion of the chute is at about an angle of twenty degrees off the vertical and contains the channel Q^3 , the remaining channel Q^2 being between this and the vertical one Q' , and both converging to a point in the height of this last which would be slightly higher than that of the longest size of slug used—say one-half an inch from the bottom of the chute.

Pivoted at r on the face of the head G is a lever R , to one arm of which is pivotally secured the end of a flexible steel strip R' , which I term the "placer," its opposite end being located in the channel Q^2 , and as the lever R is rocked by means of two pins on the face of the reciprocating cross-head O' , between which the other arm of the lever is located, such free end of the placer enters and is withdrawn from the channel Q^3 , down which the slugs fall.

In a groove Q^5 , at right angles to and in the same axis as the groove Q' and near the bottom or nose of the chute, is arranged what I term a "holder," this consisting of a short strip of steel Q^6 with beveled point forced into the channel Q' by a flat spring Q^9 , which is attached to the side of the chute and carries such steel strip Q^6 .

The expansible raceway portion of the slug, guideway (shown in longitudinal vertical section in Fig. 9 and in end view in Fig. 15) is composed, essentially, of a trough-like body S , having sides and bottom and a top formed of two adjustable strips S' S^2 , having transverse slots $s s$, (shown in Fig. 6,) through which set-screws S^3 pass to the sides. The top edges of the sides are beveled so as to incline the cover-strips S' S^2 upward laterally toward the center of the raceway, and by beveling their inner edges a proper channel S^4 (which leads into the channel Q^3 in the chute) is formed for the bodies of the slugs to pass down, while the exterior surfaces on which their heads bear are reduced to mere knife edges or lines, thus lessening friction to a considerable extent. This raceway is inclined longitudinally at about an angle of thirty degrees and supported centrally by a strip S^5 of metal, preferably of a slightly flexible nature, bolted at its lower end to one end of the bridge K^2 , so as to be in line with the cam K , for purposes to be hereinafter mentioned, and having its free end screwed to the raceway, another point of support being the chute Q , to the side of which an extension S^6 from one of the sides of the raceway is screwed.

The upper end of the raceway enters the slug-supply pot constructed and arranged as shown in Fig. 4, and now to be described. A

vertical support T is bolted to the table in rear of the crank-disk N , and serves to carry an oblong pot or receptacle T' , open at the top and having the lower portions of its sides and part of its bottom inclined in toward a rectangular opening or space T^2 in such bottom situated to the right of the whole, so as to be clear of the raceway, which is located over the left-hand portion thereof. This space T^2 is normally blocked by the head T^3 of a hollow rectangular plunger T^4 , adapted to be worked in guide-strips T^5 , extending down from the pot by means of a connecting-rod T^6 , pivoted to the lower end of the plunger and to the crank-disk N on the driving-shaft, and this head T^3 has a pivoting lip or extension t on its left-hand side, through which it is hinged to the exterior of the left hand, or that side of the plunger nearest the raceway. The plunger T^4 is made hollow to allow of the insertion of a coiled retractile spring t' therein, one end of which is connected with a hook at the bottom and the other to an eye on the inside of the head T^3 thereof. An inclined guide-plate T^5 has its bottom edge running along the raceway parallel with and close to the channel S^4 therein and its top edge in the line of vertical movement of the lip or extension t on the hinged head T^3 of the plunger, so that such lip will come in contact with the plate and be tilted, as will be more fully explained in the operation of the machine. A vertical three-sided guard T^7 partitions off the space occupied by the lip or extension t in traveling up and down in the pot, so as to avoid any possibility of slugs interfering.

At the foot of the raceway, as shown in Figs. 15, 16, 17, 18, and 19, is arranged what I term the "escapement device," this consisting of a steel spring U bent so that one end can be secured to the extension S^5 of the raceway. Its other free end projects across the line of the travel of the heads of the slugs in the raceway, and a shoulder or bearing-point U' be provided for the end of the reciprocating finger U^2 to come against and move the free end out of the way of the descending slugs. This finger U^2 is adjustably secured by a set-screw u in the head of a vertical lever U^3 , pivoted at u^3 to the rear side of the chute Q , as shown in Figs. 6, 8, and 11, and carrying also another finger U^4 beneath the one U^2 adapted to work through an opening in the raceway afforded by cutting away a portion of the end of the cover-strip S^2 , the cover-strip S' being also recessed to a certain extent to accommodate its movement. This second finger U^4 is beveled at the end and pointed, as shown in Fig. 18, so that it can be inserted between the bodies of the slugs and while moving one of them forward serve at the same time to hold the rest back, it always acting in concert with the spring U , which is moved out of the way of the slug to be fed just after the point of the finger U^4 comes in front of the remaining body of the slugs. The lever U^3 is rocked by means of a finger

U⁵, extending from a lever U⁶, pivoted at *u*⁶ to the back of the head G and bent so that one arm will extend frontward and its end have a position directly over the upper end of the chute Q and the other arm extend downward and its end rest on the periphery of the cam M, in which a fall or depression *m* is made, into which such end drops.

