(No Model.) 3 Sheets—Sheet 1.

# B. D. WHITNEY.

## BED AND PRESSER FOR PLANING MACHINES.

No. 259,958. Patented June 20, 1882.

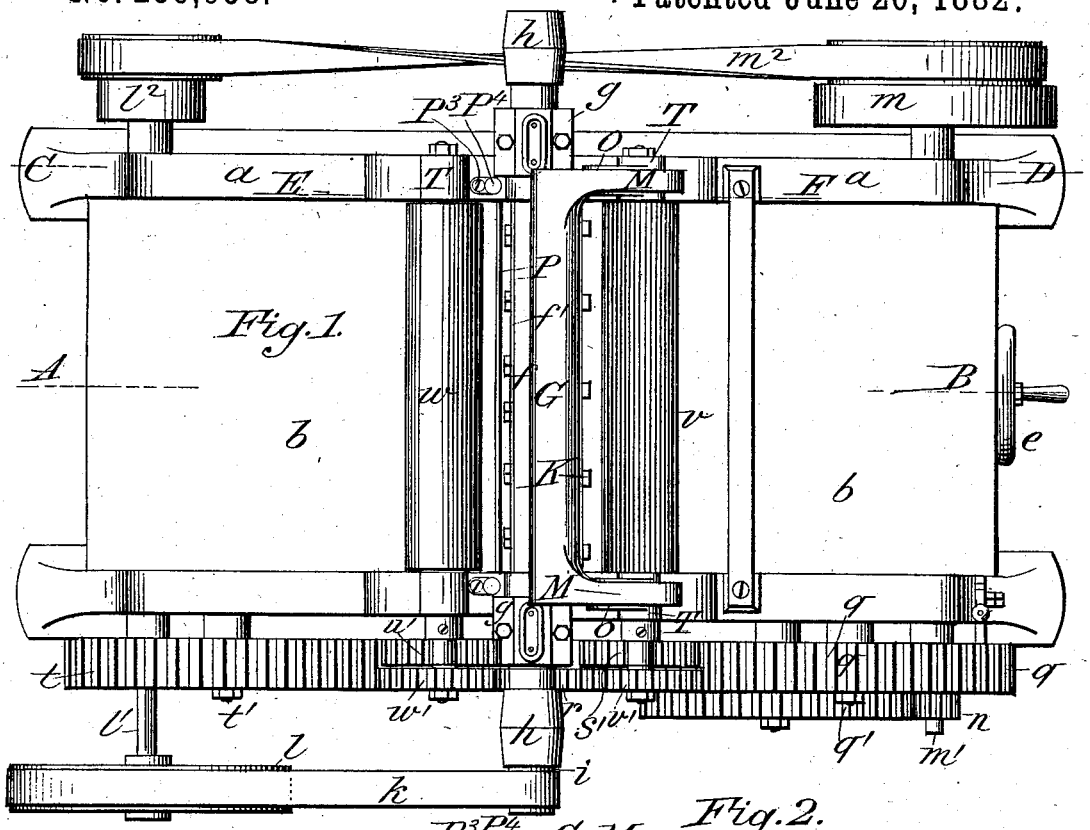

Fig. 1.

