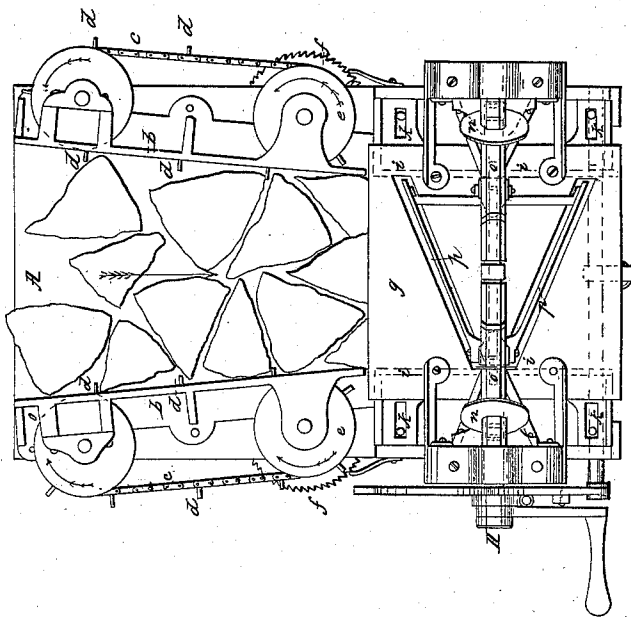
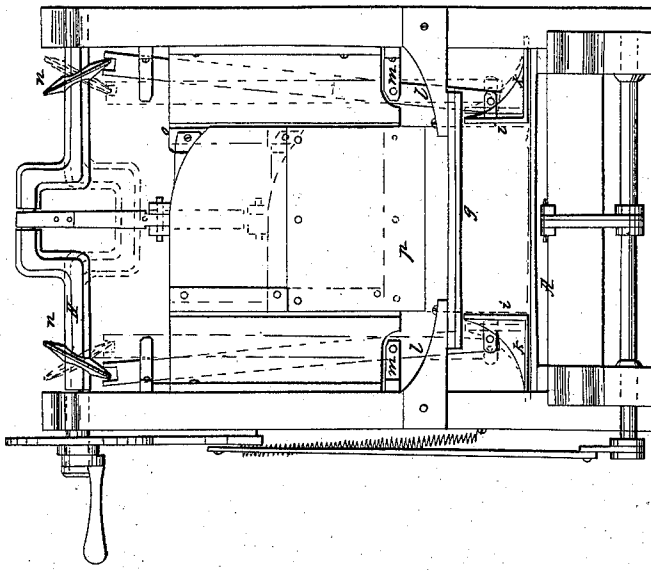


Splitting Wood,

Patented Apr. 14, 1857.



UNITED STATES PATENT OFFICE.

W. L. WILLIAMS, OF NEW YORK, N. Y.

MACHINE FOR SPLITTING WOOD.

Specification of Letters Patent No. 17,061, dated April 14, 1857.

To all whom it may concern:

Be it known that I, WILLIAM L. WILLIAMS, of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Machinery for Splitting Fire-Wood; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being made to the annexed drawing, making a part of this specification, in which—

Figure I is a top view or plan; Fig. II is a front elevation; and similar letters indicate similar parts throughout.

Machines for splitting fire-wood differ from machinery for splitting wood generally, (such as for riving shingles, and for making match splints), in this particular, that while in those the "bolts" or blocks of wood to be split are fed in singly, and are usually of uniform size as well as of regular form, the sticks of fire-wood are very irregular in shape, being uniform in length only, and these are brought to the action of the knives, sometimes singly where the sticks are large, but oftener several small ones are split at the same time while standing side by side, though not in actual contact, unless accidentally. The chief requisite of these machines is rapidity of working, for uniformity in the size of the pieces delivered is not at all necessary, (as in shingle and splint splitting). The second essential is, to be guarded against accidents, whereby the durability of the parts and continuity of action may be secured.

