

(No Model.)

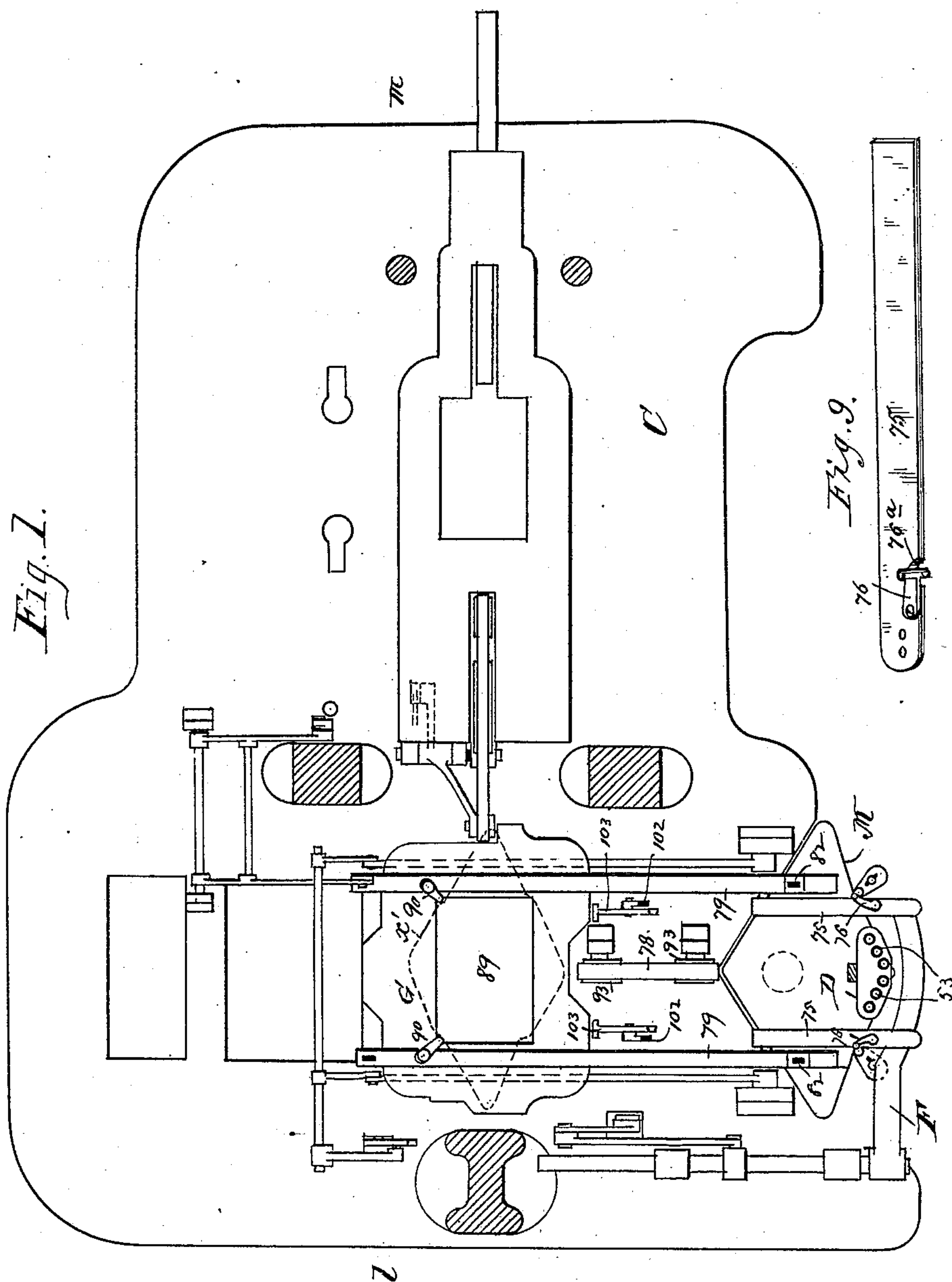
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C. H. HEYWOOD.

MECHANISM FOR FEEDING SHEETS OF PAPER.

No. 428,606.

Patented May 27, 1890.