If desired, the slug-guideway might consist of the raceway portion alone, which could extend from the supply-pot to a point beneath the driver, and the placer and holder be entirely omitted.

With the exception of mentioning that a foot-lever W (shown in Figs. 1 and 10) is pivoted to one side of the foot D of the horn-support to be used for lowering the horn when the work is put on and removed, all the parts necessary to the working of the machine have been described, and I will now describe in detail the several safeguards hereinbefore alluded to, which are, first, a removable cover X, consisting of a thin strip of metal bent to the cross-section shown in Fig. 6, so as to extend over the heads of the slugs, but not touch them, transversely slotted and secured in place on top of the cover-strip S' by the set-screws S³; secondly, an agitating-rod, (shown in Fig. 9,) consisting of a rectangular rod X' extending the full length of the raceway beneath the slugs and carried by a block X², passing through an opening in the bottom of the raceway and pivoted on the end of an arm X³, extending from the lever U³; thirdly, an adjustable projection, (shown in Fig. 3,) which is a set-screw X⁴, located in the central support S⁵ of the raceway and adapted to be knocked by the rise *k* on cam K and so shake the raceway; fourthly, an adjustable spring-retainer, (shown in Figs. 5, 11, 14, 18, and 19,) consisting of a strip of steel X⁴, slightly bent into bow form and secured to the side of the chute Q at one end, so that its other end will spring inward at the mouth of the channel Q³ as far as to be in line with the channel-edge of the cover-strip S² of the raceway, thus maintaining the same width of channel throughout, an adjusting-screw X⁵, threaded through the spring and bearing against the chute, rendering it possible to adjust same to correspond with any adjustment of the cover-strip S². This spring or retainer has an ear X⁶ projecting from it, against which a pin X⁷, termed an "opener" and projecting down from beneath the end of the lever U⁶, in which it is held by set-screw X⁸, presses to throw it (the spring) outward and allow the slug resting on it to drop; lastly, a knocker, (shown in Figs. 1, 2, 5, and 8,) which consists of an adjustable finger Y, slotted and secured in place vertically on the end of the lever U³, directly over the mouth of the channel Q³ in the chute by a set-screw Y'. The lever U⁶ receives also an opposite movement to that caused by the fall or depression *m* in the periphery of cam M from a rise *m'* immediately following such depression, this extra movement being

to operate the agitating-rod, opener, and knocker just mentioned.

To afford access to the interior of the nose of the chute Q, I make a lower front section *q* of same removable, one of the screws for securing the chute in place serving to hold such removable section in place also.

The operation of the machine is as follows: I may here remark that the horn is normally in what I term "a state of equilibrium"—i. e., the force of the spring *k'* beneath the lever D² serves to make up the difference between the force of the spring K⁹ and the weight of the horn, the pressure of which latter is less than the spring K⁹, this being necessary to allow the automatic adjustment of the horn, as will fully appear. The supply-pot T' being filled with slugs and the boot being placed on the horn, (which is temporarily lowered by pressing on the foot-lever W,) with the heel in position under the driver O, the machine is started and the shaft F revolves in the direction indicated by the arrows. The rotation of the disk N operates the plunger T⁴, raising it and carrying a number of slugs on its head T³, which remains horizontal till the lip *t* comes in contact with the guide-plate T⁵, when it is tilted, as shown by dotted lines in Fig. 4, and throws the slugs down such plate to the raceway, where a number of them will settle themselves in the channel S⁴, and others fall down between the raceway and the side of the pot into the bottom of same again. Those slugs which enter the channel will slip down to the lower end of the raceway and be checked by the escapement-spring U, till by the rotation of the cam M the lever U⁶, by its end falling into the depression *m*, is moved to rock the lever U³ forward, and thereby causes the finger U² to come in contact with the spring U and press it out of the way of the slugs, while at the same time the point of the finger U⁴ inserts itself between the bodies of the first and second slugs, and by means of its beveled end moves the former out of the raceway to be held between the edge of the mouth of the channel Q³ of the chute on one side and the edge of the retaining-spring X⁴ on the other. The further rotation of the cam M of course restores the two escapement-fingers to their former position and then causes the opposite movement of the lever U⁶, by means of the rise *m'* coming in contact with its end, which serves both to lower the pin or opener X⁷, so as to press the retaining-spring X⁴ out and release the slug, and also to lower the "knocker" Y, which, if the slug fails to fall down the chute of itself, hits it and thus impels it down. The rebound in the return of the lever U⁶ to its normal position throws the agitating-rod X' in the raceway against the points of the slugs, thus loosening any that might be sticking. Falling down the channel Q³ of the chute the slug is again detained at the point Z (indicated in Fig. 11) by the placer R', which ascends as the driver O descends, although this detention is not

