Barnum & Wells,

Wood Planing Machine,

No. 6,185. Patented Mar. 13, 1849.

Fig: 1.

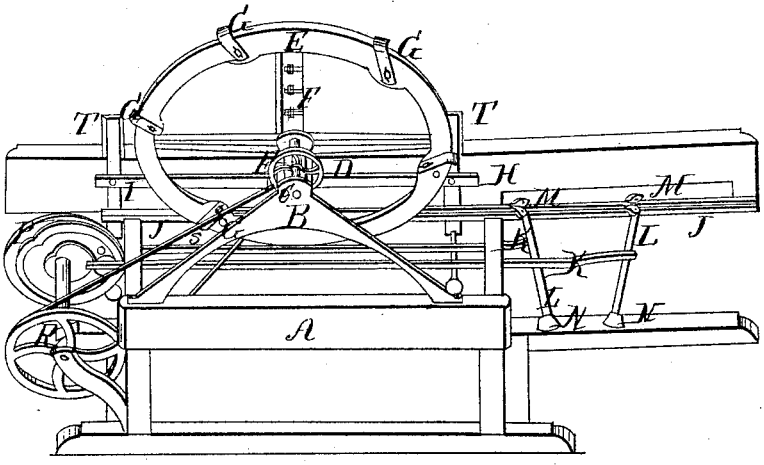
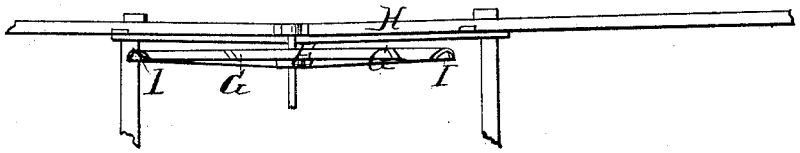


Fig: 2.



UNITED STATES PATENT OFFICE.

D. BARNUM AND T. J. WELLS, OF NEW YORK, N. Y., ASSIGNORS TO D. BARNUM.

PLANING-MACHINE.

Specification of Letters Patent No. 6,185, dated March 13, 1849.

To all whom it may concern:

Be it known that we, DANIEL BARNUM and THOMAS J. WELLS, both of the city, county, and State of New York, have invented and applied to use new and useful Improvements in Machinery for Planing Boards and Planks; and we hereby declare the following descriptions, with the accompanying drawings, to be a full and clear description and representation of the same.

The same letters refer to the same parts in the different figures.

Figure 1, is a perspective representation of the machine, with its combinations. Fig. 2, is a ground plan or top view of a part of the machine, showing the curved fence, and the screw clamps or gages, I, (J cannot be seen in this figure), and also the disk E, with the gage cutters *a*, upon the periphery—the finishers F being true with face of the disk can not be seen.

Fig. 1.—A shows the main frame; B, the standard for the support of the shaft C, upon which is seen the main driving pulley D, and also the face disk E, fitted with one or more long or broad smoothing knives or finishers F, the edge of which should form a line at right angles to the line of the shaft C. The disk is also dotted with six, more or less, deep cutting gages placed upon the periphery for the purpose of "cutting off the roughest part." "The gages act first to chop or hew away the wood roughly, but to a flat surface, and then the finishers follow and reduce it to a smooth plane, this is accomplished by their being placed nearer the center, so that they revolve, in a rather smaller radius and thus act upon the wood after the gages have finished." The curved fence H is constructed (with a slight curve at the center of the disk), on two lines, at an angle with the line formed by the face of the disk, as seen in Fig. 2, and diverging therefrom each way to the ends of the machine. I, and J, are gages, or "screw clamps with proper contrivances," adapted to both lines, and to the curve of the fence, and whether they are fitted with a tongue and groove, or any other device to act upon the edges of the board, they must extend beyond the disk, on each line of the fence, both in front, and rear, as far as may be necessary to hold the board on the front line, as it enters the machine, and also on the rear line of the fence as it leaves the machine. I, and J, are so constructed as to have a continued action upon the edges of the board, from one end of the gages to the other so as to spring, and to present each portion of the board to the action of the finishers, F, on the disk, on a curve as the board passes through the machine. J, is a fixture on the fence as seen in the drawings and model, fitted with a tongue, to operate as a clamp upon the under side of the groove in the board, as it is made to slide behind the tongue, and between it, and the fence. I, is fitted with a flange to overlap, and clamp the tongue on the board in the same manner, and is also a fixture, held firmly by screws, to the cross slides, T, these cross slides T being adjustable in order to accommodate, or to keep the gage or clamp I, in contact with the different widths of boards, for this purpose weights, may be attached to the cross slides T, as seen in the drawings, or, any other convenient means may be used. This will be well understood. These gages, or clamps, have neither weights or springs to act by pressure upon the board. They are literally "screw clamps with proper contrivances," and they are so contrived as to clamp the board upon the edges, and to hold it firmly, producing a new result. The springing a board, and presenting each portion of it, as it progresses through the machine, to the action the finishers, on a curve, for the purpose of being planed, and also preventing the finished portion of the surface from coming in contact with the knives on the back part of the wheel. K and K are connecting bars between the uprights L and L, and the double cams P. M and M, are each a pair of eccentric clamps constructed upon the principle described and shown in the specification and drawings of Thomas J. Wells's patent, dated April 11th, 1846. They are shown in the drawings with a light spring on the back to keep them in a position to act. Their eccentric form causes them to clamp the board on the forward motion, and relax their hold on the return motion. They are placed upon the top of the uprights L and L, and are made to move alternately forward producing a continuous motion.

