(No Model.)

4 Sheets—Sheet 1.

C. H. CAMPBELL.

PAPER MACHINE.

No. 393,538. Patented Nov. 27, 1888.

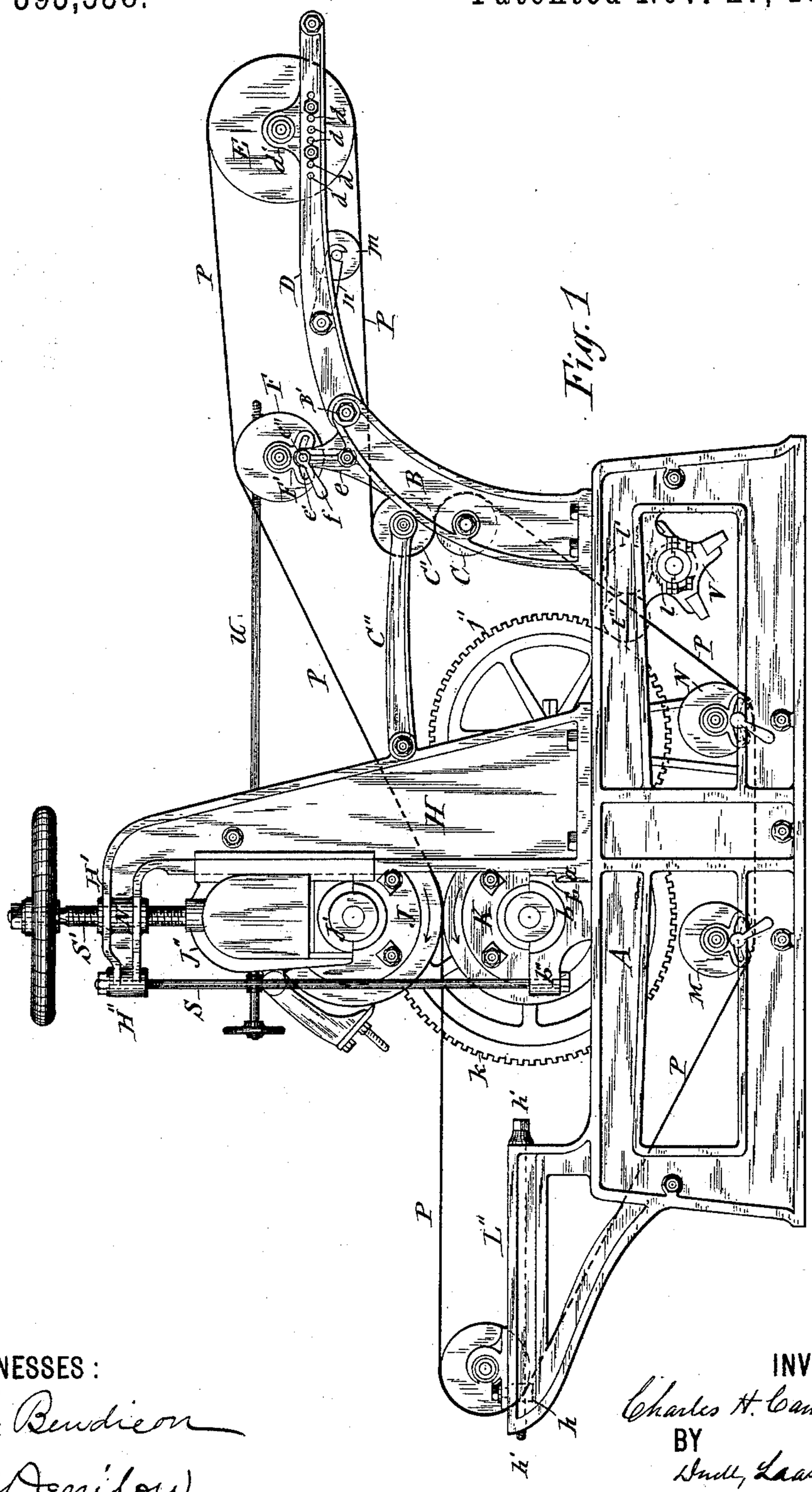

Fig. 1.

