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WOOD AND BRUSH CHIPPING MACHINE

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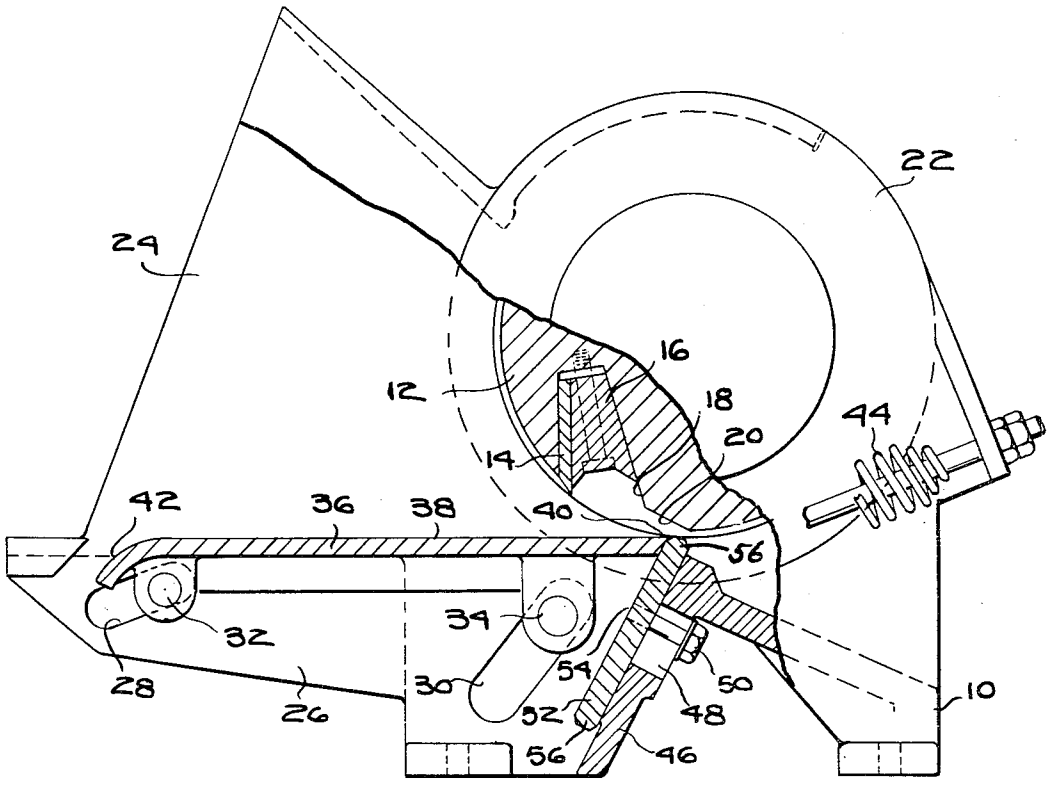


FIG. 1

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WOOD AND BRUSH CHIPPING MACHINE

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This invention relates in general to wood and brush chipping machines more or less of the general type shown and described in my copending application Serial No. 50,281 filed September 21, 1948, now Patent No. 2,634,062. The objects of the new invention are similar, but in the present case, the machine has been improved by the relocation of the bed knife and feed plate with relation to the center of the cylindrical cutter, as will be described more fully hereinafter.

The chipping machines have for their objects the rendering of brush, branches, logs, small trees, boards, sawmill edgings, leavings, etc. into a chipped or comminuted state which is easily transported and is useful in agriculture as cattle bedding, mulch, etc., as pulp wood, or chips for the paper industry and for many other industrial and agricultural purposes. Furthermore, the rendition of the brush, trees, etc. into a chipped material reduces the bulk thereof for shipping purposes and also does away with the fire hazard involved in lumbering operations, etc.

One of the great advantages of the present machine is its self-feeding feature, so that when any of the material named or the like is placed into a hopper leading into the cutter, the cutter itself feeds the material at an extremely high rate of speed through the machine and thus the capacity of the machine is extremely high and it requires several men to load it to capacity in normal operation.

