

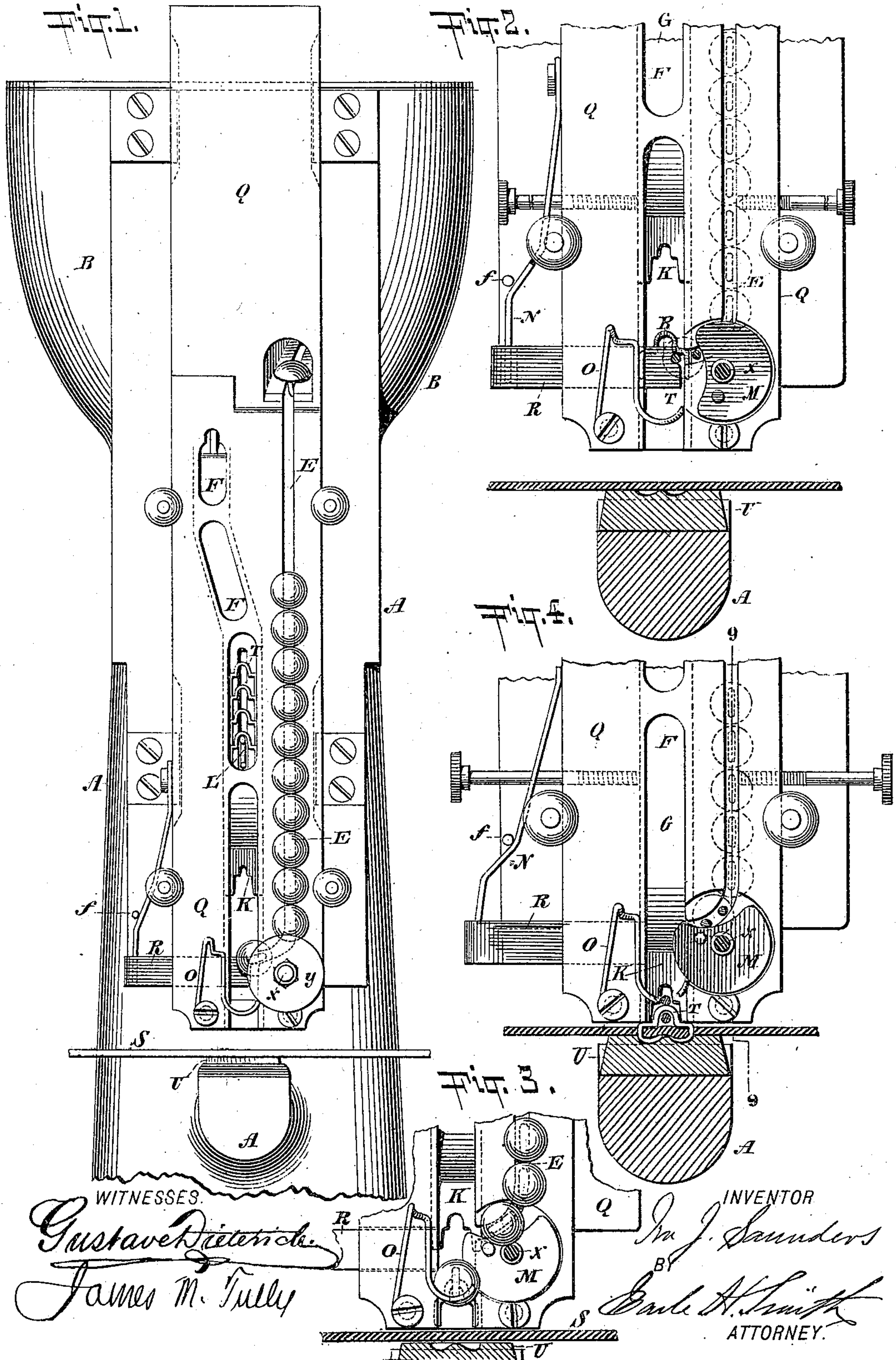
(No Model.)

5 Sheets—Sheet 1.

I. J. SAUNDERS.
AUTOMATIC BUTTON FASTENING MACHINE.

No. 529,139.

Patented Nov. 13, 1894.



