May 21, 1968 H. J. EKLUND ET AL 3,384,311

WOOD CHIPPER

Filed July 26, 1966

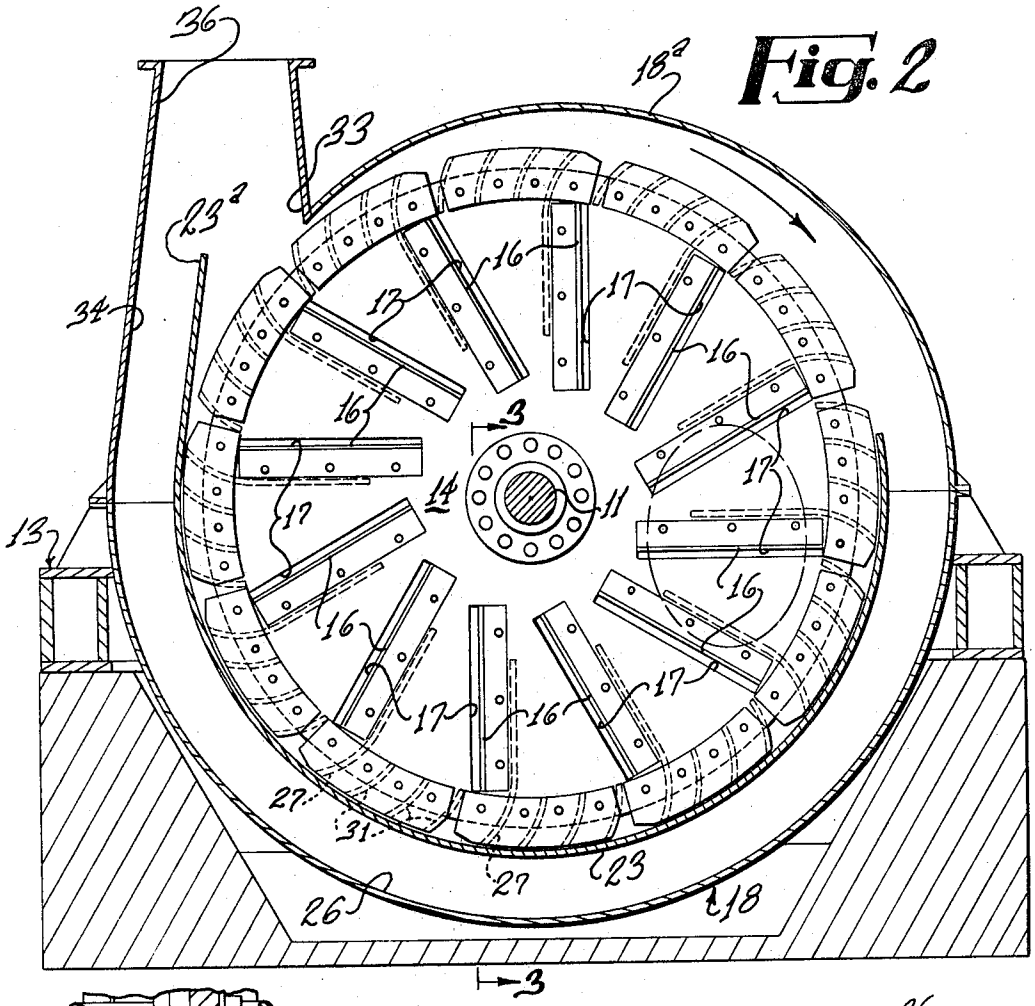

Fig. 2

Fig. 1

Fig. 3

Fig. 4

INVENTOR.
Henrik J. Eklund
Dean W. Shields
BY
Jennings, Carter & Thompson
Attorneys

United States Patent Office 3,384,311 Patented May 21, 1968

3,384,311

WOOD CHIPPER

Henrik J. Eklund, Pittsfield, Mass., and Dean W. Shields, Birmingham, Ala., assignors to Beloit Corporation, a corporation of Wisconsin

Filed July 26, 1966, Ser. No. 568,002
7 Claims. (Cl. 241—56)

This invention relates to a wood chipper and has for an object the provision of apparatus in which the chips are removed continuously from the chipper as they are cut by a combination of forces consisting of the kinetic energy possessed by the moving chips in a chip receiving chamber, and the blowing action of a moving stream of air adjacent the chips within the chip receiving chamber, and the blowing action of a blower which communicates with a plenum chamber that surrounds the chip receiving chamber and delivers air into engagement with the moving stream of chips as the chips are introduced into a discharge conduit.