Witnesses:

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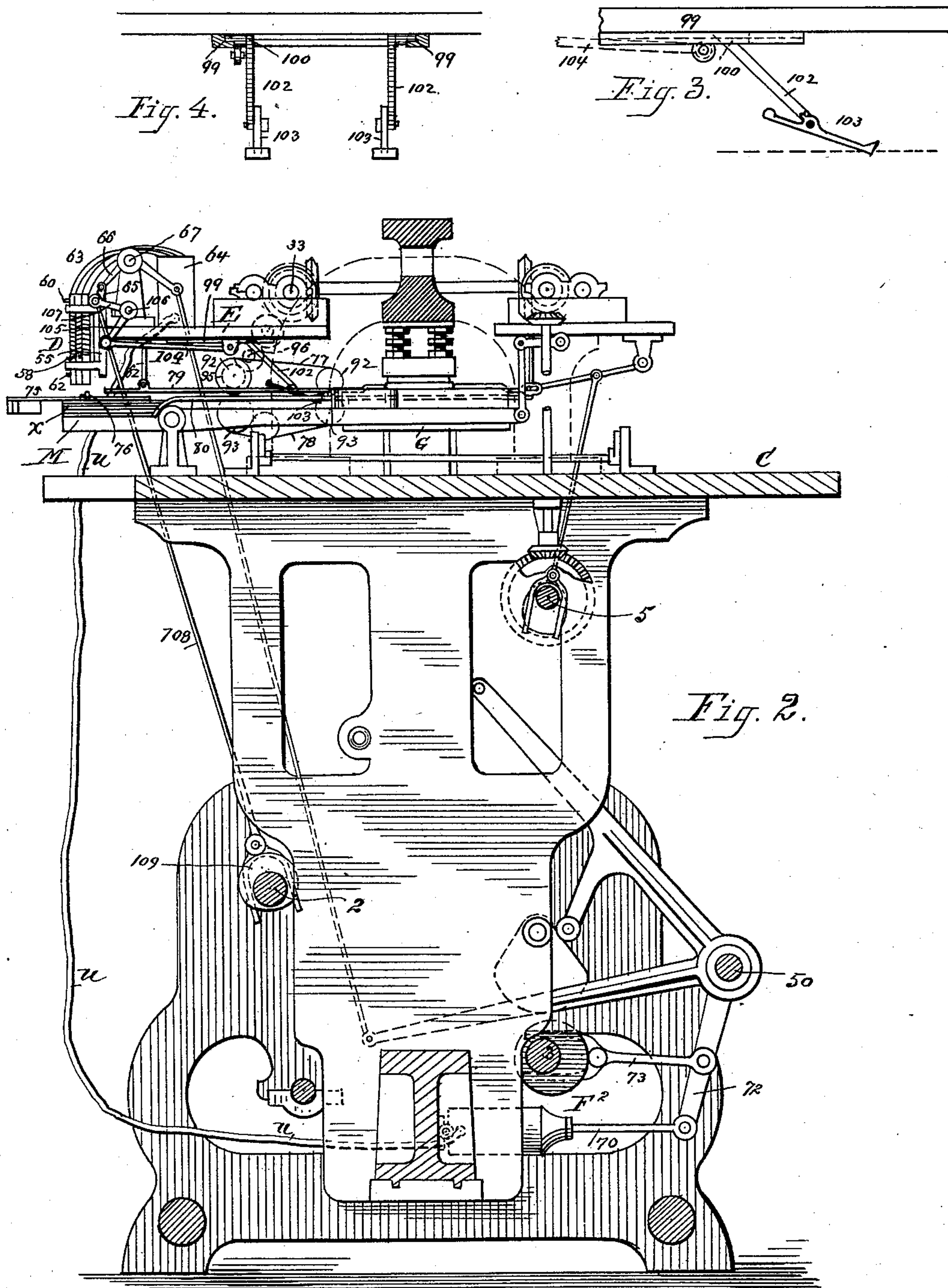
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