

(No Model.)

4 Sheets—Sheet 1.

H. W. WHELAN.

MACHINE FOR MAKING AND SANDING MATCH BOX SHUCKS.

No. 571,180.

Patented Nov. 10, 1896.

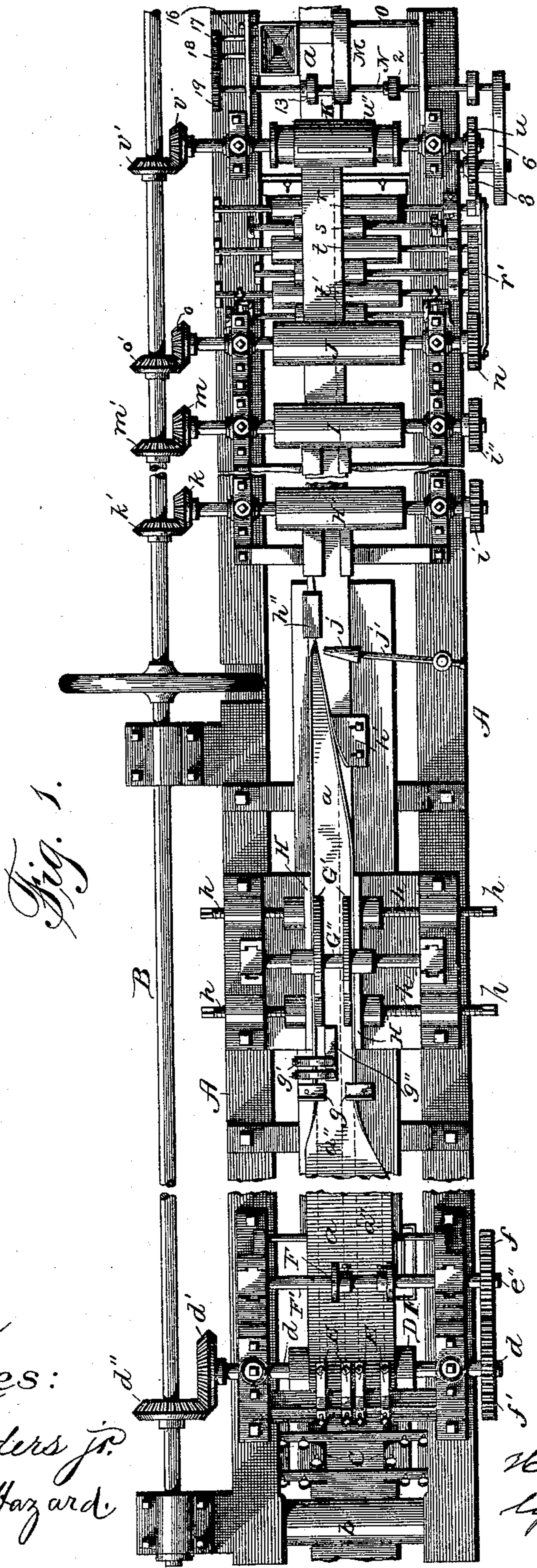


Fig. 1.

Witnesses:
John Orders Jr.
Henry C. Hazard.

