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COTTON PICKING SPINDLE ASSEMBLY

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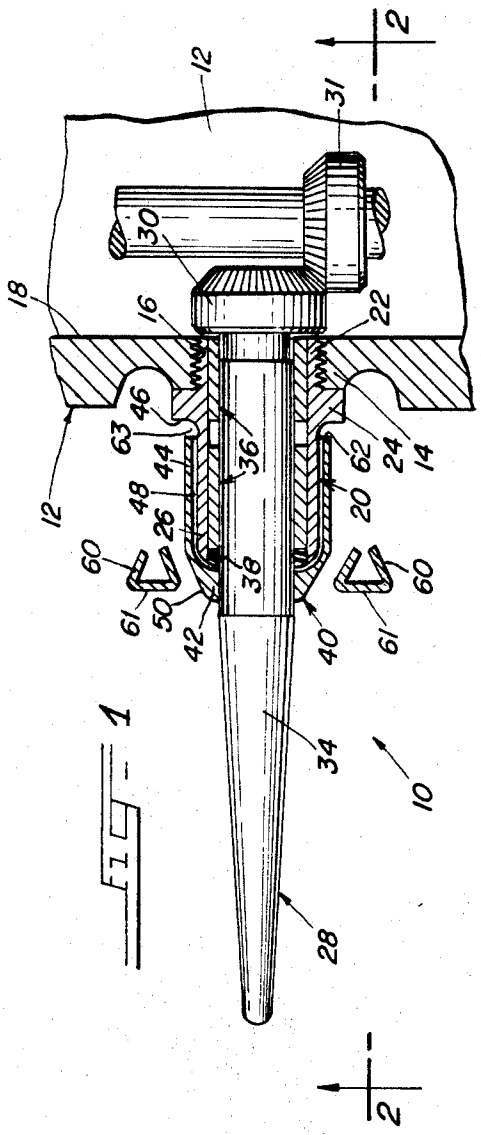


FIG - 1

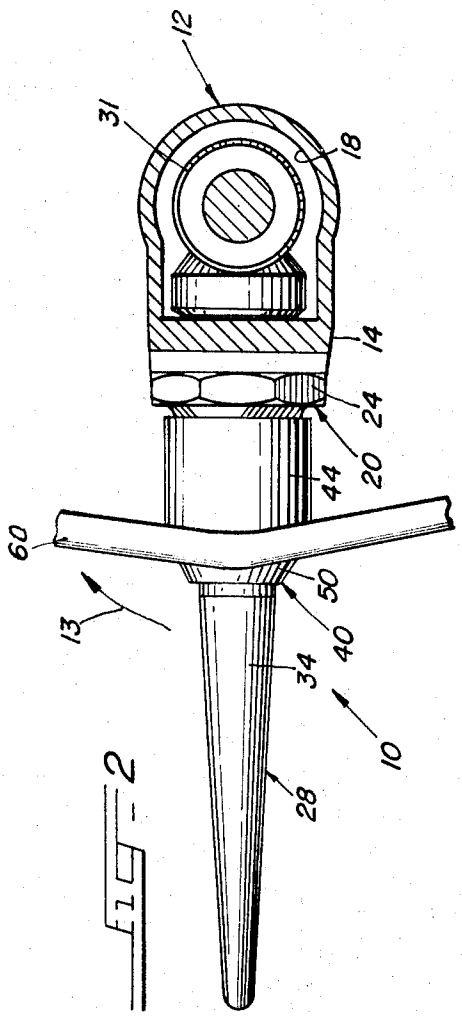


FIG - 2

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COTTON PICKING SPINDLE ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A cotton harvester having bars with spindles projecting therefrom and shields on the spindles having extensive cylindrical nut covering sleeves which have a running clearance with the nut and extend remotely from the cotton picking areas of the spindles.

The present invention relates to a cotton picking spindle assembly.

The invention relates to a spindle assembly for a cotton picker in which the spindles rotate and are projected into the cotton plants to pick the seed cotton and retract from the plant whereupon they are doffed to remove the cotton therefrom. In structures of this nature there are several difficulties encountered, a principal one of which is the accumulation of cotton shreds and foreign material on the revolving spindle at the extremity of the bearing means which mounts the spindle, together with the tendency of lubricant from the bearing means to migrate outwardly into the mass of picked cotton with the consequence that the cotton is contaminated and its value correspondingly reduced. Also the loss of lubricant requires frequent replenishing of the lubricant to the spindle assembly.

A principal object of the invention is to provide a cotton picking spindle assembly of such novel construction as to overcome the difficulties referred to above and to correspondingly prevent the accumulation of cotton fibers and foreign material on the spindle assembly and to prevent the migration of the lubricant out of the spindle assembly and into the cotton fibers.

A more specific object of the invention is to provide a spindle assembly of the foregoing character which includes a shield mounted on and carried by the spindle with a skirt portion surrounding a substantial portion of the bearing means in which the spindle is mounted, and with the skirt portion extending beyond locations where normally the cotton would be present and tend to build up, thus preventing the buildup of cotton fibers at the bearing extremity and the exit of lubricant from the bearing assembly.

