(No Model.)

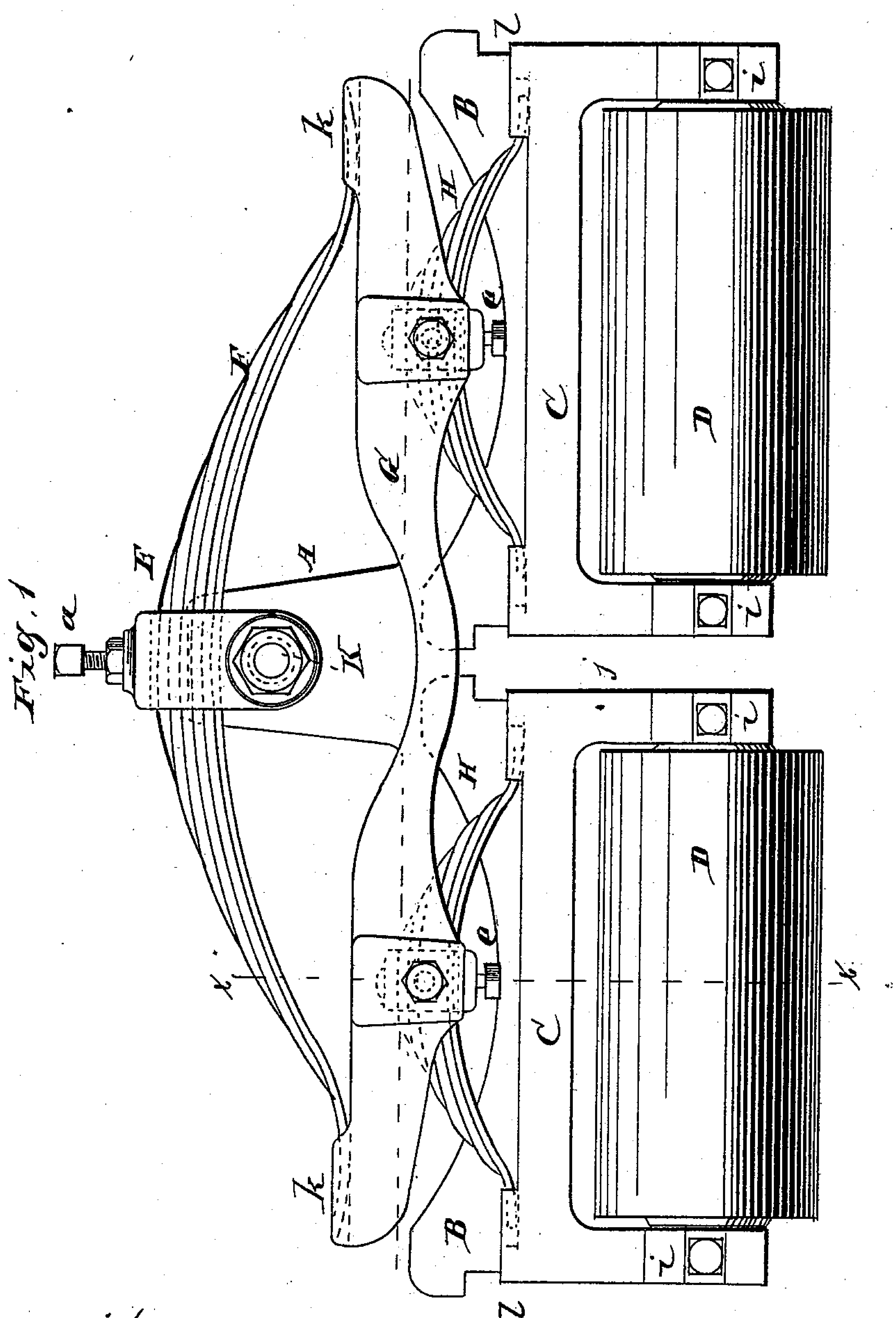
3 Sheets—Sheet 1.

L. P. HOYT.

PLANING MACHINE.

