Jan. 9, 1934. C. WIGGER ET AL 1,942,675

WOOD CHIPPING MACHINE

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Fig. 1

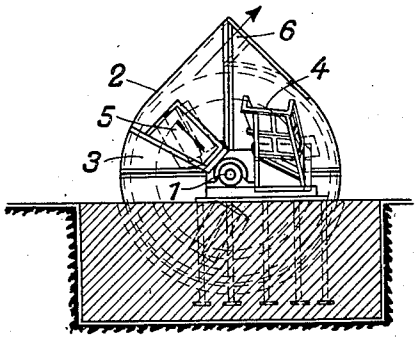
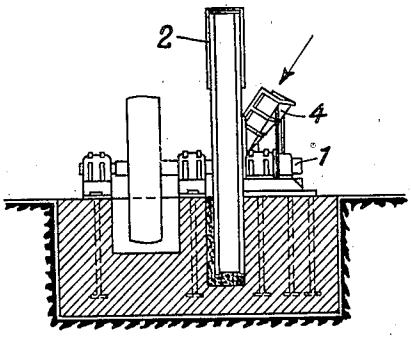


Fig. 2



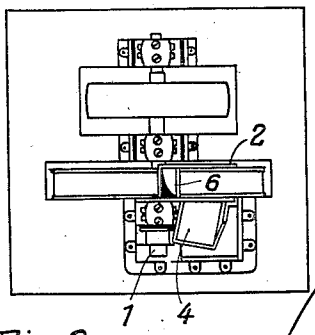


Fig. 3.

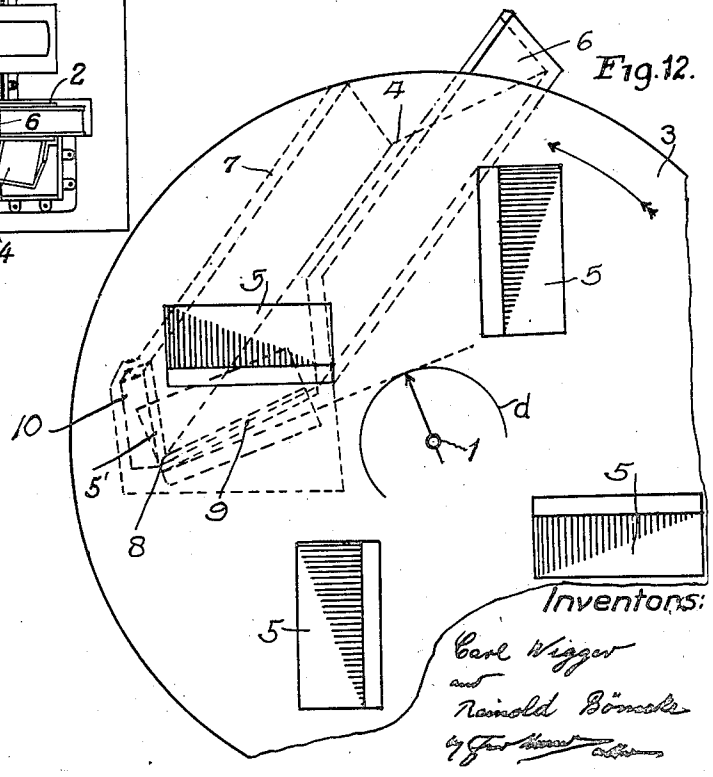


Fig. 12.

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WOOD CHIPPING MACHINE

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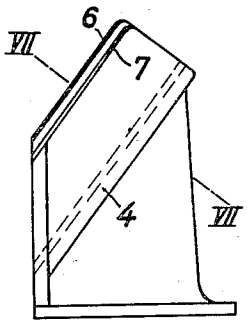


