

(No Model.)

3 Sheets—Sheet 1.

J. A. KNOX & T. J. EBERSON.

BUTTON HOLE FINISHING AND STAYING MACHINE.

No. 398,335.

Patented Feb. 19, 1889.

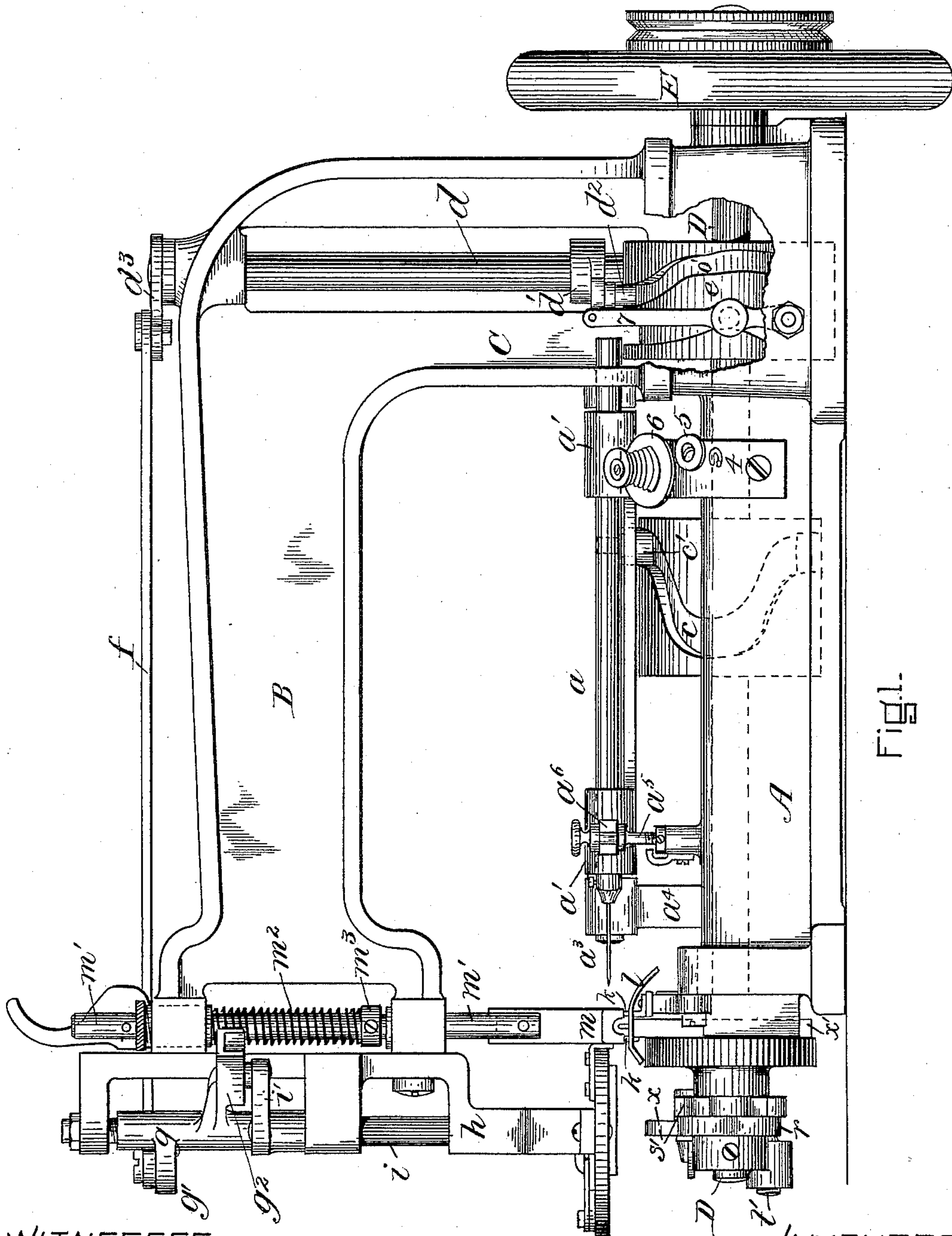


Fig. 1.

WITNESSES.

Chas. Spaulding.  
Charles E. Moss.

INVENTORS.