No. 352,976.

Patented Nov. 23, 1886.



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(No Model.)

3 Sheets—Sheet 2.

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PLANING MACHINE.

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Fig. 2

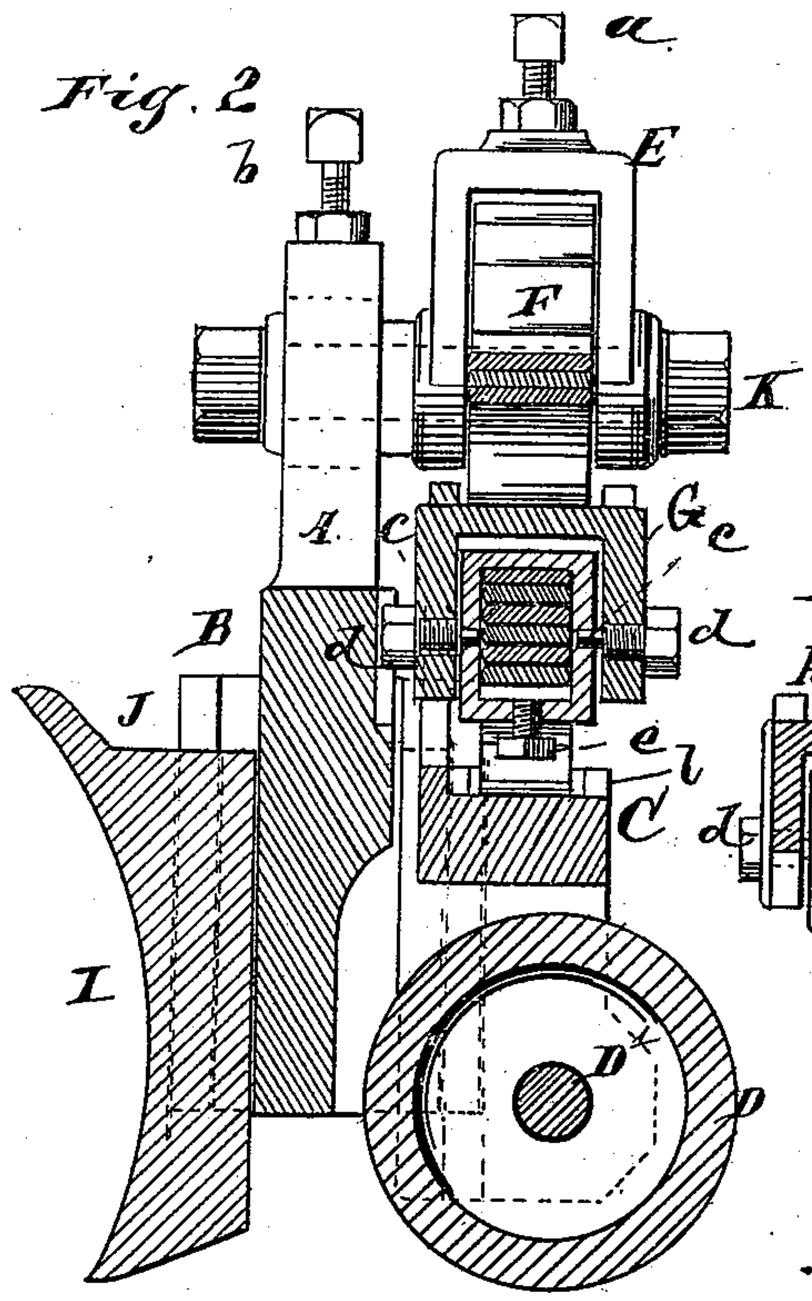

Fig. 5

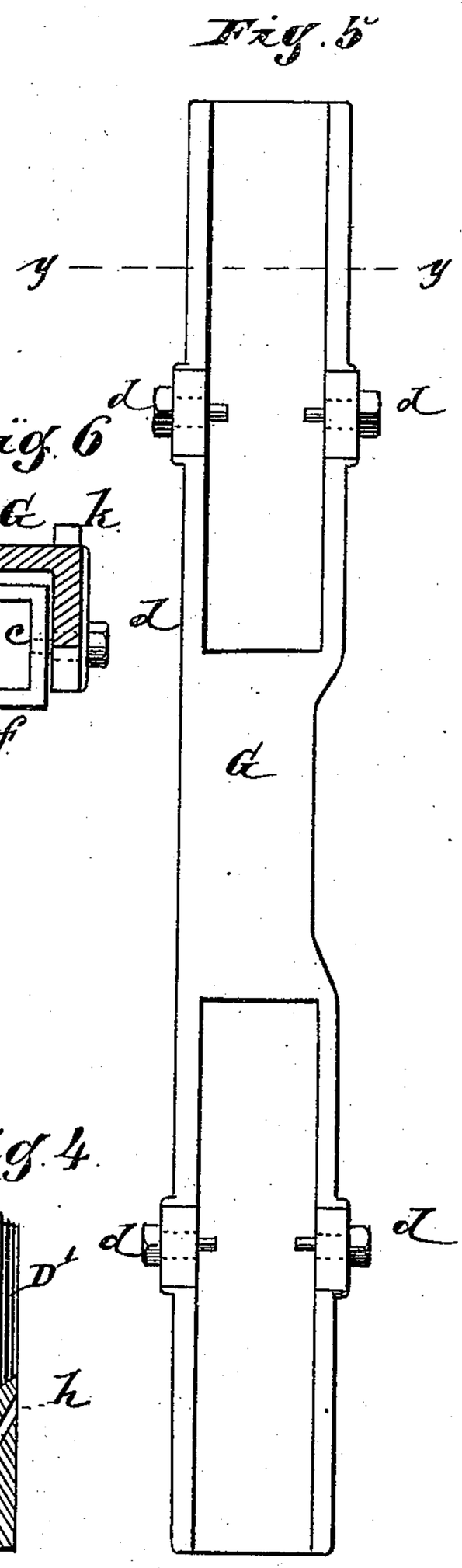

Fig. 6

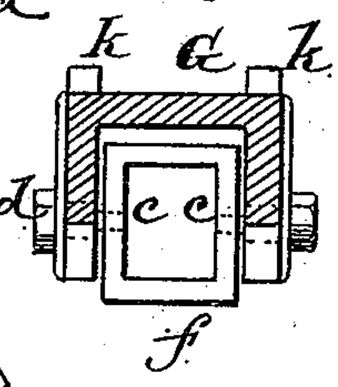