Fig.4

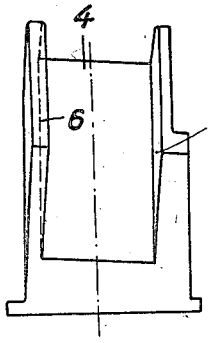


Fig.5

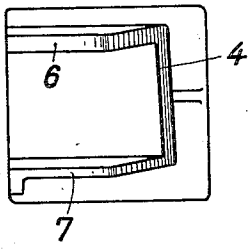


Fig.6

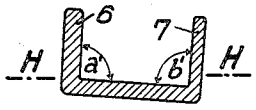


Fig.7

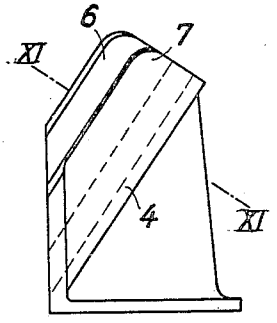


Fig.8

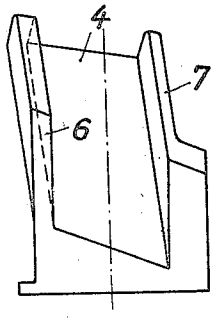


Fig.9

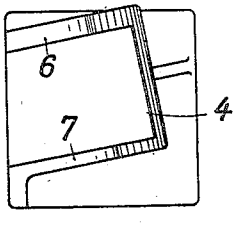


Fig.10

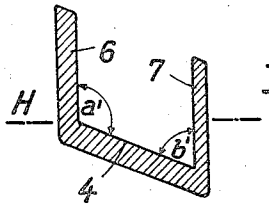


Fig.11

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WOOD CHIPPING MACHINE

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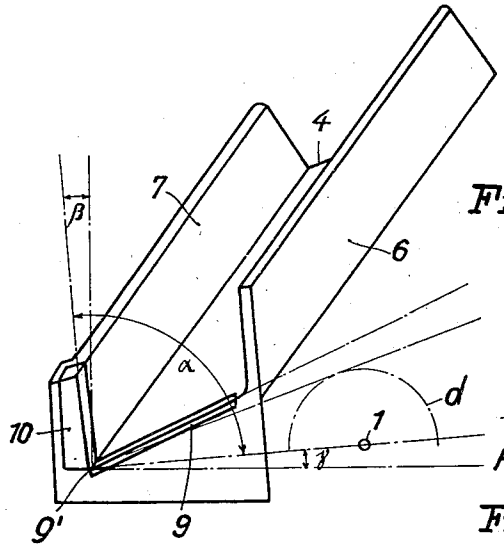
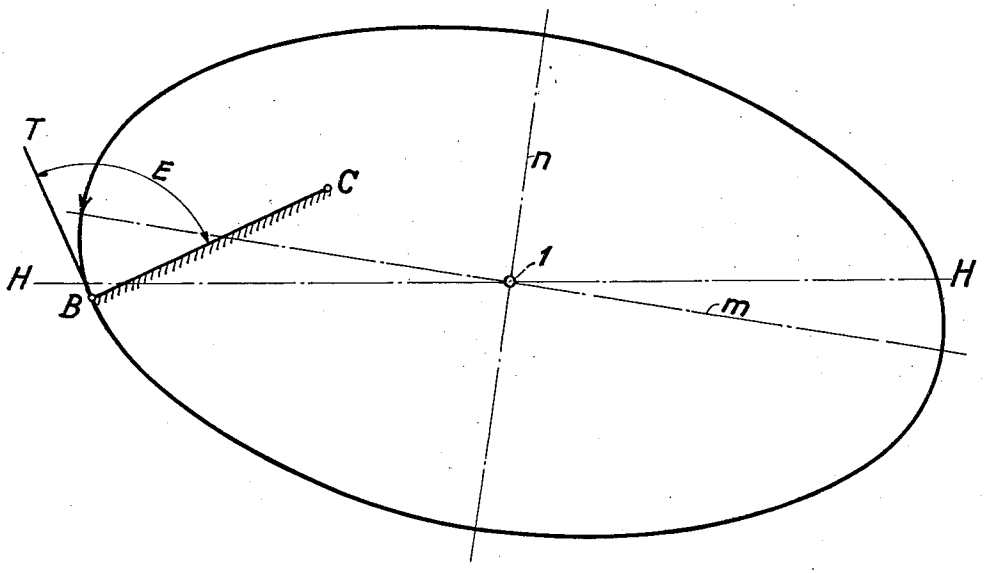


Fig. 13

Fig. 14



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UNITED STATES PATENT OFFICE

1,942,675

WOOD CHIPPING MACHINE

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Application November 28, 1930, Serial No. 498,792, and in Germany December 2, 1929

5 Claims. (Cl. 83—75)

This invention relates to improvements in wood chipping machines, especially for cutting up round timber for the purposes of the chemical wood pulp industry. In these machines the logs are fed by a spout to a rotary knife carrying disc so that chips are cut off by the knives in cooperation with counter knives arranged at the outlet of the spout. In order to obtain uniform chips, it is important for the timber to be fed straight against the chipping disc and that a shear-like cutting is ensured. The feed chutes inclined once or twice to the knife disc, hitherto employed, of open U-shaped or closed rectangular, box-shaped cross section, the bottom surface of which is, in cross section, horizontal, do not fulfill this condition. It frequently happens in these chutes, that the material to be chipped, is pressed into the corner between the bottom and the outer side wall by the strike of the chipping knife, travels with the upper end towards the opposite side, that is to the inner wall, and, when it has become sufficiently short, lies transversely in the chute and is then split longitudinally to the grain. Chips of this kind are however useless for many purposes.