A more specific object of our invention is to provide a rotary wood chipper in which an angular portion thereof, as viewed in the direction of rotation, serves as a blower for introducing air into the chip receiving chamber and the plenum chamber while another angular portion thereof performs the function of a chipper.

A further object of our invention is to provide a wood chipper of the character designated in which an effective blower and a plenum chamber therefor is provided outwardly of the chip receiving chamber and is so constructed that the chips do not enter the plenum chamber and are not engaged by the air conveyed therethrough until the chips enter the discharge conduit for the apparatus.

A still further object of our invention is to provide a wood chipper of the character designated which shall be extremely simple of construction, economical of manufacture and one in which all of the air and chip conveying blades are mounted at one side of a disc-like member which is positioned inwardly of an arcuate wall that separates the chip receiving chamber from the plenum chamber.

Briefly, our improved wood chipper embodies a rotary disc having angularly spaced knives and angularly spaced passageways therethrough, together with means to feed wood to one side of the disc whereby the wood is cut into chips which pass through the passageways to the other side of the disc. An outer housing surrounds said other side of the disc and is spaced radially and outwardly from the periphery of the disc. An arcuate wall section surrounds a portion of said other side of the disc inwardly of the outer housing to thus define a chip receiving chamber inwardly of the arcuate wall section and a plenum chamber between the arcuate wall section and the outer housing. Angularly spaced blades are carried by the disc in position to rotate within the arcuate wall section to convey chips through the chip receiving chamber and introduce air into the chip receiving chamber and the plenum chamber. Discharge outlets are provided for the chip receiving chamber and the plenum chamber whereby the air discharged from the plenum chamber engages the moving stream of chips discharged from the chip receiving chamber to thus aid in removing the chips from the chipper as they are cut, thereby eliminating carry-over of the chips.

Apparatus embodying features of our invention is illustrated in the accompanying drawing, forming a part of this application, in which:

FIG. 1 is a perspective view of the wood chipper;

FIG. 2 is an enlarged, vertical sectional view through the wood chipper;

FIG. 3 is a sectional view taken generally along line 3—3 of FIG. 2; and

FIG. 4 is a fragmental view taken generally along the line 4—4 of FIG. 3.

Referring now to the drawing for a better understanding of our invention, we show a power unit **10**, such as an electric motor, having a drive shaft **11**. Opposite ends of the drive shaft **11** are supported in a manner well understood in the art by bearing members **12**, only one of which is shown. The bearing members **12** are supported by a supporting frame **13**, as shown in FIG. 1.

Mounted on the shaft **11** and adapted for rotation therewith is a rotary disc **14** having a plurality of angularly spaced knives **16** mounted at one side thereof, as shown in FIG. 2. A plurality of angularly spaced through passageways **17** are provided adjacent the knives **16** whereby the wood cut into chips by the knives **16** passes through the passageways to the opposite side of the disc **14**.

Surrounding the other side of the disc **14** or the side thereof opposite the knives **16** is an outer housing **18**. As shown in FIGS. 2 and 3, the outer housing **18** is spaced radially and outwardly from the periphery of the disc **14**. As shown in FIG. 3, the outer housing **18** is provided with side walls **19** and **21** which are spaced from the shaft **11**. A centrally disposed inlet opening **22** is provided in the side wall **19** whereby air is drawn inwardly of the housing by means to be described hereinafter.

