

(No Model.)

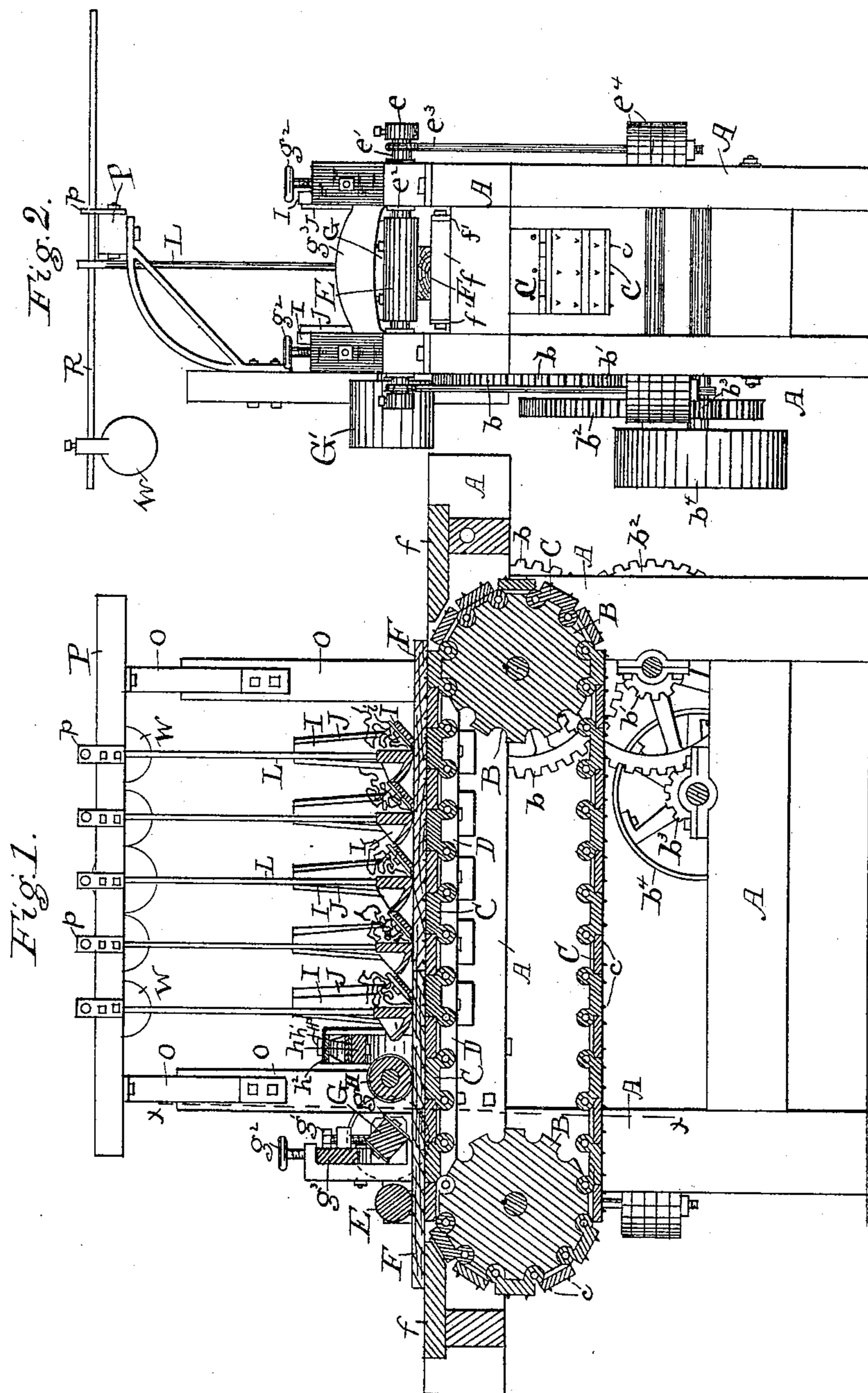
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W. H. MOORE.

MACHINE FOR MAKING EXCELSIOR.

No. 379,592.

Patented Mar. 20, 1888.



Witnesses:

Wilbur F. Lunt  
Charles S. Cook

Inventor:

William H. Moore  
by S. W. Bates.  
his atty.