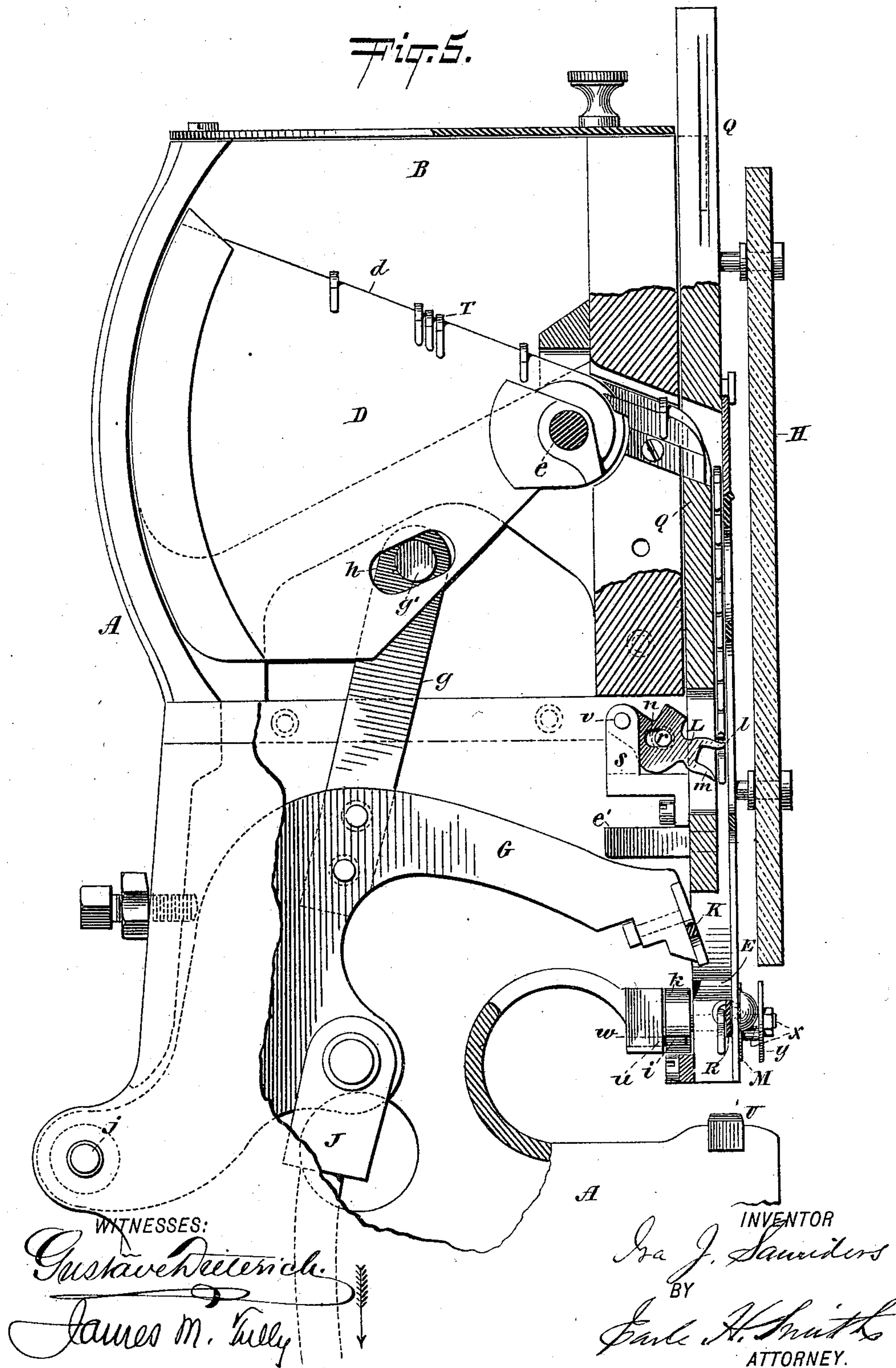
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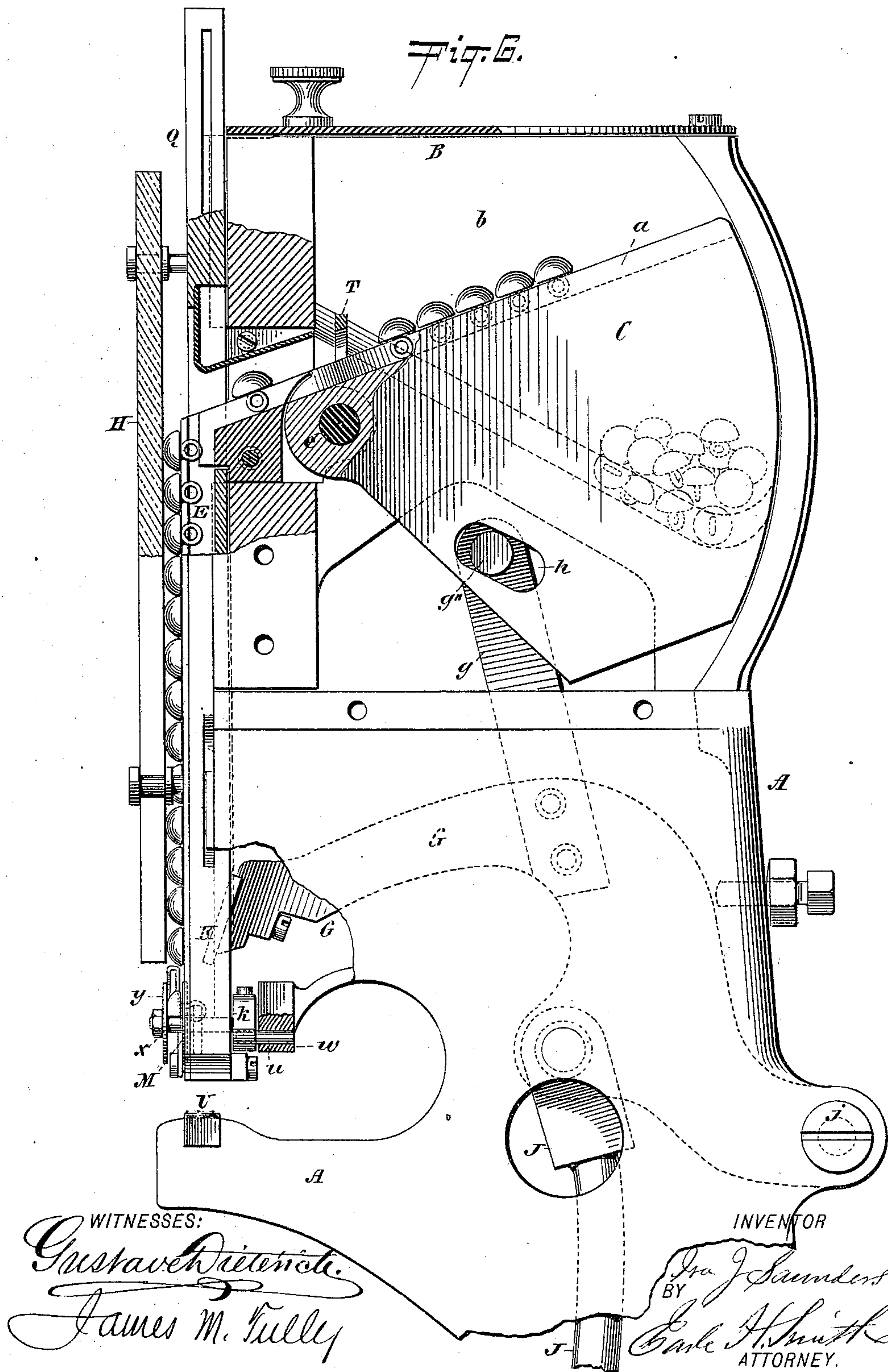