WITNESSES:

E. L. Bendicon

H. P. Denison.

INVENTOR.

Charles H. Campbell,

BY

Dodd, Laass & Dodd.

ATTORNEYS.

(No Model.) 4 Sheets—Sheet 2.

C. H. CAMPBELL.

PAPER MACHINE.

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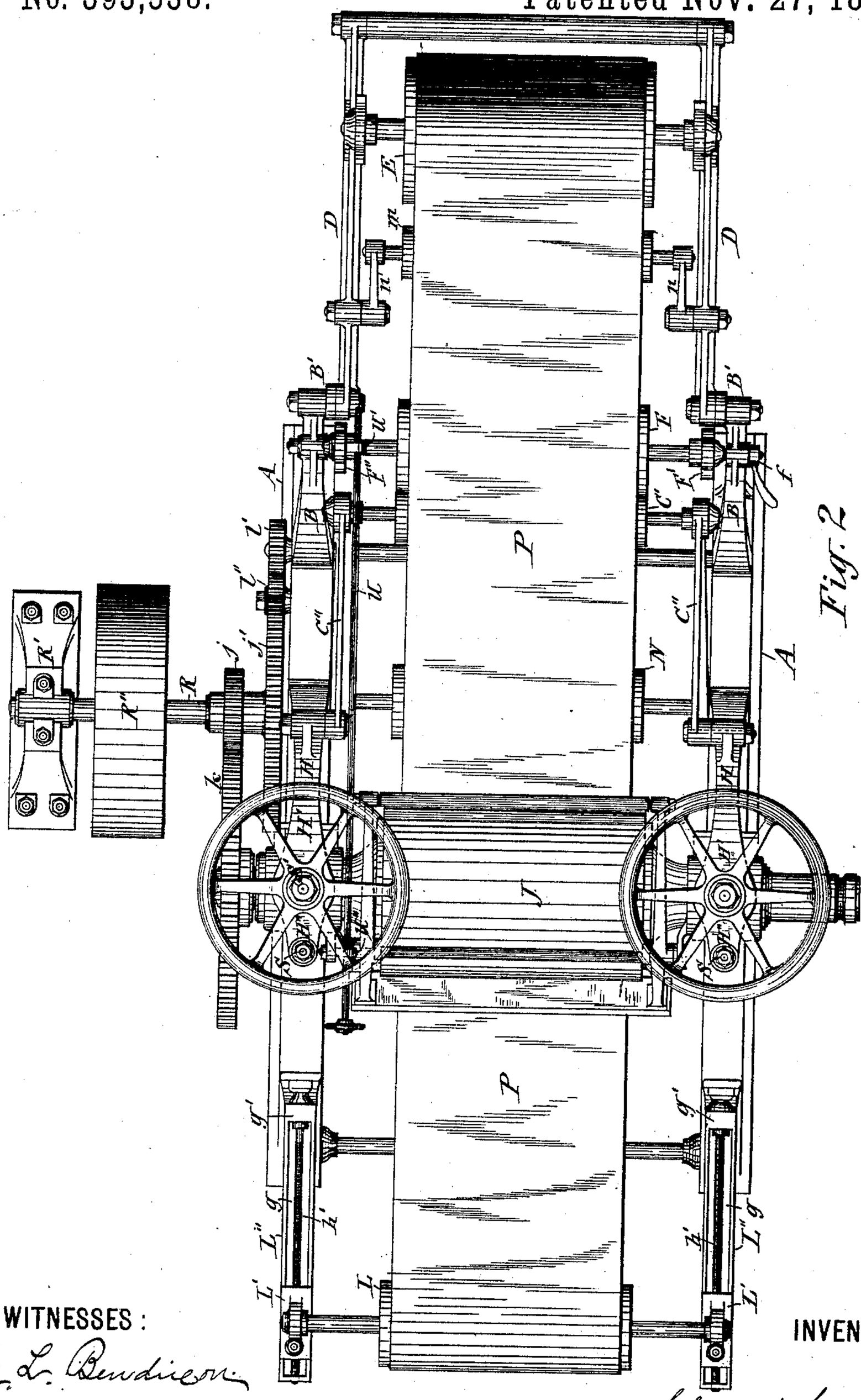

Fig. 2

WITNESSES:

C. L. Bendixon.

H. P. Dumbon.

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(No Model.)

