(No Model.) 7 Sheets—Sheet 1.

M. J. BARTLETT.

MACHINE FOR ATTACHING SHOE BUTTONS.

No. 316,724. Patented Apr. 28, 1885.

FIG. 1.

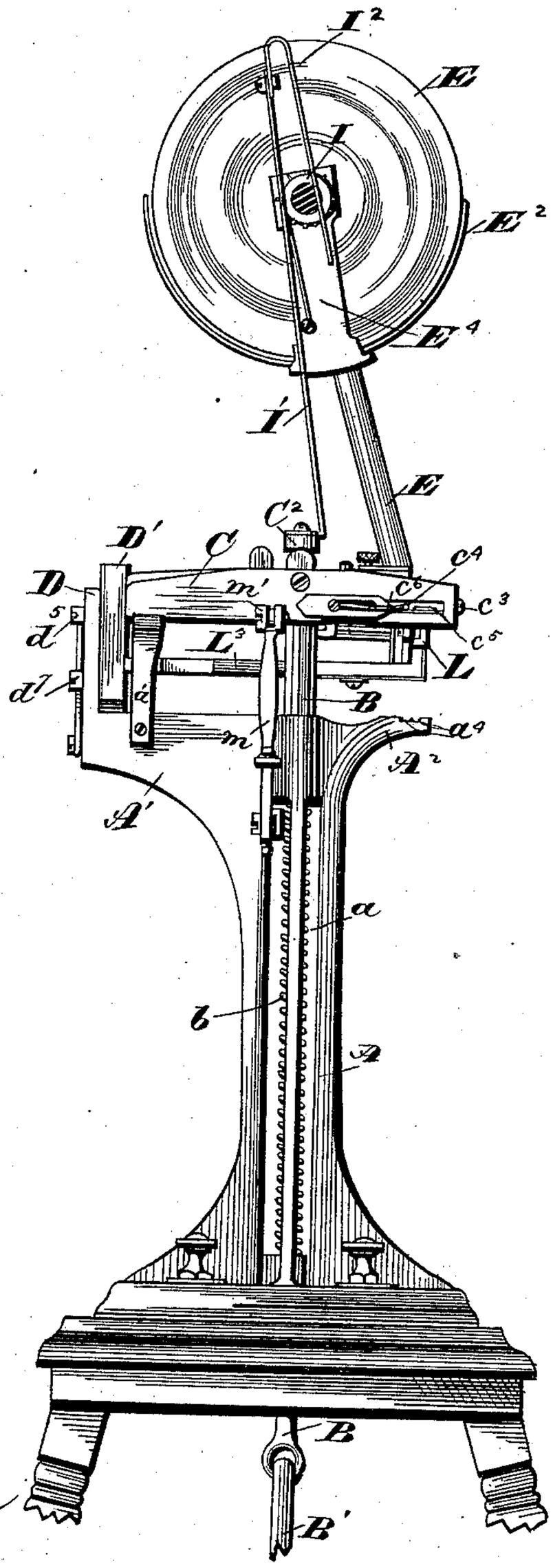

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Fig. 2.

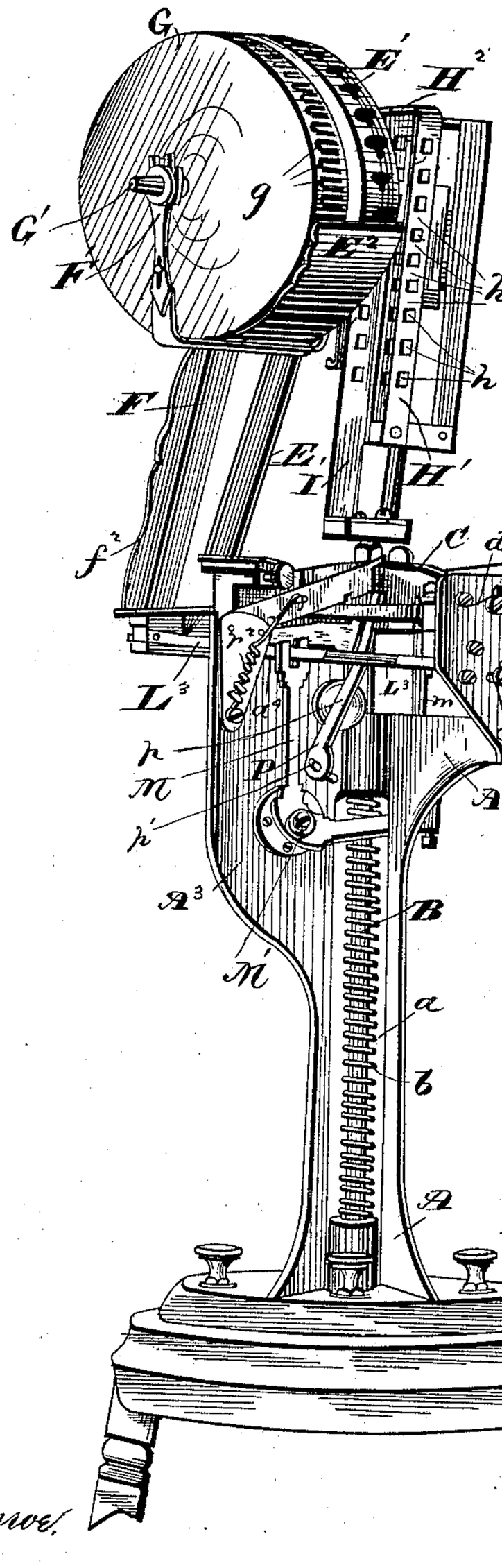

Fig. 3.

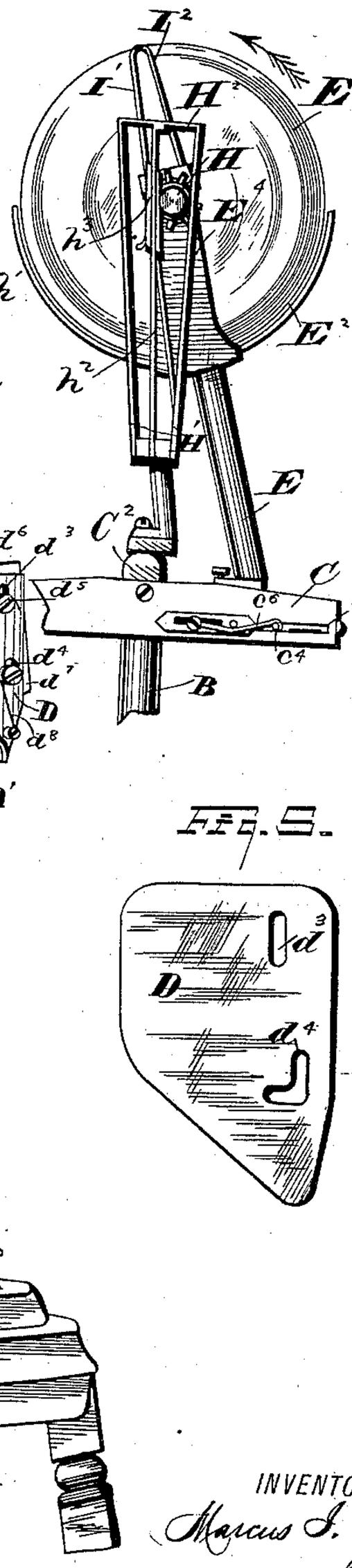

Fig. 4.

Fig. 5.

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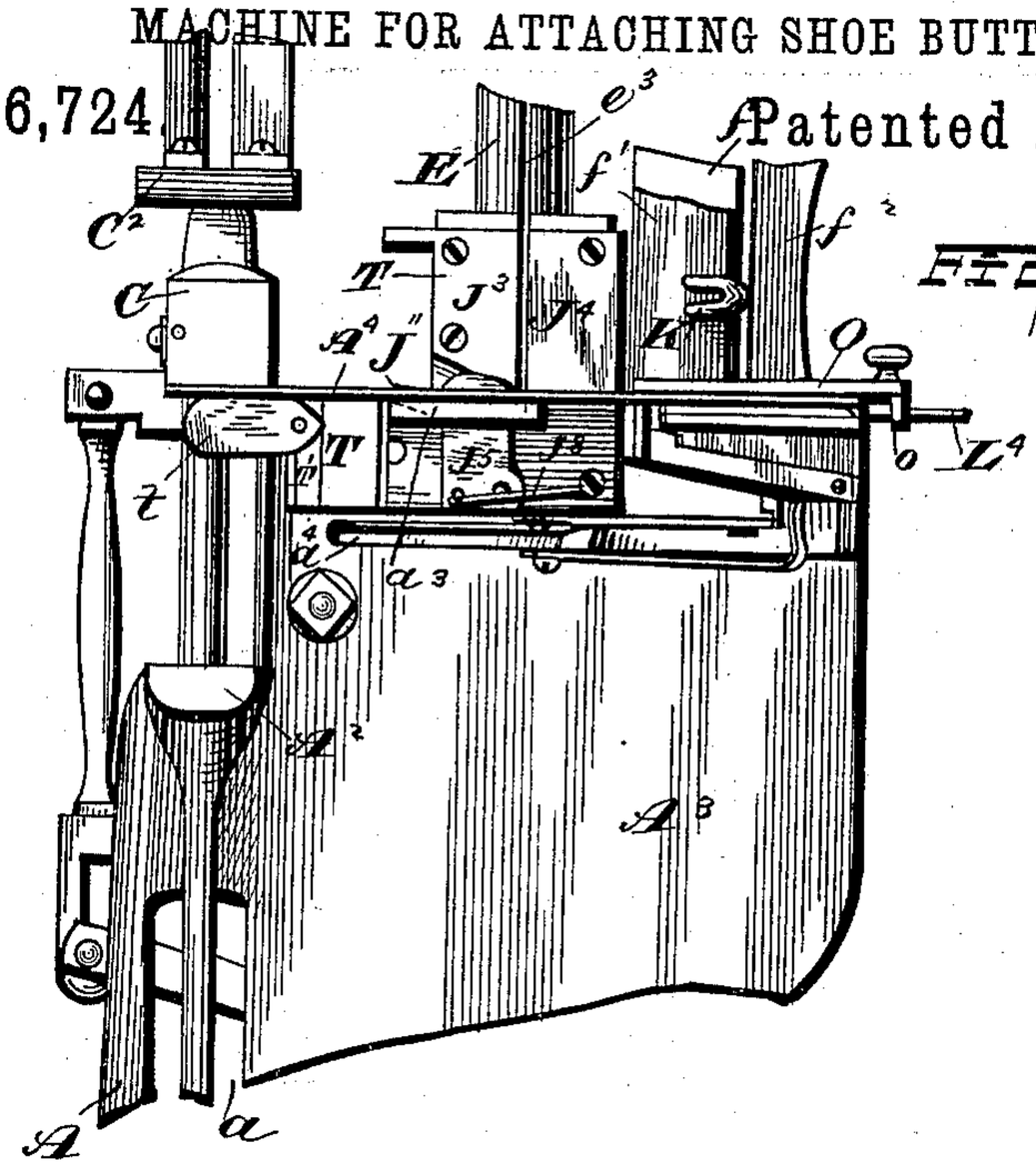

Fig. 6.