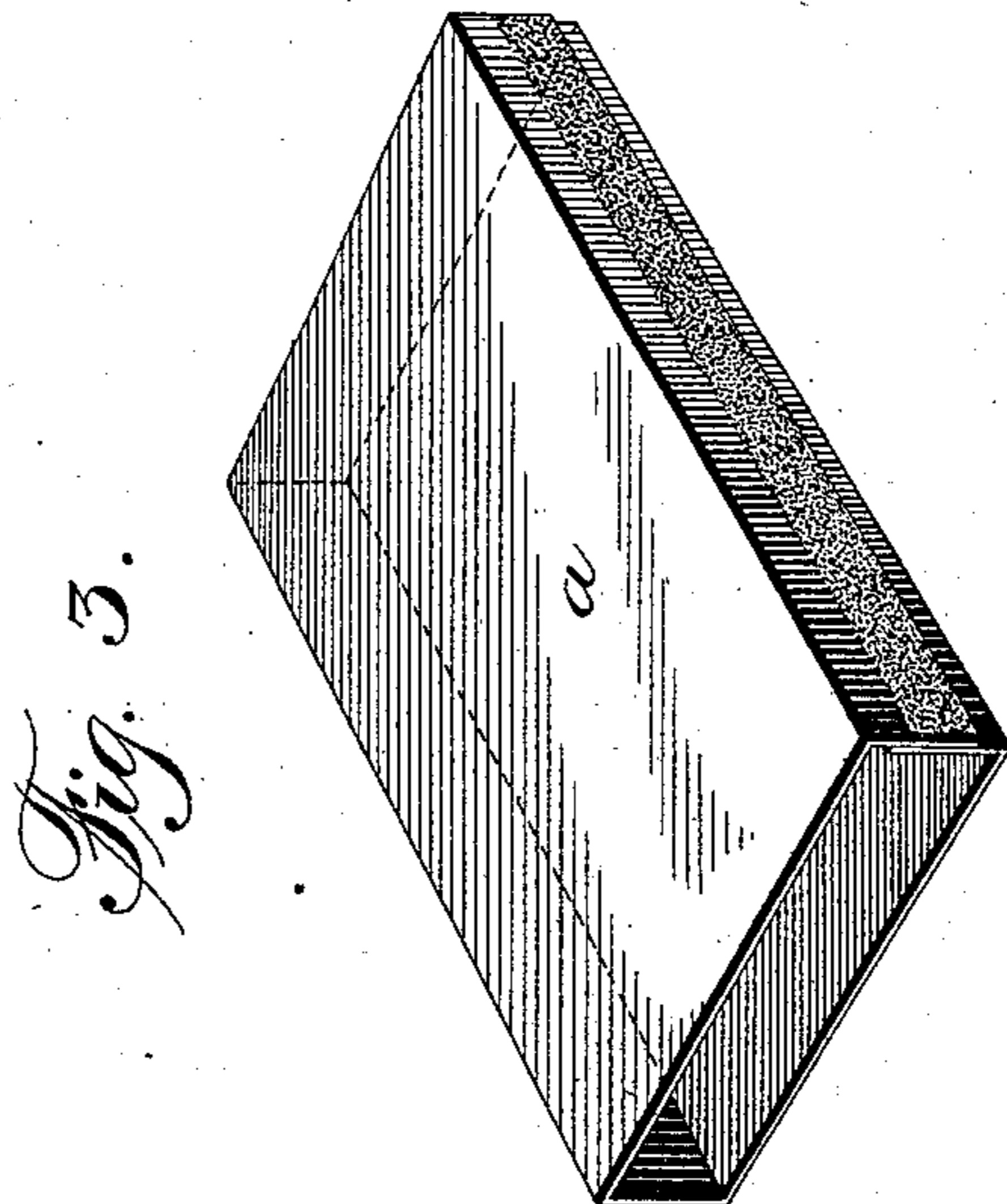
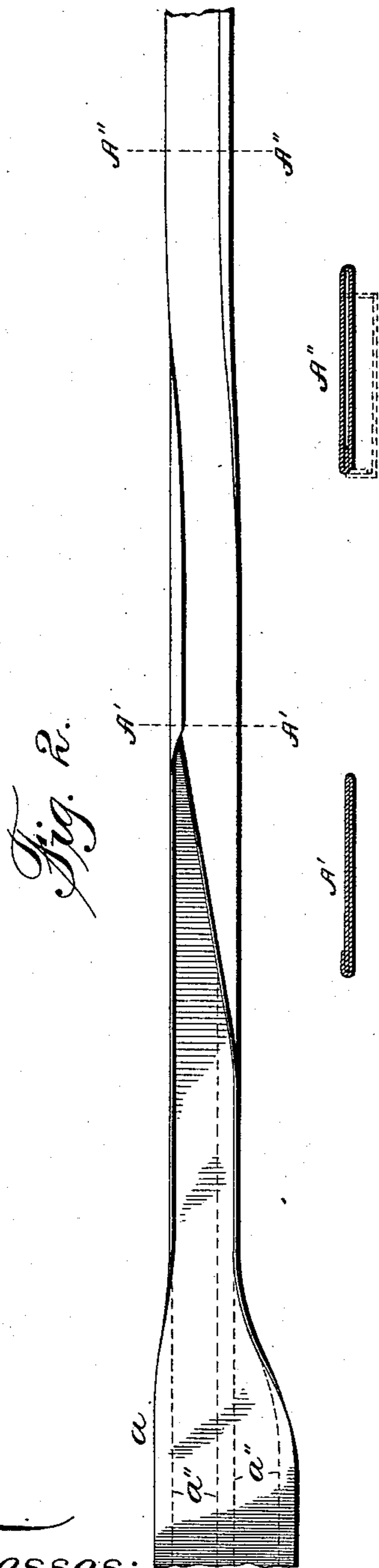
Inventor:

Henry W. Whelan
by Russell & Russell
his attorney

(No Model.)