J. A. Knox,  
T. J. Ebersson.  
By *Wm. H. Brown & Crossley*  
attys.

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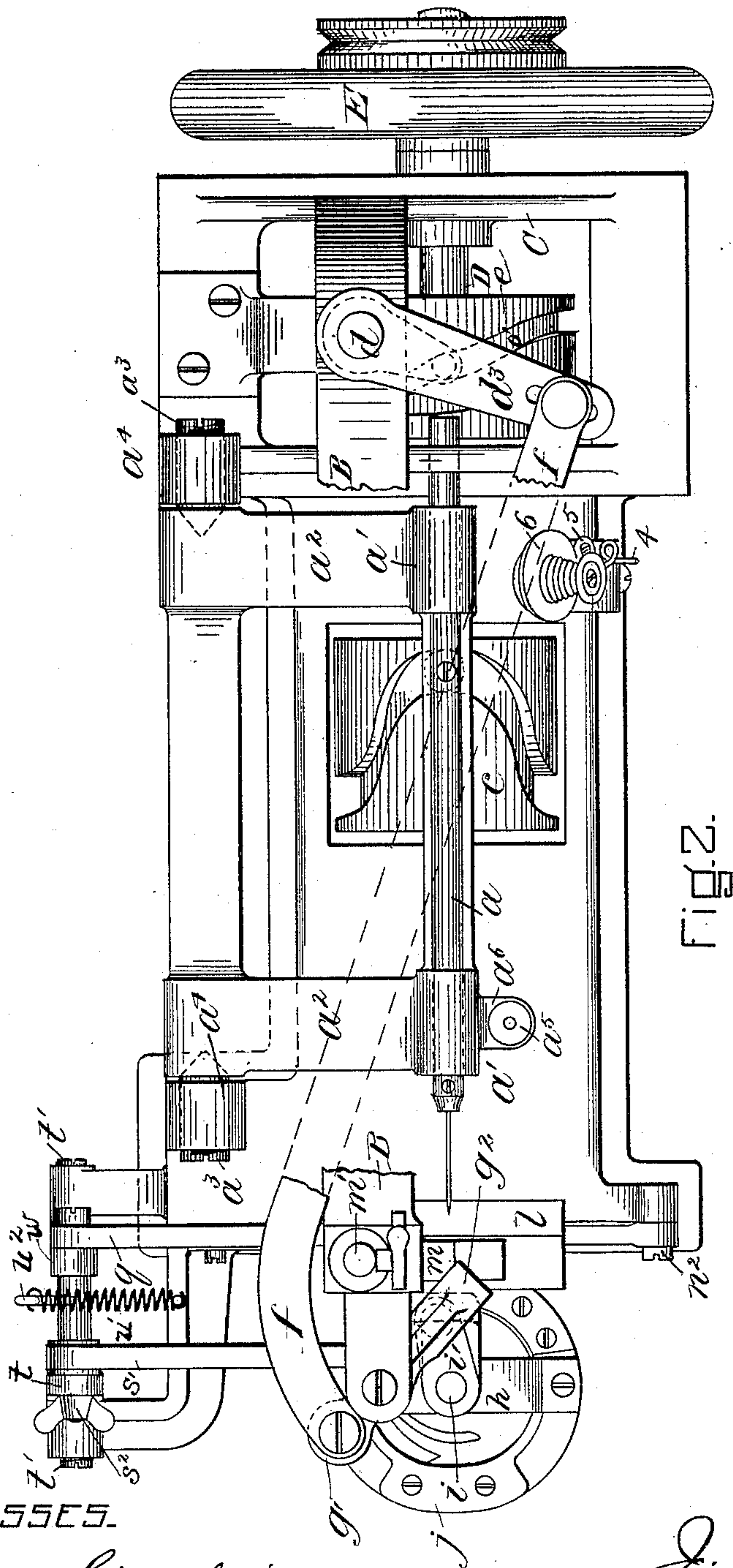


Fig. 2.

WITNESSES.

