

(No Model.)

W. MERRILL.
WOOD CUTTING MACHINE.

No. 475,881.

Patented May 31, 1892.

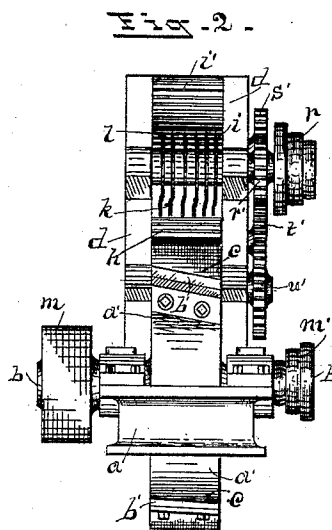
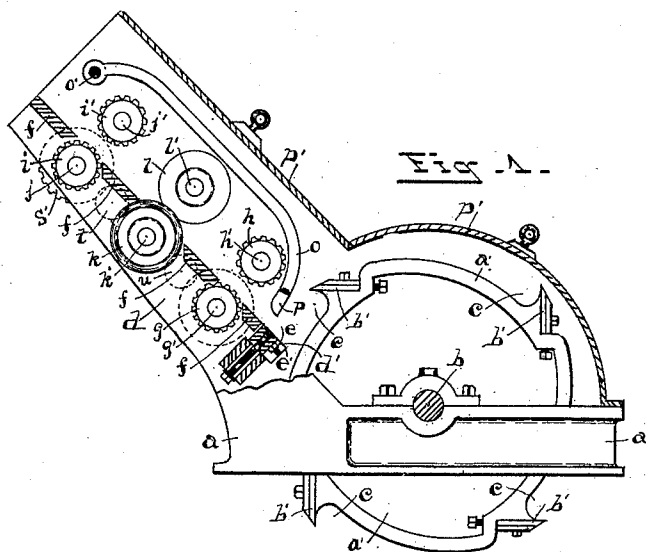


Fig. 3.

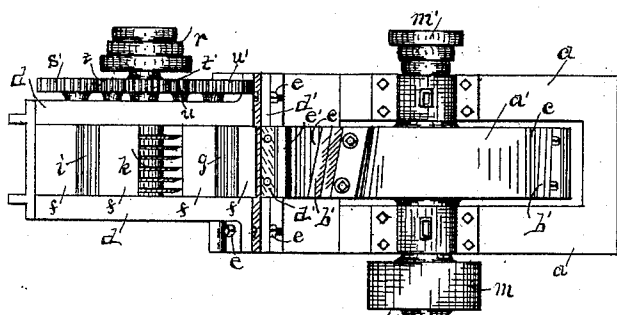


Fig. 4.

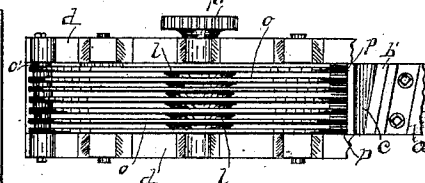


Fig. 5.

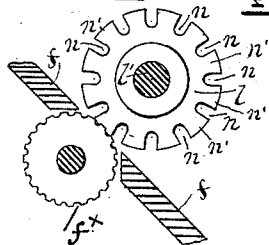


Fig. 6.

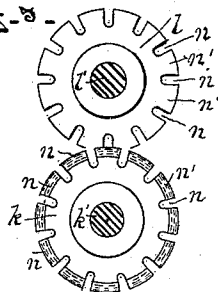


Fig. 7.

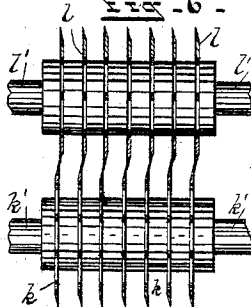


Fig. 8.

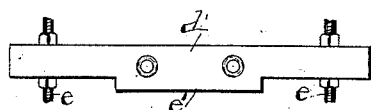
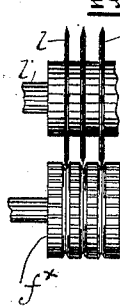


Fig. 10.

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UNITED STATES PATENT OFFICE.

WILLIAM MERRILL, OF EAST SAGINAW, MICHIGAN.

WOOD-CUTTING MACHINE

SPECIFICATION forming part of Letters Patent No. 475,881, dated May 31, 1892.

Application filed September 30, 1889. Serial No. 325,557. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MERRILL, a citizen of the United States, residing at East Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Wood-Cutting Machines; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for cutting wood into suitable dimensions for use as kindling-wood, extract-chips, wood pulp, and other purposes which requires the wood fiber to be divided transversely in pieces of a substantially uniform length.