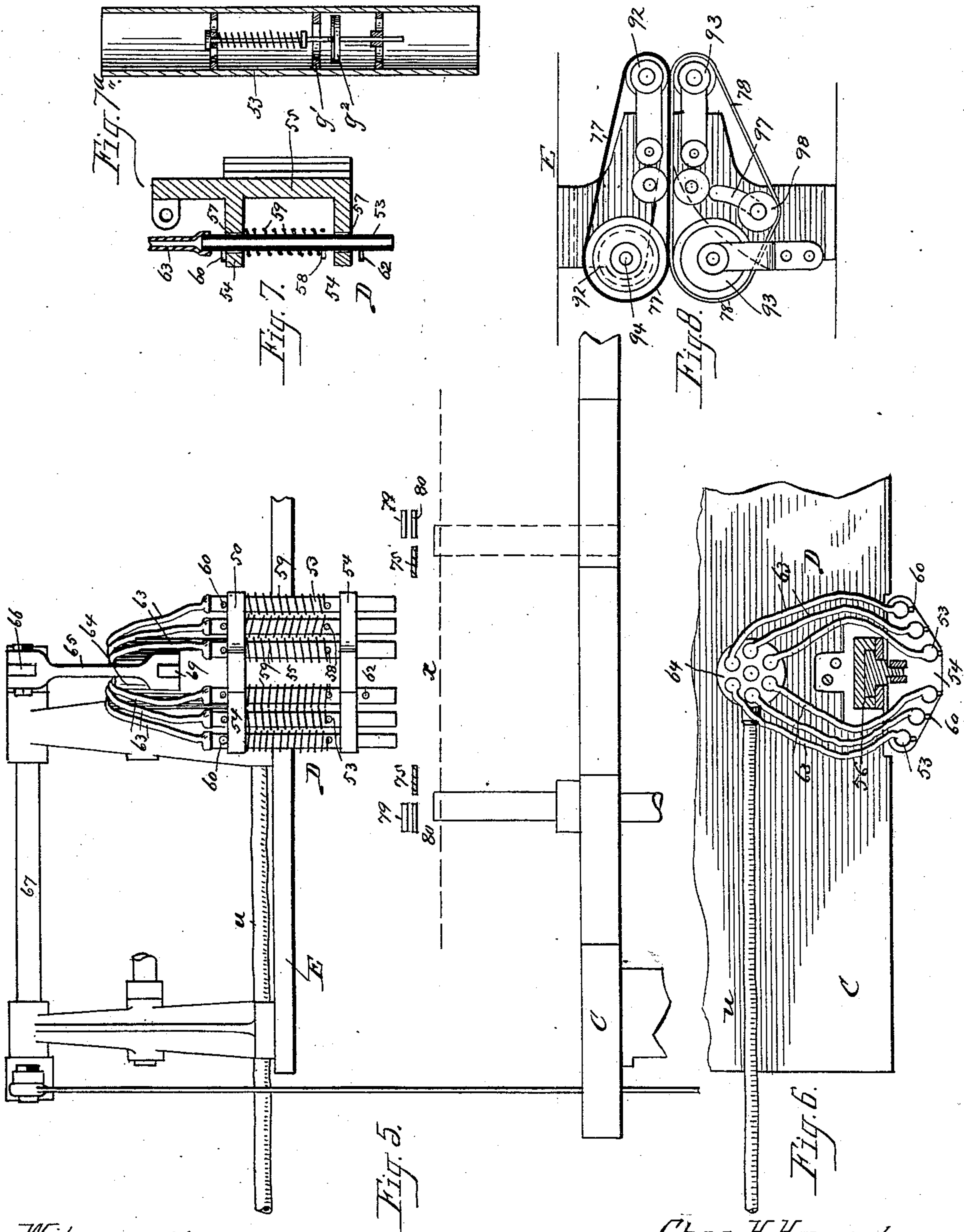
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UNITED STATES PATENT OFFICE.

