Nov. 19, 1940. A. HAUGE 2,222,073

FLOCK CUTTER

Filed Dec. 2, 1938

Fig. 1.

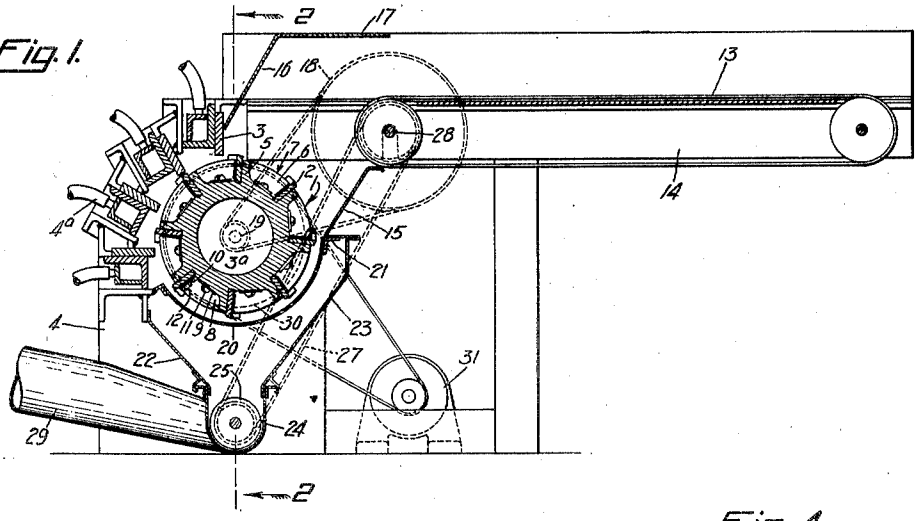


Fig. 2.

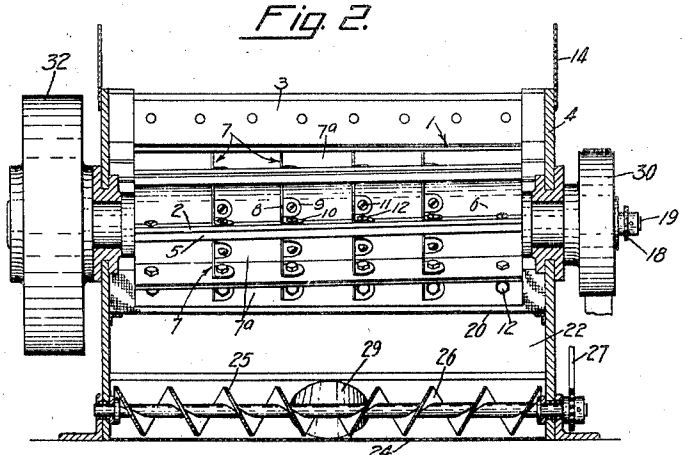
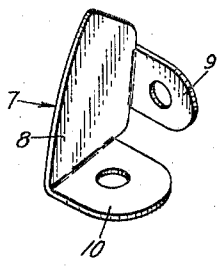


Fig. 4.



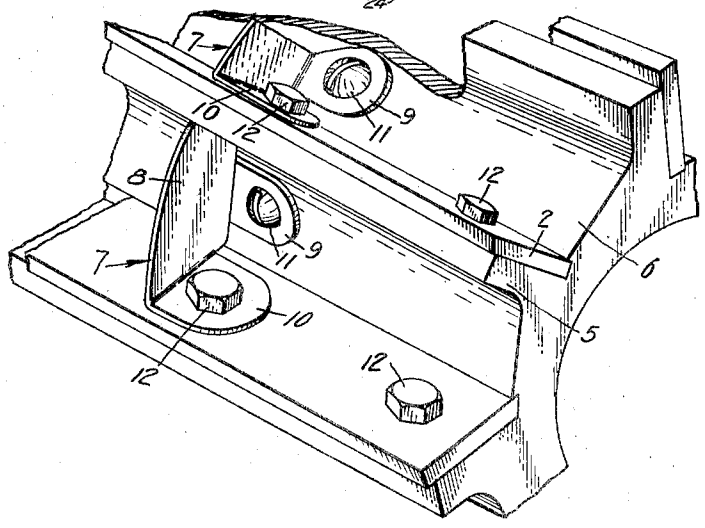


Fig. 3.

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2,222,073

UNITED STATES PATENT OFFICE

2,222,073

FLOCK CUTTER

Andrew Hauge, Claremont, N. H., assignor to Claremont Waste Manufacturing Company, a corporation of New Hampshire

Application December 2, 1938, Serial No. 243,583

16 Claims. (Cl. 83—6)

My invention relates to flock cutters.

