

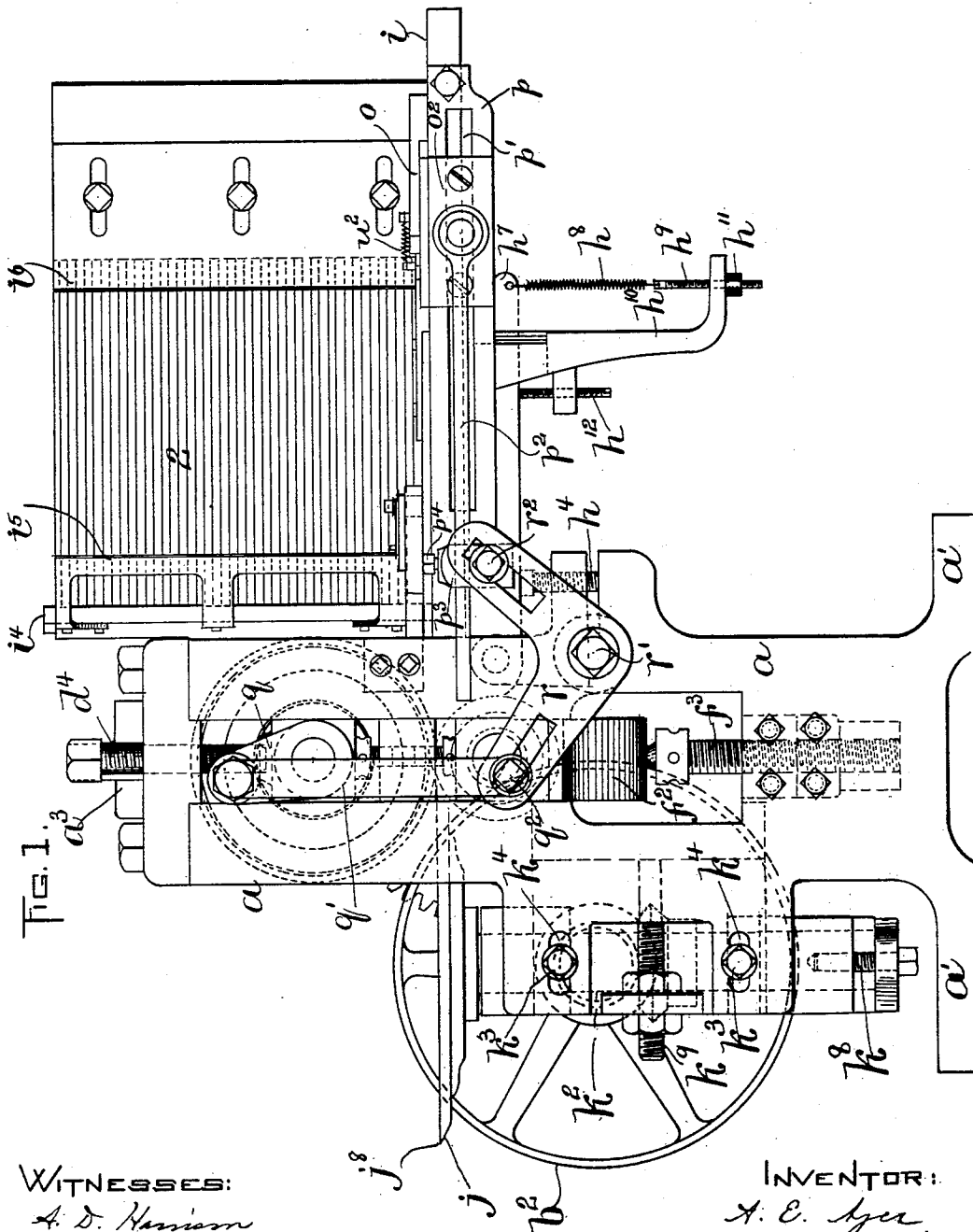
(No Model.)

5 Sheets—Sheet 1.

A. E. AYER.  
MACHINE FOR SKIVING COUNTERS.

No. 593,409.

Patented Nov. 9, 1897.



WITNESSES:

A. D. Harrison

P. W. Pezzetti.

INVENTOR:

A. E. Lyes,  
by Night & Day & Rainy  
Atty.

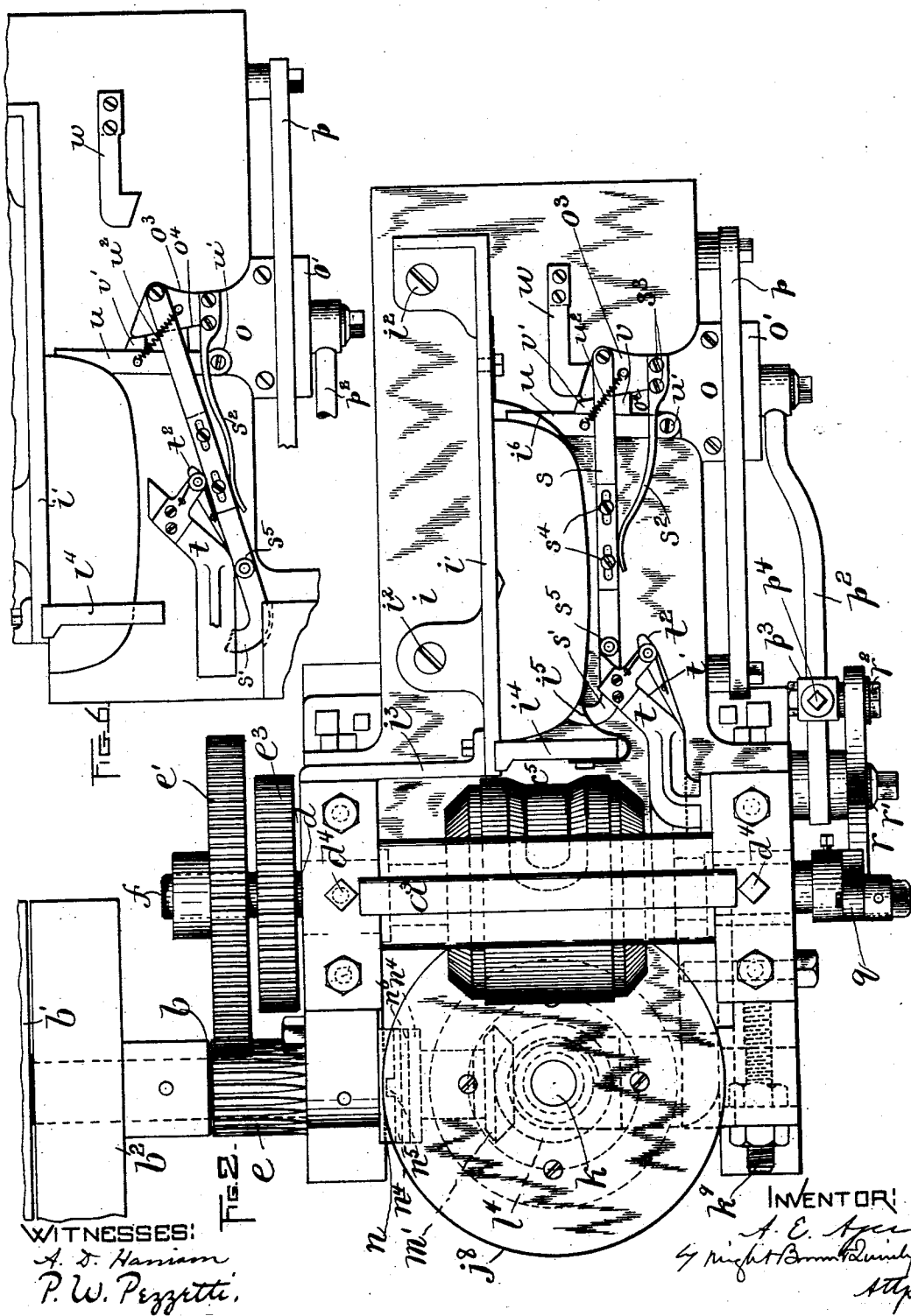
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5 Sheets—Sheet 2.

