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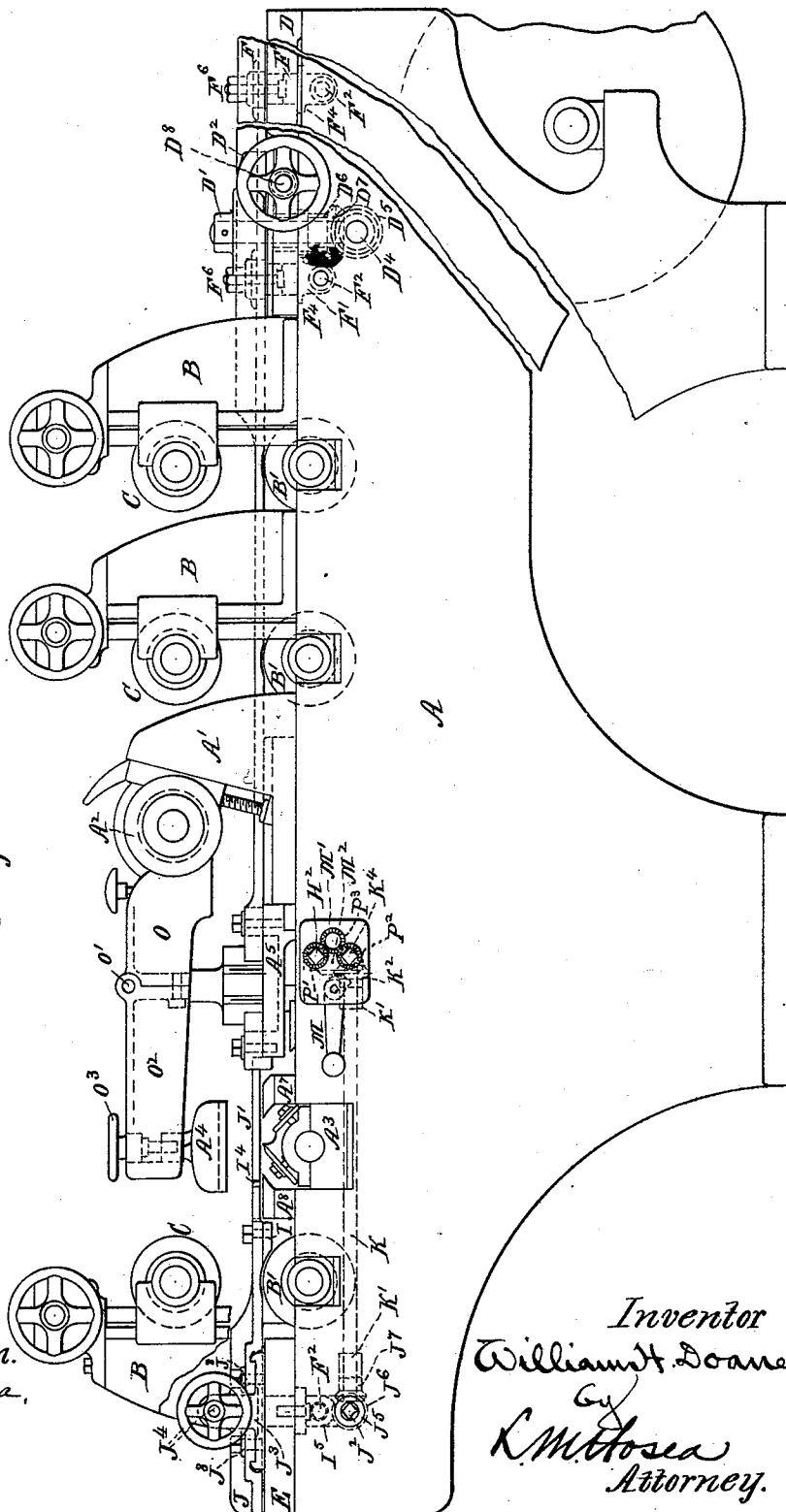
4 Sheets—Sheet 1.

W. H. DOANE.  
PLANING AND MATCHING MACHINE.

No. 463,577.

Patented Nov. 17, 1891.

Fig. 1.