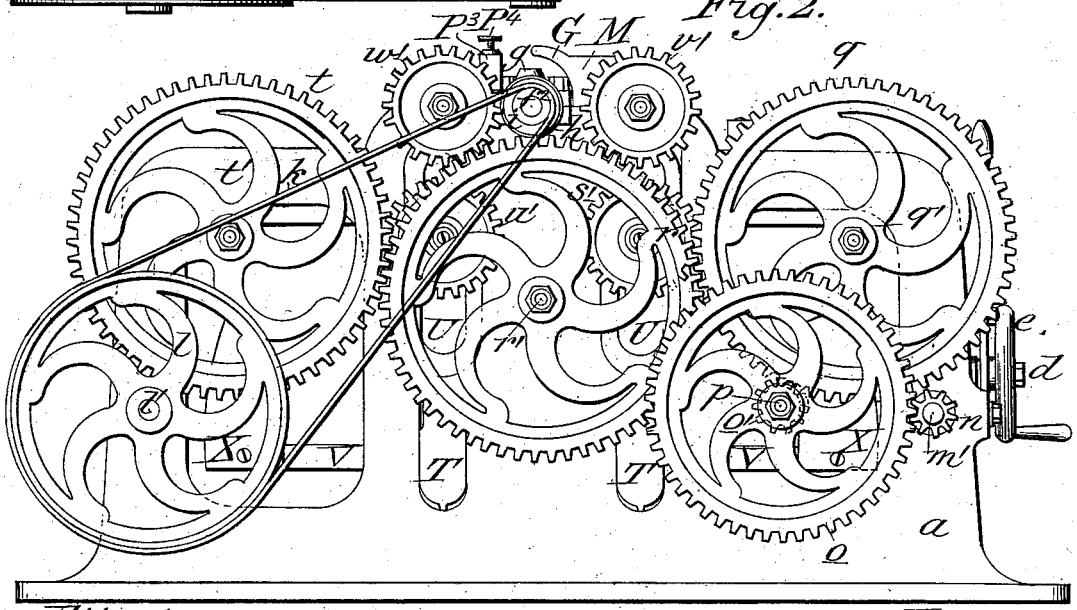

Fig. 2.

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## BED AND PRESSER FOR PLANING MACHINES.

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Fig. 4

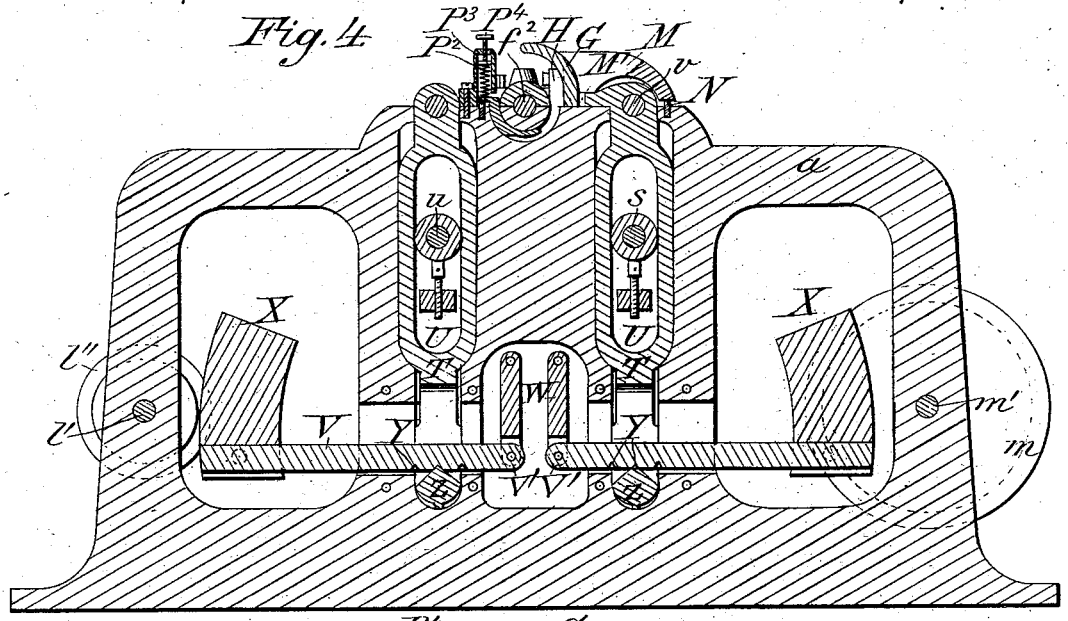



Fig. 5.