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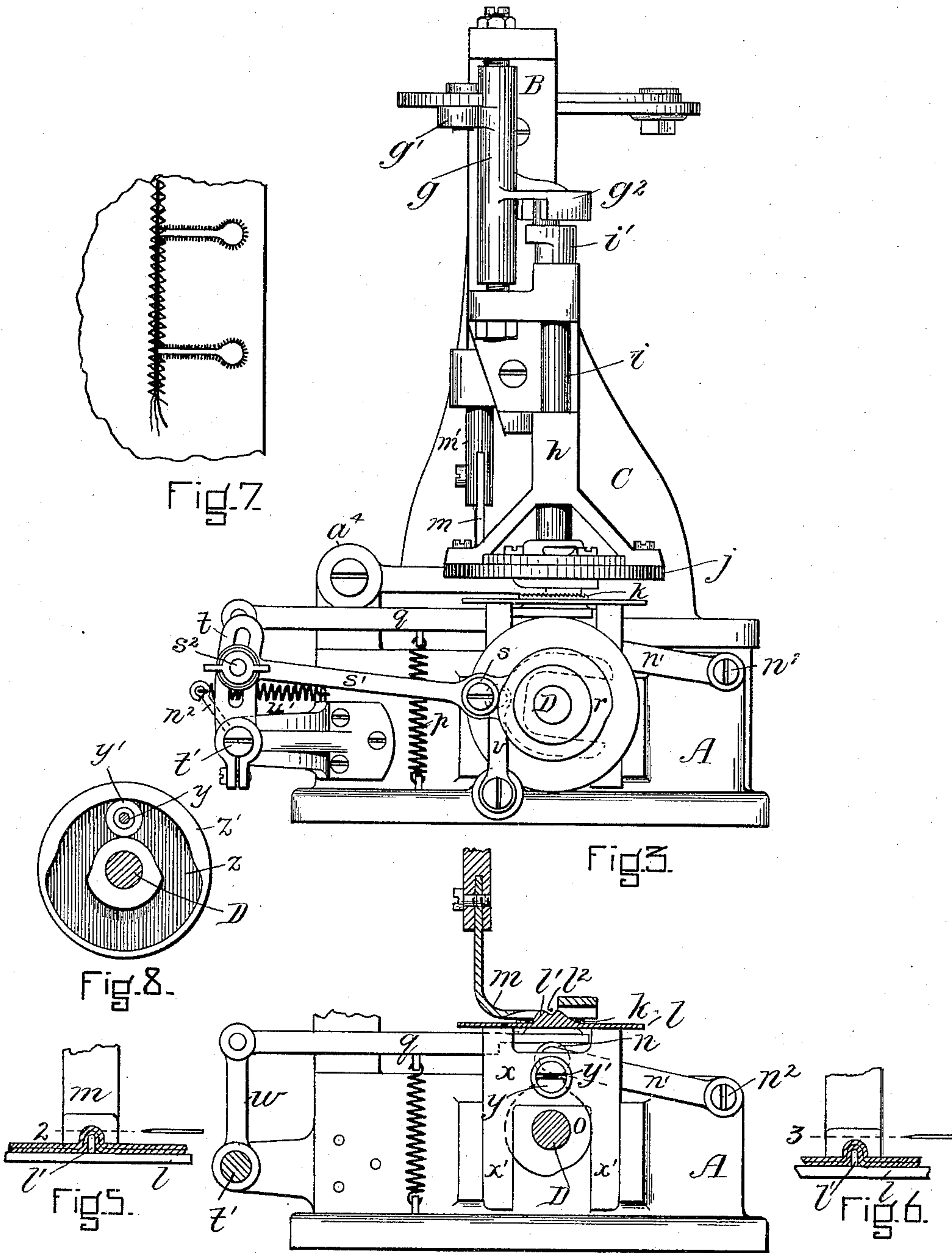
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WITNESSES.

Chas. Spaulding  
Charles O. Moss.

Fig. 4

INVENTORS.

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By Wm. H. Crossley  
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# UNITED STATES PATENT OFFICE.

JOHN A. KNOX AND THEODORE J. EBERSON, OF LYNN, MASSACHUSETTS,  
ASSIGNORS TO P. P. SHERRY, OF SAME PLACE.

## BUTTON-HOLE FINISHING AND STAYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 398,335, dated February 19, 1889.

Application filed October 17, 1887. Serial No. 252,573. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN A. KNOX and THEODORE J. EBERSON, of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Sewing-Machines, of which the following is a specification.