4 Sheets—Sheet 3.

C. H. CAMPBELL.

PAPER MACHINE.

No. 393,538. Patented Nov. 27, 1888.

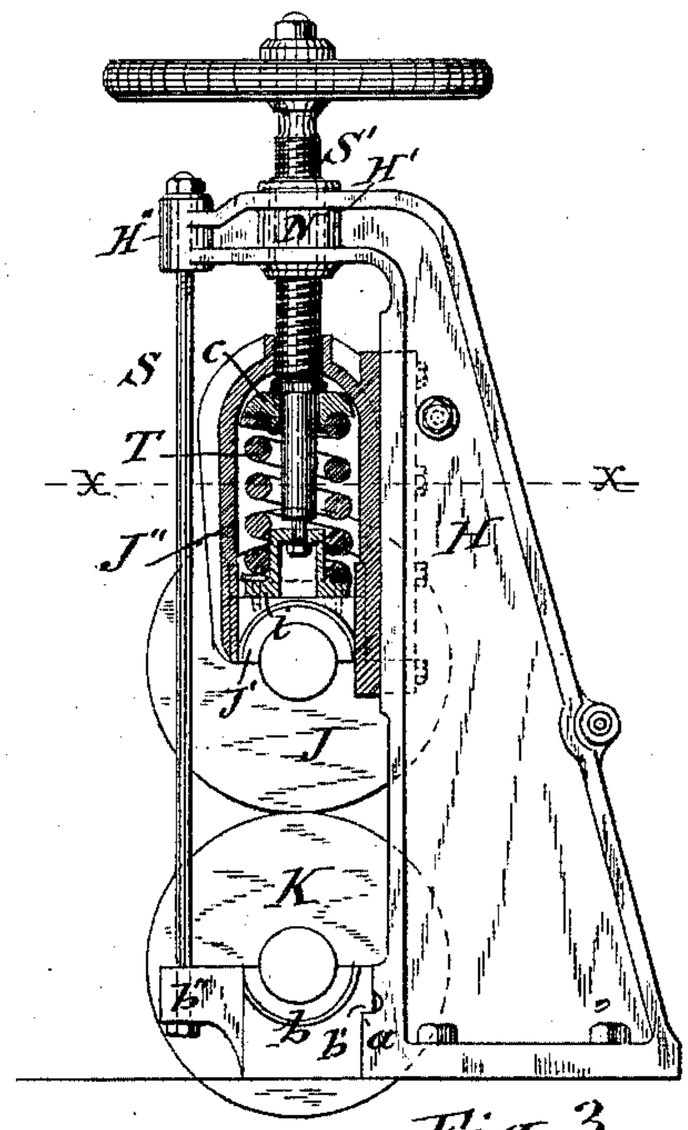

Fig. 3

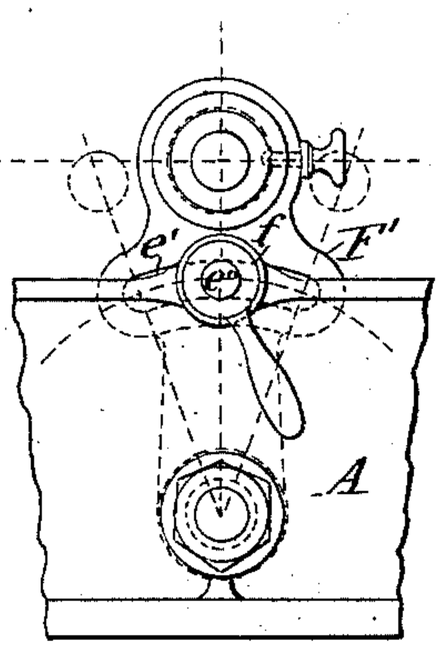

Fig. 5

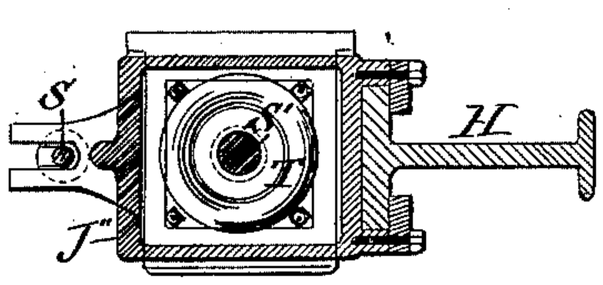

Fig. 4

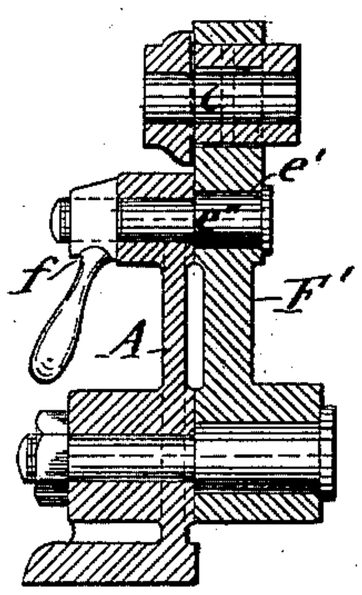

Fig. 6

WITNESSES:

A. F. Walz

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INVENTOR:

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(No Model.)

4 Sheets—Sheet 4.

C. H. CAMPBELL.

PAPER MACHINE.

No. 393,538. Patented Nov. 27, 1888.

