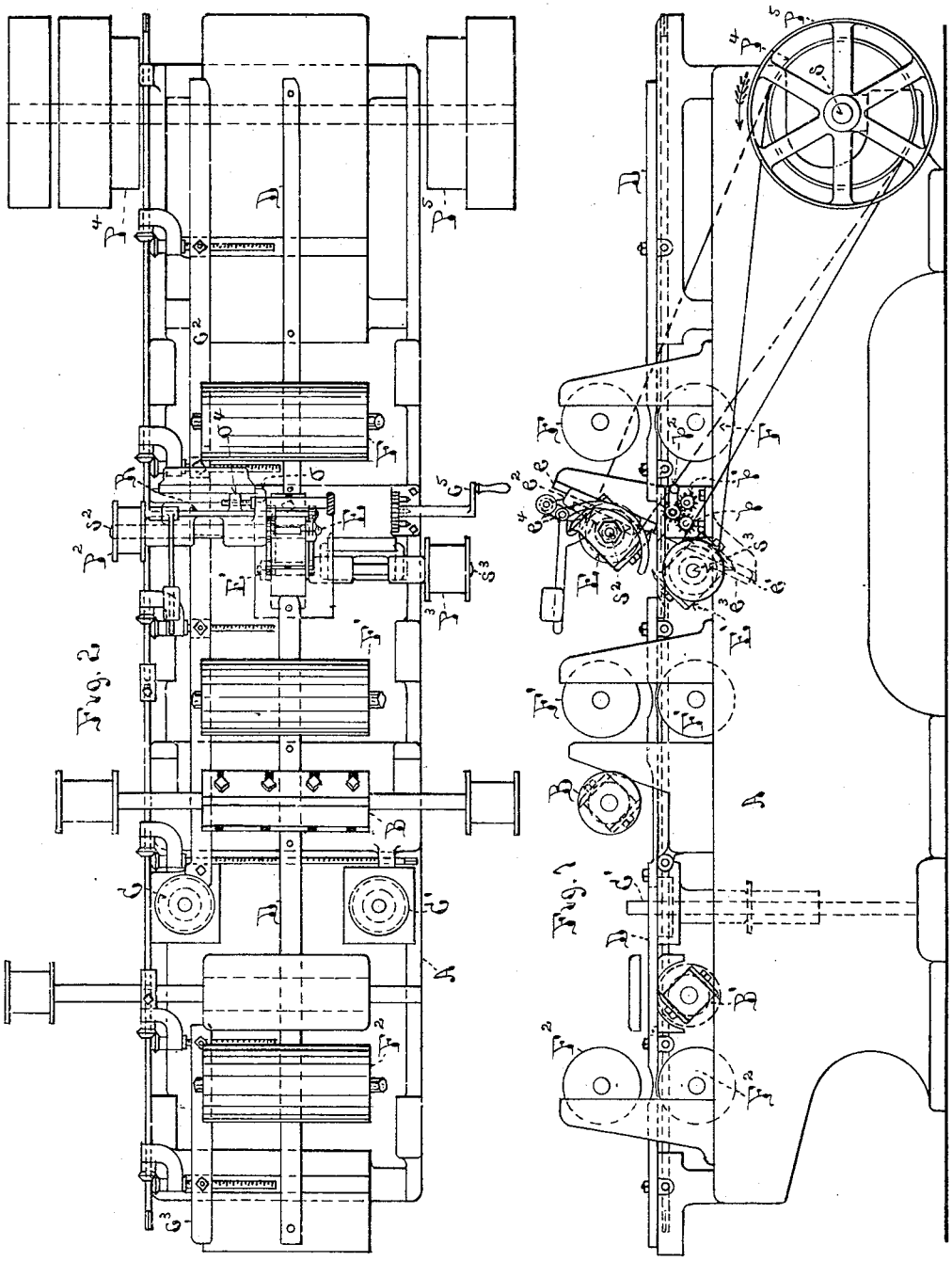
(No Model.) 2 Sheets—Sheet 1.

S. A. WOODS & J. R. THOMAS.

PLANING MACHINE.

No. 385,895. Patented July 10, 1888.



WITNESSES:

N. P. Ockington.

C. J. Toland.

INVENTOR.

Solomon A. Woods.