An arcuate wall section **23** surrounds a portion of the side of the disc **14** opposite the side thereof carrying the blades **16**. As shown in FIGS. 2 and 3, the arcuate wall section **23** is spaced inwardly of the outer housing **18** to define a chip receiving chamber **24** inwardly of the arcuate wall section **23** and a plenum chamber **26** between the arcuate wall section **23** and the outer housing **18**. That is, the chip receiving chamber is defined by the arcuate wall section **23**, the side wall **19** and the adjacent side of the disc **14**, as shown in FIG. 3.

Angularly spaced, radially extending blades **27** are secured rigidly to the side of the disc **14** opposite the side thereof carrying the knives **16** by suitable retaining bolts **28**. The outer ends of the blades **28** are curved outwardly in the direction of rotation of the disc **14**, as shown. Also, secured to each blade **27** is a plate-like member **29** which carries a plurality of angularly spaced blades **31** which are shorter in length than the blades **27**. The blades **27** are positioned closer to the passageways **17** than the relatively short blades **31**, as shown.

Wood W is fed to the side of the disc **14** carrying the blades **16** by a chute **32** whereupon it is cut into chips by the knives **16**. A tangential outlet **33** is provided for the chip receiving chamber **24** for discharging the chips, therefrom. Also, a circumferential outlet **34** is provided for the plenum chamber **26** adjacent and alongside the tangential outlet **33** for discharging air from the plenum chamber. Communicating with the outlets **33** and **34** is a discharge conduit **36** which receives the chips discharged through the tangential outlet **33** and the air discharged through the circumferential outlet **34** whereby the air discharged through the outlet **34** aids in conveying the chips through the discharge conduit **36**. As shown in FIG. 2, the discharge end of the plenum chamber **26** is directed inwardly toward the tangential outlet **33** whereby air discharged from the circumferential outlet **34** contacts the chips discharged through the outlet **33** at an angle to prevent channelling of the air.

The arcuate wall section **23** extends from a point adjacent the outlets **33** and **34** to the point that the wood W is fed to the disc, as shown in FIG. 2, whereby the chips pass through the chip receiving chamber **24** while air is forced through the plenum chamber **26**. The cir-

cumferential outlet **34** is separated from the tangential outlet **33** by a continuation **23a** of the arcuate wall section **23** whereby the air discharged from the plenum chamber **26** does not engage the chips until they are introduced into the discharge conduit **36**. Also, as shown in FIG. 2, the portion of the outer housing **18** extending in advance of the arcuate wall section **23** and between the tangential outlet **33** and the arcuate wall section **23** is involute in shape as at **18a** whereby the upper half of the apparatus shown in FIG. 2 serves as a blower to introduce air into the chip receiving chamber **24** and into the plenum chamber **26**. On the other hand, the lower half of the apparatus shown in FIG. 2 performs the function of a wood chipper. Accordingly, the portion of the outer housing **18** and the portion of the arcuate wall section **23** extending from a point adjacent the tangential outlet and the circumferential outlet to the point that wood is fed into the disc **14** is generally circular, as shown.

From the foregoing description, the operation of our improved wood chipper will be readily understood. Wood W is fed into the chute **32** whereupon it is cut into chips by the knives **16**. The chips pass through the openings **17** into the chip receiving chamber **24**. As the disc **14** is rotated, air is drawn inwardly of the housing **18** by the angularly spaced blades **27** and **31**. Since the upper portion of the apparatus shown in FIG. 2 is free of chips and is surrounded by the involute section **18a** of the outer housing **18**, this portion of the apparatus operates as a blower to introduced air into the plenum chamber **26** and to introduce air into the chip receiving chamber **24** for conveying the chips therethrough and then outwardly through the tangential outlet **33**.

