Oct. 19, 1943. F. A. VON OSTEN 2,331,943

TEXTILE DISINTEGRATING MACHINE

Filed Feb. 7, 1941 4 Sheets-Sheet 1

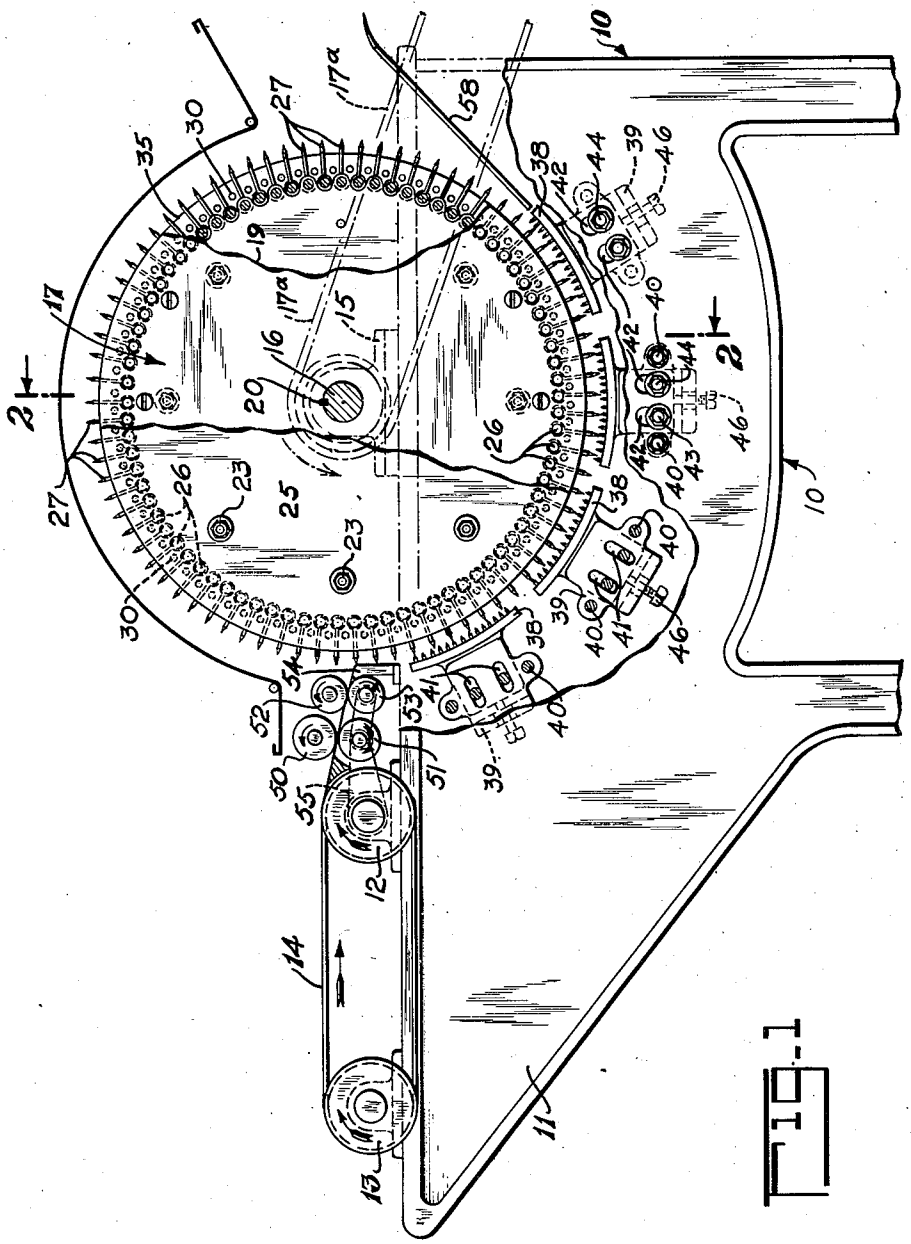


FIG. 1

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TEXTILE DISINTEGRATING MACHINE