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MECHANISM FOR FEEDING SHEETS OF PAPER.

SPECIFICATION forming part of Letters Patent No. 428,606, dated May 27, 1890.

Application filed October 4, 1889. Serial No. 326,037. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. HEYWOOD, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Mechanism for Feeding Sheets of Paper, of which the following is a specification.

This invention relates to mechanism for automatically feeding sheets of paper from a pile thereof one by one to a suitable place to permit the action thereon of other devices. For instance, by the feeding mechanism the sheet may be conveyed from the pile to a creasing and folding mechanism, as common in envelope-machines, or to the action of printing or gumming mechanism, or to the action of both printing and gumming mechanism, as described in Letters Patent of the United States issued to me February 4, 1890, No. 420,792, for improvements in envelope and printing machines; and the invention consists in the construction and combination of parts, all substantially as will hereinafter more fully appear and be set forth in the claims.

Reference is to be had to the accompanying drawings, in which the paper-feeding mechanism is shown in connection with parts of a machine for making and printing envelopes, said machine being fully illustrated and described in the aforesaid application; and Figure 1 is a plan view of the machine as seen below the gum-box plate, certain parts extending above and below the plane of the gum-box being shown in horizontal section. Fig. 2 is a vertical sectional elevation of the machine, particularly showing such parts thereof as relate to this invention. Figs. 3 and 4 are detail views of movable dogs for adjusting the blanks, to be hereinafter referred to. Fig. 5 is a front elevation of the pneumatic picker; and Fig. 6 is a plan view of same, the slideways therefor being shown in horizontal section. Fig. 7 is a vertical section in detail on the line 5 5, Fig. 3. Fig. 7^a is a detail section hereinafter referred to. Fig. 8 is a side elevation of the rolls and the supports therefor, which rolls are for carrying the blanks from the supply pile to the

place for its being operated on; and Fig. 9 is a detail view of one of the slide-fingers hereinafter mentioned.

Blanks from which the envelopes are to be formed, or for whatever purpose may be desired, are held at a proper and substantially uniform height by the blank-supporting table M of the elevator mechanism, which may be of any of the approved constructions in common use, that which is fully described and shown in Letters Patent of the United States issued to me November 26, 1889, No. 416,105, being deemed a desirable one for use in connection with the mechanism of the present invention.

The picker D, which is of the pneumatic class, comprises a series of vertical tubes 53, vertically movable through and spring-pressed from horizontally-projecting lugs 54 of a carrier-plate 55, which is vertically movable in ways 56, secured to the gum-box plate E or other suitable-fixed part of the machine. Each tube (see Fig. 5) at a slight distance above the place of its passage through the socket 57 of the lower lug 54 has a radially-projecting pin 58, between which and the under side of the upper lug is placed a spiral spring 59, the recoil of which serves to maintain the picker-tubes normally in their lowermost presentation, which is limited and made uniform as to all the pickers by the regularly-arranged and laterally-extending abutment-pins 60 of the tubes a slight distance above said upper lug. That on the downward thrust of the picker against the pile of blanks the tubes may not be forced upwardly with relation to the socketed lugs to an excessive extent, a stop-pin 62 is placed on one or more of the said tubes a short distance below the lower lug. Each tube has a continuous passage through it and is open at its lower end, and to its upper end a flexible air-conduit 63 is connected, which extends to a common chamber 64, conveniently located on a fixed part of the machine. The picker is reciprocated by means of a connecting-rod 65 between a radial arm 66 on a rocker-shaft 67, supported in stands from the gum-box plate, and an ear-piece 69, formed on the supporting-plate 55 of the picker, the said rocker-

shaft being actuated in any desired manner. The vacuum is produced in the chamber 64 through the conduit *u* from the suction-pump F², (seen in Fig. 2,) which is pivotally hung by one end on the machine-frame. The reciprocating motion to the plunger 70 of the pump is imparted by the swinging of a lever 72, hung on said girder-shaft 50 and moved by the forked thrust-rod 73, receiving its motion in one direction by a cam on shaft 3 the return movements of the parts being under the reaction of a spring.

While a stationary chamber, as the one 64, is shown and is in many instances a desirable and practical provision, its use is by no means necessary, for the several tubes 63 may each be connected with the common conduit *u*, leading from the suction-pump F².

The blanks *a* by their front edge portions are raised by the pneumatic picker, which is properly located therefor, and are then carried by the action of sliding feed-in mechanism to the feeding-in tapes.

The feed-in mechanism F is in substance the same as illustrated in my said former patent of November 26, 1889, being guided and receiving its reciprocating motion as therein stated; but instead of having downwardly-curved fingers its carrier-bar is provided with flat horizontal slide-fingers 75 75, located in a plane slightly above the level of the top of the pile of blanks, and provided with abutment-lugs 76 on its upper side. An approved construction of the slide-fingers 75 consists in forming the lug 76, (see Fig. 9,) which is screwed to the said slide-finger, with an angular extension 76^a, which extends across the edge of the slide-finger, and thereby no crevice between the adjoining faces of the lug and finger is left open into which the edge of the blank might catch. After the picker has lifted the front edge portion of a blank and the suction thereof has ceased, such portion drops; but the feed-in slide-fingers at such time have been moved inwardly nearly or quite to the position seen in Fig. 1, and, having a slight farther inward movement, the blank is fed to enter by its rear edge to the bind and carrying action of the carrier-tapes 77 78.

