

No. 638,004.

Patented Nov. 28, 1899.

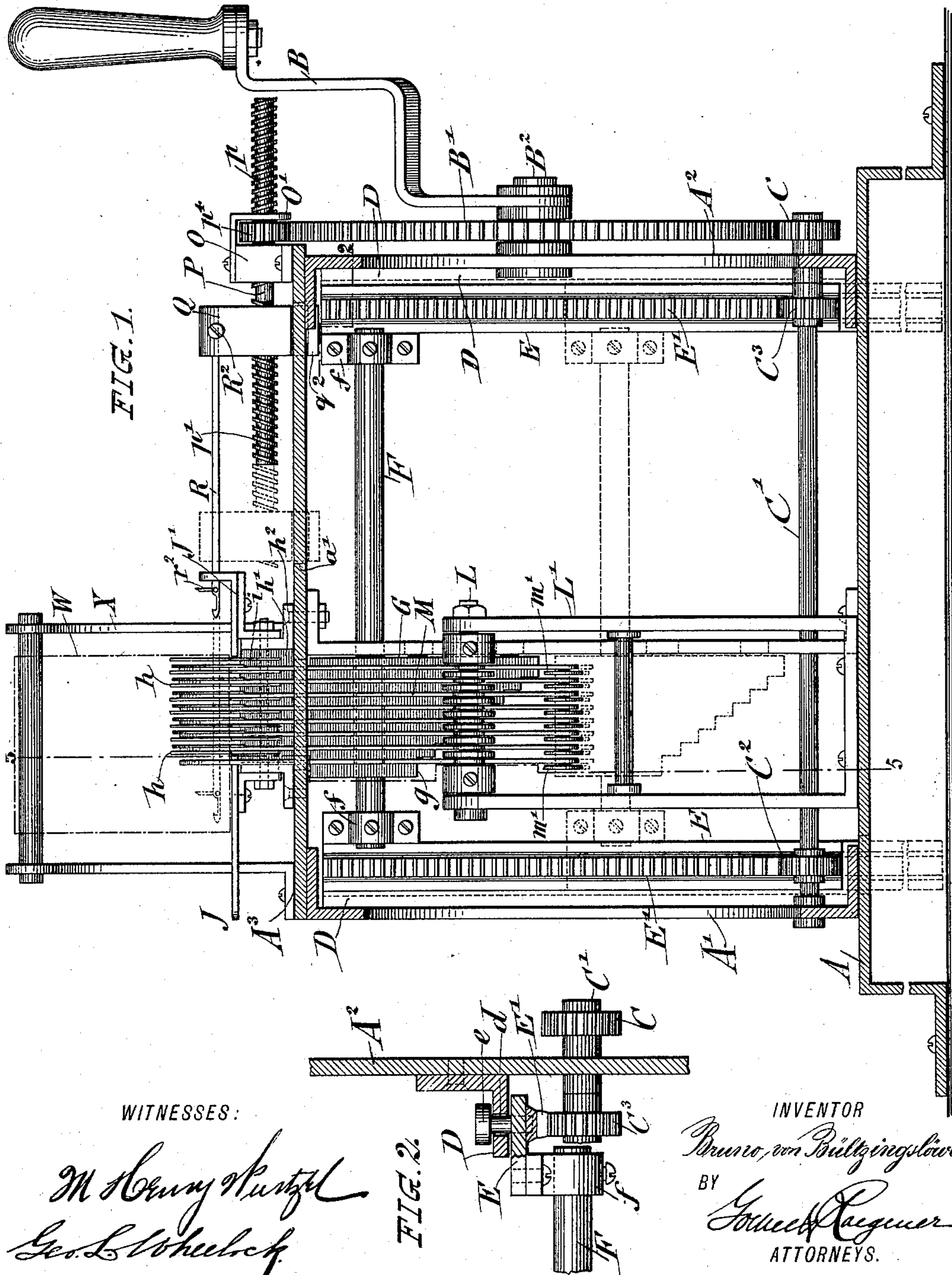
B. VON BÜLTZINGSLÖWEN.

MACHINE FOR INSERTING SHIRING STRINGS INTO BLANKS OF INCANDESCENT  
MANTLES.

(Application filed Jan. 21, 1899.)

(No Model.)

7 Sheets—Sheet 1.



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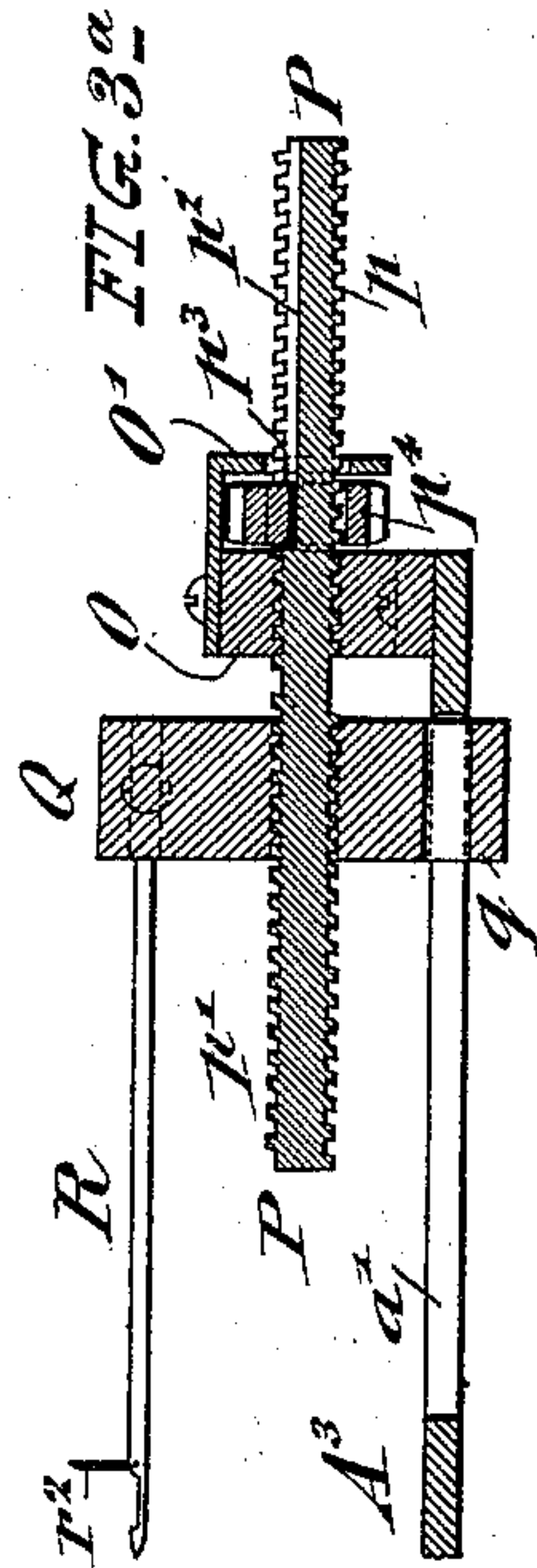
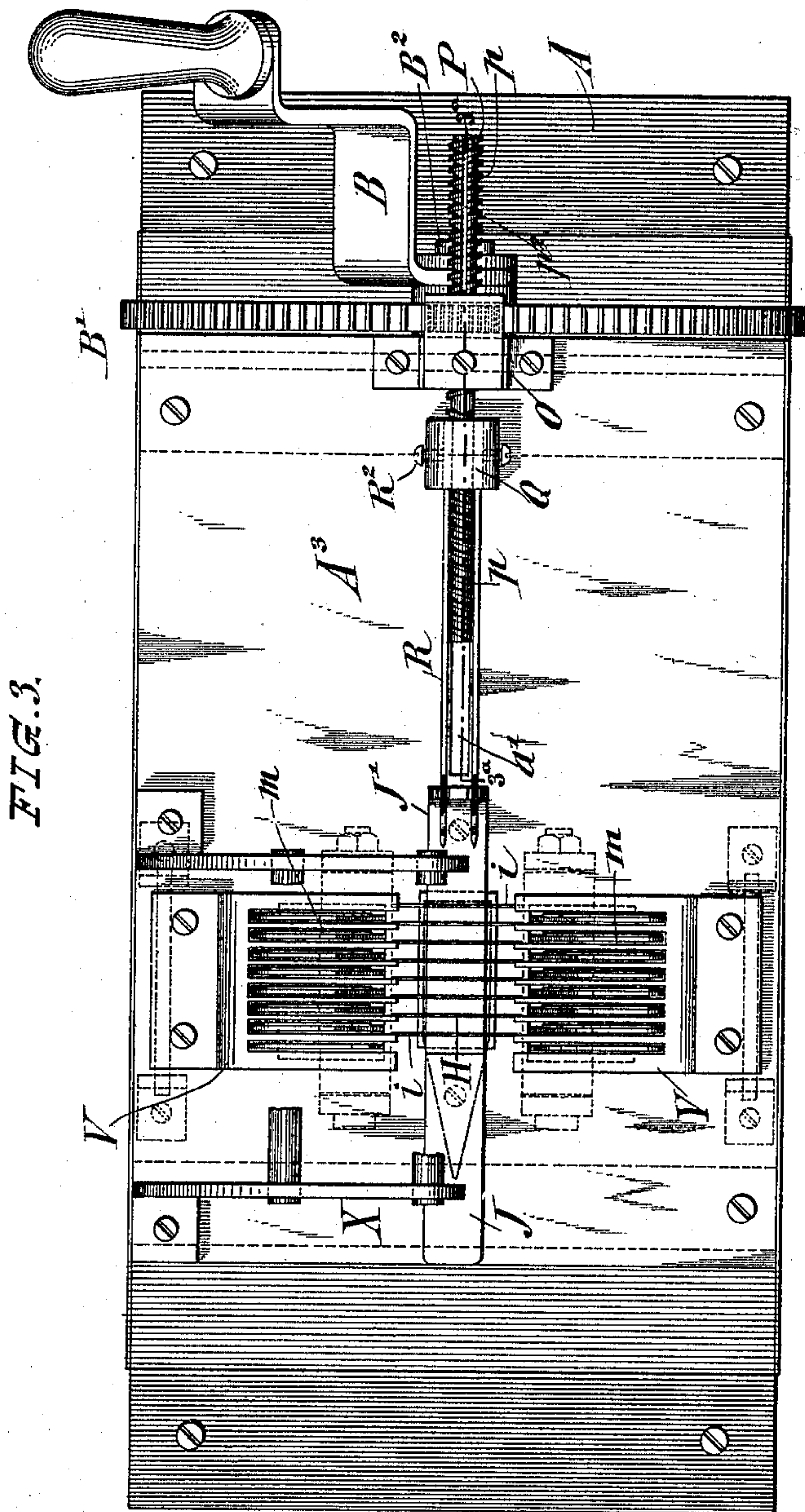
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7 Sheets—Sheet 2.