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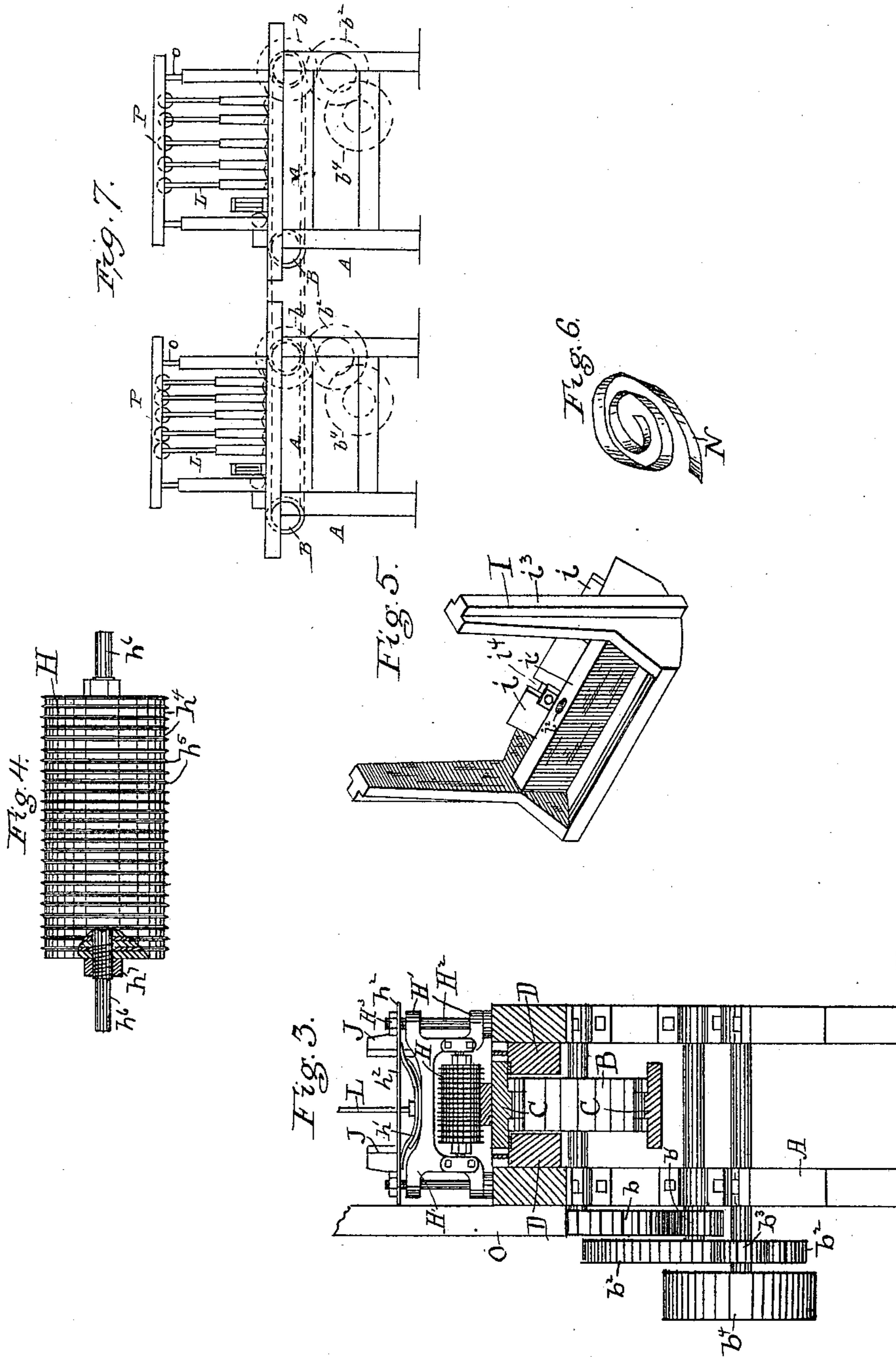
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# UNITED STATES PATENT OFFICE.

WILLIAM H. MOORE, OF GARDINER, MAINE.

## MACHINE FOR MAKING EXCELSIOR.

SPECIFICATION forming part of Letters Patent No. 379,592, dated March 20, 1888.

Application filed May 23, 1887. Serial No. 239,099. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. MOORE, a citizen of the United States, residing at Gardiner, in the county of Kennebec and State of Maine, have invented certain new and useful Improvements in Machines for Making Excelsior; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to machines for making excelsior. The machines now in common use for this purpose use reciprocating cutters, the wood being put into the machine in the form of a bolt or block, which is fed to the cutters by various devices. The knives are commonly made with a triangular point, and the product produced has a triangular or square cross-section. These machines are adapted to be used on woods like poplar, bass, &c., which have a soft fiber and little toughness or elasticity, the reason being that in working other wood of tough fiber the knives must have a keen edge at all times, and where the same knife is used continuously and with a rapid motion it soon becomes dull. The excelsior as now commonly made and sold on the market, being manufactured from wood which is practically non-elastic, and having, as it does, a considerable thickness, is a very imperfect material for the uses to which it is put. As a stuffing for mattresses and furniture it very soon becomes matted, its fibers are broken, and it becomes a solid wad, possessing none of the elasticity which is desirable in such cases.