In the machines which feed horizontally, there are some defects which my improvements are intended especially to obviate, and firstly, that the feed being necessarily intermitted, the sticks are liable to be thrown down by the sudden starting and stopping. When this occurs under the knife the attendant cannot correct it, and the edge of the knife may either be broken out, by striking upon the side of the grain, or some other part give way in consequence of the great resistance. In those which effect the feed by means of an endless revolving floor this is especially liable to occur, for the reason that the impulse must be given to the sticks at bottom, thus often throwing over the smaller ones, particularly when attempting to work rapidly. A second defect is in the manner of supporting the sticks laterally while exposed to

the immediate action of the knives, for the tendency is to expand each stick as the knife passes down, and since, to split the wood in different directions, the knives stand at an angle more or less acute with reference to the sides of the floor, the triangular mass of wood inclosed must be forced against those sides—hence the pieces must not in those machines be placed upon the floor so closely as to prevent such expansion. I am well aware that to some extent this has been obviated by making the vertical sides yielding, so that by the action of springs upon said sides the mass of wood could be permitted to extend laterally and would be closed up again as the knives were withdrawn. By this arrangement however more power is required to work the splitting tools, both in the acts of entering and of leaving the wood. A third defect is found in the arrangement and position of the cross knives with reference to each other.

As usually constructed, the splitting tool consists of one knife extending across the floor at an angle of 45 degrees with the sides thereof, and having another knife made in two parts, one of which is placed midway on each side of it, and at right angles to it forming an X shape. In the angles of these the wood becomes crowded by the entrance of the knives, so that they are often bent, particularly when there is a knot in that portion of wood which is in one of the angles.

My invention consists, firstly, in so feeding the sticks up to the action of the knives, that while being so fed, they shall be caused automatically to assume the position of close contact with each other and to fill the space between the side pieces, whereby, becoming a close mass, none of the pieces can fall over except those at the front of the machine, and which being split to proper size, are then ready to be delivered off the floor.

A second feature consists in supporting the sticks laterally while under the knives, by means of side-pieces so arranged and operated with reference to the knives, that as those descend into the wood the said sides will be withdrawn to a distance proper for a due expansion of the mass, and will be brought up again into place as the knives are retiring, both of these movements being effected by a positive force timed to the action of the splitting tool.

A third feature lies in so arranging the knives in their relation to each other, that although they stand at an angle to, they do not cross nor come into contact with each other, whereby instead of the usual four angles being formed into which the wood can be crowded, mine has but one, and at that one the knives can be placed, from this construction, so far apart that they will not both operate upon the same piece of wood at the same time. This, though of but little importance in splitting soft and clear woods, is of great consequence when operating on the harder woods, such as hickory or oak.

The construction may be as follows: Upon a suitable frame or foundation is laid a smooth and oblong floor A, a top view of which is given in Fig. I. At each side of this, and extending along the floor nearly to the splitting tool, is a rail (b) elevated about six inches above the floor. These rails are not necessarily parallel to each other, but may stand at a small angle, being opened out at the end of the floor farthest from the knives, as shown. Between the edge of this rail and the floor, on each side, an endless chain (c) travels, passing over pulleys at each end of the rails, and upon the links of each of said chains is a series of projecting prongs (d), at intervals as seen. Two of the pulleys (e) are made to turn by ratchet wheels (f) affixed to the shaft of each, below the stationary floor, and these ratchet wheels are moved by pawls with an intermitted motion derived from a cam on the main shaft H, causing the chain to progress in the direction of the arrows on the pulleys—said motion being timed to take place when the knives are out of the wood. Upon that portion of the floor toward which the feed is represented as given, the splitting is effected, and here is a plate (g) supported from above at a height from the floor which will permit the sticks of wood to pass under readily, and having suitable slots for the knives to play through. Between this plate and the floor, there is on each side a movable piece (i) set parallel to each other and so placed upon guides (k) that said pieces may be made to approach or recede from each other slightly. The limits of motion to these will be, that they do not approach to make a narrower passage than is afforded at the inner ends of the rails (b), and they must be capable of being withdrawn to such distance as will allow for the expansion of the wood fed between them, caused by the displacement of the splitting knives when those shall have been driven in to the full depth. To effect the motions of these pieces upon their guides, each has attached to it a lever (l) extending up nearly to the main shaft H, and hav-

ing a fulcrum upon the main frame, as at (m). The upper end of each lever is forked, and over it, upon the main shaft, a disk (n) is set diagonally, as shown, whereby a vibrating motion is imparted to the levers by the rotation of the shaft, thus causing the side pieces (i) to approach and recede from each other, the disks being so set with reference to the crank that the side pieces shall be at their greatest distance from each other when the knives are at the lowest part of their throw.

