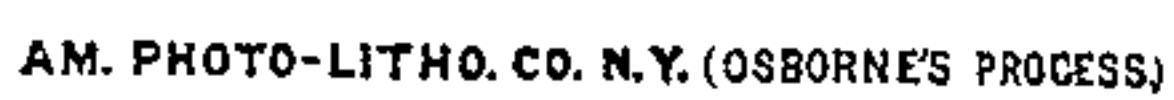


Patented Feb. 12, 1850.



UNITED STATES PATENT OFFICE.

NICHOLAS G. NORCROSS, OF MIDDLESEX COUNTY, MASSACHUSETTS.

PLANING-MACHINE.

Specification of Letters Patent No. 7,087, dated February 12, 1850.

To all whom it may concern:

Be it known that I, NICHOLAS G. NORCROSS, of the county of Middlesex and State of Massachusetts, have invented an Improved Machine for Planing Boards, Planks, or Various other Articles; and I do hereby declare that my said invention is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

In the month of April or thereabout of the year eighteen hundred and twenty-eight or some time previous thereto as I have been informed and as I believe it will appear by reference to certain affidavits filed in the United States court at Baltimore as well as in some other of the courts of the United States, one Hill (Daniel Hill I think was his name although of this I am not positive) now or late of Stoneham or thereabout in the State of Massachusetts invented and put in successful operation a machine for planing boards. My invention hereinafter described contains an improvement on the said machine and renders it capable of reducing or planing a board to an equal thickness throughout its length. The machine of the said Hill was capable of planing or reducing a board on one side or removing from such side a stratum or layer of wood of an equal thickness and so as to leave the board of an equal thickness previous to and at the time of its reduction by the said machine. My invention also contributes greatly toward the protection from fire of any building in which my improved machine may be placed and operated thereby not only effecting a reduction of risk of loss but a consequent reduction in the price of insurance.

It has been very difficult if not impossible to procure insurance on planing mills on account of the constant danger of their taking fire owing to the great amount of shavings made by the rotary planes and such shavings being scattered about in the machinery and over the floor of the room in which the planing machine may be at work. The destruction of planing mills by fire is such a common occurrence that most if not all insurance offices deem insurance on them so hazardous as to either cause them to utterly refuse to insure on them or to do so at a very exorbitant premium. As hereinbefore mentioned my invention renders

such mills comparatively safe and thereby not only protects property but life.

Before proceeding to describe my invention I will remark that I deem it proper to point out the principal peculiarities of the said Hill's machine and for this purpose I have represented it in Figures 1, and 2, of the accompanying drawings, the former figure being a top view of it, while the latter is a vertical central and longitudinal section of it, as I have seen it exhibited in model.

In the said figures, that is in either one or both of them as the same may appear A, is a table, frame, or bench, of which B, B, is the top board or platform on which the planks or board to be planed or reduced, was made to rest and move during the operation of planing it, the said plank being represented at C. There was an opening transversely made through the platform B, B, as seen at D. A rotary cutter or plane E, was placed below and within the said opening and made to revolve in such manner as to carry its cutter or cutters against the underside of the plank C, and reduce it or remove the wood therefrom.

F, and G, were two feed rollers arranged transversely of the machine and in other respects as seen in Figs. 1, and 2. One of these, viz, F, was put in revolution by means of a pulley H, and a band which proceeded from some suitable mover. The other roller G, was arranged within a frame consisting of two wooden spring bars I, I', united together by transverse bars or pieces K, L, the latter of which bars had journals at its ends which journals were supported and turned in bearings made in or on the tops of two posts or standards M, M', extended upward from the frame as seen in the drawings. Two other posts or standards N, N', also extended up from the main frame and between the cylinder G, and the posts M, M', the said two standards N, N', being connected together by a cross bar O, placed somewhat above the spring bars I, I'. A wedge P, or P', was driven between the bar O, and each of the spring bars, and for the purpose of pressing the roller G, down upon the plank, while this said plank rested on the lower roller F. From the underside of the transverse piece K, a spring plate R, extended and rested or was pressed upon the plank C over or in the vicinity of the rotary cutter. By means of the feed rollers F, and

G, the plank was advanced or moved upon the bench B, B, and over the rotary plane, the said plank being kept down upon the bench or from rising up therefrom by means of the pressure upon it of spring R, and the upper roller G, which yielded to the variations of thickness of the plank as it passed under them. The platform B, B, preserved the board from being drawn downward and toward the rotary cutter in a direction from its planed to its unplaned surface. Such is or was in substance the machine of the said Hill and having explained it I shall now proceed to specify my invention.