Fig. 3

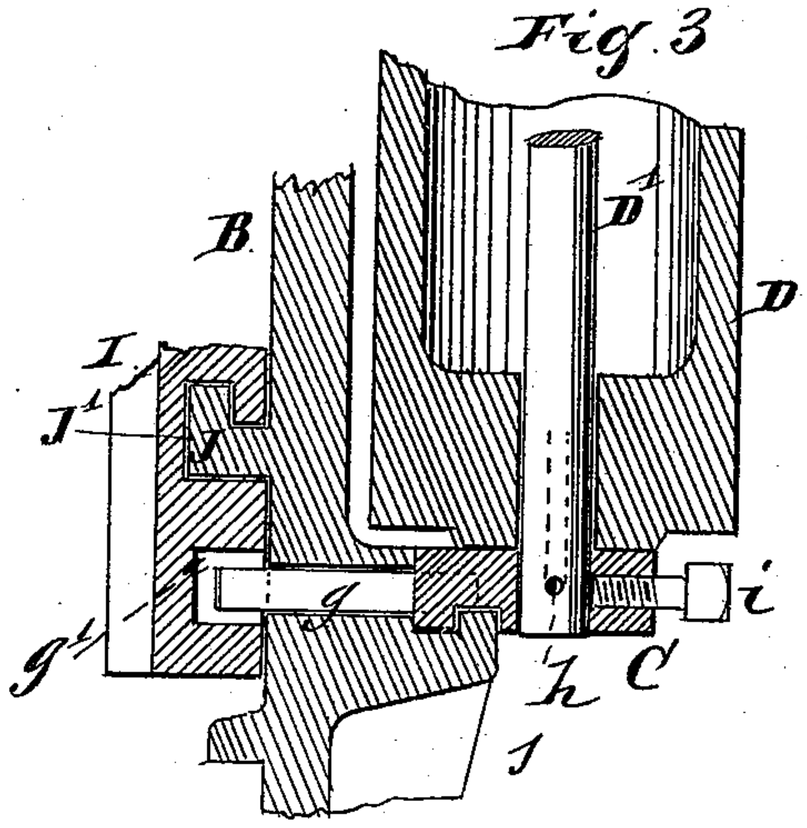

Fig. 4

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 7

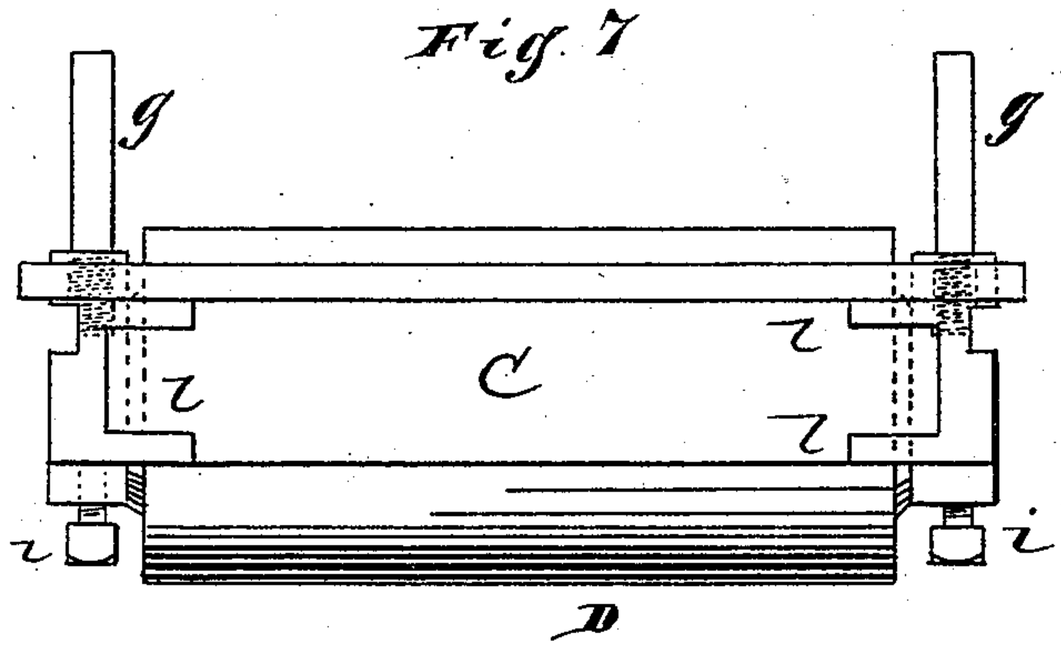
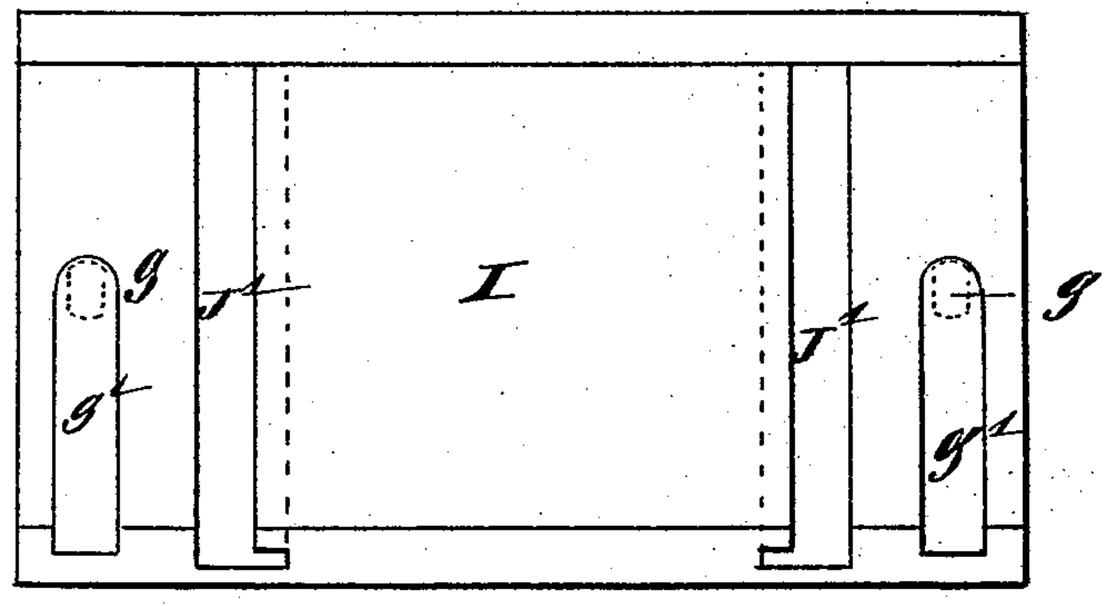


