

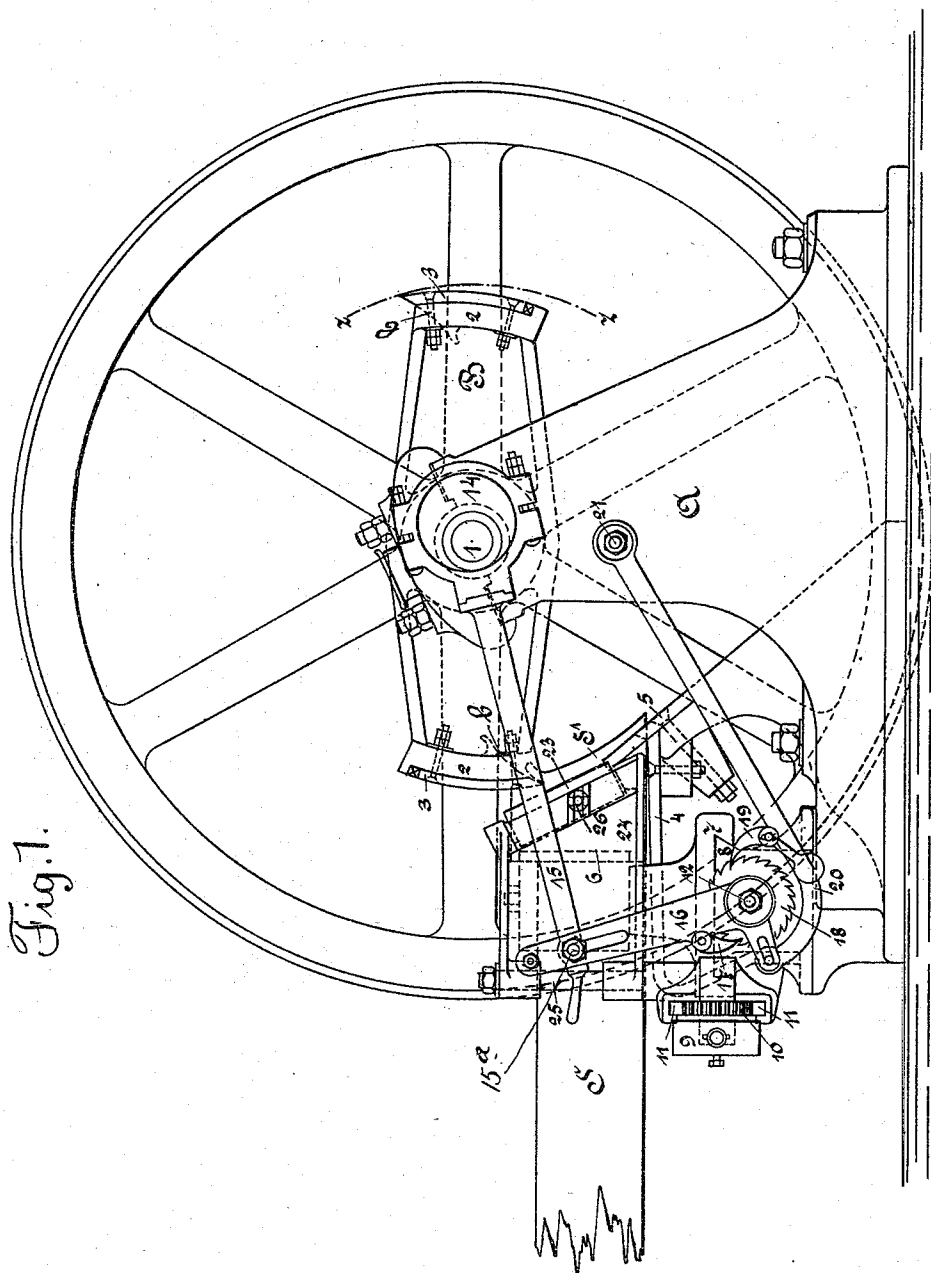
(No Model.)

3 Sheets—Sheet 1.

J. G. KREIS.
WOOD CUTTING MACHINE.

No. 547,490.

Patented Oct. 8, 1895.



Witnessed:
Otto Kreis
Alfred Kreis

Inventor:
Johann G. Kreis
by Lehnach & Lehnach
his Attys.