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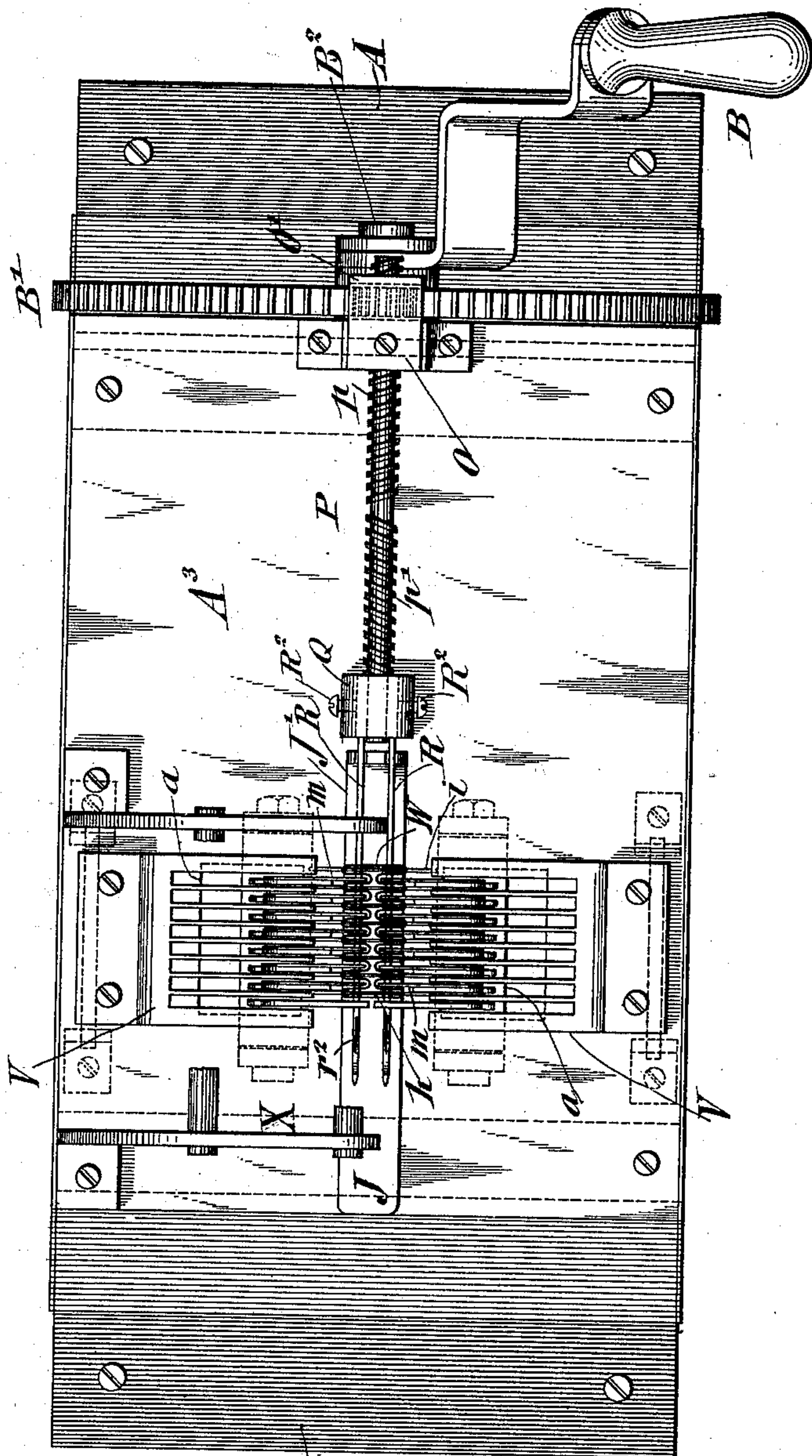
MACHINE FOR INSERTING SHIRING STRINGS INTO BLANKS OF INCANDESCENT MANTLES.

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7 Sheets—Sheet 3.

FIG. 4.



