2 Sheets--Sheet 1.

G. E. WOODBURY.

Planing-Machine.

No. 161,726. Patented April 6, 1875.

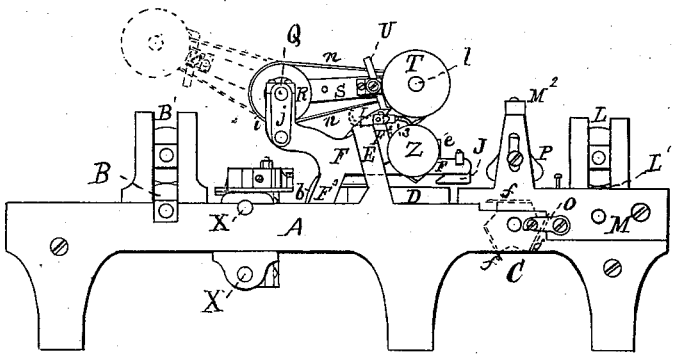

Fig. 1.

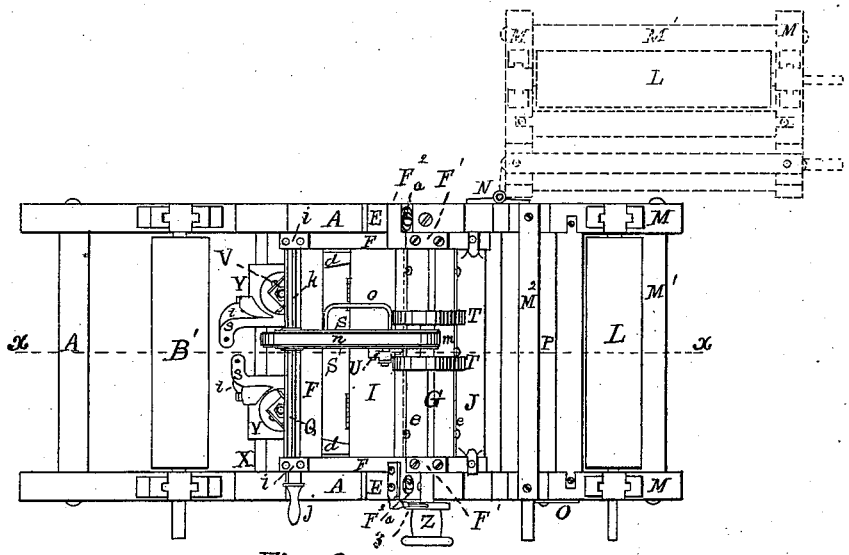

Fig. 2.

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THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

2 Sheets--Sheet 2.

G. E. WOODBURY.

Planing-Machine.

No. 161,726. Patented April 6, 1875.

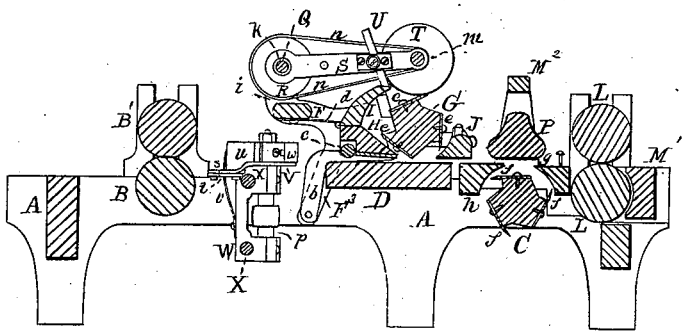

Fig. 3.

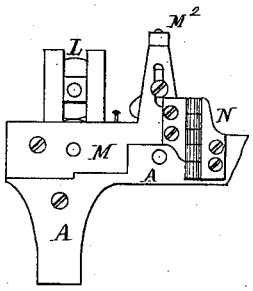

Fig. 4.

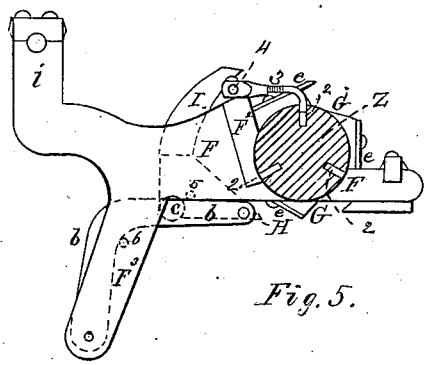

Fig. 5.