The machine itself briefly consists of a frame, a preferably but not necessarily horizontal work feed plate forming the bottom or one side of a hopper, said feed plate having a motion relative to a bed knife located in adjustable but fixed position generally tangential to a circle having an axis co-incident with the axis of a cylindrical cutter head, the feed plate and the bed knife being generally parallel to said axis. The bed knife is adjusted to lie within a few thousandths of an inch of the longitudinal cutter blades on the cylindrical cutter head, the latter being rotated at a high speed and not only chipping the work, but feeding the same rapidly through the machine, in conjunction with the feed plate which constantly exerts a pressure on the work in a general direction toward the cutter head.

In the construction of the machine disclosed in my copending application above referred to, certain kinds of work, principally small brush and branches, sometimes were shredded rather than cut, resulting in a small amount of "strings" or the like instead of chips, these strings, however, ordinarily not being longer than four or five inches. At the same time, the present invention provides a self-feeding machine like that of the copending application but in which these strings are eliminated, while at the same time the self-feeding effect is retained, and it is desired to be pointed out that the chips in the present case may be rather small, so that they are useful as mulch and cattle bedding.

Other objects and advantages of the invention will appear hereinafter.

The figure is a view in end elevation of the machine according to the invention, parts being in section.

The drawing in the present case is made in simplified form, as only so much of the invention is shown as to fully and clearly disclose the nature thereof. The copending application above referred to contains a fuller description of parts which, however, are not essential to the novelty involved in the present case.

The present machine comprises a frame **10** which may be a casting or the like and this frame embodies means for rotatably mounting a high-speed cylindrical cutter head indicated at **12**. This cutter head is provided with longitudinal straight knives **14** secured by wedges **16** in enlarged gullets **18** of the cutter head, and the periphery of the cutter head is relieved as at **20** just prior to each gullet **18** in the direction of rotation of the cutter head which is counter-clockwise as disclosed in the present instance.

The frame **10** includes the curved side pieces **22** that provide bearing supports for the cutter head and these side pieces extend to the rear forming parts of a hopper **24**. This hopper has a wide mouth as shown for the entrance of logs, brush, branches, etc., some of which may be quite bulky although small in weight.

The frame **10** extends to the left as at **26**, forming a support for the hopper, and the frame part **26** is provided with slots **28** and **30** as shown for the reception of pins or the like as at **32** and **34** respectively, riding in said slots. These pins mount between them the feed plate **36** which is completely flat at its top surface **38** all the way to the end thereof at **40**, this end extending extremely close to the sharp cutting edges of the cutter blades **14**. The feed plate is provided with stop means to prevent further advance toward the cutters, and such stop means may take the form of the upper end of slots **30** or other bumper means or the like. The feed plate **36** is curved at the entrance end of the hopper at **42** but it is not curved at the operative end **40**. A spring **44** is mounted to the pins **34** and normally maintains the feed plate **38** in its uppermost position which is that illustrated. However, it is clear that the plate may back downwardly a little and to the left in the figure under the influence of large logs, bumps, knots, etc.

The main frame **10** also includes an angled portion **46** having a slot **48** through which extends a bolt **50** for adjustably locating and securing a bed knife **52** flatly against the angle portion **46** and in very closely spaced relation to the knives **14**. This bed knife has a flat surface **54** upon which the forward end at **40** of the feed plate **36** rides as it moves downwardly, but it is pointed out that the downward motion of the feed plate **36** is relatively slight and ordinarily it does not occur except in the relatively rare instances wherein a sudden bump is encountered as the work is fed through the machine.

The feed knife **52** is beveled at both edges thereof as at **56** and extends in length according to the lengths of the knives **14** and cooperates therewith to perform the cutting action. The beveled edge at **56** provides a quadruple cutting edge, so that the bed knife may be used four times before re-grinding.

With the feed plate in its normal position shown in the drawing, a line may be projected along the plane **38**, which line intersects a radius of the cutter head at the point of tangency of the projected line at a point very close to the right-hand edge of the bevel of the bed knife **52**. In the illustration shown, the radius of the cutter head referred to is vertical, since the bed plate is shown horizontal, and of course these lines are at

right angles to each other. Hence the actual cutting area is very slightly to the left or toward the in-feed side of the machine from this point of intersection, and it may be said that essentially the bed knife is located at that point. However, in fact it is located slightly toward the in-feed side of the machine, whereas in the copending case above referred to, the bed knife is located well toward the out-feed side of the machine.