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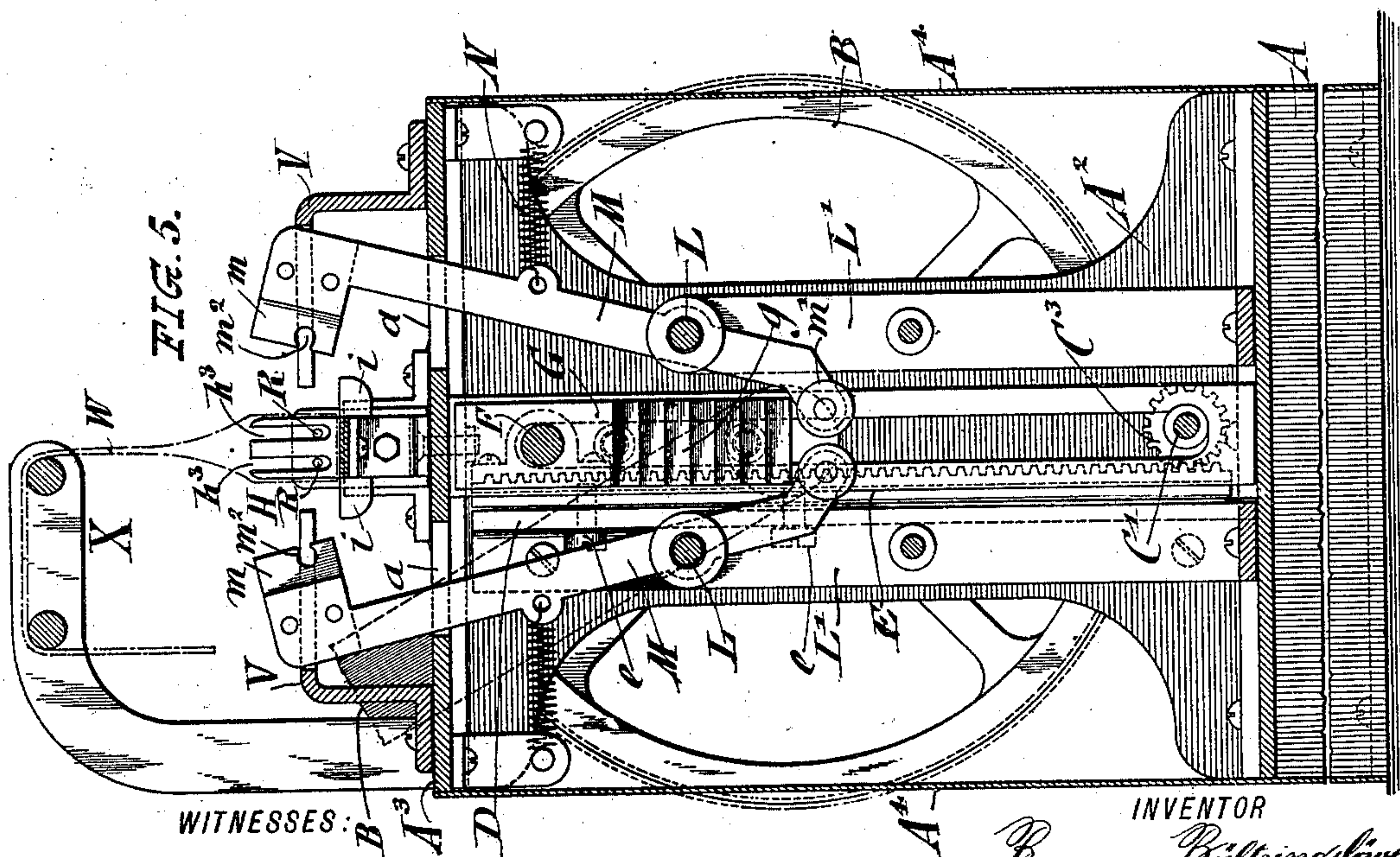
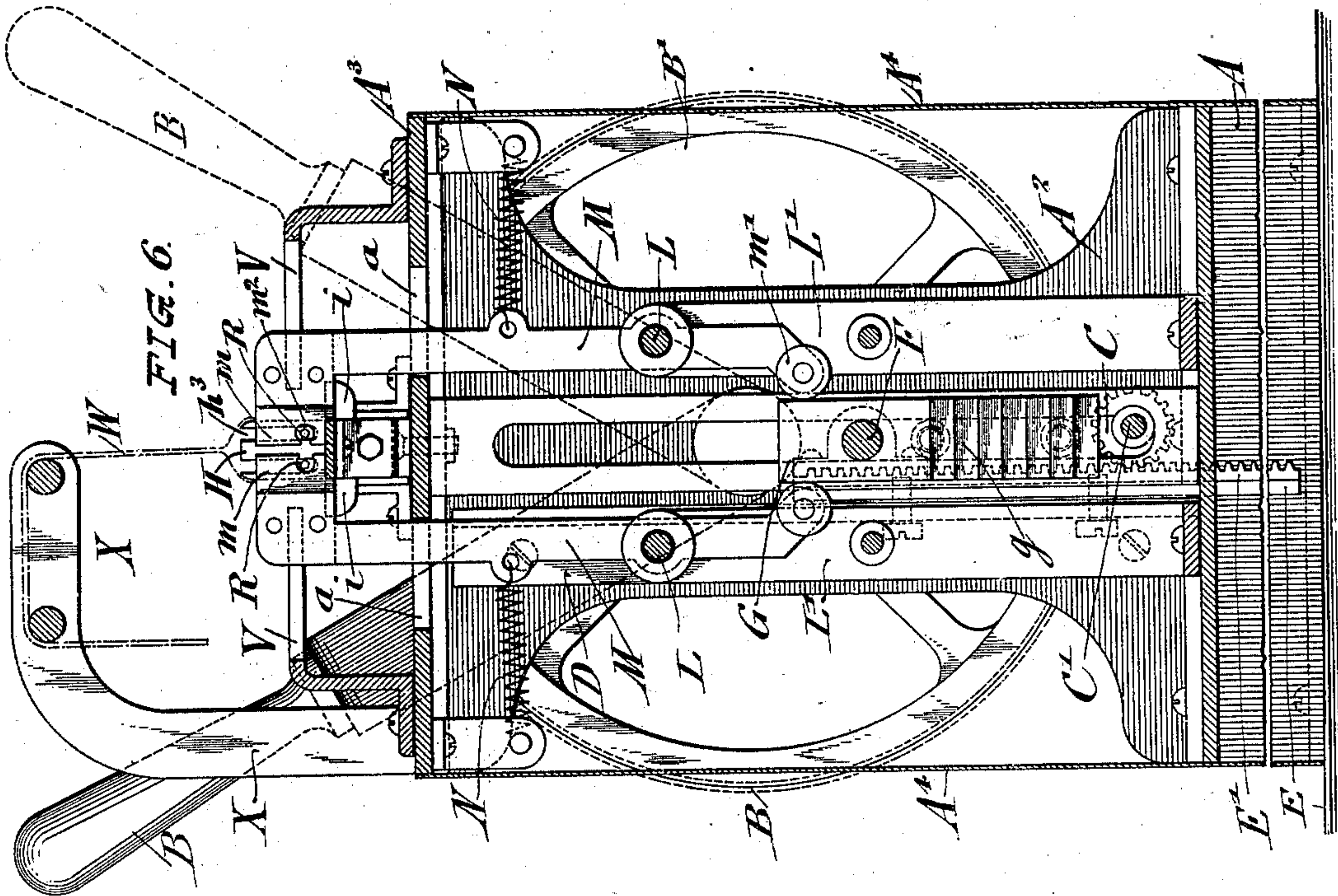
B. VON BÜLTZINGSLÖWEN.

MACHINE FOR INSERTING SHIRRING STRINGS INTO BLANKS OF INCANDESCENT MANTLES.

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(No Model.)

7 Sheets—Sheet 4.



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FIG. 8.

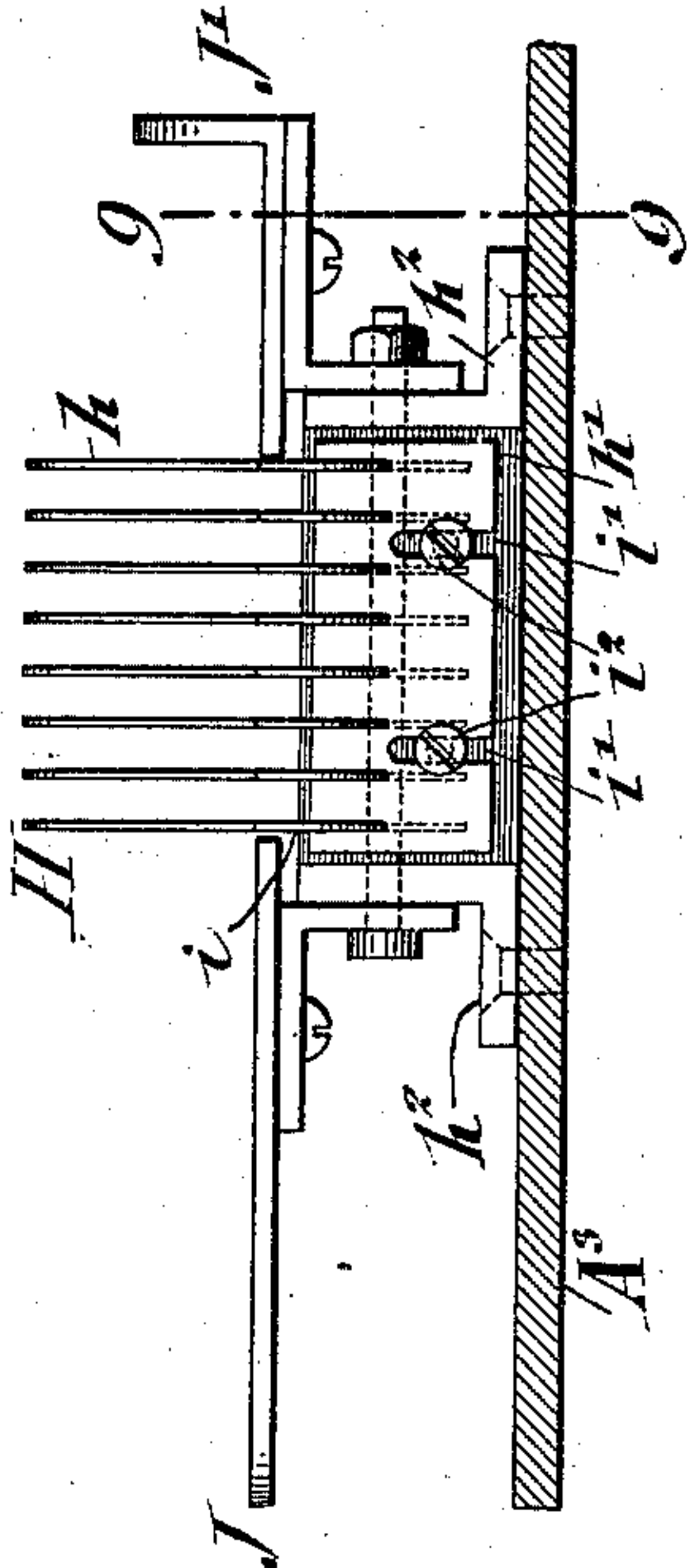


FIG. 9.