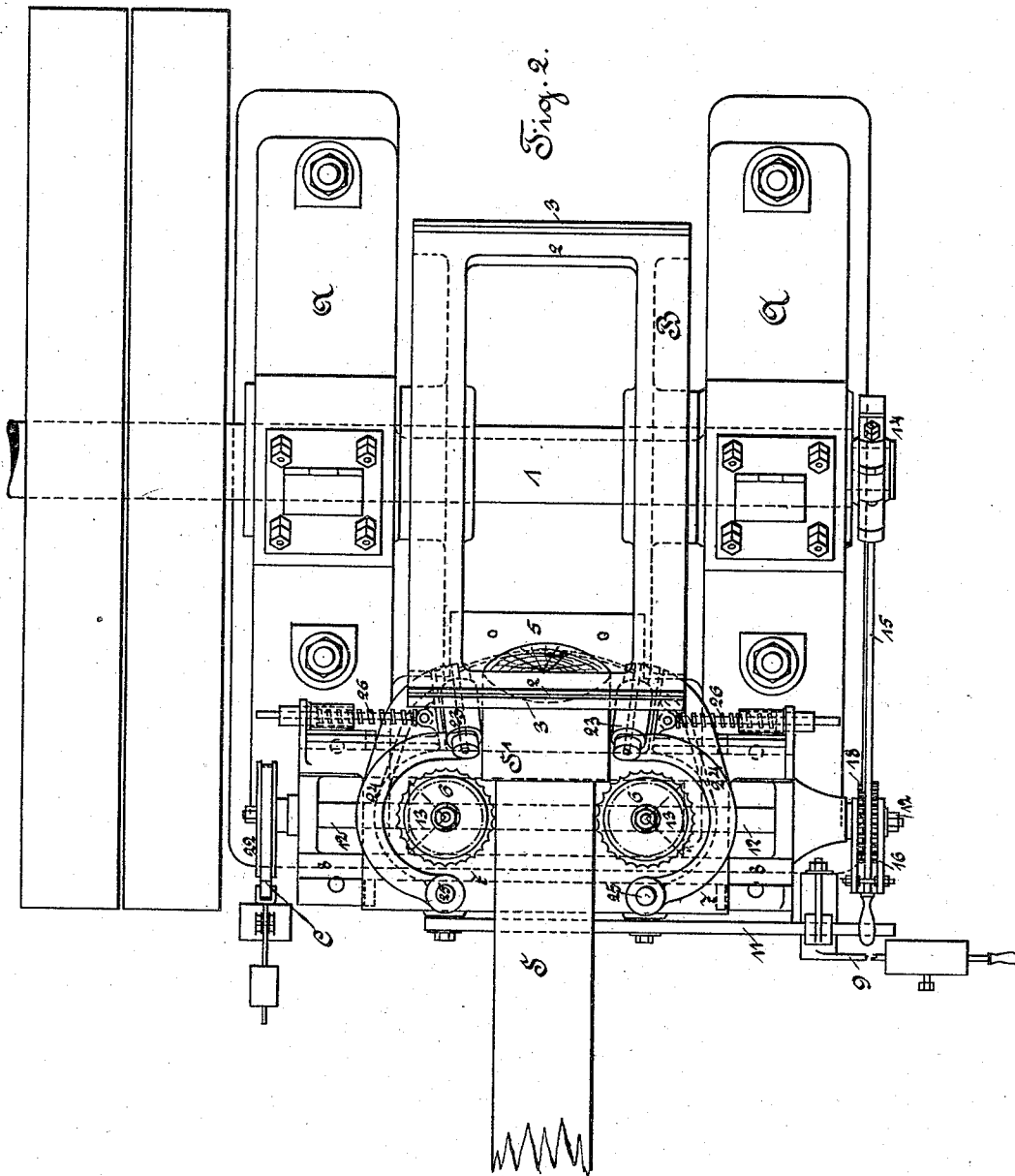
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28) witnesses:
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 Hugo Brunner

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(No Model.)