absolutely necessary when the escapement device is working properly. By the time the placer has passed up into its own channel Q^2 , leaving the slug free to drop lower, the driver O is blocking the point of entry into its channel, and therefore the slug is arrested at such point; but as the driver ascends the placer nears the slug and finally pushes it into position between the holder Q^6 and the side of the channel Q' . As the placer retreats the driver descends to drive the slug; but just before this occurs the horn is automatically raised to press the work firmly in place, as follows: The rise k of cam K comes in contact with and presses down the bar K^8 , which depresses the outer end of the clamp-plate K^4 , causing it to grip the rod K' and move same down, thus through the lever D^2 raising the horn. As soon as the slug is driven the rise l on cam L comes in contact with the bent end of the rod L' , and in raising it the clamp-plate K^5 is tilted upward, causing it to grip the rod K' and move same up, thus lowering the horn through the lever D^2 , easing the work and allowing the feed mechanism to be operated by the rise M' of cam M through the levers P^4 and P^2 .

What I claim is as follows:

1. In a boot and shoe slugging machine, the combination of a main driving-shaft, a vertically-operating driver, a work-supporting horn automatically adjustable vertically above or below a normal position, yielding pressure devices for holding said horn in its normal position, a pair of cams mounted on said driving-shaft, a lever and a rod for operating such lever, and a bar and rod, clamps and detent or support arranged in such relation with each other, the said cams and the lever operating the rod as to alternately raise and lower said horn beyond its normal position, work-feeding mechanism, a supply-pot for the slugs, and a stationary inclined guideway leading from such pot to the driver, with a plunger and a pivoted head on same working in said pot, and means for imparting a reciprocating movement to such plunger for feeding the slugs from the pot to the guideway, spring and finger retaining devices reciprocated transversely across said guideway for controlling the feed of the slugs to the driver, and means for supporting and operating the whole, as set forth.

2. In a boot and shoe slugging machine, the combination, with a vertically-operating driver and means for feeding slugs to same, of a work-supporting horn held at a normal height by yielding pressure devices and capable of movement above or below such normal height, and yielding pressure devices for holding said horn at its normal height, a pair of cams on the driving-shaft, a lever and a rod for operating such lever, and a bar, rod, clamps, and detent or support arranged in such relation with each other and with the

said cams and the lever-operating rod as to effect such movement in either direction, as and for the purposes set forth.

3. In a boot and shoe slugging machine, the combination, with an inclined guideway for the slugs, of a movable escapement device located at the foot of same and consisting of a spring with an end normally inserted in the way of the heads of the slugs and a finger-plate with beveled end adapted to be inserted between the bodies of the slugs, an adjustable push-rod for moving said spring out of the way of the slugs, and means for imparting to said push-rod and finger a reciprocating movement transversely to the guideway, so that the spring will be moved out of the way of the slugs and the finger enter between the lowermost two simultaneously, as and for the purpose set forth.

4. In a boot and shoe slugging machine, the combination, with the chute Q , having a channel Q' for the vertical driver to work in and a channel Q^3 for the slugs to pass down, of a channel Q^2 , converging with that Q^3 to a point of entry into the said channel Q' , a spring-holder Q^6 , projecting transversely across the channel Q' near the lower end thereof, and a reciprocating placer, with means for operating same, working through said channel Q^2 and adapted to push the slug into position between the end of said holder and the side of the channel Q' , for the purpose set forth.

5. The combination, with the horn E , its stand $D D'$, and the driving-shaft F , of lever D^2 , rods K' and L' , ledge L^2 , clamp-plates K^4 , K^5 , springs K^6 , K^9 , and k' , bar K^8 , and cams K and L , as shown and described.

6. In combination with the main driving-shaft E and the inclined raceway S , the correspondingly - inclined agitating-rod X' , located therein beneath the points of the passing slugs, and a lever and cam (the latter mounted on said main shaft) for throwing said rod, which is mounted on one end of said lever against the points of the slugs in a direction obliquely to their line of passage, for the purpose set forth.

7. The combination, with the driving-shaft F , cam K on same, raceway-body S , and support S^5 , of the set-screw X^4 , projecting into the line of movement of the rise k on the cam K , for the purpose set forth.

8. The combination, with the chute Q , of the spring-retainer X^4 , having a projecting ear X^6 and being located at the mouth of the channel Q^3 , the adjusting-screw X^5 , threaded in such spring, the opener X^7 , and means for carrying and operating same, for the purpose set forth.

Montreal, December 22, 1890.

SOLOMON M. CUTTER.

In presence of—

O. W. GUN. EVANS,
FRED. J. SEARS.