In connection with and as forming a part of the feed-in mechanism a separator-slide may be employed having an operation substantially as described in my aforesaid patent of November 26, 1889; but the provision of this device is here deemed unnecessary, for by giving a proper periodicity and duration to the suction in the picker-tubes the blank may be held raised until the horizontal slide-fingers 75 in their inward movement are projected sufficiently under the blank.

Upper and lower pairs of slide-strips 79 80 are arranged at each side of the main middle portion of the blank, extending from the front toward the rear of the machine, and at their rear ends terminating at or about at the rear side of the gumming-bed, which is lo-

cated at the rear of said feed-in tapes. The lower slide-strip of each pair has its forward ends just at the rear of the edges of the end flaps of the blanks, being downwardly deflected thereat, and are held stationary by any suitable supporting means. The upper slide-strips of both pairs extend by their forward ends over the blanks, being supported thereat by pending rods secured to a suitable fixed part of the machine—in the present instance to the gum-box plate E—and said strips at their rear are to be supported in any proper manner, and one or both thereof may be vertically movable through means substantially as described in my said patent of February 4, 1890, whereby the blanks may be withdrawn from the position into which they are conveyed for the desired operation thereon by the present improved feeding mechanism, as will shortly appear.

G represents a blank-supporting bed, and in an envelope-machine such as described is termed the "gumming-bed," which is of a general rectangular form, having an aperture 89 in its middle portion, outside of which it is of a form to serve as a support for the flaps or extremities of the blanks, the proper location of one thereon being indicated in dotted lines at *a'* in Fig. 1.

Adjusting and abutment lugs 90 90 are to be provided on the slide-strips 79, so that the blanks may not be carried rearwardly farther than desired and necessary to be in proper position to be gummed or printed, or both, and the one on the upper slide-strip 79, toward the end *m* of the machine, projecting downwardly and normally to be across the plane of travel of the envelope-blank, of course moves upwardly out of such plane when the slide-strip is upwardly moved, as already explained. It is immaterial on which of the slide-strips the abutment-lug 90 toward the front end *l* of the machine is located, whether on the upper or lower one, it being observed that it must always, however, project across the horizontal plane of travel of the blank.

As seen in Fig. 8, the feed-in tapes 77 78 are carried on two sets of rolls 92 and 93—upper and lower. The rolls of the upper set are carried in bearings suspended from the gum-box plate or other stationary part. The arbor 94 of one of the rolls of the upper set is provided with a spur-gear 95, and receives its rotation in the proper direction through a train of gears (indicated at 96, Fig. 2) from the arbor 33 of one of the gum-box rolls, to which rotation is imparted as usual, or of course one of the rolls 92 may receive its rotation through other common means. The lower set of rolls 93 for the other tape is journaled in bearings of a stand resting on the table C, and its endless tape being in frictional contact with the upper tape is moved thereby and therewith. The stand for the lower set of tape-rolls is provided with a slot 97, having a general direction at an angle to the line of the tape from the lower edge of the one roll to that of

the other, and an adjustable tightener-roll 98 is guided and adapted to be fixed at any point in the length of said slot, whereby it may take up any slack in the tape. A similar
5 tightener-roll plainly may be employed for the upper set of tapes.

Slideways 99 are formed in the under side of the gum-box plate above and having a direction parallel with the feed of the last-described tapes, and a frame 100 is movable in
10 said ways, carrying a pair of legs 102, extending obliquely downward at each side of the feed-in tapes, and on the lower ends of said legs are pivoted dogs 103, adapted to swing
15 from a pivotal point intermediate thereof with their forward ends lowermost. The said frame 100 receives its horizontal reciprocatory motion from the connecting-rod 104, attached thereto and to the radial arm 105 on a rocker-
20 shaft 106, the rocking motion being imparted to said shaft by the engagement with another radial arm 107 thereof of a rod 108, actuated by a cam 109 on the shaft 2.