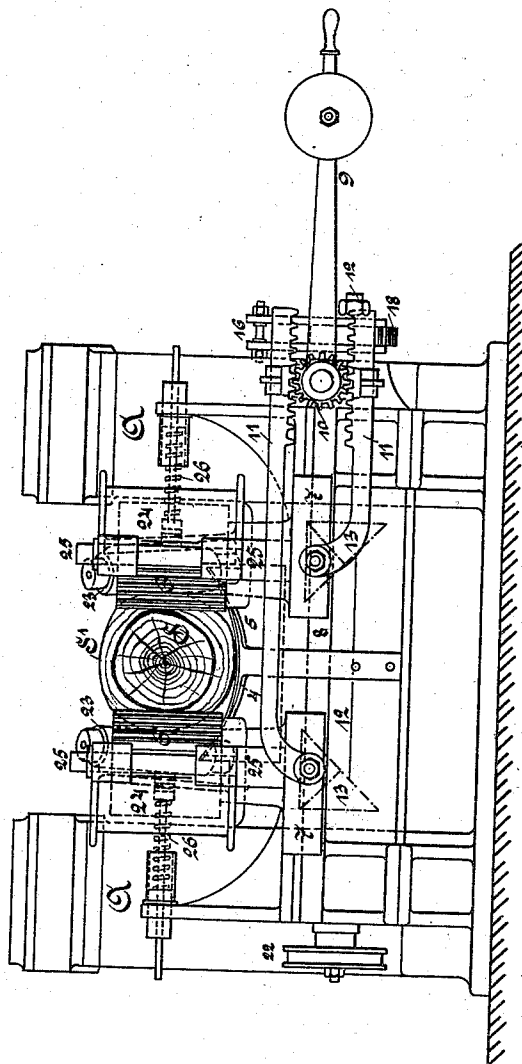
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Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHANN GEORG KREIS, OF HEINRICHSTHAL, AUSTRIA-HUNGARY, ASSIGNOR
TO EISENGIESSEREI & MASCHINENFABRIK, OF BAUZEN, GERMANY.

WOOD-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,490, dated October 8, 1895.

Application filed July 3, 1895. Serial No. 554,837. (No model.)

To all whom it may concern:

Be it known that I, JOHANN GEORG KREIS, a subject of the King of Prussia, residing at Heinrichsthal, Moravia, Austria-Hungary, have invented certain new and useful Improvements in Wood-Cutting Machinery, of which the following is a specification.

This invention relates to improvements in wood-cutting machinery.

The machine which is the subject of this invention is designed to cut up the trunks of trees into disks, chiefly for the purposes of manufacturing Ligno-cellulose, or cellular material. It is especially characterized by the fact that the disks are cut from the horizontally-fed trunk at an angle of about forty-five degrees to the axis of the trunk by a revolving cutter formed of a knife or knives arranged singly or in numbers. In the latter case the knives are spaced equidistantly round the circumference of a large circle. By this arrangement I obtain the following important advantages over the older forms of machines for the same purpose: First, by the horizontal feed of the tree-trunk in my improved machine in lieu of the slant feed in the old machines the force exerted on the tree-trunk by gravity cannot influence the cut or severance unfavorably nor compel continuance of the work when it is desirable to stop; second, by the employment of a heavy rotating cutter, with great momentum, the inequality of working, resulting from the variation of work from a maximum during the cut to a minimum in the intervals between the cuts, can be much better compensated for and the application of motive power much more nearly equalized than is any way possible with reciprocating working parts.

In the type of machine hitherto commonly employed the back of the vertically and rectilinearly reciprocating knife necessarily pressed against the freshly-cut surface of the wood, and great friction resulted. The mode of action of the knife-edge was by a direct downward pressure—as, for example, in a paper-cutting machine—but in my improved machine the knife-blade is curved and rests against a spirally-curved backing in such manner that only the cutting-edge is in contact with the freshly-cut surface, and conse-

quently there is no longer any unnecessary friction between the rear surface of the knife and the surface of the cut. The action of the knife is actually that of a chopper, and exactly like that of a carpenter's axe, which is directed obliquely against a balk.

Furthermore, this invention comprises an important improvement in the feed device. The feed-trunk is run upon the customary guide and feed rollers and at a point immediately before that at which the cut occurs is held by oblique spring-controlled guide-rollers. Thus an entirely secure lodgment for the tree-trunk is obtained during the cut, so that all risk of fracture to the knives is avoided. This arrangement will be more fully described in connection with the drawings in its proper place.

One form of this improved cutting-machine is represented by way of example in the accompanying drawings. In it two knives are employed.