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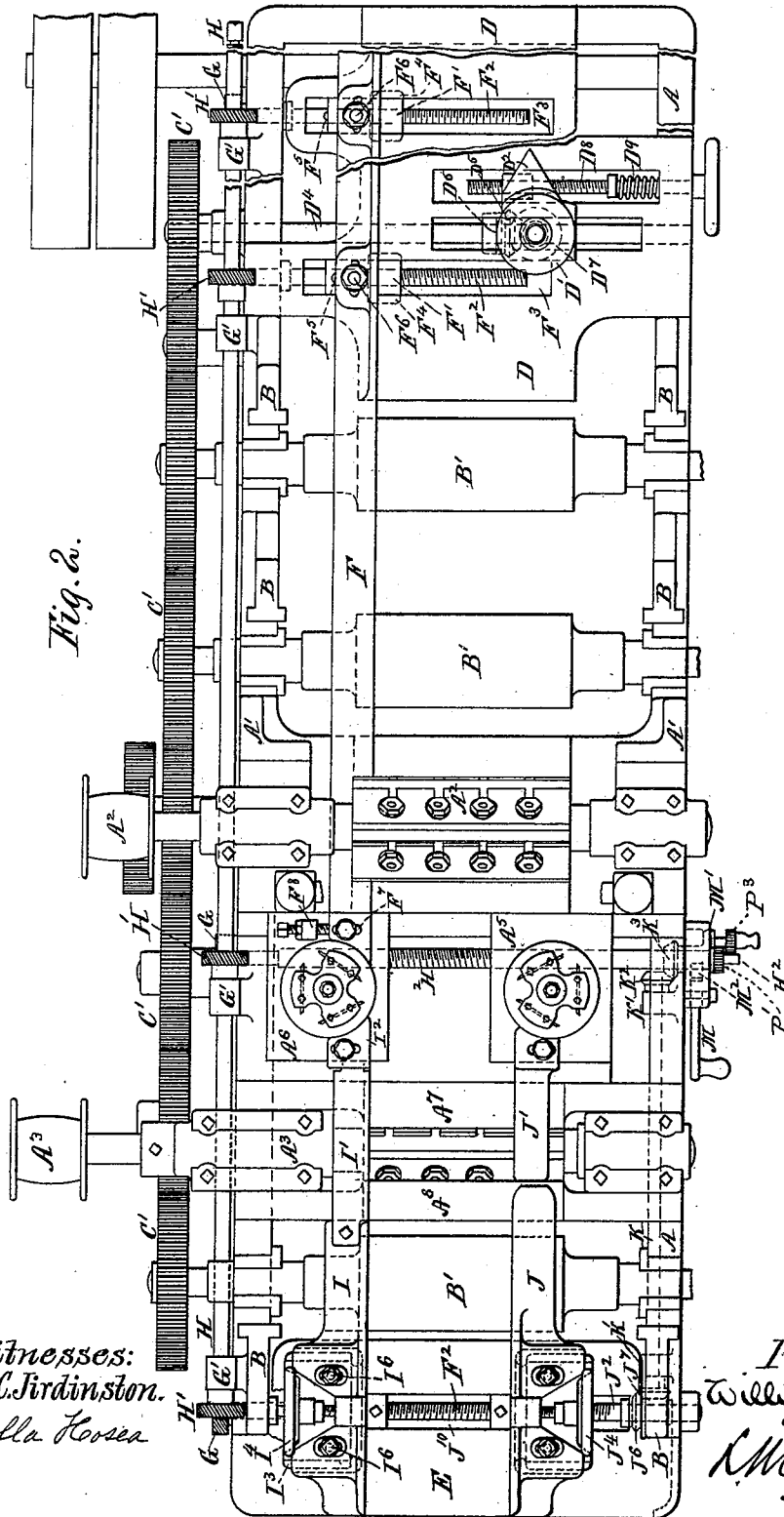
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W. H. DOANE.  
PLANING AND MATCHING MACHINE.

No. 463,577.

Patented Nov. 17, 1891.