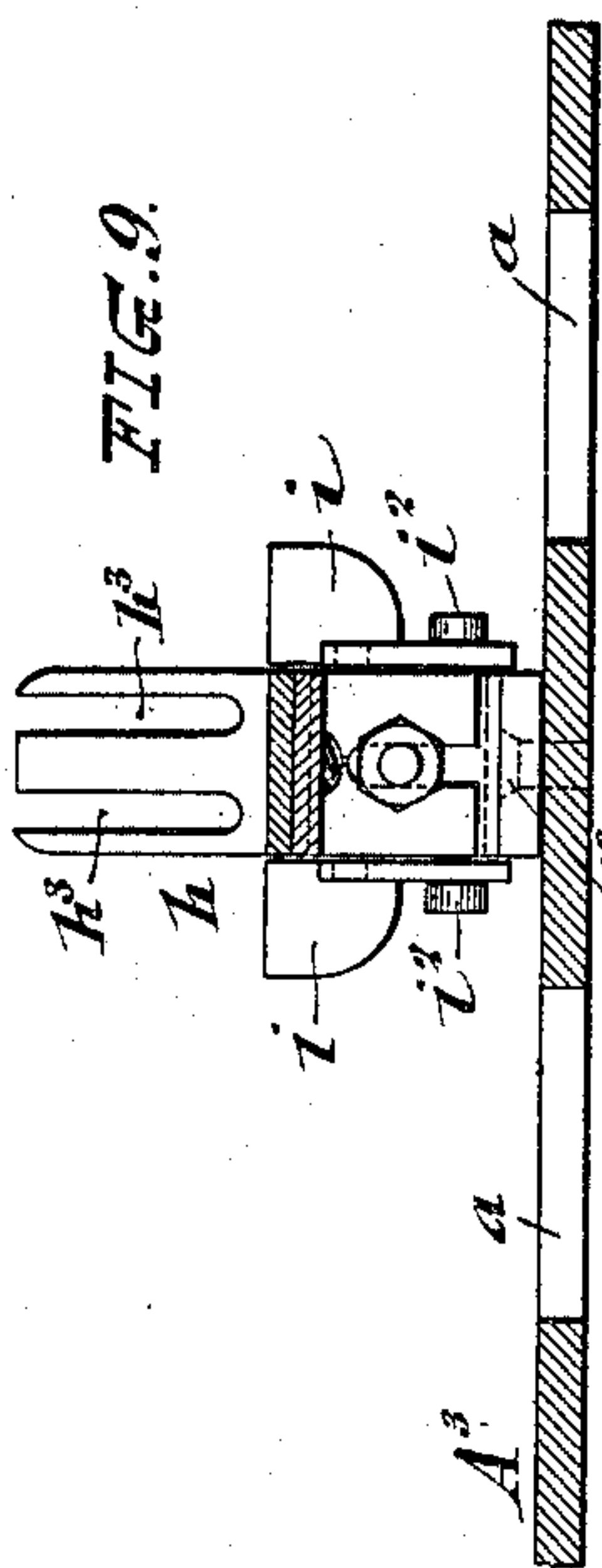


FIG. 10.

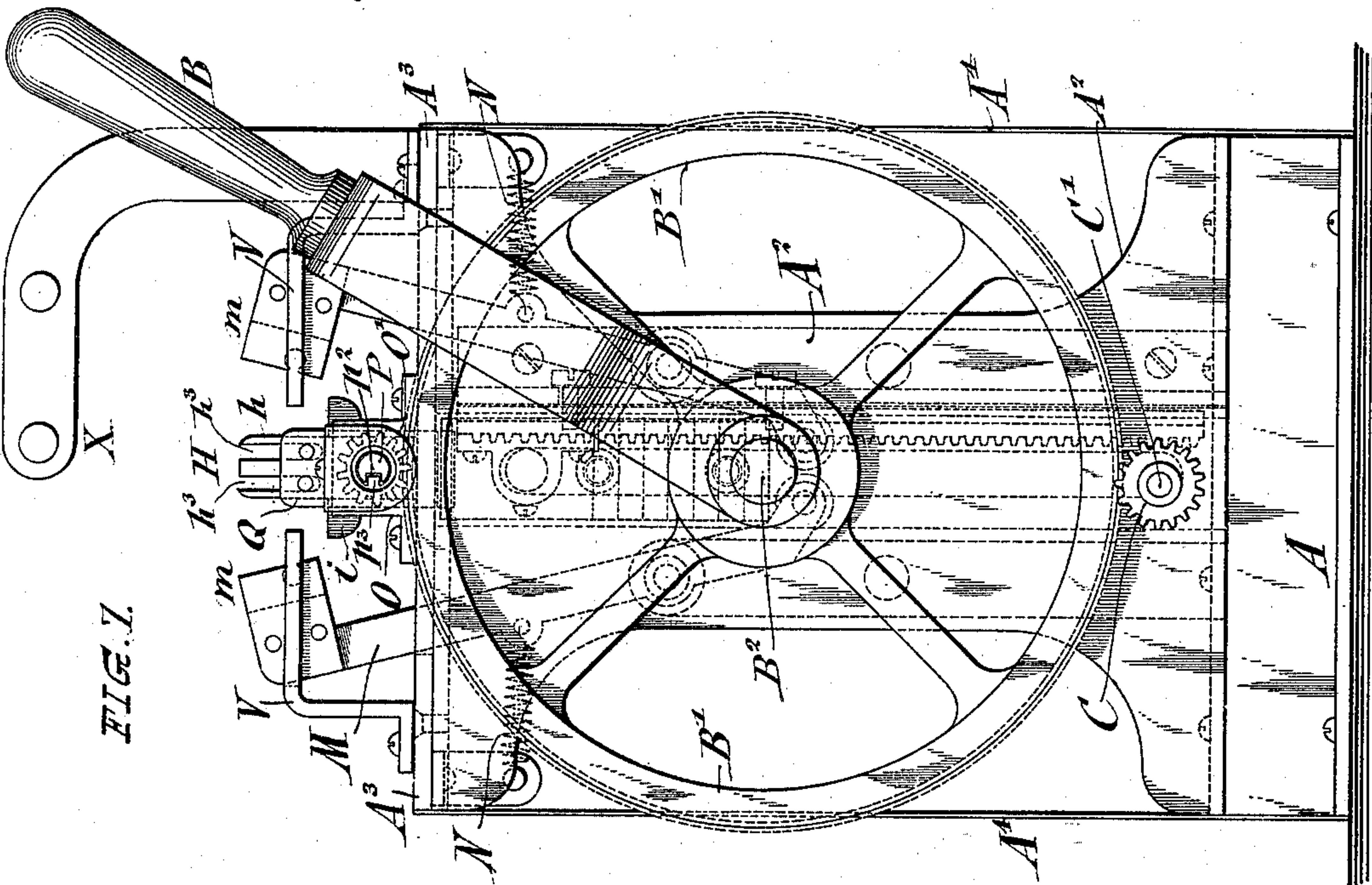
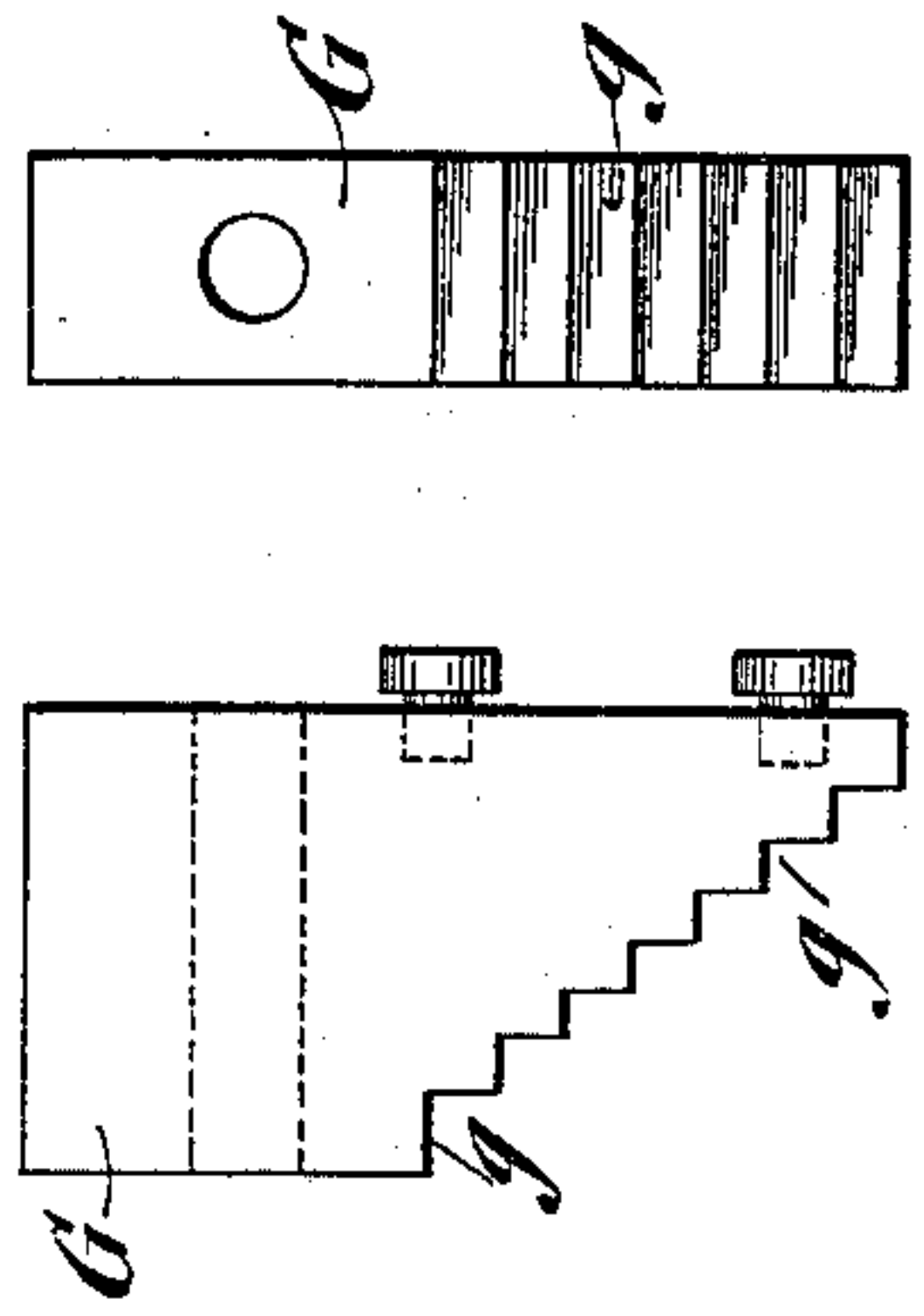


FIG. 1.