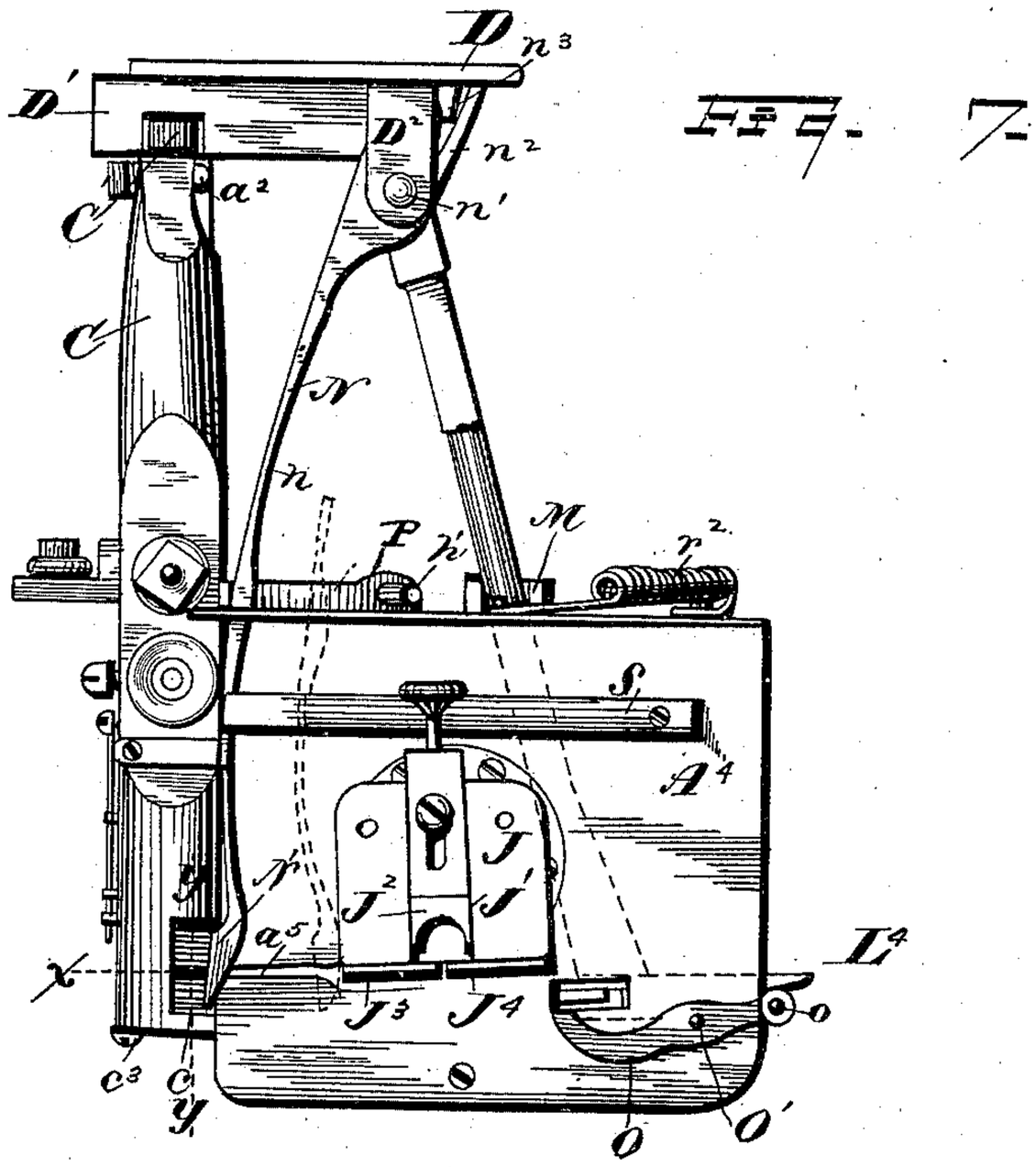

Fig. 7.

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FIG. 8.

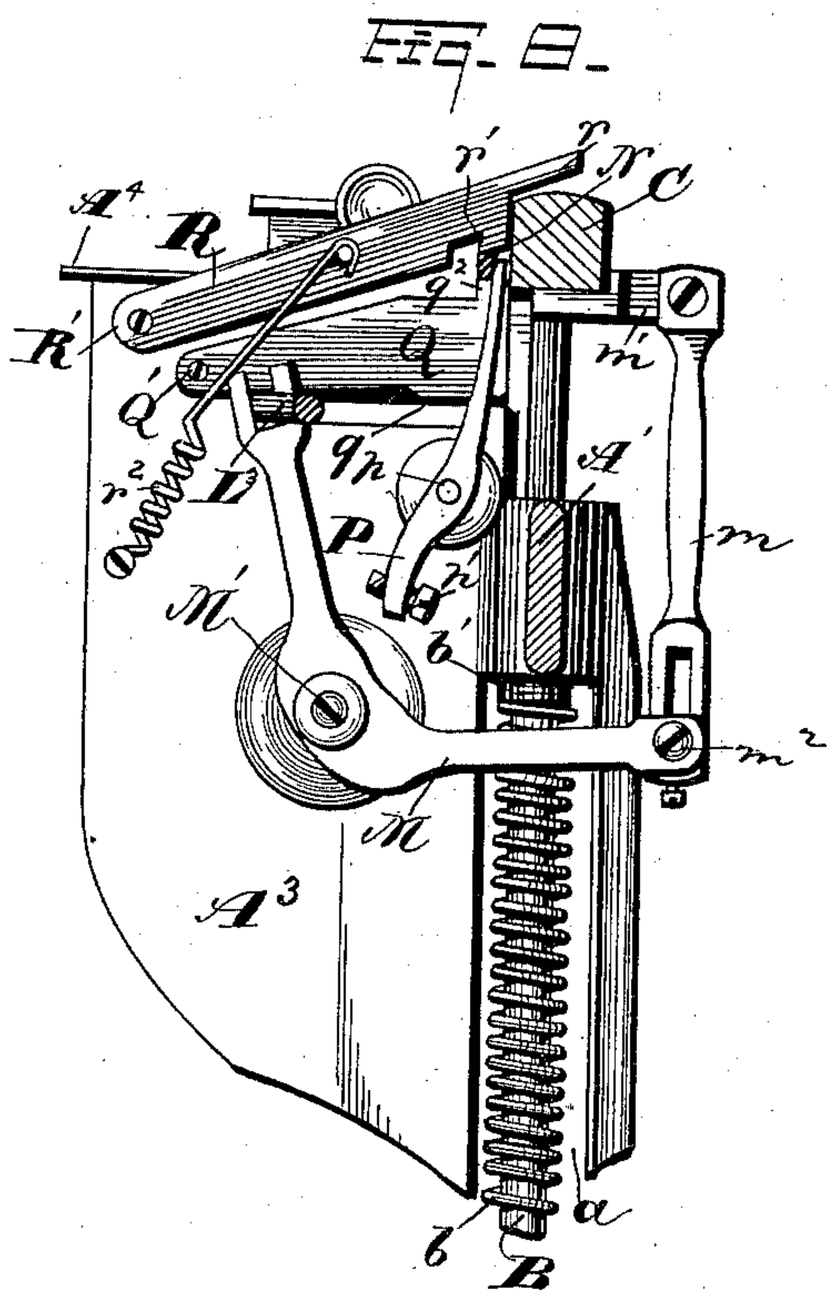

FIG. 9.

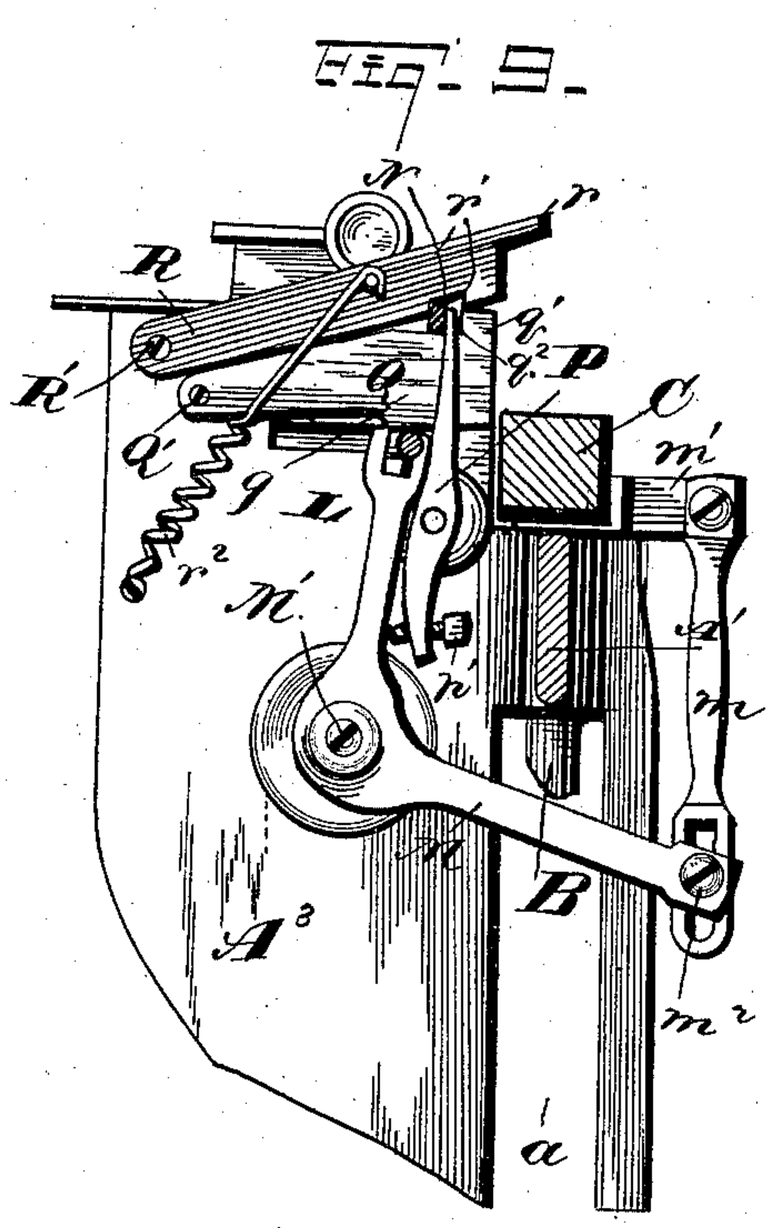

FIG. 30.