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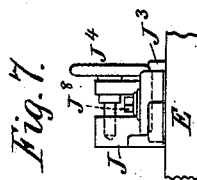
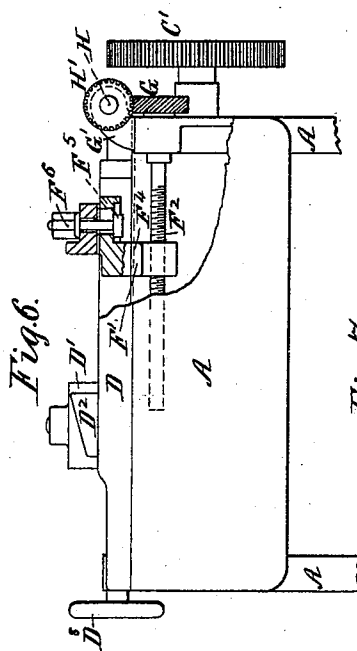
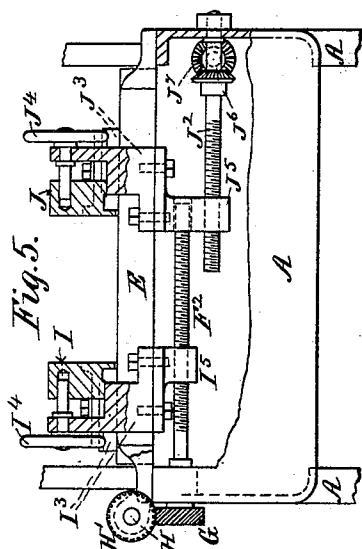
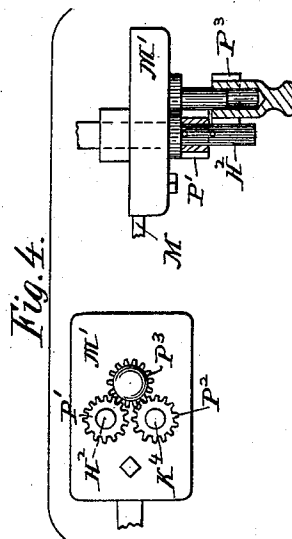
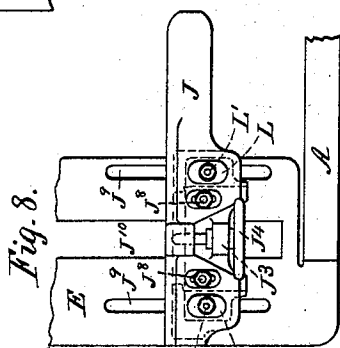
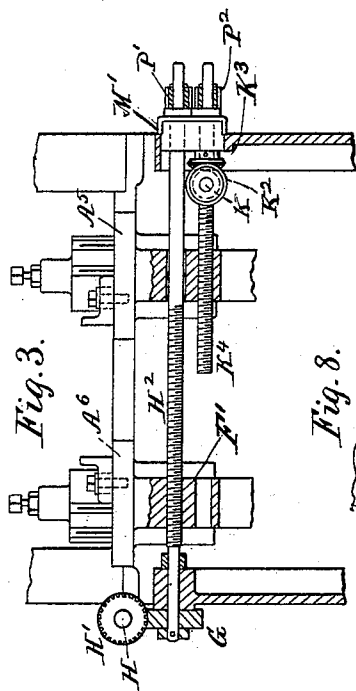
4 Sheets—Sheet 3.

W. H. DOANE.

## PLANING AND MATCHING MACHINE.

No. 463,577.

Patented Nov. 17, 1891.



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# UNITED STATES PATENT OFFICE.

WILLIAM H. DOANE, OF CINCINNATI, OHIO.

## PLANING AND MATCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,577, dated November 17, 1891.

Application filed January 14, 1889. Serial No. 296,256. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. DOANE, a citizen of the United States, residing at Cincinnati, Ohio, have invented new and useful  
5 Improvements in Planing and Matching Machines, of which the following is a specification.

My invention relates to planing and matching machines, its object being to facilitate adjustment and manipulation of the parts and secure a more perfect coaction between the same, so as to improve the quality of the work done, and, generally, to economize labor in the manipulation of the machine and promote  
15 rapidity of action.

To this end my invention consists, generally, first, in a substantially continuous movable guide or "fence" extending from the feeding-in to the feeding-out end of the machine at the right side, provided with adjusting devices, whereby the same may be shifted as an entirety to utilize the entire width of the cutter-cylinders by shifting from dulled zones to unused parts, thus avoiding the necessity of too frequent removal of the cutting-knives for regrinding or changing and constructed with an adjustable face-section to obtain nicer final adjustments independently of the shifting mechanism; second, in the construction and arrangement of the fence-shifting shaft and its connections, tending to facilitate the adjustment of the fence without interfering with the removal of the lower cutting-cylinder; third, in the construction of the fence or board guide, whereby the guiding-face is susceptible of a minor adjustment across the platen independently of the general shifting devices; fourth, in the construction and arrangement of an auxiliary and independently-adjustable feed-out fence at the left side of the machine; fifth, in the combination, with said auxiliary feed-out fence, of connections with the main fence and its shifting mechanism for simultaneously operating  
35 both fences in fixed relations when desired; sixth, in the construction of said auxiliary fence and its adjusting devices in relation to its matcher-head, whereby the auxiliary fence and its matcher-head may be adjusted together in relation to the opposite or main fence independently of or by coupling to the main fence-shifting mechanism, or the auxil-