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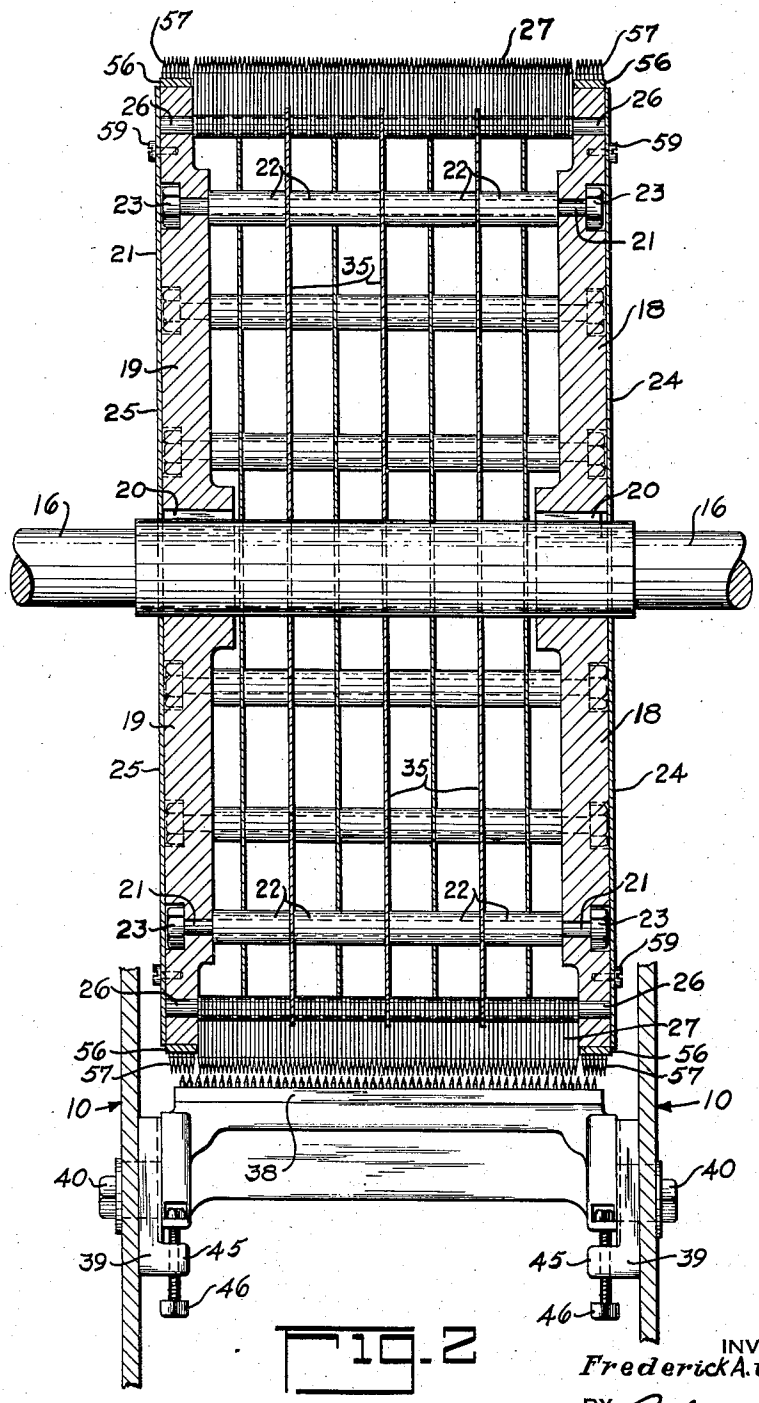


FIG. 2

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TEXTILE DISINTEGRATING MACHINE

