Nov. 10, 1970 C. G. JOA 3,538,551

DISC TYPE FIBERIZER

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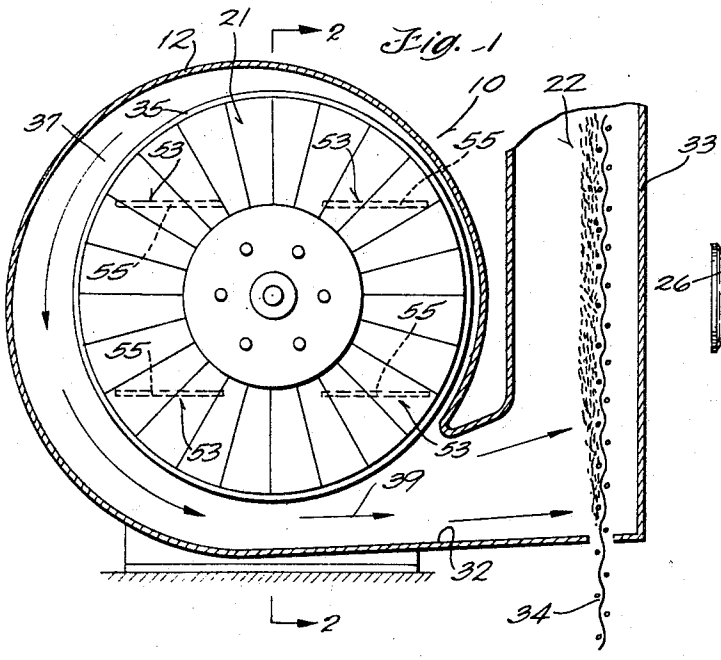