It has among its objects to provide an improved flock cutting machine and, more particularly, an improved machine of the general type described and claimed in my Patent No. 2,145,176, issued January 4, 1939. A further object of my invention is to provide an improved machine of this type utilizing a single cutting cylinder and wherein the capacity of this cutting cylinder is materially increased at the same time that greater uniformity of product is obtained. A still further object of my invention is to provide such a machine having improved means for feeding and controlling the movement in the machine of the material acted upon by the rotary and stationary knives of such a machine, in such manner as to obtain the above improved results. Still other objects of my invention are to provide such a machine having improved baffle means operating in an improved manner to control the movement of the material as aforesaid, and also to provide such improved means spaced longitudinally from one another along the cylinder and herein on the cylinder and between the blades of the latter. Other objects of my invention also include the provision of improved feeding means adapted to supply flock to be cut to such a cylinder so equipped, and to provide improved means for maintaining the material to be cut in the path of the cylinder and subsequently separating out the fine material, all whereby the cylinder and cooperating stationary knives are enabled to operate effectively throughout their length, while improving the uniformity of the product and increasing the capacity of the machine. These and other advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In this drawing:

Figure 1 is a vertical longitudinal sectional view through a machine of my improved construction;

Fig. 2 is a transverse sectional view on line 2—2 of Figure 1;

Fig. 3 is an enlarged detail perspective view of one end of the cylinder showing certain baffle means thereon, and

Fig. 4 is a detail perspective view of one of the baffles.

In this illustrative construction, I have shown my improvements as applied to a machine of the general type described and claimed in my patent mentioned, but comprising only a single rotating cylinder 1 carrying spiral knives 2, and having a single series of stationary cooperating knives 3, herein four in number, arranged one above the other in the same general manner indicated in my patent mentioned, both the cylinder 1 and stationary knives 3 being carried on a suitable frame 4 and having water-cooled connections 3*a*, 4*a* of the type shown in said patent; my present improvements being directed to improved means for effecting and controlling the passage of the flock through the machine, whereby my improved results are obtained, all as hereinafter more fully described.

In my improved construction, improved means are provided to overcome the tendency of the material to travel toward one end of the cylinder as a result of the spiral shape of the knives 2. These means are herein in the form of baffles disposed in spaced relation from one another between the knives 2 on the cylinder 1. More particularly, it will be noted that the cylinder is provided with radial knife carrying abutments 5, each adjacent knife and abutment being spaced by a longitudinal groove 6, while transverse baffles, generally indicated at 7, are disposed in spaced relation along each of these grooves. As shown, these baffles 7 are fixed to the cylinder in such manner as to divide the cylinder into radially located series of longitudinally spaced compartments 7*a*, it being found that such baffles effectually retard the tendency of the material to move longitudinally toward one end of the spiral knives. It will also be observed that, herein, the baffles 7 are formed of metal and have a body portion 8 of substantially the dimensions of the cross section of the grooves 6, but disposed within the working edges of the knives 2 and so that, herein, they do not extend beyond the outer edges of the abutments 5. Further, it will be observed that these body portions 8 of the baffles are provided with lugs 9 and 10 extending laterally from adjacent edges thereof and in the same direction and suitably connected to the cylinder 1 and knives 3. Of these, the lugs 9 are herein suitably connected, as by screws 11, to the bottoms of the troughs 6, while the lugs 10 are connected to the knives 2 by certain of the screws 12 which clamp those knives in position. Herein, as in a preferred construction, note also that no baffles 7 are disposed adjacent the opposite ends of the cylinder, better results being obtained when the baffles are disposed in spaced relation to one another along the intermediate portion of the cyl-

inder, as shown. Further, while not limited to such particular number or arrangement, it will be observed that four such baffles are so provided in each groove in such manner as to produce three compartments in each groove, and that baffles are so disposed in each of the eight grooves in such manner as to produce a uniform construction all around the cylinder.

Operatively connected to feed material to be cut to the cylinder 1 throughout the entire length thereof, is also improved feed means. These means herein include an horizontal endless conveyor 13 mounted on a suitable frame 14 and herein delivering to the upper right hand quarter of the cylinder (see Fig. 1). It will also be observed that a wide feeding throat, herein comprising the sides of the frame 4 and spaced lower and upper throat members 15 and 16, is disposed between the inner end of the conveyor 13 and the adjacent surface of the cylinder; the throat portion 15 underlying the adjacent end of the conveyor and sloping downward and to the left toward the right hand side of the cylinder, while the throat portion 16 is correspondingly located above the fed material and leads to the upper knife 3, this portion 16 also being provided with a horizontal extension 17 spaced above and extending over the adjacent end of the conveyor. It being understood that the conveyor 13 is suitably driven as, for example, by a chain connection 18, from the shaft 19 of the cylinder 1, it will be evident that the material supplied to the machine will be delivered to the cylinder throughout the length thereof and in such manner as to supply material to the grooves 6 between the knives and the various compartments in the grooves which are formed by the baffles 7, as the cylinder rotates toward the knives 3.