Still another and more specific object is to provide a spindle assembly with a shield of the character just referred to, wherein the shield includes an outer enveloping elongated skirt portion completely surrounding the bearing means in which the spindle is mounted, together with the feature that the spindle assembly is mounted in an operating structure which tends to throw materials outwardly toward the outer end of the spindle, whereby lubricant that is thrown in outward direction is prevented by the same centrifugal force that throws it outwardly, from returning under the shield and entering into the mass of cotton surrounding the spindle, as well as to prevent cotton fibers and foreign materials from entering into the space between the surrounding shield and the bearing means. Thus when non-fluid lubricants (grease) are used the non-slingout feature will greatly extend lubricant retention so that less frequent addition of lubricant is required.

Other objects and advantages of the invention will appear from the following detail description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is an axial sectional view of a spindle assembly made according to the present invention with portions of a conventional slat bar structure of a cotton picker shown in vertical section; and

FIGURE 2 is a view from the top of FIGURE 1 indicating the direction of movement of the spindle around vertical axes.

Referring now in detail to the drawings, the spindle assembly of the invention is indicated generally at **10**, which is mounted in a vertical picker bar **12** of suitable kind, this picker bar **12** being indicated also in FIGURE 2. The spindle assembly **10** is one of a plurality of such spindle assemblies mounted on the picker bar in vertical alignment. The picker bar **12** is one of a plurality of such picker bars arranged for movement in an arcuate path indicated generally by the arrow **13**, with the consequence that the lubricant in the spindle assembly tends to be thrown, due to centrifugal force, outwardly or to the left as viewed in FIGURES 1 and 2.

The means for mounting the spindle assembly on the picker bar **12** includes a tubular boss **14** internally threaded as at **16** which leads from the interior **18** of the picker bar radially outwardly to the exterior. The spindle assembly **10** includes a nut member **20** having an inwardly directed exteriorly threaded portion **22** inserted in the bore **16** of the picker bar. Outward of the extension **22** is a polygonal element **24** serving as a nut or wrench engaging element for threading the nut member into position, and outwardly of the polygonal element **24** is a tubular extension **26** of substantial axial extent. The nut member **20** is threaded into the bore **16** preferably until the nut element **24** tightly engages the boss **14**.

A spindle **28** is rotatably mounted in the nut member and includes an inner end portion on which a driving gear **30** is secured for driving engagement with another gear **31** on a driving member of suitable kind. The spindle **28** includes a cylindrical shank portion **32** disposed in the bore of the nut member and extending slightly outwardly therebeyond, and outwardly of this cylindrical portion is a tapered cotton picking portion **34**.

Interposed between the spindle and the nut member is a bearing means **36** which may be of any suitable kind such for example as a bushing or a needle bearing, and if desired a grease seal **38** may be provided outwardly of the bearing means but this seal is not essential. Also the nut could be the bearing means itself with no separate bearing **36**, required.

The lubricant provided in the bearing means **36**, whether the bearing means is in the form of a bushing, or a needle bearing, or integral within the nut, under the action of the centrifugal force developed by the movement of the mechanism in the direction referred to above, tends to flow or migrate outwardly toward the outer end of the bearing means.

A spindle shield indicated in its entirety at **40** is provided to prevent the buildup of cotton fibers at the bearing extremity and also to prevent the entrance of the cotton fibers and foreign material into the interior of the spindle assembly, and to prevent the outward migration of lubricant through the bearing means **36** into the mass of cotton being picked. The shield **40** is generally tubular in shape and includes an outer portion **42** dimensioned for frictionally and sealingly engaging the spindle, such as on the outer end of the cylindrical portion **32** that extends beyond the bearing means, so as to be carried and rotated by the spindle. The shield **40** also includes a tubular skirt portion **44** extending inwardly from the outer end portion **42** in surrounding relation to the extension **26** of the nut member. The skirt portion **44** may extend

rearwardly into close proximity to the outer surface 46 of the nut-like element 24, while the space indicated at 48 between the skirt portion 44 and the tubular element 26 preferably is of minimum clearance, great enough not to interfere with the free running rotational movement between the elements, but small enough to prevent the entrance of cotton fibers and foreign material therein to. That space is exaggerated in the drawing.

In the operation of the device as the spindle 28 enters into the cotton plants and engages the cotton bolls, there is a tendency for the cotton fibers to migrate toward or be forced toward the inner end of the spindle end in the absence of means to prevent it, to gather and wrap on the spindle at the bearing extremity and to enter into the space between the spindle and the means supporting it. In the present instance the skirt portion 44 of the shield completely surrounds the extension 26 and prevents direct engagement of the plants or the cotton bolls with the extension 26. Any cotton fibers or foreign material must follow a tortuous path into the interior of the bearing structure, i.e., around the extended terminal edge of the skirt portion 44 (the right end, FIGURE 1) and then in reverse direction in the substantially elongated space 48 between the skirt portion and the tubular portion 26 of the bearing means. The minimum running clearance of the substantially elongated space 48 prevents the passage of any cotton fibers or other materials from passing therethrough. Preferably the forward exterior surface of the shield 44 is tapered as at 50 so as to facilitate relative movement therepast by the cotton fibers and to prevent snagging thereon by the fibers.