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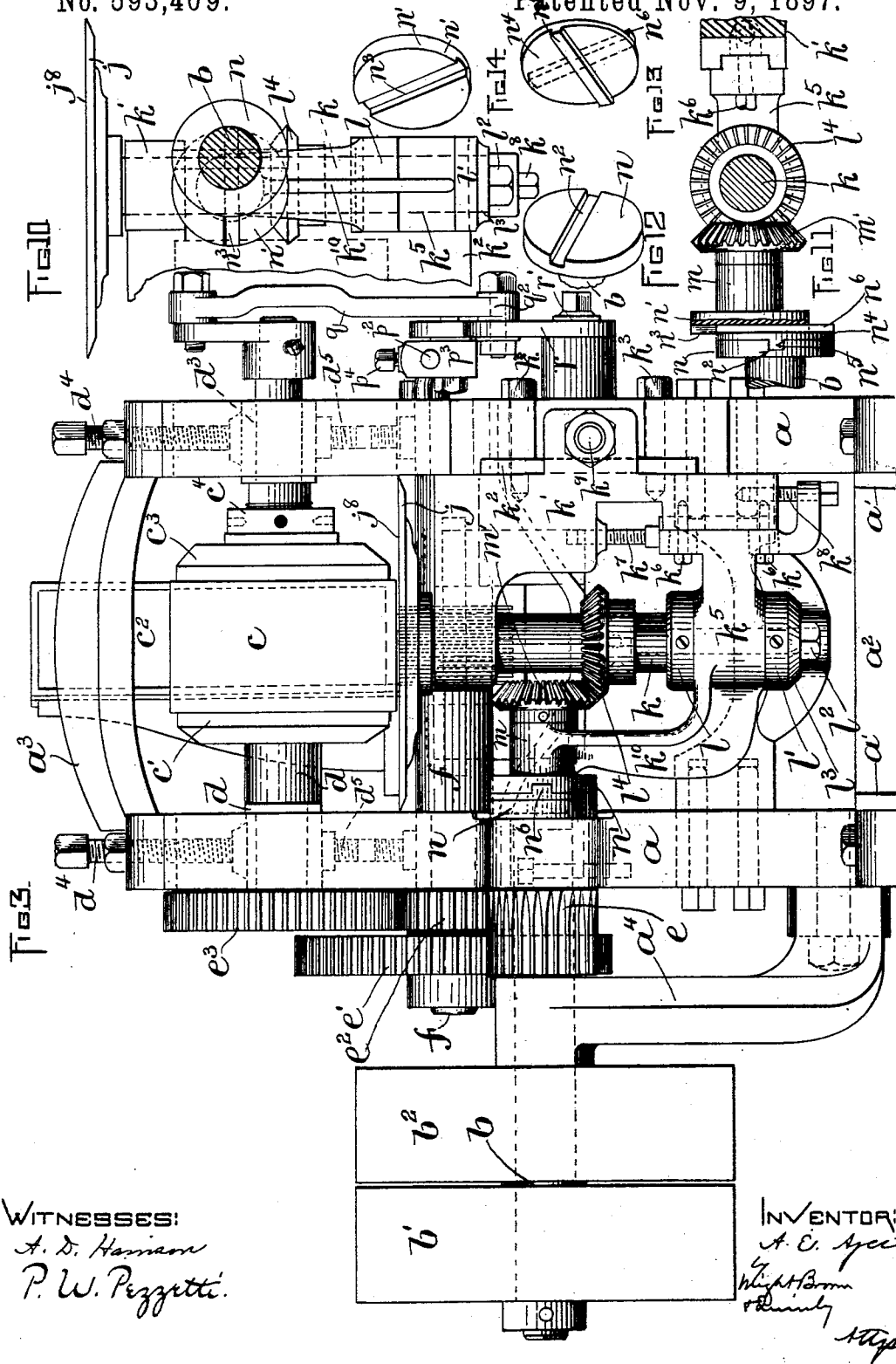
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5 Sheets—Sheet 3.