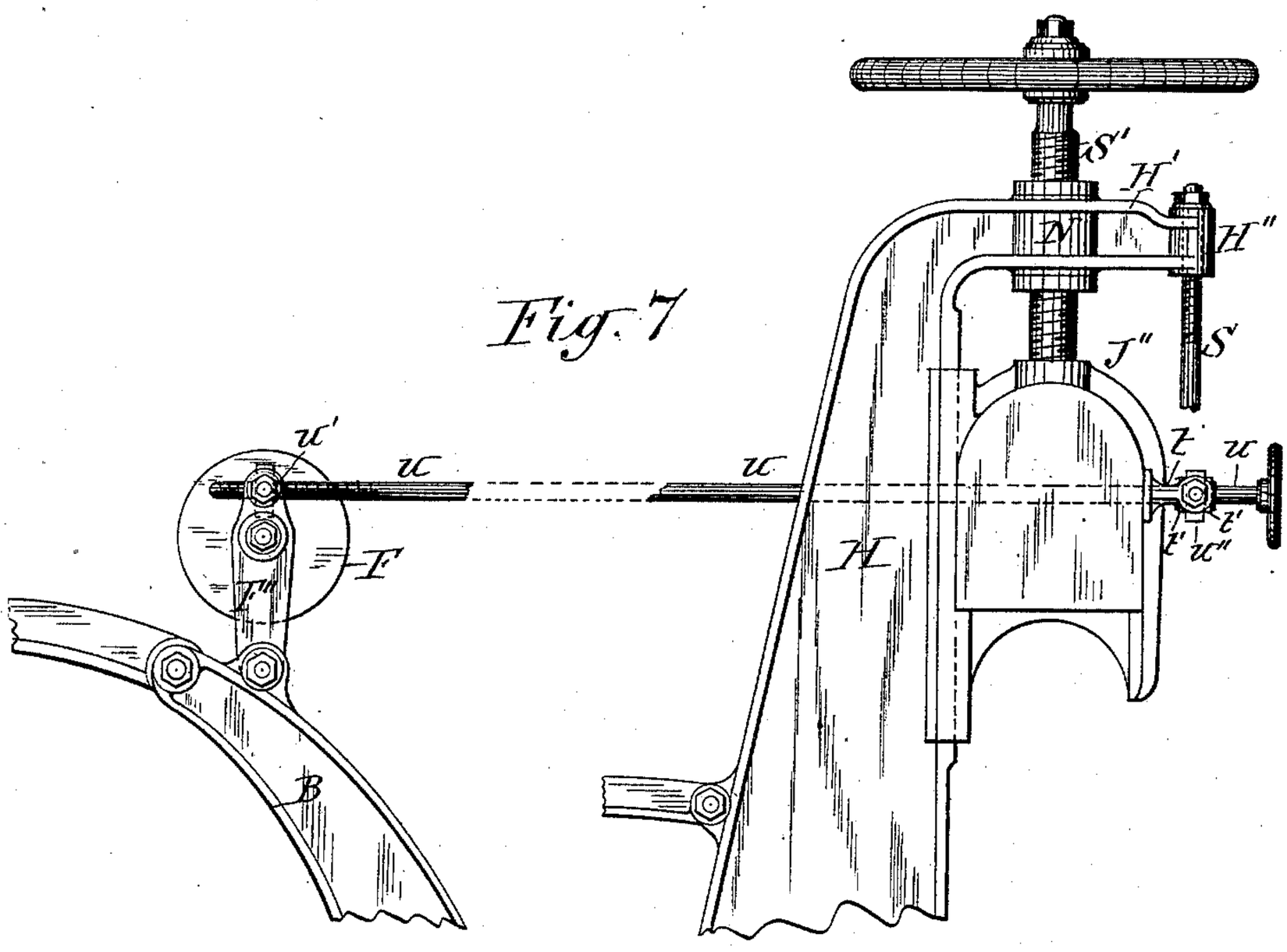

Fig. 7

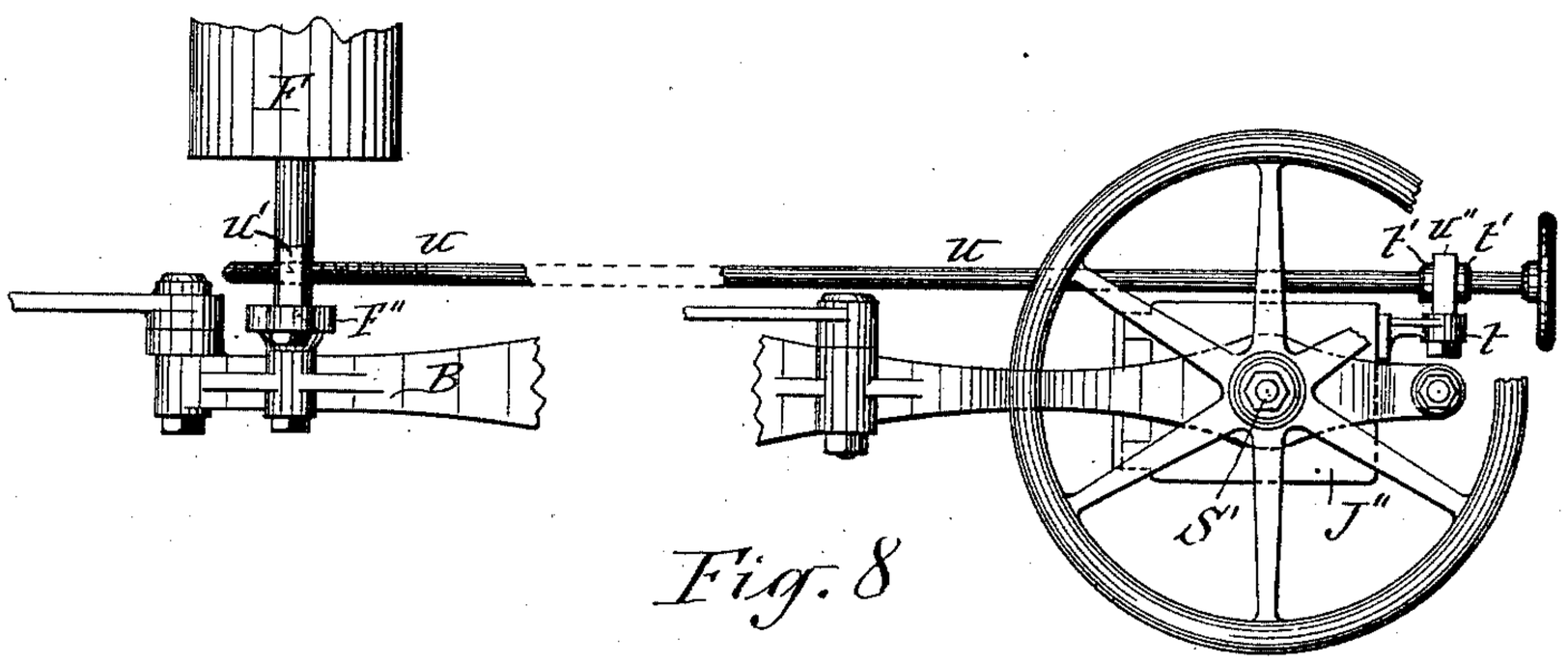

Fig. 8

WITNESSES:

C. L. Bendicon.

Mark W. Dewey.

INVENTOR.

Charles H. Campbell.

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES H. CAMPBELL, OF WATERTOWN, NEW YORK, ASSIGNOR TO THE BAGLEY & SEWALL COMPANY, OF SAME PLACE.

PAPER-MACHINE.

SPECIFICATION forming part of Letters Patent No. 393,538, dated November 27, 1888.

Application filed December 13, 1887. Serial No. 257,756. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. CAMPBELL, of Watertown, in the county of Jefferson, in the State of New York, have invented new and useful Improvements in Paper-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in an improved organization of the constituents of a paper or pulp sheeting machine which is comparatively simple in construction and very efficient in its operation, as hereinafter fully described, and specifically set forth in the claims.

My improvements are shown in the drawings herewith as applied to a machine for sheeting wood pulp, technically termed a "wet machine;" but any one skilled in the art will see their applicability to paper machinery as well.