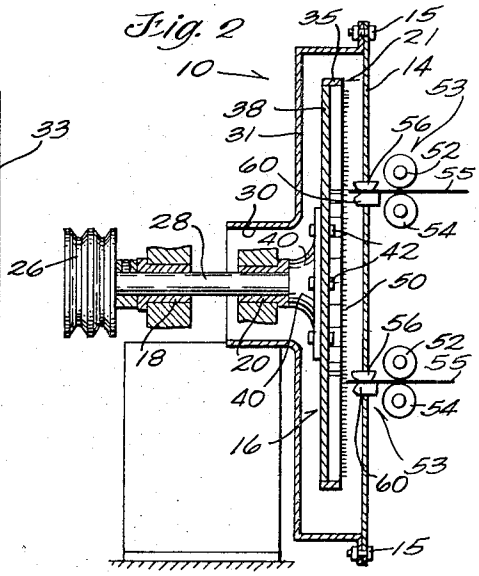

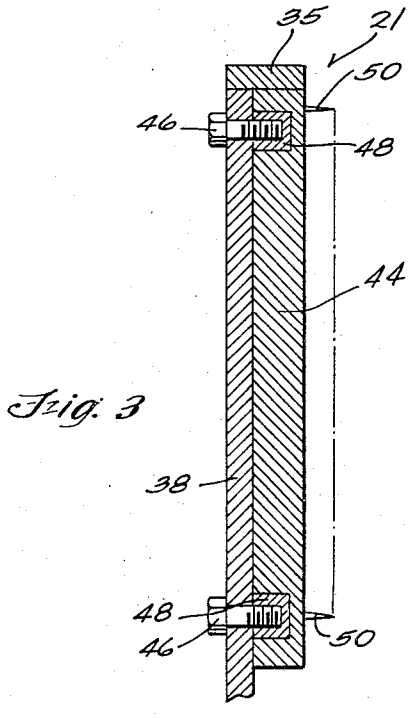

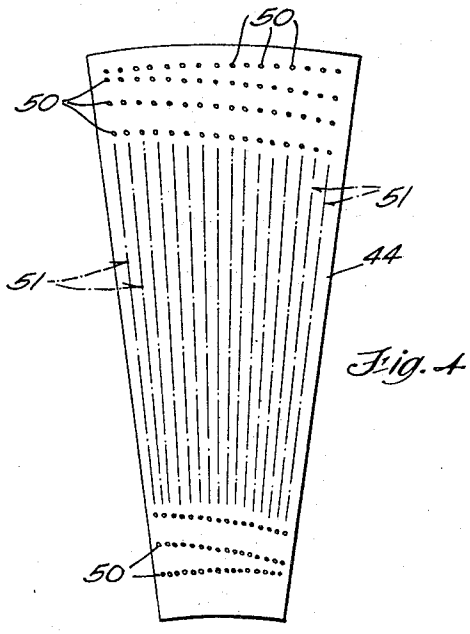

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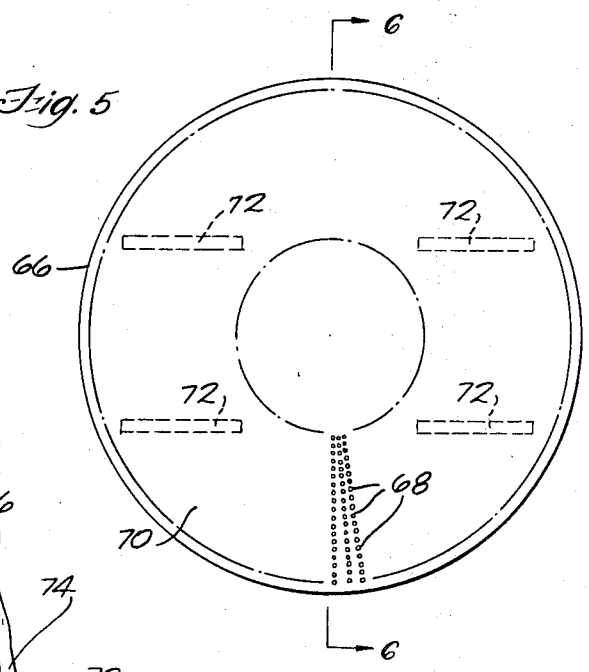
Fig. 5



