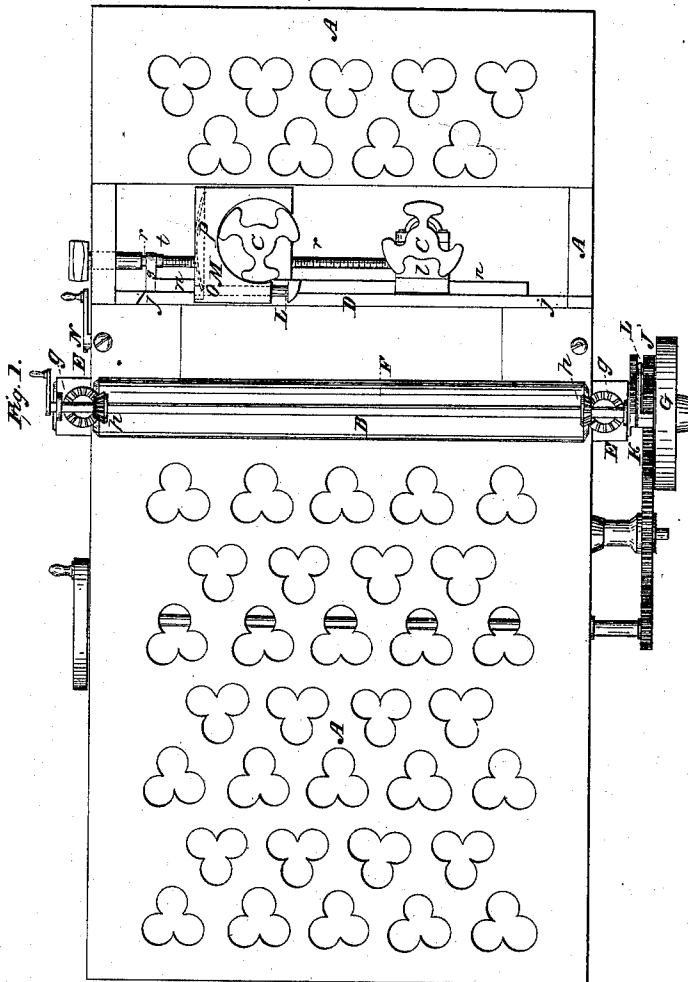


4 Sheets—Sheet 1.
Doane & London,

Planing and Matching Machine.

No 36,901.

Patented Nov. 11, 1862.



Witnesses:
G. Dutcher
R. L. Hobbs.

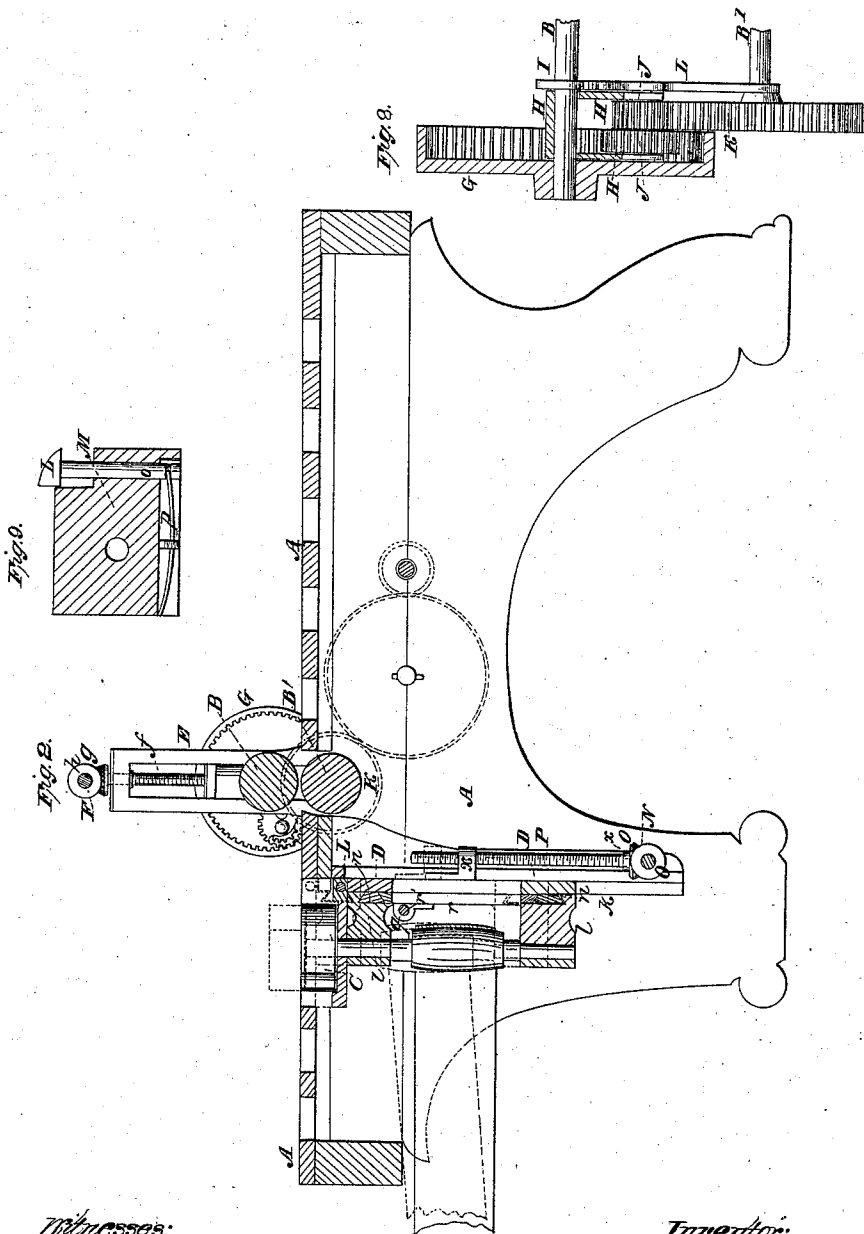
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Doane & London, *4 Sheets - Sheet 2.*