Referring to the drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a vertical section view of the pressure-head frame, showing the arrangement of the spring and screw for applying the requisite pressure to the box or bearing of the upper pressure-roll. Fig. 4 is a horizontal transverse section on line *x x*, Fig. 3. Fig. 5 is a detached enlarged side view of one of the adjustable supports of the turning-rollers. Fig. 6 is a vertical transverse section of the same; and Figs. 7 and 8 are, respectively, detached side and plan views of the adjusting-screw and its connection with the support of one of the upper guide-rollers.

Similar letters of reference indicate corresponding parts.

A represents the main supporting-frame of the machine. From the front end of said frame rise and extend forward the standards B B, on the free ends of which are hinged the forwardly-extended arms D D, as shown at B'. The free ends of these arms are provided with a series of holes, *d d d*, distributed lengthwise of the arms, for the adjustable attachment of the brackets *d'*, on which the couch-roll E is journaled. About midway the height of the standards B B is one of the squeeze-rollers C, extended across the machine and pivoted to said standards.

From the top of the standard B, on one side of the machine, rises a bracket, *e*, to the base of which is pivoted an upward-projecting arm, F', which is provided at its upper end with the journal-box *o*, in which is journaled one end of the guide-roller F. Below the journal of the roller the arm F', on one side of the machine, is formed with a segmental slot, *e'*, as shown in Fig. 1 of the drawings, and through this slot and through the upper end of the bracket *e* extends a stud-pin, *e''*, which is provided with a head on the end back of the arm F', and has its opposite or outer end screw-threaded and provided with a suitable clamping-nut, *f*, as best seen in Fig. 6 of the drawings, which shows said devices arranged for supporting on the frame A the rollers M N, hereinafter described.

The slot *e'* allows the arm F', when unclamped, to be swung forward or rearward to carry the roller F a greater or less distance from the couch-roll E and pressure-rollers J K as may be required to properly support and guide the felt P. The arm F'' at the opposite side of the machine is pivoted to the standard B, and is sustained adjustably in its position by a nut, *u'*, swiveled on said arm, and a screw, *u*, which works in said nut and is extended to the rear end of the machine, where it passes through a box or sleeve, *u''*, swiveled on a bracket, *t*, attached to the guide J'' of the pressure-roller J, hereinafter described, or to any other suitable support on the machine.

