2 Sheets—Sheet 1.

# W. BAKER.

## CUTTING WOOD INTO SHREDS.

No. 2,654. Patented May 30, 1842.

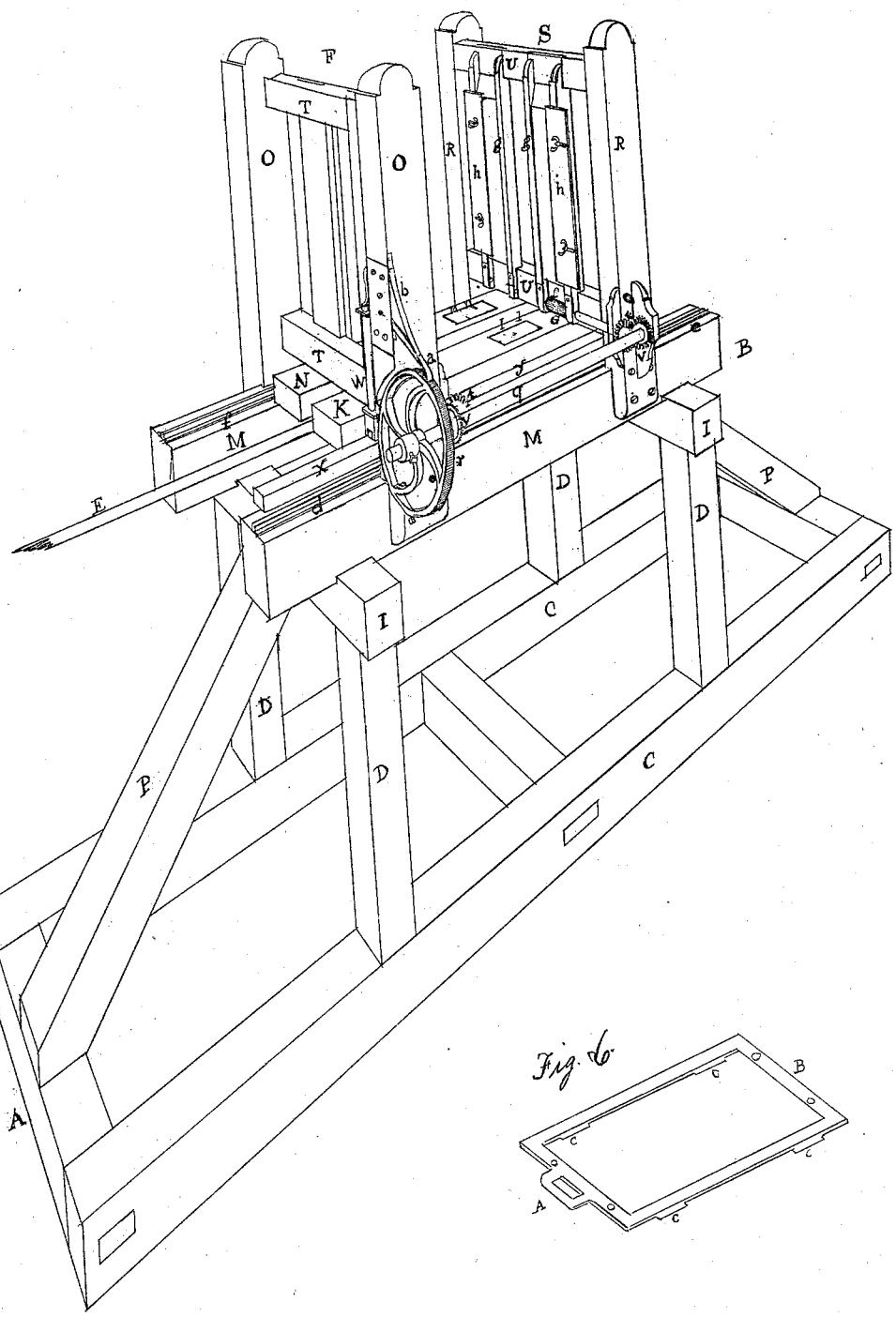


Fig. 6.

2 Sheets—Sheet 2.

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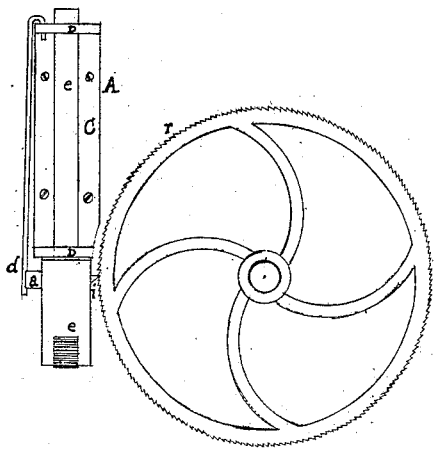


Fig. 4.