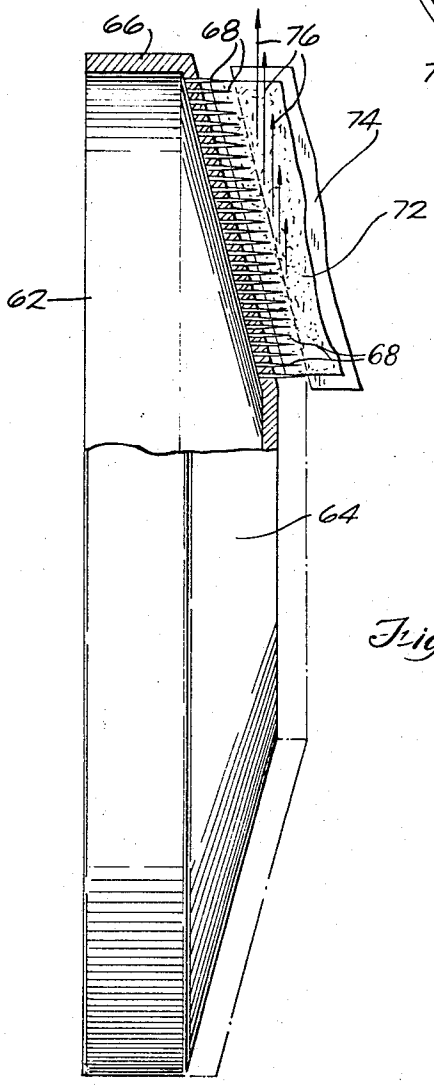


Fig. 6

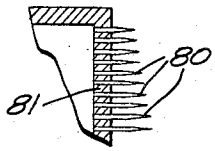


Fig. 7

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DISC TYPE FIBERIZER

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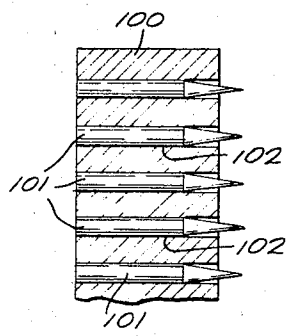
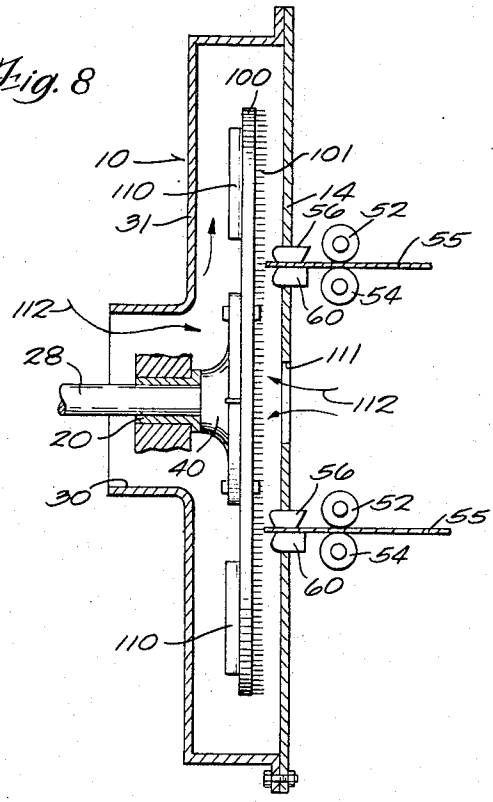


Fig. 9

Fig. 8



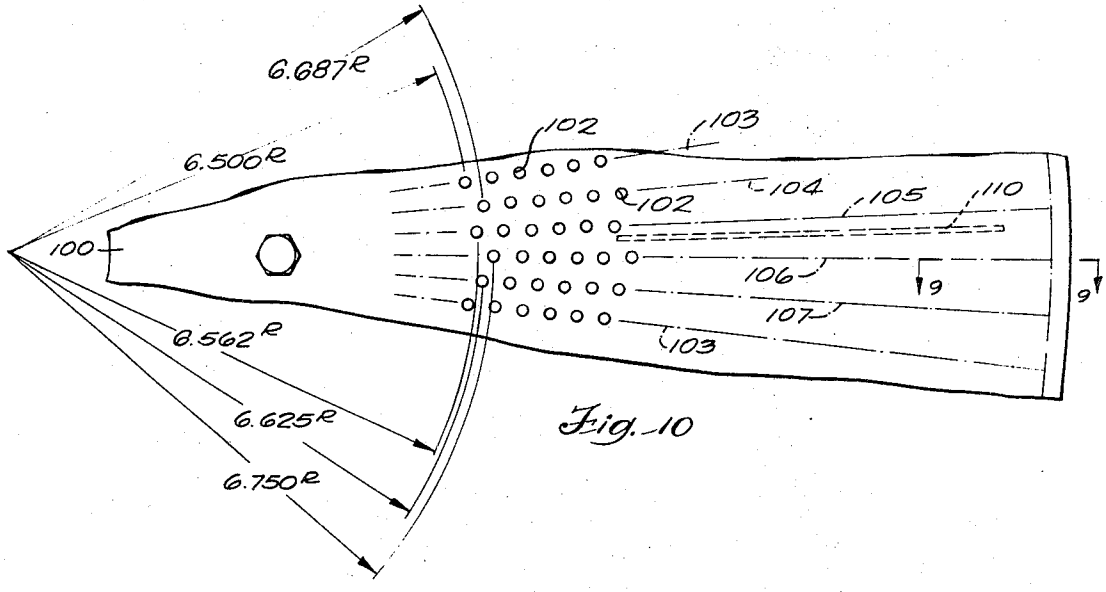


Fig. 10

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DISC TYPE FIBERIZER

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Filed May 15, 1968, Ser. No. 729,249
Int. Cl. D01g 11/00
U.S. Cl. 19—83 7 Claims

ABSTRACT OF THE DISCLOSURE

Disclosed herein is a wood pulp fiberizer which includes a disc having a plurality of outwardly directed pins on one surface. The disc is mounted in a housing for rotation in a plane transverse to the direction of motion of a web of wood pulp, and in close proximity to the points of entry of the webs into the housing so that the pins will pick the wood fibers from the web.

