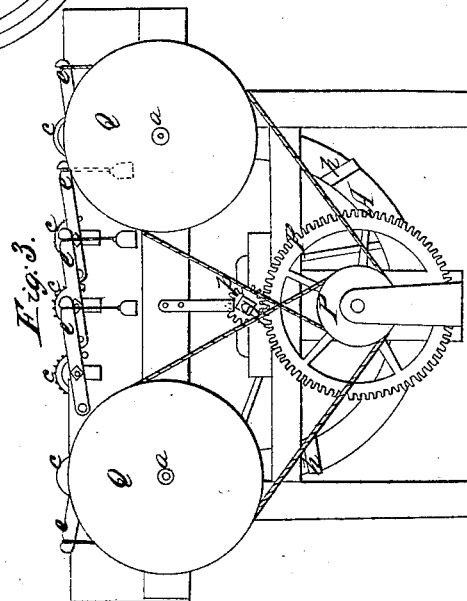
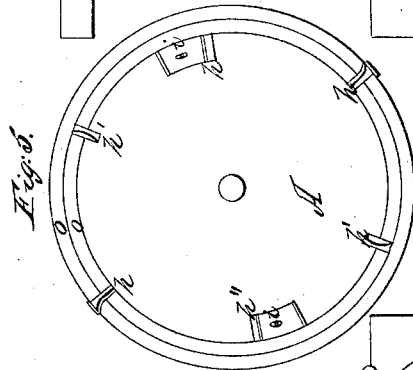
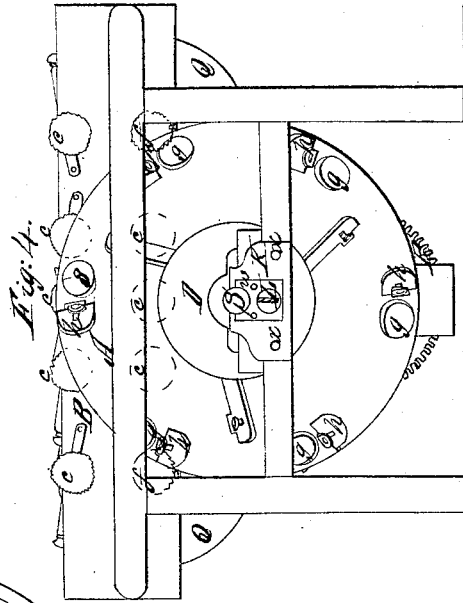


Patented Apr. 10, 1849.



UNITED STATES PATENT OFFICE.

HAZARD KNOWLES, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO JNO. LEVY,
OF NEW YORK, N. Y.

PLANING-MACHINE.

Specification of Letters Patent No. 6,294, dated April 10, 1849.

To all whom it may concern:

Be it known that I, HAZARD KNOWLES, of Washington, District of Columbia, have invented sundry new and useful Improvements in Planing-Machines, and that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, of which—

Figure 1, is a top view or plan; Fig. 2, an end view or elevation, Fig. 3, a front elevation, Fig. 4, a rear elevation of one of the forms of my improvement, and Fig. 5, is a representation of the front face of the main cutting wheel showing the arrangement of cutters and of offsets as hereinafter described. In Figs. 1, 2, 3 and 4 the same letters are used to designate corresponding objects. Figs. 6 and 7 are modified applications of my improvements.

The purpose of my invention is not only to produce planed boards or planks of uniform thickness, but also smooth and finished surfaces, capable of receiving, without further preparation, paint, varnish and polishing.

The planing machines in common use are generally so constructed as to allow more or less vibration of the plank directly under the cutters and thereby to create irregularities of surface. This evil my invention obviates by causing the board to pass between the cutter wheel A, Figs. 1, 2, 3 and 4, and the vertical face of the frame piece B, in the same figures, or between the "cutting roller" C, Fig. 6 and the supporting roller R, in the same figure. In both cases the board is kept in contact with its support by the rotary guides *c, c, c*, which are pressed by weights against the edges of the board, and being always set a little obliquely to the direction of motion of the board, produce, as they are made to revolve, a constant tendency of the board toward its support, whether the back or bench of the machine, as in Figs. 1, 2, 3 and 4, or the roller (R) in Fig. 6. The degree in which this tendency of the board to press against its support, will exist in any case, will depend on the obliquity of the plane of the rotary guiding disks *c, c*, to the plane of direction in which the board moves in passing under the cutters. These rotary guides I generally bring by beveling, (as seen at *c* Fig. 7), nearly to an edge, but vary the thickness of the edge according to the softness or hardness of the wood to be planed.

Motion is communicated to the cutter wheel A, (Figs. 1, 2, 3, 4 and 5,) as well as to the feeding rollers *f, f*, by means of the pulley D, or by any equivalent machinery to receive motion from a moving power.

The board to be planed is carried forward by the feeding rollers *f, f*, set in motion by the main shaft S, pinion *p*, toothed wheel R, pulley P, band wheels *Q, Q*, and their axes *a, a*, or by any equivalent train of machinery, by which said feeding rollers may receive the required degree of speed.