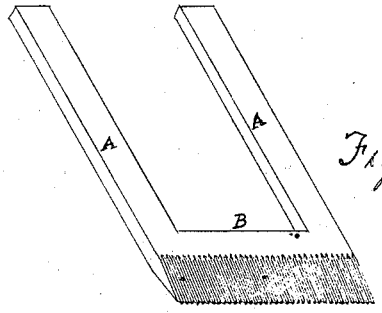


Fig. 3

Fig. 5.

# UNITED STATES PATENT OFFICE.

WM. BAKER, OF UTICA, NEW YORK.

## MACHINE FOR MANUFACTURING WOOD SO AS TO BE USED AS A SUBSTITUTE FOR CURLED HAIR IN STUFFING BEDS.

Specification of Letters Patent No. 2,654, dated May 30, 1842.

*To all whom it may concern:*

Be it known that I, WILLIAM BAKER, of the city of Utica, in the county of Oneida and State of New York, have invented a new and useful mode of manufacturing from wood, such as cedar, basswood, poplar, and other straight-grained wood, a commodity to be used as a substitute for curled hair in stuffing cushions, mattresses, and the like, and also to be used as a substitute for rags in the manufacture of paper; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in the construction of a machine, by which the wood is cut lengthwise of the grain into fine threads, or fibers, which are so curled and crimped by the same process, that when in the mass they constitute a light and elastic article suited to the purposes aforesaid.

To enable others skilled in the art to make and use my invention, I proceed to describe its construction and operation.

Figure 1 of the drawings hereto annexed shows the elevation of the machine.

The frame work A B is erected to give the operating portion of the machine, which is placed upon it, sufficient elevation for convenience, and to allow room below for the stuffing which falls from the planes as it is produced. It is constructed of timbers six inches square. The two parallel sills C C ten feet long, lying two and a half feet from each other, and connected by ties at each end and in the middle, form the foundation frame. On these sills are erected the upright posts D D D D which are two and a half feet in height, and which are also connected at the top by the girths I I. These girths support the cheek pieces, or wooden rails M M, each six feet long, nicely leveled and firmly fitted to the frame. And the whole superstructure is supported by the braces P P, extending from the outside of the girths I I each way to the end ties of the foundation frame. On the upper side of the cheek pieces extending from end to end thereof, are placed the iron rails seen at *d f e*. These are of the ordinary description of the slide rail used in other machinery; consisting of a plate of about two inches in width, with a raised tongue from end to end on the upper side. These tongues are nicely planed off, and the plates being screwed down on the cheek pieces, are so adjusted, that the tongues on both cheek pieces, are on a perfect level, and parallel to each other, and nineteen inches apart. A plane quadrangular cast iron slide frame A B Fig. 6, with grooves in the under sides of the portions C C C C, projecting from the bottom, fitted to the tongues on the rails, and made of sufficient strength to carry the planes is laid on these rails in such a manner as to move easily thereon, and in an exact horizontal line. On this slide frame two planes K and N, Fig. 1, are placed, the stocks of which are of wood and about three feet in length. These with their faces turned upward are fastened down on the cross bars, or heads of the slide frame, by screw bolts from beneath, through the cross bars into nuts let into the sides of the plane stocks. Each plane stock has three cutters. Two of each set are alike, and are of the description shown in Fig. 3. They are made with legs, or straps A A at the sides to wedge upon by narrow wedges at the sides of the plane throat, leaving the blade, except the sides, only one and a quarter inches in depth, as shown in the figure at B, so that a free passage may be allowed when in the stock, for the material which is cut off by the next tool in the rear to fall through the throat of the plane, passing between these straps to prevent choking up. In forming the blade of these cutters, after the iron is forged out, the blade is ground off to a bevel on both sides. Each side being thus made to present an oblique plane, tapering to the edge, similar to that exhibited on one side of the blade of an ordinary plane iron, the immediate edge being left of a thickness equal to about one twentieth of an inch, and is ground off perfectly straight. The oblique planes thus formed on both sides of the blade are then fluted, or cut into angular grooves, running parallel to the sides of the cutter, and at right angles with the line of its edge. These grooves are of a depth corresponding to the thickness of the blade immediately at its edge; that being about one twentieth of an