4 Sheets—Sheet 2.

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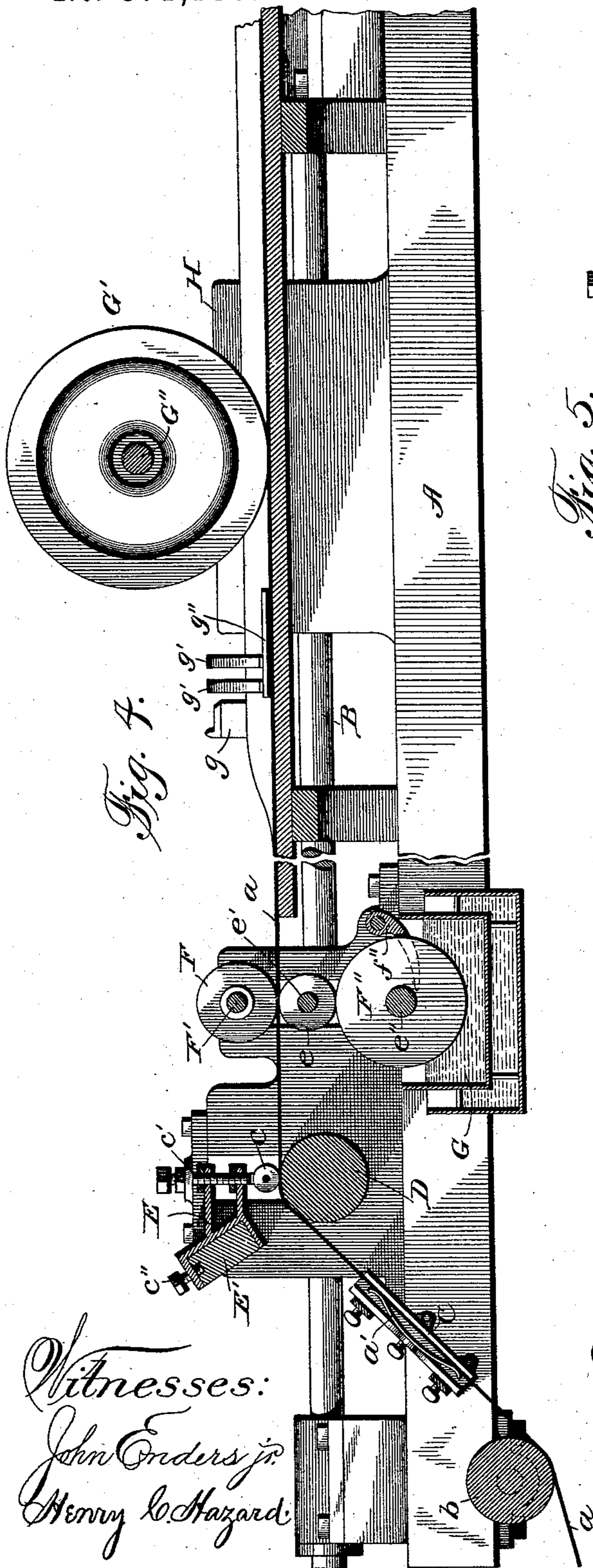
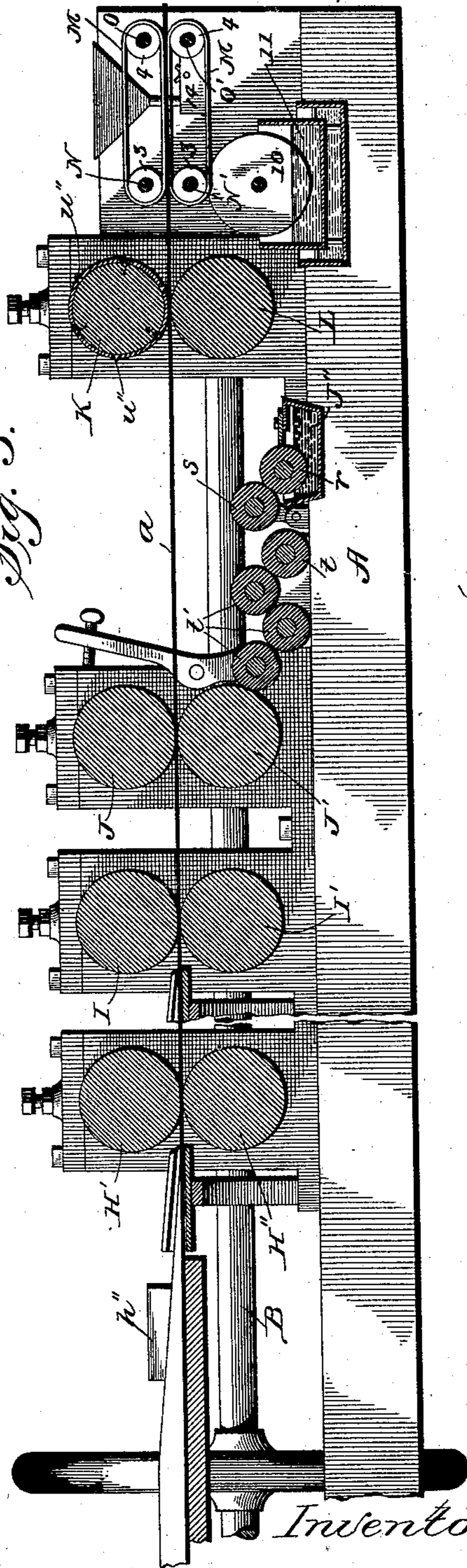


Fig. 5.



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(No Model.)

4 Sheets—Sheet 4.

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Fig. 6.