The blanks having been by the picker raised
25 from the pile and carried into the position to be operated upon, whether to be gummed or printed, or both, or otherwise acted upon, may be withdrawn from such position in any manner desired, and in the said patent of February 4, 1890, I have fully described and shown
30 devices for conveying each blank at the proper time away from its said operation-receiving position, and to which patent, for an understanding of the withdrawing devices, reference may be had, the same not being deemed
35 any part of this invention, and one of the slide-strips has only been described and shown as vertically movable that the possibility of withdrawing the blank from its operation-re-
40 ceiving position may be herein made evident.

Under no more than usually favorable circumstances the pneumatic picker, having its tubes 53 53 free and open from end to end, as shown, may be readily operated, and it has
45 been found that the picker embodying such construction is practical and effective; but provision may be made by a further improved construction of the said picker-tubes whereby the picker will be certainly operative even un-
50 der much less than favorable circumstances, and as shown in the enlarged longitudinal sectional view of one of the picker-tubes, Fig. 7^a, each of the tubes may have therein an apertured partition g' , under which is a spring-
55 depressed valve g^2 , capable of being pressed against its spring to cover the apertures in said partition should there be any rush of air into the lower end of said tube.

In the operation of the picker, and assuming that under the suction through the pick-
60 ers to hold the blanks against the lower end of the tubes the close contact of one or more of the tubes with the blank were not made, there would then be an entrance of air into
65 and through the one or more tubes, which would cause an equilibrium of air-pressure in

all the tubes, resulting in a falling off of the blank from the picker; but with the provision of a valve operating substantially as shown should, say, the end of one tube not
70 be in contact with a blank at the expected time, the inrush of air would force the valve against its spring to cover the apertures in the partition, and air which might enter one tube would be shut off from communicating with
75 any of the other tubes or the common conduit u or chamber 64 to effect the exhaust of air from the tubes which are by their ends closely in contact with the blank. The valve is to have its depressing-spring adjusted as to its
80 reaction so that the valve will be operative between two pressures—that is, the suction through the tube when its end is close upon a blank will be insufficient to close the valve before the exhaust has been effected, but any
85 such free atmospheric pressure within and through the tube as would effect the exhaust of air from the other tubes would insure the forcing of the said valve closed.

What I claim as my invention is—

90
1. In a paper-feeding machine, the combination, with a suitable horizontal support having slideways thereon and located above the plane of feed of the paper sheets, of a frame movable in said guideways and means
95 for imparting thereto a reciprocatory movement, downwardly-extending arms 102, fixed on said frame, and the dogs 103, pivoted to said arms and normally resting with their rear ends below the said plane of feed, whereby
100 a blank may be passed under said dogs from the front, raising said dogs, and whereby on an abutment against the front edge of a blank by said dogs the latter will not be raised, substantially as described.

105
2. A pneumatic picker consisting of a suitable carrier having vertical guideways therein, a series of tubes movable in said ways, and means for limiting the downward projection thereof in said ways, springs for normally
110 maintaining said tubes in their lowermost position, air-conduits connected with said tubes, and valves in said tubes adapted to close the passages thereof on the entrance of air into
115 said tubes from their lower ends, substantially as and for the purpose described.

3. In a paper-feeding machine, the combination of the blank-supporting table, the slide-strips 80 80, a picker, the slide-fingers having blank-engaging abutments, and the
120 feed-in tapes 77 78, substantially as described.

4. In a paper-feeding machine, the combination of the blank-supporting table, the slide-strips 80, blank-adjusting abutments 90, a picker, the slide-fingers having blank-en-
125 gaging abutments, the feed-in tapes 77 78, and the blank-adjusting devices, substantially as described, consisting of the arms and means for securing a reciprocating movement thereof, and the dogs pivotally supported on
130 said arms, downwardly inclining and normally resting with their rear ends below the

plane of feed for the blanks, whereby pressure exerted in a horizontal plane by a rearwardly - moving blank against the downwardly-inclining dogs will insure an upward
5 swinging thereof, so that the blank may pass under and beyond the extremity thereof, and whereby on the then inward movement of the dogs they will jog up the blank by their abutment against the rear edge thereof, substantially as described.

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