inch as before mentioned. These grooves being cut on both sides of the blade, and those on the one side falling between those on the other, the edge of the cutter when finished presents the form of the zigzag line shown in Fig. 5, forming a succession of angular gouges on both sides of the edge of the cutter for the whole width of its blade. These are sharpened to an edge, by a fine triangular file, and an oil stone or emery wheel, ridged up to correspond with the grooves in the cutter. The other or third cutter in each set, is of the form of a common plane iron, having a smooth blade as shown in Fig. 4. The cutters are all two and a half inches in width. These small angular gouges, of which the edges of the fluted cutters are formed separate the threads from the surface of the wood. This it is evident they would do, if a single cutter of this kind were to be set in the usual manner of a plane iron in a common plane stock and worked in the ordinary way by hand. And it is also evident that the surface of the wood from which threads are thus taken, would be left in ridges, corresponding to the grooves in the cutter. To take off the apex of these ridges and leave the surface smooth again, prepared for the next blow is the office of the smooth cutter, or common plane iron last mentioned. This is set in the rear of the fluted cutters, and cutting nearly to the same depth with them, takes off the ridges each of which also forms a thread of the manufactured article. Two of these fluted cutters are used in each plane because, by setting the rear one in the stock, so that its gouges or points do not follow in the trench made by that before it, but pass between and divide the ridges imperfectly formed by the first, finer, and more uniform threads are produced. The ridges to be taken off by the smooth cutter in the rear, are more perfectly formed without cutting so deep, and the article produced by the smooth cutter is not flat as it would be, if one fluted cutter only was used, but triangular in its shape, being taken from the apex of a perfectly formed ridge.

The gouges on one side only of the fluted cutters do execution at the same time. Those on the other side do not at the same time come in contact with the wood. When the points or angles of the gouges on one side, therefore, become dull by use, the cutter may be turned over, and those on the other side used also, before sharpening. If it were not for the advantage of using both sides of the cutter before sharpening, there would be no utility in the oblique plane, or bevel on more than one side of the cutter, as the blade might otherwise be beveled on one side, and be flat on the other, like the blade of the smooth cutter. The blade might then be fluted on both sides, and the edge formed would be the same as before described, but in that case the points or gouges on the bevel side only could be used, as the edge would not be presented to the wood at the same pitch if the cutter was turned over.

The cutters being formed as here described, they are placed in the plane stock, at about the same pitch of ordinary plane irons, the three cutters occupying about four inches in length of the face of the plane, being about two inches apart. The hindmost one, or smooth cutter, is wedged in the stock, the same as any common plane iron. The two forward, or fluted ones, are wedged upon their straps or legs at the sides of the plane throat by narrow wedges fitted for the purpose, leaving as large an opening for the passage of the article produced as may be.

The plane stock is three feet long, three inches thick and five inches wide. The throat for the reception of the cutters is one entire opening from the bearing of the smooth cutter in the rear, extending two inches in front of the forward fluted cutter, and slots or gains are cut in the cheeks or sides of the throat for the bearings of the fluted cutters, to which narrow wedges are fitted to secure these cutters. The smooth cutter is wedged like any common plane iron against the solid wood at the back end of the throat. The cutters being set for a proper depth of cutting, and securely wedged in the stock, the face of the plane is turned upward, and it is laid on its back upon the iron slide frame, and bolted down as before described.

The timber to be worked up into stuffing is prepared by sawing it into two inch planks, and then cutting the planks into two feet lengths. The machine cuts from the edge of the two foot piece, until all but a small remnant is cut up.

The two upright stands F and S, seen at the right and left over the planes (Fig. 1) are erected for the purpose of holding the piece of plank to be cut, and to keep it firm and steady during the process of cutting, the plank standing edgewise on the face of the plane. These stands are alike; the face of both which are presented inward are the same. The lower ends of the upright pieces O O, R R, are let into the sides of the cheeks M M, and firmly secured by screws, being first connected by the cross girth T T, U U. These upright side pieces are made of two inch plank, and are two feet in length. They are so placed as to bring the lower cross girth within half an inch of the face of the planes. Vertical back boards, about six inches wide, are nailed up against the inside of these cross girths, immediately over the planes, and cleats, or guards, placed up and down on the face of

these, forming a channel for the end of the plank to slide down in, and to hold it steady. The inside guard *g g* over each plane is stationary, but the others *h h* are of greater width and movable sidewise, so that they may be adjusted to the thickness of the plank, and then be set up against the back board and kept to their places by the thumb screws shown upon their face. Back boards and guards are prepared in this manner, on the inside of each of the upright stands F and S, and over each plane, and the stands are set at such a distance from each other that their back boards are two feet apart, or the length of the plank to be cut. The piece of plank to be cut up is now slipped down between the back boards, its ends passing between the guards thereon, until its lower edge reaches the face of the planes. The movable guards at the ends are then adjusted to it, and set up by the screws against the back boards.

