3 Sheets—Sheet 1.

W. H. DOANE.

Planing and Matching Machines.

No. 213,180. **Patented Mar. 11, 1879.**

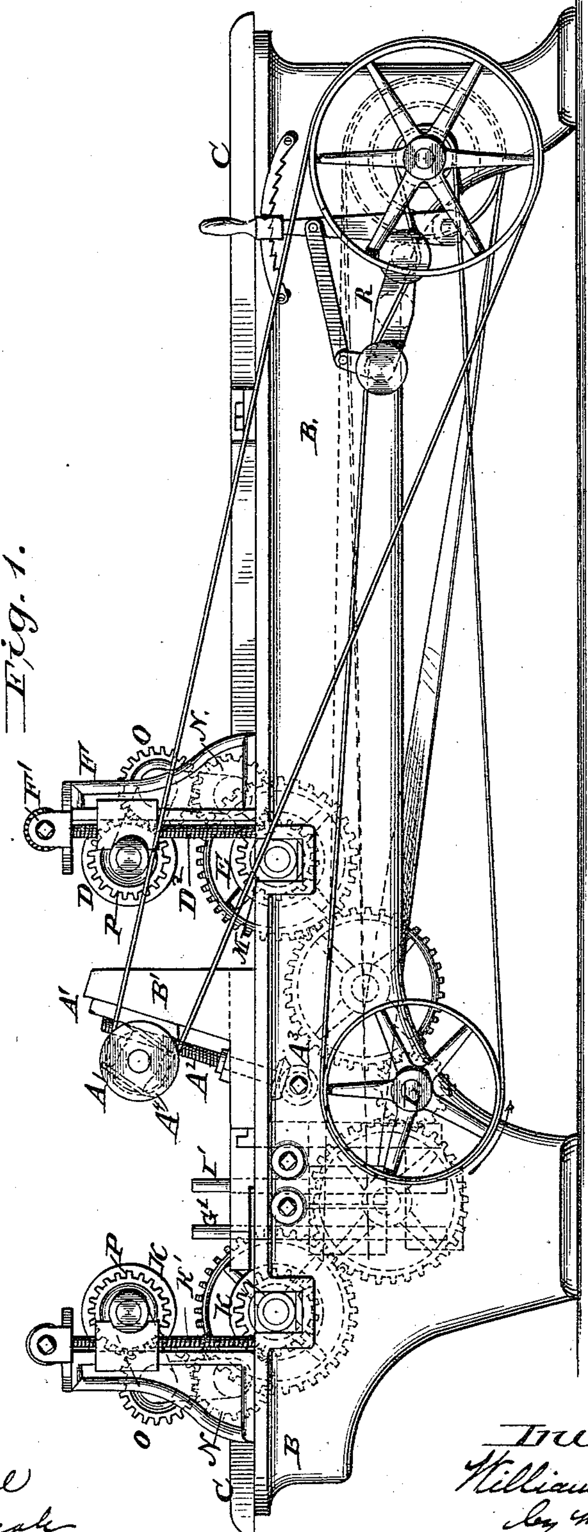

Fig. 1.

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3 Sheets—Sheet 2.