Planing and Matching Machine.

N^o 36,901.

Patented Nov. 11, 1862.



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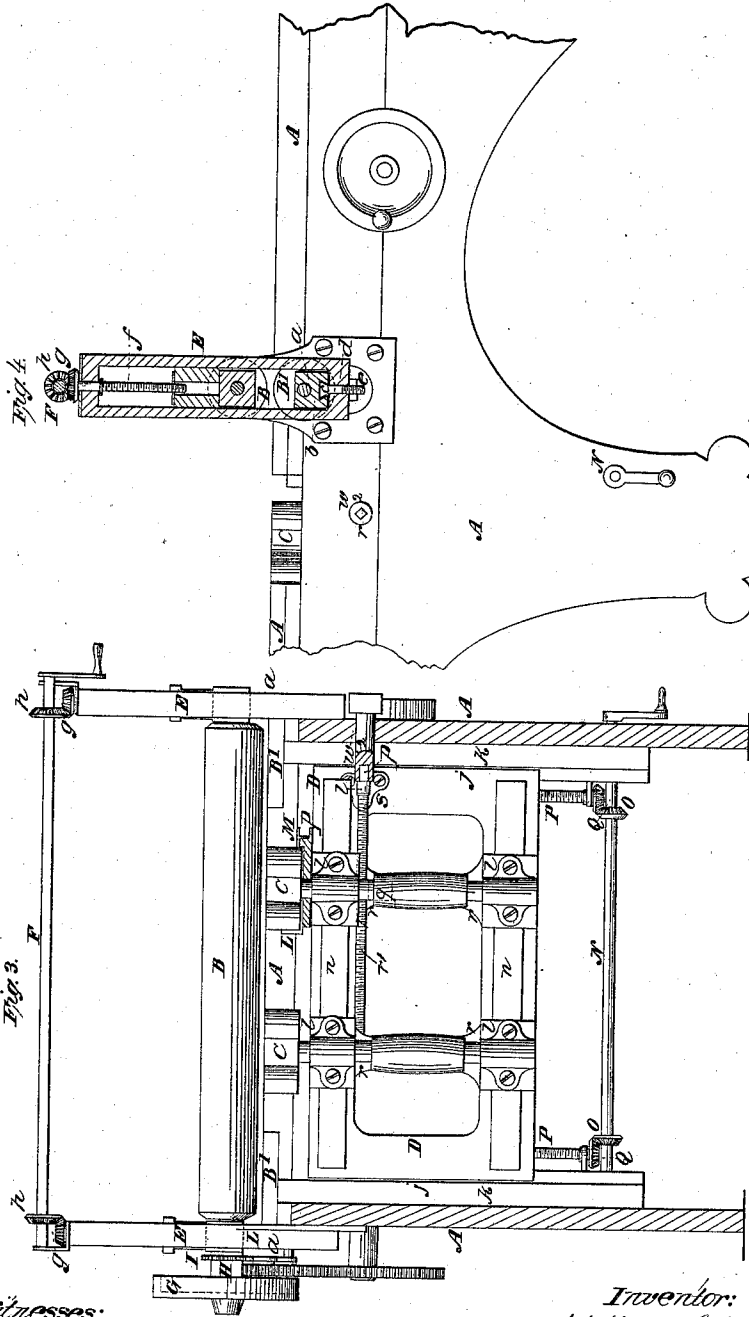
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4 Sheets- Sheet 3.