iary fence may be independently adjusted in relation to its matcher-head to compensate variation in width of lumber occasioned by wear of the cutter-bits or other causes; also, in the construction of the auxiliary fence with supplemental adjusting features for finer ultimate adjustments without changing its general position or relations with its matcher-head or the opposite fence; seventh, in the provision and arrangement of a locking device for securing the opposite matcher-heads permanently in adjusted relations; eighth, in the combination of an adjustable feed-in fence with an adjustable side or edge feed-roll, either capable of being moved toward the other across the bed of the machine; ninth, in the combination, with the surfacing-cylinders, matcher-heads, and fences, of a presser-bar for the lower cylinder carried upon an extension of the upper cylinder-housing and adjustable therewith, and, lastly, in certain other features of constructive detail, as hereinafter described, and pointed out in the claims.

Mechanism embodying my invention is illustrated in the accompanying drawings, in which—

Figure 1 is a "left" or "working" side elevation of a planing and matching machine to which my invention is applied, details and connections of parts not immediately concerned being omitted for clearness of illustration; Fig. 2, a plan view of the machine; Fig. 3, a detail end view of the matcher-hangers, showing the gears and screw connection with the guide-moving shaft. Fig. 4 is a detail plan and end elevation of the adjustable connecting devices for operating the matcher-hangers simultaneously or independently; Fig. 5, an end view of the machine, partly sectioned, showing construction of the feed-out fences and their adjusting mechanism; Fig. 6, an end view of the right guide at the feed-in end of the machine; Fig. 7, an end view of the feed-out guide; Fig. 8, a detail plan showing a modified form of the adjustable feed-out guide, in which the connection with the matcher-hanger is omitted; Figs. 9, 10, and 11, detail plan elevation and section, on a slightly enlarged scale, of the parts shown in Fig. 8; Figs. 12 and 13, a detail side view and plan, respectively, of the locking device for the matcher-adjusting screws; Fig. 14, a

detail side view showing the construction and arrangement of the fence-moving shaft and spiral-gear connections; Fig. 15, a plan detail of the upper cylinder-housing frame with

5 presser-bar overhung thereon.

Referring now more particularly to the drawings, A designates the main frame or supporting-bed of the machine, which, in the machine to which my invention is applied, is  
10 made of liberal width to accommodate longer cylinders, in order to allow for shifting the board to new cutting portions of the cutters as the used zones become worn. This is done to economize the labor and time of removing  
15 cutter-blades for sharpening, as well as to accommodate the lumber of varying widths.

A' designates the upper cylinder-housing frame; A<sup>2</sup>, the upper cylinder and bearing; A<sup>3</sup>, the lower cylinder and bearing; A<sup>4</sup>, the  
20 presser-bar over the lower cylinder; A<sup>5</sup> A<sup>6</sup>, matcher-hangers carrying matcher-heads mounted on vertical cross-bars, and A<sup>7</sup> A<sup>8</sup>, cross-bars before and after the cut of the lower cylinder.

B B B designate the roll-stands; B' B' B', the lower rollers, and C C C the upper rollers. The lower rollers are connected by a train of  
25 gears C' C' C', and the upper rollers are driven by expansion-gearing. (Not shown.)