My invention has for its object the manufacture of an excelsior from such woods as spruce, pine, &c., which have a tough elastic fiber, and the construction of a machine for this purpose which is adapted to work up wood in the form of boards, plank, edging, and other waste material, such as is thrown away in many lumber-mills.

My invention consists of an endless traveling bed of ordinary construction, having suspended over it a series of weighted cutting-knives and in front of the series of knives a set of slitting or scoring knives. The material is carried by the endless bed under the scoring and shaving knives, which latter remove in

succession thin shavings, which curl up and form a mass of tough elastic material.

My machine is provided with a cylinder head or planer, which removes the rough surface of the wood and prepares it for the cutting and scoring knives.

I illustrate my invention by means of the accompanying drawings, in which—

Figure 1 is a central longitudinal section through my machine. Fig. 2 is an end elevation, looking from the front. Fig. 3 is a section on line  $x x$  of Fig. 1. Fig. 4 is a detail of scoring-roll. Fig. 5 is a detail of knife-frame. Fig. 6 is a view of one of the fibers as it comes from the machine. Fig. 7 is a diagrammatic view of two sections of cutting and scoring apparatus provided with a continuous traveling bed.

A is a frame of any suitable construction. At each end of the machine is a sprocket-wheel, B B, and running on these sprocket-wheels is the endless bed C, made up of lags in the ordinary manner, and in the face of these lags are inserted spurs  $c c$ . The rails D D are attached to the frame-work on each side of the bed, and serve to support its upper portion.

At the front end of the machine is the compression-roll E, running in bearings  $e^2$ , which have a vertical play. On each end of the shaft  $e'$  is a collar,  $e$ , and hung on the shaft inside of the collar is the rod  $e^3$ , having on its lower end the weight  $e^4$ . Next to the compression-roll comes a cylinder-head or planer, G, of ordinary construction, such as are used in various kinds of planing-machines. This cylinder-head has the usual adjusting-screws,  $g^2$ , by which it can be raised and lowered, and it is run by the pulley G'. An adjusting-screw,  $g'$ , is provided to hold down the upper portion of the journal-box in which the cylinder-arbor runs. After the cylinder-head comes a slitting or scoring roll, H, made up of the thin circular disks or scoring-knives  $h^5$ , having sharpened perimeters and the filling-disks  $h^4$ , placed side by side and bolted together on the mandrel  $h^6$  by the nuts  $h^7$ . The disks  $h^4$  are of the width which it is desired to make the fibers. In practice I now make them one-eighth inch, and they are somewhat smaller in diameter than the cutting-disks  $h^5$ . The scoring-roll H

is journaled to the frame H', each end of which slips over a vertical rod, H<sup>2</sup>, bolted to the machine. Secured to the tops of the rods H<sup>2</sup> by the nuts H<sup>3</sup>, and extending from one rod to the other, is the flat bar h<sup>2</sup>, which confines the elliptical springs h'. These springs press downward on the frame H' and force the cutting-disks h<sup>5</sup> into the wood.

Behind the scoring-roll H comes a series of shaving or planing knives, i, secured to suitable frames, I. (See Fig. 5.) Each of these frames has a curved bottom having a lateral slit or opening, through which the edge of the cutting-knife projects, the knife being bolted to an inclined bearing, i<sup>4</sup>. The frame has also on each side a vertical arm containing a tongue, i<sup>3</sup>, which is adapted to fit a vertical groove in the upright guide J, which is bolted to the frame of the machine. These frames can each be lifted independently out of its guide. A longitudinal frame-work, P, is secured by brackets or otherwise over the machine, and directly over each of the cutting-knives is a plate, p, bolted to the frame and having a hole in its upper end, through which passes the rod R, the two ends of which extend out over each side of the machine. The rod R slips through a hole in the upper end of the vertical rod L, the lower end of which rests in a socket, i<sup>2</sup>, in the center of the knife-frame I. A weight, W, or pressure-regulator, is clamped at a suitable distance from the end of the rod R.

The sprocket-wheel B and the traveling bed are run by the pulley b<sup>4</sup> by means of the connecting-gears b<sup>3</sup>, b<sup>2</sup>, b', and b.