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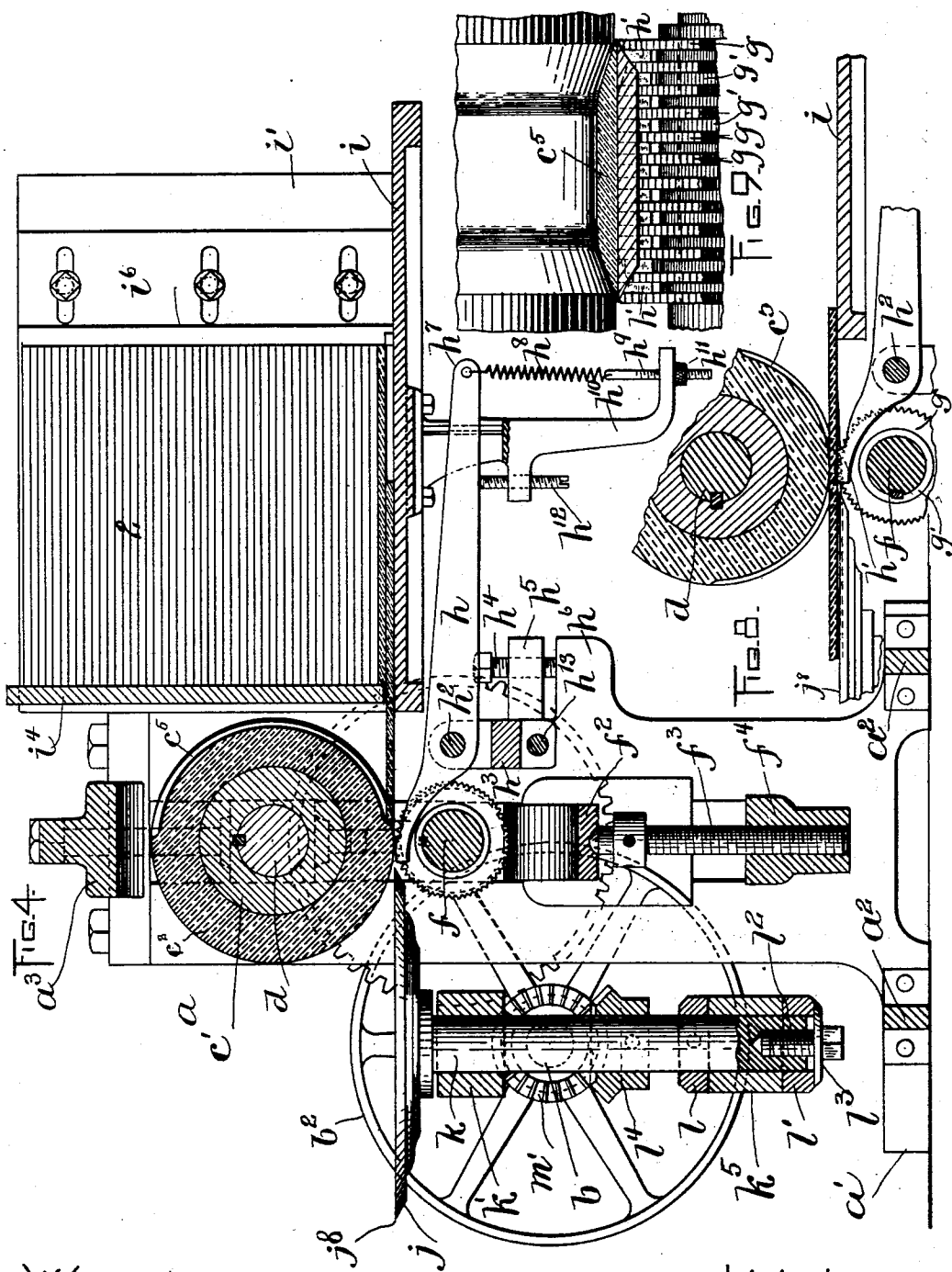
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A. D. Harrison  
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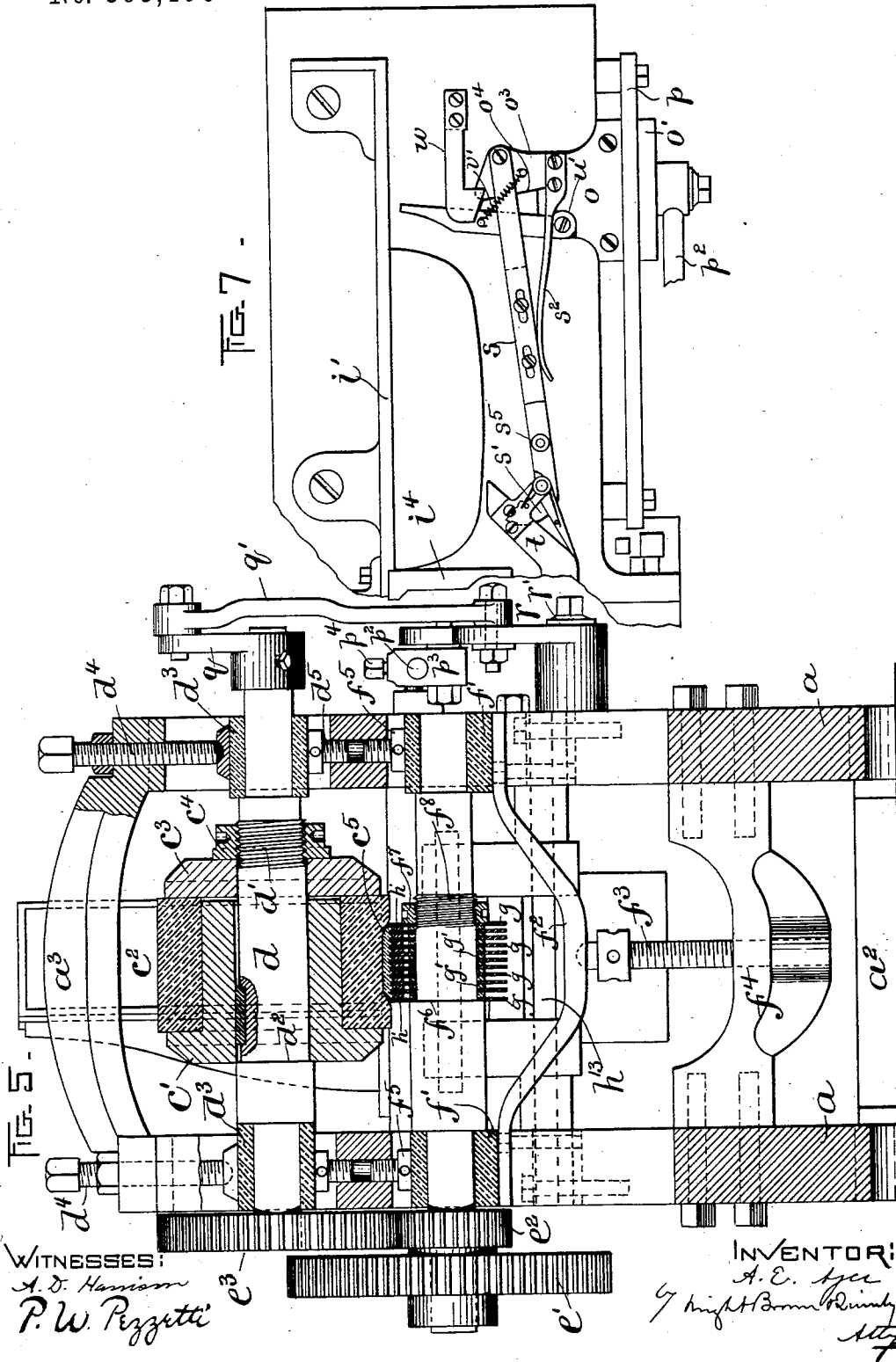
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5 Sheets—Sheet 5.