John R. Thomas

BY David Hall Reed.

ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3

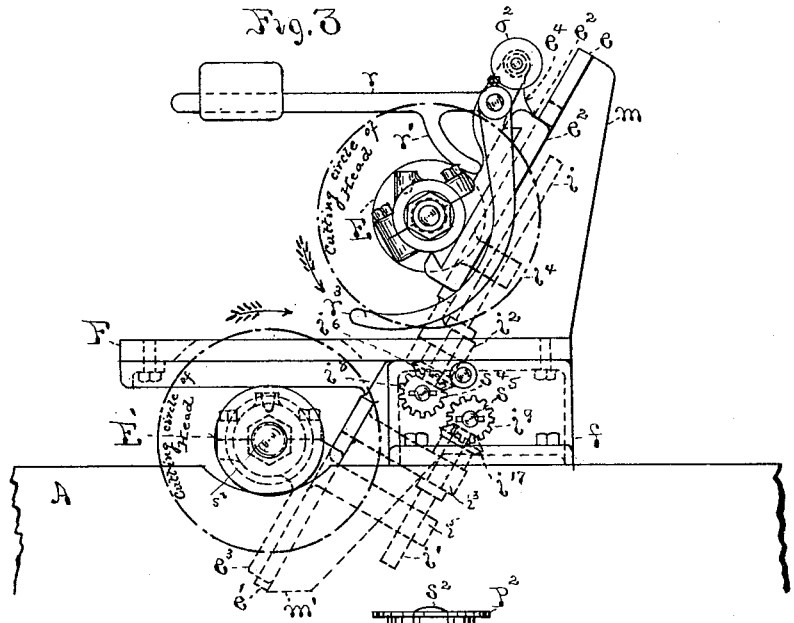
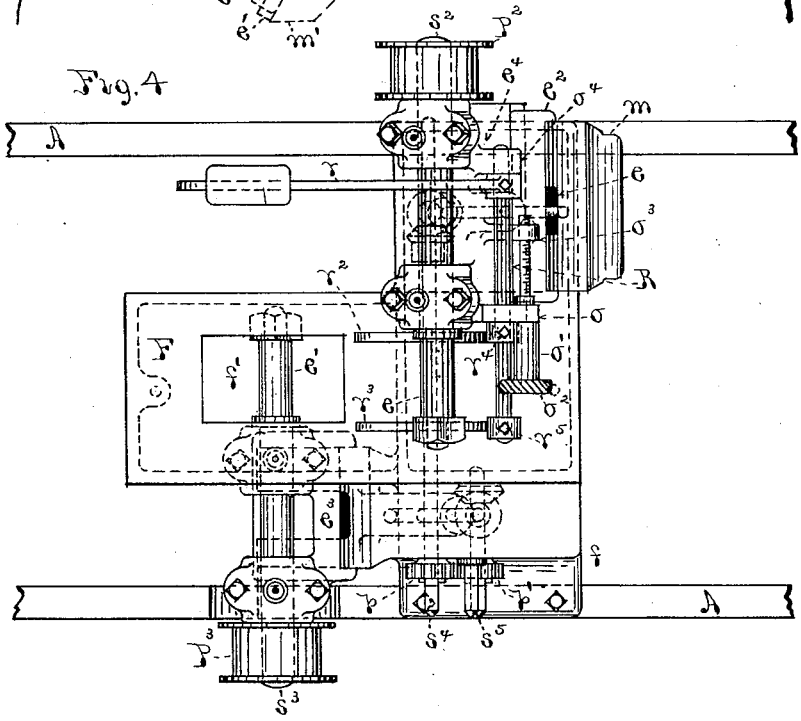


Fig. 4



WITNESSES:

A. P. Ockington.

C. J. Poland.

INVENTOR:

Edmund A. Woods.

John R. Thomas.

BY

David Hall Rice

ATTORNEY.

UNITED STATES PATENT OFFICE.

SOLOMON A. WOODS AND JOHN R. THOMAS, OF BOSTON, MASSACHUSETTS, ASSIGNORS TO THE S. A. WOODS MACHINE COMPANY, OF MASSACHUSETTS.

PLANING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 385,895, dated July 10, 1888.

Application filed December 14, 1887. Serial No. 257,891. (No model.)