Fig. 8.



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UNITED STATES PATENT OFFICE.

LUCIUS P. HOYT, OF AURORA, ILLINOIS.

PLANING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 352,976, dated November 23, 1886.

Application filed July 16, 1885. Serial No. 171,811. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS P. HOYT, residing at Aurora, in the county of Kane and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Planing-Machines, of which the following is a full description, reference being had to the accompanying drawings.

This invention relates to pressure mechanism pertaining to planing-machines of that class wherein provision is made for simultaneously running through the machine and reducing in thickness two boards or pieces of lumber, regardless of their relative thickness before their introduction into the machine.

In planing-machines of such character it has been usual to provide a divided spring-controlled pressure-roll, or two independent spring-controlled pressure-rolls arranged in a line transversely to the line of feed, so that each pressure-roll may automatically adjust itself in height to the thickness of the particular board or piece of lumber upon which it is intended to bear, and in one instance it has been proposed to provide two half-elliptic distributing-springs, one for each roller, with the ends of each spring applied to the vertically-sliding journal-boxes of the roller to which it is allotted, in conjunction with a third and somewhat larger half-elliptic mainspring, which at its middle is held in rigid connection with the usual main supporting-frame by a vertically-adjustable clip, and at its ends arranged to bear upon the clips which secure together the leaves of the said distributing-springs, and which fit between vertical guides on the main supporting-frame. Under such arrangement one roller necessarily adjusts itself to the thickness and contour of the board on which it operates without affecting the adjustment or pressure of the other roller; but where either roller is unduly raised by reason of an increase in thickness of the work the yielding but constantly-increasing spring resistance provided in opposition to such rise on the part of the roller is due simply to the action of the particular distributing-spring allotted to such roller, combined with the spring action of but one-half of the mainspring, in which way the functions of the mainspring so far as its action conjointly with the distributing or subordinate springs is concerned are the same as though it were divided into two separate springs, one bearing directly upon the middle portion of one and the other bearing directly upon the middle portion of the other of the said two distributing or subordinate springs.

The object of my invention is to improve upon said construction or organization of spring-pressure mechanism, whereby, first, while each roller may adjust itself to the thickness or contour of the work on which it operates without affecting the adjustment or pressure of the other roller, the individual spring action of each one of the distributing or subordinate springs may operate conjointly with the spring action of the entire length of the mainspring, the spring-pressure controlling each roller being equally distributed between the distributing-spring which is allotted to such roller and the full length of a mainspring that is common to both of the two distributing-springs.

A further object is to provide for the employment of a much longer mainspring than has heretofore been found practicable in the employment of a mainspring in connection with a pair of distributing or subordinate springs, whereby the spring-pressure mechanism may have a wider range of action than heretofore.

