

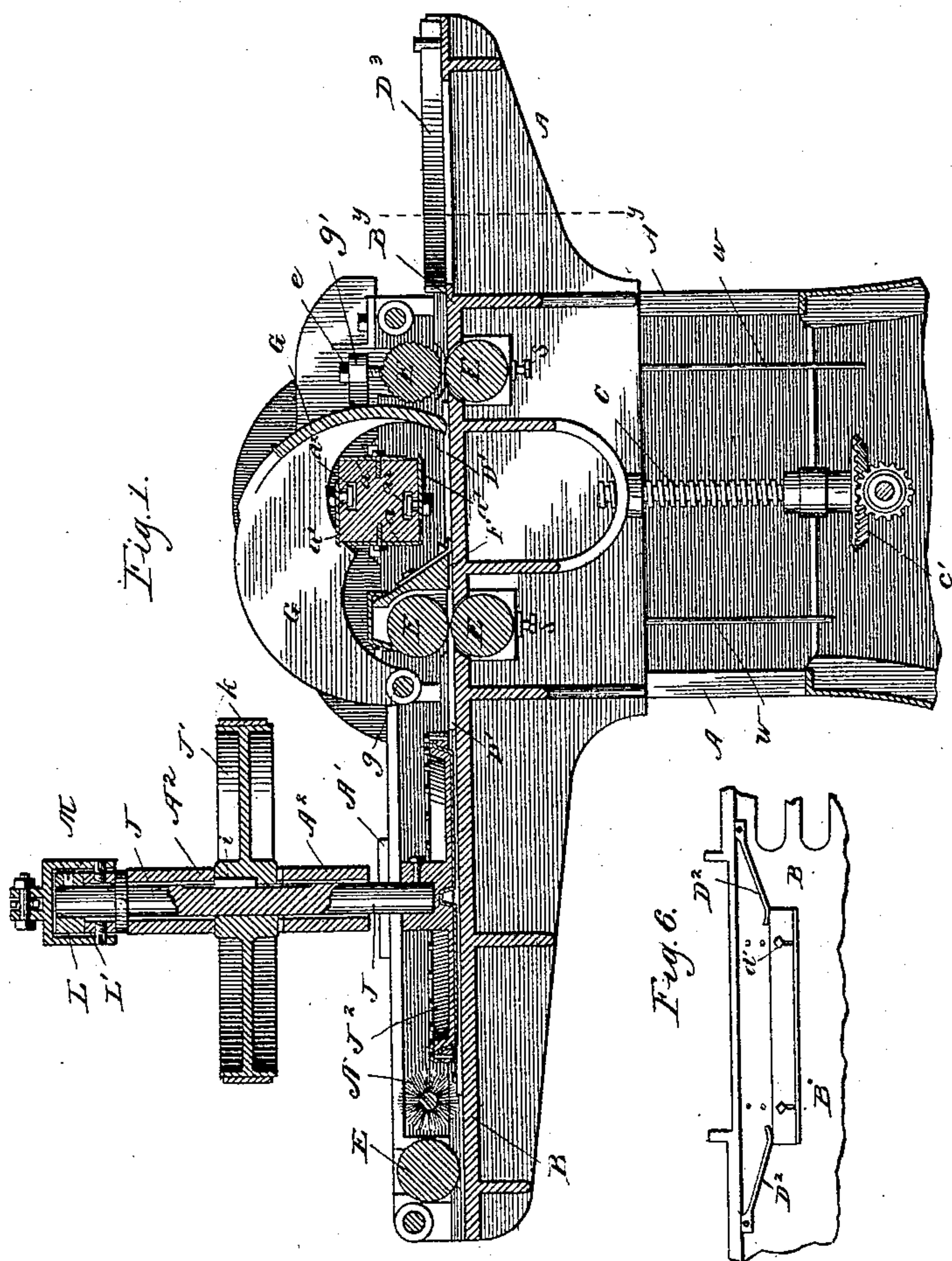
(No Model.)

4 Sheets—Sheet 1.

R. S. GREENLEE & E. G. STRÖM.  
MACHINE FOR FORMING AND POLISHING DOOR PANELS.

No. 454,730.

Patented June 23, 1891.