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7 Sheets—Sheet 6.

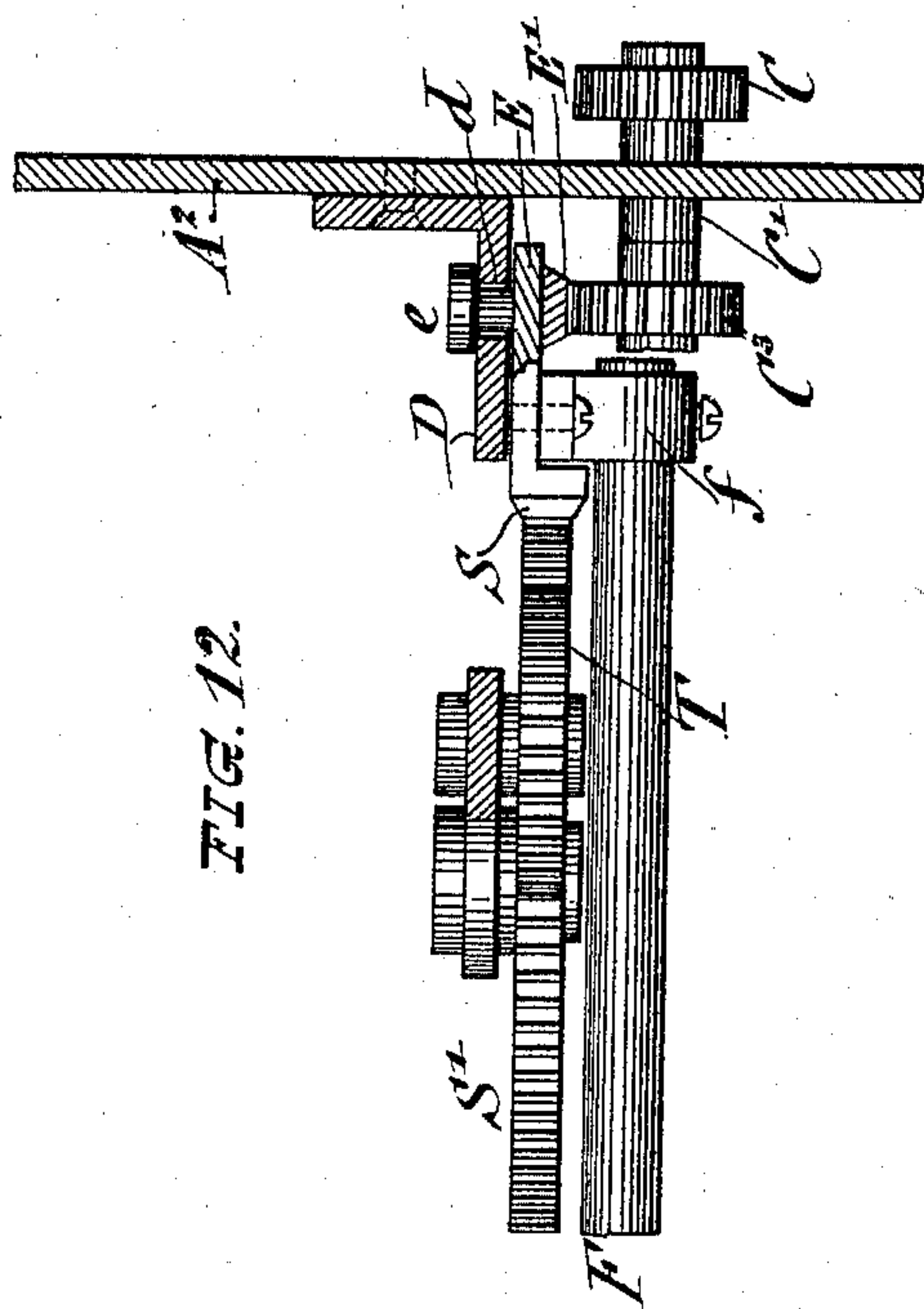


FIG. 12.

FIG. 13.

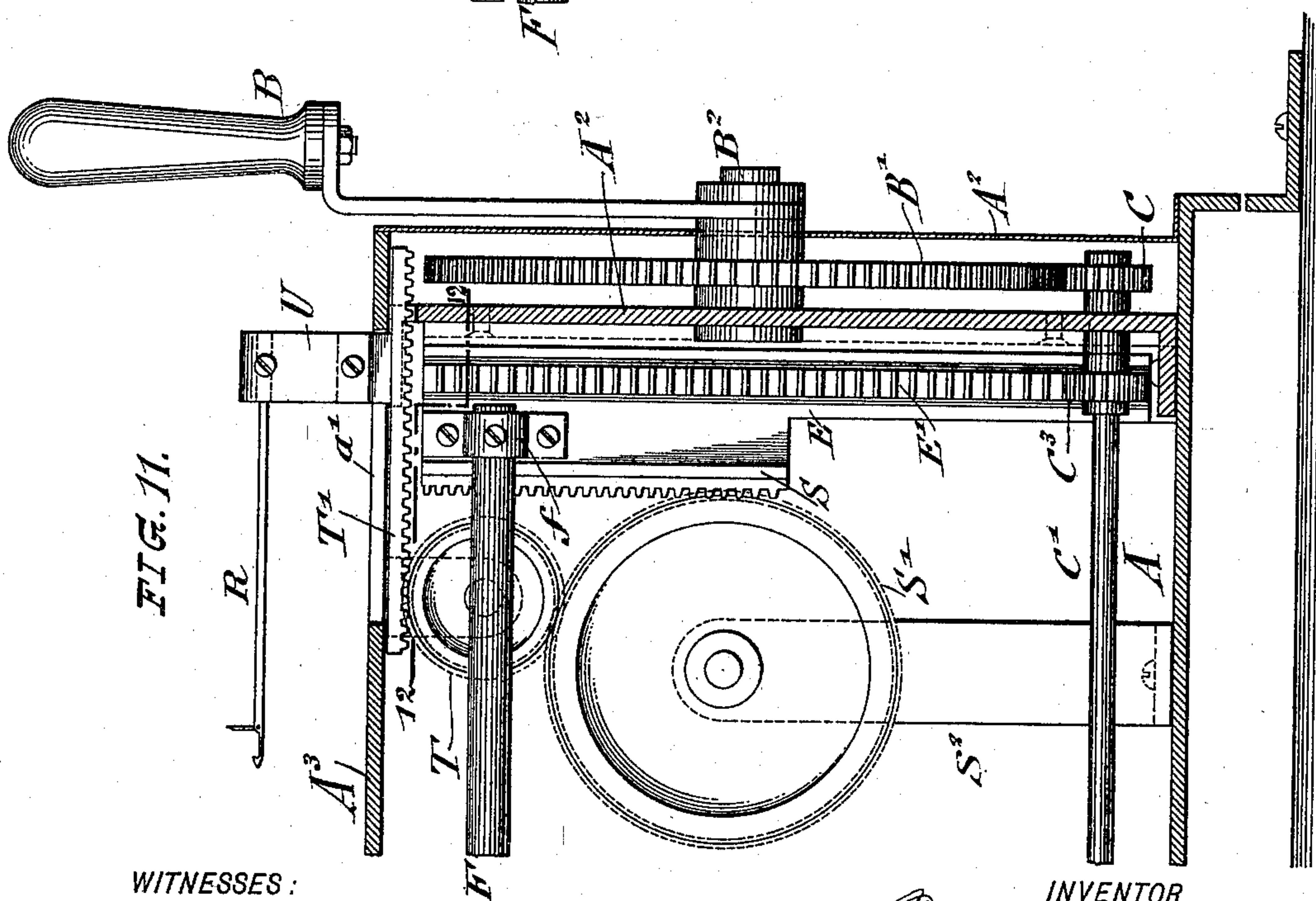
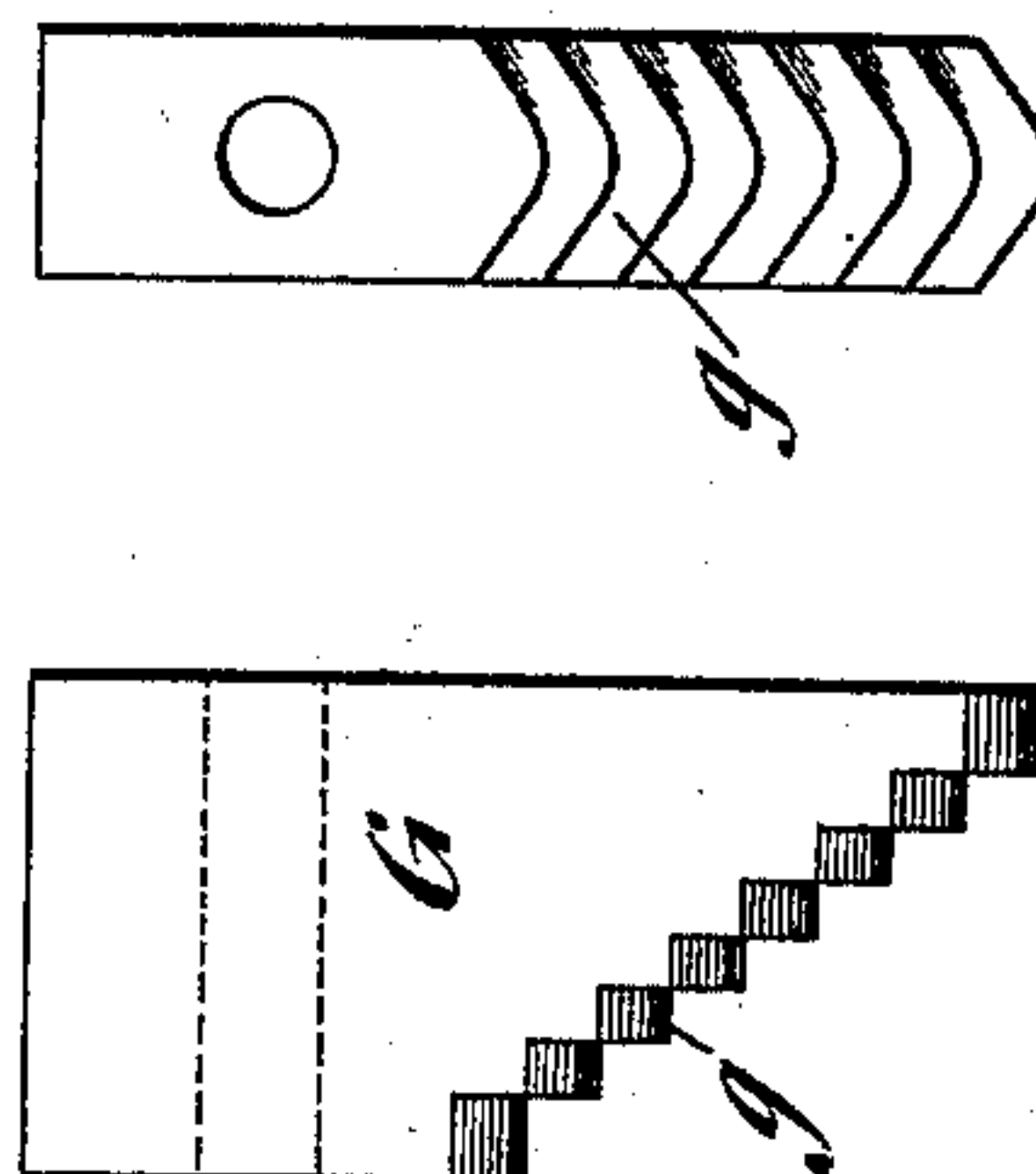