A further object is to permit the rollers to tilt from either end without subjecting the raised end portion of the tilted roller to a spring-pressure greater than the pressure exerted upon its opposite lower end.

To the attainment of these and other useful ends my invention consists in certain matters hereinafter described, and particularly pointed out in the claims.

In carrying out the principles of my invention the two pressure-rollers are separately journaled in vertically-movable housings, and upon each housing is arranged to bear one of a pair of distributing or subordinate springs. These springs are connected with a tilting balance or equalizing bar, upon which latter the ends of the mainspring are arranged to bear. The said mainspring is secured to a rocking box or bearing, which permits the spring to tilt bodily. When, for example, the hous-

ing of either pressure-roller is under such arrangement raised against the spring-pressure mechanism, the yielding spring-pressure resistance in opposition to the rise of the pressure-roller will be distributed throughout both its particularly-allotted distributing-spring and the mainspring, without, however, affecting the distributing-spring allotted to the other pressure-roller, such action being due to the fact that the distributing-springs are connected with the balance-bar at points between the points of contact or connection between the mainspring and the balance-bar, and to the further fact that the mainspring is secured to a rocking bearing. The particular action of the springs under such circumstances can, however, be better explained in connection with the drawings, and hence said action will be hereinafter more particularly set forth.

By extending the balance far beyond the points where it rests upon the distributing-springs the mainspring can be made much longer than where it is arranged to bear at its ends directly upon the middle portions of the distributing-springs, and by pivotally connecting the distributing-springs with the balance-bar by means of pivoted or rocking clips or boxes the distributing-springs will be free to tilt bodily in case an end of either roller is raised from a horizontal plane, without causing the spring directly allotted to such roller to exert an excess of pressure upon the raised end of the latter.

In the drawings, Figure 1 represents in elevation my improved pressure-mechanism attachment. Fig. 2 represents a transverse vertical section taken on the line *x x*, Fig. 1. Fig. 3 is a sectional detail view, principally representing a horizontal section taken through one end portion of the frame and one end portion of one of the pressure-rollers on a plane coincident with the axis of the roller. Fig. 4 represents a position of one of the roller shafts or axles, partly in longitudinal section. Fig. 5 is a bottom plan view of the balance or equalizing bar. Fig. 6 represents a cross-section taken through the balance-bar on the line *y y*, Fig. 5, the rocking clip or box, which is to be attached to the balance-bar at this point, being included in said view. Fig. 7 is a top plan view of one of the roller-supporting frames or housings. Fig. 8 represents in elevation the rear side of a chip-breaker which may be employed in connection with the present attachment.

In said drawings the main frame of the attachment is provided with a centrally-arranged raised portion, A, formed to rise from a body portion, B, that will in practice be provided with suitable flanges or other means appropriate for attaching it in proper place upon a planing-machine. The vertically-movable frames or housings C C, in which the pressure-rolls D D are mounted, have suitable sliding connections with the main frame—such, for example, as the tongue-and-groove connections shown at *j*, Fig. 3—said connections being desirably made at the ends of the housings. The two distributing or subordinate springs H H are respectively arranged to bear upon one and the other of the two housings C, which are provided at points adjacent to their upper end corners with projections *l*, arranged to provide seats for receiving and holding upon said housings the ends of the distributing-springs H. The balance or equalizing bar G is arranged over and supported by the distributing-springs H. The mainspring F is held at its middle within a vibratory or rocking clip or box, E, which is pivotally attached by a pivot-bolt, K, to the raised portion A of the main frame, so as to provide for said spring a rocking bearing or support, which permits the spring to tilt bodily. The ends of the mainspring bear upon the balance-bar at or near the ends of the latter at points beyond the points where said bar is supported by the distributing-springs H, the bar being at its ends extended beyond its point of connection with the distributing-springs. In order to maintain the mainspring in connection with balance-bar the latter is provided with suitable seats for the ends of the spring—as, for example, it may be provided on its upper side with a pair of lugs, *k*, at each end, with the ends of the mainspring arranged to lie between said lugs.