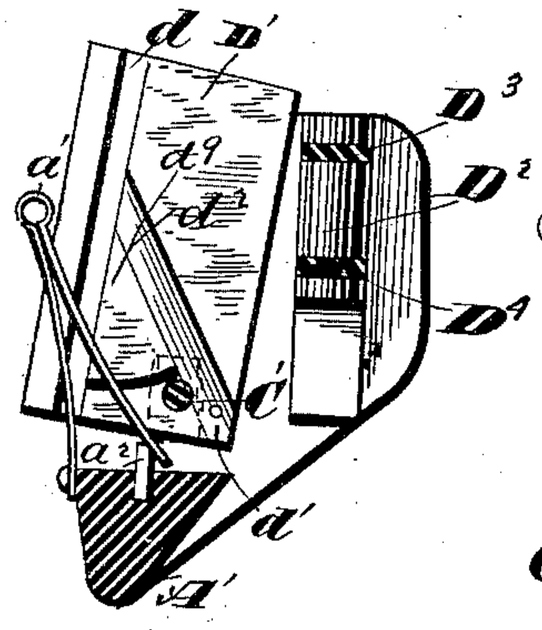

FIG. 10.

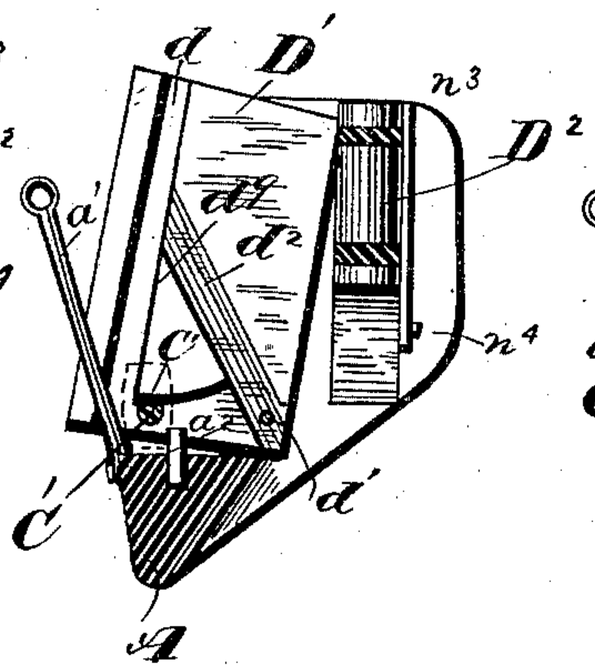

FIG. 31.

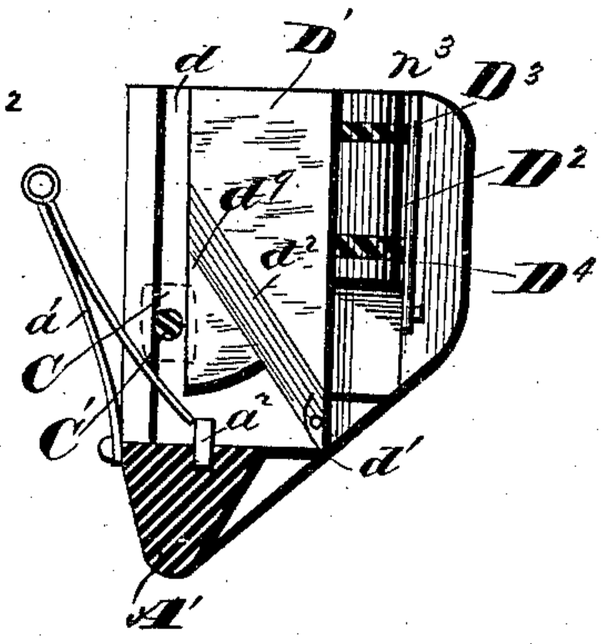

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Fig. 11.

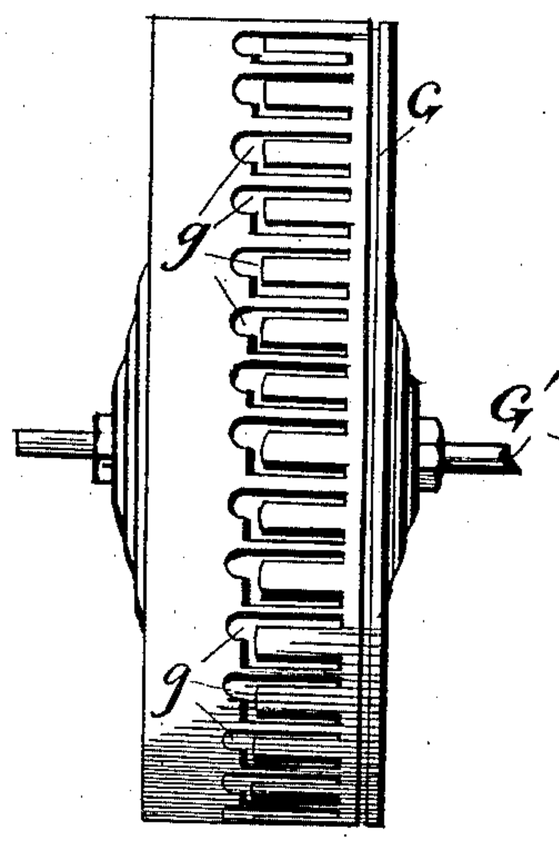
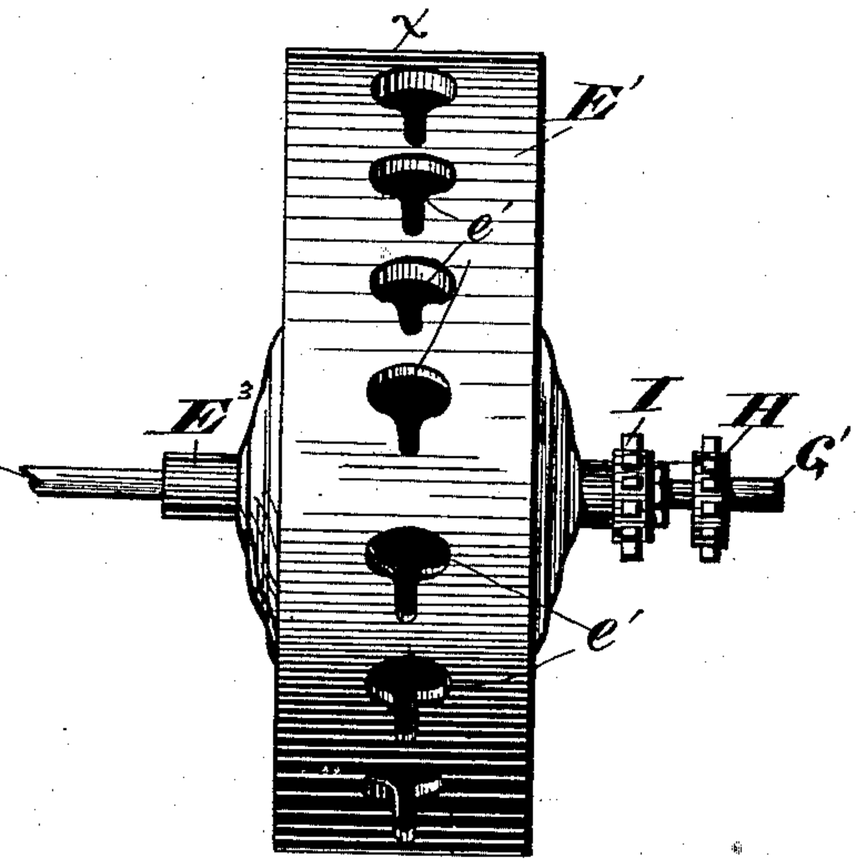


Fig. 12.



x

Fig. 14.

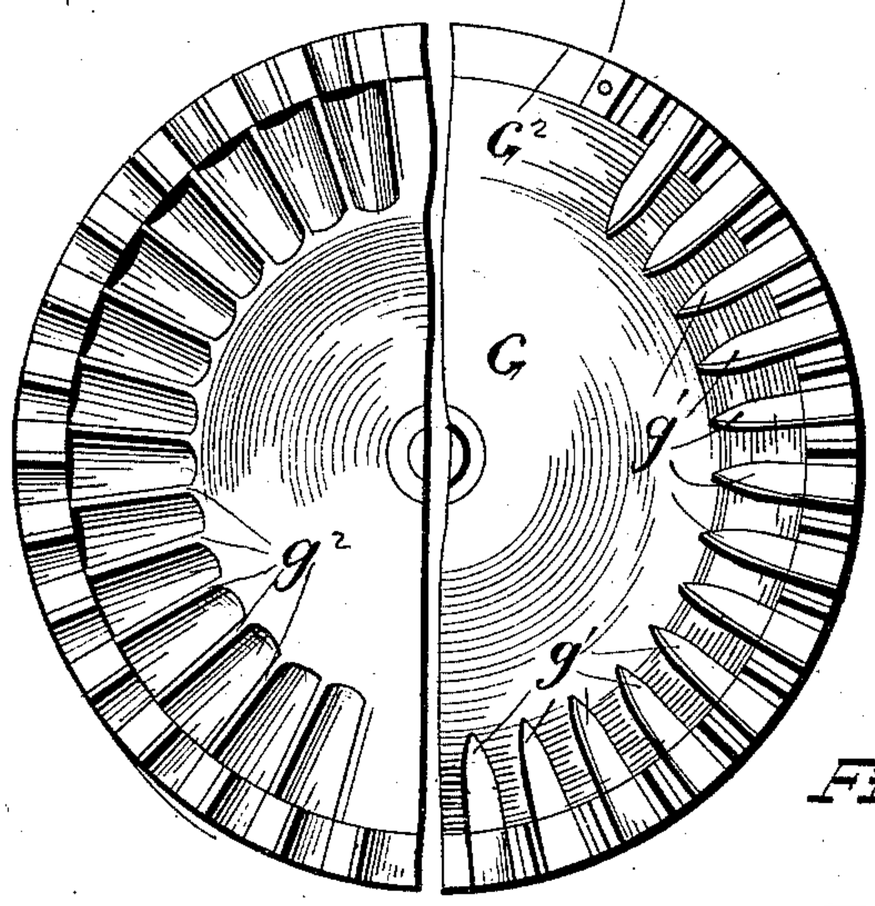


Fig. 13.