Fig. 3, of the accompanying drawings exhibits a top view of my improved planing machine. Fig. 4 is an elevation of one side of it. Fig. 5, is an elevation of the other side of it. Fig. 6, is a central, longitudinal and vertical section of it. Fig. 7, is a transverse and vertical section of it taken through the axis of the rotary planing cylinder.

In the said drawings, of Figs. 3, 4, 5, 6 and 7, A represents the main frame of the machine which may be constructed in any proper manner and of wood or any other suitable material.

B, B', is a stationary platform or bed, fixed on the top part of the main frame and made in two parts B, and B', placed at a suitable distance asunder to admit the rotary plane, cylinder, or cutter E, to be placed and made to operate between them. The said rotary plane has its journals *a, a*, Fig. 7, supported in boxes *b, b*, confined in a frame composed of two vertical end frames *c, d*, and a horizontal and transverse rest or bar *f*, the frames *c, d*, being respectively supported in stationary guide frames or puppets *g, h*, fastened on the main frame and so made as to allow of a free and simultaneous vertical movement either upward or downward of the said frames *c, d*, the rest bar *f*, and the planing cylinder E. In other words the said planing cylinder and the said rest bar should be so connected together or by mechanism that when one rises the other shall rise in the same proportion and when one falls or is depressed the other shall fall or be depressed in the same degree.

The distance between the circle of revolution of the rotary plane and the underside of the rest bar determines the thickness of a plank to be planed, and for the sake of being able to plane a plank or board to any desirable thickness as circumstances may require either the rest bar *f*, or the planing cylinder or both may be provided with suitable mechanical contrivances by which their distance apart may be adjusted or regulated. The mode of accomplishing this I have exhibited in the drawings. It consists of screws *k, l*, tapped into and through the top parts of the frames *c, d*, and made to screw against the rest bar. It further consists of

one or more blocks *m, n*, placed underneath each end of the rest bar and between it and the adjacent box of the journal of the rotary plane the said block or blocks being of the proper thickness to carry the circle of revolution of the rotary plane at the required distance from the rest bar. I however do not intend to limit my invention to the employment of such or any other mode of adjusting the distance of the rest bar from the rotary planing cylinder, as I intend to employ any method which will answer the purpose. The rest bar and the planing cylinder should be so supported by their guide frames as to freely rise or fall without any improper lateral or endwise vibration or movement. In order to cause the front end of the board to pass on to the part B', of the platform, such part B', has the upper surface of it near the cutting cylinder beveled or chamfered down as seen at *x*, in Fig. 6.

In the operation of planing a board or piece of wood it passes between the rest bar and the planing cylinder the latter being drawn or so kept up to the board by the former as to cause it to reduce the board to an equal thickness throughout its whole extent. The under surface or part of the board is reduced to parallelism with the upper surface of it which always throughout the operation rests against the rest bar and in consequence of its being supported on the part B, of the platform B, B', it elevates the rest bar in accordance with any increase of thickness and consequently causes the rest bar to draw the planing cylinder toward or up into the board or in a direction from the unplaned under surface to the planed under surface of the said board.

For impelling the board toward and over the rotary cutting cylinder we employ one or more sets of feed rollers F, G. The roller F, should be made so as to freely revolve in its journals while in other respects it should be stationary. The other roller (G) should not only be capable of rotating but of rising and falling so as to adapt itself to the varying thickness of the board. For this purpose it is borne down toward the other roller by means of one or more springs or by weighted levers U, U', and suitable bearing rods or contrivances such as are in common use for such purpose. The said feed rollers are connected by gears *m', n'*. The board as it passes between them and the rotary cutter cylinder and rest bar is seen at C, in Fig. 6.