The feed-in platen D, Fig. 2, carries a side or edge feed-roll D', fitted rigidly to a pintle carried vertically in bearings in a slide-frame D<sup>2</sup>, gibbed to the under side of the platen, said pintle carrying at its lower end a bevel-gear D<sup>7</sup>. The frame D<sup>2</sup> is formed with a downwardly-projecting yoke D<sup>6</sup>, embracing the hub of the bevel-gear D<sup>5</sup>, carried in a "pin-and-feather" sliding engagement upon a driving-shaft D<sup>4</sup>, journaled across the bed A, beneath  
30 the slideway of the roll D'. The yoke holds the bevel-gears D<sup>5</sup> and D<sup>7</sup> in constant engagement while permitting the sliding of the roll-frame and the roll across the bed. This side movement is effected by a screw-shaft D<sup>8</sup>,  
35 journaled in the bed A, adjacent to the driving-shaft D<sup>4</sup>, threaded through a projection of the bearing-frame D<sup>2</sup>, and carrying a hand-wheel at its outer extremity. A coiled spring D<sup>9</sup> is placed upon the screw-shaft D<sup>8</sup>, bearing  
40 from the bed A against a collar upon said shaft to permit an automatic receding adjustment of the roll D' to accommodate the varying width of lumber fed through the machine.

The feed-roll just described operates the  
45 lumber in connection with the opposite fence or guide F, which extends from the feed-in end of the machine to the matcher-hanger A<sup>6</sup>, and thence by an extension I' I throughout the entire length of the machine across the  
50 feed-out rolls B' C and feed-out platen E.

The integral adjustability of the entire fence and right matcher-head is accomplished by a shaft H, journaled at the right side of the bed A longitudinally, and provided with  
55 spiral gears H', placed opposite slotted openings F<sup>3</sup> in the platens across the bed of the machine. Beneath and parallel with these

slotted openings are journaled cross-screw shafts F<sup>2</sup>, provided externally with corresponding spiral gears G, meshing with the gears H',  
60 respectively. The screw-shafts F<sup>2</sup> at the feed-in end of the machine, Fig. 6, engage with angle-blocks F', having flat upper faces and vertical extensions projecting downward through the openings, as guides F<sup>8</sup>. The fence F rests  
65 upon the upper faces of the angle-blocks, the bolts for securing the fence thereto being elongated laterally in the faces of the angle-blocks, whereby the fence F has an adjustment upon the angle-blocks independent of the screw-  
70 shafts by loosening and resetting the fastening-bolts F<sup>6</sup>.

The feed-in fence is adjustably attached to the matcher-hanger A<sup>6</sup>, which intervenes between the feed-in and feed-out portions of  
75 the fence, the fence F being slotted cross-wise at F<sup>7</sup>, where it is bolted to the hanger A<sup>6</sup>, and is provided with a backing-screw F<sup>8</sup> for the nice adjustment of the fence in relation to the sweep of the matcher-hanger cutters,  
80 as to accommodate wear in the cutting-surfaces. The principal object of these adjustments is to give the fence "lead" when requisite independently of its general shifting adjustment—that is, vary its angle slightly in  
85 relation to the feed-in rolls so as to crowd the lumber sufficiently to insure absolute fixedness of lateral position while being operated on by the cylinders.

The rear or feed-out portion of the fence, designated in the drawings at I, may be pivoted to and connected across the lower cylinder A<sup>3</sup> by a removable bridge continuation I', extending into a guide-block I<sup>2</sup>, at the  
90 matcher-hanger A<sup>6</sup>, which has a slotted bolt-hole connection to the matcher-hanger A<sup>6</sup>, similar to F<sup>7</sup>, but without a backing-screw. At the rear terminal cross-adjusting screw-shaft F<sup>2</sup>, the part I has the described slotted connection for sidewise adjustment upon its  
95 angle-block I<sup>3</sup>, and is further provided with a backing-screw and hand-wheel I<sup>4</sup>, Fig. 5.

The fence I is made in two parts—that is to say, an intervening plate or carrier I<sup>3</sup>, having the described adjustable bolt-connection, with  
100 the angle-block I<sup>3</sup> and with an upward lug carrying the backing-screw and hand-wheel I<sup>4</sup> and the fence proper I, independently adjustable upon the plate by means of the backing-screw. The object of these adjusting  
105 constructions is to provide not only for a general or permanent adjustment of the fence, but also for the smaller and nicer individual adjustments in relation to the matcher-head independently of the general shifting of the  
110 fence as a whole to regulate the draft of the board in feeding-out according to varying conditions.