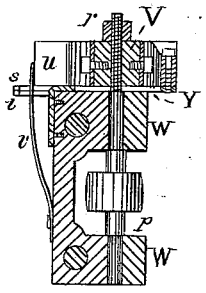

Fig. 7.

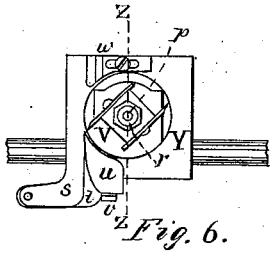

Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE E. WOODBURY, OF CAMBRIDGE, MASSACHUSETTS.

IMPROVEMENT IN PLANING-MACHINES.

Specification forming part of Letters Patent No. **161,726**, dated April 6, 1875; application filed March 28, 1871.

To all whom it may concern:

Be it known that I, GEORGE E. WOODBURY, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Planing-Machines, of which the following, taken in connection with the accompanying drawings, is a specification:

The first part of my invention relates to the manner of constructing and hanging the chip-breaking pressure-bar; and it consists in pivoting the chip-breaking pressure-bar to one end of each of two radius-arms or levers, the other ends of which are pivoted to the cutter-yoke, or other suitable part of the machine, at a point in the rear of and below the cutter-cylinder, so that the forward or chip-breaking edge of the pressure-bar, as it is moved up or down by the varying thickness of the stock, shall move in an arc of a circle the curve of which is the reverse of that described by the edge of the cutters. It further consists in securing the jointing or matching cutter-heads to their shafts by means of screw-threads formed on the upper ends of said shafts, and a corresponding thread in said cutter-heads, and a binding or check nut, all so arranged that said cutter-heads may be readily adjusted vertically when desired.

The second part of my invention relates to the arrangement of the lower cutter-cylinder and forward feed-rolls, and the construction of the forward end of the frame, whereby the forward feed or draft rolls are placed forward of the lower cutter-cylinder, so as to act upon the board until it is entirely planed, while at the same time said feed-rolls and other parts of the machine above or in front of said lower cutter-cylinder may be readily swung to one side, so as to make the said cylinder accessible; and it consists in making a portion of the front end of the frame separate from the main frame, in the form of a supplementary frame, mounting thereon, in suitable bearings, the forward feed or draft rolls, in a position forward of the lower cutter-cylinder, so that they may act upon the board until it is entirely planed, said supplementary frame being hinged or otherwise secured to the main frame, so that it may be readily swung to one side, or removed from above the cutting-cylinder, so as to make said cylinder and its cutters conveniently accessible for repairs.

The third part of my invention relates to sharpening the cutters of a cylinder planing-machine; and it consists in the combination, with a cylinder planing-machine, of one or more grinding-wheels, suitably mounted upon a short shaft provided with a pulley, and mounted in suitable bearings in the movable ends of one or more radius-arms, the ends of which are so fitted to the hub of a driving-pulley, or a sleeve-shaft upon which said pulley is mounted, that it may be revolved, and at the same time it may be moved endwise upon the driving-shaft, carrying with it the grinding-wheels, so that they may act upon the whole length of the cutter, the driving-shaft being provided with a spline, to compel the revolution therewith of the driving-pulley while it is free to reciprocate thereon. It further consists in providing said radius-arms or frame with an adjustable stop or gage, arranged to co-operate with the upper edge of the cutter-shield, or other straight bar arranged parallel to the axis of the cutter-cylinder, for the purpose of limiting the downward movement of the grinding-wheels. It further consists in the use, in combination with the cutter-cylinder and a grinding mechanism, of an adjustable locking device for securing the cylinder in the proper position for grinding a cutter and holding it there, as will be described.

In the drawings, Figure 1 is a side elevation of so much of a cylinder planing-machine as is necessary to illustrate my invention. Fig. 2 is a plan of the same in working position, and also showing the supplementary frame and draft-rollers swung to one side in dotted lines. Fig. 3 is a vertical longitudinal section on line *x x* on Fig. 2. Fig. 4 is a partial elevation of the side opposite to that shown in Fig. 1, and showing the manner of hinging the supplementary and the main frames together. Fig. 5 is an end elevation of the yoke-frame, drawn to an enlarged scale, and showing the manner of locking and holding the cylinder in position while the cutters are being ground. Fig. 6 is a plan of the jointing or matching cutter-head and its accessories, also drawn to an enlarged scale. Fig. 7 is a vertical section of the same on line *z z* on Fig. 6.