The novel relationship of the bed knife, feed plate and cutter comprises the improvement in the present case over that of my copending application, and it has been discovered that the particular arrangement shown in the present invention results in a self-feeding action of the work as in the former case and in addition accomplishes a complete avoidance of the production of strings, regardless of the size of the work run through the machine, and in a more uniform size of chip cut from logs, branches, etc.

The present machine operates just about as well whether the feed plate **36** is horizontal or whether it is at any other angle, the feed relying upon the operation of the cutter head and not upon gravity, regardless of the position of the feed plate **36**. In the horizontal position as shown in the illustration in this case, there is obviously no gravity aiding the feed. If the feed plate **36** were tipped up 45°, gravity would slightly aid the descent to the cutter of logs, but it does not effect brush, branches with leaves on them, etc., since such branches and brush are too bulky for gravity to make any difference as to the feeding rate thereof. Therefore, it is seen that the present invention relates to a self-feeding device not dependent in any way upon gravity, regardless of the angle that the hopper may be located with relation to the cutter.

The chips resulting from the operation of the present device as compared with that of the prior art results in chips that are uniform in size and more "cross-grained." In other words, the chips are cut more nearly transversely of the work and thus more nearly directly across the grain. This in turn results in greater and more uniform breaking up of the chips, so that they do not tend to remain in chunks as was sometimes the case in the prior art, but split up along the grain of their own accord, and this is one of the advantages that is derived in the present invention since the resultant product is more uniform and thus more salable and more useful in the paper pulp industry as well as in agriculture and for industrial purposes.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:

1. A self-feeding chipping machine comprising a rotary cylindrical cutting head, longitudinal cutting knives arranged thereon, a work feeding platform located in general tangential relation to the cylindrical cutting head, and a bed knife arranged in fixed position and having an edge parallel and close to the cutting edges of the cutting knives, said bed knife being arranged generally at the point of intersection of a line projected from the feed plate in the plane thereof and a radius of the cylindrical cutting head at the point of tangency thereto of the projected line.

2. A self-feeding chipping machine comprising a cylindrical cutting head, longitudinal blades at the periphery of the cutting head, a feed plate arranged tangentially to the cutting head, and a bed knife having an edge for cutting cooperation with the cutting head knives, said bed knife edge being arranged in general at the point of tangency of the feed plate with the surface of the cutter head, whereby the cooperative cutting action thereof occurs generally at said point of tangency.

3. A self-feeding chipping machine comprising a cylindrical cutting head, longitudinal blades at the periphery of the cutting head, a feed plate arranged tangentially to the cutting head, and a bed knife having an edge for cutting cooperation with the cutting head knives, said bed knife edge being arranged in general at the point of tangency of the feed plate with the surface of the cutter head, whereby the cooperative cutting action thereof occurs generally at said point of tangency, said feed plate being flat and extending into sliding contact with a flat surface of the bed knife and hence closely adjacent to the cutter head.

4. A self-feeding chipping machine comprising a cylindrical cutting head, longitudinal blades at the periphery thereof, a flat feed plate arranged tangentially to the cutting head at the in-feed side of the machine, and a bed knife having an edge for cutting cooperation with the cutting head knives at the end of the feed plate, said bed knife edge being arranged very slightly in advance of the point of tangency of the bed plate with the surface of the cutter head, whereby the cooperative cutting action occurs immediately prior to the point of tangency.

5. A self-feeding chipping machine comprising a cylindrical cutter head, longitudinal blades arranged at the periphery thereof, gullets in said cutter head in advance of the cutter blades, a feed plate arranged tangentially relative to the cutter head and parallel to the axis thereof, a bed knife arranged at an angle to the feeding plate, said bed knife having a cutting edge arranged generally at the point of tangency of a projection of the feed plate with relation to the cutter head.

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