Filed Feb. 7, 1941 4 Sheets-Sheet 3

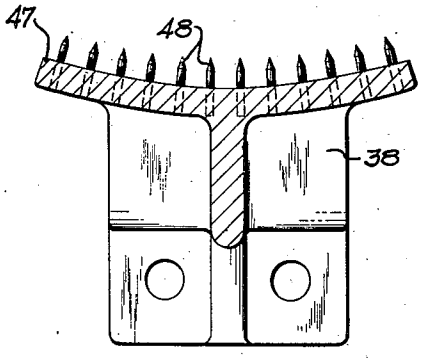


FIG. 9

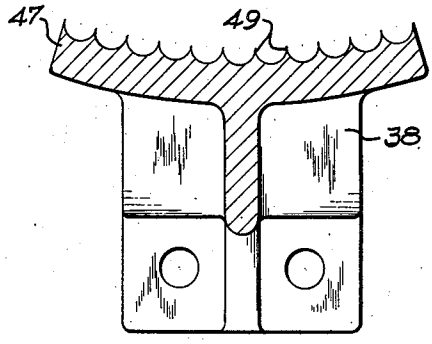


FIG. 10

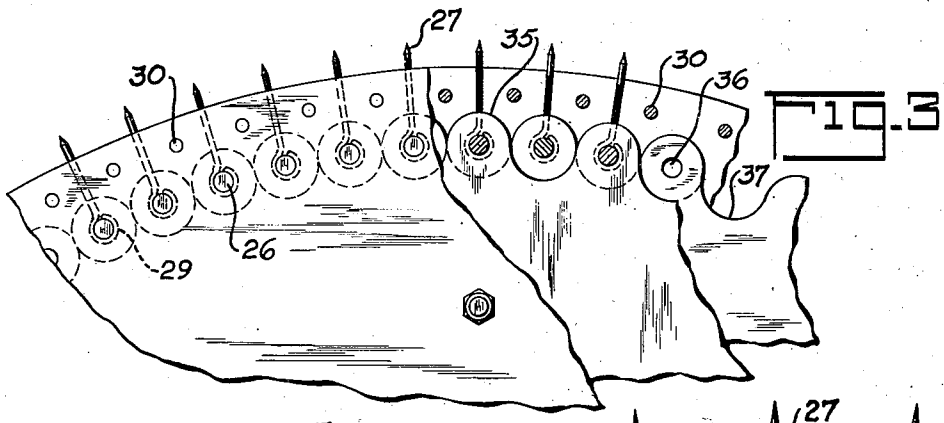


FIG. 3

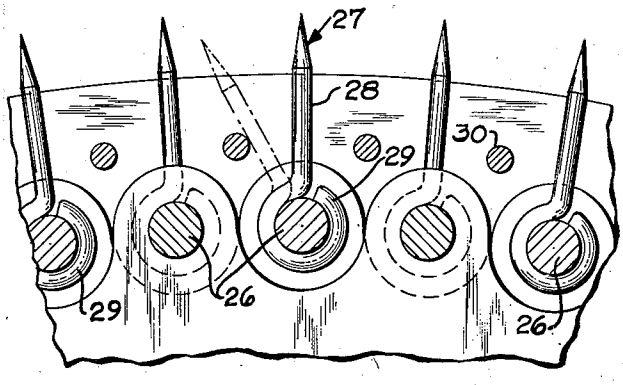


FIG. 3A

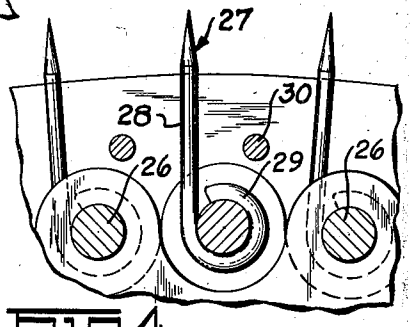


FIG. 4

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TEXTILE DISINTEGRATING MACHINE