The first part of my invention relates to a revolving knife-carrying wheel; and it consists in the construction and formation of a wheel carrying on its periphery cutting-knives having their edges substantially parallel with its axis and having the portions of its periphery directly in front of said knives cut out or reduced to receive the ends of the wood to be cut.

The second portion of my invention consists in the combination of a series of splitting-disks with suitable mechanism for feeding the wood thereto and also in the construction and arrangement of the cutting portions of the disks.

Third. My invention further consists in the combination and arrangement of the knife-carrying wheel with devices for retaining the wood in a proper position during the operation of the knives thereon.

Fourth. The invention also consists in the combination and arrangement of the several elements which I use in the construction of the machine, as I will presently proceed to describe, and which will be specifically pointed out in the claims of this specification.

One of the objects of my invention is to construct a machine for cutting wood to uniform lengths with knives.

Another object of my invention is to provide a machine for splitting slabs, boards,

and coarse refuse of sawmills into suitable dimensions for kindling-wood and then cutting the pieces into proper lengths by revolving knives.

A third object is to so arrange the parts of the machine that the wood may be severed by knives nearly at a right angle with the fiber, and another object is to provide a machine having knives for cutting wood into lengths with devices for retaining short pieces in a proper position during the cutting operation.

In the accompanying drawings will be found illustrations of the several devices and contrivances I use to attain these objects.

Figure 1 is a side view, in elevation and partly sectional, of my improved wood-cutting machine. Fig. 2 is an end view in elevation of the same, with the cover thereof removed. Fig. 3 is a plan view of Fig. 1 with the upper feed-rolls, &c., removed. Fig. 4 is a top view of the feeding devices shown in Fig. 1. Fig. 5 is a side view of the splitting-disks detached and enlarged. Fig. 6 is an edge view of the same. Fig. 7 is a plan view of the shearing bar or block detached and enlarged. Figs. 8 and 9 are front and side views of the splitting-disks arranged in a modified form.

The same elements or parts are designated by the same letters of reference in each of the several illustrations.

a represents the horizontal portion of the frame, of suitable dimensions and form, and *a'* is a wheel mounted upon a shaft *b*, which is journaled in suitable boxes upon the frame *a*. This wheel is so constructed as to be of great weight and strength, and upon its periphery the cutting-knives *b'* are secured by suitable bolts and cap-pieces, the edges of the knives being set substantially parallel with the axis of the wheel and at a proper angle to the radius thereof. The portions of the periphery directly in front of the knife-edges are cut out, forming cavities *c*, and these cavities afford room for presenting the ends of the wood in position to allow the knives to cut off the desired length of sticks, the cavities beginning at the heel or back portion of one knife and gradually increasing in depth in the form of a geometrical curve till a point coincident with the radial plane of the next succeeding knife is reached, so that as the sticks to be

cut are fed forward the contour of the inner side of the cavity will, by receiving the end-thrust of the sticks, prevent too great a length of stick being presented to the knives by the uneven operation of the feeding devices, which will presently be explained.

Any desired number of knives b' may be used, according to the length of the pieces to be cut off, the shorter chips for extract or wood pulp permitting the use of more knives than when the longer pieces for kindling-wood are to be manufactured, the longer pieces requiring more time for feeding in than the shorter.

d are side pieces of a portion of one end of the frame a , extended at an angle upwardly, and at the lower end of the side pieces d and across the frame is a shearing-bar d' , secured by the adjusting-screws e , or in any other suitable manner, in a position to allow the knives b' to pass the hardened edge e' closely on the downward portion of their revolution, the edge being located coincident with the bed f between the side pieces d .

g is a lower feed-roll, supported upon a shaft g' between the bed-pieces and with the upper portion of its periphery extending slightly above the bed f , and above this feed-roll is adjustably supported an upper roll h , mounted on the shaft h' . Similar feeding rolls i and i' are mounted on the shafts j and j' , respectively, and journaled to the upper ends of the frame-pieces d , while between the two pairs of feeding-rolls are arranged a lower series of cutting-disks k , mounted on a shaft k' , which is supported in suitable boxes upon the side pieces d , and directly above the lower series is an upper series of disks l , mounted on a shaft l' , which is also supported in suitable boxes carried by the side pieces d . These disks are arranged with a cutting-edge around their peripheries, and the edge may be centrally located, if desired, or may be formed coincident with one side, and the disks are arranged so that the adjacent edges of the two series will slightly overlap each other, and the edges may be continuous or may be formed into a series of chisel-shaped cutters n' by the radial slots n , cut in the peripheries of the disks, as shown in Fig. 5.