The action of this spring-pressure mechanism will be understood from the following, to wit: Should one of the pressure-rolls be raised higher than the other by reason of an increase in thickness of a passing piece of lumber, the distributing-spring allotted to such roll will be subject to an upward pressure, tending to straighten it out. In thus yielding to the up pressure it will transmit force upwardly against the balance-bar, the force or power thus transmitted by the distributing-spring being exerted against the balance-bar at a point between the middle and one end of the latter, under which circumstances the balance-bar may be regarded as a lever of the third order, having, however, a yielding spring-fulcrum. Thus the resistance of the mainspring bearing at one end of the bar may be considered as the yielding spring-fulcrum, the resistance of the mainspring as applied to the opposite end of the lever as the weight or resistance, and the force transmitted through the distributing-spring as the power applied upwardly against the lever at a point between the weight and fulcrum, and adjacent to the latter. Since, however, the mainspring is held at its middle by a rocking bearing or support, and is therefore free to tilt, the tendency of the power thus exerted to swing up the bar at one end from and about its yielding fulcral point will also act to raise the other end of the bar against the spring resistance, which thus affords a temporary spring-fulcrum. The act of raising the bar at its end nearest the power, and simul-

taneously opposing with the power any downward tilt of the opposite end of the bar, distributes the force applied throughout the tilting mainspring in a manner to also counteract the tendency of the said opposite end of the bar to rise, whereby although the mainspring may be more or less straightened out, yet it will be lifted only at its end which is over the pressure-roller that is raised.

As a further explanation of the foregoing action of the tilting bar and mainspring, let it be supposed that two pieces of lumber differing from each other in thickness are passed under the two rollers, respectively, whereby the thicker piece of lumber will cause one of said two rollers to rise higher than the other. The tilting bar may now be regarded as a lever against which the power is applied upwardly, and nearer to one than to the other of its ends. The spring resistance due to the application of the end of the mainspring on the bar at that end of the latter which is nearest the power thus applied may be regarded as a spring or yielding fulcrum, while the resistance of said spring as applied to the end of the lever that is farthest from the power may be considered as the weight or resistance. The power thus applied will necessarily raise the lever against the spring resistance at its end nearest the power, and simultaneously therewith it will have a tendency to lift or swing up the opposite end of the lever; but this tendency of the power to swing up the end of the lever that is farthest from the power and over the roller-bearing on the thinner of the two pieces of lumber will be counteracted by the lifting force against the end of the lever that is nearest the power or lifting force, since the said force at this last-mentioned end has a tendency to bodily tilt the mainspring in a direction downwardly and in opposition to any tendency on the part of that end of the lever which is farthest from the power to rise, and hence, while one end of the mainspring may be raised higher than the other, the mainspring will straighten out uniformly throughout its length, and without materially exerting upon one roller a greater or less pressure than it exerts upon the other roller. Of course the same principle of action in the spring-pressure mechanism applies to both pressure-rolls; but where one roll is raised higher than the other the resistance will be so distributed throughout the alotted distributing-spring and the mainspring as to practically avoid either an increase or decrease of pressure upon the remaining pressure-roll.

Where the up pressure against either or both distributing-springs is comparatively moderate the distributing spring or springs alone may yield sufficiently to permit the roll or rolls to accommodate themselves in height to the thickness of the work; but where thick pieces of lumber are planed—such as joists or square pieces of timber — the upper mainspring is especially serviceable, since after either or both of the lower distributing-springs have yielded to a certain extent and an additional yielding spring resistance becomes desirable, such additional spring resistance will be attained by the action of the upper mainspring; also the spring action of the entire length of mainspring is rendered available to one of the two rollers, which feature is not attainable where the mainspring is held as a fixture at its middle, it being evident that in the latter case each roller is subject to but one-half the length of the mainspring. It will also be seen that by reason of the extension of the balance-bar beyond the points where it bears upon the lower distributing-springs a much longer mainspring can be employed than where the ends of a mainspring bear directly on the lower springs, and hence the range or capacity of the spring resistance be considerably augmented.