Filed Feb. 7, 1941 4 Sheets-Sheet 4

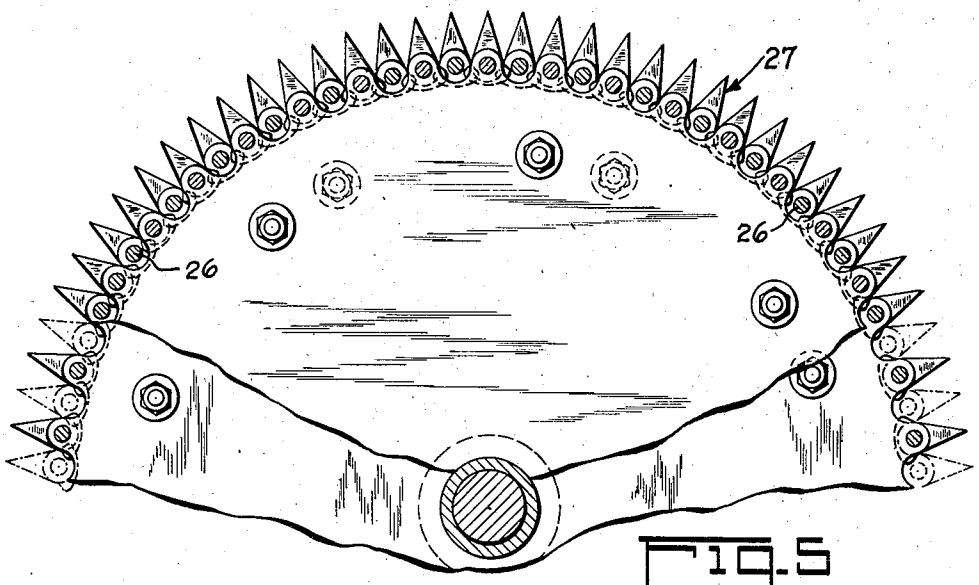


Fig. 5

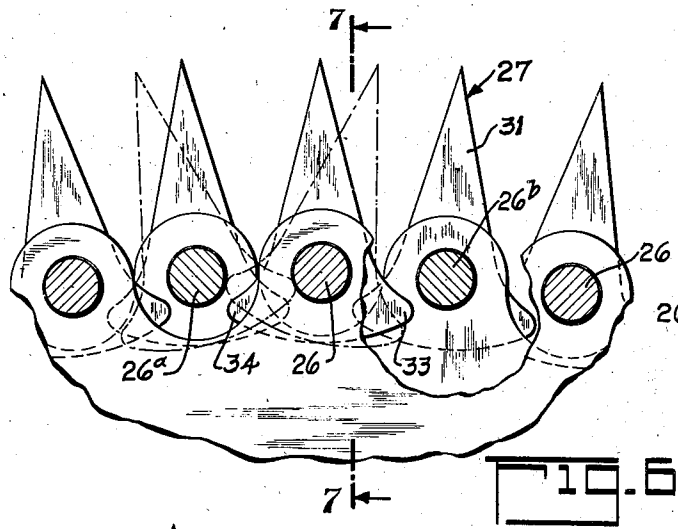


Fig. 6

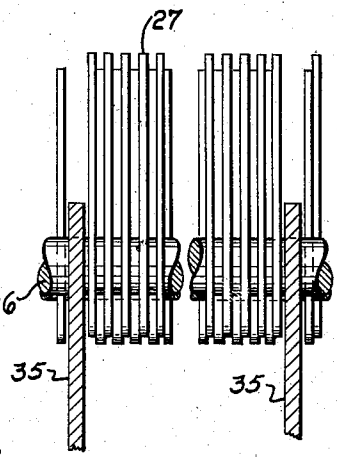


Fig. 7

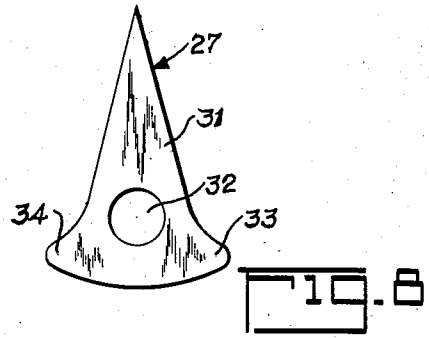


Fig. 8

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Patented Oct. 19, 1943

2,331,943

UNITED STATES PATENT OFFICE

2,331,943

TEXTILE DISINTEGRATING MACHINE

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Application February 7, 1941, Serial No. 377,789

7 Claims. (Cl. 19—97)

This invention relates to textile disintegrating machines and, more particularly, to a textile disintegrating machine for disintegrating textile waste and scrap in a manner to produce lint of long staple fiber.

An object of the present invention is to provide a textile disintegrating machine which will tease out the fibers of scrap cloth, yarns, cards, and other fibrous material and produce a lint, the fibers of which are unbroken by the disintegrating operation and have a long staple quality, in such a manner that the lint is free of undisintegrated pieces of material.

Another object of this invention is to provide a textile disintegrating machine which will draw out or parallel the fibers of scrap cloth and other fibrous material in such a manner that the fibers thusly teased out will be free from knots and in condition for later spinning.

A further object of this invention is to provide a textile disintegrating machine having a teasing element possessing a comparatively long life, which will thoroughly disintegrate fibrous material.

Another object of this invention is to provide a textile disintegrating machine which may be adjusted to accommodate fibrous material of various thicknesses, classes and types, so that a lint will be obtained therefrom, which lint will have fibers of a long staple quality, unbroken by the disintegrating action of the machine.

A still further object of the invention is to provide a teasing roll of novel construction for a disintegrating machine.

Other objects of the invention will become apparent in the course of the following specification.

The above and other objects of this invention are accomplished by providing a textile desintegrating machine having a frame with a teasing roll comprising side members fixed upon a shaft rotatably mounted in said frame, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, teasing elements comprising a plurality of pins of a rigid material pivotally mounted in groups in longitudinal extension on said carrying rods, the free ends of said pins projecting outwardly, annular spacer plates longitudinally spaced between said side members, said spacer plates being mounted adjacent the periphery thereof on alternate carrying rods and recessed therebetween to separate the pins on said alternate rods only into groups, bed plates adjacent the periphery of said roll having projections thereon, extending toward said roll, said plates being adjustably mounted in said frame to move said projections toward and away from said roll, and means adjacent the surface of said roll for feeding the material to be disintegrated into contact with said teasing elements.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings, showing by way of example a preferred embodiment of the invention.

In the drawings:

Figure 1 is a side elevational view of the disintegrating machine of this invention, having portions of the frame broken away;

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a fragmentary view of a portion of the teasing roll of said machine;

Figure 3A is an enlarged fragmentary view of the mounting of the picker pins on said teasing roll;

Figure 4 is a fragmentary view showing a picker pin having an offset shank;

Figure 5 is a side elevational view of the teasing roll of said machine, having a modified type of picker pin thereon;

Figure 6 is an enlarged fragmentary view of said teasing roll with said modified pin mounted thereon.