A is the main frame, having mounted thereon, in suitable bearings formed for the purpose, the feed-rolls B and B′ and the cutter-cylinder C, for planing the under side of the board, and having secured thereto the bed D, and provided with the standards E, rising upward from said frame, upon which is adjustably mounted the yoke-frame F. The yoke-frame F consists of two arms connected together at one end by a cross-tie cast in one piece therewith; said frame being placed in a horizontal position, or nearly so, with the cross-tie in the rear of the cutter-cylinder G, which is mounted in the boxes F^1 F^1, formed upon said side arms near the middle of their length, at or near which point the frame F is provided with the ears or flanges F^2, by means of which and the bolts *a a* the yoke-frame is secured to the standards E, in a well-known manner; said ears or the standards being slotted to permit a proper adjustment of the cylinder-cutter to adapt it to plane stock of different thicknesses. The yoke-frame F is also provided with two arms, F^3, which project downward in the rear of the cutter-cylinder, one from each of the side arms of said frame, to the lower ends of which are pivoted the two bent links or radius-arms *b b*, rising above and extending forward over the bed D, and pivoted at their forward ends to the ends of the chip breaking pressure-bar H at a point near its forward edge, said bar being so constructed and arranged that its forward edge shall rest on the board near the path of the edge of the cutter, to serve as a chip-breaker, while the rear portion of said bar, which is made heavy, has hung upon its under side the roll *c*, which rests upon the upper surface of the board with a force due to the weight of the pressure-bar H and the roll *c*, combined with the tension of the springs *d d*. I is a cutter shield or bonnet, hinged to the upper side of the pressure-bar in a well-known manner. J is a pressure-bar placed just in front of the cutter-cylinder G, and mounted on the forward ends of the side arms of the yoke-frame F, in a well-known manner. The cutter-cylinder G is constructed in a well-known manner, and has secured thereon the cutters *e e′*, of the usual form. C is a cutter-cylinder, having secured thereon the cutters *f f*, and mounted in suitable bearings in the frame A, in position to plane the under side of the board.

Formerly it was customary to have a pair of draft-rolls in front of this cylinder; but on account of the difficulty of getting at the cutters to remove them for sharpening, of late the draft-rolls have been dispensed with, and the cutter-cylinder has been placed on the extreme front end of the frame, so as to make the cutters accessible without removing the feed or draft rolls; but this plan is objectionable from the fact that the board is released from the feed-rolls before it is entirely planed, and if another board does not immediately follow it, so as to push it through, and not allow the feed to stop while the board is under the cutters, a short piece of the last end of the board is very likely to be spoiled.

To overcome this difficulty I hang the forward feed or draft rolls L and L′ on a supplementary frame, M, consisting of two short side pieces connected together by the tie-girts M^1 and M^2, and secure said supplementary frame to the main frame A by means of the hinge N and a hook, O, or other suitable locking device, so that said frame, with the draft-rolls, may be swung around to one side, as shown in dotted lines in Fig. 2, moving in a horizontal plane. P is an adjustable bed-bar placed above the lower cutter-cylinder C, and *g* and *h* the pressure-bars, which serve to hold the board firmly against the bed P while it is passing the cutter-cylinder C. The adjustable bed-bar P and the pressure-bar *g* are mounted on the supplementary frame M in the case shown. The yoke-frame F has two arms, *i i*, which rise from its rear end at both sides of the machine, in the ends of which are formed boxes, in which is mounted the shaft Q, in a position parallel to the axis of the cutter-cylinder G, to which a rotary motion may be imparted by the crank *j*; or, if desired, a pulley may be substituted for the crank, and said shaft may be driven by a belt from a countershaft overhead. The shaft Q has a spline-groove or rib, *k*, extending the whole length thereof, between its bearings, upon which the pulley R is fitted to slide. S S are two radius-arms fitted to the hubs of the pulley R, in such a manner that the pulley may revolve freely, while said arms remain in a fixed position; or said arms may be made to vibrate about the axis of said pulley, at the will of the operator. The arms S S are connected together by suitable ties, so as to form a frame, and at their movable ends are formed boxes, in which is mounted the short shaft *l*, provided with the pulley *m*, and having secured thereto the grinding-wheels T, to which rotary motion is imparted from the pulley R by means of the belt *n*. A handle, *o*, is attached to one of the arms S, by which the grinding-wheels and their carrying mechanism may be reciprocated from one side of the machine to the other. U is an adjustable stop or rest, arranged to limit the depth to which the grinding-wheels can cut by said stop coming in contact with the upper edge of the shield or bonnet I, or other suitable straight fixed surface that is parallel to the axis of the cutter-cylinder G. The grinding-wheels T, when not in use, are thrown back away from the cutters, as shown in dotted lines in Fig. 1. V V are two cutter-heads, provided with suitable cutters for jointing and tonguing and grooving the edges of the board, said heads being mounted upon the upper ends of the vertical shafts *p p*, which are mounted in bearings in suitable standards W W, fitted so as to be adjustable transversely of the machine on the rods X X. The cutter-heads V V are secured to the shafts *p p* by means of screw-threads formed upon