The main driving shaft is placed as seen at V, in the drawings. It is put in motion by any suitable power and has a large pulley W, on one end around which pulley an endless crossed belt X, extends and from thence passes to and about a small pulley Y, fixed on one end of a horizontal transverse shaft Z, placed at the opposite end of the main frame as seen in Figs. 3, 4, 5, 6. The said

shaft revolves in boxes a' , a' , and has two pulleys b' , b' , fixed to it around each of which one of two endless belts c' , c' , passes and thence passes around one of two pulleys d' , d' , fixed on the axle or shaft of the rotary cutter cylinder E the whole being as seen in the drawings. By such means the rotary cylinder is put in rapid revolution when the main shaft is made to revolve.

On one end of the axle of the lower feed roller F, a large gear wheel e' , is fixed the same being made to engage with a tooth pinion f' , fixed on one end of a transverse horizontal shaft g' , which plays or rotates in boxes h' , h' , and has a pulley i' , on its other end. An endless crossed band k' , passes around the pulley i' , and also around a pulley l' , fixed on one end of the driving shaft, the whole being as seen in the drawings. By such means the lower feed roller is revolved when the main shaft is put in rotation.

A horizontal bar or throat piece y , may be arranged with its upper surface parallel with the under surface of the rest bar f , and on a level or a very little above the level with the extreme upper part of the circle of revolution of the cutting edge of the cutters of the planing cylinder. The said bar is further arranged in front of the said cylinder and across the machine and is fastened firmly at its ends to the frames c , d . The board as it advances beyond the planing cylinder passes between the bar y , and the rest f , and is kept up to the rest by means of the said bar.

From the under side of the bench or platform B, B', and below the rotary cutter cylinder a box or conductor m^2 , is made to extend downward and to partially inclose the rotary cutter cylinder E, that is to say the rotary cylinder is arranged within the upper part of the conductor in such manner that the shavings or wood removed by it from the board shall pass or be thrown into the said conductor. This conductor should be made so close that no shavings or chips can escape from out its sides while the machine is in operation the object of it being to collect the shavings or chips and preserve them from accidental contact with fire. This conductor may be a close box of itself, or it may lead down and open into a close box, or chamber formed under it, or under the planing machine such close box or chamber being seen at n^2 , in Figs. 4, 5, 6, 7. The said conductor and its chamber or either of them may be made in any suitable manner so as to protect the shavings from fire. They may be made fire proof if desirable and there may be applied to either one or both of them one or more suitable openings and doors to said openings for the purpose of removing the accumulated shavings, as circumstances may require.

My improvement of applying or arranging the rotary cylinder so as to cut against the underside of the board, and combining with the cylinder so placed, a fire protecting conductor or conductors and chamber for the collection of the shavings, is of great value as it not only protects property but life from danger of fire. Such a contrivance may also be applied to a rotary cutter when arranged so as to have its axis either vertical or inclined between a vertical and horizontal position. In planing machines which have the rotary cutter cylinder placed above the board the shavings are thrown out upon the same, and in various directions and lodge upon the floor and machine so as to be very liable to being thrown or carried in contact with a stove or whatever may cause them to take fire. Besides the above there is a great deal of fine dust made by such machines, which floating in the atmosphere is inhaled into the lungs of workmen and thereby becomes injurious to health. Such fine dust to a great extent if not entirely is thrown down into the conductor or fire protection chamber and in consequence, thereof the operatives are greatly protected thereby from its injurious influences on their lungs.

As the rapid revolution of the rotary cylinder causes it to operate on the air somewhat like a common fire blower, there will be a current or currents of air more or less rapid created in the shaving conductor or chambers. In order that such currents may not be injurious and be rendered advantageous a ventilating pipe a^2 , may be inserted in and made to lead out of some proper part of either the conductor or the chamber below the same and be carried therefrom out of the building or into such an apartment or place as circumstances may require, and when so carried it may be made to open either into the external atmosphere or elsewhere as may be most convenient. The currents of air which are caused to rush into the conductor operate to prevent the escape of any dust or shavings out the top of the same and they also operate at the same time to force the dust and shavings downward.

Should the weight of the rotary cutter cylinder its rest and their mechanical connection not be found sufficient to press the board down against the platform B, B', with the force required in order to perform good work, an additional weight may be placed on the top of the rest f , or said rest may have one or more springs or analogous contrivances adapted to it and the standards or puppets g , h .