The aforesaid screw *u* is restrained from longitudinal movement by collars *t' t'*, secured to said screw at the front and rear of the box *u''*. The rear end of said screw is provided with a hand-wheel by which to turn it. By turning the said screw the roller F is swung with its axis into various angles to the axes of the couch-roll E and pressure-rolls J K. This adjustment is necessary to take up the slack which is sometimes produced on one edge of the felt P by the uneven texture of the felt.

Directly over the squeeze-roller C and resting thereon is a similar roller, C', which is pivoted on the free ends of arms C'', hinged on the pressure-head frame H.

From the rear of the frame A project rearward two horizontal arms, L'', which are formed with longitudinal guide grooves or

ways *g*, and in said grooves or ways are movably mounted brackets L′, on which is pivoted a roller, L. To each of said brackets is connected a nut, *h*, and in said nut works a screw, *h*′, which is journaled in a cross-wall, *g*′, at the forward end of the way *g*, and is prevented from moving endwise by collars secured to the screw at opposite sides of the wall *g*′. By means of the screws *h*′ *h*′ the brackets L′ L′ can be held a greater or less distance rearward to carry the felt P with the requisite tension.

M and N denote turning and guiding rollers extended across the frame A, underneath the pressure-head frame H, and preferably equidistant from the center of the length of the frame. Said rollers are adjustably supported in the same manner as the guide-roller F, hereinbefore described, but their supports are not provided with the adjusting-screw *u*.

J and K represent, respectively, the upper and lower pressure-rolls, which I support on a pressure-head frame, H, rising from the center of opposite sides of the frame A and firmly secured thereto. The frame H is formed separate from the frame A and made to carry the journal box or bearing *b* of the lower pressure-roll, K, independent of the frame A by a shoulder, *a*, on the base of the frame H, and a corresponding shoulder, *b*′, on the box or bearing *b*, resting on the shoulder *a*. The upper end of the pressure-head frame H is formed with a forward-projecting head, H′, which has a vertical nut, N, either formed integral therewith or rigidly attached to it in any suitable manner, and the free end of the head H′ is formed with a vertical sleeve, H″, through which is extended a screw-rod, S, the lower end of which passes through an ear or sleeve, *b*″, on the journal-bearing *b*, and is provided with a head underneath said ear or sleeve. The upper end of the screw-rod is provided with a nut by which to tighten the hold of said rod on the sleeves *b*″ and H″, and support the box or bearing *b* in such manner as to entirely relieve the frame A from the pressure of the rolls K J. Through the nut N is extended a stout screw, S′, which is coupled to the journal-box J′ of the upper pressure-roll, J, by means of a yoke, *i*, rigidly attached to the said box, and having the lower end of the screw S′ swiveled to it, as shown in Fig. 3 of the drawings.

The box J′ is sustained movably vertically in a guide, J″, secured adjustably vertically to the pressure-head frame H, and receives downward pressure by means of a stout spiral spring, T, interposed between the box J′ and a collar, *c*, swiveled on the screw and resting with its top against a shoulder on the said screw. The neck on the lower end of the screw by which it is swiveled on the box J′ is of sufficient length to allow the screw to move longitudinally on said swiveled connection, and thus by turning the screw the collar *c* can be crowded toward the box J′ and the pressure of the spring increased accordingly. Said spring, being necessarily very stiff, requires but a very slight adjustment of the screw S′ to increase the pressure when desired.

It will be observed that all the pressure exerted by the spring T is resisted by the frame H and rod S, supporting the journal box or bearing J′ of the lower pressure-roll, J, and thus the main frame A is relieved from said strain, and is only subjected to the weight of the pressure head frame H and devices mounted thereon.