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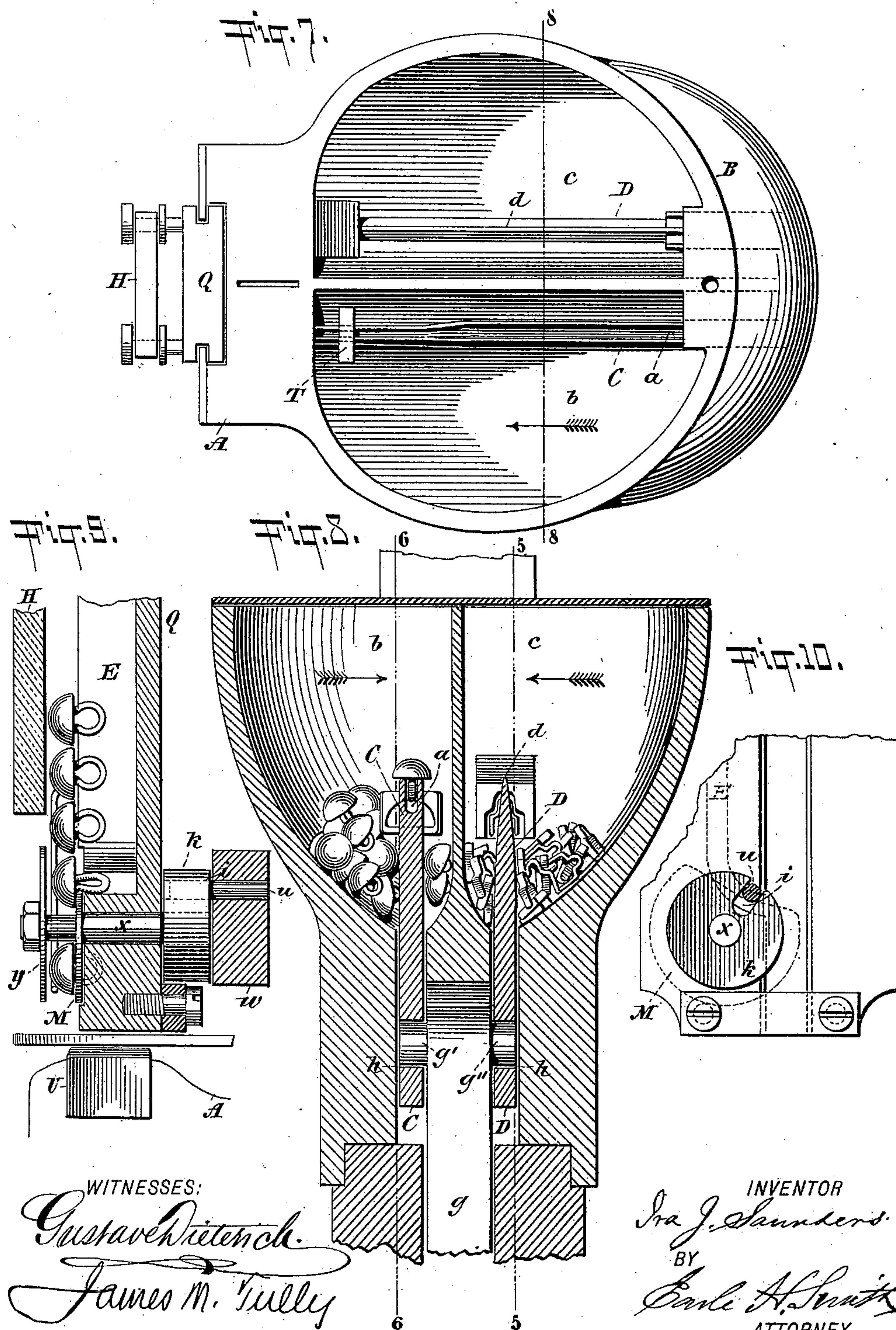
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5 Sheets—Sheet 5.