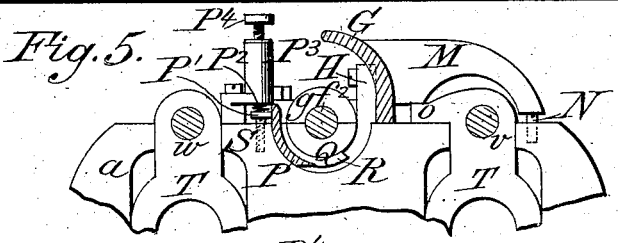
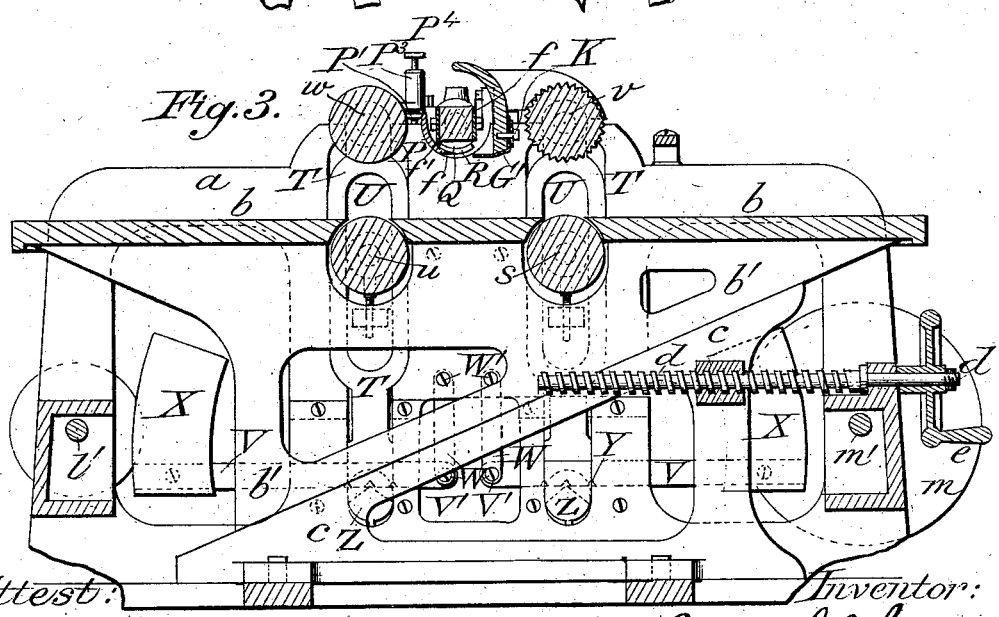



Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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## BED AND PRESSER FOR PLANING MACHINES.

No. 259,958. Patented June 20, 1882.

Fig. 6.

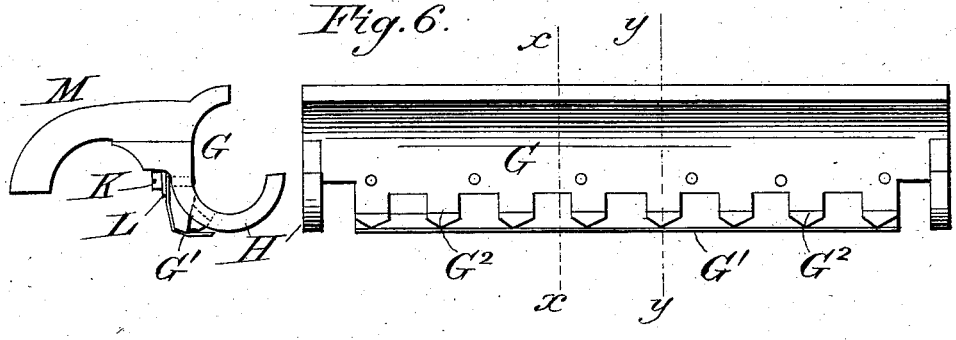



Fig. 7.