Witnesses,

J. J. Mann

Frederick G. Goolburin

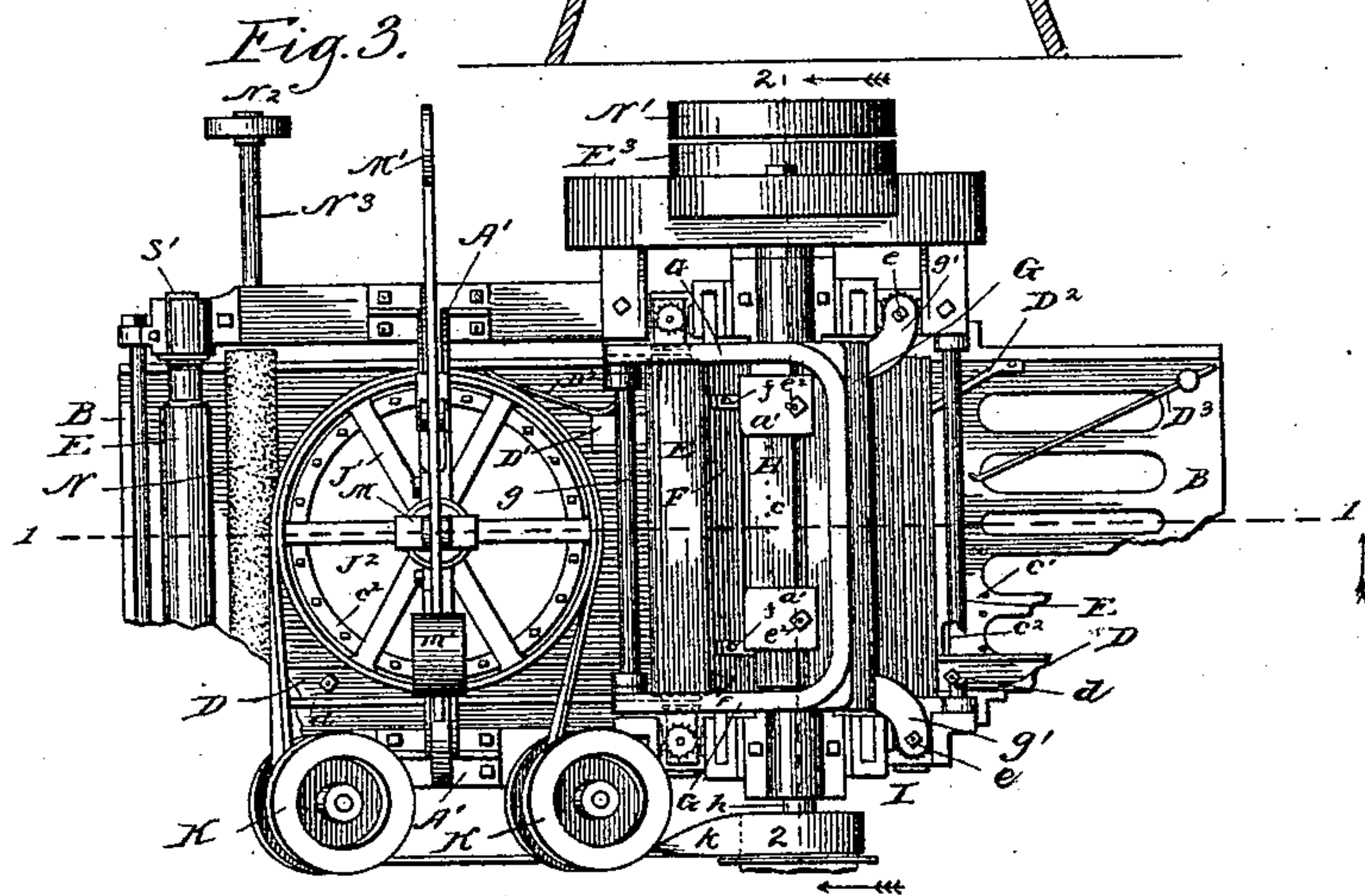
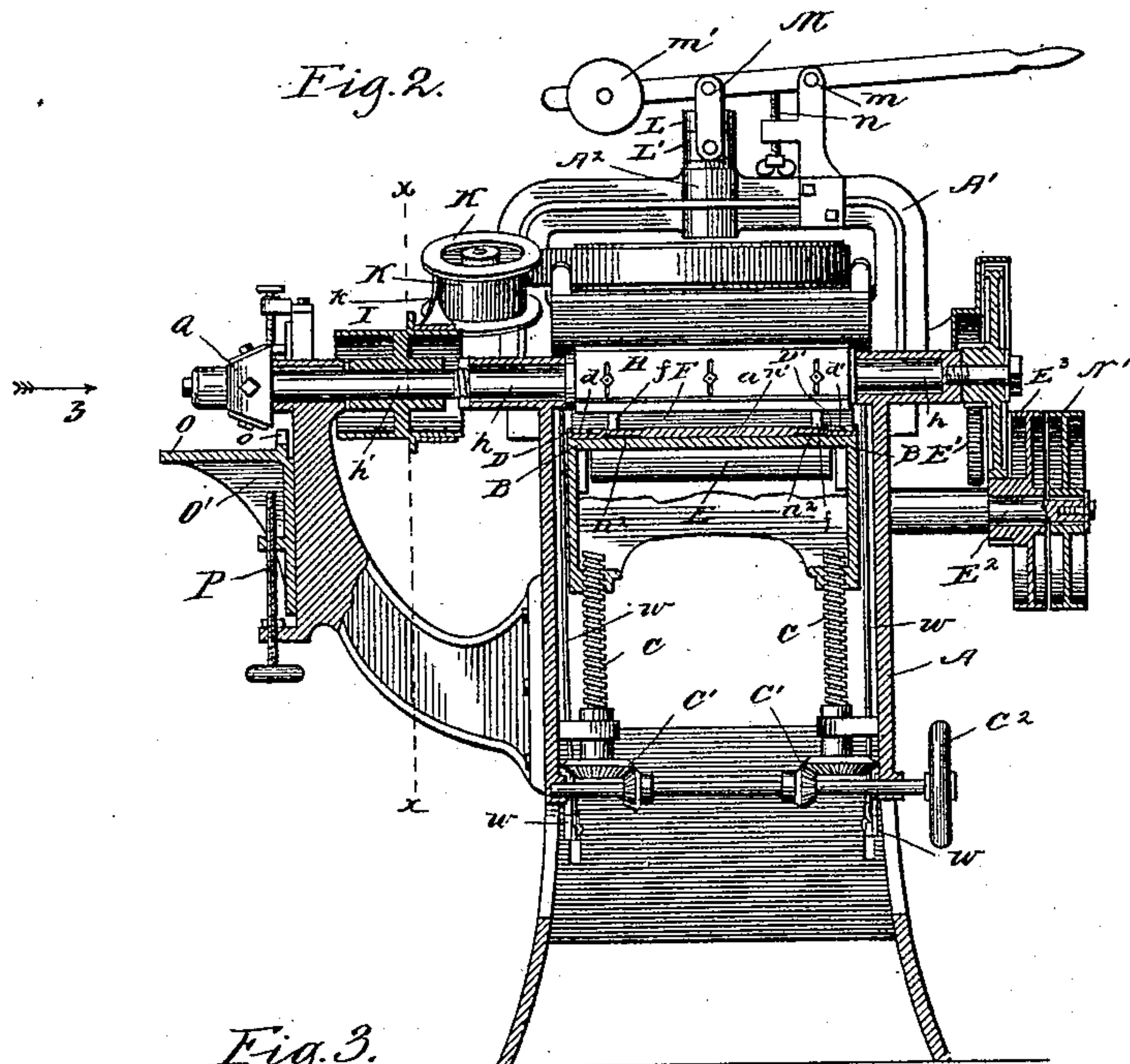
By