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Fig. 11.

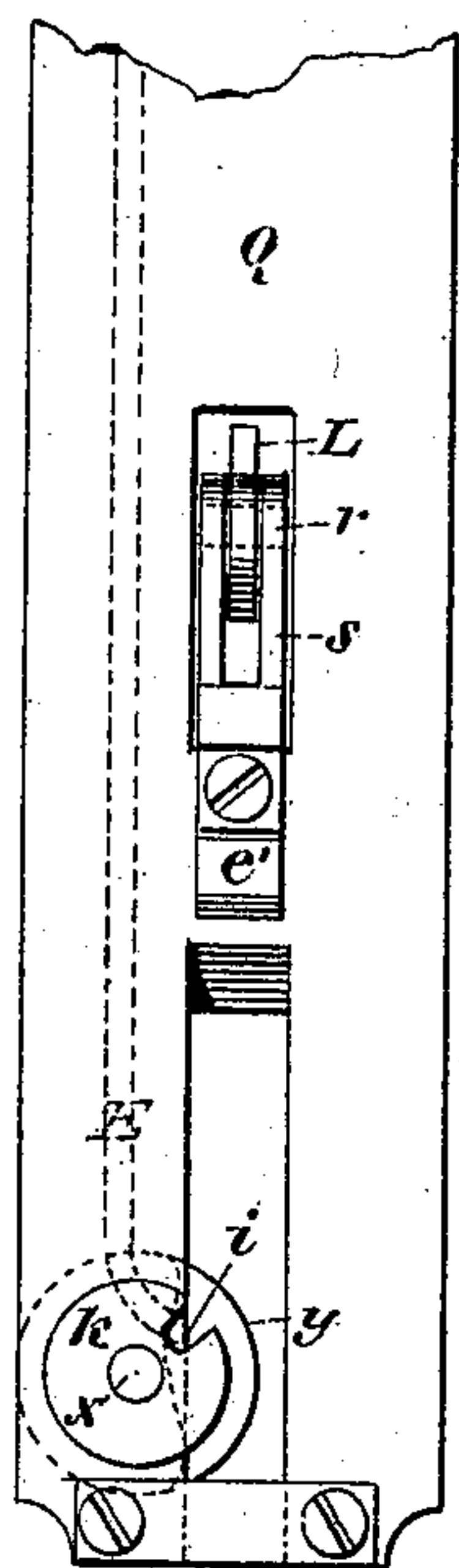


Fig. 12.