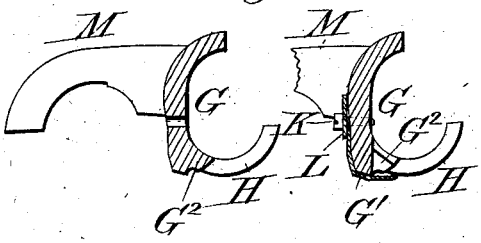
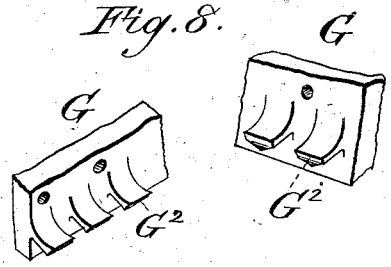



Fig. 8.

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# UNITED STATES PATENT OFFICE.

BAXTER D. WHITNEY, OF WINCHENDON, MASSACHUSETTS.

## BED AND PRESSER FOR PLANING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 259,958, dated June 20, 1882.

Application filed August 11, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, BAXTER D. WHITNEY, of Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Planing-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, which form a part of this specification.

My invention relates to improvements in wood-planing machines of that class in which a revolving cylinder with cutters making the "dip" and "lift" cut is used in connection with feeding-rollers, bed-plate, and other suitable appliances.

The invention consists, first, of a peculiar construction and arrangement of presser-bars to work in close proximity to the revolving cutters, with provisions for a greater range of action, superior facilities for adjustment, and more complete and effective bearing upon the lumber than is usual in devices heretofore employed for similar use; second, of a system of gearing for operating the feeding-rollers so that changes of the position of the rollers incident to different thickness of lumber may be made without special adjustment; and, third, in a method of regulating and readily adjusting the pressure of the feed-rolls by means of weighted levers provided with vibrating stirrups and changeable fulcrums.

A machine with my improvements is represented by the accompanying drawings, in which Figure 1 is a plan view. Fig. 2 is a side elevation, showing gears for operating the feed-rolls. Fig. 3 is a longitudinal section on line A B of Fig. 1. Fig. 4 is a longitudinal section on line C D of Fig. 1. Fig. 5 is an enlarged section on line E F, Fig. 1. Fig. 6 is a side and end view of a presser-bar with its flexible sheet-metal foot and auxiliary supports, showing the side next to the cutter-head; and Fig. 7 shows sections of the same on the lines *x x* and *y y*. Fig. 8 is a detail.

Similar letters refer to similar parts of the machine as represented in the several views.

*a a* represent the frame of the machine.

*b* is the bed-plate for supporting the lumber as it is planed. It is raised or lowered to and from the cutters by a sliding inclined plane or wedge, *c*, acting upon its stationary converse plane *b'*, which supports said bed-plate.

*d* is a screw with a hand-wheel and crank, *e*, for working the inclined plane *c*.

*f* is the revolving cutting-cylinder, provided with knives *f' f'*. Its shaft $f^2$ has bearings *g g* and driving-pulleys *h h*, and also a small pulley, *i*, for giving motion to the feed-gearing, all of which are or may be arranged in accordance with usual methods.

*k l l'* $l^2$ *m m'* $m^2$ indicate a system of intermediate shafts, with appropriate pulleys and driving-bands for operating the feed mechanism, which may be readily traced without minute explanation.

*s*, *u*, *v*, and *w* are feed-rollers for carrying forward the pieces to be planed. These rollers are arranged in pairs at the front and rear of the cutting-cylinder. The lower rollers, *s* and *u*, are in the bed-plate *b* and move up and down with it as it is adjusted for varying thicknesses of lumber. The upper rolls, *v* and *w*, serve as pressure-rollers and have their bearings in yielding weighted hangings T T T T, so that they may rise and fall slightly to correspond with the surface of a board passing under them. The hangings T T, as shown, have slots or openings U for the shafts of the lower rollers, but they may be of other forms. Requisite pressure of the feed-rolls is obtained by weighted levers V, pivoted at V' to a vibrating stirrup or link, W, which swings upon a pin, W', connected with the frame of the machine, a lever being provided for each hanging T and furnished with a weight, X, which may be adjusted at different positions on the lever in any convenient manner; but the peculiar method of adjustment which I regard as an improvement consists in sliding the lever endwise to produce a change of its fulcrum, for which purpose I have a series of notches, Y Y Y, formed in the levers and fitted to the bearing Z of the hanging T, so that by a change in the relative position of the fulcrum, allowable by the vibrating stirrup W, the pressure upon the rollers may be increased or diminished more readily and to a greater extent than by movement of a weight upon the arm of the lever in the ordinary manner.