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Eric Gustav Ström  
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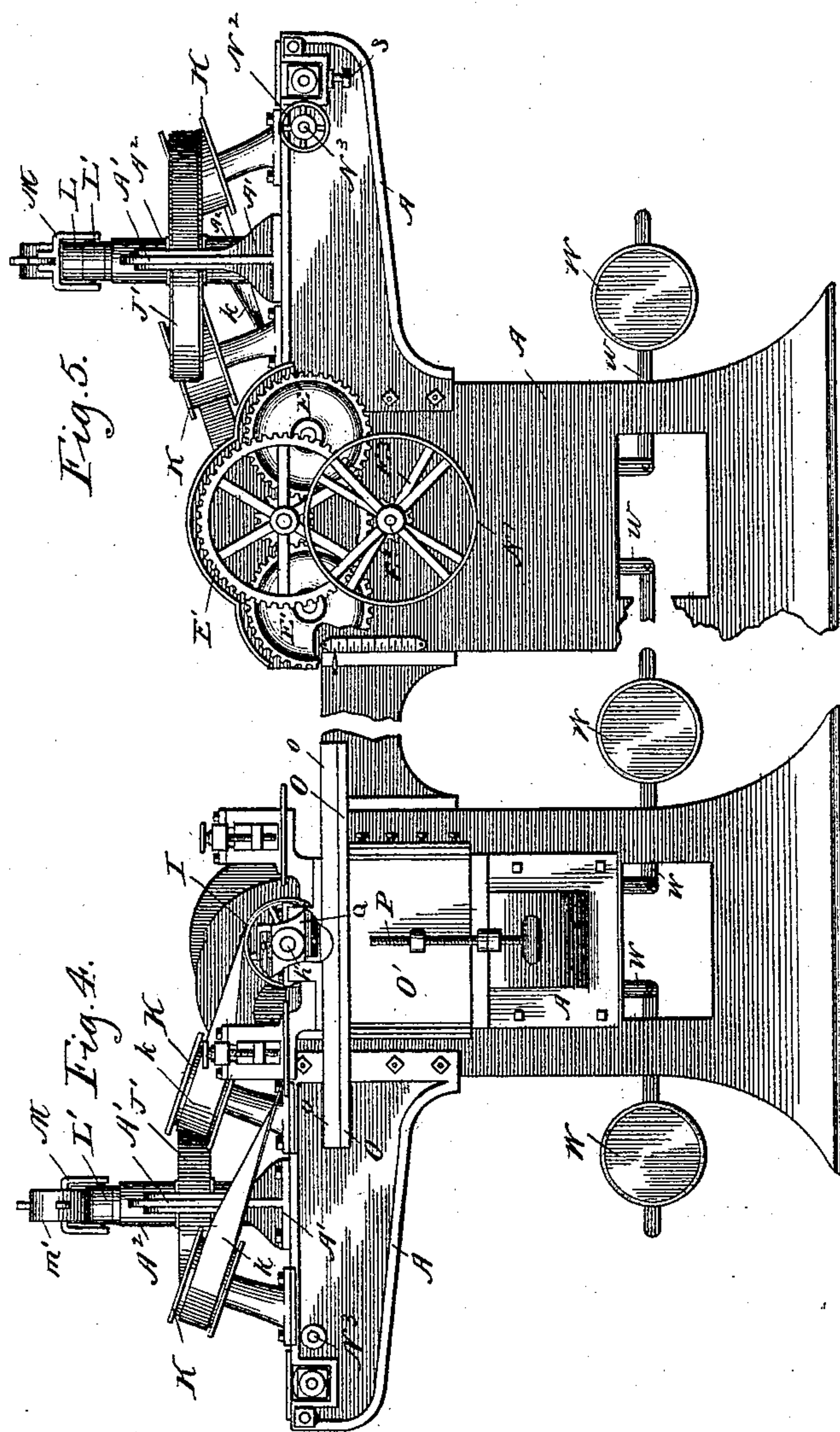
