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## GRID SECTION

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This invention relates generally to textile fiber preparation and pertains more specifically to a novel grid section for pickers and similar machines used in the preparation of textile fibers for carding and spinning and in which a beater mechanism (bar or cylinder) is employed similar to that used in a picker.

In opening and cleaning textile fiber, it has been the practice for many years to use a picker including a revolving beater to beat the textile fiber supplied by a suitable feed device such as two fluted feed rolls or a feed roll and a cooperating plate or evenner pedals while the fiber is held under compression, and to beat the fiber from the feed across a series of transversely extending grid bars in order to remove trash therefrom. The trash either falls through the spaces between the grid bars or is driven therethrough by centrifugal force while the fiber, being relatively light and longer in length than the trash, is carried across and over the grid bars by the air currents set up by the beater. An additional strong air current produced by a fan is then employed to carry the clean fiber from the picker to the condenser or next operation.

Although pickers of this general construction have been used in the textile industry for many decades, it has been recognized for a long time that such devices do not effect complete separation of the trash from the fiber at the grid bars. If the bars are spaced sufficiently far apart to permit a larger proportion of the trash to pass through the intervening spaces, too high a proportion of the spinnable fiber is carried along with the trash, and conversely if the bars are set close together to retain the fiber, too much of the dirt and trash is also retained with the fiber.

One object of the present invention is to provide a grid bar assembly for pickers and the like which provides better cleaning and less loss of spinnable fibers.

Another object is to provide a picker grid bar assembly which permits both the beater and the fan associated with the picker to be run at lower speeds, resulting in a saving in power consumption and also reducing wear on the machine while at the same time resulting in less damage to the fibers.

Another object is to provide a picker which will produce a lap free from bunches and capable of being carded with less damage to the fibers and to the card clothing than is the case with pickers heretofore known.

Another object is to reduce the number of grid bars required in pickers without loss of effectiveness of the picker.

Other and further objects will be apparent from the description which follows and from the appended drawings.

In the drawings,

Fig. 1 is a diagrammatic elevation in section showing the novel grid bar assembly mounted in a conventional picker; and

Fig. 2 is a plan view of the drive mechanism.

Referring first to Fig. 1, the picker shown is pro-

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vided with a downstroke beater 10 mounted for rotation with a suitable enclosure. Beater 10 is illustrated as a carding or Kirschner beater, although any other suitable form of beater such as a blade beater may be desirable in certain cases. A conventional feeding mechanism including feed roll 11 and evenner pedals 12 is provided as shown to feed the fiber into the path of the beater teeth, although a pair of feed rolls may equally well be used. A supplemental fringe roll 13 is also provided immediately beneath the point at which the fiber is fed to the beater and closely spaced to the rotating beater, the spacing between adjacent surfaces being of the order of  $\frac{1}{32}$  inch. The grid section of the device includes two rotatable grid bars 14, 14 spaced closely adjacent to the path of the beater, the spacing normally being from  $\frac{1}{32}$  to  $\frac{1}{16}$  inch, and arranged generally parallel to the axis of rotation of the beater. Grid bars 14, 14 are adjustably mounted on cheeks 15 disposed at each side of the picker by means of sliding brackets 16, 16 secured to the cheeks by set screws 17, 17. A sheet iron bottom plate 18 is also secured to cheeks 15 by means of bracket 19 and set screw 20. Cheek 15 is adjustably secured to the frame of the picker so that the grid bars 14, 14 may be moved as a unit toward and away from the beater as well as being individually adjustable.

Power is supplied from a source (not shown) to the feed roll which has gear 21 fixed on its shaft. Fringe roll 13 is driven through sprocket 23 on its shaft from a chain 24 passing over sprocket 25 fixed to the shaft carrying gear 22 which in turn meshes with gear 21. Revolving grid bars 14, 14 are driven at equal speeds through gears 26, 26 fixed to their respective shafts and meshing with pinion gear 27 secured to shaft 28 carrying at its other end sprocket 29, which is driven by means of chain 30 from sprocket 31 fixed to the shaft of feed roll 11. The drive assembly is arranged so that the peripheral speed of the fringe roll and of each revolving grid bar 14 is slightly greater than the peripheral speed of feed roll 11, preferably about 10 to 15% greater than the peripheral speed of feed roll 11. All of these members rotate at a peripheral speed much less than that of beater 10. As will be apparent from the drawing, feed roll 11 rotates in the same direction as beater 10 so that its periphery is moving in a direction opposite to that of beater 10 while fringe roll 13 and revolving grid bars 14, 14 rotate counter to beater 10 so that their peripheries are moving in the same direction as that of beater 10. All three of the rolls 13, 14, 14 may be either plain or fluted, sand blasted or wound with saw tooth wire, as in the case of an Ashworth roll, the latter being preferred for most purposes.