Two bars set edgewise extend from one end of the machine to the other on each side of the bed, and they are raised slightly above it and furnish supports for the bottoms of the knife-frames to rest on, and to prevent the knives from coming in contact with the moving bed.

F represents the bolt or stock passing through the machine.

The operation of my machine is as follows, viz: The material designed to be used is sawed lumber, like strips of board, edgings, plank, &c., such as are wasted in furniture-factories and other establishments of that kind. The strip is fed in at the front end of the machine as in a board or clapboard planer. The compression-roll E presses it firmly down on the spurs c c, and the cylinder-head takes off the rough upper surface of the stock. As it passes under the slitting-roll H, the wood is scored to a depth equal or greater than what the succeeding section of knives will remove. The knives now remove the material in the form of thin shavings of greater or less thickness, according to the set of the knives, each succeeding knife cutting lower than the one which preceded it. I have here represented a single section of the machine; but in actual practice the scoring-roll followed by a series of knives of any suitable number (I use five) are multiplied to any desired length, one section following another. This is shown diagrammatically in Fig. 7, a scoring-roll and a series

of shaving-knives being provided for each section of the machine, a traveling bed carrying the material to be operated upon continuously forward. The relations of the details in the organization shown in this figure are the same as in a single section, so that further description would be unnecessary. It is designed to have sections enough so that when the stock, which will ordinarily be seven-eighths inch in thickness when fed in, will be worked down to a mere shim when it comes from the back end of the machine. If the machine is not made long enough for this, the bolts can be returned and fed through any number of times. The material, as it comes from the knives, is pulled from the top of the machine and carried away. The fiber thus produced is of uniform width and thickness, and is equal in length to the length of the stock. It is made of various thicknesses, according to the purpose for which it is to be used, this thickness being very readily varied by the set of the knives. It is evident that the knives being independent of each other, any one of them can be removed while the machine is running for the purpose of being repaired, &c.

It is designed to have two sets of the knife-frames and knives, so that one can be ground and set while the other is in use, and one set can be substituted for the other without stopping the machine.

Any kind of sawed material can be used in my machine, and it can be fed very rapidly, so that one machine can be constructed to make a very large quantity of the excelsior with a small amount of labor. The facility with which the knives may be removed and sharpened renders it possible to use tough woods in my machine; and since the knives have pressing on them a limited and adjustable weight, they are not forced to cut after they become dull, as in machines where the bolt is fed with a positive feed, and thus the smooth and even character of the product is insured. When one of the knives becomes too dull to cut, this fact is readily observed by the operator, and it can then be removed and another inserted in its place. In removing the knives from the machine the operator pulls down on the end of the lever R, thus raising the rod L, which is unstepped, from the knife-frame.

I claim—

1. In a machine for making excelsior, the combination of a horizontal traveling bed, a series of weighted shaving-knives suspended above said bed, said knives being fixed relatively to the bed, and a set of scoring-knives in front of said shaving-knives, substantially as described.

2. In a machine for making excelsior, the combination of an endless traveling bed, above said bed a series of shaving-knives secured to weighted frames having curved bottoms, vertical guides secured to the machine, for holding said frames in position and allowing them a free vertical motion, and a set of scoring-

knives in front of said shaving-knives, substantially as shown.

3. In a machine for making excelsior, the combination of an endless traveling bed, a series of weighted shaving-knives suspended above said bed, a set of scoring-knives in front of said shaving-knives, and a cylinder head or planer, and a compression-roll in front of said scoring-knives, substantially as shown.
4. In a machine for making excelsior, the combination of an endless traveling bed, a series of weighted shaving-knives suspended over said bed in position to engage the material to be operated upon, a scoring-roll in front of said knives, said roll having on its surface parallel annular cutters adapted to cutting parallel slits in the stock, and means for pressing said roll downward, substantially as described.
5. In a machine for making excelsior, the combination of an endless traveling bed, a series of knife-frames with their shaving-knives

held by vertical guides above said bed, a vertical rod, the lower end of which rests on said frame, a fulcrumed rod or lever passing through an opening in the upper end of said vertical rod and having adjustably secured thereto a weight whereby the said vertical rod is pressed downward on said knife-frame, substantially as described.

6. In a machine for making excelsior, the combination of an endless traveling bed, above which are arranged successive sections of cutters and scorers, each of said sections being composed of a series of weighted shaving-knives, and in front of said series a set of scoring-knives, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. MOORE.

Witnesses:

RICHARD C. PLAISTED,  
E. N. WHEELER.