FIG. 11.

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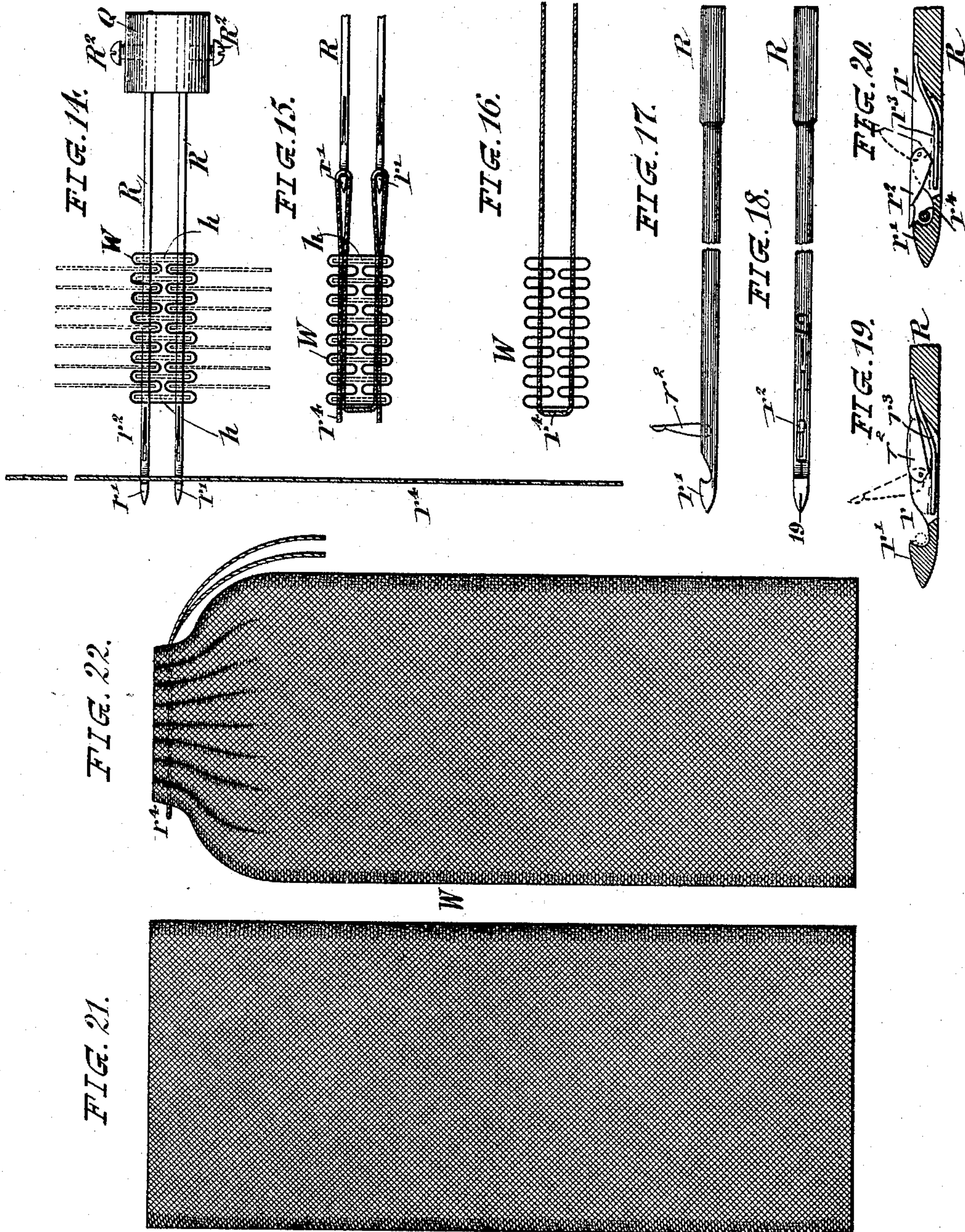
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(No Model.)

7 Sheets—Sheet 7.



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# UNITED STATES PATENT OFFICE.

BRUNO VON BÜLTZINGSLÖWEN, OF NEW YORK, N. Y., ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE INCANDESCENT MANTLE MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR INSERTING SHIRring-STRINGS INTO BLANKS OF INCANDESCENT MANTLES.

SPECIFICATION forming part of Letters Patent No. 638,004, dated November 28, 1899.

Application filed January 21, 1899. Serial No. 702,938. (No model.)

*To all whom it may concern:*

Be it known that I, BRUNO VON BÜLTZINGSLÖWEN, a citizen of the Empire of Germany, residing at New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Machines for Inserting Shirring-Strings into the Blanks of Incandescent Mantles, of which the following is a specification.

10 This invention relates to an improved machine for inserting shirring-strings into mantles for incandescent gas or other lamps, and more particularly to improvements in the construction shown and described in my copending application Serial No. 689,630, filed August 27, 1898.

20 The object of the invention is to dispense with the hand-labor usually employed for the purpose of inserting shirring-strings into this class of mantles and to simplify the machines of this class, so that the operation of inserting the string can be done by unskilled hands, whereby the rapidity with which the strings are inserted is increased and their manufacture facilitated and rendered cheaper.

25 The invention consists of a set of stationary central folders, a set of movable side folders adapted to move intermediately of the central folders, said side folders being arranged in corresponding pairs, means for moving the side folders into the central folders, means for removing the same therefrom, and a pair of longitudinally-movable needles provided with means for reciprocating the same 35 for passing the shirring-thread through the gathered-up or crimped mouth of the mantle.

40 The invention further consists in so constructing the needles and rendering them movable relatively to the folding mechanism as that during the return movement of the needles and while the mouth of the mantle is gathered up or crimped the shirring-string is drawn through the mantle, so as to do away with the necessity of cutting the strings and 45 the removal of the same from the needles by hand, the strings being placed upon the needles when the same are projected through the crimped or gathered-up mouth of the mantle.

50 The invention also consists in certain simplified constructions of the instrumentalities for producing the movements of the various parts of the machine, all as will be hereinafter

described in detail and then finally pointed out in the claims.