Planing and Matching Machine.

No 36,901.

Patented Nov. 11, 1862.



Witnesses:
F. Dietrich,
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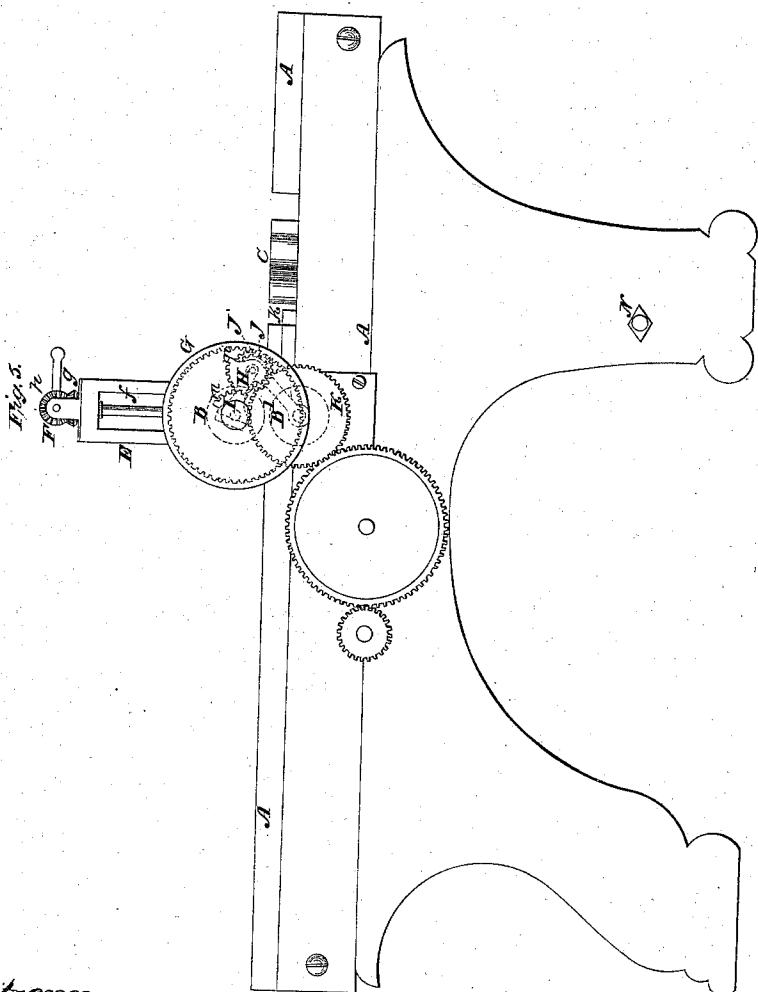
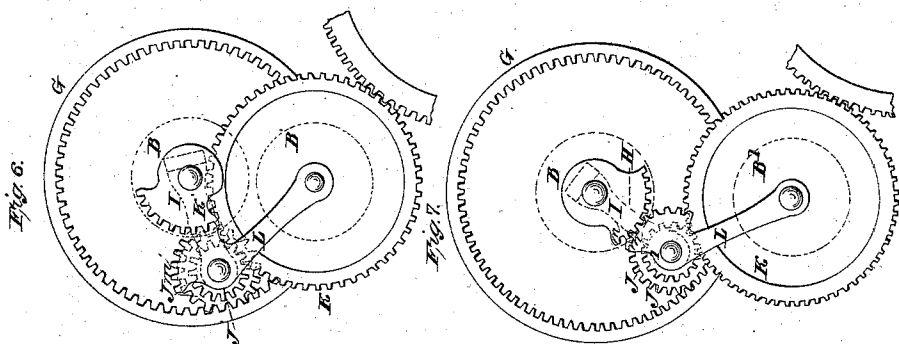
Inventor:
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4 Sheets-Sheet 4.
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Planing and Matching Machine.

N^o 36,901.

Patented Nov. 11, 1862.



Witnesses:
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Inventor:
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1862.

UNITED STATES PATENT OFFICE.

WM. H. DOANE AND WM. E. LONDON, OF CINCINNATI, OHIO.

IMPROVEMENT IN COMBINED PLANING AND MATCHING MACHINES.

Specification forming part of Letters Patent No. 36,901, dated November 11, 1862.