I will now describe my improved mode of gearing the feeding-rollers.

Operating-gears $s'$ $w'$ $v'$ $w'$ are placed upon the respective rollers, and, as may be seen by the plan view, Fig. 1, out of line upon the upper and lower rolls of each pair, so that they may lap or shut by each other to allow a larger diameter of gear than can otherwise be used, thereby adding strength of movement and reducing the lateral or sidewise strain at the axis of roll, which is frequently a troublesome element of unequal and irregular action of feeding and pressure rollers. To give the several roll-gears their proper motion, and to connect them when at different positions, I place outside of the lower roll-gears, $s'$ and $w'$, two gears, $q$ and $t$, of such diameter as may allow the rise and fall of the roll-gears a sufficient distance in a line tangential to their pitch-circles without material or improper variation in the depth of mesh. The position of the axes of these gears $q$ and $t$ is in line with those of the roll-gears $s'$ and $w'$ when at their medium height, or varying slightly therefrom, as may be expedient, better to accommodate their more common positions of use, the intention being to provide a range of traverse for rolls sufficient for extreme variations in thickness of lumber.

The machine is intended to plane without disengagement of the gears, while at the ordinary or average use they may work practically correct. The gears $q$ and $t$ have sufficient width of face to match the gears $s'$ and $w'$ of the lower rollers, to which they give motion; also, to engage with a central connecting-gear, $r$, which sets in line with and drives the gears $v'$ and $w'$ of the upper rollers. The gears $q$, $r$, and $t$, being simply intermediate or connecting gears, may run loosely upon stationary pins or studs $q'$, $r'$, and $t'$, as represented, or they may be mounted in any other convenient way. This train of gearing receives motion from a pinion, $o'$, attached to the large gear $o$ on a post, $p$, while the gear $o$ is in turn driven by a pinion, $n$, on the shaft $m'$, this latter being arranged with a clutch or locking device, so that it can be disengaged for stopping the feed mechanism when desired.

It will be observed that the arrangement of the train of gears $q$, $r$, and $t$ with the several roll-gears is such that each of the connecting-gears receives power at one point of its periphery and gives it off at other points, so that very little frictional and cramping strain is occasioned by the leverage of the gears across their turning-points, while with larger gears than are usually permissible upon the rollers themselves it makes this plan very much superior to many devices for connecting the gears of feed-rolls heretofore employed.

I will now describe the construction, mode of application, and use of my improved presser-bars. These bars are arranged on either side of the cutting-cylinder and in close proximity thereto, for the purpose of bearing upon and holding the lumber, especially thin boards, firmly to the bed-plate to prevent vibrations or "chattering," which is a fruitful source of rough and uneven planing. They are also advantageous for holding the extremities of the boards during their passage between the rollers, and greatly facilitate the planing of short stuff, such as box-boards, pail-heading, door-panels, &c.; also, to prevent the breaking of the surface in advance of the cut. To obtain the best effect it is necessary that the presser-bar be made to lift—as it must do to accommodate the inequalities of the lumber—mainly in a curved line concentric, or nearly so, with the circle described by the cutting-edges of the revolving knives, although for some reasons it may be advisable to have the distance become slightly greater as the bar rises to its greatest height. To give the bars the desired movement, either concentric or slightly eccentric, I provide for them at each extremity curved or circular grooves R, partially surrounding the journal-boxes of the cylinder-shaft. The ends of the bars being fitted thereto, and made to slide freely therein, guide the bars in their intended course. This method of holding the bar is more convenient and possesses other advantages over the use of collars or bands encircling portions of the shaft of the cylinder, in which way a concentric movement has heretofore been obtained. By reason of my construction I am enabled to remove the cylinder without disturbing the pressure-bar.