This invention relates to means for performing what is commonly called "overstitching."

10 The invention is particularly adapted to finishing the "fly" of boots and shoes after button-holes have been worked therein by overstitching and stitching down the stay cords and threads left floating between the  
15 "worked" button-holes, and the description herein will for the most part be confined to explanations as to how the invention may be arranged and adjusted to be employed in such use, though it will appear obvious to artisans  
20 skilled in the operation of sewing-machines that it may be used for other purposes than that specially mentioned.

It is the object of our invention to provide an improvement in the means for overstitching and stitching down floating stay-cords and threads in which what is commonly termed the  
25 "lock-stitch" may be employed, such improvement consisting in means for entering the needle and thread at one side of such floating stay-cords and threads, passing said needle  
30 and thread into though not through from side to side of the material and having them emerge from the same side of the material, though on the side of the floating stay-cords  
35 and threads remote from that at which they entered the material, interlocking said needle-thread with another thread, drawing said needle-thread back and carrying it above the  
40 said stay-cord and floating threads, and interlocking it with the thread on the other side, as before, and so on, with the effect of overstitching and binding down the floating threads and stay-cords with a smooth stitch that cannot  
45 be raveled or readily removed.

The improved mechanism for accomplishing the results mentioned embraces a reciprocating eye-pointed needle, a thread-carrying shuttle, means for bending and holding the material so that the needle is made to  
50 enter it at one side of the cord or threads, or

whatever is being overstitched and bound down, on one side of such cord and threads and emerge on the opposite side of the same, but on the same side of the material, and means for raising and lowering the material being  
55 operated upon and feeding it through the machine.

In developing and perfecting our improvements we have practiced with means whereby the material being operated upon was held  
60 in the same plane, while the needle and shuttle were moved so as to effect the uniting or interlocking of the seaming-threads first above and then below the material to be overseamed or bound down, and while the described mode  
65 of procedure was successfully carried out with such means we have found that a reverse operation of the instrumentalities, as herein shown, whereby the needle and shuttle are  
70 operated in the same plane and the means carrying the material being operated upon are raised and lowered intermittently, is capable of simpler construction and arrangement and more certain in operation.

To enable others skilled in the art to make  
75 and use our invention, we will now proceed to fully describe the same, having reference to the accompanying drawings and to the letters of reference marked thereon, forming a part of this specification, the same letters and figures of reference designating the same parts  
80 wherever they occur, of which said drawings—

Figure 1 represents in side elevation a machine embodying our invention, a part being  
85 pictured as broken out for the purpose of showing the cam employed to operate the take-up lever and the devices for actuating the shuttle. Fig. 2 is a top plan view of the machine shown in Fig. 1, parts being represented as broken away. Fig. 3 is a left-hand  
90 end elevation of the machine shown in Figs. 1 and 2. Fig. 4 is a cross-section of parts of the machine on a line running through substantially the center of the presser-foot, showing the construction of the work-support, the  
95 presser-foot, and means for operating the feed. Figs. 5 and 6 are sectional diagrams designed to assist in giving a clear understanding of the invention. Fig. 7 is an under side view of  
100



part of a boot or shoe containing button-holes, showing the floating portions of the stay-cord and threads used in working the button-holes as overseamed and stitched  
5 down in accordance with our invention.

In the drawings, A designates the bed of the machine; B, the overhanging arm; C, the standard connected with the bed and supporting said arm; D, the main or cam shaft hav-  
10 ing bearings in the bed, and E a pulley on the main shaft by which it may be rotated.

In the organization of the machine as here represented the needle-bar *a* and needle *b* are arranged to reciprocate horizontally above the  
15 needle-bed, said needle-bar being mounted in suitable bearings, *a'*, formed in the forward ends of arms *a''*, pivoted at their rear ends on studs *a'''*, screwed into ears *a''''* of the bed A; and to render said needle-bar adjustable ver-  
20 tically we turn a thumb-screw, *a''''''*, through a screw-threaded hole of a lug, *a''''''''*, formed on the forward part of the support for the needle-bar, the lower end of the thumb-screw resting upon the bed of the machine. This has been  
25 found to be a very convenient means among the several used by us, and which may readily be constructed by any skilled mechanic, for supporting and vertically adjusting the needle-bar.