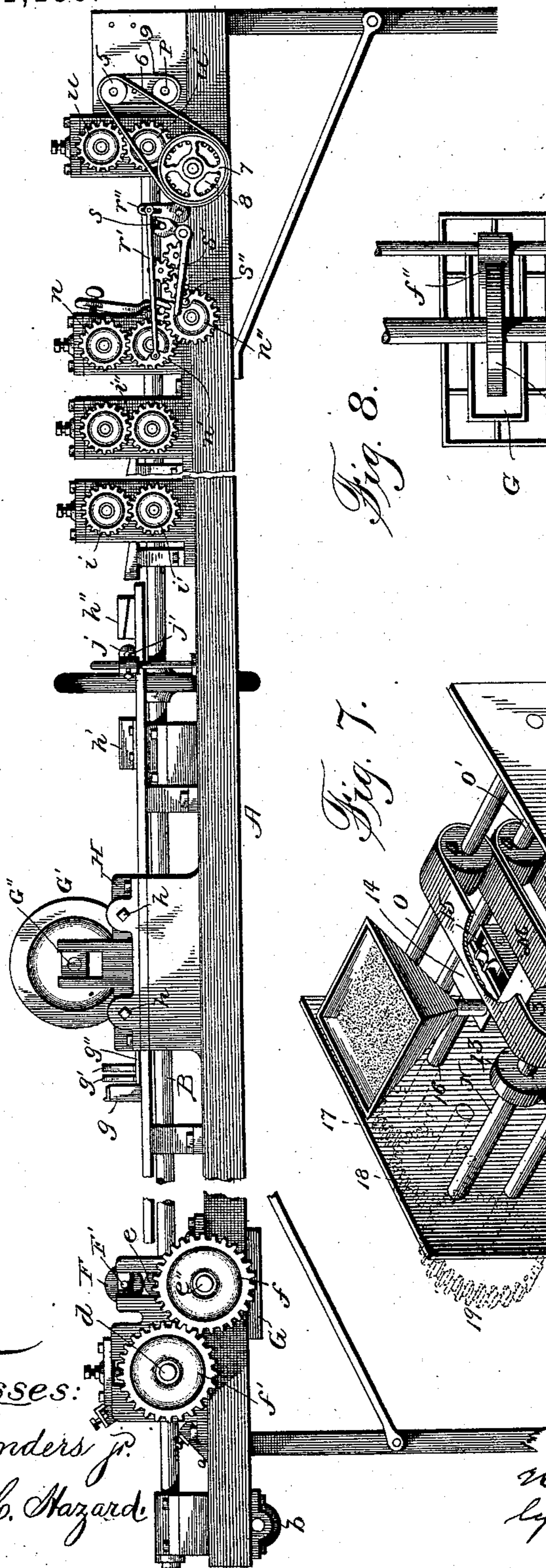


Fig. 8.