The distributing-springs H are held at their middle portions by pivoted rocking clips or boxes *f*, herein shown pivoted between pendent side lips or extensions of the balance-bar, as best illustrated in Fig. 6, wherein one of said boxes is provided with holes *c*, which serve to receive the pivots *d d*. By thus pivoting the clips or boxes which hold the distributing-springs H either end of either one of the roller frames or housings C can be slightly raised should the nature of the work tend to tilt the pressure-roll journaled in such box, in which case the distributing-spring will tilt and balance itself, so as to avoid undue pressure upon the higher end of the roll. This feature is particularly applicable to a pressure mechanism where a balance-bar such as herein described is employed; but, more broadly considered, it could be applied to the old form of spring-pressure mechanism, wherein the balance-bar is absent and the upper spring or springs applied against or connected with vertically-sliding clips or boxes, which prior to my invention have in spring-pressure mechanism for planing-machines been incapable of a rocking movement.

The bolt K, upon which the clip or box of the mainspring is free to turn, is desirably attached to the main frame in a manner to permit it to be raised or lowered, so as to vary the spring-pressure, to which end the frame can be slotted vertically to receive said bolt and the latter squared or flattened to hold it against turning.

A set-screw, *b*, is arranged to pass down through the upper portion, A, of the main frame in order to securely maintain the bolt in its adjustment, but permit the same to be raised or lowered, as may be desired. The mainspring is conveniently held in its clip or box by a set-screw, *a*, while the distributing-springs are held in their respective clips or boxes by like set-screws *e*. The springs herein shown are all half-elliptical, each desirably composed of two or more leaves; but, if desired, other forms of spring could be obvi-

ously substituted for the distributing-springs H, and arranged to bear directly upon the middle portions of the frames or housings of the pressure-rolls.

In order to provide comparatively light rolls and housings therefor, and to avoid weighting down the housings by extra metal sufficient to afford bearings for the journals of the rolls, I may, when desired, make the pressure-rolls hollow, except at their ends, and mount them to revolve on fixed shafts or axles D′, which are secured in the frames or housings C by set-screws *i*, as best shown in Fig. 3.

In order to lubricate the bearings at the ends of the rolls, which turn on the fixed axles, the latter are conveniently provided with diagonally-arranged oil ducts or passages *h*, (see Fig. 4,) which at one end open at points beyond the rolls, and at the other end open at points opposite said end bearing portions of the rolls, in which way a lubricant can be readily supplied to points where the rolls bear and turn upon the fixed shafts or axles.

It has been customary to provide spring-pressure mechanisms for planing-machines with chip-breakers, and hence I have herein shown a chip-breaker, I, provided with vertical grooves J′, Figs. 3 and 8, in which hook-shaped projections J upon the back of the main frame are received. The chip-breaker is also provided with grooves *g*′, in which limit-pins or stops *g* on the main frame are received for the purpose of preventing the chip-breaker from being raised too high or dropping too low.

What I claim as my invention is—

1. The combination, with the independent pressure-rolls, of the two independent distributing-springs, one on each roller, the balance-bar supported upon both of the distributing-springs, and the mainspring held at the middle by a rocking box or bearing, and at its ends arranged to bear upon the balance-bar, substantially in the manner and for the purpose herein described.

2. The combination, with the independent pressure-rolls, of the two tilting distributing-springs held at their middle portions by vertically movable and rocking clips or bearings, and bearing one on each roller, and a main upper spring common to both distributing-springs, substantially as and for the purpose described.

3. The combination, with the independent pressure-rolls, of the balance-bar, the distributing-springs held at their middle portions by clips or boxes pivoted to the balance-bar, with each distributing-spring bearing on one pressure-roll, and the mainspring bearing upon the balance-bar, substantially as described.

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