Figure 1 shows the elevation thereof. Fig. 2 is the plan, and Fig. 3 is an end view, of the machine.

Like letters and numerals indicate like parts throughout the drawings.

The main driving-shaft 1 is mounted in a powerful frame A and carries the two-armed frame B to the two head-pieces 2, whereon the knives 3 are securely screwed. The outer edges of the head-pieces 2 are formed spirally or approximately spirally, so that the cutting-edges of the knife-blade (which are parallel therewith) do not coincide with the circle described by any point of such edge, as appears (see Fig. 1) from the circular arc *zzz* described by the extreme outer point of one of the blades or cutters, as shown in Fig. 1. In other words, each knife has its cutting and following edges parallel with each other and with the axis of rotation of the frame B, but has its surface spirally curved inward from the cutting-edge toward that axis. The bearing surface for each knife on the frame B is correspondingly curved. By means of this arrangement of the surfaces, the wear of the knives can be taken up by sliding the knives along the frame B. The position of the cutter-axis is so selected in relation to the tree-trunk S that as the latter is fed to the cut-

ting-point the cut is effected at an angle of approximately forty-five degrees to the longitudinal axis of the trunk. The tree-trunk which is to be cut up rests at its forward end upon a bridge 4. The latter is bounded and terminated at its forward end (*i. e.*, the end presented toward the knives) by the slanting steel plate 5, which is indented or hollowed at its upper edge, which acts as support or fulcrum against the action of the cutters. For guiding and feeding forward the tree-trunk the two ribbed rollers 6, rotating on vertical axes and gripping the trunk between them, are employed. These feed-rollers are mounted on slides 7, which reciprocate to and fro at right angles to the bridge 4 upon the slide-bar 8. A weighted lever 9 tends continually to bring the slides 7 together, with their feed-rollers 6. The lever is connected to the toothed wheel 10, and this acts on the rack-bars 11, which are each connected to the slides 7, as shown. Beneath the slide-bar 8 is located a shaft 12, journaled in bearings in the frame. On the shaft are mounted the miter-wheels 13 in such manner that they can rotate with, but not relatively to, the shaft and are movable along it so as to be kept always operatively engaged with similar miter-wheels on the spindles of the ribbed rollers 6.

In the machine illustrated the tree-trunk must be fed forward twice at equal intervals for a distance equivalent to the intended thickness of the disks during each complete revolution of the main driving-shaft 1 by means of the ribbed rollers 6. This is effected by a single eccentric 14, secured to the said shaft 1. The eccentric-rod 15 is connected by a movable joint to the bent or angle lever 16, mounted loosely, so as to oscillate freely on the counter-shaft 12. By means of a suitable slot in the lever 16 and a screw-pin 15^a in the end of the arm the throw of the angle-lever can be regulated and adjusted to requirements. A thrust-pawl 17 on the lever-arm 16 engages with the ratchet-wheel 18, secured to the shaft 12, and a second thrust-pawl 19, also engaging with ratchet-wheel 18, is mounted on the lever 20, with which the other arm of the angle-lever 16 is movably connected, so as to admit of adjustment, and which is pivoted at 21 to the frame A. Thus in the course of each revolution of the main shaft 1 the ratchet-wheel is twice turned round, first by the one pawl and then by the other, and, in consequence, between each two cuts the feed mechanism causes the tree-trunk to advance a step equal to the appointed width of the cut. Accidental motion of the shaft 12 is prevented by a band or brake-strap C, made to act by a weight on the disk 22, securely mounted on the said shaft 12. We now come to the special guide-rollers already mentioned in the introductory part of this specification. These are shown in the drawings at 23, and are carried by the semicircular arms 24, which are each pivoted on a pivot-