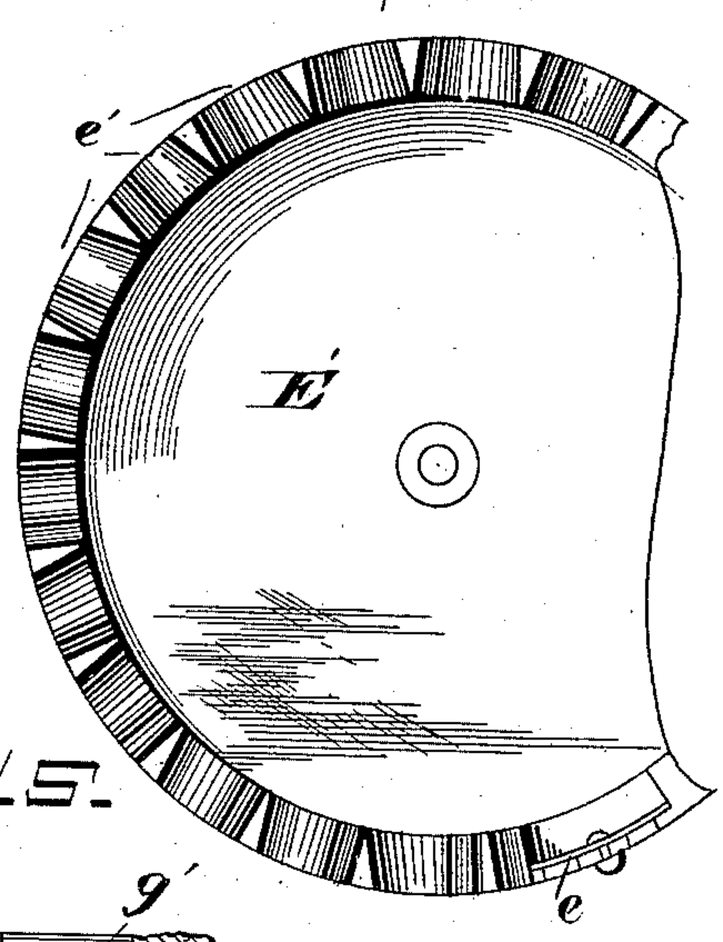
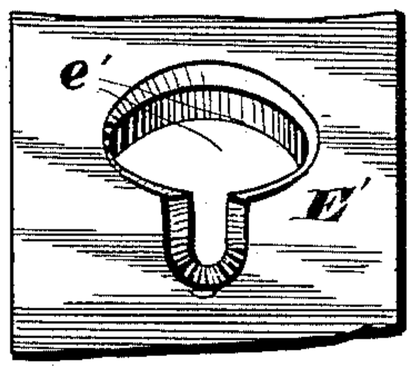
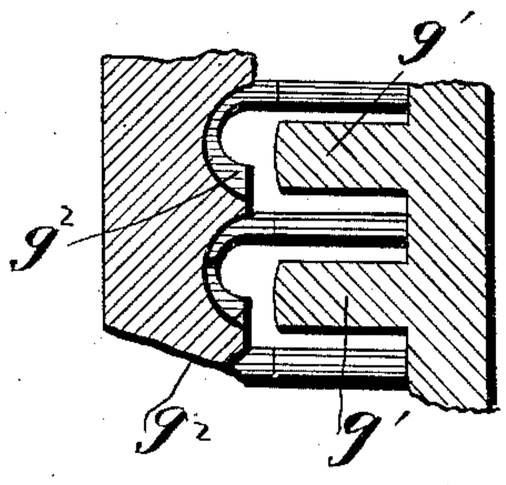


Fig. 15.

Fig. 16.





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M. J. BARTLETT.

MACHINE FOR ATTACHING SHOE BUTTONS.

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Fig. 16.

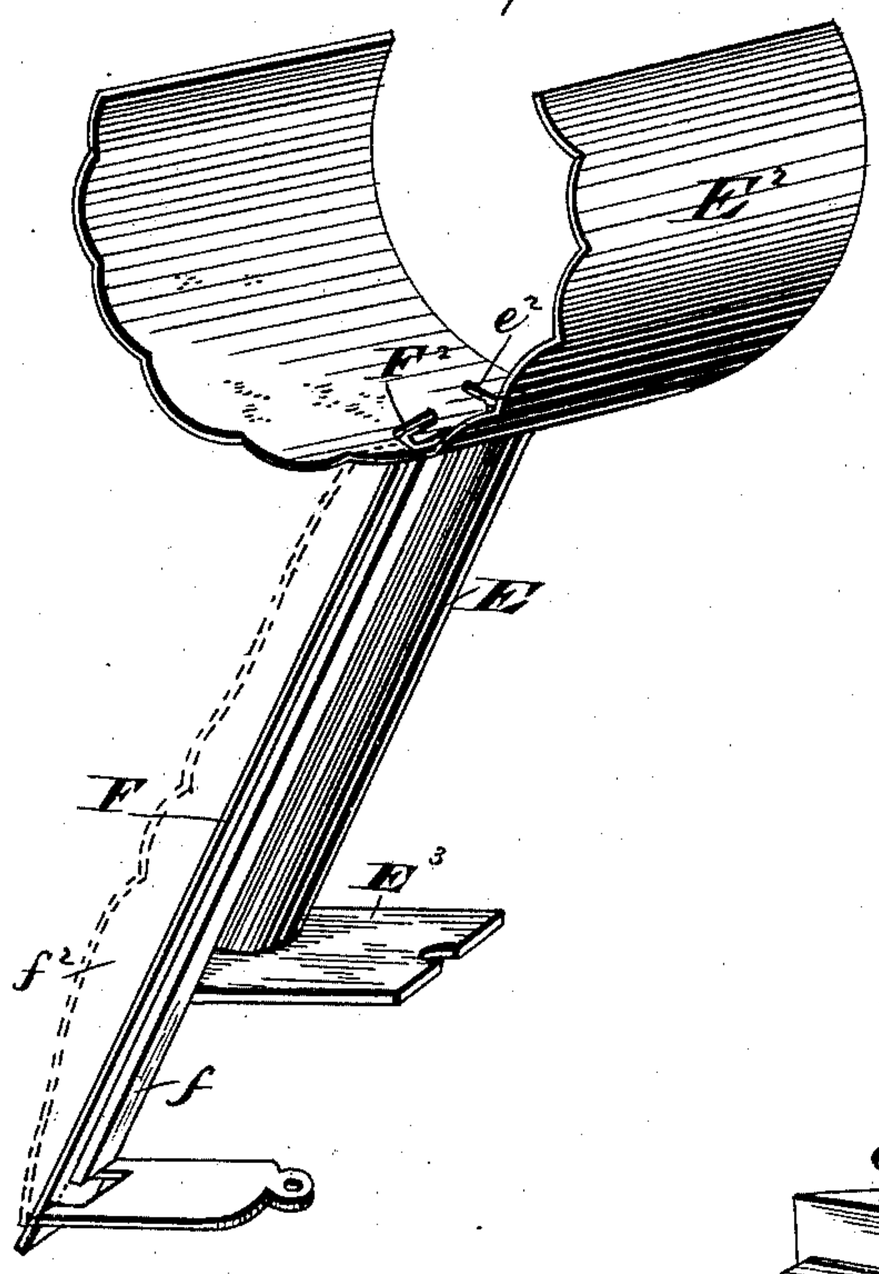

Fig. 17.

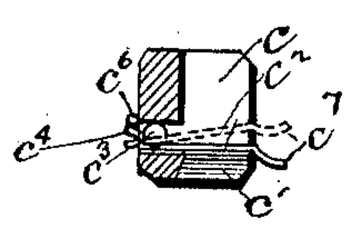

Fig. 18.

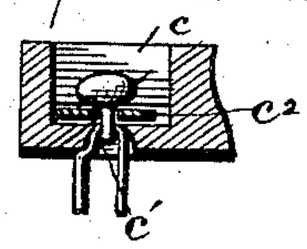

Fig. 21.

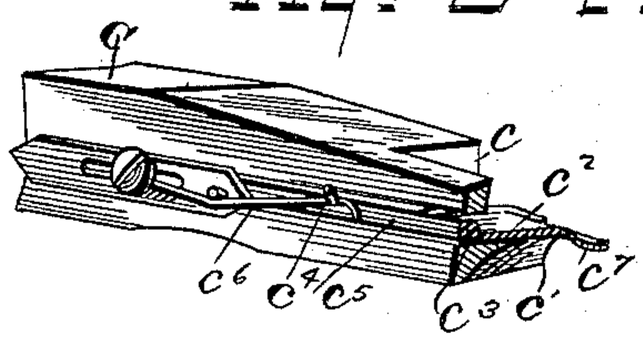

Fig. 19.

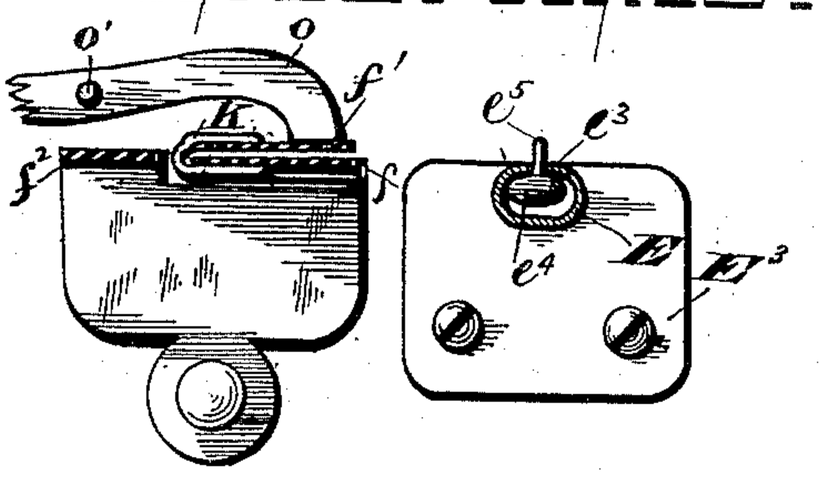

Fig. 22.

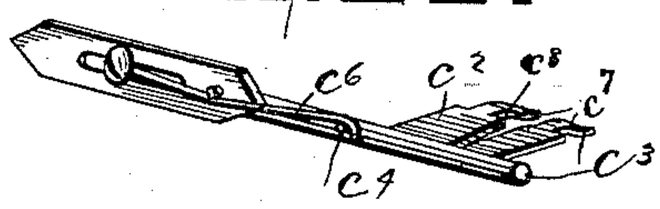

Fig. 20.

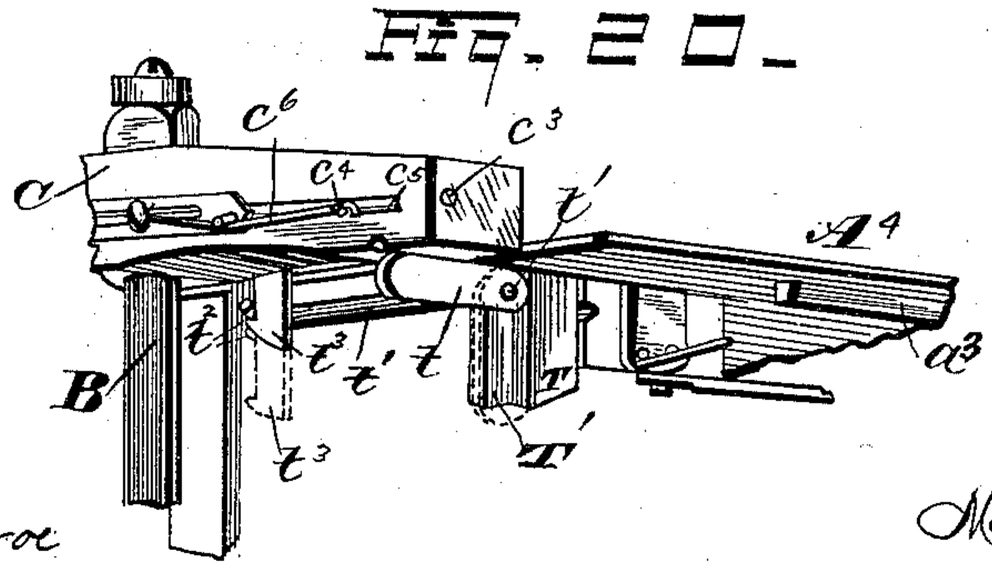

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Fig. 23.