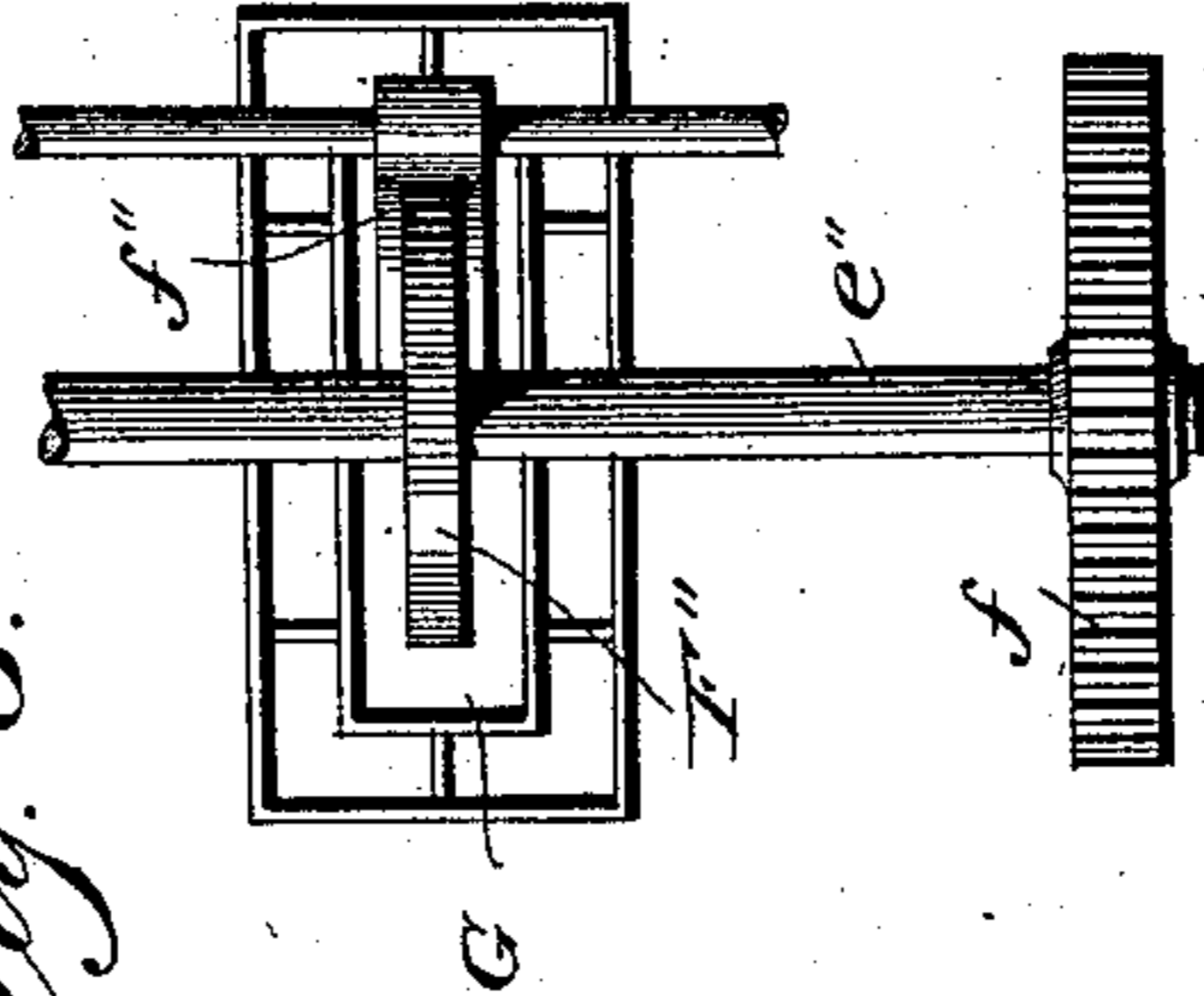
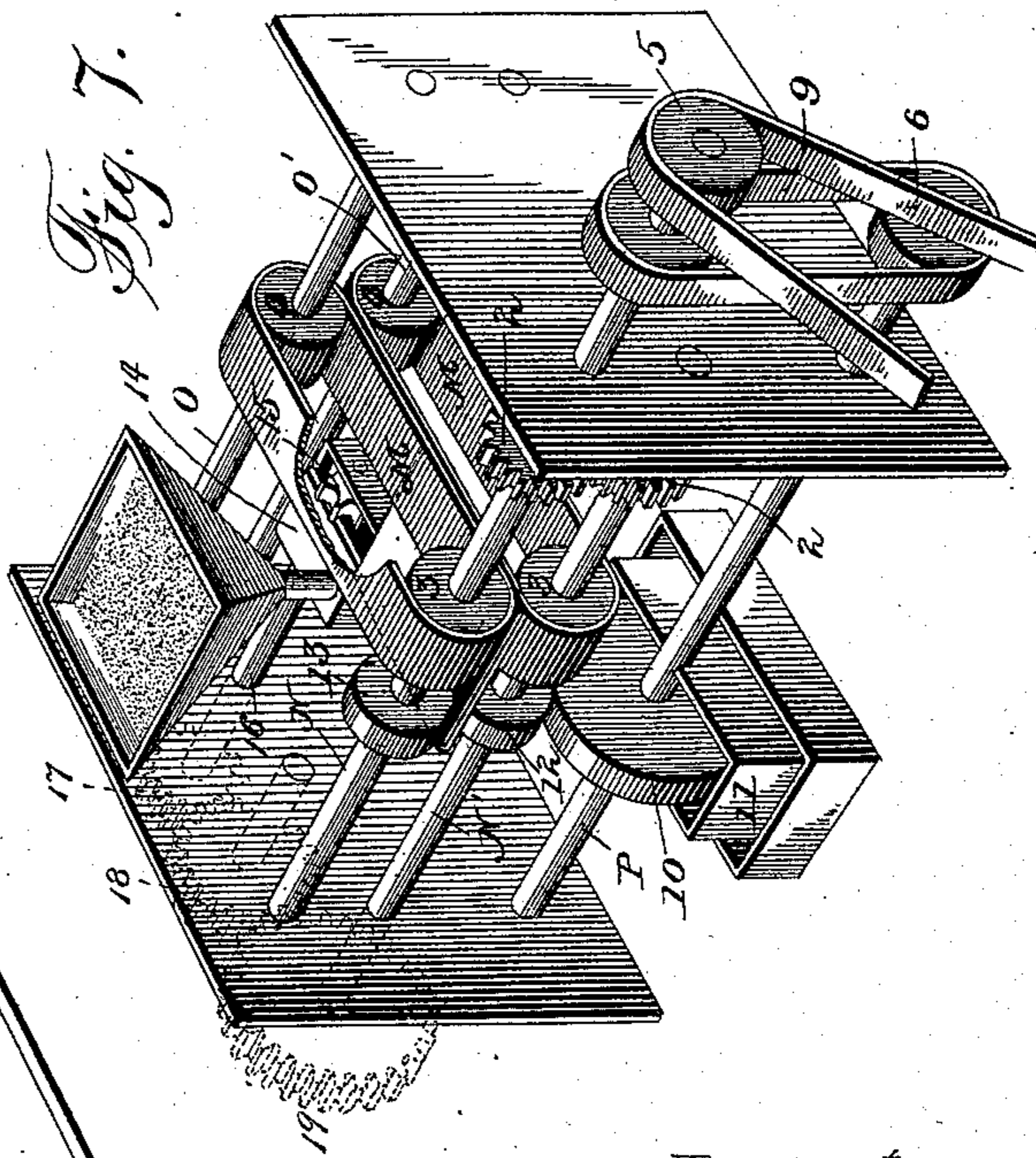


Fig. 7.