My oblique rotary guides *c, c*, when used with the "Bramah wheel" planing machine are placed each on its own axis in a small jointed or hinged frame, having levers *e, e, e*, &c., to which weights are suspended for pressing the guides strongly against the edges of the boards. The levers applied to the guides under the lower edge of the board are of the first order, those above the upper edge, of the second order. When used in combination with the "Bentham" "cutting roller" C, (Figs. 6 and 7) my oblique rotary guides will be placed in arms *a, a*, projecting from leaning shafts F, F, and will be kept in contact with the edges of the board while it passes under the cutter, by means of a weight or weights W, acting over a pulley on arms L, L, at right angles to *a, a*. In this application they are combined with a roller R which sustains the board at the moment of its passage beneath the cutting roller, and also with a spring scraper S, which serves to detach any chips, slivers or lumps of dirt which might chance to adhere to the under surface of the board, and which if allowed to pass between the board and the roller would cause an irregular cutting away of the upper surface. With respect to the combination of parts just described, I will remark that as the "cutting roller" was long since described by Bentham as "a plain cutter so long as to cover the whole breadth of the piece" and "having the advancement of the piece in a direction opposite to that of the rotation" I do not of course claim this as new.

When making use of "cutting rollers" either for planing, tonguing, grooving or molding boards or other pieces I adopt the principle laid down by Bentham, that is,— "to gain time, cutters are applied to different sides of a piece at once," and still

further in constructing my cutting rollers I "make the teeth distinct from each other as well as from the cylinder from which they are to project—taking on and off as occasion may require," as the same was described by Bentham.

For the purpose of putting the cutters on and off I make use of any of the well known mechanical devices such as grooves, flanges, wings, screws, bolts and slots which are in common use for similar purposes.

I am aware that of late years it has been attempted by Woodworth and others to establish claims to several of these features of Bentham's invention as if the same were new, but inasmuch as they have been more than fifty years published to the world I do not think proper to claim them as my invention.

My oblique rotary guides hold the edge of the board immediately at the points which are undergoing the planing, which gives them an advantage over rollers resting on the broad surface of the board, which latter must always be at a distance from the line of action of the cutters. They are as above set forth, equally applicable to the "rolling-cutter" planing machines of Bentham and the "cutter frames" or wheels of Bramah. To the latter wheel my second improvement is more particularly applicable. That improvement consists in forming one, two, or more offsets, or in lieu thereof one or more bevels near the outer periphery of the cutter-wheel. Upon the circuit of the outer or deeper of these offsets, is set a series of reducing cutters marked *h*, *h*, Fig. 5. These cutters may project a short distance beyond the periphery of the wheel A. The purpose of the offsets or bevels is to allow a board thicker than the finished work is intended to be, to enter between the edge of the wheel and the face of the bench or support. The side or projecting corner of the reducing cutter is made sharp as well as the lower edge, as represented at *h*, *h*, Fig. 5. Entirely within the outer circumference of the wheel are set, through inclined mortises of appropriate form the second series of plane irons or jack cutters *h'*, *h'*. The plane irons here used are concave on their faces, by which conformation the corners precede, a little, the center portion of the cutter. These cut-

ters stand farther out toward the plane of the wheel than the reducing cutters. Still nearer to the axis of the wheel is another series of cutters called smoothing cutters, the edge of each of which is ground straight and made sufficiently broad to cover the whole face of the board to be planed. Two of these cutters are seen at *h''*, *h''*, in front of each of which is an adjustable gage plate *i*, having a set-screw passing through a countersunk slot by means of which it is capable of being set nearer to or more remote from the edge of the cutter, in order to limit the feed or hold taken of the timber by the smoothing plane.

In order to adjust the distance between the wheel A and the face of the bench B Figs. 1, 2, 3, and 4 the main shaft S has near the back end a neck or groove turned upon it into which a collar *w* is fitted, supported on a sliding block K. This block slides on the two guide rods *x*, *x* (Figs. 1, 3 and 4) and is made to slide toward the frame F, by turning the screw L. The collar *w* and shaft S are thus pressed forward, or withdrawn, to adjust the space between A and B to the thickness of the finished or planed boards. At *g*, *g*, *g* are represented the apertures on the back of the wheel A through which the shavings from the several cutters make their escape.

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

1. The method of holding the board firmly against the bearing bench or roller of a planing machine by means of the obliquely placed, rotary guides, firmly pressed against the edge of the board, and drawing it to the bed in the manner substantially as herein set forth.

2. I also claim the oblique rotary guides herein described, in combination with a cutter-wheel having bevels or offsets around its face, and also with the adjustable plates in front of the smoothing cutters set in its plain face, as herein set forth, not confining myself to the precise arrangement described but varying it to attain the same ends by means substantially the same.

HAZARD KNOWLES.

Witnesses:

WALTER R. JOHNSON,
A. STEINWEHR.