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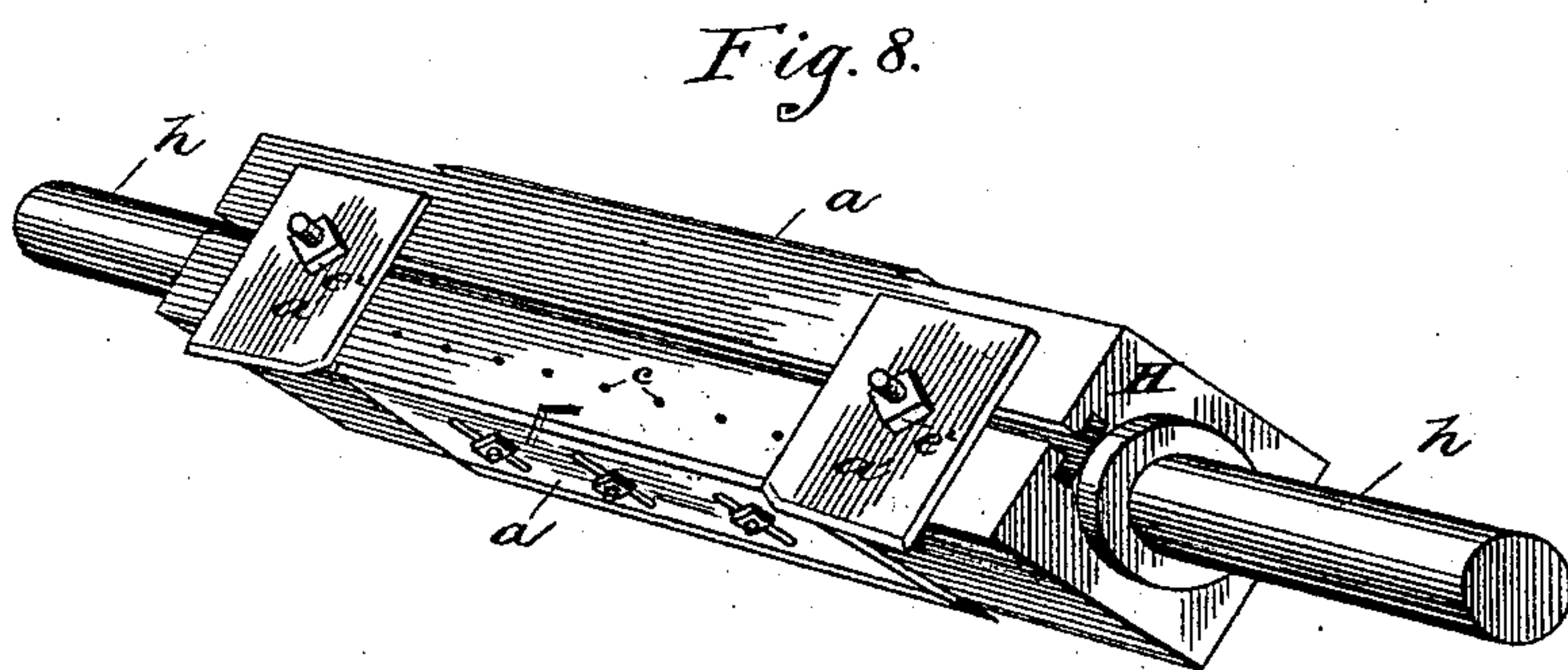
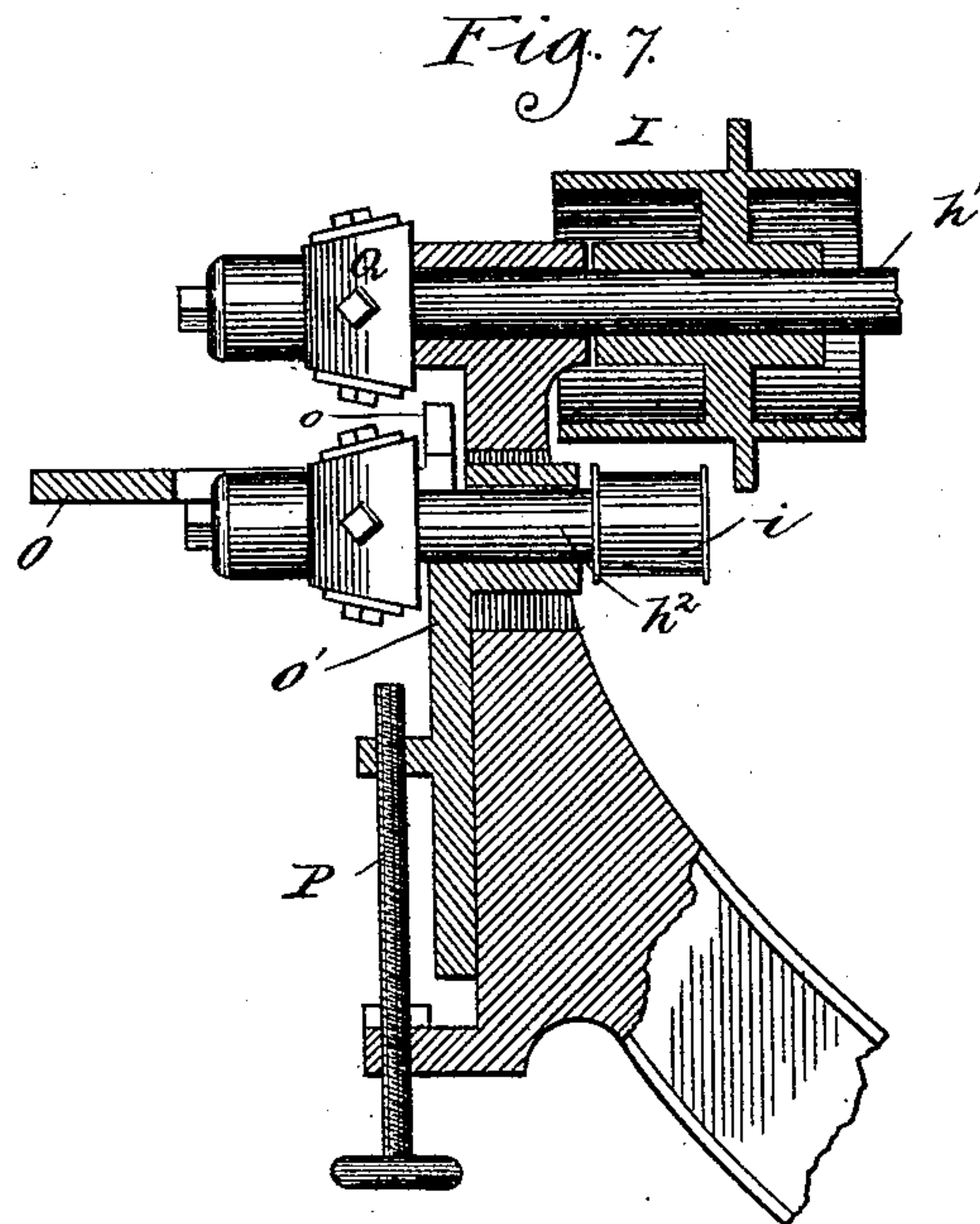
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# UNITED STATES PATENT OFFICE.