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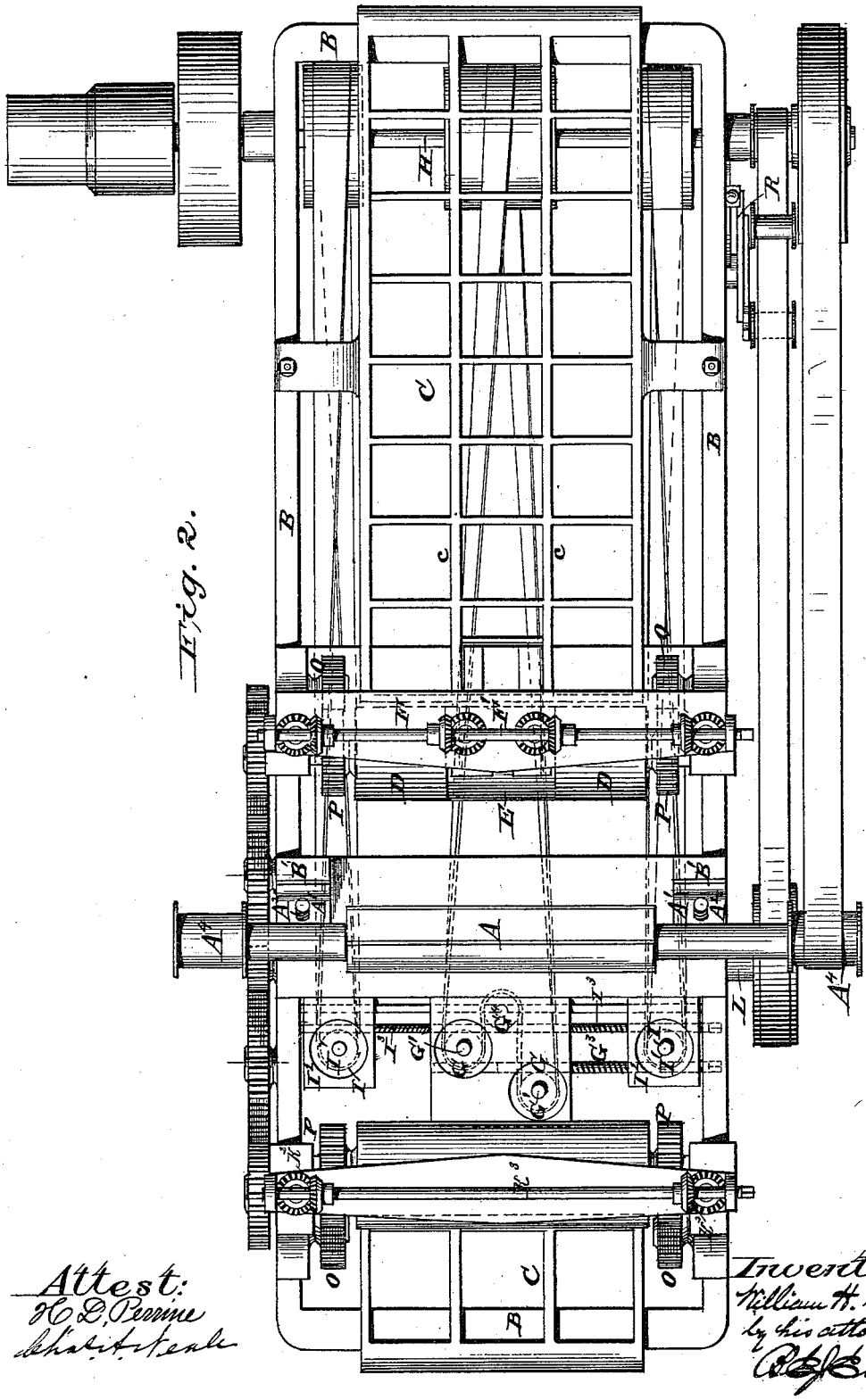

Fig. 2.

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Planing and Matching Machines.

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Fig. 3.