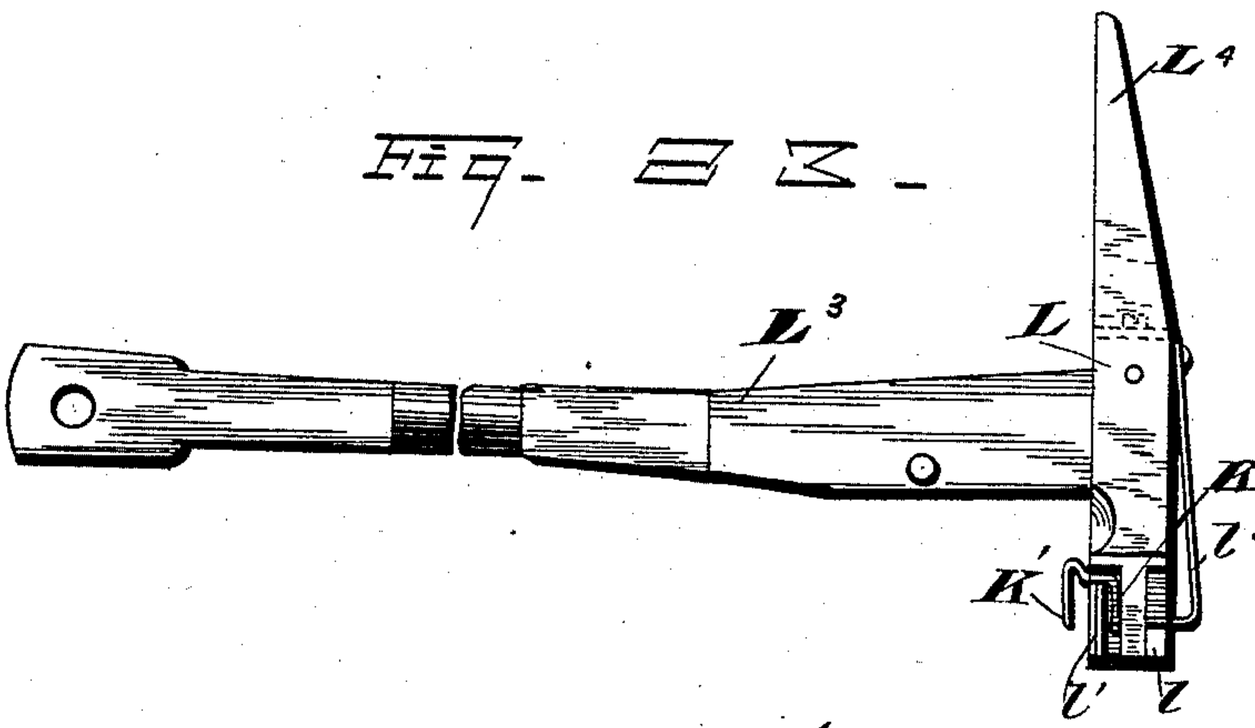


Fig. 32.

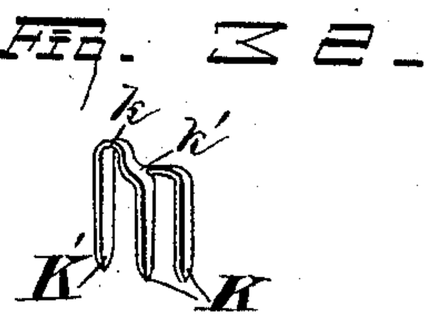


Fig. 24.

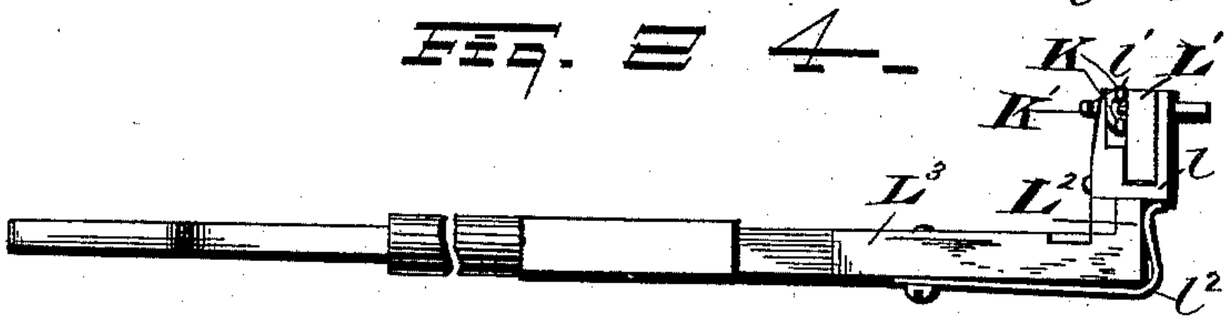


Fig. 26.

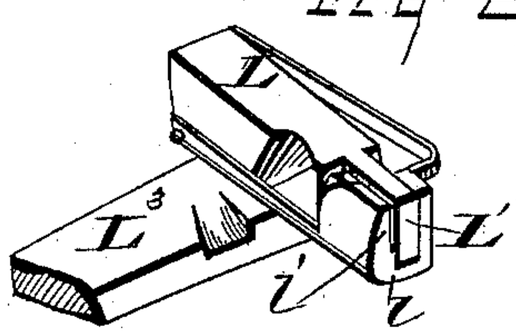


Fig. 25.

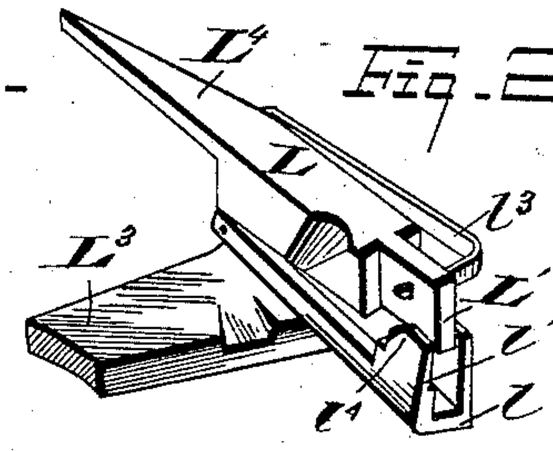


Fig. 27.

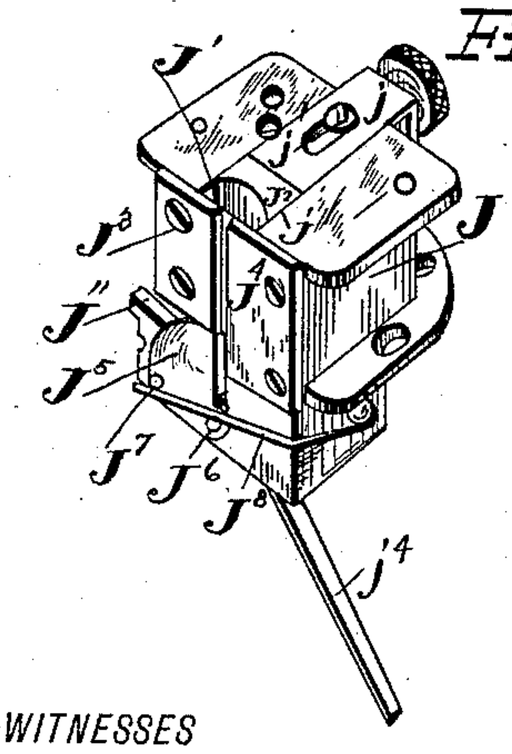


Fig. 28.

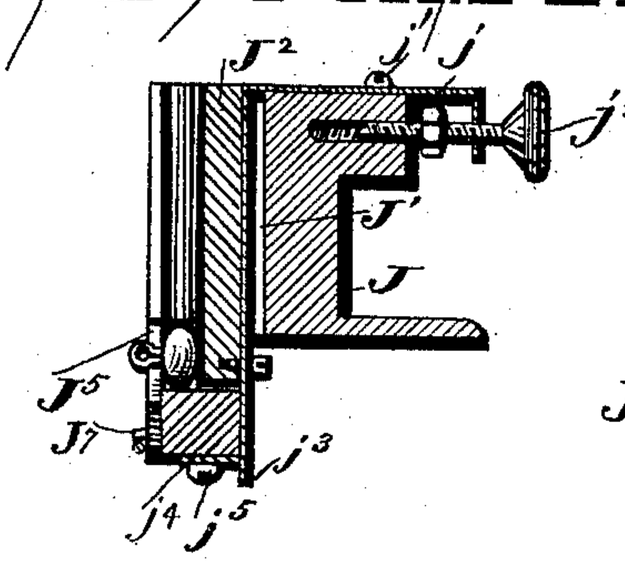
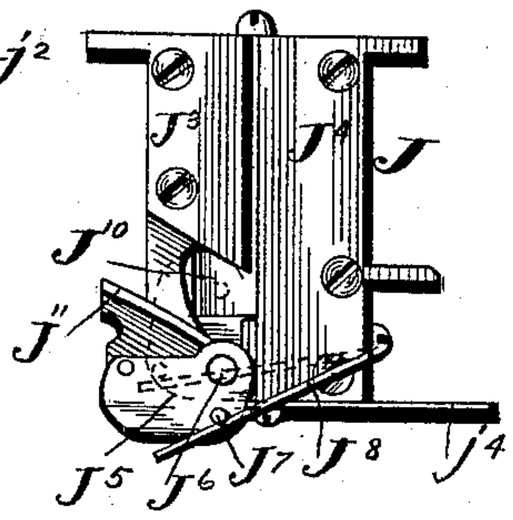


Fig. 29.



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UNITED STATES PATENT OFFICE.

MARCUS J. BARTLETT, OF CHARDON, ASSIGNOR OF ONE-HALF TO FREDERICK H. KELLY, OF CLEVELAND, OHIO.

MACHINE FOR ATTACHING SHOE-BUTTONS.

SPECIFICATION forming part of Letters Patent No. 316,724, dated April 28, 1885.