The shaft and wheel *q r* and the apparatus conected with them, are contrived to assist in holding the plank while cutting, and to feed it out to the plane, by giving to the cutters an equal quantity at each blow. And as all the cutters in one plane cut at the same time, and in one direction only, this apparatus is intended to hold the plank stationary during the return motion of the plane, and thus prevent the friction and wearing of the cutters which would otherwise take place during their return motion. This contrivance and its operation are as follows: The shaft *q* is a wrought iron rod an inch in diameter and two and a half feet long, on which are the ratchet wheel *r* about ten inches in diameter, and the two small miter wheels *v v* of equal size, and about three inches in diameter. These latter wheels connect with and turn similar wheels *t t*, on cross shafts, extending along the inside of the lower girths of the upright stands, and immediately under the ends of the back boards. These shafts turn in bearings filled to the sides of the upright pieces *o*, and *r*. On each of these cross shafts, and immediately under the ends of the back boards, in a position to come slightly in contact with the end of the plank as it passes down, is a cylindrical whur, of a length corresponding to the thickness of the plank and fluted from end to end into sharp angular teeth. One of these whurs is seen at G. These cross shafts being made to turn inward, or toward each other, by the miter wheels on the same being placed within those on the shaft *q;* at both connections, the fluted whurs grasp the respective ends of the plank as it passes down. The plank being thus held by the whurs on the cross shafts, it is evident that if the shaft *q* is turned in either direction the plank will be raised or depressed accordingly.

A slight movement of the shaft *q*, and a corresponding depression of the plank at each blow, is effected as follows. The periphery of the ratchet wheel *r* being cut into small ratchet teeth the position of the bearings of its shaft is such as to bring the circumference of the wheel over the outer edge of the iron slide frame, on which the planes are placed. The small iron frame A, Fig. 2, is constructed, consisting of a back plate C about eight inches in length, with a short plate projecting at each end D D, sufficient to admit of gage holes, three fourths of an inch in diameter, drilled through them. The movable slide bolt *e e* is then constructed, the upper part of which is turned off so as to move easily in the gage holes in the projecting plates D D, and this is slipped up through these gage holes as seen in the figure. The lower part of the slide bolt is square, and has a shive or roller in its lower end to stand upon when attached to the machine. A hole is drilled through the square part of this bolt parallel to the axis of the roller, and the catch *a i* is nicely turned off, and fitted to move easily in this hole, the end *i* being shaped to fit the notches in the periphery of the ratchet wheel *r*, against which the catch is constantly pressed by the wire spring *d*, the upper end of which is bent over and inserted in a small hole in the upper projecting plate, D; the lower end being made to press gently against the end of the catch at *a*. The ratchet wheel *r* in this figure, presents a side view of the wheel *r* in Fig. 1. It is here drawn, as is also the catch frame connected with it, on an enlarged scale, and shows the manner in which the ratchet wheel is operated upon by the catch *a i* when the proper motion is given to the slide bolt *e e* as hereafter described. The back plate C, containing the slide bolt, the catch, and the spring as seen in the figure, is now screwed in an upright position to a board nailed to the back of the upright stand F, Fig. 1, as seen at *w*, in such a manner as to bring the catch *a i* Fig. 2 in contact with the teeth of the ratchet wheel as shown in that figure. The slide bolt *e e* Fig. 2 standing on the roller or shive *e* in its lower end, and resting on the horizontal bar X Y Fig. 1.