R represents the main driving-shaft supported at its outer end on a pillow-block, R′, and at its inner end in a journal-box secured to the main frame A. On said shaft are mounted the driving-pulley R″, pinion *j*, and gear-wheel *j*′. Said pinion meshes with a gear-wheel, *k*, secured to the shaft of the lower pressure-roll, K, and thus transmits motion to said roll in the direction indicated by arrows in Fig. 1 of the drawings.

Across the forward portion of the frame A is extended the rotary felt whipper or washer V, which is pivoted to the sides of the frame and is provided with radial wings, which during the rotation of the whipper strike the side of the felt on which the pulp has been carried. Said felt-whipper receives motion by a gear, *l*, on the shaft of the whipper and intermediate gears, *l*′ and *l*″, transmitting motion from the gear-wheel *j*′ to the gear *l*.

In the operation of the machine the felt P travels from the top of the couch-roll E over the top of the guide-roller F, thence between the pressure-rollers J K, which express the water from the pulp lying upon the felt. From thence the felt passes with its clean or bare side over the top and rear side of the guide-roller L, and under the guide-rollers M N, beneath the pressure-rollers J K, and thence passes over the whipper or washer V, which is arranged at the pulp-carrying side of the felt and thoroughly cleanses the felt, which then passes between the squeeze-rollers C C′, which express the water from the felt, and in this condition it passes around the under side and front of the couch-roll E and over the top thereof. It will be observed that in passing over the several guide-rollers F, L, M, and N the felt always presents the clean side to said rollers, and thus the adhesion of pulp to the rollers is obviated.

An additional guide-roller, *m*, may be employed between the squeeze-roller C′ and couch-roll E. Said guide-roller should be pivoted on arms *n*, hinged to the couch-arms D D, as shown in Figs. 1 and 2 of the drawings.

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

1. In combination with the frame A and pressure-rolls K J, the pressure-head frame H, formed separately from the frame A and with the sleeve H″ on the upper end thereof, the journal-box *b*, seated adjustably on the lower portion of the frame H and provided with the sleeve *b*″, and the screw S, adjustably

connecting the sleeves H″ and *b″* and supporting the box *b* independently of the frame A, to entirely relieve said frame from the pressure of the aforesaid rolls, substantially as described and shown.

2. In combination with the main frame A, pressure-rolls K J, and endless felt P, the pressure-head frame H, mounted on the frame A, provided at its base with the shoulder *a*, and at its upper end with the head H′, nut N, and sleeve H″, the journal-bearing *b*, having a shoulder, *b′*, resting on the shoulder *a* and provided at its opposite side with the sleeve *b″*, the screw-rod S, connecting the sleeves *b″* and H″, the guide J″, secured to the head H, the box J′ in said guide, the screw S′, extending through the nut N and coupled to the box J′ and provided with the collar *c*, and the spring T, interposed between the collar *c* and box J′, substantially as described and shown.

3. In combination with the supporting-frame, couch-roll E, pressure-rolls K J, and endless felt P, the bracket *e* on one side of the frame, the arm F′, pivoted to the base of said bracket and provided with the slot *e′*, the roller F, journaled on the upper end of the arm F′, the stud-pin *e″*, extending through the slot *e′* and upper end of the bracket *e* and provided with the clamping-nut *f*, the arm F″, pivoted to the opposite side of the frame, the nut *u′* on said arm, the screw *u*, working in said nut, the box *u″*, swiveled to a support on the machine, and collars *t′ t′*, attached to the screw at opposite ends of said box, substantially as described and shown.

4. In combination with the frame A and endless felt P, the horizontal arms L″ L″, projecting rearward from the frame and provided with the longitudinal ways *g*, the brackets L′ L′, mounted movably on said ways, nuts *h*, connected to the brackets, and the adjusting-screws H′, working in said nuts and confined from longitudinal movement on the arms L″ L″, substantially as and for the purpose set forth.

In testimony whereof I have hereunto signed my name, in the presence of two witnesses, at Watertown, in the county of Jefferson, in the State of New York, this 1st day of December, 1887.

CHARLES H. CAMPBELL. [L. S.]

Witnesses:

CHAS. D. BINGHAM,

G. A. BAGLEY.