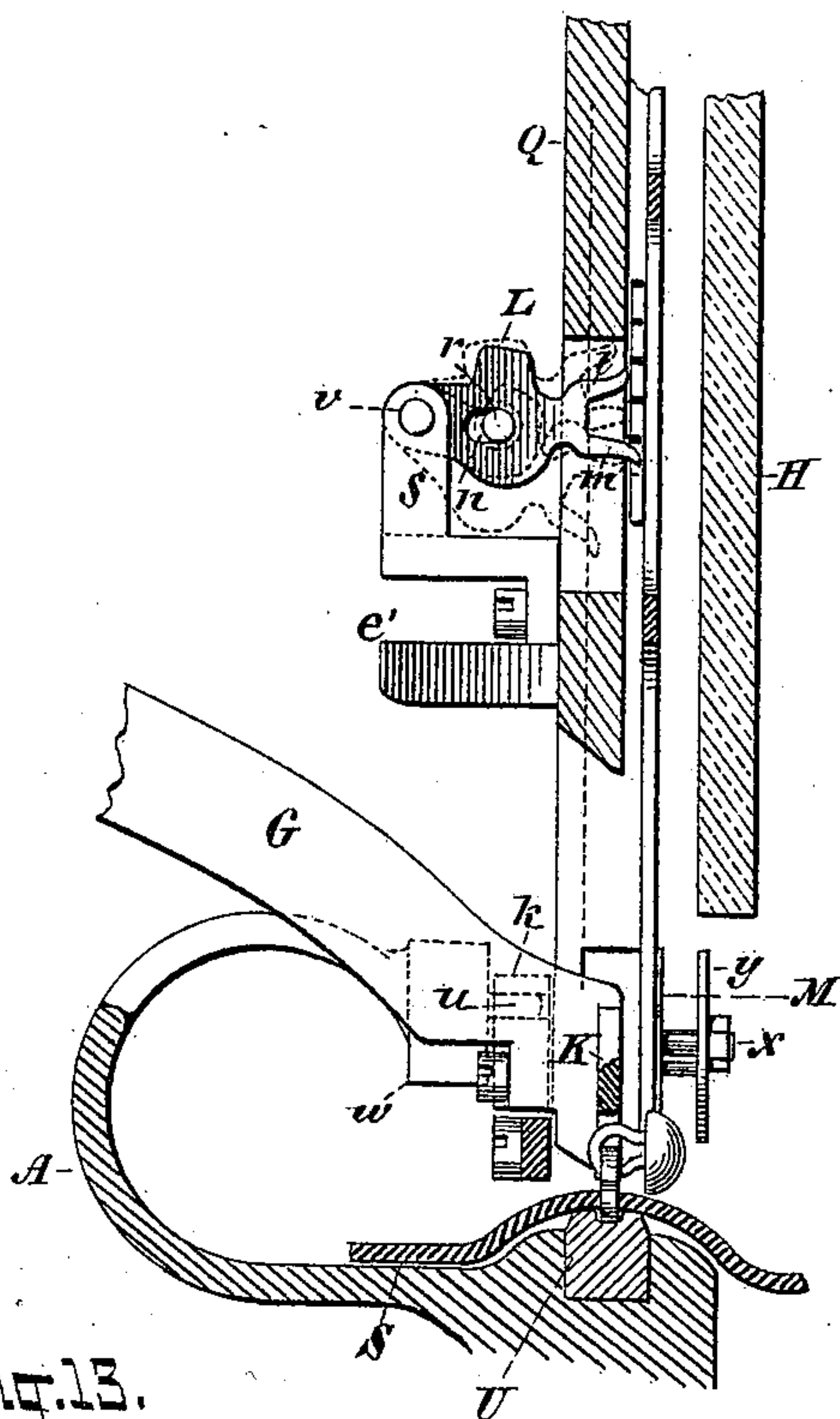
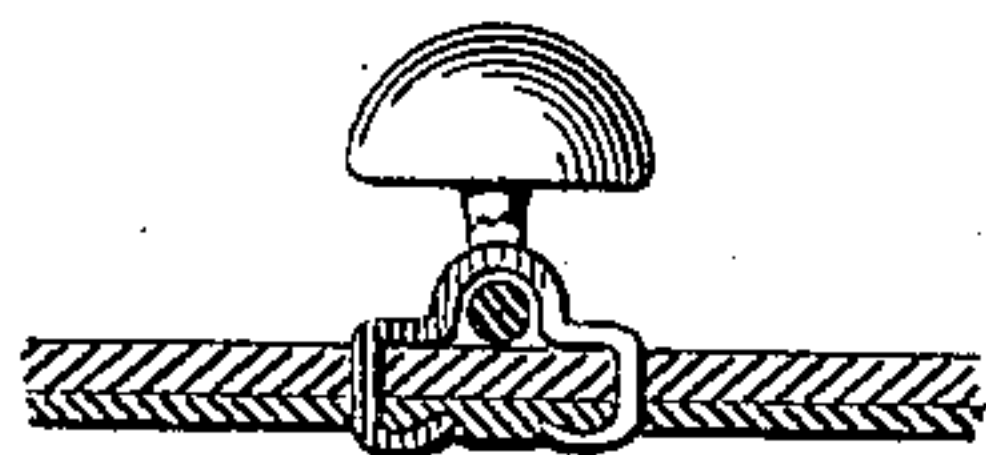


Fig. 13.



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UNITED STATES PATENT OFFICE.

IRA JAMES SAUNDERS, OF NEW YORK, N. Y.

AUTOMATIC BUTTON-FASTENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 529,139, dated November 13, 1894.

Application filed December 5, 1892. Serial No. 454,075. (No model.)

To all whom it may concern:

Be it known that I, IRA JAMES SAUNDERS, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented a certain new and useful Improved Automatic Button-Fastening Machine, of which the following is a specification.

My invention relates to a new machine for fastening shank-eye buttons to boots and shoes by the staple-like metallic fasteners in common use. In this machine the buttons and metallic fasteners are placed in a hopper containing mechanism which, in operation lifts out a button and a fastener from the hopper, delivers them to guiding channels, these channels directing them to each other to be united, whereupon they are acted on by attaching mechanism which attaches the button by its fastener, to the shoe, as the latter is supported on a block or anvil.