To accommodate the last-described or supplemental adjustment of the fence I upon its  
115 plate I<sup>3</sup>, the fence is provided with laterally-elongated bolt-holes to accommodate the fastening-bolts I<sup>6</sup>, which, in connection with the backing-screw, serve as guides to preserve its

parallelism, besides clamping-bolts to secure it in ultimate positions upon the plate I<sup>3</sup>. Thus independently of the shifting movement (for determining the position of the board relative to the cutting-zones of the cylinders) a permanent adjustment of the fence in relation to the matcher-head may be approximately made by adjusting the plate I<sup>3</sup> upon the angle-blocks I<sup>2</sup>, and a finer and more exact adjustment is effected by the hand-screw I<sup>5</sup> moving the fence I upon its plate I<sup>3</sup> from time to time as required.

The matcher-hanger A<sup>6</sup> is gibbed to the bed A to slide across, as impelled by a screw-shaft H<sup>2</sup>, which also has a screw-gear connection G II' with the shaft H. (The shaft H<sup>2</sup> is in this case extended across and beyond the bed for connections presently to be described.) Thus the fence F, its extension I, and the matcher-hanger A<sup>6</sup> are all geared similarly to the shaft H and moved in unison by it. The shaft H, however, is in two portions, the main portion H extending above the screw-gears G as far aft as the gear for the matcher-hanger A<sup>6</sup> and the rear portion H<sup>3</sup> extending thence in a lower horizontal plane beneath the under cutting-cylinders. The spiral gear G of the matcher-hanger screw H<sup>2</sup> is the connecting medium of power between the two portions of the shaft. This construction places the rear extension of the shaft below the bearings of the under cutting-cylinder A<sup>3</sup> and permits the removal of the latter without disconnecting the shaft or any portion or disturbing other parts, besides avoiding the interference with the free discharge of chippings from the matcher-head. The shaft being at the right or fence side of the machine, the shifting-screws are comparatively short and require but one bearing, and the manipulating end of the shaft being at the feeding-in end and above the level of the screw-moving gears is thus brought to about the level of the fence itself and arranged in a position most convenient for operation by the attendant with reference to the fence-gage on the bed of the machine at the feed-in end. He can thus manipulate the fence with great ease and accuracy not otherwise attainable. The construction of the shaft in sections, and the directness of the connections with the screw-moving gears is also advantageous in avoiding the constructive difficulties incident to a single long shaft and the liability to lost motion from torsion and wear of intervening parts.

The matcher-hanger A<sup>5</sup> (corresponding and opposite to A<sup>6</sup>) is similarly mounted upon the bed A in sliding bearings and adjusted by a screw-shaft K<sup>4</sup>, Fig. 3, beneath and parallel with the screw-shaft H<sup>2</sup>. It may carry a guide-block extension J', extending rearward over the feed-out cylinder A<sup>3</sup>, (corresponding with the bridge I' of matcher-hanger A<sup>6</sup>.) The guide J' moves with the matcher-hanger A<sup>5</sup>, to which it is adjustably attached by a slotted bolt-hole connection, permitting it to be set to

accommodate wear of the cutters and to guide the lumber properly and firmly while acted upon by the under cutting-cylinder to its engagement with the final feed-out guides.

I also provide a feed-out guide J, extending over the rear feed-out roll B'. It is practically an opposite duplicate in construction of the feed-out fence I, already described, to which it may be considered as auxiliary, and embraces a screw-shaft J<sup>2</sup>, arranged beneath the rear screw-shaft F<sup>2</sup>, Fig. 4. It is also provided with a backing-screw and hand-wheel J<sup>4</sup>, all these being counterparts of those already described and designated by the letter J, instead of I, with corresponding distinguishing numbers, and situated on the other side of the feed-out platen. The screw-shaft J<sup>2</sup> may have a detachable connection by movable bevel-gear J<sup>6</sup> with gears J<sup>7</sup> K<sup>2</sup> K<sup>3</sup> and counter-shaft K with the screw-shaft K<sup>4</sup>, whereby the general adjustment of the part J may be made simultaneous with the setting-up or receding of the matcher-hanger A<sup>5</sup>. The screw-shaft H<sup>2</sup>, as already mentioned, is extended through a bearing at the front or working side of the machine, and the two screw-shafts H<sup>2</sup> K<sup>4</sup> are provided, Figs. 1, 2, 12, and 13, with a yoke-plate M', in which operates a block M<sup>2</sup>, fitted to both screws and set up or allowed to recede by a cam hand-lever M, by means of which construction the two matcher-hangers are locked in position when suitably adjusted.