Figure 7 is a sectional view taken on the line 7—7 of Figure 6;

Figure 8 is an elevational view of said modified picker pin;

Figure 9 is a vertical sectional view of a preferred embodiment of the bed plate of this invention; and

Figure 10 is a vertical sectional view of a modified form of a bed plate for the disintegrating machine of my invention.

Like numerals refer to like parts throughout the several views.

Referring to Figure 1 of the drawings, the side frame of the machine is designated by the reference numeral 10. The side frame 10 has an extension 11 on one end thereof, said extension having rotatably mounted thereon transversely extending longitudinally spaced rollers 12 and 13 over which passes an endless apron 14, said rollers being driven from any suitable source of power. Journaled in bearings 15, on the side frames 10, is a main shaft 16 having mounted for rotation therewith a novel type of teasing roll 17 herein-

after fully described, said shaft being adapted for rotation from a desired source of power by means of a chain or belt 17a.

The disintegrating or teasing roll 17 is composed of opposite side members 18 and 19 fixed upon the shaft 16, preferably by means of keys 20. The side members 18 and 19 are held in spaced relation to one another by means of spacer rods 21, having a plurality of sleeves 22 positioned thereon. The ends of the spacer rods 21 are screw-threaded to receive nuts 23, so that the side members may be removed from the spacer bars, if so desired. A covering plate 24 is provided to cover the side member 18, while a covering plate 25 is provided to likewise cover the side member 19.

Mounted in the side members 18 and 19 in inwardly spaced relation to the periphery of the same is a plurality of carrying rods 26 which extend between the side members and are disposed in an annular row about the axis of the roll 17. Pivotally mounted on the carrying rods 26 is a plurality of picker pins 27 which extend longitudinally between the side members 18 and 19. The picker pins 27 are of a rigid material, each having a shank 28, pointed at its outer end, which end projects beyond the periphery of the side members. The inner end of the shank 28 has formed thereon an eye 29 adapted to movably fit on the carrying rods 26. In this manner, the picker pins 27 may swing or pivot on the carrying rods, as shown in dot and dash lines in Figure 3A of the drawings. The shank 28 preferably extends from the central portion of the eye 29, as shown in Figure 3A of the drawings. However, the shank 28 may be offset in respect to the eye 29, as shown in Figure 4 of the drawings.

When the machine is used for disintegrating a thick material, such as, for example, carpet, which material offers a great resistance to the picker pins 27, stop rods 30 are used to limit the pivotal movement of the pins 27. The stop rods 30 are mounted in and extend between the side members 18 and 19. The stop rods are positioned so as to be located between each row of picker pins and be engaged by the shanks 28 thereof thereby limiting the pivotal or oscillating movement of the pins.

The stop rods 30 are not necessary when a thin material offering little resistance, such as silk, is being disintegrated. The centrifugal force caused by rotation of the teasing roll 17 acts to prevent the picker pins from pivoting too great a distance away from the cloth and insures sufficient contact between the points of the picker pins 27 and the cloth.

Stop rods may be eliminated even when it is desired to disintegrate a thick material, such as carpeting, by the use of a modified form of picker pin 27, as illutrated in Figures 5 to 8, inclusive, of the drawings. The modified form of picker pin has an angular-shaped shank 31 pointed at the top thereof. The picker pin is made of a rigid material, preferably of sheet metal, and is not flexible and will not bend. Adjacent the opposite end of the pin is an aperture 32 of sufficient size to accommodate one of the carrying rods 26, so that the picker pin may be mounted on and have pivotal movement in respect to said rod. The base of the picker pin has projections 33 and 34 formed on opposite sides thereof. The projections are of sufficient length to engage an adjacent carrying rod when the picker pin pivots or reciprocates on the carrying rod 26 upon which it is mounted, which limits the pivotal, or reciprocating, movement of the pivot pin.

As shown in Figure 6 of the drawings in dot and dash lines, when the picker pin 27 swings to the right, the extension 34 engages the carrying rod 26a, which limits the pivotal movement of the picker pin to the right. Should the picker pin 27 swing to the left, the extension 33 will engage the carrying rod 26b, limiting the movement of the picker pin to the left. The pivotal, or swinging, movement of the pins may be governed by the length of the extensions 33 and 34. The picker pins 27 are placed upon the carrying rods in staggered relation to one another, so that the extensions on a picker pin mounted on one of the carrying rods 26 will move between the extensions on the picker pins mounted on the adjacent carrying rods. For example, the picker pin is placed on carrying rods 26a and 26b. Another picker pin is then mounted on the carrying rod 26 between the rods 26a and 26b. Further picker pins would then be placed on the carrying rods 26b and then another picker pin placed on the rod 26a and so until rows of picker pins extend across the machine.