In the annexed drawings I have shown a machine which illustrates my invention, whereof—

Figure 1, is a front elevation. Figs. 2, 3 and 4, show the attaching mechanism in different positions. Fig. 5 is a vertical section taken through the fastener channel at right angles to Fig. 1. Fig. 6 is a vertical section taken through the button channel and the hopper. Fig. 7 shows the hopper as seen from above. Fig. 8 is a vertical cross-section of the hopper. Figs. 9, 10, 11 and 12 are different views of parts of the attaching mechanism. Fig. 13 shows a button as attached to the stock or shoe with a metallic fastener by the machine; all of which are hereinafter more fully described.

A in said drawings indicates the body of the machine, surmounted by a strong hopper B. The hopper is divided into two compartments *b, c*, Figs. 7 and 8, for containing the buttons and the fasteners, respectively in mass. The bottom of each compartment is inclined downward toward the rear, Fig. 6. Means are used for taking buttons from out the mass, as they lie in the hopper, and conducting them to the machine; and like means for taking the fasteners from the mass in the hopper, and directing them into the machine. Such means here consists of levers C, D, pivoted at *e* in a part of the hopper at the front

side thereof, Figs. 5 and 6; and adapted to be vibrated in corresponding vertical planes, Figs. 5, 6 and 8. They are arranged adjacent to each other in slots adapted to receive them, formed in and through the bottom of each compartment, see Fig. 8, and so occupy said slots as to keep the bottom of the hopper closed at all times and in all positions of such levers. They are operated from a drive lever G which is pivoted in the body of the machine frame, at the rear, Fig. 6. This lever has an extension piece *g*, reaching up and passing between the two take-levers C, D. It carries two studs *g', g''*, in opposite sides, which enter and engage the respective take-levers by a cam slot *h* formed in each, Figs. 5, 6 and 8, thus operating both take-levers at once and by the same motion of the drive-lever.

When the take-levers are in their lowest position, see dotted lines in Figs. 5 and 6, they incline downward toward the rear, of the machine, corresponding to the shape of the hopper bottom. These levers, in operation, are pushed up through the mass of articles (buttons or fasteners) in the hopper, taking some of the articles with them. In their highest position they are sharply inclined in the opposite direction, toward the front, see Figs. 5 and 6, causing the said articles to slide down thereon by gravitation to the front of the machine, there entering guiding channels E, F, one for the buttons and the other for the fasteners.

I provide means operating to adjust all the buttons uniformly to one position, heads up, as they slide down the inclined take-levers; and also means for throwing off and rejecting all such as do not so adjust or right themselves; whereby those which do not become properly righted are precluded from passing into the machine. With these objects the button take-lever C, has a groove *a* in its upper side, see Figs. 7 and 8, in which groove the buttons are taken up when the free end of this lever is elevated. There the groove is wide and gradually narrows to the dimensions of the flatwise thickness of the button eyes. There is also a stationary guard staple T erected on this lever near the narrow end of the groove, the bow of which is just large enough to permit the button head to pass through.

When the take-lever C is elevated, passing up through the mass of buttons, Fig. 8, it takes up a number with it; and all which so lodge on the lever that the shank eye is within the wide part of the groove α have their shank-eyes gradually drawn to the center, as the buttons slide down the inclined lever, Fig. 6, causing the heads of the buttons to come uppermost. At the same time the gradual narrowing of the groove toward the pivoted end of the lever, Fig. 9, so turns the buttons by their shank-eyes that they finally adjust themselves with the plane of the button eye parallel with the sides of the narrow groove, and in this attitude will pass through the guard T, and thence into the guiding channel E, which is practically a continuation of the groove in the take-lever. See Figs. 1 and 6. But when the buttons taken up so lodge on the take-lever that the shank-eye is outside of the groove α , they cannot be acted on for adjustment by said groove; and as they slide down the inclined take-lever, on approaching the narrow part of the groove α they come in contact with the guard or staple T, and are thrown off or drop, falling back into the hopper, whereby the unadjusted buttons are prevented from entering and clogging the machine. Such rejection is facilitated and insured by chamfering off the upper edge of the lever at the narrowest part of the groove. See cross-section in Fig. 8.

The adjusted buttons, on passing into the channel E, continue to be guided by their eyes or shanks, and are held in the channel by a front plate H, Figs. 5, 6, 7, &c.

The take-lever D is shaped to present a single edge d on top, see Figs. 7 and 8, and as it rises through the mass of fastenings in the hopper, they lodge thereon astride, and slide down the lever when inclined as seen in Fig. 5.

The fulcrum ends of the take-levers are directly above and on a level with the receiving ends of the guiding channels; and the fasteners, without changing their position, slip off the end of their lever and drop, feet foremost, into their channel F. See Fig. 5. Thereafter they are guided and controlled in their channel by the outer surfaces of their prongs, Figs. 1 and 6.