pin 25 to one of the slides 7. By a presser, such as powerful springs 26, supported on the main frame the guide-rollers 23 are pressed against the tree-trunk independently of one another. These springs, it is obvious, may also be replaced by the substitution of suitably-arranged weights. It has already been prominently set forth that by the aid of these rollers a perfectly firm and secure position is obtained for the trunk at the time of cutting. Owing to their slanting position tangential to the circle described by the revolving cutters, they may be placed almost in contiguity therewith. Lying thus close in front of the knives they obviate the possibility of derangement through any lever action of the trunk by any effort or strain in the direction of the feed. Quite independently of the ribbed rollers 6 they hold the trunk securely fast even in case of any material variation in the thickness of the trunk intervening between 6 and 23 as the feed progresses. Even in the hypothetical case assumed in the drawings, Fig. 2, of so material a difference in the thickness, as shown, between S and S', which practically would never occur, the guide-rollers would do what is required of them without fail, and the same may be said of the still more probable case that the stem should run materially thicker or thinner at, say, the forward than at the backward end. In virtue of their mutual independence the rollers adjust themselves easily to any one-sided irregularity in the trunk; also, thanks to these rollers, the tree-trunk may be used up to the last tangible remainder. This will be obvious from superficial examination of the drawings, Fig. 2, as if S and S' were two different trunks or barks, squared at the ends to butt up against one another. Equally, by reason of their obliquity, these rollers prevent any tilting of the trunk, and, finally, also, they oppose and prevent any longitudinal displacement due to any unforeseen effort which is less than that exerted by the eccentric rod 15 or ratchet-wheel 18.

I claim—

1. In a wood cutting machine, the combination with a framing, of a horizontal guide 4, a rotary cutter journaled in the frame above the level of the guide and having curved bearing surfaces on which are two adjustable knives each of which has its surface spirally curved inward from the cutting edge toward the cutter axis, feed rollers on movable carriages, guides for the feed roll carriages transverse to the guide 4, a motor device in operative connection with the carriages for keeping the feed rolls up to their work, mechanism constituting an operative connection between the feed rollers and the cutter shaft, a brake for that mechanism, arms pivoted to the main frame and each provided at the end away from its pivot with a guide roller situated near the cutter obliquely to and approxi-

mately tangential to the path the cutter traverses during its cut, and a pressing device for the said arm; substantially as set forth.

2. In a wood cutting machine, the combination with a framing, of a horizontal guide 4, a rotary cutter journaled in the frame above the level of the guide and having curved bearing surfaces on which are two adjustable knives each of which has its surface spirally curved inward from the cutting edge toward the cutter axis, feed rollers on movable carriages, guides for the feed roll, carriages transverse to the guide 4, a motor device in operative connection with the carriages for keeping the feed rolls up to their work, mechanism constituting an operative connection between the feed rollers and the cutter shaft, arms pivoted to the main frame and each provided at the end away from its pivot with a guide roller situated near the cutter obliquely to and approximately tangential to the path the cutter traverses during its cut, and a pressing device for the said arms; substantially as set forth.

3. In a wood cutting machine, the combination with a framing, of a horizontal guide 4, a rotary cutter journaled in the frame above the level of the guide, and having curved bearing surfaces on which are two adjustable knives each of which has its surface spirally curved inward from the cutting edge toward the cutter axis, arms pivoted to the main frame and each provided at the end away from its pivot with a guide roller situated near the cutter obliquely to and approximately tangential to the path the cutter traverses during its cut, and a pressing device for the said arms; substantially as set forth.

4. In a wood cutting machine, the combina-

tion with a rotary cutter journaled in a main frame, of arms pivoted to the main frame and each provided at the end away from its pivot with a guide roller situated near the cutter obliquely to and approximately tangential to the path the cutter traverses during its cut, and a pressing device for the said arms; substantially as set forth.

5. In a wood cutting machine, having a rotary cutter journaled in the frame, the combination with the cutter shaft, of an eccentric 14, eccentric rod 15, angle-lever 16, lever 21, pawls 17 and 19, ratchet wheel 20, shaft 12, sliding gear wheels thereon, traversing carriages with feed rollers mounted therein and mechanism operatively connecting the feed rolls with the said sliding gear wheels; substantially as set forth.

6. In a wood cutting machine, the combination with the cutter, feeder and feed eccentric, of a drive gear interposed between the eccentric and feeder consisting of the ratchet wheel, the lever connected with the eccentric, the pawl on the lever cooperating with the ratchet wheel during one half of the rotation of the eccentric and the independently pivoted lever jointed to the first lever and carrying the pawl for cooperation with the ratchet wheel during the other half of the rotation of the eccentric; substantially as described.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

JOHANN GEORG KREIS.

Witnesses:

OTTO WOLFF,
HUGO B. CONWAY.