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY W. WHELAN, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DIAMOND MATCH COMPANY, OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING AND SANDING MATCH-BOX SHUCKS.

SPECIFICATION forming part of Letters Patent No. 571,180, dated November 10, 1896.

Application filed March 31, 1893. Renewed April 20, 1896. Serial No. 588,392. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. WHELAN, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Machines for Making and Sanding Match-Box Shucks; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to an improved machine for the making and sanding of match-box shucks; and it consists in the construction and arrangement of parts, as fully hereinafter set forth, the essential features of which being pointed out particularly in the claims.

The object of the invention is to produce a machine for making, printing, and sanding the shucks of match-boxes by a continuous operation, and in which the arrangement is such that said shucks may be perfectly and rapidly made. This object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the complete machine. Fig. 2 is a view showing the various stages of formation through which the strawboard passes in the operation of making the shucks. Fig. 3 is an enlarged perspective of the completed shuck. Fig. 4 is an enlarged longitudinal section through the feed end of the machine. Fig. 5 is a like section through the discharge end of the machine, including the printing and sanding mechanism. Fig. 6 is a side elevation of the machine. Fig. 7 is an enlarged perspective of the sanding mechanism, and Fig. 8 is an enlarged plan view of the glue-applying mechanism.

Referring to the letters of reference, A designates the frame of the machine, upon which is journaled the drive-shaft B, extending longitudinally of said frame.

The strawboard *a* from which the shucks are made passes through the machine in a continuous strip, having been previously cut

to the required width. This strip of strawboard *a* enters the feed end of the machine under the guide-roller *b* and passes through a tension device C, having adjustable springs *a'*, that bear upon said strip to regulate the tension thereof, more clearly shown in Fig. 4. From the tension device the strawboard passes over a large revoluble cylinder D, which is mounted on a transverse shaft *d*, journaled in the frame and carrying at one end a beveled gear *d'*, that meshes with a like gear *d''* on the drive-shaft B, by means of which said cylinder is revolved. Located directly above the cylinder D are the scoring disks *c*, that are journaled in the forks of a series of vertically-adjustable stems *c'*, depending from a series of movable heads E, that are supported on a transverse bar E' of the frame, and adapted to adjust laterally thereon to regulate the space between said scoring-disks, said heads having a set-screw *c''*, that enters a slot in said bar to secure said heads in place when the disks have been properly adjusted.

The strawboard passing over the cylinder D is scored by the disks *c* on the lines on which said board is folded to give the shucks their proper form, said score-marks being indicated by dotted lines *a''* in Figs 1 and 2. From the scorers the strawboard passes between the upper disk F, mounted on the shaft F', and the lower disks *e* on shaft *e'*. One of said lower disks runs in peripheral contact with the large lower disk F'', which is mounted on the shaft *e''* that carries on its outer end a gear *f*, that meshes with a gear *f'* on the outer end of the shaft *d*, whereby the shaft *e''* is driven and the disk F'' thereon caused to revolve in a solution of glue contained in the tank G, supported under said disk. (Clearly shown in Fig. 4.) The glue adheres to the periphery of the disk F'' and is taken up by the smaller disk *e*, running in contact therewith, and deposited on one edge of the strawboard as it passes along.

f'' designates a bifurcated shoe that sits astride of the disk F'' and prevents an accumulation of glue on the sides of said disk. With the forked shoe thus astride of the disk F'' and having its forked arms scraping the disk sides, so as to remove all glue projecting

beyond the edges of the disk-face, the portion of glue applied to the face of disk *e*, and by the latter applied to the strip of strawboard, will be uniform in width, so that the line of
5 glue on the strip will be a straight one, with well-defined parallel edges of unvarying width.