To all whom it may concern:

Be it known that we, SOLOMON A. WOODS and JOHN R. THOMAS, of the city of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Planing-Machines, of which the following is a specification.

Our invention relates to planing-machines; and it consists in certain new and useful constructions and combinations as an improvement upon the mechanism for which Patent No. 364,743 was granted to S. A. Woods, June 14, 1887, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of a planing-machine containing our improvements. Fig. 2 is a top plan view of the same. Fig. 3 is an enlarged view of a portion of Fig. 1. Fig. 4 is an enlarged view of a portion of Fig. 2.

This machine is intended to form a tongue or tongues on the edge of the board by means of horizontal cutter-heads projecting from the sides of the bed of the machine above and below the latter, and provided with the necessary adjusting attachments for the same; and this invention consists in an improved method of mounting said horizontal cutter-heads and connecting said adjustments thereto.

A is the frame of the machine. B is the upper cylinder. B′ is the lower cylinder. F F F′ F′ F^2 F^2 are the feed-rolls. C C′ are the side cutter-heads for forming the grooves in the outer edges of the boards. D is the removable central guide, which, with the side guides, c^2 c^3, is used to guide the lumber through the machine. These and other common and well-known parts of the machine are constructed substantially as shown and described in said former patent, and need not be more particularly described. The guide D, extending longitudinally through the center of the machine, separates the two boards which are being simultaneously tongued and grooved, the cutter-heads E E′ simultaneously forming the tongues on the inner edges of the boards on each side of the central guide, substantially as in the said Woods patent.

The horizontal cutter-heads E E′, which form the tongues, are placed between the first pair of feed-rollers F F and the upper cylinder on the feed-in side of the latter, E being the upper head, and E′ the lower. Their location in this position enables the main cylinders to remove any roughness and splinters from the surface of the board which these tonguing-cutters may form in cutting the tongue. As they must necessarily, when located in this position, be quite near the main driving-shaft *s*, from which they are belted, which is located at the feed-in end of the machine, it is found that the adjustment of these heads vertically to vary the size of the tongues and finish the edge of the board alters the tension of their driving-belts. We therefore overcome this difficulty by mounting them on inclined ways *e e′*, placed at such an angle to the shaft *s* as to cause the belt to remain substantially at the same tension as the heads are adjusted vertically, the ways *e* having the upper cutter-head, E, mounted upon them, and the ways *e′* the lower one, E′. These ways *e e′* are formed on brackets *m m′*, extending upward and downward from and bolted to the main frame A. The inclined ways *e* on their bracket *m* are attached to and project upward from one side of the main frame A, while the inclined ways *e′* on their bracket project downward near the other side of the machine.

The cutter-head E′ is mounted on shaft s^3, which projects inward from one side of the machine and passes through bearings in the block or slide e^3, in which it revolves. This slide is fitted to its ways *e′*, and slides up and down upon them to adjust the cutter-head E′ vertically. The cutter-head E is mounted upon the horizontal shaft s^2, which projects inward above the bed from the opposite side of the machine, and passes through bearings in the block or slide e^4. This latter slide is mounted on horizontal ways in the slide e^2, and is adapted to move horizontally therein. This horizontal adjustment is only sufficient to enable the cutters on head E to be brought exactly over those of head E′, thus saving the time required to adjust these cutters in the heads accurately by hand. These cutters must, of course, cut the upper sides of the tongues on two boards on each side of the central guide, D, as described in said patent to

Woods, and the opposite side of each tongue must be of exactly the same depth, which is attained by the foregoing adjustment. The slide e^2 is mounted upon the inclined ways e, to which it is fitted by a suitable slot or groove so as to move up and down thereon. The up-and-down movement of the slide e^3 upon the ways e' is regulated by a screw, i', which is journaled and revolves in a lug, i^3, projecting from bracket m', and has its thread tapped through a lug, i^5, projecting from the slide e^3. On the upper end of this screw is a bevel-gear, i^7, which serves to revolve it by means of the bevel-gear i^9 upon shaft s^5. This shaft projects beyond the front side of the main frame and is squared on the end (see Fig. 4) to receive the crank-wrench c^5. (Shown in Fig. 2.)