The splitting tool consists of two knives set at an angle to each other of 45 degrees, or less, and extending quite across the floor between the movable side pieces, forming, in top view a V shape, as seen at (p) Fig. I. These knives are fastened to a cross-head playing on suitable guides (o) on the main frame, and actuated by a crank on the shaft, in the usual manner. The cutting part of the knives is not in contact with each other along the side where they approach nearest, and at these sides they should properly be set (particularly as before remarked for hard woods) at such distance apart that the knife which gives the second cut will act at that end upon a piece of wood which is not at the same time acted upon by the other knife. A distance apart equal to the amount of a single feed will afford this sufficiently.

The operation will be thus: Rotary motion being given to the main shaft, the splitting tool will be made to rise and fall in the usual manner, and by the action of the pawls upon the ratchet wheels, the feeding chains will also be made to move along in order to effect a feed, which as before remarked is to take place while the splitting tool is at its highest throw. The sticks of wood having previously been cut to nearly uniform length, the attendants place them on end upon that part of the floor farthest from the splitting tool, and they are fed up from that place by the onward motion of the projecting prongs on the chains. These prongs however would merely act to cause each separate stick to turn a little out of the way and be pushed toward the center, were it not that the sticks stand thickly all over the floor, and thus are compressed together so that motion given to those along the sides by the action of the prongs carries the whole along in a body, and the sticks become, before progressing far, worked into the close order required, that when under the knives, the vertical position of the pieces may be preserved, particularly of those which having passed the first knife have received a cut in one direction. With some care on the part of the attendants in placing the sticks this compacting of the mass would be effected even if the rails (b) were parallel, but since economy of working requires that

considerable speed should be given, the attendants are not able when feeding rapidly to set the sticks as closely as would be necessary to bring them into a dense mass by the time the knives are reached. The desired compactness is, however still obtained under these circumstances, by the narrowing of the floor, which necessarily brings the sticks closer together as they are carried onward.

As the splitting tool enters, the mass is of course somewhat extended in all directions. That expansion which takes place toward the feeding floor is sustained by the sticks which are advancing; none can fall over toward the front until they have passed the second knife, and at the sides are the movable pieces (*i i*), standing, when the tool is out of the wood, just at the width of the mass as it came through from the feeding chains. As the knives now descend, these movable sides are made to retire by the positive action of the disks (*n*) through the levers (*l*), and when the knives rise, the side pieces are returned to place by the continued action of the disks, thus avoiding any pressure while the splitting tool is in the wood. If set at an angle of 45° to each other the knives cut the sticks into rectangular form, but if at any less angle they are delivered in rhomboidal shape, and for kindling, this is preferable, since being thin at the acute angle, the wood takes fire more readily.

It may be remarked that the rails (*b*) are not absolutely necessary to the working of the feed, since if the chains are supported against rollers, or move upon a plate so that they will not yield to pressure, the action will be equivalent to that of the fixed rails described.

1. I claim the combination of the feeding chains arranged as set forth, with the stationary conveying floor, for effecting the feeding up of the sticks in a fire-wood splitting machine, substantially as described herein.

2. I claim the movable side clamps operated by a positive motion governed by the motion of the knives and proportioned to the displacement of the wood by said knives, for the purpose of supporting the sticks laterally and also of relieving the pressure upon the same substantially as set forth.

3. I claim the arrangement of the two separate knives, each extending entirely across the feeding floor, and being set at such angle to each other, and such distance apart, as will effect the cross or second cutting upon a block which is not at that feed receiving the first cut, substantially as described.

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Witnesses:

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