BACKGROUND OF THE INVENTION

As indicated in my earlier United States Pat. No. 3,268,954, issued Aug. 30, 1966, wood pulp is generally shipped in the form of webs which have been compacted under calendaring pressure. It is desirable that the wood fibers in the compacted webs be separated from the web with a minimum of damage to the fiber, thus to preserve the fiber in relatively long lengths for use in an absorbent batting. This was accomplished in my prior patent by feeding such a web against a cylindrical drum having a number of radially directed pins on its outer surface.

SUMMARY OF THE INVENTION

The invention relates to an improved fiberizer of the type shown in my prior patent aforesaid, and more specifically to a rotary disc type fiberizer having a plurality of axially direction pins which removes wood fibers from a web of wood pulp. The axial disposition of the pins militates against their being thrown out of the disc by centrifugal force.

In one embodiment of the invention the pins are embedded in a plurality of slats mounted on the face of the disc. The slats are secured to the disc by a number of axially aligned bolts that are screwed into nuts embedded in the back of the slats. The bolts will thus be subjected only to shear forces as the disc is rotated. A rim is mounted on the outer peripheral surface of the disc to limit the effect of centrifugal force on the bolts. In another embodiment of the invention the disc is continuous. Its face may be plane or flat, or in the form of a frustum of a cone.

A number of feed stations are positioned to feed webs of wood pulp toward the face of the disc. The feed stations are desirably inclined at an angle to the disc radius. Accordingly, the pins will progressively engage the webs to thereby reduce noise as the fibers are progressively removed from the web. To avoid any tendency for the fibers to be fragmented due to reengagement of the fibers with the pins as the fibers are thrown outward across the face of the disc, the pins may be aligned with a line that tapers back from the center of the disc toward the outer edge of the disc. The fibers picked from the web will then have an unobstructed radial path and will not be fragmented after being picked from the web. The cone frustum embodiment is particularly suited to achieve this advantage.

Other objects, features, and advantages of the invention will appear from the following disclosure.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of one embodiment of the fiberizer with the housing removed to show the disc.

FIG. 2 is a cross section taken on line 2—2 of FIG. 1.

FIG. 3 is an enlarged view of a section of the disc of the FIG. 1 embodiment, showing the mounting for one of the slats on the disc.

FIG. 4 is a front view of one of said slats, showing the location of the pins on the disc.

FIG. 5 is a front view of a modified embodiment having a frusto conical disc having tapered pin supporting surfaces.

FIG. 6 is a very partly in side elevation and partly in cross section taken on the line 6—6 of FIG. 5 showing the taper of the pin supported surfaces.

FIG. 7 is a fragmentary view similar to FIG. 6 and showing a still further modification.

FIG. 8 is a cross section similar to FIG. 2, but of another embodiment having a continuous disc with planer face.

FIG. 9 is an enlarged cross section through a portion of the disc of FIG. 8.

FIG. 10 is a fragmentary face view of the disc of FIG. 8.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Although the disclosure hereof is detailed and exact to enable those skilled in the art to practice the invention, the physical embodiments herein disclosed merely exemplify the invention which may be embodied in other specific structure. The scope of the invention is defined in the claims appended hereto.

Referring first to the embodiment of FIGS. 1–4, housing **10** for the fiberizer is shown as having a fan type peripheral casing **12** that increases in radius toward outlet **32**. A centrally disposed inlet **30** is provided on the back **31** of the housing to allow for the admission of air into the housing. The front of the housing is closed by a removable front plate **14** that is secured to the housing by bolts **15**.