To all whom it may concern:

Be it known that we, WILLIAM H. DOANE and WILLIAM E. LONDON, both of Cincinnati, Hamilton county, and State of Ohio, have invented a new and useful Improvement in Combined Planing and Tonguing and Grooving or Matching Machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan or top view of a planing-machine frame with our improvements applied to it. Fig. 2 is a vertical longitudinal section of the same; Fig. 3, a vertical transverse section of the same. Fig. 4 is a partial side view and longitudinal section of the same. Fig. 5 is a side elevation of the gearing side of the machine. Figs. 6, 7, and 8 are views of the expansion-gearing of the feed-rollers. Fig. 9 is a horizontal section of the head of one of the grooving or tonguing cutter-stocks.

Similar letters of reference in the several figures indicate corresponding parts.

Our invention relates, first, to the attaching of tonguing, grooving, or matching works of planing-machines to a sliding bed or ways, or the equivalent thereof, whereby they can be instantaneously removed down out of the way below the top of the bed upon which the planing-tools cut, so that the same machine can be used for planing either wide or narrow lumber without any detriment or delay to the operator, and thus not only a double purpose is accomplished, but a machine of great importance produced, which may be used at pleasure either for planing wide and narrow lumber, or for tonguing, grooving, and matching, or for both planing and tonguing, grooving, and matching at one time.

It relates, second, to an arrangement of gearing for raising and lowering the matching-works with facility.

It relates, third, to the location of and manner of operating the screw which adjusts the the matching-tools laterally.

It relates, fourth, to fastening the boxes of the lower feed-roller in position by means of screws, with dovetail heads and dovetail slots cut in the under side of the boxes, whereby the roller is firmly held in true position.

It relates, fifth, to an arrangement of expan-

sion-gearing, combining geared levers, and operating in a novel and useful manner.

It relates, sixth, to an arrangement of the sliding foot and spring within the head-frames of the matching-cutter, so as to prevent the "clip" to the board in matching.

To enable others skilled in the art to make and use our invention, we will proceed to describe the same with reference to the drawings.

A represents the frame and bed of a planing-machine; B B', the feed-roller. Upon this frame and bed, in the usual or proper relation to the feed-rollers, planing-works (not shown) are to be arranged. Behind the feed-rollers the tonguing and grooving or matching works C C are arranged upon a vertical sliding bed or frame, D, so as to be raised above the top of the planing-bed, as shown in red lines, or to be lowered below the top of said bed, as shown in black lines, as circumstances may require. The lower feed-roller, B', has its journals fitted in boxes *a a*. In the bottom of these boxes dovetail grooves *b b* are cut, into which dovetail heads *c* of vertical screw-bolts *d* fit snugly. The screw-bolts are extended down through the solid parts of the guide-standards E E of the frame A, and have nuts screwed on their lower ends, so that the roller B' can be drawn down and held firmly to its proper position. There has been more or less trouble experienced in keeping the boxes of the feed-roller B' solid and in position. In feeding the roller turns up, which has a tendency to raise the boxes. To obviate this, the boxes of the roller have either been keyed in or confined by set-screws from the side, both of which modes are objectionable.

Our plan of casting the dovetail slot or groove in the bottom of the boxes and inserting a bolt with dovetail head to hold them down we have used with great success. The upper feed-roller has its journals fitted in sliding boxes, which are adjusted up and down in the guide-standards E E by means of screw-rods *f f* and bevel-gears *g g h h*, arranged as shown, and operated by a crank-shaft, F.

On the outer ends of the journal of the roller B an internally-toothed pulley, G, is arranged; also, a swinging bracket or two-armed hanger, H, and a segment-toothed lever, I, which is loosely attached. The swinging bracket car-

ries at its lower end two pinions, $J J'$, one of which gears with the internal-toothed pulley G and the other with an intermediate spur-gear, K , of the ordinary system of spur-gearing.

To the shaft or axis of the pinions $J J'$ a lever, L , is affixed loosely. The lower part of this lever is fitted loosely round the journal of the lower feed-roller, B' , while the upper portion is of segment form and toothed, and gears with the teeth of the segment-lever I , as shown.

The levers are constructed with a blank tooth and a finger, $m m'$, so that their movement shall be arrested at the proper time.

Our experience with the use of expansion-gearing has proven the comparative worthlessness of the same without the aid of the geared levers.