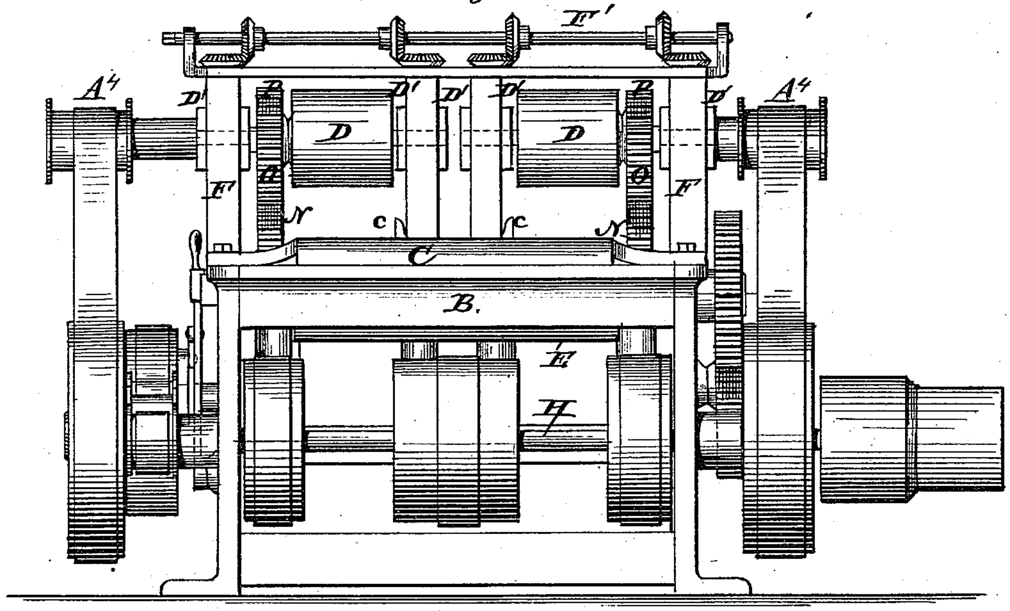


Fig. 7.

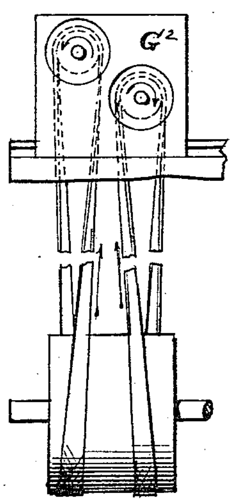


Fig. 5.

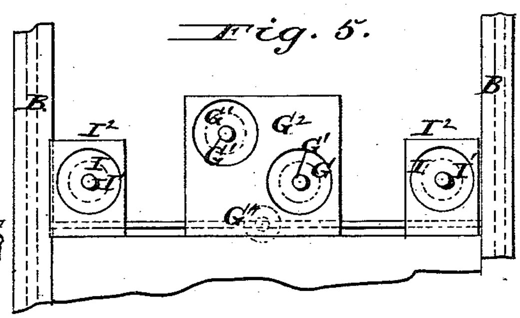


Fig. 6.

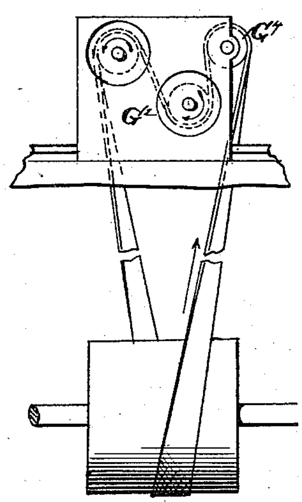
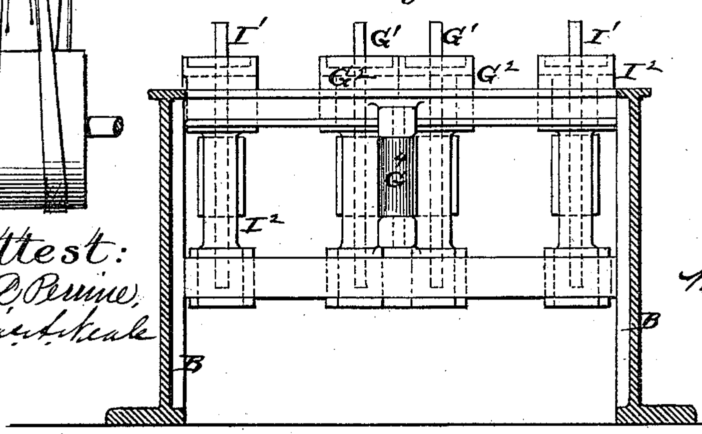


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM H. DOANE, OF CINCINNATI, OHIO.

IMPROVEMENT IN PLANING AND MATCHING MACHINES.

Specification forming part of Letters Patent No. **213,180**, dated March 11, 1879; application filed December 6, 1878.