A shaft **28** is axially aligned in the inlet opening **30** and is journaled for rotation in bearings **18** and **20**, shown mounted on fixed supports. A drive sheave **26** is secured to one end of the shaft, and a hub **40** is secured to the other end of the shaft **28**. A disc support plate **38** is secured to the hub by bolts **42** and a number of radially extending sector shaped disc forming slats **44** are secured to the face of the plate **38** by bolts **46**. Bolts **46** are screwed into nuts **48** embedded within the slats. Twenty-four slats **44** are shown in the drawing, but any appropriate number can be used to make up a complete circle. The plate **38** and slats **44** together constitute a pin supporting disc **21**. Any type power source can be used to rotate the shaft through the sheave **26**.

As the disc **21** rotates (in the direction of arrow **37** in FIG. 1) within the housing **12**, a radial force will be imposed on the slats **44** due to centrifugal force which imposes a shear force on the bolts **46**. To minimize the effect of this force on the slats, a continuous annular rim **35** is secured to the outer edge of the disc **21** and overhanging the outer periphery of the slats **44**, thus to contain such centrifugal forces.

A plurality of picker pins **50** are embedded in the face of the slats **44**. One embodiment of pin arrangement is shown in FIG. 4. The pins in each row **51** are slightly radially offset from the pins in the next row **51**, thus to provide a pattern of staggered pin contact with the pulp sheets or webs **55** as the disc **21** rotates. This arrangement avoids the establishment of lines in the web **55** and assures an even removal of wood fiber from the web. In-

asmuch as the pins are mounted normal to the direction of movement of the disc **21**, they will not be subject to any axial forces which would tend to pull the pins out of the slats. The pins take all centrifugal force in shear.

Several feed stations **53**, opening through the front housing face **14**, are provided at which pulp webs **55** are fed concurrently against the face of the disc **21** by means of sets of paired feed rolls **52** and **54** disposed at each feed station at various locations through the front plate of the casing. Each web **55** is fed past a breaker bar **56** located close to the face of the disc. A clamping bar **60** is used to hold the web in close proximity to the breaker bar. Four feed stations **53** are shown in the disclosed embodiment but additional stations can readily be provided if desired.

In FIG. 2 the breaker bars **56** are shown on top of the web inasmuch as the portion of the disc **21** shown in FIG. 2 will be moving upward past the feed stations **53**. The two feed stations **53** on the left of FIG. 1 have the breaker bars **56** located at the undersurface of the web with the clamping bar **60** at the top, inasmuch as the disc **21** will be moving downward past these two feed stations. The nose of the breaker bar **56** is rounded to aid in breaking the wood fibers loose from the web as the pins pick the fibers from the webs.

As each fiber is removed from the web it will be thrown outward toward the side wall of the casing **12** and will be carried around the casing and be blown out through outlet **32** into vacuum belt housing **33**. The fan action of the disc **21** as it is rotated within the housing and suction in housing **33** will provide sufficient air flow to pneumatically convey the wood fibers along the path of arrow **39**. The wood fibers are picked up by a screen type belt **34** to form a batt **22**. As described in my previous U.S. Pat. No. 3,268,954, air drawn through the screen belt **34** by a suction fan will hold the batt **22** on the belt **34** as it moves upward in the housing.

In the operation of the fiberizer, it is generally preferred that a plurality of superposed, separately fabricated webs or plies of pulp board are fed concurrently through the feed stations **53** into the face of the disc **21**. As the disc **21** rotates, the staggered pins **50** will progressively pick the wood fibers from the composite web. The feed stations are arranged in angularly offset relation to radial lines drawn outward from the axis of the disc so that the pins in each row on the slats progressively engage the webs and thereby reduce the noise level.

In FIGS. 5 and 6 a modified fiberizer embodiment is shown which provides an unobstructed path for the fibers after the fibers have been picked from the web **72** and are in the course of being thrown outward against the casing **12**. Instead of the slat type of disc **21** of the previous embodiment, these figures show a continuous disc **62**. Disc **62** has a face **64** shaped in the form of a frustum of a cone, with a skirt **66** secured to its outer periphery. A plurality of axially extending pins **68** of substantially equal length are press fitted into the frusto conical disc surface **64**.