Application filed December 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, MARCUS J. BARTLETT, of Chardon, in the county of Geauga and State of Ohio, have invented certain new and useful Improvements in Machines for Attaching Shoe-Buttons; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in machines for attaching buttons to shoes or other work; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a front view in elevation of my improved machine, but with the mechanism for rotating the rear cylinder, G, omitted to show more clearly the mechanism that revolves the front cylinder, E′. Fig. 2 is a view in perspective of the rear and left-hand sides of the machine. Fig. 3 is a front view in elevation of the cylinder E′, showing also the mechanism for revolving the rear cylinder, G. Fig. 4 is a front view in elevation of a portion of the mechanism for revolving the cylinder G detached from the machine. Fig. 5 is an enlarged view in elevation of the plate D. Fig. 6 is an end view in elevation of the right-hand end of the table, showing adjacent parts above and below the table. Fig. 7 is a plan view of the table, cross-head, and adjacent parts. Figs. 8 and 9 are elevations of the left-hand portion of the machine with the plate D removed, showing different positions of the mechanism in operating the machine, and with the cross-head and arm A′ in section. Figs. 10, 30, and 31 are side views in elevation of the face or right-hand side of the plate D′, together with the connections and adjacent mechanism, showing different positions of these parts. Fig. 11 is a view in elevation of the hook-container cylinder G. Fig. 12 is a view in elevation of the button-container cylinder E′. Figs. 13 and 14 are side views in elevation of portions of the respective inner sides of the cylinder G. Fig. 15 is an enlarged plan view showing the openings, ribs, &c., in the cylinder G. Fig. 34 is an enlarged view in perspective of a portion of the cylinder E′ as seen from the inside, showing the chamfered edges around a hole, *e′*. Fig. 16 is a view in perspective of the band E^2 and the supporting feed devices E and F. Fig. 17 is a transverse vertical section of the cross-head on the line *x x*, Fig. 7, showing different positions of the plate c^2. Fig. 33 is a longitudinal vertical section of a portion of the cross-head on the line *y y*, Fig. 7, showing the button in position on the plate c^2, and showing a hook in position engaging the seat on the bottom of the cross-head. Fig. 18 is a plan view of the lever O, and a horizontal section of the parts *f*, *f′*, and f^2. Fig. 19 shows a horizontal section of the tube E with a button in position in the tube, and a plan view of the plate or flange E^3, by means of which the tube is secured to the block J. Fig. 20 is a view in perspective of the right-hand side, end, and under side, respectively, of the table and cross-head and certain attachments. Fig. 21 is a view in perspective of the right-hand end of the cross-head with a portion of the end broken away to show the recess *c* and the plate c^2. Fig. 22 is a view in perspective of the plate c^2 and attachments. Fig. 23 is a plan view of the carrier and arm, showing a button-hook in position. Fig. 24 is a front side view in elevation of the carrier and arm, showing also a hook in position. Fig. 25 is a view in perspective of the carrier, showing the clasp *l* depressed or open. Fig. 26 is a view in perspective of a portion of the carrier, showing the clasp *l* elevated or closed. Fig. 27 is a view in perspective of the block J and attachments. Fig. 28 is a side elevation in section of the block J and attachments, with a button in position. Fig. 29 is a view in elevation of the block J and the plates and attachments on the face of the block. Fig. 32 is an enlarged view in perspective of a hook for attaching a button to a shoe. Fig. 35 is an elevation in section of the container E′, showing one of the inner sides, the section-line corresponding with the line *x x*, Fig. 12.

A represents a hollow standard that may be mounted on a table, bench, or other suitable support, and is provided with the arms A′ and A^2, extending laterally in opposite directions, and a broad rib or flange, A^3, projecting rearward and extending above the said arms and supporting a small table, A^4. The standard has longitudinal narrow slots *a*, ex-

tending from the outside into the central cavity, in which operates the reciprocating rod B, that, extending below the standard, is connected with the rod B′, that is connected with any suitable treadle (not shown) by means of which the rod B and attachments are depressed. The rod B is free to rotate or turn slightly within its bearings in the standard A, and is embraced by a spiral spring, *b*, the lower end of which engages the base of the standard, and the upper end abuts against a collar, *b′*, on the rod B, by means of which the said rod and attachments are elevated. To the upper end of the rod B is rigidly attached the cross-head C, that in its normal position is directly over the arms A^7 and A^2. To the end of the arm A′ is secured the plate D, to which is pivoted the guide-block D′, that has two grooves, *d* and *d′*, as shown in Figs. 10, 30, and 31. This end of the cross-head terminates in the pin C′, (see Fig. 7,) that slides in these grooves, by means of which the end of the cross-head is guided in a lateral direction during its vertical reciprocations. The groove *d′* (see Fig. 10) has a flat spring, d^2, secured at the lower end in the bottom of the groove, and the upper and free end is cut diagonal on a line with the side of the groove *d*. The free end of the spring in its normal position stands out from the bottom of the groove, and prevents the pin C′ on its downstroke from entering the groove *d′;* but when the said pin has entered the groove *d′* from the bottom end thereof the spring d^2 is pressed back against the plate and offers no obstruction to the upward movement of the pin. The plate D (see Fig. 5) has two slots, d^3 and d^4, in which operate, respectively, the shanks of the screws d^5 and d^7, (see Fig. 2,) the screws being firmly attached to the guide-plate D′ and form guide-pins, and by means of this arrangement of the said screws or guide pins and slots the plate D′ may turn on the pivoted pin d^5 as far as the pin d^7, operating in the lateral portion of the slot d^4, will admit, and when the pin d^7 is in the upright part of the slot d^4 the plate D′ may have a limited vertical movement. The spring d^6, with its free end resting on the pin d^5, has a tendency to keep the plate D′ depressed, with the pin d^5 in the bottom of the slot d^3. The spring d^8 would press the pin d^7 and the lower end of the plate D′ forward, but is opposed by the stronger spring *a′*, that is attached to the arm A′, (see Figs. 10, 30, and 31,) and presses the end of the cross-head rearward, and causes the lower part of the plate D′ to remain rearward, keeping the screw or pin d^7 in the rear end of the lateral part of the slot d^5, in which position the slot *d* is vertical, as shown in Fig. 31, where the position of the cross-head is marked in dotted lines.

An upwardly-projecting pin or stop, a^2, is attached to the arm A′ (see Figs. 7 and 10) in such position that the cross-head commences to pass down in front of this stop before the pin C′ has left the groove *d*. Just before the termination of the downstroke of the cross-head the pin C′ leaves the groove *d*, and the spring d^8 instantly turns the plate D′ to the position shown in Fig. 10, with the triangular part d^9 over the pin C′. When the cross-head commences its upstroke, the pin C′ abuts against the part d^9 and raises the plate D′ (the pins d^5 and d^7 sliding in the slots d^3 and d^4) until the cross-head is above the stop a^2, as shown in Fig. 30, when the spring *a′* carries this end of the cross-head rearward until the pin C′ is in the groove *d′*, which it follows until the pin again enters the groove *d*. As soon as the pin C′ passes from under the part d^9 the plate D′, by the action of the spring d^6, is depressed, and the pin C′, by the action of the spring *a′* on the cross-head, presses against the rear wall of the groove *d′*, by means of which the bottom of the plate D′ is pressed rearward until the groove *d* is again vertical, (the pin d^7 meantime passing to the end of the lateral part of the slot d^4,) so that during the latter part of the upstroke this end of the cross-head moves vertically.

As the cross-head at the central part is attached to the vertically-sliding rod B, it is evident that any lateral movement of the left-hand end, where the pin C′ is located, will cause a lateral movement in the opposite direction on the right-hand end of the cross-head, which latter is the end that receives the button and the fastening or hook from the table and attaches the button to the work.

It will be observed that the cross-head moves vertically when near the table, and continues to move vertically during the entire downstroke, at the end of which the button is secured to the work, and continues to move vertically a short distance on the upstroke until the cross-head is lifted a trifle from the work or has at least released the pressure thereon, after which the end of the cross-head that fastens the button is moved suddenly forward to disengage it from the button that has just been fastened, after which it moves first diagonally and then vertically back to its position adjacent to the table, as already described.

Supported from the table A^4 are the feed devices E and F, that support, respectively, the hollow cylindrical containers E′ and G. The former contains the buttons and the latter the metallic fastenings for securing the buttons. (See Figs. 2, 11, 12, 13, and 35.) The parts E and F are connected above by the curved band E^2, that extends about half-way around the periphery of the cylinders E′ and G, and is close to but does not come in contact with the cylinders. The cylinder G is mounted on the spindle G′, that at the rear end is journaled in the arm F′, that extends upward from the part F. The front end of the spindle passes through and is journaled in the sleeve E^3, on which the cylinder E′ is mounted, and the sleeve E^3, in front of the cylinder E′, is journaled in the arm E^4, that is attached to the part E. (See Fig. 1.)

To the forward parts, respectively, of the spindle G′ and the sleeve E³ are attached the small sprocket-wheels H and I. (See Fig. 12.) The cross-head C has a cross-bar, C², to which are attached the devices for engaging the sprocket-wheels and rotating the cylinders, and are as follows: To the cross-bar C² are attached thin strips of spring metal H′, each provided with a series of square holes, *h*, leaving bars *h′* between the holes, that are adapted to engage the sprockets of the wheel H. These metal pieces H′ are attached above to the block H², and are separated, so that in their normal position neither of them would engage the sprocket-wheel H.

In front of the pieces H′, and on a line about midway between them, is located the thin elastic strip *h*², that is secured at the bottom to the cross-bar C² and at the top to the block H², and has attached the block *h*³, the ends of which are beveled in opposite directions, as shown in Figs. 3 and 4. The strip *h*² is located beyond the front end of the spindle G′, so as to be out of the way of said spindle when moved laterally, as hereinafter explained, and block *h*³, secured to said strip *h*², projects rearwardly, so as to engage said spindle for the purpose of moving the strips *h*² and H′ laterally.

At the commencement of the descent of the cross-head the lower beveled end of the block *h*³ engages the end of the spindle G′, that extends a short distance in front of the sprocket-wheel H, and by means of the beveled end thereof forces the parts H′ to the right hand, so that the left-hand strip H′ engages the sprocket-wheel (see Figs. 3 and 4) and rotates the wheel and the cylinder G in the direction of the arrow. At the lower end of the stroke the block *h*³ passes below the spindle G′, and the parts H′ and *h* spring back to their normal position, and on the upstroke of the cross-head the upper beveled end of the block *h*³ engages the spindle G′ and forces the device to the left hand—that is, the block *h*³ passes over on the opposite side of the spindle—so that the right-hand part H′ engages the sprocket-wheel and continues the rotation of the wheel and cylinder in the same direction. (See Fig. 3.)

I′ (see Figs. 1 and 2) is a strip of metal with square holes and intervening cross-bars, similar to those just described, and adapted to engage the sprockets on the wheel I. The part I′ is attached to the cross-bar C², and with the reciprocations of the cross-head the plate I′ rotates the wheel I and the cylinder E′ alternately in opposite directions.