30 The needle-bar *a* has a reciprocating movement imparted to it by means of a cam, *c*, on the main shaft D, operating on a stud, *c'*, (or it may be on a roller or bowl formed on a stud,) extending down from the needle-bar, the  
35 form of such cam *c* being such as to impart the proper movements in proper time to the needle-bar.

Journalled in suitable bearings in the stand-ard C is an upright rock-shaft, *d*, provided on  
40 its lower end with a crank-arm, *d'*, having on its forward end a stud, *d''*, (or it may be a roller on a stud,) arranged to travel in cam-groove *o'* of cam-cylinder *e*, secured to main shaft D, and so impart a proper rocking motion to  
45 shaft *d*, for a purpose to be presently explained.

To the upper end of shaft *d* is affixed an arm, *d'''*, adjustably connected at its outer end with one end of a bar or rod, *f*, pivotally con-  
50 nected at its opposite end with a crank-arm, *g'*, of an upright shaft, *g*, suitably journaled in a bracket, *h*, secured to the forward end of overhanging arm C. Said shaft *g* is provided with another crank-arm, *g''*, loosely connected  
55 with the outer end of a crank-arm, *i'*, attached to the upper end of the vertically-arranged shuttle-operating shaft *i*, also journaled in suitable bearings in the bracket *h*, which latter device at its lower end supports a shuttle-  
60 race, *j*, in which is arranged a rotary reciprocating shuttle, *j'*, of ordinary construction, adapted to carry a thread and co-operate with the needle in the formation of a "lock-stitch," so called.

65 There is nothing peculiar in the shuttle or shuttle-race, excepting that they are horizon-

tally arranged instead of being placed in a vertical position, as heretofore.

Shaft *i* is provided on its lower end with proper means for engaging and operating the  
70 shuttle, and has a proper rocking motion imparted to it by the action of cam-groove *o'* on stud *d''* and the devices intermediate of the latter and said shaft *i*.

*k* designates the feed-dog, of ordinary con-  
75 struction, operating through slots in the work-plate *l* to feed the work along under the presser-foot *m*, attached to the presser-bar *m'*, and held pressed down by a spring, *m''*, bearing at the upper end against the overhanging  
80 arm and at its lower end against a collar, *m'''*, secured to said presser-bar. The feed-dog rests on a roller or bowl, *n*, attached to the free end of a lever, *n'*, pivoted at its opposite  
85 end, as at *n''*, to the bed. Said roller *n* rests in turn on a cam, *o*, attached to main shaft D, by which construction and arrangement of  
90 devices the feed-dog is intermittently raised, it being lowered by its own gravity or the operation of a spring, *p*, attached at one end to  
95 a bar, *q*, integrally or otherwise connected with and extending back from the feed-dog *k*, the other end of said spring being connected with the bed A.

*r* designates a cam on main shaft D, adapted  
95 to operate on a bowl or roller, *s*, arranged on a stud extending outward from an arm or bar, *s'*, forked at its forward end, as shown in dotted lines in Fig. 3, so as to embrace shaft D, and adjustably connected at its rear end, as  
100 at *s''*, with an arm, *t*, rigidly connected to a shaft, *t'*, adapted to be rocked in bearings in the bed or brackets attached to the bed. Shaft *t'* has also connected with it an arm, *w*,  
105 pivotally connected at its upper end with the rear end of bar *q*. A spring, *u'*, (shown as connected at one end with a pin, *u''*, in rock-shaft *t'*, though it might as well be connected  
110 at one end with either arm *t* or *w*, and at the other with the bed of the machine,) operates to hold bar *s'* forward, with its bowl or roller  
115 *s* in contact with cam *r*. By this means rock-shaft *t'* is operated so as to move feed-dog *k* to feed the work ahead, spring *u'* effecting its return or forward movement.

Bar *s'* is pivoted at a point directly oppo-  
site that at which roller *s* comes in contact with cam *r* to the upper end of a short arm, *v*, which arm *v* is in turn pivoted at its lower  
120 end to the bed A, all as clearly represented in Fig. 3, this construction being for the purpose of keeping roller *s* in unvaried position with respect to cam *r* in the adjustments of the rear end of bar *s'* on arm *t*.