Both forms of picker pins are held against lateral movement and divided into groups on the carrying rod 26 by means of spacer plates 35. The spacer plates 35 are annular in shape and are held against lateral movement on the spacer rods 21 by means of sleeves 22 on the rods 21. Inwardly of the periphery of said spacer plates is an annular row of apertures 36 adapted to engage alternate carrying rods 26, the periphery of the spacer plates extending upwardly of the carrying rods a sufficient distance to bear against the shank of the picker pins. The periphery of the spacer plates between the apertures 36 is recessed at 37, as shown more particularly in Figure 3 of the drawings, so as to avoid engaging with the carrying rods and picker pins intermediate of the apertures 36. The adjacent spacer plate 35, which is similar to the first-mentioned spacer plate, is so positioned that the apertures 36 therein will engage the intermediate carrying rods 26, which rods were not engaged by the apertures in the first-mentioned spacer plate.

In this manner, the picker pins on each carrying rod are divided into a plurality of groups by the spacer plates. However, the groups are so divided that the space between them formed by the spacer plate will bear a staggered relation to the space between the groups of picker pins on the adjacent carrying rods. In this manner, the entire width of the teasing roll 17 is covered by the picker pins and is effective to disintegrate the material. No ribbons or pieces are formed in the material being disintegrated as the spaces between the groups of picker pins on one carrying rod is followed by picker pins on the next succeeding carrying rod.

Mounted adjacent the periphery of the teasing roll 17 at the bottom thereof in an arc concentric to said teasing roll and in radial alignment with the axis of the teasing roll is a plurality of bed plates 38. The bed plates extend transversely between the side frames 10 and are mounted on said frames so as to be moved toward or away from the teasing roll 17. The bed plates 38 are preferably spaced apart circumferentially to provide spaces therebetween through which foreign material may drop. The manner of mounting, as illustrated in Figures 1 and 2 of the drawings, comprises brackets 39 fastened to the side frames 10 by means of bolts 40. The bracket

39 has slide-ways 41 therein, the frame 10 having similar slide-ways 42 adjacent the slide-ways 41. Extending through the slide-ways 40 and 41 and into the bed plate 38 are bolts 43 and 44. The bracket 39 has an extension 45 on the bottom thereof in which is positioned a set screw 46 having a head thereon so that the bed plates may be moved toward the teasing roll 17 or drawn away therefrom by turning the set screws in opposite directions. When the bolts 43 and 44 are loosened, the bed plate 38 may be moved toward or away from the teasing roll 17 by turning the set screw 46. The setting may be maintained by tightening the bolts 43 and 44. On the face 47 of the bed plate 38, which face conforms to the surface of the roll 17, is positioned a plurality of pointed projections 48. In the embodiment of the bed plate shown in Figure 9 of the drawings, these projections comprise a plurality of pins positioned within the face of the bed plate. In the modified bed plate shown in Figure 10, the projections comprise pointed serrations 49 formed in the face 47 of the bed plate 38.

Located intermediate the inner end of the apron 14 and the disintegrating, or teasing, roll 17 is a mechanism for feeding to the disintegrating roll the material to be disintegrated. This mechanism comprises a pair of transversely extending feed rollers 50 and 51, the roller 50 being positioned above the roller 51. Intermediate of the feed rollers 50 and 51 and the periphery of the teasing roll 17, and closely adjacent thereto, is a pair of gripper rollers 52 and 53, a guide plate 54 being positioned between the roller 53 and the disintegrating roll 17. The rollers 51 and 53 may be driven by means of a belt or chain drive 55, so that the material placed on the apron 14 will be moved into engagement with the feed rollers 50 and 51 and thence through the gripper rollers 52 and 53 and over the guide plate 54 into contact with the picker pins on the disintegrating roll 17.

If so desired, a ring 56 may be positioned about the peripheries of each of the side members 18 and 19, said rings 56 having pointed picker pins 57 mounted in the outer surface thereon. In this manner, the full width of the teasing roll 17 may be utilized for disintegrating material.

In the operation of the textile disintegrating machine of this invention, power is applied to the teasing roll 17 through the belt 17a and the shaft 16, as shown in Figure 1 of the drawings, the roll 17 being rotated at a higher rate of speed than the feeding mechanism. By way of example, the teasing roll 17 is rotated in a counter-clockwise direction. Since the picker pins 27 are pivotally mounted on the carrying rods 26, the picker pins tend to swing radially outwardly through centrifugal force when the teasing roll 17 is rotated rapidly.