The gage J, extends the length of the line in front, and serves as a perpendicular guide to L and L, and also as a guide and support to the board upon its edge, and to direct it between the clamps M, and M, into the ma-

chine. The parallel motion of the clamps M and M, is produced by means of the rockers N and N, upon which the uprights L and L, are seen to rest,—the segments of the circles, of N, and N, have their center at M and M, consequently when M and M are made to vibrate on N, and N, a parallel motion is produced, without ways, or slides—as seen in the drawings and model. The connecting bars K and K have each a friction roller fitted to one end which rollers are made to revolve within the grooves of the double cams, as seen at O. These grooved cams may be called female cams, the rollers O, acting alternately upon the outer and inner side of the grooves produces an arbitrary reciprocating motion. One of the double cams P, and rollers O, being on the opposite side of P, can not be seen in the drawing they are however the same in all respects as those which are seen. These cams are so proportioned that two thirds of the revolution is taken up in giving the forward motion, and one third on the return motion. The position of the double cams are reversed, that is one is a half revolution in advance of the other so that the one is giving a forward motion while the other is giving a return motion, which being made quicker than the forward motion affords time for the receiving clamp to return and to take hold of the board and to commence its forward motion before the preceding clamp lets go its hold or commences its return. The arrangement and combination of the double cams P the eccentric clamps and the rockers N and N, produce a uniform and continuous forward parallel motion, without ways or slides and dispensing with all friction and expense, in their construction and by the combination of means, which has not been before known or used. R and S shows the feed pulley and belt which gives motion to the feeding apparatus.

The planing wheel or face disk E is constructed upon the principle of the Bramah wheel, which was patented in 1802, and described in Rees Encyclopedia as a face disk at right angles to the axis of motion, with two sets of knives, the relative position and operation of both sets, as well as the form of tools used, are thus described in Bramah's language. "Instead of common tools; bent knives, spoke shaves, or deep cutting gages are used, for cutting off the roughest part. And planes, of various shapes and constructions, as the work may require, are applied to follow the former in succession, under the same operation, and which latter I call finishers.

The "work" to be done with our improvements "require" the "planes" or "finishers" to be constructed, of sufficient length to extend across the entire board, and they are placed upon the disk at about an angle of 15 degrees from a radial line from the center of the disk. They are also "placed nearer the center, so that they revolve in a rather smaller radius" than the gage cutters A, on the periphery, and thus act upon the wood, after the gages have finished "cutting off the roughest part."

The position and angles of the finishers F, relatively, with the disk E and the board when sprung around the fence, are such, that the smooth finish, of each cut, is given at, or nearly in a vertical line from the center of the disk—at, or nearly at, right angles with the grain of the wood, and the whole width of the board. This effect is produced by means of the curved fence, against which the board is to be held and sprung to a corresponding curve, and by the progressive motion of the board, and as it moves by the disk, a small portion, is left by the gages G, to be taken off by the finishers E at each stroke, at or nearly at, the center of the curve, while cutting with the grain, leaving no circular marks across the board, as the circular marks of each preceding cut is taken off by the succeeding cut of the finishers, in the manner above described, by which means an absolutely level surface is produced, finished in a manner, far superior to that, of any other planing machine known.

The curved fence used in these improvements is formed as seen in Fig. 2, on two lines at an angle with the face of the disk E. This form of fence requires the board to be sprung and presented to the action of the fiinishers on a curve. The means used to hold the board must be such as, not only to hold it when sprung, but they must also be adapted to the end of springing each portion of the board, as it approaches the point of operation, commencing at the end as it enters the machine, and changing the curve in the board gradually from one end to the other, as it progresses through the machine. Each portion of the board is thus made to assume the same relative position with the finishers, while it is being operated upon by them, so that a uniform and even surface is produced the entire length of the board, and for this purpose the screw clamps are gages with proper contrivances to act upon the edges, embracing the entire portion of the board which is sprung, and holding it at the point of operation, are used in contradistinction to the pressure rollers as applied and used by Woodworth, and the difference between them is strikingly manifest, for the gages are firmly held by screws and act, upon the edge, arbitrarily, by clamping it. The rollers act only, by pressure upon the face of the board, by weighted levers, or springs. The gages act, upon the edges, to spring the board between the disk and fence, while the knives are rotating over and operating to plane the surface, while the roll-