RALPH S. GREENLEE AND ERIC GUSTAF STRÖM, OF CHICAGO, ILLINOIS.

## MACHINE FOR FORMING AND POLISHING DOOR-PANELS.

SPECIFICATION forming part of Letters Patent No. 454,730, dated June 23, 1891.

Application filed December 7, 1888. Serial No. 292,889. (No model.)

*To all whom it may concern:*

Be it known that we, RALPH S. GREENLEE and ERIC GUSTAF STRÖM, of Chicago, Illinois, have invented certain new and useful Improvements in Machines for Forming and Polishing Door-Panels, of which the following is a specification.

The object of the invention is to provide a machine which will plane the blank, cut down the margins, so as to leave the raised panel in the center, and polish or sandpaper the panel on one side, all at a single operation or single passing of the blank through the machine. Heretofore the blank was first planed, then paneled, and then polished, each of these processes, when effected by machinery, requiring the blank to be passed through a separate machine.

The invention consists in the machine and the features thereof which are hereinafter particularly described and claimed, and which are illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section taken on line 1 1 of Fig. 3, looking in the direction indicated by the arrow. Fig. 2 is a transverse vertical section of the machine, taken on line 2 2 of Fig. 3, looking in the direction indicated by arrow 2. Fig. 3 is a plan or top view of the machine, omitting the fragment shown in transverse vertical section at the left of line  $x x$  of Fig. 2 and portions at the corners where the signatures are. Fig. 4 is a side elevation of all that part of the machine to the left of line  $y y$  of Fig. 1, such as would be seen by looking at that side of the machine toward which the arrow 3 is pointed in Fig. 2. Fig. 5 is a side elevation of the same part of the machine, looked at from the opposite side. Fig. 6 is a detail showing a fragment of a detached part in plan view. Figs. 7 and 8 are modifications.

A designates the supporting-frame of the machine.

B is the bed of the machine. The bed is adapted in the ordinary manner to be raised and lowered by means of screws C, arranged to be operated by miter-gear C' and a hand-wheel C<sup>2</sup>, which it is not deemed necessary to describe more particularly. At one side of its top surface the bed is provided with a stationary guide D, which is secured to the

bed by nuts  $d$  or other equivalent means. At the opposite side the bed has a spring-guide D', the bolts  $d'$  of which work in slots in the bed or in the guide itself, as shown in Fig. 6, adapted to allow the spring-guide to be moved toward the opposite guide by the spring D<sup>2</sup>. These guides rest against the edges of the panel as it is passing through the machine, and the object of having one of them, as D', yielding is to make them automatically adapt themselves to blanks which vary slightly in width. The bed is also provided with a spring D<sup>3</sup>, which is adapted to hold the blank over against the guide D when the blank is being fed into the machine and before it is caught by the feed-rollers.

The machine is provided with feed and pressure rollers E E, which are made adjustable by means of set-screws  $s$  or otherwise in the ordinary way, and are also operated in the ordinary way by means of gears E' E', engaging with a wheel on a shaft geared to the pulley-shaft E<sup>2</sup>, provided with pulley E<sup>3</sup>, adapted to operate the feed and pressure rollers independently of the cutter-shaft. The machine is also provided with a presser-bar F of ordinary construction, with the exception that it has feet  $f$ , which are adapted to bear upon the lowered margins of the panels as the latter comes from the cutter-head. The cutter-head shield G is pivoted to a rod  $g$ , so as to permit the front part to be raised and turned back from over the cutter-head, and the front part is provided with projections or short arms  $g'$ , in which are set-screws  $e$ , the points of which rest on the boxing of the front feed-roller for the purpose of adjusting the height of the front edge  $e'$ , Fig. 1, of said shield, so that it shall rest upon the tail end of the blank and hold it down after it is free from the front feed-rollers, the set-screw  $e$  being adapted to adjust the height of the shield edge independently of the adjustment of said feed-rollers.

H is the cutter-head, which is extended at each end in the form of a shaft  $h$  and journaled in the frame of the machine in the ordinary manner. To one end of shaft  $h$  is attached a supplemental shaft  $h'$ , (which, however, may be an integral extension of the shaft  $h$ ,) to which is attached a double-flanged pulley I, upon the outermost of the flanges of



which the main drive-belt for operating the cutter-head is applied. The cutter-head is provided with two planing-knives  $a$   $a$  for planing the blank and two paneling-knives  $a'$  at each end for cutting and planing the lowered portion along the margin of the panel.