To secure the simultaneous shifting of the two matcher-heads and their guide from the actuating-shaft H, I provide at the projecting terminals of the screw-shafts H<sup>2</sup> K<sup>4</sup>, at the working side of the machine, spur-gears P' P<sup>2</sup>, permanently connected to said shafts, and arrange between them an idler spur-gear P<sup>3</sup> upon an elongated stud upon the yoke-plate M', which permits the lateral withdrawal of the connecting-idler from such connection. When in connecting position, the motion of the screw-shaft H<sup>2</sup> is transmitted to the screw-shaft K<sup>4</sup> and by the counter-shaft K to the screw-shaft J<sup>2</sup>, thus moving the auxiliary feed-out guide J and matcher-hanger A<sup>5</sup> simultaneously with the general fence and matcher-head at the opposite side of the machine. Thus the entire system of fences and matcher-heads may be shifted across the bed of the machine simultaneously and at a single operation in exact maintenance of their permanent relations, while by drawing out the idler-pinion P<sup>3</sup> the left feed-out fence and matcher-head may be independently adjusted as an integral part of the system.

In Figs. 8, 9, 10, and 11 I have shown a slight modification in which the bevel-gear and screw-connection between the guide J and the matcher-hanger A<sup>5</sup> is omitted, and the guide and the matcher-hanger are moved independently by hand. In this case two extra guide-slots J<sup>9</sup> are provided in the platen and elongated bolt-holes L in the fence J for the passage of fastening-bolts L', by which the fence when adjusted is clamped to the platen. The

fence J is held to its plate J<sup>3</sup> by bolts J<sup>8</sup> passing through elongated bolt-holes. The extra adjustment of the guide J upon the surface of the plate J<sup>3</sup> is effected, as before described, by the hand-wheel J<sup>4</sup>.

In addition to the improvements thus detailed I introduce a further one in respect to the construction and mounting of the presser-bar over the under cutting-cylinder with the object of facilitating the removal of said cylinder when necessary. To this end I extend forward from the housing of the upper cylinder a yoke-frame O<sup>2</sup>, hinged by rule-joints at its terminals with short extensions O, from the sides of said housing so as to swing up into a vertical position and fold back over the housing. A vertical guideway at the outermost point of the inner periphery of the said yoke-frame receives a duly fitted upward extension of the presser-bar A<sup>4</sup>, which is held and adjusted by a hand-wheel screw O<sup>3</sup>, set in the yoke-frame. The hinged joints of the frame are locked by set-screws, as required. By this construction the presser-bar partakes of the general vertical adjustment of its cutting-cylinder, but is independently adjustable to accommodate minor variations and may be swung back to allow removal of the lower cylinder.

I claim as my invention and desire to secure by Letters Patent of the United States—

1. In a planing and matching machine having one or more vertical matcher-heads, a substantially continuous board-guide or fence extending throughout the machine in two longitudinal sections embracing the matcher-hanger as an intervening element, and shifting mechanism for moving the fence and matcher-head across the machine as an entirety, the fence-sections constructed in two parts, of which the guiding-face is adjustably held as one part, upon a support or supports as the other part, said guiding-face portion being adjustable independently of the shifting mechanism in the same general line of adjustment, substantially as set forth.

2. In a planing and matching machine, in combination with a substantially continuous board-guide or fence extending throughout the machine, including a vertical side matcher-head as an intervening element and a series of screw-shafts for shifting said fence and matcher-head across the platen, an actuating-shaft with gears directly engaging and actuating said adjusting-screws, said shaft being in two independent sections in different planes connected by and the motion of one transmitted to the other through the matcher-hanger screw-gear, substantially as set forth.

3. In a planing and matching machine having vertical side matcher-heads, the combination of a substantially continuous adjustable board-guide or fence extending throughout the machine at the right side, provided with a shaft and screw-gears for its actuation, with an auxiliary feeding-out guide at

the left side rearward of the left matcher-head connected with the adjusting mechanism and having a top section adjustable by hand across the platen, substantially as set forth.

4. In a planing and matching machine, an adjustable fence or board-guide constructed with a supporting-plate having a down-projecting lug embracing the shifting-screw, a top plate or section carrying the fence proper and independently adjustable on the supporting-plate, and a fence or guide independently adjustable upon the top plate, substantially as set forth.