The invention intends to overcome this objection in every instance by giving to the plane of the chute bottom right across to the direction in which the logs advance a slight inclination towards the circumference of the disc so that the material to be chipped always travels towards the outer wall of the chute and must retain the proper position owing to the inclination of the chute bottom, to ensure a perfect cutting of the chipping knives. At the same time the operating elements, the different knives, are arranged in a favorable position the one to the other and to the material to be chipped.

The invention therefore relates to a wood chipping machine, which is provided with a feed chute for the material to be chipped, arranged substantially so, that the bottom surface of the chute, seen from the direction of the timber feed is downwardly inclined towards the outer side, that is towards the circumference of the knife carrying disc. It is without importance, whether the feed chute has a simple or double inclination or, whether the chute consists of a flat bottom surface and vertical or substantially vertical side walls and, seen from the side, horizontal or downwardly inclined to the chipping knife disc and, seen from above, either parallel or oblique to the axle of the chipping knife disc.

The outwardly, downwardly inclined bottom surface must be used with any position of the feed chute so that it is now possible to speak of a double inclined chute, instead of a single inclined chute as hitherto, and of a triple inclined chute, instead of a double inclined chute as hitherto.

It has further been found, that this inclination of the bottom surface towards the outside by edging the chute is alone not sufficient in all cases to produce a good result, especially if short timber is worked, such as exists when standard timber, has been already considerably shortened by chipping, and also timber of small diameter, that is of light weight. This edging of the chute can, according to the invention, be further combined with a special position of the chute and of the chipping knives relative to the axis of the chipping knife disc.

The arrangement frequently employed by manufacturers of wood chipping machines in recent times, with the outlet mouth of the chute in a low position so that the cutting operation proper of the chipping knives occurs entirely or mostly below the horizontal plane determined by the center of the chipping disc, is origin of the objection that, owing to the friction of the chipping disc and with normal radial arrangement of the knives also by the cutting effect of the cutting knives a force component is produced which is directed towards the chipping disc axle and which pulls the logs inwardly. The result is that, in spite of the outwardly inclined bottom surface of the chute, a pushing of the wood in the direction of the axis of the chipping disc can occur under certain circumstances, so that the guiding of the timber along the outer side knives of the chute is no longer endured. This disadvantage is overcome according to the invention by elevating the formerly low situated chute so that the bottom knife edge lying in the bottom of the box chute which is outwardly inclined in the transverse direction to that of the timber feed is arranged in or above a plane imagined through the axis of the chipping disc, which plane is downwardly inclined towards the spout side in the angle of the outwardly inclined bottom surface of the spout chute. In order to obtain the most favorable cutting angle, in spite of the high position of the bottom knife of the chute, the inner corner of the chipping disc knife is turned, a suitable distance backwards or forwards out of the radial position around a centre formed by the outer end point of the knife.

In order to clearly illustrate the invention a chipping machine with the above mentioned improvements is shown by way of example in the accompanying drawings in which:—

Fig. 1 shows in rear elevation a general view of the machine.

Fig. 2 is a side elevation.

Fig. 3 a top plan view.

Figs. 4 to 11 show forms of construction of a simple and double inclined fed chute descending to the chipping disc.

Figs. 4 and 8 showing the chute in side elevation, Figs. 5 and 9 seen from the chipping disc,

and Figs. 6 and 10 are top plan views of the chute. Figs. 7 and 11 show cross sections of the chute on lines VII—VII and XI—XI of Figs. 4 and 8 respectively.

Fig. 12 shows in front view the position of the chute and of the knives of the chipping disc relative to the chipping disc axis.

Fig. 13 indicates the position of the bottom knife and of the outer side knife relative to the chipping disc.

Fig. 14 represents a position diagram.

The chipping machine mounted on a suitable foundation consists of a knife carrying disc 3 keyed on a driving shaft 1 mounted in a case 2 and of a feed chute 4 for the timber arranged on one side of the disc 3. The feed chute is inclined towards the knife carrying disc 3, carrying a plurality of knives 5. The chips cut from the timber are discharged at 6.