As shown in Figs. 1 and 4, o are a series of pressure bars or fingers pivoted at one end by the rod o' to the upper end of the frame-pieces d , and, reaching over the presser-rolls and splitting-disks, are arranged with their opposite ends p turned downward to reach a position directly over the shearing-block d' and between the presser-roll h and the wheel a' , and these ends p then rest upon and retain in position upon the shearing-block any material of uneven thickness that may be passed through between the rolls.

A suitable cover p' is placed over the entire mechanism and rests upon the frame and is secured in position by suitable bolts and dowels.

The shaft b is provided on one end with a

pulley m for imparting a rotary motion to the knife-wheel a' , and on the opposite end of the shaft is mounted a set of cone-pulleys m' , and the shaft l' is also provided with a series of cone-pulleys r , arranged to carry a belt from the cone m' for imparting a rotary motion to the splitting-disks, and the shaft l' is provided with a gear-wheel r' , engaging with the gear s upon the lower shaft k' , and from the gear s proper rotary motion is imparted to the lower feed-rolls by the train of gear s' and t and t' and u , or a link belt may be substituted for the gear, and also the upper feed-rolls may be provided with a rotary motion, if desired, by means of gear or link belt.

Proper power being applied to revolve the wheel a' at a suitable speed, wood—such as slabs, edging, &c., from sawmills—is fed endwise into the machine between the rolls i and i' and is carried thereby between the series of disks k and l , which act upon the material in the manner of chisels, dividing or splitting the pieces lengthwise, and, passing between the rolls g and h , the material is carried beneath the pressure-bars o and with its end projecting over the shearing-bar d' into the cavity c , and the revolving knives then cut off the projecting portion and carry it downward out of the way of the next cut, the feeding operation of course being continuous, so that each knife as it passes the edge of the shearing-bar cuts off and carries with it a short piece of the material.

It will be noticed that by providing the splitting-cutters with the radial slots n the chisel-shaped cutters are enabled to draw the material forward as well as split the same, so that short pieces may be passed through with a positive feed, and while I have described two series of splitting-disks operating together as being preferable for use in splitting heavy material one series of disks operating against a fluted opposing roll, substantially as shown at f^* in Figs. 8 and 9, would better perform the splitting operation should the material be thin and light.

By means of the cone-pulleys m' and r , on which is placed a link or other suitable belt, the speed of the feeding-rolls can be changed to regulate the length of the several pieces to be cut off, a slow feeding movement of the pieces to be cut off being required to produce very short chips, while a faster feeding movement places a greater length of wood beyond the shearing-bar before it is caught by the descending knife, so that a greater length of piece is cut off, the curve of the inner side of the cavities, however, preventing too great a length of stick to be presented to the knives should the speed of the feeding devices vary or be greater than is required, the greatest depth of the cavities being just forward of the cutting-edge of the knives and arranged to conform to the length of stick to be cut, while the gradually-increasing depth in the form of the geometrical curve allows the feeding to begin directly after the knife has passed and continue until

the full depth of the cavity is reached, when the next knife is ready to make its cut.

So long as the material is of a sufficient length and thickness it will be held in position on the shearing-bar by the press-roller; but for short or uneven pieces the pressure-bars *o* serve to retain the material and prevent its being drawn forward by the descending knives.

It will be seen, of course, that a very great advantage is gained in the saving of time and material by the use of knives for splitting the material before it is cut into short lengths, as the splitting is done together with the feeding, so that no extra time or handling of material is required, and the machine only needs to be provided with the required weight and strength to insure speed and economy in its work.

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

1. The combination, in a wood-cutting machine, of the frame carrying a wheel provided on its periphery with knives for severing the material into lengths and provided with outwardly and upwardly extending side pieces *d* and with the inclined bed *f* between the side pieces, the shearing-bar secured to the frame at the lower end of the bed *f* and in proximity to the said knives with the pressure-bars *o*, arranged in series side by side above the said

bed *f* and pivotally supported at their outer ends by the said side pieces and having their inner and lower ends reaching over said shearing-bar, substantially as set forth.

2. In a machine for cutting wood, the combination, with the frame having a supporting-bed and carrying feeding devices and an upper and a lower series of splitting-disks, each series of disks being provided on their periphery with cutting-edges lying coincident with one side and with the flat sides of one series of disks overlapping the flat sides of the opposing series, and a shearing-bar at the end of the said supporting-bed, of a wheel mounted upon the said frame and carrying knives on its periphery having cutting-edges lying substantially parallel with its axis and passing in proximity to the said shearing-bar and provided on its periphery in front of said knives with cavities, substantially as described, beginning at the heel of one knife and increasing in depth to the radial plane of the edge of the next succeeding knife, substantially as and for the purpose set forth.

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

WILLIAM MERRILL.

Witnesses:

G. P. THOMAS,
JAS. E. THOMAS.