The bar X Y Fig. 1, is a square strip of two inch plank, about three feet in length, planed off to true lines, and screwed down on the side bar of the slide frame, and extending out to the left beyond the length of the slide frame as seen at X, about eighteen inches, or far enough to form a support for the slide bolt W, in whatever position the slide frame, bearing the planes, may be, in performing its reciprocating motion hereafter described. The slide bolt W is stationary except a slight vertical motion hereafter described. The wooden bar X Y

might be dispensed with by extending the side of the slide frame to an equal length to the left as at X, and planing off its upper side, to a true horizontal line, for the slide bolt W to rest upon. The catch thus placed in contact with the ratchet wheel is made to fall at every blow of the slide frame and plane, and to seize the next tooth below in the ratchet wheel, and to raise the same to the place of the former, and turn the wheel a corresponding distance, by means of a slight depression in the surface of the horizontal bar X Y, on which the slide bolt stands, which depression is shown at Y, and is at a point occupied by the slide bolt, when the slide frame is at its farthest extent to the left, or in the direction of the ratchet wheel, in performing its reciprocating motion. Into this depression the bolt falls, as the slide frame in its movement, brings this depression immediately under it, and carries with it the movable catch which slips over the tooth in the ratchet wheel next below, and is forced by the wire spring, bearing against its opposite end into the next notch in the wheel. As the slide frame returns, the movable bolt rises from the depression in the surface of the bar X Y into which it had fallen, the higher plane thereon being forced under it, and by the catch fastened upon the tooth of the ratchet wheel as before described, raises the same and turns the wheel suddenly in a corresponding degree, and through that the cross shafts with the fluted whurs which hold the plank. Thus the plank is suddenly depressed at the commencement of each blow, and immediately before the cutters come in contact with the wood.

The ratchet catch *a* with the spring *b* pressing upon it, is used for the purpose of holding the wheel, and preventing its turning back, when the catch in the slide bolt W on the opposite side of the wheel falls to seize another tooth in the wheel.

Each plane is furnished with this feeding apparatus; and as the planes, although moving together do their execution in contrary directions, this apparatus for the respective planes, works at opposite ends of the slide frame, as well as on opposite sides of the machine. The throats *l l n n* of the planes Fig. 1, are shown without the cutters, exhibiting the diagonal slots or gains *l l* and *n n* on the farther or opposite sides of the throats, in which the fluted cutters are to be fastened by narrow wedges as before described. The corresponding places for the cutters on the other side of each plane throat, cannot be seen in the figure. These wedging places are seen pitched in contrary directions, as the cutters in the respective planes do their execution in contrary directions. Those in the plane K cut to the right, and those in N to the left. The object of which is to equalize the resistance to the propelling power.

For greater durability, and for convenience in setting the cutters, a cast iron throat or jack is made for each plane with proper bridges at the sides, similar to those before described for the wooden stock, and the cutters being fitted to the cast iron throat this is let into the plane stock, in such a manner that its face is level with the face of the stock. It is then screwed down to the stock, by screw bolts from the under side. When the cutters require sharpening, this iron throat, or jack is taken out, the tools sharpened and reset, and the whole again replaced in the plane stock for use. By the use of duplicate jacks and cutters, one set of tools may thus be repaired and sharpened, while the other set is used. The propelling power is applied to the slide frame through the pitman E, one end of which is fitted to take hold of a wrist on the end of the slide frame between the planes K and N. The other, which is here broken off, is attached to a crank, or wrist on a fly wheel, which describes a circle in its movement, the diameter of which is equal to the length of the movement required of the planes. And as the plank to be cut is two feet in length, and the three cutters take up four inches on the face of the plane, the length of the stroke must be at least two feet four inches. About three fourths of an inch more than this is found useful to enable the feeding apparatus time to work to advantage.

The machine being set in motion, by giving a crank motion to the outer end of the pitman E of the magnitude above mentioned, the slide frame with the planes K and N are thrown back and forth on the iron rails *d f e* in an exact horizontal line, each of the cutters taking threads from the under edge of the plank, while this by the same movement is by the feeding apparatus, before described, depressed at the commencement of every blow, and then held there till a course of threads is taken off, and the plane is brought back. The commodity thus cut off from the plank falls through the throat of the plane, upon the floor below, being at the same time so curled and crimped by the process as to need nothing further to be done to render it fit for use, except shaking up and loosening by hand, or with a pitchfork. It is in this state used in the place of curled hair, moss and other articles for stuffing mattresses, cushions and the like; or is ground up in the manner of grinding rags for the manufacture of paper.

What I claim as my invention, and desire to secure by Letters Patent is.

The combination of the fluted cutters with the smooth cutter for the purposes of pro-

ducing the article herein described, and their arrangement in the plane stock, as above set forth, together with the adaptation, to the uses of the machine, of the apparatus above described for holding the timber and feeding out the same to the plane as the surface is cut away, the whole being combined, and connected with the machine as herein set forth.

WILLIAM BAKER.

Witnesses:
BENJN. F. BROOKS,
CHAS. A. MANN.