Fringe roll 13 does not form an essential part of the present invention but is separately described and claimed in my prior Patent No. 2,435,938 issued February 10, 1948. Grid bars 14, 14 may be used either with or without the supplemental fringe roll 13, but it has been found that better results are obtained if the fringe roll is employed, and such arrangement is preferred. It should be noted that the fiber is still in the form of a sheet at the surface of fringe roll 13, being held by feed roll 11 and pedals 12 subject to the opening action of the beater. However, as the fibers advance over grid bars 14, 14, they are no longer positively held in the form of a sheet or fringe but are contained in the air stream generated by the heater. Any fibers knocked out of this stream at the revolving grid bars tend to be drawn against the revolving grid bars and are carried back into the air stream. After this action is repeated over the second grid bar, the separation of the fibers is so complete that they remain in the air stream over the wide open space (which is several times the length of the fibers themselves)

between the second grid bar 14 and the plate 18, without appreciable loss of fiber.

The arrangement of the present invention makes it possible to have much wider spacing between grid bars, thus facilitating removal of trash and dirt and reducing the number of grid bars required. Using grid bars in the form of wire wound rolls having a diameter of about 1½", they may be spaced from 3½" to 5½" between centers and the spacing from the second grid bar to the plate may be even greater. The revolving grid bars of the present invention may be used to replace part or all of the conventional grid bars in a picker or other similar beating mechanism.

Remarkably improved results are obtainable using the device of this invention, as compared with conventional grid bars. For example, when used with one batch of mechanically picked cotton full of sticks, crab grass and straw, less than 0.2% could be removed in a picker with a carding beater run at 850 R. P. M. and at a normal fan speed of 1400 R. P. M. with Universal grid bars in the open position. A similar picker equipped with the revolving grid bars of the present invention run at a beater speed of 650 R. P. M. and a fan speed of 650 R. P. M. removed 0.5% of trash. Furthermore, the lap produced by the picker having the grid section of the present invention handled much better on further processing, exhibiting little or no fiber droppings under the beater, but considerable gas and straw.

In another case, 1½" middling cotton run through a No. 7 feeder and a vertical opener could be cleaned and opened, using the revolving grid bars of the present invention, at a beater speed of 650 R. P. M. and a fan speed of 650 R. P. M. compared with a beater speed of 1050 R. P. M. and a fan speed of 1400 R. P. M. when conventional grid bars were employed on the same beater.

While the specific embodiment I have described includes only two revolving grid bars, a greater number may be desirable in some situations.

Although I have herein described specific embodiments of my invention, I do not intend to limit myself solely thereto but to include all of the obvious variations and modifications which are within the spirit and scope of the appended claims, for example, application of the invention to the card licker-in.

#### I claim:

1. In a picker apparatus and the like for opening and cleaning textile fiber of trash and dirt having a rotatable beater, a grid bar rotatable about its axis and positioned adjacent the periphery of said beater, said grid bar having a passage immediately adjacent thereto of a length greater than individual fibers for removal of trash and dirt from the textile fiber, and means for continuously rotating said grid bar in a direction counter to said beater at a peripheral speed much slower than the peripheral speed of said beater.

2. The apparatus of claim 1 in which the grid bar comprises a toothed roll.

3. In a picker apparatus and the like for opening and cleaning textile fiber of trash and dirt having a rotatable beater, a plurality of grid bars rotatable about their axis and positioned adjacent the periphery of said beater, said grid bars being spaced apart a distance greater than the individual fibers for removal of trash and dirt from said fiber, and means for continuously rotating said bars in a direction counter to said beater at a peripheral speed much slower than the peripheral speed of said beater.

4. In a picker apparatus and the like for opening and cleaning textile fiber of trash and dirt having a rotatable beater and a feed roll, a plurality of grid bars rotatable about their axis and positioned adjacent the periphery of said beater, said grid bars being spaced a distance greater than the individual fibers for removal of trash and dirt from the textile fiber, and means for continuously rotating said bars in a direction counter to said beater at a peripheral speed from 10 to 15% greater than the peripheral speed of said feed roll.

5. The apparatus of claim 4 further including means for adjustably positioning said grid bars with respect to said beater.

6. In a picker apparatus and the like for opening and cleaning textile fiber of trash and dirt having a rotatable beater and fiber-feeding mechanism including a feed roll and cooperating evenner mechanism, in combination, a supplemental roll positioned closely adjacent the path of said beater forwardly of said feed roll in the direction of travel of said beater, a plurality of continuously rotatable grid bars comprising toothed rolls spaced from each other a distance greater than the individual fibers to form passages therebetween for the removal of trash and dirt from the fibers, said grid bars being positioned closely adjacent the path of said beater, means for adjustably positioning said grid bars with respect to the path of said beater, and means for driving said supplemental roll and said grid bars at a peripheral speed from 10 to 15% greater than the peripheral speed of said feed roll but much less than the peripheral speed of said beater, the surfaces of said supplemental roll and said grid bars nearest said beater continuously running in the same direction as said beater.

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