Thus far the features described are common to both front and rear bars, but their functions are so unlike that materially different elements are requisite in their construction to make them serviceable. While the bar at the incoming side acts upon the unplaned and uneven surface with its motion and frictional contact, tending to bind or cramp the bar upon the board and to draw it toward and under the cylinder, the other, at the outgoing side, is acted upon only by lumber which has been reduced to an even thickness with motion favorable to its freedom of action, so that a simple rigid bar of suitable curvature and form (as represented by P) serves the purpose very well for this side.

Q represents elongated projections from the bar P for guiding it in the curved grooves R at either end, and P′ are projecting ears, which serve as stops to rest upon the adjustable stop-screws S S, to sustain the bar at the right height when no boards are underneath; also, to provide for suitable pressure from a spring, $P^2$, in the turrets or spring-chambers $P^3$, which have pressure-regulating screws $P^4$, these appliances being attached at each extremity of the bar. For the incoming side my improved bar is quite different in construction. This consists of a rigid bar or piece, G, a section of which, at its lower edge, is nearly perpendicular, while its upper portion, as shown, is curved to make a "chip-directer" or "bonnet" for the cylinder. This form, however, is in nowise essential to its use as a pressure-bar. This bar is supported and guided by curved pieces H

H, which attach to and project from it to work in the curved grooves R at each side of the machine.

G′ is an elastic plate or pad, which forms a supplemental flexible foot or distributive pressure-regulator for the bar G. As represented in the drawings, it is of an angular form, to be reversible, and attaches to the bar G by a cap-plate or binder, L, and screws K K. This foot may be of a single piece or sectional, as most convenient. Its conformation, however, must be consistent with its purpose, which is to secure an equable pressure as close as practicable to the line of cut and extending across the whole width of the board. This requires sufficient elastic or yielding capacity to fit itself to the ordinary inequalities of the surface of undressed lumber upon which it acts. It must also be arranged so that the whole bar shall rise and fall to adapt its action to the amount of "chip" taken, and in this it must be governed principally by riding upon the surface of the boards as they pass under it. I have found good practical results from the use of steel plates so fitted that when in a natural position the portion next to the cutting-cylinder has an inclination or dip of about ten degrees from the horizontal line or plane in which the board moves, with width usually about one and a half inch, sufficient to obtain the proper degree of flexibility. The edge next to the cylinder should be a little lower than the "cut" to insure proper tension and bearing upon boards having thin or depressed places, while next to the feed-roller it must be sufficiently high to receive incoming boards and of such obliquity and position that the action of the board will readily lift the bar rather than force it toward the cylinder. For this purpose I have found an inductive angle of about twenty degrees very good.

For the adjustment of the bar it has arms or levers M M to rest upon the screws N N when no boards are in, also to engage with projections O of the hangings of the feed-roll *v*, which elevates the bar when very thick lumber is introduced. An incoming board, by raising the roller *v*, lifts the front of the bar G, so that it enters readily below the more oblique portion of the pressure-foot G′, upon which it acts until the yielding surface of the flexible foot rests with an even bearing upon different sections of its breadth, holding it firmly down and preventing the slivering or chipping of its surface in advance of the line of cut, and as the board advances the bar P, acting upon the planed side, assists in bearing it down firmly upon the bed-plate, insuring much smoother and better work than can be obtained when the lumber is held only by the feed-rollers or common forms of presser-bars at comparatively remote distances from the cutters.

In order to allow the use of a more flexible and delicately-yielding presser pad or foot for the bearing-surface of the presser-bar when it comes in contact with the lumber to be planed than has been heretofore employed, and thus provide for a more uniform pressure upon different parts of a board of varying thickness, I have devised an auxiliary supporting device which is so arranged that any portion of the pressure foot or plate may be prevented from becoming strained or unduly deflected by coming in contact with obstructions—such as snow, ice, chips, slivers, &c.—which often adhere to the surface of boards. A more even bearing-surface is thus insured, and the working of short and narrow pieces of lumber is greatly facilitated whenever it is desired to pass two or more lines of such work through the machine simultaneously.