A. E. AYER.  
MACHINE FOR SKIVING COUNTERS.

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Patented Nov. 9, 1897.



# UNITED STATES PATENT OFFICE.

ALBERT E. AYER, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF TWO-THIRDS  
TO WELCOME B. JOHNSON, OF SAME PLACE, AND BERNARD J. MULLIGAN,  
OF SALEM, MASSACHUSETTS.

## MACHINE FOR SKIVING COUNTERS.

SPECIFICATION forming part of Letters Patent No. 593,409, dated November 9, 1897.

Application filed January 20, 1897. Serial No. 619,876. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT E. AYER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and  
5 useful Improvements in Machines for Skiving Counters, of which the following is a specification.

The object of this invention is to provide a machine which will operate with the greatest  
10 efficiency in skiving counters or beveling the edges thereof, and which machine will be simple in construction and capable of nice and delicate adjustment of the various parts, and which will insure that all of the counters will  
15 be treated in precisely the same way, so that the product will be unvarying.

Another object of the invention is to provide a machine of the character specified which will be equipped with improved devices for cen-  
20 tering the stock immediately before it is fed to the action of the cutters to insure each blank being cut in precisely the same way.

To these ends the invention consists of a skiving-machine provided with those features  
25 of improvement which are illustrated in the drawings and which I shall now proceed to describe in detail, and then point out in the claims hereto annexed.

Reference is to be had to the accompanying  
30 drawings, and to the letters and figures marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 shows in side elevation a skiving-machine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a front elevation of the machine. Fig. 4 is a central vertical longitudinal section  
40 through the machine. Fig. 5 is a vertical cross-section through the machine. Figs. 6 and 7 are plan views of the device for centering and feeding the blanks to the matrix, showing them in different positions. Fig. 8  
45 is a partial section of the matrix and the adjacent device and showing a blank having been partially operated on. Fig. 9 is a front elevation, partially in section, of the matrix and the coacting disks therebeneath and also

showing the ends of the levers which hold  
50 the stock or the blanks in the depression in the matrix. Figs. 10, 11, 12, 13, and 14 are detail views illustrating the coupling for connecting the power-transmitting shaft with the upright revolving knife-shaft.  
55

In carrying out my invention, which, it will be understood, is not limited to the particular devices which I have chosen to illustrate and am about to describe as being a part of this embodiment of the said invention, I employ  
60 a frame consisting of the side standards  $a$ , each formed with a supporting-base  $a'$  and connected by cross-braces or tie-rods  $a^2$  and a top cross-brace  $a^3$ , which is bolted to the upper ends of the said side standards.  
65 The side standards are provided with slots to receive the movable bearing-blocks, in which are journaled the shafts of the matrix and the serrated feeding-disks, to be hereinafter described.  
70

The main driving or power shaft (designated by  $b$ ) is mounted in bearings in one of the side standards  $a$  and a bracket  $a^4$ , bolted to the frame, and is provided with fast and loose pulleys  $b'$   $b^2$ , as is ordinarily the custom.  
75 Power is imparted through this shaft to the operative parts of the machine to accomplish the feeding of the blanks and the skiving of the same, as I shall now set forth.

The matrix is designated as a whole at  $c$ , and, as shown in Figs. 4 and 5, consists of a flanged sleeve  $c'$ , on which is placed a tubular body  $c^2$ , held thereon by a collar  $c^3$ . The sleeve  $c'$  is splined to a shaft  $d$ , which is provided with screw-threads  $d'$  to receive a nut  
85  $c^4$ , which binds the collar  $c^3$  against the body  $c^2$  of the matrix, the sleeve  $c'$  abutting against the shoulder  $d^2$ , formed on the shaft  $d$ . The matrix is provided in its periphery with a groove or depression  $c^5$ , (see Figs. 4, 8, and  
90 9,) the edges of which are beveled, and which depression is of a shape corresponding to the finished counter. If a counter with squared edges is forced into the depression and the projecting edges are cut off flush with the periphery of the matrix, the blank thus trimmed will  
95 be in proper condition for use after having been straightened out. The shaft  $d$ , on which

the matrix is mounted, is journaled in bearing-blocks  $d^3$   $d^3$ , adjustably held in slots in the side standards by adjusting-screws  $d^4$   $d^5$ , the former arranged above the blocks and the latter below and supporting them. Power is imparted to the shaft  $d$  from the main driving-shaft through the medium of a pinion  $e$ , intermeshing with a gear-wheel  $e'$  on a shaft  $f$ , to be hereinafter described, and a pinion  $e^2$  on said shaft  $f$ , meshing with a gear-wheel  $e^3$  on said shaft  $d$ .

The blanks are fed one by one to the depression in the matrix by devices which I shall hereinafter refer to and are held in said depression and presented to the action of a horizontally-arranged revolving disk cutter located in front of the machine, all as I shall now set forth.