To all whom it may concern:

Be it known that I, WILLIAM H. DOANE, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Planing and Matching Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to machines for dressing lumber for flooring-boards, and more particularly to such machines as are adapted for tonguing and grooving two boards at one and the same time, an example of which is shown in my United States Letters Patent No. 155,431.

My improvement consist of certain combinations and arrangements of mechanical devices, the principal members of which are a planing-cylinder for simultaneously dressing the top surface of both boards, two outside matcher-heads for tonguing or grooving the outside edges of the two boards, two inside matcher-heads for tonguing or grooving the inside edges of the two boards, two short independently-adjustable feed-rolls for feeding the two boards to the cutters in connection with one long counter-roll, and a pair of long feeding-out rolls.

The various combinations of said devices which constitute the invention are specifically set forth in the claims at the close of this specification.

Either all of these combinations or only some one or more may be embodied in the same machine, as may be deemed best or expedient.

The annexed drawings and the ensuing description set forth the best form of my invention known to me at this date. I do not, however, confine myself to the details of construction there shown, as such details may be much varied.

Figure 1 is a side elevation of a duplex planing and matching machine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is an end elevation of the same. Fig. 4 is a transverse section, showing the arrangement of the matcher-heads. Fig. 5 is a plan of the matcher-heads. Fig. 6 is a diagram showing an arrangement by which one belt is adapted to drive the two inside matcher-heads, so that both will cut in directions opposite to the direction in which the boards are fed through the machine. Fig. 7 is a diagram showing an arrangement where separate belts are used for the respective inside matcher-heads to drive them, so that both will cut in directions opposite to the direction in which the boards are fed through the machine.

The same letters of reference are used in all the figures in the designation of identical parts.

The planing cylinder A, for dressing the top surface of the two boards, is mounted in bearings A^1 of the standards B′ of the main frame, B. The bearings A^1 are adjustable up and down on the standards B′, and are controlled respectively by the screw-spindles A^2 A^2, which are swiveled in the main frame and provided with bevel-gears at their lower ends, which bevel-gears mesh into similar bevel-gears on a shaft, A^3, which can be turned by a winch from the side of the machine when it is desired to raise or lower the bearings A^1 to adjust the planing-cylinder A. The shaft of the planing-cylinder A projects through its bearings, and each end is provided with a pulley, A^4, so that a driving-belt may be applied at each end. The planing cylinder is driven by belts from pulleys on the counter-shaft H, which extends across the machine under the table at the forward end of the main frame. A suitable platen or table, C, is formed or secured upon the main frame for the proper support of the boards fed through the machine. This table is provided with inside fences *c c*, in advance of the feed-rolls, for the guidance of the boards along their inside edges.

Adjustable guides—such, for instance, as are shown in my aforementioned Letters Patent—will be arranged on the platen to press against the outside edges of the boards in advance of the feed, and two sets of adjustable guides will be placed on the platen directly in rear of the feeding-out rolls to receive and

guide the finished ends of the boards as they emerge from said feeding-out rolls. The boards are fed to the planing cylinder A by two short independently-yielding feeding-in rolls, D D, which operate in connection with a single long counter-roll, E. The upper surface of the counter-roll E is about flush with the surface of the platen C. Each roll D is supported in a pair of boxes, D^1 D^1, mounted on guides of a suitable gallows-frame, F, arranged across the main frame. The boxes D^1 are hung upon screw-spindles D^2, the upper ends of which carry bevel-gears meshing into corresponding bevel-gears on a cross-shaft, F′, mounted in fixed bearings on the gallows-frame F. The shaft F′ can be turned by applying a suitable winch to its squared end, and by thus turning shaft F′ the boxes D^1, and consequently the rolls D, can be simultaneously raised or lowered. The screw-spindles D^2 are adapted to slide to a limited extent through their bevel-gears, in order that the rolls D may adjust themselves independently to boards of unequal thickness. One or more weighted levers will be applied in the usual manner to each roll D, so that each roll will firmly press down upon the board it is feeding forward.