At the same time, power is applied to the rollers 12 and 13, rotating the same at a slower speed than the roll 17, for example, in a clockwise direction, as shown in Figure 1 of the drawings. The source of power for rotating the rollers may be the same as the source of power for rotating the teasing roll 17, or independent sources of power may be used. The rollers 51 and 53 are also rotated in a clockwise direction, the roller 51 being connected by a drive chain, or belt, to the roller 12, and the roller 53 likewise being connected to the roller 51 through another belt or chain. Rotation of the rollers 51 and 53 in a clockwise direction will rotate the idling rollers 52 and 50 in a counter-clockwise direction.

The material to be disintegrated is placed upon the apron 14 and is moved toward the feed rollers 50 and 51 and passes therethrough. From the feed rollers 50 and 51 the material passes through the gripper rollers 52 and 53 and thence over the guide plate 54. The material is then engaged by the picker pins 27.

Since the picker pins 27, which are rigid and will not bend, are pivotally mounted on the carrying rods 26, centrifugal force caused by the rapid rotation of the teasing roll 17 will cause the picker pins to extend radially from the teasing roll until the same engage the material to be disintegrated. Upon engaging the material to be disintegrated, the resistance of the material causes the picker pins 27 to yield slightly against the centrifugal force created by rotation of the roll 17, as the pins are dragged over one side of the material. For example, when the teasing roller is being rotated in a counter-clockwise direction, as illustrated in Figure 1, the picker pins upon contacting the material will pivot on the carrying rods 26 in a clockwise direction due to the resistance of the material. In other words, the picker pins 27 exert only enough force on the cloth to draw or tease out the fibers. An excess force sufficient to break or tear the fibers is prevented since the pins may pivot away from the material, yet, centrifugal force insures a sufficient contact between the pins and the material to properly draw out the fibers.

The opposite side of the material is engaged by the projections 48 or pins 48 on the bed plates 38. As the material is engaged by the picker pins 27, it is moved over the pins 48. The pins 48 tend to hold the material against movement by the picker pins 27. In this manner, a garnett or carding action is secured, the fibers being drawn or paralleled from the material without knots or snags.

When a thick material offering a high resistance to the picker pins is to be disintegrated, the stop rods 30 are inserted in the machine and the pivotal movement of the pins 27 is limited by contact with the rods. In other words, when the resistance offered by the material is in excess to that of the centrifugal force created by rotation of the teasing roll 17, it is necessary to limit the pivotal movement of the pins so that the pins will be held in proper engagement with the material as they pass thereover.

The bed plates 38 are adjustable toward or away from the teasing roll, so that material of various thicknesses may be accommodated by the machine and so that any wear of the picker pins may be compensated for. The material is moved by this action to the right of Figure 1 as it is disintegrated. The projections 48 also engage the fibers and assist in the disintegration of the material, a lint of long stable fiber resulting.

The lint or fibers pass from the machine on the chute 58. With the construction of the teasing roll 17 of this invention the lint from the disintegrated material is of uniform quality, there being no wide strips, or ribbons, of material, since by staggering the groups of picker pins on the various carrying rods 26 the entire surface of any material in the machine is engaged by picker pins, as the teasing roll is rotated. The fibers are also of long stable quality and free from knots and snags.

With the form of picker pin 27 having an offset shank 28, as illustrated in Figure 3 of the drawings, as the teasing roll 17 is rotated, the pins, because the shank is offset in respect to the eye

29, has a whipping action as it engages the material being disintegrated which gives the material a quick jerk, helping to loosen the fiber, so that the pins as they pass over the material will more easily tease out the fibers.

The teasing roll 17 is constructed in such a manner that it is easily assembled, it being merely necessary to position the side members 18 and 19 upon the shaft 16, the spacer plates 35 being positioned between the side members in spaced relation to one another. The spacer rods 21, having sleeves positioned thereon between the plates 35, are anchored in the opposite side members 18 and 19, the side members and spacer plates being firmly held in spaced relation to one another by drawing the nuts on the ends of the spacer rods tightly against the side members, the sleeves between the spacer plates holding the same against lateral movement. Alternate spacer plates 35 are so positioned in relation to one another that the apertures 36 therein will engage alternate carrying rods 26. The apertures 36 of the intermediate spacer plates are positioned to engage the intermediate carrying rods 26. The carrying rods are then inserted through a side member, a group of picker pins 27 being slided thereon prior to the carrying rods passing through the spacer plates 35, which plates separate the group of picker pins. If stop rods 30 are to be used they are positioned in the side members 18 and 19 and between the rows of picker pins.