From the gluing apparatus the strawboard is carried through guides *g g*, that raise the
10 edges thereof to a vertical position, said board between said guides being held flat upon the table of the machine by means of the springs *g'*, which bear upon a plate *g''*, that lies upon and prevents the buckling of said board be-
15 tween said guides as its edges are turned upward. The strawboard from the guides *g* next passes under the large revoluble disks *G'*, mounted on a shaft *G''*, journaled in boxes that slide vertically in suitable supports on
20 the frame, whereby said disks bear with their full weight upon the strawboard as it passes under them and accommodate themselves to the various thicknesses of said board. The vertical edges of the strawboard pass between
25 the outer faces of the disks *G'* and the inner faces of the adjacent side plates *H*, which are attached to horizontal screw-shafts *h*, whereby the lateral adjustment of said plates may be effected. This passage of the strawboard un-
30 der the disks *G'*, with its turned edges between the sides of said disks and the plates *H*, causes a right-angle bend or break in said board on two of the score-lines, which form diagonal opposite corners of the shuck, when formed.
35 This breaking of the strawboard permits the edges thereof to be turned over by the guide-block *h'* and folder *h''*, respectively, as shown in Fig. 1, so that the glued margin of the strawboard receives the folded margin
40 of the opposite edge thereof, which is turned onto it by the folder *h''*. The conical roller *j* on the end of the arm *j'*, bearing upon the folded glued margin, retains it in place, in which position said parts are firmly pressed
45 together by passing between the rollers *H' H''*, which are geared together by the gear-wheels *i i'*, carried on their respective shafts, the roller *H''* being driven by the beveled gear *k* on the inner end of its shaft, which meshes
50 with a like gear *k'* on the drive-shaft *B*. The gluing together of the edges of the strip of strawboard forms a continuous case thereof, as shown in cross-section *A'* of Fig. 2, taken on dotted line *A' A'* of said figure. The case
55 thus formed, after passing through the rollers *H' H''*, is slightly twisted and flattened, so as to break the strawboard on the line of the other score-marks, as also shown in Fig. 2, section *A''* of which, on dotted line *A'' A''*
60 of said figure, shows by its dotted position the expanded form of the case or shuck when bent or broken at right angles on all of its score-marks. This twisting and flattening is the same as the refolding described in the
65 United States Patent to Beecher, No. 186,978, and for the same purpose, and can be accomplished by any suitable means. As this is

so well understood by those familiar with the art of making covers or shucks for match-boxes I have not considered it necessary to
70 show the refolding devices. The result of their action is, as set forth in the patent cited, to bend or fold the cover or shuck on the scored lines other than those at the ex-
75 tremite sides of the blank as first flattened out by the rollers *H'* and *H''*, so that when the shuck reaches rollers *I I'* it will be flattened out by the latter in the manner indicated at *A''*, in Fig. 2, with the point where the edges
80 overlap and are glued together brought on the under side. When the case is so twisted and flattened after passing the rollers *H' H''*, it is passed between the compression-rollers
85 *I I'*, which are geared together at *i''* and are driven through the gear *m* on the shaft of roller *I'*, which meshes with the gear *m'* on the drive-shaft. These rollers *I I'* complete
90 the break of the latter score-marks and render the case or shuck perfectly flat, in which condition it passes between the printing-rollers *J J'*, of which the roller *J'* carries the
95 type and the roller *J* serves as the platen, by means of which any suitable matter may be printed upon the shucks while collapsed. These printing-rollers are geared together by
100 the gear-wheels *n n'* and are driven from the main shaft through the gears *o o'*. The ink is supplied to the printing-roller *J'* through a series of rollers driven from the gear *n'*.

Roller *r* (shown in Fig. 5) is caused to re-
100 volve intermittently in the ink-fount *J''*. This motion is imparted to said roller through the pitman *r'*, coupled to the gear *n'* and attached at its opposite end to the pivoted arm
105 *r''*, carrying a ratchet (not shown) which engages with said roller.

s designates a roller journaled in bearings adapted to oscillate and to which is connected
a lever *s'*, that extends into the path of a pin *s''*, projecting from the gear *n''*, whereby, by
110 the rotation of said gear, said lever is caused to rise and fall and rock the roller *s*, so as to alternately throw it into contact with the rollers *r* and *t*, which latter roller is one of a con-
115 tiguous series *t'*, which convey the ink to the printing-roller *J'*.

The continuous case, on passing from the printing-rollers, passes between the cutting-rollers *K L*, which are geared together by the
120 gear-wheels *u u'* on their respective shafts, said rollers being driven from the drive-shaft through the beveled gears *v v'*, as shown in Fig. 1.

In the periphery of roller *K* is a series of longitudinal knives *u''*, that are set at such
125 distance apart as to cut the case into shucks of the desired length as said roller revolves. From the cutting-rollers the severed shucks next pass to the gluing and sanding mechanism at the tail of the machine, (more clearly
130 shown in Fig. 7,) in which *M* designates two contiguous endless belts arranged one above the other and adapted to travel together, their meeting faces moving in the same direction.

These belts are driven from the shafts N N', which are geared together by the gears 2 2 mounted thereon, the belts passing around the rollers 3 3 on said shafts and around like rollers 4 4 on the counter-shafts O O'. Shaft N carries a pulley 5, which is connected by belting 6 with a pulley 7, carrying a gear-wheel 8, which meshes with the gear *u'*, as shown in Fig. 6, whereby said shaft and the gluing and sanding mechanism is driven.

P designates a lower shaft, which is driven from pulley 5 through the belt 9. Mounted upon said shaft is a disk 10, adapted to turn within a glue-tank 11, whereby glue is caused to adhere to the periphery thereof. Directly above said disk 10 and running in peripheral contact therewith is a disk 12, on shaft N', which takes up the glue and deposits it upon one of the under edges of the shucks *a* as they are carried along between the belts M. The roller 13 above the glue-depositing disk holds the shucks in contact with said disk, so as to effect a positive application of the glue thereto. The conveying-belts M engage but one edge of the shucks, leaving the glued edge extending therefrom. This glued edge, as the shucks are carried rearward by the belts, projects over an orifice in the sand-box 14, in which is located a revoluble sand-wheel 15, by which the sand is thrown with force against the glue on the under face of the shucks and adheres thereto.