The part I′ may have an extension, I², bent back, as shown in Fig. 1, and provided with a long slot, through which the sprocket-wheel I may operate without obstruction, and the sides of the part I² that are on either side of said slot may be made to slide on the sleeve E³ on either side of the wheel, to hold the aforesaid cross-bars and the part I′ to their engagement with the sprockets; but if the bar I′ is of considerable stiffness the last-described attachment I² will not be required.

The cylinder E′ is supplied with a quantity of buttons through the slide-door *e*, and has a series of openings, *e′*, around the periphery. These openings are of such shape that they will pass a button when the latter is presented sidewise, and with the shank of the button extended in the same direction as the narrow elongated part of the opening. The metal through which the openings *e′* are made is of considerable thickness; or, if thin, is re-enforced by a lining that may be of wood, metal, or any suitable material, so that the inner edges around the openings *e′* may be chamfered, (see Fig. 34,) so that the buttons may more easily enter these openings, and there should still be sufficient thickness of material between the chamfered edges and the outside, forming a wall around these openings, that will hold a button in position after it has once properly entered, as against displacement by rotating the cylinder so long as the button remains on the lower side of the cylinder. Of course if the buttons were carried to the upper portion of the cylinder they would fall back into the cylinder by gravity.

The buttons that have properly entered the openings *e′* are held from passing outward by the band E². This band has an opening, *e*², (see Fig. 15,) that corresponds with the openings *e′*, and is located under the cylinder and directly over the feeding-tube E, and when any of the buttons that are in the proper position in the openings *e′* are carried along over the opening *e*² they fall by gravity into the tube E. With each rotation of the cylinder a large number of buttons will engage the openings *e′* in every position but the right one, and will be carried up a short distance and fall back. As but one button is required for each reciprocation of the cross-head, that, as aforesaid, rotates the cylinder E′ something more than a revolution in each direction, there will always enough buttons find their way into the tube E to supply the machine.

The tube E on the inside in cross-section (see Fig. 19) corresponds to the larger or curved part of the openings *e′;* but in place of the narrow rectangular part of the said openings has a slot, *e*³, (see Figs. 6 and 19,) through which the shank *e*⁵ of the button *e*⁴ extends with the eye protruding, and this slot is so narrow that the shanks are edgewise and the eye is in a horizontal direction. The tube E is not attached directly to the table A⁴, but to the top of the block J, that is secured to the table, and a portion of it extends below the table.

The block J has a vertical rectangular slot, J′, in which is located the trough J², with its concaved side facing outward, and two thin plates, J³ and J⁴, are secured to the face of the block and extend toward each other, leaving a narrow opening in front of the central part of the trough J², so that the trough and the plates form a passage-way for the buttons sub-

stantially the same in form as that had in the tube E that is directly above. The trough J^2 is supported by the spring *j*, that is bent nearly at a right angle, and extends back on the edge of the block J, to which it is secured by the screw *j'*, that passes through an elongated hole in the spring, by means of which the spring and trough may be moved toward or from the plates J^3 and J^4, to increase or diminish the size of the passage-way for the buttons. At the rear of the block the spring is bent downward, and has a thumb-screw, j^2, that passes through the spring and screws into the block, by means of which, when the screw *j'* is loosened, a nice adjustment of the spring and trough may be had. A point, j^3, of the spring extends through an opening in the bottom of the block J. This spring in its normal position holds the trough slightly inclined with its lower end toward the plates J^3 and J^4, and while in this position a button will not pass down quite to the bottom of the trough.

A lever, j^4, is pivoted at j^5 to the under side of the block, and passes along the face of the depending end j^3 of the spring *j*, and the rear end of the lever is engaged by the carrier L near the end of its backward stroke, by means of which the lever is pressed against the spring, and the bottom of the trough is thereby carried back from the plates J^3 and J^4 just enough to allow the button to descend to the bottom of the passage-way. As the carrier commences its movement forward the lever j^4 is released, and the spring *j* presses the trough toward the said plates, causing the shank of the button to extend as far beyond the plates J^3 and J^4 as possible, in which position it is held with the eye of the button-shank entirely outside of the plates. (See Fig. 28.) The plate J^3 does not extend to the bottom of the trough; but in place thereof is the plate J^5, that is pivoted at J^6 (see Figs. 27 and 29) to the bottom part of the block J, below the passage-way for the buttons. The plate J^5 has a laterally-projecting pin, J^7, that is engaged by a slight spring, J^8, that holds the plate J^5 in the position shown in Fig. 27. When the button is carried away, in a manner hereinafter shown, the plate J^5 is turned down in the position shown in Fig. 29; also, the corner of the trough at J^{10} is cut away to allow the button to pass out.

The cylinder G has a slide-door, G^2, through which a quantity of the hooks or fastenings K (see Fig. 32) are supplied, and has a series of openings, *g*, on the periphery that are of suitable shape to allow the hooks K to escape. The hooks or fastenings, as shown in Fig. 32, have three prongs, two of which, for convenience, we will call a "double" prong, K, on one side and a "single" prong, K, opposite, and the single prong is bent in the form of a loop at *k*, and there is a flat part, *k'*, between the loop and the double prong.

Inside of the cylinder G and on one side are the ribs *g'*, and on the other side are the ribs g^2. These ribs are set radially and slope back, respectively, toward the heads of the cylinder. The rib *g'* is of suitable thickness to pass between the double and single prongs of the hook K; but the prong K' must be on the side of the rib *g'*, where the opening corresponds with the loop *k*. When the prongs are astride of the rib *g'* and in the proper position, the thin ribs g^2 abut against the flat part *k'* and hold the hook from tilting or displacement as it slides down a rib, *g'*, and out at an opening, *g*. Very few of the hooks get right side up the first time trying, but as there are plenty of ribs *g'*, and the cylinder makes several revolutions to each stroke of the cross-head, enough of the hooks manage to get in the required position and pass into the opening *g*, where they encounter the band E^2 until they reach the opening F^2 in the band, (see Fig. 15,) when they pass to the feed device F. This consists of a thin flat bar, *f*, secured at the top to a still thinner flat spring, *f'*, and the combined thickness of the bar and spring is such that the hooks slide down astride them, the double prong being next the spring. A thin flat bar, f^2, is arranged parallel with the bar *f* and in such position that one edge thereof comes in contact with the parts *k'* of the hooks and holds them in position on the bar and springs *f* and *f'*. (See Fig. 18.) Near the lower end the spring *f'* diverges slightly from the bar *f*, by means of which the hooks are arrested in their descent at this part.

A lever, O, is fulcrumed at O', and the front end engages the spring *f'* near the front edge and out of the way of the point of the hook. The rear end of the lever has a depending pin, *o*, (see Fig. 6,) that engages an incline, L^4, on the carrier L, (see Fig. 7 and 23,) by means of which, when the carrier is near the end of the back-stroke, the lever O is actuated and the spring *f'* pressed back toward the bar *f*, so that the hook slides down and is delivered to the carrier.

The carrier L has a tongue, L', extending forward, and a thin shank, L^2, extending downward, and is joined to or integral with the supporting-arm L^3. (See Figs. 23, 24, 25, and 26.) A clasp, *l*, embraces the shank, and is pivoted thereto near the rear edge, and the forward part of the clasp has upwardly-projecting lips that embrace the tongue L', one of which is cut away on the inside at *l'*, leaving a space that receives the double prong of the hook. This lip is quite thin, and so that the single prong K' stands off a sufficient distance from the lip (see Fig. 23) to allow the end of the button-shank to pass between the lip and the prong K' as the latter enters the eye of the button-shank. The clasp is held in a horizontal position by the spring l^2; but the corner of the lip that engages the hook is rounded off at l^4, so that the clasp is depressed when the hook is drawn forward and upward, as hereinafter shown.

A light spring, l^3, is attached to the side of the carrier, and the end is bent at about a right angle and enters a hole in the tongue L'

just in advance of the crotch of the double prong. This spring in its normal position stands out from the carrier, so that the point does not engage the hook; but as the carrier moves forward the spring l^3 engages an inclined lug, a^3, (see Fig. 6,) depending from the bottom of the table, by means of which the point of the spring is pressed into the crotch of the double prong of the hook, and prevents the hook from tilting during the engagement of the hook with the button and while the latter is being drawn out of its seat in the block J. This engagement of the spring l^3 with the lug a^3 occurs near the end of the forward stroke of the carrier, and as the carrier recedes the spring is released from the lug and draws back to its normal position, and releases the hook K just before it is drawn from its seat in the carrier.

The arm L^3, that supports the carrier, passes through a slot, a^4, in the rib A^3, (see Figs. 2 and 7,) and is hinged to the plate D. The arm L^3 is actuated by the bell-crank lever M, that is pivoted at M′, (see Figs. 8 and 9,) to the rib A^3. The upright arm of the lever is forked, as shown, and embraces the arm L^3. The horizontal arm of the lever passes through the slots a in the standard, and in front is pivoted to the connecting-rod m, that in turn is pivoted to a short arm, m', that is attached to the cross-head C. By means of these attachments the vertical reciprocations of the cross-head reciprocate the arm L^3 horizontally.

As shown in Figs. 8 and 9, the lower end of the rod m is slotted, and the wrist m^2 of the bell-crank slides in this slot, so that the bell-crank and its attachments are only actuated by the rod m when the cross-head is near the end of its throw both upward and downward.

When the carrier moves forward, the projecting single prong of the hook enters the eye of the button-shank, as aforesaid, and when the shank strikes or enters the loop k' of the hook the button is carried out at the side of the block J, pressing down the plate J^5, as already described. The head of the button passes up the incline J^{11}, (see Fig. 27,) that is a part of the block J. As the shank is held fast by its engagement with prong K′ of the hook K, the button as it passes up the incline is elevated above the hook, and is consequently tilted over in an upright position as it comes on top of the table, and in this position it is afterward carried along with the shank extending down through the slit a^5 in the table. (See Fig. 7.)

The cross-head C, near the right-hand end, is recessed at c from the rear and top sides. (See Figs. 7, 21, and 33.) The lower wall of the recess is thin, and is slotted at c', to receive the shank of the button; and the under edges, next the seat c', are curved out, as shown in Fig. 33, to fit the loop k of the hook, so that the top part of the hook may fit and rest firmly against the under side of the cross-head.