After the two boards have had their upper surfaces planed by the planing-cylinder A they pass between two sets of matcher-heads, where their edges are dressed and tongued and grooved simultaneously. The matcher heads G G, operating upon the inside edges of the boards, are attached to the spindles G^1 and G^1, mounted on the bracket-frame G^2, which is supported on horizontal cross-rails of the main frame, and can be bodily adjusted laterally by means of a screw, G^3, reaching to the side of the machine. These matcher-heads G and G are driven by belting from the counter-shaft H. They may be driven by a single belt, as shown in Fig. 2, in which case one of them cuts against the feed and the other cuts with the feed; but when it is deemed best to have both these inside matcher-heads cut against the feed, then, where a single belt is used, the guide-roll G^4 of the belt should be arranged accordingly—in such manner, for instance, as shown in Fig. 6; or else a separate belt may be used for each of said inside matcher-heads, as shown in Fig. 7.

In the machine described in my aforesaid Letters Patent No. 155,431 a single matcher-head is used for operating upon the inside edges of both boards. This double duty puts too much strain on the matcher-head and connections, occasioning too rapid wear.

The arrangement is objectionable for other reasons that need not be recited here, and the use of two inside matcher-heads is a great improvement.

The outside matcher-heads, I and I, are respectively attached to and driven by the spindles I^1 and I^1, which are mounted on separate bracket-frames I^2 and I^2, supported on horizontal cross-rails of the main frame. The brackets I^2 and I^2 are simultaneously adjusted laterally by a screw, I^3, which has a right-hand thread on one end and a left-hand thread on the other end, and reaches to the side of the machine, so that a winch can be applied to its squared end. These outside matcher-heads are driven by separate belts from pulleys on the counter-shaft H, and in such directions that both will cut against the feed.

Suitable provision must be made for the vertical adjustment of the several matcher-heads in order to adapt the machine for turning out flooring-boards of varying thickness.

As the boards pass beyond the matcher-heads they are caught between the pair of long feeding-out rolls K and K, the upper one of which is journaled in sliding boxes adjusted by screws K^1 and bevel-gearing K^2, operated by a shaft, K^3.

The upper roll K should also be connected with a weighted lever (one or more) to press it firmly down on the boards, and be capable of automatic adjustment to a limited extent.

In case it is desired to also dress the under side of the boards another cutter-cylinder should be placed in a position beyond the matcher-heads to operate upon the under surface of said boards.

The feeding-in rolls and the feeding-out rolls are driven by trains of gearing from the feed-driving shaft L. The shaft of the long counter-roll E of the feeding-in rolls has at each end a pinion, M, for transmitting motion to each feeding-in roll D separately through the medium of separate sets of gear-wheels. Each of these sets of gear-wheels is like the set used for transmitting motion from the pinion on the shaft of the lower feeding-out roll K to the upper feeding-out roll K, and consists of the fixed or localized gear-wheel N, the intermediate loose gear-wheel O, and the gear-wheel P on the shaft of the feed-roll.

The loose wheel O is centrally linked to the fixed axle of wheel N, and the axle of wheel P is connected by another link to the center of loose wheel O, which connection admits of the vertical adjustment of the wheel P with its roll without throwing the several wheels out of mesh.

The belt extending from counter-shaft H to the feed-driving shaft is normally slack, so that it will not drive; but a belt-tightener, R, is provided for tightening this belt whenever the feed-gearing requires to be run.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, substantially as before set forth, of two separate independently-yielding short rolls for simultaneously feeding in two boards, (whether of equal or of unequal thickness,) a single planing-cylinder, and two pairs of matcher-heads.

2. The combination, substantially as before set forth, of two separate independently-yielding short rolls for simultaneously feeding in two boards, (whether of equal or of unequal thickness,) a single planing-cylinder, two pairs of matcher-heads, and a pair of long feeding-out rolls.

In testimony that I claim the foregoing as my own I have affixed my signature in presence of two witnesses.

WM. H. DOANE.

Witnesses:

ALBERT N. SPENCER,

CHAS. G. JONES.