By the combination of the geared levers a twofold object is secured. The intermediate pinions, $J J'$, are kept in a position equidistant from the centers at all times and in full gear, which relieves them from all strain and prevents binding or "cornering" on the other gears. The blank tooth and finger $m m'$ of the geared levers act as a check, preventing the feed-roller B from being raised or lowered above or below a certain distance. The bed or frame D , on which the matching-works $C C$ are arranged, has its vertical side edges beveled, as at $j j$, or they may be squared, or any other suitable shape, and these edges are fitted to slide freely against the inner beveled or otherwise shaped edges of two cleats or ways, $k k$, of the frame. The matching-works $C C$ are connected to the frame D by means of dovetails, formed in the boxes $l l$ of the cutter-shafts, and horizontal dovetail cleats $n n$, formed on the back of the frame D . Thus while the frame moves up and down with the matching-works $C C$ the matching-works can be moved independently of the frame D in a lateral direction.

The matching-works may be of any approved or the ordinary construction, with the addition of a horizontal sliding foot, L , arranged in a box, M , with its stem o bearing against a flat steel spring, p , as shown in Figs. 1 and 9 of the drawings. With this addition the board planed comes through the rollers and strikes against the foot first. The foot yields just enough to allow the matching-knives to work free, and yet acts with sufficient force to prevent the end of the board from "skewing" round and being "clipped." The spring is so placed and closed in that the shavings will not be liable to choke it.

The means provided for moving the matching-works apart or together are a screw and nut. The nut q is formed on the standard r of the boxes $l l$, and the screw r' extends horizontally through it. The screw has its head r'' square, and is supported and kept from moving laterally by means of a bracket, s , and collar t . This bracket is formed on or attached to the frame D of the matching-works $C C$, and therefore is inside of the frame

A . So, also, is the square end of the screw. This arrangement or location is necessary, because if the square end of the screw extended outside of the frame A the matching-works could not be raised or lowered unless the frame A was weakened by being made of open or lattice metal, which would form a space for the screw to rise and descend in. To thus obviate the weakening of the frame A , we bore a round hole, w , through one of its sides, and through this hole insert a turn-key with square socket in its end to receive the square end of the screw r' , whenever it is desirable to set the matching-tools farther apart or nearer together.

It is obvious that the screw r' might be constructed with a right-and-left thread, so that both tools move apart or together simultaneously.

The means provided for raising and lowering the frame with matching-works are a shaft, N , with two bevel-wheels, $o o$, near its ends, and two screw-rods, $P P$, with bevel-wheels $Q Q$ on their lower ends. The crank-shaft passes through the frame A , while the screw-rods are fitted to nuts formed in brackets $x x$ of the frame D . The bevel-wheels of the shaft N and of the screw-rods gear together, as represented. With this arrangement, by turning the crank-shaft the matching-works can readily be adjusted to suit different thicknesses of stuff to be tongued and grooved, thus rendering change of bits unnecessary.

Again, if it is desired to plane very wide lumber, the heads with cutters of matching-works $C C$ can be lowered below the surface or level of the top of the bed of frame A .

For ordinary widths of lumber which is being tongued and grooved sufficient lateral adjustment of the matching-works can be effected by the screw r' ; but while this is the case it is often necessary to lower the heads of the works $C C$, so as to suit the varying thickness of such lumber and obviate the change in the bits.

Our arrangement provides for this necessity, and thus possesses two advantages—viz., it answering for simply planing very wide lumber, and also for planing and tonguing and grooving ordinary widths of lumber of varying thicknesses, without requiring a change in the bits of the matching-works $C C$.

Our invention as a whole constitutes a planing and matching machine of great utility and convenience, saving the expense of a separate machine for planing very wide lumber, and also the expense of extra bits in tonguing and grooving ordinary widths but varying thicknesses of lumber with machines adapted particularly for planing and matching such lumber.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In a combined planing and tonguing and grooving or matching machine, so attaching the tonguing and grooving or matching works

that they may be adjusted to a position above or below the top of the planing-bed, substantially in the manner and for the purpose described.

2. In a combined planing and tonguing and grooving or matching machine, the sliding frame or bed D, with matching-works mounted upon it and operated by the gearing P P, O O, Q Q, and N, so as to raise or lower the matching-works above or below the top of planing-bed, all constructed and arranged substantially in the manner and for the purpose described.

3. In a combined planing and matching machine, the arrangement of the screw-shaft r' , sliding bed D, with matching-works C C mounted upon it, and the aperture w in the closed plane A, substantially in the manner and for the purpose described.

4. The arrangement of the sliding guard-

foot L and its spring p , substantially in the manner and for the purpose described.

5. The combination of the lower feed-roller, B', and its boxes a , with dovetail slots b in them, with the dovetail-headed screw-bolts d and their nuts, the whole arranged and operating substantially as and for the purpose described.

6. The arrangement of the checking geared lever-segments I L, constructed as described, in combination with a system of expansion-gearing for feed-rollers of a planing-machine, substantially as and for the purposes described.

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WM. E. LONDON.

Witnesses:

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