Herein, improved means are also provided for retaining the cut material in the path of the rotating knives 2 until the material has been cut to the desired fineness, and then separating out the same. Herein, these means include a bottom screen 20 extending throughout the length of the cylinder and from adjacent the bottommost stationary knife 3 under and around the cylinder 1 to the bottom of the throat member 15, where both are suitably supported on a common transverse support, herein in the form of an angle iron 21. Note further that both this screen 20 and the space below the same are suitably enclosed in downwardly sloping removable closure members 22 and 23, which cooperate with the end members of the frame 4 to form a fine material receiving chamber. As shown, these members 22 and 23 herein also slope downward and deliver to screw conveyor means in a horizontal bottom trough 24, the lower ends of the members 22 and 23 being hooked over the opposite upper edges of the trough. As shown, the screw conveyor means in the trough includes oppositely feeding screw conveyors 25 and 26 driven by a chain connection 27 from the driving shaft 28 of the endless conveyor 13, while the discharge from the two conveyors 25 and 26 is withdrawn through a central lateral outlet 29, as, for example, by suitable suction means.

In my improved construction, the cylinder 1, which, in turn, drives the endless conveyor 13 and the screw conveyors 25 and 26 as above described, is preferably provided with a pulley 30 on one end of its shaft 19, this pulley, in turn, being driven from a suitable power source, as, for example, a motor 31, herein illustrated as disposed below the conveyor 13. In a preferred construction, a fly-wheel 32 is also preferably provided on the opposite end of this shaft 19 from the pulley 30, in order to assist in obtaining uniform action under all conditions.

In the operation of my improved construction, it is found that, as distinguished from an accumulation of material to be cut at one end of the spirally shaped cylinder knives, the material is very effectively distributed along the length of the cylinder. Thus, not only is the cutting capacity of the cylinder materially increased, but the material is cut with greater uniformity, in such manner as to produce a higher grade product. Moreover, the tendency of the knives to wear more at one end of the machine, with the resultant necessity for adjustments and sharpening, is minimized, thereby further increasing the production through reducing the time that the machine is idle. Attention, moreover, is directed to the fact that the feeding mechanism is such as to make it possible to supply the material to be cut, uniformly throughout the length of the cylinder, and in such manner that the cylinder is enabled to operate at capacity. Further, with the material distributed longitudinally of the cylinder and the stationary knives as herein, the water cooling of the cylinder and stationary knives in such manner as to keep this material below the igniting point is also markedly facilitated, the previous danger points of maximum temperature, arising from previous accumulations and maximum cutting at the ends, being eliminated. Obviously, the screw conveyor mechanism acting upon the material falling through the screen will also tend to keep the cut material chamber clear, while access may also be readily had to the screen upon removal of the members 22 and 23, whenever desired.

While I have herein specifically described one embodiment which my invention may assume in practice, it will be understood that the same is shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, an enclosing casing therefor including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and longitudinally fixed means disposed transversely to said knives and extending across the path of the axially fed cut material for preventing accumulation of said material by said knives at one end of said cylinder.

2. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and longitudinally fixed means disposed transversely to said knives at spaced points in the path of the axially fed cut material and engaging the latter at spaced points along the cylinder for retarding the normal axial movement of said cut material as fed by said spiral knives.

3. In a flock cutting machine, a rotary cutter carrying spirally disposed knives extending longitudinally of the axis of said cutter, casing means enclosing said cutter including cooperating stationary knives and wherein the cut material is

normally fed axially by said spiral knives, and means carried by said rotary cutter between the spiral knives thereon and disposed generally transversely of said knives and in the path of excess material tending to move longitudinally thereof for preventing excessive accumulation of material by said knives at one end of said cutter.

4. In a flock cutting machine, a rotary cutter carrying spirally disposed knives extending longitudinally of the axis of said cutter, casing means enclosing said cutter including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and material flow retarding means disposed transversely of and close to the cutting edges of said knives and across the path of excess material tending to move along the length of said knives for maintaining the material to be cut substantially uniformly distributed along the length of said knives.

5. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and longitudinally fixed means interposed in the path of the axially fed cut material for preventing accumulation of said material at one end of said cylinder due to the axial feeding action of said spiral knives comprising a series of baffle members disposed transversely of the axial path of said cut material and spaced from each other along said cylinder.

6. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and longitudinally fixed means interposed in the path of the axially fed cut material for preventing accumulation of said material at one end of said cylinder due to the axial feeding action of said spiral knives comprising a series of baffle members disposed transversely of the axial path of said cut material and spaced from each other along said cylinder, the end baffle members being substantially spaced from the ends of the cylinder.

7. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, an enclosing casing therefor including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, and means interposed in the path of the axially fed cut material for preventing accumulation of said material at one end of said cylinder due to the axial feeding action of said spiral knives comprising a series of baffle members spaced from each other along said cylinder and carried by the latter between the knives thereon.

8. In a flock cutting machine, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, means interposed in the path of the axially fed cut material for preventing accumulation of said material at one end of said cylinder due to the axial feeding action of said spiral knives comprising a series of baffle members spaced from each other along said cylinder and carried by the latter between the knives thereon, and means for connecting said baffle members to said cylinder including connecting elements also connecting said knives to said cylinder.

9. In a flock cutting machine, a cylinder carrying longitudinally extending spirally disposed knives and having longitudinal grooves between adjacent knives, stationary knives cooperating with said cylinder knives, and baffle members carried in said grooves and spaced from one another between adjacent cylinder knives, said baffle members bridging said grooves and dividing each of the latter into a series of compartments.

10. In a flock cutting machine, a cylinder carrying longitudinally extending spirally disposed knives and having longitudinal grooves between adjacent knives, stationary knives cooperating with said cylinder knives, and baffle members carried in said grooves and spaced from one another between adjacent cylinder knives, said baffle members being disposed transversely of said cylinder between adjacent knives and having lugs fixed to the bottom of said grooves and to certain of said knives.

11. In a flock cutter, a rotary cylinder carrying longitudinally extending spirally disposed knives, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, feeding means delivering to said cylinder, and means including material travel retarding elements located between said spiral knives and disposed across the axial path of said cut material and cooperating with said cylinder to form compartments filled by said feeding means for controlling the material delivered to said cylinder and maintaining the same distributed along the length of the cylinder during operation of the latter.

12. In a flock cutter, a rotary cylinder carrying longitudinally extending spirally disposed knives, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, feeding means delivering to said cylinder, means including spaced material travel retarding abutments carried by said cylinder between said spiral knives and disposed across the axial path of the cut material to form compartments filled by said feeding means and maintaining the fed material distributed along the length of the cylinder during operation of the latter, and screen means on the opposite side of said stationary knives from said feeding means and underlying said cylinder and receiving material in said compartments as said cylinder rotates and retaining said material in the path of said cylinder and knives until said material will pass through said screen means.

13. In a flock cutter, a rotating cutter carrying longitudinally extending spirally disposed knives, casing means enclosing said cutter wherein the cut material is normally fed axially by said spiral knives including cooperating stationary knives extending longitudinally of said cutter, means disposed substantially uniformly throughout the length of said knives for maintaining the material while operated upon below the igniting point, and means for obtaining during operation of said knives a substantially uniform distribution of said material for substantially uniform cutting by said knives along the length of the latter including barriers disposed transversely of said sets of knives and located between certain of the latter for retarding the normal axial flow of material along said cutter.

14. In a flock cutter, a rotary cylinder carrying longitudinally extending spirally disposed knives, casing means enclosing said cylinder including cooperating stationary knives and wherein the cut material is normally fed axially by said spiral knives, feeding means delivering to said cylinder, means for controlling the material delivered to said cylinder and maintaining the same substantially evenly distributed along the length of the cylinder during operation of the latter including baffle means located between said spiral knives and disposed normal to the axis of said cylinder, a screen below said cylinder through which the finished cut material escapes, and means for maintaining the material below the igniting point while in contact with said cylinder and stationary knives and within said screen.

15. In combination, an endless conveyor, a feeding throat receiving material therefrom, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder and exposed throughout its length in said throat, casing means enclosing said cylinder including cooperating stationary knives disposed over an upper portion of said cylinder beyond said throat and wherein the cut material is normally fed axially by said spiral knives, means for effecting substantially equal distribution of the material to be cut along the length of said cylinder including material retarding abutment means located between said spiral knives and disposed normal to the axis of said cylinder, and a screen disposed under said cylinder throughout the length of the latter and extending between one wall of said throat and the lower one of said stationary knives.

16. In combination, an endless conveyor, a feeding throat receiving material therefrom, a rotary cylinder carrying spirally disposed knives extending longitudinally of the axis of said cylinder and exposed throughout its length in said throat, casing means enclosing said cylinder including cooperating stationary knives disposed over an upper portion of said cylinder beyond said throat, means for effecting substantially equal distribution of the material to be cut along the length of said cylinder including material retarding abutment means located between said spiral knives and disposed normal to the axis of said cylinder, a screen disposed under said cylinder throughout the length of the latter and extending between one wall of said throat and the lower one of said stationary knives, a screw conveyor comprising oppositely delivering sections spaced beneath said screen, and material deflecting casing members disposed under said screen and each delivering to both of said conveyor sections.

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