The channels for the buttons and fasteners respectively are preferably formed in a vertical bar Q, fitted to slide in suitable ways on the front of the hopper. The vertical position of the channels enables the buttons and fasteners therein to descend by the force of gravity. Other means may be used to aid their descent and in this instance an up and down, jolting motion is imparted to the channel-bar, for which purpose such bar has a lug e' projecting therefrom in the path of the lever G. At every motion of that lever it takes under said projection, reciprocating, or lifting and dropping said bar. The action of the take-levers in the hopper is such, that the channels E, F, are always kept supplied with a line of buttons and fasteners, suffi-

cient for the continuous operation of the machine.

Projecting into the fastener channel, is a lever L, having two fingers l, m , on the upper one, l , of which the line of fasteners in the channel rests, and by which they are supported. This lever, herein termed a feed-lever, has a fulcrum slot n , at its mid length which is entered by a fulcrum pin r made fast in the frame of the machine and on which said lever hangs. The channel-bar has a bracket s made fast on the back near the lower end, which bracket carries an operative pin v that enters the rear end of the feed lever, see Fig. 12, and at every movement of the channel bar, said feed lever is vibrated by said pin v , causing such lever to incline alternately in opposite directions, upward and downward, indicated by dotted lines in Fig. 12.

The space between the upper and lower fingers l, m , of the feed-lever is just equal to the length of a metallic fastener. The lower one of the line of fasteners hangs suspended by its bow or loop on the upper finger l , when the lever is in the position indicated by full lines in Fig. 5.

In the upward motion of the feed-lever, its inclination is such, that the upper finger l becomes withdrawn from the fastener suspended thereon, whereupon that fastener drops to, and hangs on the lower finger m , all the fasteners in the channel following and resting on the shoulders of the said lowest one of the line. See Fig. 12.

In the lowest position of the feed-lever, Fig. 5, its inclination is such, that the lower finger m becomes withdrawn from the lowest one of the line of fasteners, allowing it to escape and fall. See Fig. 6. Before this happens, however, the upper finger l has come forward, passing under the loop of the fastener next above, and assumes the support of the line of fasteners above it, and so prevents the escape of any but the lowest one, as aforesaid, which, being let off the lower finger is thus fed down to be united with a button when presented therefor. See Fig. 6.

The fastener channel F is vertical and straight, throughout, but the button channel E, is curved at the lower end toward, and terminates at, the fastener channel forming a junction therewith, so that the fasteners and buttons are directed toward each other. Such curved part of the button channel serves to turn the button to a nearly horizontal position, Figs. 1 and 9, for receiving a fastener therein as it comes from the channel F preparatory for the operation of the attaching mechanism which attaches the button, by the fastener, to the shoe. The foregoing constitute the various means for taking the buttons and fasteners from the mass, and delivering them in orderly procession preparatory to the operation of attaching the buttons to the shoe.

Various attaching mechanism may be om-

played in connection with the taking and delivering apparatus.

In the machine I am describing, the attaching mechanism comprises a driver having a die faced hammer K, a holder bar as R, discharger as M, and a check-spring O. The driver for convenience, is here made in form of a lever but may take other forms. Such driver is the lever G hereinbefore referred to. The drive lever is pivoted in the body of the machine frame at j, and carries the hammer K for striking the fasteners. This hammer has a die-shaped face presenting two lobes leaving a free space between for the head or loop of the fastener and the eye-shank of the button. The feet of these lobes are adapted to strike the fastener on the shoulders only, and directly over its prongs. The fulcrum of the drive-lever is so located, that when in its lowest position the hammer K projects into the fastener channel, and the movement of the hammer there, is approximately vertical, in line with the path of the fasteners, but when raised up the motion of the drive-lever in a curved line draws back the hammer out of the range or path of the line of fasteners, leaving their way unobstructed.

The driver lever is operated by a suitable treadle (not shown) which communicates with this lever as by the treadle-rod J.

The discharger is an oscillating, crescent-shaped cam M, made fast on an arbor X which is journaled in the lower extremity of the channel-bar Q and moves up and down therewith; and on the circular periphery of this cam M, the entire line of buttons in the straight part of the channel rests. This cam is so disposed as to sweep across the bend in the button channel, closing it above the bend; and as it moves up and down with the channel-bar, it is oscillated on its axis, by means of a small pin u that is fixed in a part w, of the frame of the machine, see Fig. 9, and enters a slit i, cut in one side of a hub k made fast on the cam-arbor x, see Figs. 5, 6 and 9, also Figs. 10 and 11, which show the reverse side of the channel-bar. The concave of the cam M is in depth just the width of a button, and as the lowest button of the line enters said cam, it passes out from under the front plate H, but is still held to the channel by a small disk y made fast on the cam-arbor x.