A web **72** of matted wood fiber is fed toward the disc face **64** over a breaker bar **74** that has its leading edge slanted to conform to the taper of the confronting complementary ends of the pins **68**. As the disc **62** is rotated, wood fibers that are picked from the web **72** by the pins will be thrown radially outward by centrifugal force toward the casing **12**. As seen in FIG. 6, the paths **76** of the fibers released from inboard portions of the web by the pins **68** which are near the center of the disc are clear of the ends of the pins **68** disposed radially outwardly thereof near the periphery of the disc. Accordingly, then fibers will not be repeatedly subject to pin action to reduce the fibers to undesirably short lengths.

Another alternate arrangement to reduce fragmentation of the fibers is shown in FIG. 7 in which pins **80** of progressively increasing length are mouned on a planer

disc **81**. The longer pins are located near the center of the disc **81**, and the shorter pins are located near the outer edge of the disc. The ends of the pins will then provide a tapered effect in substantially the same manner as shown for the ends of the pins in FIG. 6.

FIGS. 8, 9 and 10 show a still further modified embodiment of the invention in which the disc **100** has a plane or flat face. The pins **101** are embedded in the disc **100** as shown in FIG. 9.

As best shown in FIG. 10, there are repeating patterns of staggered or radially offset pin holes **102** to receive the pins **101**. These pin holes are arranged in the embodiment of FIG. 10 in radially extending rows **103**, **104**, **105**, **106**, **107**. Successive pin holes **102** in each row are spaced 5/16" apart. However, the holes in one row are radially staggered or offset from the holes in adjacent rows, so that the web will be "picked" at different places across its width as the disc **100** rotates past the web. The spacing for one embodiment is indicated in the drawing.

In this embodiment the disc **100** is mounted in a casing **10** in the same manner shown in FIG. 2, and the various corresponding parts are given the same reference characters.

FIG. 8 also illustrates an arrangement in which the rear face of the disc **100** may be provided with air flow inducing vanes **110** which will increase flow of air radially within the housing **10**. Moreover, the front plate **14** of the housing **10** may be provided with a central opening **111** through which air may be drawn as indicated by the arrows **112**.

As in the previously described embodiments, the pins **110** resist in shear the centrifugal force generated by the rotating disc **100**.

I claim:

1. A wood pulp fiberizer comprising a fan type housing having front and rear faces, a number of feed station openings through the front face and means for feeding webs of pulp wood through said openings and into said housing, a disc mounted to rotate in said housing between said faces and in close proximity to webs fed into said housing on a path transverse to the direction of infeed motion of said webs, a number of pins projecting from the surface of said disc to fiberize said webs as they are fed into said housing, said pins having their axes transverse to the direction of centrifugal force generated by rotation of the disc whereby to oppose said force in shear, and an air inlet opening near the axis of disc rotation and through at least one of said faces, air admitted through said opening being impelled by said disc to pneumatically convey fibers along said housing.

2. The invention of claim **1** in which the disc is provided on its side opposite the pins with air flow inducing vanes.

3. The invention of claim **1** in which the said surface of the disc is in the form of a frustum of a cone, whereby fibers centrifugally discharged from pins near the center of the disc will not impinge pins spaced outwardly therefrom.

4. The invention of claim **1** in which pins near the periphery of the disc are offset rearwardly from those near the center of the disc, whereby fibers centrifugally discharged from pins near the center of the disc will not impinge pins near the periphery of the disc.

5. The invention of claim **1** in which said disc comprises a series of removable slats in which the pins are mounted, a backup plate and axially extending bolts securing the slats to the plate.

6. The invention of claim **5** in which said disc includes a peripheral rim which projects over the slats to contain centrifugal force imposed thereon.

7. The invention of claim **1** in which said pins are mounted in rows in which the pins are staggered.

5

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U.S. Cl. X.R.

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