In Figs. 4 to 11 two forms of construction of feed chutes are shown. These chutes consist of a bottom 4 and of side walls 6 and 7. In order to obtain a perfect working of the chipping machine, guiding of the wood by or traveling of the wood towards the wall 7 is desired. For this purpose the bottom 4 is downwardly inclined outwards, that is towards the wall 7. It is immaterial, whether the side walls 6 and 7 are also edged, that is stand only approximately perpendicular, so that the angles a' and b' remain rectangles or whether the angles a' and b' are more or less than 90°, as for example the side walls remain perpendicular whereas the bottom surface is edged.

Fig. 12 shows the position of the chute 4 behind a knife carrying disc provided with four chipping knives 5. The knives lie in this disc tangentially to a circle d concentric to the centre 1, the radius of this circle representing the measurement for the backward turning of the knives in relation to the radial arrangement.

This figure shows in dotted lines the position of a knife 5' when its outer corner 8 is situated absolutely in the apex of the angle between the bottom knife 9 and the outer side knife 10 of the chute. Fig. 13 clearly shows the position of the bottom knife 9 relative to the chipping disc axis 1. α is equal to the angle between the bottom wall 4 and the outer side wall 7 of the box chute seen in the wood feeding direction. This angle, which is turned around the edge of the side knife 10 in the plane of the drawing, is about 90°, but may be larger or smaller. β corresponds to the outward inclination of the outer side wall 7 in the transverse direction to the wood feed, and γ supplements the angle α up to the horizontal plane through the outer end 9' of the bottom knife 9. In order to produce an outwardly directed cutting effect of the knives 5 of the chipping disc 3 to the apex of the angles between the bottom knife 9 and the side knife 10 until the last moment of cutting, which effect is necessary for ensuring a guiding of the timber against the outer side knife, even when the timber is of minimum diameter, the condition must be fulfilled, that the centre line of the axle 1 does not lie higher than the lower arm of the angle α.

The position of the bottom knife is illustrated in Fig. 14 according another kind of view. In this figure the circle, drawn with the axis of the chipping disc as centre through the end point of the bottom knife edge on the chipping disc, is projected onto an imaginary plane transverse to the wood feed through the chipping block chute and appears as an ellipse with the large axis m and the smaller axis n. The tagent T situated in the extremity B of the bottom knife edge projection BC on the ellipse should form an angle with the line BC which is less than or at the most equal to a right angle.

The fundamental idea, which led to this invention, consists in that the determinations of the directions and angles for the working parts have been separated from the relation to the chipping disc axis or surface and are placed in relation to a plane imagined through the chipping block chute perpendicular to the direction of the wood feeding.

We claim:

1. A wood chipping machine, comprising in combination a rotary knife carrying disc, a box shaped chute for the material to be chipped leading to said knife carrying disc, upwardly extending almost vertical side walls of said chute and a flat bottom of said chute inclining slightly towards the outer side transversely to the wood feed direction, so that the outer lateral edge of said bottom lies lower than the inner side edge which lies nearer to the centre of said knife carrying disc.

2. A wood chipping machine as specified in claim 1, comprising in combination with the knife carrying disc the box-shaped chute and the chute bottom, a bottom knife edge on said chute bottom arranged in a plane extending through the axis of said knife carrying disc and downwardly inclined relative to said chute so that the angle between the upper side of said chute bottom and the tangent of the ellipse formed by projecting the circle drawn through the end point of said bottom knife edge situated towards the circumference of said knife carrying disc on the surface of said knife carrying disc concentric to the axis of said knife carrying disc onto an imaginary plane extending through said chute transversely to the wood feed direction does not exceed 90°.

3. A wood chipping machine as specified in claim 1 comprising in combination with the knife carrying disc the box-shaped chute and the chute bottom, a bottom knife edge on said chute bottom arranged above a plane extending through the axis of said knife carrying disc and downwardly inclined relative to said chute so that the angle between the upper side of said chute bottom and the tangent of the ellipse formed by projecting the circle drawn through the end point of said bottom knife edge situated towards the circumference of said knife carrying disc on the surface of said knife carrying disc concentric to the axis of said knife carrying disc onto an imaginary plane extending through said chute transversely to the wood feed direction does not exceed 90°.

4. A wood chipping machine as specified in claim 1, comprising in combination with the knife carrying disc, knives on said disc arranged so that the corners of their cutting edges directed towards the axis of said disc are turned out of the radial direction towards the rear around their end points directed towards the circumference of said disc.

5. A wood chipping machine as specified in claim 1, comprising in combination with the knife carrying disc, knives on said disc arranged so that the corners of their cutting edges directed towards the circumference of said disc are turned towards the rear around their end points directed towards the axis of said disc.

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