The chips are conveyed through the chip receiving chamber **24** by the kinetic energy possessed by the moving chips and by the air drawn inwardly of the chip receiving chamber through the inlet opening **22**. Due to the fact that the arcuate wall section **23** is circular, the blades **27** and **31** remain relatively close to the inner surface thereof, as shown in FIG. 2, thereby preventing the chips from entering the small space between the arcuate wall and the blades. As the chips are discharged from the tangential outlet **33**, they are engaged by the air discharged from the plenum chamber **26** through the outlet **34** whereby this air aids in conveying the chips through the discharge conduit **36**. Since the arcuate wall section **23** is provided with an extension **23a** which separates the outlets **33** and **34** from each other, the air discharged through the circumferential outlet **34** does not engage the chips until they are introduced into the discharge conduit **36**.

From the foregoing, it will be seen that we have devised an improved wood chipper which is extremely simple of construction and one in which an angularly disposed portion thereof serves as a blower for introducing air into the chip receiving chamber and the plenum chamber while another angularly disposed portion thereof performs the function of a wood chipper. By providing the arcuate wall section **23** which separates the wood receiving chamber from the plenum chamber, we not only provide an efficient blower which aids in conveying the chips, but also provide a compact, centrally disposed chip receiving chamber which is positioned close to the chip conveying blades, thereby preventing the chips from passing between the conveying blades and the arcuate wall section. Furthermore, by providing a plenum chamber outwardly of the chip receiving chamber and the arcuate wall therebetween, a common blower unit is employed for both the plenum chamber and the chip receiving chamber.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and we desire, therefore, that only such limitations shall

be placed thereupon as are specifically set forth in the appended claims.

What we claim is:

1. In a wood chipper embodying rotary disc having angularly spaced knives and angularly spaced passageways therethrough together with means to feed wood to one side of the disc whereby the wood is cut into chips which pass through the passageways to the other side of the disc,

(a) an outer housing surrounding said other side of the disc and spaced radially and outwardly from the periphery of the disc,

(b) an arcuate wall section surrounding a portion of said other side of the disc inwardly of said outer housing to define a chip receiving chamber inwardly of said arcuate wall section and a plenum chamber between said arcuate wall section and said outer housing,

(c) angularly spaced blades carried by said other side of the disc and disposed to rotate within said arcuate wall section with a relatively close fit to convey chips through said chip receiving chamber,

(d) a tangential outlet for said chip receiving chamber for discharging chips therefrom,

(e) a circumferential outlet for said plenum chamber adjacent and alongside said tangential outlet for discharging air therefrom,

(f) said arcuate wall section extending from a point adjacent said tangential outlet and said circumferential outlet to the point that wood is fed to the disc so that the chips pass through said chip receiving chamber while air is forced through said plenum chamber, and

(g) a discharge conduit communicating with said tangential outlet and said circumferential outlet to receive chips discharged through said tangential outlet and air discharged through said circumferential outlet whereby the air discharged through said circumferential outlet aids in conveying the chips through said discharge conduit.

2. In a wood chipper as defined in claim **1** in which the disharge end of said plenum chamber is directed inwardly toward the tangential outlet whereby air discharged from said circumferential outlet contacts the chips discharged through said tangential outlet at an angle.

3. In a wood chipper as defined in claim **1** in which the circumferential outlet is separated from the tangential outlet by a continuation of said arcuate wall section whereby the air discharged from the plenum chamber does not engage the chips until they are introduced into the discharge conduit.

4. In a wood chipper as defined in claim **1** in which a plurality of said angularly spaced blades extend radially between adjacent angularly spaced passageways.

5. In a wood chipper as defined in claim **4** in which the blades nearest the trailing edges of said angularly spaced passageways extend inwardly of the other blades.

6. In a wood chipper as defined in claim **1** in which the portion of the outer housing extending in advance of said arcuate wall section and between said tangential outlet and said arcuate wall section is involute in shape.

7. In a wood chipper as defined in claim **1** in which the portion of said outer housing and the portion of said arcuate wall section extending from a point adjacent said tangential outlet and said circumferential outlet to the point that wood is fed to the disc is generally circular.

References Cited

UNITED STATES PATENTS

1,697,925	1/1929	McKay	146—107
3,123,311	3/1964	Fontaine	241—278
3,346,027	10/1967	Kirsten	144—176

GERALD A. DOST, *Primary Examiner.*