The holder-bar R is arranged to slide laterally in bearings in the channel bar directly opposite the discharger cam. Its office is to hold the button momentarily in co-operation with the cam M while the fastener drops therein. It is worked by a suitable cam and spring, in this instance made in one piece, and consisting of a bent wire N made fast at the upper end, and the lower end of which connects with the holder-bar R, and the bent portion of which spring acting as a cam surface against a stationary pin f operates the holder at the proper time, as the channel bar rises and falls.

Operation: Assuming the machine to be in

full operation, when the drive lever G is carried down, as by the treadle-rod J (and a treadle) the take-levers, the hammer K and the channel-bar, all move down together. At the same time, the discharger cam oscillates to the right allowing the lowest button of the line to enter from the channel above. See Fig. 4. When the drive-lever with its hammer K and the take-levers rise, the channel bar lifts, the discharger cam M, oscillates to the left, the button therein is conveyed along the bend of the channel by the upper limb of the crescent directly into the fastener channel, see Fig. 1, being now in a nearly horizontal position, ready to receive a metallic fastener therein from the fastener channel. See Fig. 9. At the same time with the said conveying motion of the cam toward the fastener channel the hold-bar is moving in the contrary direction, ceasing to move as the cam stops moving, and grasping the button by its eye, between them. See Figs 1 and 2. While the motions described are taking place, the channel-bar by its upward motion is in the act of lowering the fingers of the feed-lever in readiness to supply a metallic fastener; and at the moment the cam M and hold-bar R have taken firm hold of the button eye, the feed lever drops a fastener which falls, thrusting one leg through the eye of the button, thus uniting a fastener and button. See Figs 2 and 5. On the next downward motion of the drive-lever and channel-bar, the cam M and hold-bar R recede from each other, thus releasing the button and its fastener; and by the further motion of the cam M they are discharged. When the button and its fastener are so discharged their fall is arrested by a check spring O, in front of the button, see Fig. 3, until struck by the hammer K, in the act of attaching the button by its fastener, to the shoe. As the hammer finishes its downward stroke, the fastener is driven through the stock s or shoe-fly, and clinched on the supporting anvil U. See Figs. 4 and 12.

In the above described machine, I do not restrict myself to particular forms or construction, but shall vary the same within the invention, as circumstances may require.

What I claim as my invention is—

1. The combination with attaching mechanism, and means of operating the same, of the hopper having two compartments, for the buttons and fasteners respectively, a reciprocating channel-bar arranged in ways on the front of the hopper, and provided with two channels, respectively adapted to receive buttons and fasteners, and direct them to each other and to the attaching mechanism, vibrating levers for supplying said channel-bar with buttons and fasteners from the hopper, and means of reciprocating the channel-bar.

2. The combination with attaching mechanism comprising a hammer and anvil, of the two take-levers C, D, arranged adjacent to each other, the drive-lever G connecting means between lever G, and the take-levers,

and a treadle-rod or pitman attached to the drive-lever whereby all the said parts are actuated in unison.

3. The combination with the two take-levers arranged adjacent to each other, of the drive lever having an extension piece passing up between the take-levers, and connecting therewith by means of studs g' , g'' , each entering slots formed to receive them in the respective take-levers.

4. The combination with the treadle-rod or pitman of the drive-lever G pivoted thereto, and the two take-levers operatively connected with the drive-lever.

5. The combination with the channel-bar, and the fastener channel therein, of the vibrating feed-lever L , slotted at its midlength to receive a fulcrum-pin r , and the channel-bar provided with a bracket, s , carrying an operative pin or stud entering said feed-lever, whereby this lever is vibrated by the motion of the channel-bar.

6. In combination, the vertical reciprocating channel-bar and means of operating the same, such bar provided with separate channels for both buttons and fasteners and forming a junction at their lower ends, means for delivering buttons one by one, by gravity and presenting them in position for receiving the fasteners in the eye thereof, and a feeder in the fastener channel serving to feed the fasteners one by one to the buttons as presented: the feeding and delivering devices being operated by the motion of the channel-bar.

7. The combination with the reciprocating channel-bar having button and fastener channels therein, and adapted to direct them to each other, of a cam M at the junction of the two channels co-operating with a hold-bar, R , to control the button while receiving the fasteners, and a check spring, as O , to check the fall of the button when released by said cam and hold-bar, and retain the united button and fastener until struck by the hammer K .

8. The combination with the movable channel-bar and means of operating the same an arbor x journaled in the lower end of the channel-bar, which arbor carries at the front or outer end, a crescent shaped cam M , and at the inner end a hub having a slit in one side which is engaged by a stationary pin u whereby the cam M is oscillated by the motion of the channel-bar.

9. The combination with the channel-bar and the hammer K , of the cam M , and holder-bar R for holding the button momentarily while receiving the fastener, and a check-spring O which detains the united button and fastener until struck by the hammer K , substantially as set forth.

Signed at New York city, in the county of New York and State of New York, this 30th day of November, A. D. 1892.

IRA JAMES SAUNDERS.

Witnesses:

JAMES M. TULLY,
JONATHAN MARSHALL.