ers can only be placed across the surface of the board one of each being placed in front and rear of the disk they (the rollers) therefore act on different lines of the fence, without any means to control, or power over the board after leaving the front roller, to curve it while it is passing the planing wheel, around the fence to the roller on the rear line of the fence. The correctness of the differences as above recited will be demonstrated by an examination of the curved fence and gages in combination with the disk as shown in Fig. 2. The fact that pressure rollers cannot possibly be used as a substitute for the gages or clamps in combination with a face wheel or disk, will also be seen from an examination of this figure in the results which must be obtained were rollers used to illustrate this we will suppose the gages I and J are removed, (J being under I in this figure is not seen) and rollers substituted in their place, as they act only on the face of the board the rollers must be placed so as to clear the gages on the periphery of the disk this would place them on each line of the fence about at the point where the cross slides T, are seen. Now suppose a board or plank of sufficient thickness to fill the space between the fence and disk at the center, or shaft, is placed upon the front line of the fence. It is plain, that unless the rollers can be made to change the line of the motion of the board or plank, it must or would continue on the front line directly against the cutters on the back part of the disk, and therefore could not reach the roller on the rear line of the fence—this result must inevitably follow the introduction of each and every board or plank put into the machine with rollers as a means of holding the board—and every board or plank thus attempt to be planed would be spoiled. The impossibility therefore of producing a successful result with rollers as a means of holding the board in these combinations demonstrates the entire want of analogy (which is by some said to exist,) between the gages or screw clamps with proper contrivances which are used in these combinations, and the pressure rollers described and claimed in the Woodworth patent. The face disk with gages and finishers, and the screw clamps with proper contrivances, were patented by Bramah in 1802. (We do not claim the original machine except in combination with our improvements. Bramah used short finishers, leaving the surface marked in circular scores; we use long finishers, by which means (the board being curved,) we finish the surface with the grain leaving no circular marks. Bramah's finishers being short and placed near the gages upon the periphery can only finish the surface while cutting from one edge to the other in circles—our finishers being long embrace the whole width of the board, coming in contact with the surface on the curve, nearly at right angles, each cut finishing a small portion with the grain and each portion of the surface, when thus finished, by each cut must of necessity be parallel to the face of the disk.

Having thus fully described the parts and combinations of parts of our invention with the modes in which we contemplate applying the same, what we claim as our invention and desire to secure by Letters Patent is—

1. The combination, arrangement and construction of the double cams P, the eccentric cams M and M, and the rockers N and N, for the purpose of producing a uniform, continuous and parallel feed motion without rollers, rack and pinions, endless chains or any common device, by which means we produce a parallel feed motion, without the expanse and friction of ways, or slides, whether applied to planing machines or for any other purpose, substantially as described and shown.

2. Also the construction of the fence D, or any analogous device against which to spring or curve a board to be planed, in combination with screw clamps, or gages, with proper contrivances, I and J, or other means adapted to the curve on the fence D, extending each way from the center of the curve and disk, embracing each line of the fence, as far as may be necessary for the purpose of receiving the board or plank by clamping or otherwise acting upon the edges, while it is on the front line of the fence, holding, and directing it around the curve, springing, and presenting each portion of the board successively to the action of the finishers on the disk, on a curve, and also preventing the finished portion, of the surface, from coming in contact with the knives, on the back part of the disk, as it passes out of the machine, on the rear line of the fence—substantially as described and shown.

3. Also the combination of the curved fence H and gages I and J, or any other device for springing and presenting a board or plank on a curve to the action of planes or finishers on a disk—with the disk E and the long or broad finishers F to extend across the board the entire width and at right angles with the shaft C for the purpose of planing boards and plank when presented on a curve, thereby finishing them while cutting with the grain, and leaving no circular marks or scores across the board or plank, in the manner hereinbefore substantially described and shown.

4. And also a new method, or principle, of presenting a board or plank to the action of the knives or finishers revolving on a disk, on a curve, by which means the finished surface is made, while the finishers are cut-

ting with the grain of the wood, thus connecting the disk, or Bramah wheel; which has hitherto been comparatively of little worth, into a most useful and valuable machine. The tendency of the planing operation with the disk; is to move the board edgeways, in the same plane in which the knives revolve, in contradistinction to the Woodworth cylinder which tends to lift the board directly up from its bed as it cuts up and out from the reduced or planed to the unplaned surface, as declared in said Woodworth patent.

DANIEL BARNUM.
THOMAS J. WELLS.

Witnesses:
HENRY T. DREW,
CHAS. W. SMYTH.