The cutter-head is provided with longitudinal slots  $a^2$  upon two sides for the purpose of making the paneling-knives adjustable to different widths of panels, the heads of the bolts  $e^2$ , which secure said paneling-knives to the cutter-head, being adapted to slide in the enlarged bottom of the slots, so as to set said knives at different distances apart, and for the purpose of more readily setting the machine to the regulation sizes of panels the cutter-head is scaled or marked by hole  $c$  or otherwise to indicate the various points of adjustment corresponding with the regulation sizes of panels. Such setting of the paneling-knives is most readily effected by moving only one of them, leaving the other stationary, and for this reason we prefer to make the guide  $D$  adjustable in correspondence with the adjustment of the paneling-knife over its side of the bed, with hole  $c'$  corresponding in lateral position with the position of the scale-marks or holes on the cutter-head. We prefer holes  $c$   $c'$ , because by placing a pin temporarily therein the paneling-knife or guide, when loosened, can be shoved over against the pin as a stop and then be tightened in the proper place. Slots  $c^2$  in the bed allow the bolts to move when the nuts  $d$  are loosened.

To the rear of the cutter-head a bracket-frame  $A'$  is attached to the main frame  $A$ , and this bracket-frame is provided with a vertical sleeve or boxing  $A^2$  on each of its cross-beams, adapted to support a vertical shaft  $J$ , which is provided with a pulley  $J'$  and has a sand-paper wheel  $J^2$  attached to the bottom. Two inclined pulleys  $K$   $K$  are arranged to carry a belt  $k$  from the inner flange of the double-flanged pulley  $I$  over the pulley  $J'$  for operating the sand-paper wheel, and as the blank passes from the cutter-head it is caught by the presser-rollers at the rear thereof and forced under the sand-paper wheel and thence under the last roller and out of the machine. The sand-paper wheel, being rotated at a high speed and being in contact with the upper side of the panel, as it is passing polishes it, so that the rough panel-blank fed in at one end of the machine comes out at the other end planed, lowered at the side margins, and polished on one side. The sand-paper wheel is made adjustable vertically in order that it may be set closer to the work as the paper becomes dulled or worn by use. This adjustability is secured by attaching the shaft  $J$  to pulley  $J'$ , so as to slide through the same. The key  $i$ , being permanently seated in the box of said pulley and sliding in a groove in the shaft, permits the shaft to be raised and lowered without moving said pulley. The shaft is supported from the top, there being a ring  $L$  fixed to its top by a set-screw and

a loose ring  $L'$ , to which a clevis  $M$  is attached, so that by means of a lever  $M'$  the shaft may be raised or lowered when desired. The lever is pivotally fixed at  $m$ , Fig. 2, and a weight  $m'$  is thus rested, through the lever, on the top of the shaft to hold the sand-paper wheel down to its work. The downward movement of the vertical shaft is limited by a set-screw  $n$ , adapted to strike the under side of the lever and stop the dropping of the sand-paper wheel below the proper limit, and when the sand-paper is dulled or worn by use it is lowered to compensate the wear by varying the set-screw.

A rotary brush  $N$  is arranged over the bed and adapted to be operated by a belt from pulley  $N'$  on the shaft, which operates the feed-rollers passing to the pulley  $N^2$  on the shaft  $N^3$  of the brush for the purpose of freeing the panel of dust as it comes from under the sand-paper wheel. The two rollers  $E$   $E$  above the bed of the machine are held down to their work by means of weights  $W$ , connected through lever-and-link connections  $w$   $w$ , so as to bear down the sliding boxes supporting the journals of these rollers. This mechanism, and its connection with the rollers for this purpose, is of ordinary construction and application, and it is therefore not deemed necessary to describe it in detail.

To the side of the machine is attached an adjustable bed-plate or table  $O$ , having a stop-guide  $o$ . This bed-plate and guide are attached directly to the frame  $A$  of the machine by means of a bracket-support  $O'$ , which is preferably made integral with said plate and connected with the frame by means of the ordinary dovetail groove in the bracket and corresponding tongue on the frame, (not illustrated,) whereby the bracket may slide vertically on the frame, and a set-screw  $P$ , passing through a projecting lug of the bracket and corresponding lug on the frame  $A$ , is adapted to raise and lower the same, as desired. Over this adjustable bed-plate and attached to the projecting end of shaft  $h'$  is a cutter-head  $Q$ , of ordinary construction and provided with paneling-knives the same as the paneling-knives of the cutter-head  $H$ , adapted to cut the same marginal formation of panel as that cut by the paneling-knives of said cutter-head  $H$ . By this added device the marginal formation at the ends of the panel is to be cut, and thus the machine is made complete in itself for doing all the work required in forming and finishing panels, as will more fully appear in the described mode of its operation, as given below.