A thin plate, c^2, is pivoted on the pin c^3 that has a lug or pin, c^4, extending through the slot c^5 to the front side of the cross-head, and engages a spring, c^6, secured to the cross-head. (See Figs. 17, 20, 21, and 3.) The spring holds the plate c^2 in the position shown in dotted lines in Fig. 17. The rear ends of the plate c^2 are bent down and rearward, as shown at c^7, and these points, when the cross-head moves upward, engage the under side of the table and depress the plate c^2 until it is close to the lower wall of the recess c, as shown in solid lines in Fig. 17, bringing the top of the plate c^2 flush with the top of the table, while the under side of the cross-head is flush with the under side of the table. (See Fig. 20.) The plate c^2 has a slot, c^8, (see Fig. 22,) that registers with the slot c', and when the parts are in the position just described the button is moved into the cross-head and rests on the plate c^2, with the shank of the button reaching down through the slots c' and c^8. (See Fig. 33.) As the cross-head descends the points c^7 are released from the table, and the plate c^2 raises the button and draws the hook against the bottom of the cross-head and holds it firmly in position with the prongs of the hook in a vertical position to engage the work that is placed on the arm A^2 below.

From the mechanism already described it will be seen that when the cross-head is at the end of its upstroke, in which position it receives the button, the carrier is at the end of its rear movement so that the button that is brought forward by the carrier as the latter moves forward and the cross-head moves downward is received by the cross-head at its next stroke.

The mechanism for moving the button and hook from the carrier to the cross-head will next be described.

An arm, N, (see Fig. 7,) made thin at n, so that it may bend laterally and perform the functions of a spring, is secured by the pin n' in a lateral slot, D^3, in the block D^2, that is attached to the plate D. (See also Fig. 10.) The slot in the block is somewhat larger in a vertical direction than the part of the arm N that enters the slot; also, the hole in the arm has an easy fit on the pin n', by means of which the free end of the arm N may have a limited vertical movement. A portion of the arm n^2 extends past the side of the block D^2, and a thin wedge-shaped plate, n^3, is pivoted at n^4 and extends along the face of the block and between the block and the part n^2. By turning this plate n^3 on its pivot the part n^2 may be forced more or less away from the block D^2, and the free end of the arm thereby adjusted to the required position relative to the cross-head. The arm N extends along on top of the table, and has a head, N′, projecting forward, and is of such shape and in such position that it may enter the slot c of the cross-head. A lever, P, is fulcrumed at p (see Figs. 8 and 9) to the rib A^3. The upper end of this lever is in front of the arm N, and between it and the cross-head C. The lower end of the lever is provided with the set-screw p', that engages

the upright arm of the bell-crank M, by means of which the lever P is actuated, and by means of the set-screw the engagement with the lever M is regulated, so that the lever P is moved the distance required. When the upright arm of the bell-crank M moves forward, it comes in contact with the end of the screw p', and moves the lower end of the lever P forward, and the upper end of the lever moves the arm N rearward.

A lever, Q, is pivoted at Q′ to the rib A^3, and extends toward the cross-head and rests upon the arm L^3. The lower edge has an incline at q, and on top has an upwardly-projecting part, q', terminating at the rear in a square offset or shoulder, q^2.

Above the lever Q and extending in the same direction is the lever R, pivoted at R′, and has a tongue, r, that extends over the cross-head, and a shoulder, r', that registers with the shoulder q^2.

On top of the table (see Fig. 7) is secured the spring S, with its free end extending toward the cross-head. This spring at the rear lies flat upon the table, but inclines upward as it extends forward, so that the forward end of the spring rests upon the arm N, and when this arm is near the cross-head the downward pressure of the spring on the arm is but slight; but when the arm N is at the end of its stroke rearward the pressure of the spring on the arm is considerable.

The operation of these parts is as follows: The upright arm of the bell-crank M moves forward about one half (more or less) of its stroke before it engages the screw p', and at the same time that this occurs the arm L^3 engages the incline q, so that the arm N as it is moved rearward by the action of the lever P is also raised from the table by the action of the lever Q. It is evident from the connections already described that the forward movement of the arm L^3 and the carrier L must terminate simultaneously with the backward movement of the arm N. We have seen at the end of the forward movement of the carrier the button is brought on top of the table with its shank extending downward, and with a prong of the hook engaging the eye of the shank. The arm N, just at the extreme end of its backstroke, is pushed off at the shoulder q^2 of the raised part q', and the spring S forces the arm N down upon the table, and the head N′ falls behind the button, and at the same time the lever R falls by gravity, aided by the spring r^2, with the shoulder r' in front of the arm N, by means of which the arm N is retained in this position rearward. The carrier immediately recedes, but as the button is held firmly between the table and the arm N the hook is drawn up out of the carrier and left suspended from the eye of the button. As the carrier and arm L^3 move rearward the incline q is passed, and the lever Q again returns to its place below the top line of the table. When the cross-head has nearly reached the end of the upstroke, it engages the tongue r of the lever R and raises the lever, so that as the cross-head reaches the extreme of its upward movement the shoulder r' releases the arm N, that by its recoil moves instantly forward, pushing the button along in advance of it to its proper position in the cross-head.

The double prong of the hook K is heavier and farther removed from the loop k than the single prong, and for this reason the hook, when suspended from the eye of the button, if left free, would incline to the left hand—the side on which the single prong is located. To hold the prongs of the hook vertical while the button is being pushed along to its place in the cross-head, the block T is provided, and is attached to the under side of the table (see Fig. 6) and in such position that the single prong of the hook slides along the face of the block, and is thus kept in a vertical position. The front right-hand corner of the block T is recessed at T′. In the recess operates the arm t, that is secured to the end of the spindle t', that passes through a hole in the block T and is journaled thereon. The spindle on the left-hand side of the block T is provided with a pin, t^2, extending forward, and a hook, t^3, attached to the cross-head, engages the pin t^2 on the upstroke and rotates the spindle and brings the arm t to a horizontal position extending forward under the cross-head, as shown in Figs. 6 and 20. The face of the arm t is flush with the block T, so that the single prong of the hook K has a continuous lateral support until the button is deposited in the cross-head. As the cross-head descends the hook t^3 releases pin t^2, and the arm t turns downward by gravity. Before the arm t has left the point of the prong K′ the plate c^2 has raised the button and brought the hook firmly against the bottom of the cross-head, so that the lateral support of the arm t is no longer required.

The arm A^2, that supports the work, has grooves a^4 curved in cross-section, as shown in Fig. 1, and are located so that the points of the prongs of the hook K engage, respectively, the outer curved sides of these grooves, and are thereby bent inward and properly clinched. These grooves are just deep enough to prevent the prongs from cutting the work as they are clinched by the pressure of the cross-head. The operator, as aforesaid, draws the cross-head downward by pressing the treadle with his foot, and soon learns the pressure required to properly clinch the prongs of the hook and securely fasten the button.

The buttons may be attached as fast as the operator can move the work along to receive the buttons.

What I claim is—

1. A machine for attaching buttons, consisting, essentially, of rotating containers, respectively for the buttons and button-fasteners, means, substantially as described, for discharging each in their proper position, a carriage for receiving the button-fasteners and uniting them with the buttons, a reciprocating device,

substantially as described, for attaching the buttons to the work, and mechanism for delivering the buttons and attached fasteners to said reciprocating device, substantially as set forth.

2. In a machine for attaching buttons, a reciprocating cross-head with a recess and slotted under wall for receiving the buttons, a seat on the under side, around the slot, for the fasteners, and a slotted plate arranged to operate in the recess and engage the table, and be depressed thereby on the upstroke, and then press the button upward on the downstroke of the cross-head, substantially as set forth.

3. In a machine for attaching buttons, the combination, with devices, substantially as described, for discharging the buttons and button-fasteners in their proper positions, and a carrier for receiving the fasteners and uniting them with the buttons, of a vertically-reciprocating and laterally-movable cross-head for attaching the buttons to the work, provided with a recess for receiving the buttons, substantially as set forth.

4. In a button-attaching machine, the combination, with the cross-head C, provided with the recess c, slot c', and the plate c^2, of the spring c^6 for tilting the plate upward, substantially as set forth.

5. In a button-attaching machine, the combination, with the cross-head C, of the guiding-plate D′, provided with the grooves d and d', and provided with pivotal bearings operating in slots, and the parts so arranged that the plate may move vertically and swing laterally, substantially as set forth.

6. In a button-attaching machine, the combination, with the plate D, provided with grooves d and d', and arranged to slide vertically and swing laterally, of a cross-head engaging the said grooves, the spring a', and the stop a^2, substantially as set forth.

7. In a button-attaching machine, the combination, with devices, substantially as described, for discharging the buttons and fasteners in their proper positions, and an intermittently-operating carrier constructed to unite the fastener and button, of a reciprocating cross-head having a recess for the reception of the button, and a movable arm located between the carrier and cross-head and constructed to move the buttons and fasteners from the carrier to the cross-head, substantially as set forth.

8. The combination, with the container E′ and the tube E, of the block J, the trough J^2, and spring j, substantially as set forth.

9. The combination, with the block J, the trough J^2, and spring j, of the plates J^3 and J^4 and the pivoted plate J^5, substantially as set forth.

10. The combination, with the trough J^2 and the lever j^4, of the carrier L, arranged to engage the lever and actuate the trough near the rear terminus of the carrier's movement, substantially as set forth.

11. The combination, with the carrier L, of the plate l and springs l^2 and l^3, substantially as set forth.

12. A cylindrical hook-container provided with the openings g and ribs g' g^2, substantially as set forth.

13. The combination, with the container G, a sprocket-wheel, and spindle extending beyond the wheel, of the plates H′, with openings arranged to form a rack and engage the sprocket on opposite sides, the block h^3, with inclined ends to engage the spindle, and the parts so arranged that, by reciprocating the parts H′, the container is rotated in the same direction by opposite movements of the parts H′, substantially as set forth.

14. The combination, with the container G, of the part F, consisting of the bars f and f^2, and the spring f', arranged substantially as set forth.

15. The combination, with the bar f and spring f', of the lever O and incline L^4, arranged to engage the lever and actuate the said spring near the end of the back movement of the carrier, substantially as set forth.

16. The combination, with a reciprocating cross-head and mechanism for delivering buttons and fasteners thereto, of a guiding-block depending from the table, an arm pivoted to said table and block, and devices for connecting said pivoted arm with the cross-head, whereby the arm is moved up to a horizontal position, for the purpose of forming an extension to the guiding-block, substantially as set forth.

17. The combination, with a reciprocating cross-head and slotted rod m, pivoted thereto, of the bell-crank M, lever L^3, and carrier L, substantially as set forth.

18. In a machine for attaching buttons, the combination, with mechanism, substantially as described, for delivering buttons and fasteners, and an attaching device, of the bell-crank lever M, the lever P, and arm N, substantially as set forth.

19. The combination, with the carrier-arm L^3, of the lever Q, provided with the incline q and shoulder q^2, substantially as set forth.

20. The combination, with the lever Q, of the lever R, provided with the shoulder r' and the extension r, reaching over the cross-head, substantially as set forth.

21. In a machine for attaching buttons, the combination, with mechanism, substantially as described, for delivering buttons and fasteners, and an attaching device, of the levers Q and R, and the arm N, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses, this 12th day of August, 1884.

MARCUS J. BARTLETT.

Witnesses:
CHAS. H. DORER,
ALBERT E. LYNCH.