The movement up and down of the slide e^2 upon its ways e is controlled by a similar upwardly-projecting screw, i, journaled in lug i^2 upon bracket m, and having its thread tapped through lug i^4 upon slide e^2. The lower end of this screw is provided with a bevel-gear, i^6, which engages with the bevel-gear i^8 upon the shaft s^4. This shaft projects beyond the same side of the frame, which supports it by suitable bearings, and is also squared at its outer end to receive the crank-wrench, if desired.

Pinions p p' are attached, respectively, to shafts s^4 s^5, so that an adjustment of one slide, e^2, will adjust the other, e^3, or vice versa, if desired, by means of a third pinion, p^2, meshing into them, as shown in Fig. 1; but this third pinion may be removed and shafts s^4 s^5 separately revolved, if preferred.

The slide e^4 has projecting from it a lug, o, in which is journaled the horizontal screw o', having hand-wheel o^2. The thread of this screw is tapped through the lug o^3, which is attached to the slide e^4. This affords adjustment horizontally and longitudinally of shaft s^2 for the slide e^4 and cutter-head E, to bring it into proper position with cutter-head E'. A rock-shaft, R, is journaled in the lug o and in another lug, o^4, upon slide e^4. Upon it is attached the horizontal arm r, provided with a weight upon its outer end, and a finger, r', which bears against the face of slide e^4 and holds it from dropping down. Pressure-fingers r^2 r^3 are firmly attached to this rock-shaft and curve downward and forward in the direction in which the lumber is fed under the cutter-head E, on each side of the path of its knives, over the bed of the machine in position to bear upon the boards upon each side thereof. These pressure-fingers are attached to rock-shaft R by collars and set-screws r^4 r^5, by loosening which the fingers may be set higher or lower with relation to the bed. These pressure-fingers of course bear upon the boards on each side of the guide D as the two boards pass through on opposite sides of the guide, as before described.

The bed is formed of a plate, F, which is secured by screw-bolts to the cross-girt f of the frame, and has an opening, f', formed in it, through which the knives of the cutter-head E' work in cutting the tongue. This plate or bed F may be removed to give better access to the knives of the lower cutter-head.

It will be observed that the pressure-fingers r^2 r^3 are capable of independent adjustment to suit different thicknesses of boards being simultaneously worked, and that they are also adjusted simultaneously with the cutter-head E; also, that the construction of the shafts of the cutter-heads E E' and attaching parts so that they project from different sides of the machine gives great facility of access to the working parts for adjustment and in belting to the driving-shaft. For this purpose the pulley P^2 is attached to the outer end of the shaft s^2, and the pulley P^3 to the outer end of the shaft s^3 outside the machine-frame. The pulley P^4 on the driving-shaft s is belted to the pulley P^2 by a straight belt, and the pulley P^5 on the same shaft is belted to the pulley P^3 by a cross-belt, as shown in Fig. 1. Both the pulleys P^2 P^3 are thus brought closer in toward the frame of the machine than when both of them are located on the same side of the machine and belted to the same shaft s.

The employment of the presser-finger r^2 between the guides c^2 and D of the machine is especially important in insuring the formation of a tongue on the board which shall fit the groove made by the side cutter-head, C, in a preceding board, because any lifting action of the cutter-heads E E' tends to vary the width of the board as well as the shape of the tongue and to draw the board away from the side cutter-head.

What we claim as new and of our invention is—

1. The combination, in a wood-planing machine, of the single long planing-cylinder B, the feed-rolls in advance thereof, the horizontal planer-bed, over which the lumber passes, the horizontal shafts s^2 s^3, placed transversely above and below said bed, having pulleys P^2 P^3 attached to their outer ends, respectively on opposite sides of the machine-frame, and having their inner ends lapping past each other over and under said bed, and the tonguing cutter-heads E E', attached to the inner ends of said shafts respectively opposite to each other, and in position to simultaneously form the opposite sides of the same tongue on the same board, substantially as described.

2. The combination, in a wood-planing machine, of the single long planing-cylinder B, feed-rolls, central guide, D, and the tonguing cutter-heads E E', mounted upon shafts held and projecting inward from opposite sides of the machine, and bearing against said guide-frame above and below the path of the lumber passing through the machine, and adapted to operate thereon one above the other, substantially as described.