The shaft  $f$  is mounted in bearing-blocks  $f'$   $f'$ , sliding in the slots in the side standards  $a$  and resting upon the ends of a spring  $f^2$ , which extends between the side standards and is bowed downward, as shown in Fig. 5, to rest upon an adjusting-screw  $f^3$ , which is threaded into a cross-brace  $f^4$ , bolted to the side standards  $a$ . The spring  $f^2$  holds the bearing-boxes or journal-blocks for the shaft  $f$  up against screws  $f^5$   $f^5$ , which act as stops to prevent too great upward movement and to hold the shaft in proper relation to the shaft  $d$ . Upon the shaft  $f$ , which is thus supported yieldingly upon the spring  $f^2$  and which is formed with a shoulder  $f^6$ , I place a series of serrated disks  $g$   $g$ , separated by spacers  $g'$   $g'$  and keyed to the shaft and bound firmly against the shoulder  $f^6$  by a nut  $f^7$ , screwed on threads  $f^8$ , formed on the shaft. The serrated disks operate to hold the blanks in the depressions  $c^5$  in the matrix and at the same time to feed the said blanks forward to the action of the revolving disk-like cutter.

To assist in maintaining the blanks in the depression in the matrix, I employ a series of levers  $h$ , each having its forward short end  $h'$  arranged between two of the serrated disks  $g$  in position to bear upon a blank at points in front of the plane of the axes of the shafts  $d$  and  $f$ . The levers  $h$  are all fulcrumed on a cross-bar  $h^2$ , mounted at its ends in brackets  $h^3$ , pivoted on a shaft or bar  $h^4$ , supported upon the side standards, said brackets being adapted to be adjusted by screws  $h^4$ , passing through arms  $h^5$  of said brackets and threaded into or bearing against projections  $h^6$  on the side standards. The rear ends  $h^7$  of the levers are held downward by springs  $h^8$ , having their lower ends connected to screws  $h^9$ , passing through the bent end of a depending bracket  $h^{10}$ , bolted to the under side of a table  $i$ , secured to and extending rearwardly from the said side standards of the main frame. The screws  $h^9$  are provided with lock-nuts  $h^{11}$  to prevent their working loose, and the levers are limited in their movement by set-screws  $h^{12}$ , arranged beneath them. When a blank is fed forward to the matrix, it is held within the depression  $c^5$  by the forward

ends of the levers  $h$  and by the serrated disks, being fed forward by the latter with the matrix to the action of the knife.

By providing adjusting means for varying the positions of the matrix, the serrated disks, and the levers I am enabled to take up any wear and to insure that the blank will be properly presented to them. The disks and the shorter ends of the levers  $h$  are both arranged to bear with sufficient force upon the blanks to hold them in the depression  $c^5$  and yet are capable of yielding to prevent breakage in case the counters or blanks are of different thicknesses.

The cutter which severs the projecting portions of the blanks as they are fed forward by the matrix and the serrated disks consists of a circular disk  $j$ , having a beveled cutting edge  $j^8$ , and located in the horizontal plane, which is tangential to the matrix and the serrated disks, or is, in other words, at right angles to the plane of the axes of the shafts  $d$  and  $f$ . It is secured upon the upper end of a vertical shaft  $k$ , which is journaled at its upper end in a bracket  $k'$ , having a broad tongue  $k^2$  extending into a horizontal groove in a forwardly-projecting portion of one of the side standards, said bracket being secured to the standard by bolts  $k^3$ , passing through slots  $k^4$ , and threaded into said bracket, whereby it may be adjusted horizontally by a screw  $k^9$ , passing through an arm on the bracket and threaded into the standard. A bracket  $k^5$  is secured to the face of the lower end of the bracket  $k'$  by bolts  $k^6$ , which pass through slots in said bracket  $k^5$  to permit of its vertical adjustment by screws  $k^7$   $k^8$ , one of which is arranged above it and the other below it and both engaging the bracket  $k'$ . In this bracket  $k^5$  is journaled the lower end of the shaft  $k$ , which may be held at any desired adjustment vertically by collars  $l$   $l'$ , secured thereto by screws and arranged one above the bracket and one below it, there being a screw  $l^2$  passing loosely through a disk  $l^3$  and threaded into the end of the shaft for adjusting it relatively to the collars and the bracket.

Power is transmitted from the main driving-shaft to the knife or cutter shaft by means of the following mechanism: Upon the shaft  $k$  is adjustably secured a bevel-wheel  $l^4$ , intermeshing with and driven by a similar wheel  $m'$  on the end of a shaft  $m$ , journaled in bearings on the upper end of an extension  $k^{10}$  of the bracket  $k^5$ . The shaft  $m$  is substantially in alinement with the main driving-shaft  $b$ , but as the knife must be adjusted at times either vertically or horizontally I provide a coupling for connecting the two shafts in such way that such adjustment will not affect their driving and driven relationship. Hence on the adjacent ends of the two shafts I secure disks  $n$   $n'$ , which are similar in shape and each provided with a cross-groove  $n^2$   $n^3$  in its face. The disks are arranged so that the grooves are at right angles to each other, and

between them I place a third loose disk  $n^4$ , having on its opposite faces tongues  $n^5$   $n^6$ , which are likewise at a right angle to each other and which fit snugly in the grooves  $n^2$  and  $n^3$ , respectively, of the disks  $n$   $n'$ . By coupling the shafts in this way it will be observed that the shaft  $m$  may be adjusted to a considerable extent in any direction (except axially) without affecting the transmission of power from the main driving-shaft  $b$ . Thus the knife may be adjusted with great delicacy either vertically or toward and from the vertical plane of the axes of the shafts  $d$  and  $f$  to compensate for wear or for other reasons, and at the same time power may be applied thereto positively and not by the use of bands, belts, or chains, which are liable to slip or break.