In the accompanying drawings, Figure 1 is 55 a sectional side elevation of my improved machine for inserting shirring-strings into incandescent mantles. Fig. 2 is a detail transverse section on the line 2 2, Fig. 1, the reciprocating rack-bars and connecting-rod 60 of same being down in position shown in dotted lines, same figure. Fig. 3 is a plan view of the machine, showing the side folders in open position and the needles in backward position ready to perform the operation. 65 Fig. 3<sup>a</sup> is a detail longitudinal section on the line 3<sup>a</sup> 3<sup>a</sup> of Fig. 3. Fig. 4 is a plan view of the machine with the side folders closed upon a blank, so as to gather up the mouth of the mantle, and showing the needles passed 70 through the same. Fig. 5 is a vertical transverse section on the line 5 5, Fig. 1, showing the machine ready to receive a blank. Fig. 6 is a similar section showing the side folders pressed in upon the blank, so as to fold or 75 gather up the mouth. Fig. 7 is an end elevation of the machine looking from the operating end. Fig. 8 is a detail side elevation of the central folding device. Fig. 9 is a transverse section of the same on line 9 9, 80 Fig. 8, looking toward the left. Fig. 10 represents side and end views of the step-shaped cam for actuating the side folders. Fig. 11 is a detail vertical section of one end of the machine, showing a modified form of the in- 85 vention. Fig. 12 is a section on the line 12 12, Fig. 11. Fig. 13 represents side and end views of the step-shaped cam adapted to be used in this modified form of the invention. Fig. 14 is an enlarged detail view of the 90 needles inserted through the gathered portion of the blank with a shirring-string placed upon the needles and ready to be drawn through the blank. Fig. 15 is a similar plan view showing the thread passed 95 through the mantle by the needles, but before the thread is removed from the needles. Fig. 16 is another plan view showing the thread removed from the needles and its ends drawn through the gathered portion of the 100 blank. Fig. 17 is a side elevation of one of the needles. Fig. 18 is a plan view of one of the same. Figs. 19 and 20 are respectively enlarged vertical longitudinal sections on line



19 19, Fig. 18, showing the two positions of the latch used with the needle, whereby the necessity of threading the string or thread through a needle-eye is obviated; and Figs.

5 21 and 22 are respectively a side elevation of the mantle-blank and of a blank in which a shirring-string has been passed through the gathered portion of the same.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A indicates a suitable bed-plate on which the frame of the machine is supported, said frame consisting of end plates  $A^1$   $A^2$  and a top-plate  $A^3$ , the parts being connected together in any suitable manner. The frame may have side walls  $A^4$  to protect the interior mechanism.

The parts of the machine are operated by means of an oscillating hand-crank B, which is fixed to the hub of a large gear-wheel  $B^1$ , which turns upon a short fixed shaft  $B^2$  on the end plate  $A^2$ , the teeth of said gear-wheel meshing with a pinion C, fixed on one end of a shaft  $C^1$ , journaled in bearings in the lower parts of the end plates  $A^1$   $A^2$ . Angle-irons or angle-flanges D are riveted or otherwise fastened to the end plates of the frame of the machine, as shown more clearly in Fig. 2 in connection with Figs. 1, 5, and 6. These flanges D are longitudinally slotted at  $d$  to receive pins or studs  $e$ , that are fixed to back plates E of racks  $E^1$ , the teeth of which racks intermesh with the pinions  $C^2$   $C^3$ , mounted on the shaft  $C^1$ . By reason of the size of the large gear-wheel  $B^1$  the racks  $E^1$  may be quickly reciprocated up and down through the medium of the pinions  $C^2$   $C^3$ , said racks being guided in their up and down movements by means of the pins or studs  $d$ , that travel in the slots  $e$  of the flanges D. At one side of each of the racks and at their upper ends are arranged clips  $f$ , which are applied to the ends of a transverse rod F, that thereby connects the racks and enables them to simultaneously move up or down. Supported upon this rod F at a suitable point is a block G, which is more properly termed a "stepped" cam, inasmuch as it is provided at its lower end with a number of steps or offset shoulders  $g$ . This stepped-cam device is for the purpose of oscillating the side folders, presently to be described.

I will first describe the central folders. The central folders H consist of a set or series of thin blades  $h$ , which are set at suitable distances apart and appear in side elevation like the teeth of a comb. (See Fig. 8.) The blades  $h$ , as shown in Figs. 8 and 9, project upwardly from the base-piece  $h^1$ , which is fastened by means of suitable flanges and screws  $h^2$  to the top plate  $A^3$  of the frame. Adjustable comb-shaped guards  $i$  are arranged at opposite sides of the base-piece  $h^1$  of the central folding-blades, the mount of the same being provided with slots  $i^1$ , which receive set-screws  $i^2$ , whereby the same may be adjusted up or down, according to requirement. At

opposite ends of the central folding-blades are arranged angular brackets J  $J^1$ , respectively, upon which the lower end of the mantle, the mouth of which is inserted over the central folding-blades, rests.

The side folders are supported in sets at both sides of the central folders, and are more especially shown in Figs. 1, 5, 6, and 7. The side folders are hung upon fulcrum-rods L, which are supported in the upper end of an auxiliary frame  $L^1$ , fixed to the base-plate A of the machine. The side folders each consist of the lever M, hung on said fulcrum-rods at a point about one-third of the distance from its lower end, so that the ends of the levers form the short arms and the upper ends the long arms of the levers. The upper long arms of the levers extend through openings  $a$  in the top plate of the frame, are guided in slotted guide-plates V, fixed to the top plate, and carry at their upper extremities laterally-extending wing-like folding-blades  $m$ , the folding-blades of the side folders extending toward the central folders and said side folders being so arranged that the blades of each opposite folder are adapted to enter the same corresponding space between two adjacent blades of the central folding device. The directly-opposite side folders are therefore arranged in pairs and the blades of the same enter the spaces between the blades of the central folders, and each pair of side folders has a relatively-timed movement to the adjacent or any other pair of side folders. This definitely-timed movement is accomplished by means of the stepped cam G, heretofore referred to, by arranging the steps of the cam so that the steps G are adapted to successively come in contact with the lower ends of one pair of folders after the other. The lower ends of the shorter arms of the levers M of the side folders carry antifriction-rollers  $m^1$ , upon which the step-shaped cam bears. Suitable springs N, connected with the long arms of the levers M and with the frame of the machine, return the side folders to their normal outward position. (Shown in Fig. 5.) The upper ends of the blades  $h$  of the central folders are provided each with a pair of open vertical recesses  $h^3$ , the corresponding recesses of each blade being aligned, so that the needles to be hereinafter described may pass therethrough. The inner side edges of the blades  $m$  of the side folders are provided also with recesses  $m^2$ , the object of this being also to permit the passage of the needles. The recesses  $m$  have contracted throats or entrance-ways, so as to enable the better manipulation of the parts.

The needle mechanism is shown fully in Figs. 1, 3, 3<sup>a</sup>, 4, and 7 and Figs. 14 to 20, inclusive. This mechanism is also actuated from the large gear-wheel  $B^1$ , the same which actuates the side folders, and consists as follows: O represents a screw-threaded bearing which is suitably secured to one end of the top plate  $A^3$ , in which engages the screw-



thread  $p$  on one end of the screw-spindle P, the opposite end of the screw-spindle having a reverse screw-thread  $p'$ , which engages in a correspondingly-screw-threaded opening in a needle-carrier Q. The screw-threaded end  $p$  of the screw-spindle is provided with a groove  $p^2$ , in which engages a spline or feather  $p^3$  upon a pinion  $p^4$ , through which the screw-spindle passes, said pinion  $p^4$  being held in position against axial displacement by means of a retaining-finger O', projecting outwardly and downwardly from the bearing O. The pinion  $p^4$ , while it rotates with the gear-wheel B', causes also, by reason of its tongue-and-groove connection with the screw-spindle P, a rotation of the latter, while at the same time it causes the screw-spindle to move in forward or backward direction, according to the direction of movement of the operating-crank B. The needle-carrier Q before referred to is provided with a depending guide-lug  $q$ , which is guided in a longitudinal slot  $a'$  in the top plate A<sup>3</sup> of the frame. The needle-carrier supports a pair of needles R R, which are fixed thereto by suitable means, as by set-screws R<sup>2</sup>. The needles project in a direction toward and in alignment with the corresponding recesses  $h^2$  in the central folders H, and they have a movement imparted thereto by means of the screw-spindle sufficient to carry their pointed ends entirely through the central folders and the mantle which is placed thereover. The pointed forward ends of the needles are provided with longitudinal recesses  $r$ , in which are pivoted back of the beaks  $r'$  of the needles thread-retaining latches  $r^2$ , said latches each having an upward tendency, so as to stand outwardly, by means of a suitable tension-spring  $r^3$ , fixed in the recess  $r$ . Between the beak  $r'$  and the pivot of the latch the side walls of the needle are cut away, so that the string or thread  $r^4$  can be passed over the beak  $r'$  and be retained by means of the latch, as shown in Fig. 20. The latches are automatic in their action, and when they move forward they are turned in the position shown in Fig. 19, so as not to interfere with the forward passage of the needle through the blank, while in their backward movement they are turned into the position shown in Fig. 20, in which position the thread is locked in position, so that it can be drawn through the mantle. When the latches are free from the mantle, they are at liberty to move into raised position. It will be seen in dotted lines, Fig. 17, that when the latch is in vertical position there is no contact between the latch and spring, nor is there any appreciable contact between the same in the dotted-line positions shown in Figs. 19 and 20. When moved beyond these positions, however, toward the needle-body, as shown in full lines, the spring  $r^3$  is placed under tension and the latch when released thrown in the opposite direction, so that the automatic action referred to takes place.