5. In a planing and matching machine, a fence-shifting shaft constructed in two longitudinal sections and arranged at the right or fence side of the machine, the first or manipulating section being at the feeding-in end and extending above and connecting directly with the screw-moving gears to the matcher-hanger gear and the second section connecting the after gears below and passing beneath the lower cylinder-journals, so that the cylinder can be removed or adjusted vertically without disturbing any portion of the fence-shifting mechanism, substantially as set forth.

6. In a planing and matching machine, the combination of two opposite vertical side matcher-heads, a substantially continuous fence throughout the machine at the right side, including one matcher-head as an element, and shifting mechanism connecting said fence and matcher-heads into an integral system shiftable as an entirety across the bed of the machine at one operation, substantially as set forth.

7. In a planing and matching machine, the combination of two vertical side matcher-heads, a substantially continuous fence throughout the machine at the right side and an auxiliary feed-out fence after the matcher-head at the left side, and shifting mechanism connecting said fences and matcher-heads into an integral system, whereby the same may be shifted as an entirety across the bed of the machine at one operation, substantially as set forth.

8. In a planing and matching machine, the combination of a substantially continuous adjustable fence at the right side throughout the machine, including the matcher-head as an element, with an adjustable feed-out fence, and an adjustable matcher-head, both at the left side of the machine and adjustable independently of each other or in connection simultaneously, substantially as set forth.

9. The combination, in a planing and matching machine, of vertical side matcher-heads, a substantially continuous fence at the right side of the machine, an auxiliary feed-out guide at the left side of the machine, shifting mechanism arranged to shift the main or continuous fence across the machine, and connections between said shifting mechanism and the auxiliary fence, whereby



the two fences may be shifted simultaneously in fixed relations, or the main fence only shifted, substantially as set forth.

10. In a planing and matching machine, in  
5 combination with vertical side matcher-heads and a substantially continuous fence at the right side of the machine, and an independent feed-out fence at the left side of the machine, provided with mechanism for shifting the  
10 same across the bed with its matcher-head and for adjusting the same laterally independently of the matcher-head, substantially as set forth.

11. A guide-fence for planing and matching  
15 machines adjustable across the platen, constructed in two separate parts, to wit, a supporting part connected with the general shifting mechanism and a guiding-face section independently adjustable upon the supporting  
20 part in the general line of adjustment across the platen, substantially as set forth.

12. In a planing and matching machine, in  
25 combination with the two matcher-heads and their adjusting screw-shafts, an adjustable block arranged to engage both screw-shafts and secure the matcher-heads rigidly in ultimate relations, substantially as set forth.

13. The combination, with the matcher-heads and their shifting screw-shafts, of the  
30 yoke-plate, the block, and the cam-lever, substantially as set forth.

14. In a planing and matching machine, in  
35 combination with an adjustable fence provided with side-shifting mechanism, an opposite side roll provided with shifting mechanism for adjusting its position in relation to the said fence, substantially as set forth.

15. The combination of upper surfacing-cylinders, side matcher-arbors, adjustable  
40 fences upon the feed-out end of the machine,

and a presser-bar for the lower cylinder carried upon an extension of the upper cylinder-housing frame and adjustable therewith.

16. In a planing-machine having upper  
45 and under surfacing-cylinders, vertical side matcher-heads and feed-out rolls, and adjustable fences at the feed-out end of the machine, a housing for the upper cylinders constructed with a forward extension extending over and beyond the matcher-heads and adapted to  
50 swing upwardly, in combination with a presser-bar adjustably carried thereby over the under cylinder, substantially as set forth.

17. The combination of the shifting-screws, the angle-block, and the fence having slotted  
55 bolt-hole connections with said blocks for lateral adjustment upon said blocks independently of the screws, substantially as set forth.

18. The combination of the angle-blocks, the plates adjustable thereon, the backing-  
60 screws, and the fence having slotted bolt-hole connections with the plate, substantially as and for the purpose specified.

19. In a planing and matching machine  
65 having a substantially continuous fence extending at the right side of the machine and including the matcher-hanger as an element, a removable bridge-piece connecting the matcher-hanger and the feed-out portion of the fence across the lower cylinder adjust-  
70 ably connected to the matcher-hanger and pivotally connected to the feed-out portion of the fence, substantially as set forth.

In testimony whereof I have hereunto set  
my hand in the presence of two witnesses. 75

WILLIAM H. DOANE.

Witnesses:

L. M. HOSEA,  
L. E. HOSEA.