I shall now describe the devices which properly center each blank before it is advanced to the matrix and finally feed it forward to be grasped between the latter and the serrated feeding-disks.

Upon the table  $i$ , which, as before stated, is secured to the side standards so as to project rearwardly therefrom, and which is in substantially the horizontal plane of the upper face of the revolving knife, I place a vertical gage-plate or supporting-wall  $i'$  and secure it thereto by screws  $i^2$ , passing through ears in the plate into the table. The gage-plate is also maintained in vertical position by a plate  $i^3$ , bolted to its forward end and to one of the side standards, as shown in Fig. 2. Projecting at right angles across the table from the inner face of the gage-plate is a plate  $i^4$ , which assists in holding the blanks shown at 2 in position upon the table. It is cut away at its lower end to allow the passage of the lowest blank of the pile forward under the impulse of the feeding devices. The pile of blanks is held against the plates  $i'$   $i^4$  by flat springs  $i^5$   $i^6$ , which are capable of adjustment, as shown in Fig. 4.

$o$  is a slide which is connected to a vertical plate  $o'$  by a block  $o^2$ , (shown in dotted lines in Fig. 1,) which block is arranged to slide in a slot  $p'$  in a bar  $p$ , secured at its ends to the table. The slide is intermittently reciprocated, once for each revolution of the matrix, by means of a crank  $q$  on the shaft  $d$  and a bell-crank lever  $r$ , pivoted at  $r'$  on the frame and which has one arm connected to a rod  $p^2$ , secured to the plate  $o^2$  at one end and passing through a block  $p^3$  at its other end, which is adjustably secured to the other arm of the bell-crank lever by a bolt  $r^2$ , the rod  $p^2$  being held in said block  $p^3$  by a set-screw  $p^4$ . The lower end of the rod  $q$  may be secured in any desired position along the arm of the bell-crank lever by a bolt  $q^2$  passing into a slot therein and provided at its other end with a nut, as shown in Fig. 5. By reason of the adjustability of the bolts or screws  $q^2$  and  $r^2$  toward and from the pivot  $r'$  of the bell-crank lever the play of the feeding-slide may be varied as desired.

Now referring to Figs. 2, 6, and 7, it will be seen that the slide  $o$  has an extension  $o^3$  with an oblique edge  $o^4$ . Upon the extension  $o^3$  is pivoted a lever  $s$ , which has a curved end  $s'$  to engage the curved end of the bottom counter of the pile, as shown in Fig. 2, so as to center it properly to be fed forward to the matrix. A spring  $s^2$  exerts a constant pressure against the lever and is secured to the slide  $o$  by screws  $s^3$ . The lever is formed in two overlapping parts, one of which is slotted to receive screws  $s^4$  to permit of its being extended or contracted longitudinally. The lever is also provided with a roller  $s^5$ , which when the feed-slide and lever are fed forward engages the oblique edge  $t'$  of a cam-bracket  $t$  and rides therealong so as to draw the end  $s'$  of the lever out of engagement with the counter or blank.

$u$  is a lever pivoted at  $u'$  to the slide-plate  $o$  and extends beyond the rear end of the lowest blank in the pile, so that when the feed-slide is moved forward the lever carries the blank forward beneath the plate  $i^4$ . Between the lever  $u$  and the extension  $o^3$  is arranged a wedge or block  $v$  with a thickened end  $v'$ , the upper face of which is flush with the upper face of the lever  $s$ . A spring  $u^2$  tends to hold the block tightly between the lever  $u$  and the extension  $o^3$  and against the lever  $s$ .

$w$  is a cam resting above the face of the table sufficiently to allow the passage of the extension  $o^3$ , but to engage the end  $v'$  of the wedge or block as the slide  $o$  is reciprocated rearwardly. Pivoted to the cam-bracket  $t$  is a spring-held guide-lever  $t^2$ , having its end normally resting against the oblique edge  $t'$  and which acts as a cam-track during the backward movement of the feed-slide for the roller  $s^5$ .