I would remark that I lay no claim to the invention of pressure rollers nor their application in any machinery for the purpose of holding or keeping any particular part

of said mechanism against some other parts thereof while the former may be in motion nor do I claim the employment of either rotating or stationary planes, made in any manner either alone or in combination with rollers, or any analogous device, to prevent the boards from being drawn up by the planes when cutting upward, or from the reduced or planed to the unplaned surface, for I believe such contrivances have been in common use, and been common property for at least twenty one years or more, as will be seen as I believe, and either in whole or in part, by reference to the specification of the patent granted in the United States of America, on the twenty first day of June, A. D. 1828, to one John Hale, of the county of Worcester, and State of Massachusetts. And as will also be seen, as I believe, and either in whole or in part, by reference to the descriptions of patents granted in France, and on the ninth of March, A. D. 1825, and twenty-eighth of April, A. D. 1825, to one Manneville, which descriptions are to be found in Volume XLI, of the French work entitled, "*Descriptions des Machines et Procédés consignés dans les Brevets d'Inventions de Perfectionnement et d'Importation.*" And as will further be seen as I believe, and either in whole in part by reference to the specifications of the patents granted in France on the fifteenth day of March, A. D. 1817, and the thirtieth day of March 1818, to one Rogerin, the same being described in Volume XXIII, of the said French work.

Although the hereinbefore mentioned machine of the hereinbefore mentioned Hill could not reduce a board to an equal thickness throughout, when not of such equal thickness, yet it contained a means of preventing the board from being drawn toward the rotary planes while they were in operation, the said means being the bench or platform B, B'.

In the rotary planing machines, when the rotary cutter cylinder is disposed above the board, while the rest is placed beneath it, it is customary and generally necessary, to curve convexly and transversely the rest, so that the board in passing over the same is curved, the curve being produced by the operation of the pressure rollers. This will be understood by reference to Fig. 8, which represents in section the rest, rotary cutter, pressure rollers, and board. a^3 , being the rest, b^3 the boards, c^3 , c^3 , the pressure rollers, and d^3 , the rotary cutter. Such curving of the rest a^3 , in a convex manner, produces a strain on the grain or fibers of the top surface of the board, which not only tends to tear or throw up the fibers more or less, but to loosen the knots, so that they are often disengaged from the boards by the rotary

knives of the cylinder. The said mode of forming the rest, and presenting the board to the cutters, becomes necessary in such an arrangement of mechanism, in order to prevent vibration of the board, and consequent inequalities or irregularities in its planed surface.

In my improved machine instead of making with a convex curve that part of the rest f , (Fig. 6,) against which the board rests, I construct it with a concave curve on its under side, somewhat as seen in Fig. 9, which denotes a section of the rest, cutter, and adjacent parts, on a somewhat larger scale than they are shown in Fig. 6. The part B, of the bench is formed and applied to the rest f , or made to extend under it in such manner as, in connection with the concave surface of the rest, to cause the board, as it passes between the rotary cutter E, and the rest f , to bend a little and present a concave surface to the action of the cutting cylinder. In this way the fibers or grain of the wood, at or near the surface reduced, become condensed, and so as to grasp the knots more firmly, and thereby prevent them to a great extent from being thrown out or removed by the cutters when they pass in contact with them. Besides the advantage of so preserving the knots, the surface of the board by the fibers of the wood being contracted or condensed, is planed in a much better and smoother manner, than it is when the rest is made convex as before described.

What I claim as my invention, is—

1. The combination of the rotary planing cylinder E, and the rest f , with mechanism by which the two can be freely moved up or down simultaneously and independently of the bed or platform B, B', on any analogous device, substantially in the manner and for the purpose of reducing a board to equal thickness throughout its length, all as hereinbefore specified.

2. I also claim the above described improvement of making the under side of the rest concave, in combination with so extending the part B under the rest f , and applying it to the concave part thereof, as to cause the board as it passes across the rest to be bent and presented with a concave surface to the operation of the rotary cutter planing cylinder substantially as specified; the same being for the purpose hereinbefore mentioned.

In testimony whereof I have hereto set my signature this thirty first day of October, A. D. 1849.

NICHOLAS G. NORCROSS.

Witnesses:

R. H. EDDY,
F. GOULD.