the upper ends of said shafts, to fit corresponding threads cut in the heads and the binding-nuts *r r*, so that said heads may be readily and easily adjusted vertically to adapt them to the thickness of the stock being planed, while at the same time the cutter-heads may be firmly secured to said shafts by means of the extra friction obtained by the use of the binding-nuts *r r*, said friction being obtained by screwing the binding-nuts down onto the cutter-head while said cutter is held from turning, thereby forcing the upper side of the thread in the binding-nut hard against the under side of the thread on the shaft, and the under side of the thread in the cutter-head hard against the upper side of the thread on the shaft. Y is an annular table, mounted upon the stand W, and surrounding the cutter-head V at its base, and provided with the arm *s*, to which is pivoted one end of the radius-arm *t*, to the opposite end of which is secured the chip-breaking pressure bar or shoe *u*, all arranged in such a manner that as the shoe is moved back against the tension of the spring *v* its point will move along a line in close proximity to the path of the edge of the cutter, but in an arc of a circle curved in the reverse direction to that described by the cutter. *w w* are adjustable gages to press against the edge of the board after it has passed the cutters. Z is the driving-pulley on the cutter G, the inner flange of which has formed in its periphery as many radial holes 2 2 as there are cutters on said cylinder, into which the hook 3 engages to hold the cylinder firmly in position while the cutters are being ground. The hook 3 is made in two parts, screwed together, as shown, so that its length may be adjusted to vary the angle of the cutter while it is being ground, said hook being pivoted at 4 to the ear F^2 on the yoke-frame F, so that it may be thrown back and away from the pulley Z when not in use.

The main driving-shaft, gears, and belts for operating the various parts of the machine are not shown in the drawings or otherwise described, as they form no part of my present invention, and may be arranged in any well-known manner.

For the purposes of this description the end of the machine where the planed lumber is delivered is called the front of the machine.

The chip-breaking pressure-bar H is prevented from falling too low by the stop-pins 5, set in the end of said bar, and 6, set in the arm F^3 of the yoke-frame, arranged to strike against the edge of the radius-arms *b*, as shown in dotted lines in Fig. 5.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A chip-breaking pressure-bar, H, or roll, constructed and arranged to move in an arc of a circle the curve of which is in the reverse direction to the arc of a circle described by the edge of the planing-cutters while they are acting upon the board, substantially as described.

2. In a machine for planing lumber, the combination of two cutting-cylinders, adapted to plane both sides of a board at the same time, and a pair of draft-rolls, placed in front of said cylinders, and mounted upon a supplementary frame, arranged to be swung to one side, for the purpose of giving access to the under cylinder, all the parts being constructed, arranged, and operating in the manner shown and described.

3. The combination, with the cylinder G in a planing-machine, of the grinding-wheel T, the radius-arm S, the shaft Q, the pulleys R and *m*, and the belt *n*, all arranged and operating substantially as shown and described.

4. In combination with the radius-arms S and the pulley R, fitted to slide on the shaft Q, and grinding-wheel T, the adjustable stop U, arranged to operate substantially as described.

5. The combination, with the cutter-cylinder G, of a pivoted hook, arranged to lock said cylinder in position by engaging with holes formed in said shaft, or a hub or flange secured thereon, substantially as described.

6. The pivoted hook 3, made in two parts and screwed together, substantially as described, for the purpose specified.

Executed at Boston this 24th day of March, 1874.

GEORGE E. WOODBURY.

Witnesses:
WM. P. EDWARDS,
L. A. WOOD.