3. The combination of the wood-planing-machine bed F, the central longitudinal guide, D, the tonguing cutter-heads E E', and presser

plates or fingers r^2 r^3, formed and arranged to bear upon the lumber over said bed and upon opposite sides of the guide D, substantially as described.

4. The combination of the wood-planing-machine bed F, the tonguing cutter-heads E E', arranged to operate one above the other upon opposite sides of the lumber, and the presser finger or plate r^2, extending underneath the spindle of cutter-head E, and arranged and adapted to press the lumber upon the bed alongside the path of the knives of one cutter-head, and on the opposite side from the path of the knives of the other, and against the lifting action of both heads, substantially as described.

5. The combination of the wood-planing machine bed F, the central longitudinal guide, D, the side guide, c^2, the side cutter-head, C, and the tonguing cutter-heads E E', mounted upon shafts projecting in opposite directions from the sides of the machine above and below the bed, and the presser plate or finger r^2, extending underneath cutter-head E, and arranged and adapted to press the lumber upon the bed between said guides and against the lifting action of both cutter-heads, substantially as described.

6. The combination, in a wood-planing machine, of the single long planing-cylinder B, feed-rolls upon the feed-in side thereof, the tonguing cutter-heads E E', mounted upon shafts respectively held and projecting inward from the side of the machine-frame on the feed-in side of said cylinder, supported and adjustable vertically upon inclined guideways e e', and provided with pulleys P^2 P^2, and the driving-pulleys P^4 P^5 of said shafts, mounted at the feed-in end of said machine-frame, substantially as described.

7. The combination of the planing-machine frame and its bed F, the tonguing cutter-heads E E', mounted upon shafts held and projecting inward from opposite sides of the machine-frame above and below said bed, the guideways e e', projecting upward and downward from said machine-bed, the slides e^2 e^3, mounted upon said guideways and supporting said cutter-head shafts, the screws i i', mounted upon the frame and adapted to adjust said slides, and the shafts s^4 s^5, extending across the machine beneath the surface of said bed to the same side thereof, and connected, respectively, at one end by gearing to said screws, and having the other end projecting beyond the same side of the machine, whereby said slides may be adjusted from that side, substantially as described.

8. The combination of the planing-machine frame and its bed F, the tonguing cutter-heads E E', mounted upon shafts held and projecting inward from opposite sides of the machine-frame above and below said bed, the guideways e e', projecting upward and downward from said machine-bed, the slides e^2 e^3, mounted upon said guideways and supporting said cutter-head shafts, the screws i i', mounted upon the frame-work and adapted to adjust said slides, and the shafts s^4 s^5, extending transversely across the machine beneath the surface of said bed, and connected together and to said screws respectively by gearing, and having the end of one of said shafts s^4 s^5 projecting beyond the side of the machine, whereby said slides may be simultaneously adjusted from that side by turning said projecting shaft, substantially as described.

9. The combination of the single long planing-cylinder B, the bed F, the tonguing cutter-heads E E', mounted upon shafts projecting from the side of the machine above and below the bed, the vertically-adjustable slides e^2 e^3, supporting said shafts, and the presser finger or fingers r^2 r^3, carried upon said slide e^2 and adjustable therewith, and adapted to press the lumber upon said bed adjacent to said cutter-heads, substantially as described.

10. The combination of the single long planing-cylinder B, feed-rolls, the bed F, the tonguing cutter-heads E E', mounted upon shafts projecting from the side of the machine above and below the bed, the vertically-adjustable slides e^2 e^3, supporting said shafts, the horizontally-adjustable slide e^4, mounted upon slide e^3, and the presser finger or fingers r^2 r^3, carried upon said slide e^2 and adjustable therewith, and arranged and adapted to press the lumber upon the bed adjacent to said cutter-heads, substantially as described.

11. The combination of the single long planing-cylinder B, the feed-rolls, the bed F, the tonguing cutter-heads E E', mounted upon shafts s^2 s^3, projecting from the side of the machine, the slide c^2, carrying the shaft s^2, the rock-shaft R, mounted upon said slide and provided with the weighted arm r, and the adjustable presser-fingers r^2 r^3, attached to said rock-shaft, substantially as described.

SOLOMON A. WOODS.
JOHN R. THOMAS.

Witnesses:
DAVID HALL RICE,
N. P. OCKINGTON.