In Fig. 2 the panel as passing through the machine is seen in cross-section at  $n'$ . The blanks, being pieces of board of the required length, width, and thickness to form a panel, are fed in, being laid flat on the bed and pushed forward by hand against the spring  $D^3$ , with one edge against the guide  $D$ , until caught between the first pair of feed-rollers, the uppermost one of which is corrugated.



These rollers draw it in and force it under the front edge  $e'$  of the shield and thence under the cutter-head H and the presser-bar F until it is caught by the second pair of rollers, which force it on under the sand-paper wheel and under the last roller and out of the machine, the succeeding blanks assisting in pushing forward those that precede the last presser-roller E at the rear of the machine, whose shaft  $s'$  is journaled in the frame A, being operated by the panels as they are forced under said presser-roller and pushed along by those which follow. During this passage of the blanks they are first planed and have the margins lowered by the planing and paneling knives of said cutter-head and then sandpapered on the upper side. After a lot of blanks have been thus run through the machine they are carried forward and run through again, the other side up; but before commencing the second operation a thin strip of wood or metal, as seen at  $n^2$ , Fig. 2, corresponding in thickness and width to the lowered margin of the panel, is placed on and secured to the bed of the machine under the paneling-knives, so as to support the edge from below during the second cutting. This second operation completes the panel, excepting the marginal formations at the ends thereof, and these portions are finished by passing them by hand under the cutter-head Q, the end being held against the guide  $o$  and the side held flat in the bed-plate O, first one side up and then the other.

It is obvious that the machine with only the planing-knives and the sand-paper wheels can be used to advantage when it is desired to plane and polish a board without lowering the margins thereof, as is done in paneling. It is also obvious that the planing-knives need cover in operation only those portions of the blank which constitute the raised portion of the panel, and that the paneling-knives will be so disposed as to operate on the remaining portions of the blank. It is also obvious that the planing-knives may be divided—that is, two planing-knives may be secured on the same edge of the cutter-head with a paneling-knife adapted to cut a central groove.

In Fig. 8 we have shown the planing-knives occupying only a portion of the length of the cutter-head with the paneling-knives arranged to operate outside of the path of the planing-knives. In Fig. 7 we have shown provisions for forming the marginal depressions on both sides of the end of the panel at the same time and whereby the panel end need be passed through but once. These provisions consist of a second cutter-head  $Q'$ , mounted on a short shaft  $h^2$ , journaled in the sliding bracket-support  $O'$ , and a pulley  $i'$  on the shaft.

The table O is cut away to permit the cutter-head  $Q'$  to project above its top. A belt being applied to the pulley  $i'$  may be carried over and driven by the driving-pulley I, so as to turn the cutter-head  $Q'$  in unison with the cutter-head Q.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with the bed B, of a cutter-head provided with planing-knives covering the whole surface of the blank and paneling-knives at each side covering the margins along opposite sides of the blank adapted to cut such margins lower than the panel portion, and a sand-paper wheel arranged over said bed at the rear of the cutter-head and adapted to operate on the blank as it passes from said cutter-head in a machine having feed-rollers and operating mechanism, substantially as shown and described.

2. The combination, with the bed B, of the cutter-head H, provided with planing-knives  $aa$  and paneling-knives  $a'a'$ , and the presser-bar F, having a straight portion adapted to the surface covered by the planing-knives and a projecting portion at each side of the straight portion adapted to the depressed marginal surfaces covered by the paneling-knives in a machine of the class mentioned provided with feed and operating mechanism, substantially as shown and described.

3. The combination, with the bed B and the bed O, the latter having guide  $o$ , of the cutter-head H, provided with planing-knives  $aa$  and paneling-knives  $a'a'$ , and the cutter-head Q on the same shaft and provided with paneling-knives adapted to form the panel margin at the end of the panels in a machine of the class mentioned, provided with mechanism, substantially as shown and described, for operating said cutter-heads simultaneously, as set forth.

4. A machine for forming panels, consisting of a supporting-frame and bed-plate B and supplemental bed O, in combination with a rotary cutter-head H, provided with planing and paneling knives, a rotary cutter-head Q on the same shaft, provided with paneling-knives, and a sand-paper wheel arranged over the bed B at the rear of cutter-head H and connected through pulleys K K and  $J'$  by a belt running to a pulley on the shaft of said cutter-heads, said machine having feed-rollers and presser-bar, all arranged to operate substantially as and for the purpose specified.

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