The sand-wheel 15 is mounted on a shaft 16 and is geared to a high speed by the gears 17, 18, and 19. (Shown by dotted lines in Fig. 7.) The shucks, after sanding, are discharged from between the belts M into any suitable receptacle.

The conical roller *j* has a different function, or at least produces a better or more satisfactory result, than a cylindrical roller on an inclined axis could. With the conical roller rotated only by the contact of the strip with its periphery said roller naturally tends to receive its rotation from the contact of the strip with its part of largest diameter. The periphery of this larger part will then, because of the taper of the roller, travel faster than that of other portions of the roller. The different parts of the strip in contact with the roller will then be in engagement with surfaces traveling at different rates. The tendency in such case is for the roller-engaged portion of the strip to travel or work inward toward the smaller end of the conical roller. Such working inward of the intumed part of the strip, which passes under the conical roller *j* of applicant's machine, has been found to be advantageous in aiding and insuring the infolding or carrying over of such part of the strip toward the folder *h*² which it is to pass under.

It will be apparent from the foregoing that the strawboard, entering the machine in a continuous strip, is, by the various operations

of said machine, converted into shucks of the required size, which are printed and sanded ready for the reception of the box.

I am aware that it is not new in paper-box-making machines to have, in connection with a table upon which the blank is supported while being fed to and by the glue-applying devices, traveling belts to move the blank over such table, and I do not or intend to cover by my claims in this case such a construction.

In devising the sanding part of my machine it has been my especial purpose to provide means for supporting and carrying the blanks, which would present to the gluing and sand-applying devices below a clear portion of each blank out of contact with any supporting table or surface over which it would be rubbed as the blank moves along. This purpose has been attained by means of the two traveling belts arranged so as to grip and hold a part of the blank and carry the rest of it over the gluing and sand-applying devices unsupported by and clear of any table or stationary supporting-surface, between which and the under side of the blank the sand might get to interfere with the progress of the blank or which might loosen or rub off some of the applied sand. With my mechanism each blank is gripped by the traveling belts at one side and moved so that the under side of the main part, entirely free of any support, travels over the devices whereby the sand is applied to the glued surfaces.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a suitable support, and means for feeding the strip along, the strip-bending devices, and the conical roller engaging the strip after it has passed the bending devices, substantially as and for the purpose shown.

2. In combination with a suitable support and means for feeding the strip along, bending devices to bend up portions of the strip, means for turning the bent-up portions over toward each other, and the conical roller engaging one of such bent portions to fold the same down, substantially as and for the purpose set forth.

3. As a means for sanding shucks for match-boxes, in combination with the two traveling belts, adapted to grasp between them a portion of a shuck, so as to support the shuck and carry it along with them, a glue-applying device, to apply glue to the under side of part of the shuck projecting beyond the belts, and a sand-applying device, over which the glued part of the shuck is moved along by the belts, substantially as described.

4. As a means for sanding shucks for match-boxes, in combination with the traveling belts to engage opposite sides of the shuck so as to entirely support the shuck and carry it

along, means for applying glue to the under side of an exposed part of the shuck, a source of supply of sand, and a revolving wheel adapted to apply sand to the glued part of the shuck, substantially as and for the purpose shown.

5. As a means for sanding shucks for match-boxes, in combination with the traveling belts to engage opposite sides of a shuck so as to support the latter and carry it along, a rotating disk supplied with glue situated below and at one side of the path of the belts, a sand-receptacle and a sand-throwing wheel rotating therein, having the notched periphery adapted to take sand from the receptacle and throw it against the glue applied to the shuck by the glue-disk, substantially as and for the purpose set forth.

6. In combination with a machine for making shucks for match-boxes whereby the shucks are delivered in a flattened condition, two traveling belts, between which the shucks are fed from the machine, and by which the shucks are grasped and supported adapted to engage the opposite sides of only a portion of the shucks, a gluing device to apply glue to the under side of a projecting part of each shuck, and a sander to apply sand to the

glued part, substantially as and for the purpose described.

7. In combination with a machine for making shucks for match-boxes whereby the shucks are made and delivered in a flattened condition the two traveling belts between which the shucks are delivered from such machine and by which the shucks are supported and carried along, with a clear projecting part having its under side out of contact with any supporting-surface, the rotating glue-applying disk to apply glue to the under side of the projecting parts of the shucks, means for supplying it with glue, the rotating sanding-wheel situated substantially in line with the glue-applying disk, so that the portion of the shuck which is supplied with glue will be carried over it as the shuck is moved along by the belts, and means for supplying such wheel with sand, substantially as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY W. WHELAN.

Witnesses:

EDWARD H. PARKER,
E. S. WHEELER.