In Figs. 11, 12, and 13 a modification of the

machine is exhibited, in which the large gear-wheel B' operates the side folders, as in the main form of the invention, but the needles are operated by means of a second rack S on plate E, the teeth of which rack engage a gear-wheel S', supported in suitable brackets S<sup>2</sup> from the base-plate A of the machine, said gear-wheel S' meshing with a suitably-journaled pinion T, which in turn meshes with a rack T', that supports the needle-carrier U, that projects through the top plate A<sup>3</sup> of the frame.

In Fig. 13 a modification of the stepped cam G is shown, in which the steps are made in the shape of entering wedges, so as to more readily enter between and separate the lower ends of the levers of the side folders.

The operation of the machine is as follows: The mantle-blanks W, which are of the form shown in Fig. 21, are hung over a supporting-hook X in such manner that the mouth of the same can be placed over the central folder H until the lower edge of the same rests upon the bracket-shelves J J' and upon the supplemental side combs  $z$ . The operator then takes notice that the mouth of the mantle is neatly supported over the central folders and takes hold of one side of the same, so as to retain the mantle in the position shown in dotted lines in Fig. 1. The hand-crank B is now given an oscillating movement from the position shown in full lines to that shown in dotted lines, Fig. 6, so as to cause a downward movement of the step-cam G, thereby moving through the medium of the steps  $g$  of said cam one pair of side folders M after the other into the spaces between the blades of the central folder H. In the meantime the operator holds the mouth of the mantle taut, so as to cause a uniform gathering or folding of the mantle by means of said side folders, one oscillation of the hand-crank being sufficient to close, through the medium of said stepped cam, all of the blades of the side folders upon the mantle, so that the same is gathered up or folded, as shown in Fig. 4, while the side folders are moved into the position shown in Fig. 6. During this oscillating movement of the hand-lever and the forward inward movement of the side folders the needles are moved forward through the folds of the gathered-up mantle into the position shown in dotted lines in Fig. 1 and in full lines in Fig. 4. This is accomplished by the rotation of the screw-spindle through the medium of the pinion  $p^4$ , and inasmuch as the screw-thread  $p'$  is reversed to that of the screw-thread  $p$  the needle-carrier Q will be given a movement twice that of the distance of movement of said screw-spindle, so that the needle-carrier is moved into the position shown in dotted lines in Fig. 1 and passes through the mantle. When the needles are in their rearward position, the latches  $r^2$  of the same are in their upright position; but as soon as the needles enter into the gathered-up portion of the mantle and the latches come in con-



tact with the same they are thrown into backward position, (shown in Fig. 19,) thus obviating the danger of the forward end of the latch locking into the mantle, so that the needles  
 5 are free to pass through the same. As soon as the needles have passed through the gathered-up portion of the mantle the springs  $r^3$  cause the latches to rise. The needles having passed through the mantle-blank, a shirring string or thread  $r^4$  is passed over the beaks  
 10  $r^1$  of the needles, so as to enter into the recesses  $r$ . The operator now holding the shirring-string taut, an oscillation is imparted to the hand-lever in reverse direction to that heretofore given and the needles are caused  
 15 to draw the ends of the shirring-string  $r^4$  through the gathered or folded portion of the blank, while by the engagement of the latches with the blank the said latches are closed  
 20 down upon the shirring-thread  $r^4$  into position shown in full lines in Fig. 20, whereby the thread is locked in position or retained in the needles until the needles are drawn entirely through the gathered-up portion of the  
 25 blank. As the needles pass through the central and side folders on the return stroke the side folders which they have passed are automatically released from the blank and returned into outward position by means of  
 30 their actuating-springs N. The parts then assume their normal position, as shown in Figs. 3 and 5, so that another blank can be shirred after the mantle W (shown in Fig. 22) has been removed. After the removal of the  
 35 shirred blank the shirring-string is secured and looped in the well-known manner.

The last pair of side folders do not properly act as folders, but as retainers for the purpose of holding the fabric of the blank in  
 40 place while the needles pierce it, so as to prevent that end of the blank from following the needles. In a somewhat-similar way the contracted throats of the recesses  $m^2$  of the side folding-blades tend to prevent the fabric of  
 45 the mantle being drawn into the recesses.

Over my previous machine the present invention possesses advantages, among which may be mentioned that the side folders are more positively moved and that the objection-  
 50 able movement and mechanism for moving the central folders are done away with, as in the present machine they are stationary. Instead of the complicated cam mechanism and mechanism for moving the same the simple stepped-  
 55 cam mechanism is substituted, while the construction of the needles enables the mantles to be shirred without having to cut the thread after the shirring operation, the needles performing the shirring operation during their  
 60 backward instead of during their forward movement.

It is obvious that in place of shirring-strings platinum or other wires may be used and inserted into the folds of the blanks in the same  
 65 manner; also, other changes in the construction and method of operation may be resorted to by skilled mechanics without departing

from the spirit and scope of the present invention. I therefore do not limit myself to the exact mechanism herein shown and described. 70

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a machine for inserting shirring-strings into mantle-blanks, the combination, with a set of central stationary folders, of movable side folders, one set at each side of said central folders, said side folders being arranged in corresponding pairs, means for  
 80 moving the side folders into the spaces of the central folders, and needle mechanism for inserting the shirring-strings through the gathered-up mouth of the mantle-blank, substantially as set forth. 85

2. In a machine for inserting shirring-strings into mantle-blanks, the combination of a set of stationary central folders, of a set of parallel, movable side folders located intermediately of the central folders and arranged in pairs, means for successively moving one pair of side folders after the other into the spaces of the central folders, and  
 90 needle mechanism for inserting a shirring-string through the gathered mouth of the mantle-blank, substantially as set forth. 95

3. In a machine for inserting shirring-strings into mantle-blanks, the combination of a set of central folders, a set of oscillating side folders, one set at each side of said central folders, means for oscillating each pair of side folders successively after the adjacent folders, and needle mechanism for inserting a shirring-string through the gathered mouth of the mantle-blank, substantially as set forth. 105

4. In a machine for inserting shirring-strings into mantle-blanks, the combination of central folders, movable side folders cooperating with said central folders, a step-shaped cam adapted to actuate one pair of  
 110 side folders after the other, means for reciprocating said step-shaped cam, and needle mechanism for inserting a shirring-string through the gathered portion of the mantle-blank, substantially as set forth. 115

5. In a machine for inserting shirring-strings into mantle-blanks, the combination of central folders, means for supporting the mantle-blank from above said central folders, in downward position, movable side folders  
 120 cooperating with said central folders, means for operating said side folders, and needle mechanism for inserting a shirring-string through the gathered mouth of the mantle-blank, substantially as set forth. 125

6. In a machine for inserting shirring-strings into mantle-blanks, the combination, with means for gathering or folding up the mouth of the mantle-blank, comprising central folders provided each with a pair of needle-receiving recesses, and movable folders  
 130 cooperating therewith to gather up the mouth of the mantle-blank, of needle mechanism for inserting a shirring-string in said gathered or



folded up portion of the blank, said needle mechanism comprising a pair of needles provided with beaks, and spring-actuated latches cooperating with said beaks for holding the shirring-string in the needles, substantially as set forth.

7. In a machine for inserting shirring-strings into mantle-blanks, the combination, with means for gathering or folding up the mouth of the mantle, comprising central folders provided each with a pair of needle-receiving recesses, and movable folders cooperating therewith to gather up the mouth of the mantle-blank, of needle mechanism for inserting a shirring-string through the gathered or folded part of the blank, said needle mechanism comprising a pair of needles, each provided with recesses and a beak at its pointed end, and an automatic latch pivoted to the needle adjacent to said recess and adapted to cooperate with said beak for confining a shirring-thread in the needle, substantially as set forth.

8. In a machine for inserting shirring-strings into mantle-blanks, folding mechanism, comprising central folders, movable side folders, and additional movable side folders or retainers, arranged to move outside one end of the central folders, and means for moving said side folders toward the central folders in combination with means for inserting a shirring-string through the gathered-up mouth of the mantle-blank, substantially as set forth.

9. In a machine for inserting shirring-strings into mantle-blanks, the central folders, in combination with the side folders having blades provided with recesses with contracted throats, said side folders being movable toward the central folders, and means for inserting a shirring-string through the gathered-up mouth of the mantle-blank, substantially as set forth.

10. In a machine for inserting shirring-strings into mantle-blanks, the combination of the central folders provided with laterally-projecting side guards or blades, movable side folders, and needle mechanism for inserting a shirring-string through the gathered-up mouth of the mantle-blank, substantially as set forth.

11. In a machine for inserting shirring-strings into mantle-blanks, the combination of the central folders provided with laterally-projecting side guards or blades, means for adjusting the latter relatively to the central folders, movable side folders, and needle mechanism for inserting a shirring-string through the gathered-up mouth of the mantle-blank, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

BRUNO VON BÜLTZINGSLÖWEN.

Witnesses:

PAUL GOEPEL,  
M. HENRY WURTZEL.