The cover plate 24 may then be fastened by means of screws 59 to the side member 18 and the covering plate 25 likewise applied over the side member 19.

The modified form of picker pin, as shown in Figures 5 to 8, inclusive, are in their operation the same as the preferred embodiment of the picker pin, as shown in Figures 1 to 4, except that the stop rods 30 are not necessary. The projections 34 and 33 on the base of the picker pins will engage the carrying rods 26 on opposite sides of the carrying rod upon which the picker pin is mounted and limit the pivotal movement of the pins.

In all forms of the picker pins of this invention, the pins 27 are made of rigid material, so that the same will not become bent, as, for example, will occur when a flexible picker pin or brush is used. A rigid pin likewise would not lose its shape, such as would happen when a brush or bristle is used and will not quickly become worn, nor will the rigid pins become matted or clogged with lint and fibers as will a brush.

The rigid pins will not tear or break the fiber of the material, since the same are pivotally mounted on the carrying rods 26 and since the bed plates 38 may be adjusted toward or away from the teasing roller 17 to accommodate the thickness and type of material to be disintegrated in the machine, the bed plate being adjusted in an arc which is concentric to the teasing roll 17.

It is apparent that the specific illustrations shown have been given by way of illustration and not by way of limitation and that the structure above described is subject to a wide variation and modification without departing from the scope or intent of the invention, all of which variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, and a plurality of pins of a rigid material, each of said pins being separately pivotally mounted in longitudinal extension on said carrying rods the free ends of said pins projecting outwardly of said side members.

2. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, a plurality of pins of a rigid material, each of said pins being separately pivotally mounted in longitudinal extension on said carrying rods the free ends of said pins projecting outwardly of said side members, and means limiting the pivotal movement of the pins.

3. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, a plurality of pins of a rigid material pivotally mounted in longitudinal extension on each of said carrying rods the free ends of said pins projecting outwardly of said side members, a plurality of spacer plates longitudinally spaced between said side members each of said spacer plates having an annular row of apertures positioned inwardly of the periphery of said plate, said apertures being spaced to engage alternate carrying rods and recessed to avoid engagement with the pins on the carrying rods intermediate said alternate rods, the apertures in alternate spacer plates engaging alternate carrying rods and the apertures in the spacer plates intermediate said alternate plates engaging the carrying rods intermediate said alternate rods.

4. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, a plurality of pins of a rigid material pivotally mounted in longitudinal extension on each of said carrying rods the free ends of said pins projecting outwardly of said side members, stop rods extending between said side rods intermediate said carrying rods adapted to be engaged by said pins and limit the pivotal movement thereof, a plurality of spacer plates longitudinally spaced between said side members each of said spacer plates having an annular row of apertures positioned inwardly of the periphery of said plate, said apertures being spaced to engage alternate carrying rods and recessed to avoid engagement with the pins on the carrying rods intermediate said alternate rods, the apertures in alternate spacer plates engaging alternate carrying rods and the apertures in the spacer plates intermediate said alternate plates engaging the carrying rods intermediate said alternate rods.

5. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, a plurality of pins of a rigid material pivotally mounted in longitudinal extension on each of said carrying rods the free ends of said pins projecting out-

wardly of said side members the base of said pins having extensions on opposite sides thereof adapted to engage the adjacent carrying rods and limit the pivotal movement of said pins.

6. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, a plurality of pins of a rigid material pivotally mounted in longitudinal extension on each of said carrying rods the free ends of said pins projecting outwardly of said side members the base of said pins having extensions on opposite sides thereof adapted to engage the adjacent carrying rods and limit the pivotal movement of said pins, a plurality of spacer plates longitudinally spaced between said side members each of said spacer plates having an annular row of apertures positioned inwardly of the periphery of said plate, said apertures being spaced to engage alternate carrying rods and recessed to avoid engagement with the pins on the carrying rods intermediate said alternate rods, the apertures in alternate spacer plates engaging alternate carrying rods and the apertures in the spacer plates intermediate said alternate plates engaging the carrying rods intermediate said alternate rods.

7. In a disintegrating machine, a teasing roll comprising a shaft, side members fixed upon said shaft, a plurality of carrying rods extending between said side members and disposed in an annular row about the axis of said roll adjacent the periphery of said side members, and a plurality of picker pins of rigid material pivotally mounted on said carrying rods the shanks thereof being offset to one side of the center of said rods said pins being mounted in longitudinal extension on each of said carrying rods the free ends of said pins projecting outwardly of said side members.

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