The construction and relationship of parts  
125 for effecting the "four-motion" feed movements of feed-dog *k* have been so fully set forth as to make clear the operation of said feed-dog without further description.

Work-plate *l* is provided on its upper face  
130 with a rib, *l'*, preferably, though not necessarily, provided with a notch or depression, *l''*.



Said rib  $l'$  extends upward into a slot in the presser-foot  $m$ , and is for the purpose of bending the work on a line corresponding with that on which the floating stay-cords and thread lie thereon, as shown in Figs. 5 and 6.

As appears from the description already given, the needle always operates in the same horizontal plane, and in order to make it pass at one operation through the material bent over rib  $l'$ , as aforesaid, and at the next operation above the material, in accordance with the mode of operation hereinbefore specified, it becomes necessary to raise and lower the work intermittingly, so that this thing can be done, and this is accomplished by raising and lowering work-plate  $l$ , which will next be described.

Work-plate  $l$  is secured to a base,  $x$ , provided with legs  $x' x'$ , made to straddle shaft D. To the side of base  $x$  is attached a stud,  $y$ , provided with a roller,  $y'$ , extending into a cam-groove,  $z$ , in the side of disk  $z'$ , (see Fig. 8,) said disk being fast on and rotating with main shaft D, cam-groove  $z$  being of such form as to effect the raising of work-plate  $l$ , so that the needle will pass through the material at one operation, as indicated by the dotted line 2, Fig. 5, and lower said plate, so that in the next operation of the needle it will pass above the work, as indicated by the dotted line 3 in Fig. 6.

Each time that the needle moves forward the thread carried thereby will be interlocked with the thread carried by the shuttle in a manner common in the formation of a lock-stitch in sewing by machinery, with the result of first locking the two threads in the material below the floating stay-cord and threads and next above said threads and stay-cord, and so on, as represented in Fig. 7.

It will be seen that the needle does not pass through the material from side to side, but enters and emerges from the same side of the material, though on opposite sides of the floating stay-cord and threads. The depth to which the needle is allowed to pass in the material is regulated by the adjusting-screw  $a^5$ , the notch  $b^2$  in rib  $l'$  of the work-plate permitting the needle to pass as near as may be to the "right side" or lower surface of the goods in position in the machine.

The means employed and method followed by us are exceedingly simple, while the float-

ing threads and stay-cord are securely bound down by a stitch that is at once secure and attractive in appearance.

4 designates a guide-eye, 5 6 a tension device, and 7 a take-up for the needle-thread. These devices are of ordinary construction and function.

Though we have been particular to describe the machine in all of its parts as shown in the drawings, it is obvious that the various elements or parts may be varied in form and arrangement within the limits of mechanical skill without departing from the nature or spirit of the invention.

What we claim is—

1. The combination, with the shuttle, of a horizontally-reciprocating needle, a vertically-reciprocating work-plate provided with a rib, a presser-foot provided with a slot or groove into which the rib extends, and a feed mechanism, substantially as set forth.

2. The combination, with a horizontally-operating shuttle, of a horizontally-reciprocating needle, a feed mechanism, a vertically-reciprocating work-plate provided with a rib or raised portion, and a presser-foot provided with a slot or depression to co-operate with said rib or raised portion of the work-plate, substantially as set forth.

3. The combination, with a shuttle, a horizontally-reciprocating needle, a work-plate, a feed mechanism, and a presser-foot, of a shaft D, and a cam on said shaft for intermittingly raising the work-plate, as set forth.

4. The combination, with a shuttle, a work-plate, and feed mechanism, of a horizontally-reciprocating needle and needle-bar, a rotary shaft, a cam,  $c$ , on said shaft, means connecting said cam with said needle-bar to reciprocate the same, a cam,  $z'$ , also on said rotary shaft, and means connecting said latter cam with the work-plate, whereby the latter may be raised and lowered intermittingly, as set forth.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 8th day of October, A. D. 1887.

JOHN A. KNOX.

THEODORE J. EBERSON.

Witnesses:

ARTHUR W. CROSSLEY,  
C. F. BROWN.