The supports $G^2$, which may form a part of the casting of the bar G or may be made in separate parts and attached thereto by any suitable means, are adapted to provide a rigid bearing surface or surfaces of such form as shall contact with the flexible pressure-foot or spring-plate G′ at points that will properly support said foot or plate and prevent its deflection beyond a proper limit. By means of the rigid bearing-surface thus formed the spring-plate can be made longer without liability of getting into the path of the cutters. These supports are preferably placed at proper intervals to support the flexible plate, and are formed with such curvatures and inclinations as to leave spaces for the egress of shavings and chips. To further facilitate their clearance I give an increasing bevel to the surfaces of the supports as they recede from the points next to the cutters, so that the currents of air caused by the revolving cutter-head may the more readily dislodge anything that might be thrown into the space between them and the flexible sheet-metal plate. When the pressure-foot is unduly pressed at any point it comes in contact with the rigid auxiliary supports $G^2$, and instead of being improperly deflected, it is relieved by a movement of the presser-bar through its hangings in a convenient and effective manner.

The utility of presser-bars has long been acknowledged, and many plans have been devised to obtain their benefits, but with different degrees of success. A rigid bar to act upon an unplaned surface is necessarily imperfect, and holding devices without a nearly concentric retreating movement cannot be used in the close proximity to the cutters requisite to prevent "slivering" or "eating in," as it is termed, in many kinds of work. The modes heretofore employed for obtaining such movements have been faulty and inconvenient. My invention has important advantages and removes many of the objections common to machines heretofore in use.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a planing-machine, the combination, with the cutting-cylinder *f* and its journal boxes

or bearings, provided with curved grooves R, partly surrounding the journals of the cylinder and concentric, or nearly so, therewith, of the presser-bar G, having curved guides adapted to engage with and slide in the grooves R, whereby said bar is enabled to lift in a curved line substantially concentric with the cutting-edges of the revolving knives, substantially as shown and described.

2. The presser-bar G, provided with levers M M, curved guides H H, adapted to engage with and slide in curved grooves formed in or around the journal boxes or bearings of the cutter-cylinder concentrically with the journals of said cylinder, and a yielding presser-foot, G′, consisting of an elastic plate or plates having an inductive bearing-surface adapted to regulate the pressure of the bar to correspond with the varying thickness of the advancing board, substantially as shown and described.

3. In a yielding presser-bar, the combination of a flexible pad or foot, G′, with auxiliary supports $G^2$, to prevent undue deflection and injury of the flexible pad, substantially as shown and described.

4. In a planing-machine, the combination, with the cutting-cylinder having its journal boxes or bearings provided with curved grooves partly surrounding the journals of the cylinder and concentric therewith, of the pressure-bars G and P, having curved guides adapted to engage with and slide in the grooves, whereby said bars are enabled to lift in a curved line concentric with the cutting-edges of the revolving knives, substantially as shown and described.

5. In combination with the gears $s'$, $w'$, $q$, and $t$, the gears $v'$ $w'$, and the central intermediate gear, $r$, connecting the whole and arranged to admit of an adjustment of the feeding-rollers, substantially as shown and described.

6. The combination, with the gears of the upper and lower rollers and the gears $q$ $r$ $t$, of the gear $o$ and pinion $o'$ on stud $p$ and the pinion $n$ on shaft $m'$, substantially as and for the purpose shown and described.

7. The combination of the weighted levers V, having notches Y Y, with pivoted vibrating links or stirrups W, and with the bearings Z in the hangings T, or their equivalents, for adjusting the pressure of the feed-rolls, substantially as shown and described.

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

BAXTER D. WHITNEY.

Witnesses:

PHILIP MAURO,

A. R. BROWN.