The operation of the machine is as follows: The parts being all properly timed, the rotation of the fast pulley  $b'$  causes the rapid revolution of the disk knife and the revolution of the matrix and the feeding-disks therebeneath. The parts being in the position shown in Fig. 2, the revolution of the fast pulley produces the following results: The feed-slide  $o$  is drawn forward through the medium of the crank and bell-crank lever and the connecting devices, so that the feed-lever  $u$  may advance the lowest blank in the pile into position to be gripped between the matrix and the feeding-disks. The blank has been properly centered by the lever  $s'$ , so that as the slide  $o$  advances the roller  $s^5$  rides outward on the oblique edge  $t'$  of the cam-bracket, so as to carry said lever  $s$  away from the blank to allow of its being fed forward. As soon as it reaches the proper position it is gripped between the feed-roll and the matrix and is forced into the depression in the matrix by the said feed-disks and the ends of the levers  $h$ . It is thus forced forward to the action of the revolving disk-like knife, which acts to shear off those edges of the blank which project beyond the inclined side wall of the depression, the cuttings dropping through the



open space beneath the feed-disks to the floor. When the crank  $q$  on the shaft  $d$  has passed its lowest limit of movement and begins to ascend on the opposite side, the feed-slide begins its backward movement, and as it travels rearward the roller  $s^5$  rides down the edge of the movable track-lever  $t^2$  until it reaches the end of the same, at which time it is not allowed to spring back into place against the blank, as it might prevent the proper feeding of the same, since the end  $v'$  of the wedge strikes against the cam  $w$  and holds the lever outward until the feed-slide has been fed forward sufficiently to allow the said wedge to slide off from the cam  $w$ , whereupon the lever springs forward and its end  $n'$  engages the lowest blank in the pile to insure its being centered. The positions of the various parts during these operations are portrayed clearly in Figs. 2, 6, and 7.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. A machine for skiving counters comprising in its construction a matrix having a depression in the periphery thereof, means for holding the body of the blank in the said depression, and a revoluble disk-like knife arranged in front of the matrix, and in a plane tangential thereto to shear off the projecting edges of the blank in the matrix.

2. A counter-skiving machine comprising a revoluble matrix having a depression, means for pressing each blank into the depression, a revoluble disk-like knife arranged in a plane tangential to the matrix, and means for adjusting said knife in any direction relatively to said matrix.

3. A counter-skiving machine, comprising a revoluble matrix having a depression, a vertical shaft having a disk-like cutter arranged tangentially to the matrix and directly in front thereof, a horizontally-arranged driving-shaft, power-transmitting means connecting the said shafts, and means for adjusting said vertical shaft and cutter relatively to the horizontal shaft and the matrix.

4. A counter-skiving machine comprising a revoluble matrix having a depression, a vertical shaft having a disk-like cutter arranged in a plane tangential to the matrix and directly in front thereof, means for driving said shaft, a bearing for said shaft mounted adjustably in the frame and means for adjusting the shaft relatively to the bearing.

5. A counter-skiving machine comprising a revoluble matrix having a depression, a disk-like cutter arranged tangentially to the matrix, an adjustable shaft for supporting and driving the same, a bearing-bracket for said shaft adjustable longitudinally of the shaft and transversely thereof, a main driv-

ing-shaft, and means for imparting power from the main driving-shaft to the cutter-shaft, said means comprising an adjustable shaft geared to the cutter-shaft and supported by the said bearing-bracket, and arranged substantially in alinement with the driving-shaft, and a coupling for connecting the adjustable shaft with the said driving-shaft.

6. A counter-skiving machine comprising a revoluble matrix having a depression, a disk-like cutter arranged tangentially to the matrix, an adjustable vertical shaft for supporting and driving said cutter, a bearing-bracket for said shaft adjustable both longitudinally and transversely of said shaft, a main driving-shaft, a shaft journaled in said bearing-bracket and having a bevel-wheel intermeshing with and driving a bevel-wheel on the cutter-shaft, and a coupling connecting the said bevel-wheel shaft with the driving-shaft, comprising two disks connected with said shafts respectively, and a loose disk having tongues on its faces which are at right angles to each other, and which tongues fit in grooves in the faces of the first-mentioned disks.

7. A counter-skiving machine comprising a revoluble matrix having a depression, a cutter arranged in front of said matrix, means coacting with the matrix for feeding each blank to the action of the cutter, and means for feeding each blank to the matrix, consisting of a feed-slide, a bell-crank lever connected therewith, and a crank on the matrix-shaft connected to said bell-crank lever.

8. A counter-skiving machine comprising a revoluble matrix having a depression, a cutter arranged in front of said matrix, means coacting with the matrix for feeding each blank to the action of the cutter, and means for centering and feeding each blank to the matrix, said means consisting of a feeding-finger and a lever adapted to bear intermittently on the front end of the blank.

9. A counter-skiving machine comprising a revoluble matrix having a depression, a cutter arranged in front of said matrix, means coacting with the matrix for feeding each blank to the action of the cutter, and means for centering and feeding each blank to the matrix, said means comprising a feeding-finger, a lever, adapted to bear against the counter, and means for holding the lever away from the blanks except at predetermined times.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 24th day of December, A. D. 1896.

ALBERT E. AYER.

Witnesses:

PETER W. PEZZETTI,  
MARCUS B. MAY.