As noted above, the tendency in the operation of the picker incorporating the spindle assembly is to throw lubricant outwardly through the bearing means, and in the absence of means to prevent it, the lubricant would find its way into the picked cotton. In the present instance the only path for that lubricant to escape from the bearing assembly would be through the space 48, but in view of the fact that this involves a tortuous path, the progression of the lubricant out of the assembly is retarded. This is the more so because of the axial length of the space 48 which would require the lubricant after being thrown from the bearing means to migrate axially inwardly throughout the full extent of the space 48 which, because of its great length, retards and even prevents such migration of lubricant. Centrifugal force also tends to prevent migration of lubricant through the space 48. This is a considerable factor since any lubricant that contacts the cotton, materially lowers its commercial value.

Thus the outwardly enveloping skirt portion 44 extending rearwardly as far as it does around the bearing assembly, together with its relatively tight fit with the bearing structure, produces the dual advantage of preventing the escape of lubricant and the entrance of cotton fibers and foreign material.

It will be noted also that the shield 40 extends behind the slat bars 60, 60 which on their forward sides 61 define one side of a plant passage of a cotton picker as well known in the art. The axial extent of the sleeve portion 44 is such that its free edge 62 is a considerable distance from the region where normally cotton would be present. Thus any lubricant which may incidentally escape through the space 63 would deposit on the non-rotating member 46 and/or the column or bar 12.

While I have herein disclosed a preferred embodiment of the invention it will be understood that changes may be made therein within the scope of the appended claims.

I claim:

1. A cotton picking spindle assembly adapted for mounting in a picker bar having an aperture for receiving it, comprising, in combination, a nut member threaded into the aperture and having a enlargement axially outwardly beyond the threaded portion and an elongated tubular extension axially outwardly of the enlargement, a spindle mounted in the nut member and having a cotton picking extension axially outwardly therebeyond, and a shield mounted on, carried by and rotatable with the spindle and sealingly engaging the spindle at a position axially outwardly of the nut member and having a skirt portion extending axially inwardly in surrounding relation to the tubular extension and extending into close proximity to the enlargement of the nut member.

2. The invention set out in claim 1 wherein the skirt member and the tubular extension of the nut member are so dimensioned as to provide an annular space therebetween, constituted by a minimum running clearance whereby to prevent the entrance of solid particles such as cotton fibers and dirt into the space and to retard the migration of lubricant outwardly through the space.

3. For use in a cotton harvester having a picker bar for providing an aperture, the combination comprising, a nut member mounted in said aperture and providing a bore, and having a tubular portion projecting a substantial extent axially outwardly from the picker bar, a spindle mounted in said bore and having a cotton picking portion extending axially outwardly beyond said tubular portion, and tubular means sealingly engaging the spindle and rotatable therewith and surrounding substantially all of the projection of said tubular portion, and comprising a chamfer portion disposed at one end of said tubular portion and having a cylindrical portion extending from the chamfer portion with a slight clearance relative to said tubular portion.

4. A cotton picker spindle assembly for use in a picker bar, comprising in combination, a nut member mounted in the picker bar and having an axially outwardly directed tubular extension, the nut member defining a bore leading from the interior of the picker bar outwardly therethrough, a spindle mounted in the nut member having an inner end in the picker bar, means on the inner end of the spindle for engagement with driving means for rotating the spindle, the spindle having a cylindrical base end portion journalled in the nut member and extending axially outwardly a short distance therebeyond, and an outer tapered picking portion, bearing surface means interposed between the spindle and the nut member susceptible of limited migration of lubricant between the spindle and surface means, and a tubular shield having an axially outer reduced end frictionally and sealingly engaging the spindle on the cylindrical base end portion thereof outwardly of end adjacent to the nut member whereby the shield is carried and rotated by the spindle, the shield also having a tubular skirt portion extending axially inwardly in surrounding relation to the tubular portion of the nut member to a position adjacent the inner end of the nut member with minimum running clearance therebetween.

5. In a cotton picker of the type having a plant passage defined at least in part by a slatted wall structure and a picker bar behind said wall structure and orbital about a predetermined axis and including a plurality of cotton picking spindles projected through said wall structure into said passage for picking cotton from plants therein, a tubular holder for each spindle on said picker bar and extending transaxially of said axis and mounting said spindle for rotation about its longitudinal axis, and a shield and lubricant retainer means connected to the spindle and rotatable therewith and including a tubular portion extending from said wall structure to said picker bar and having a distal end distantly remote from said wall structure out of the cotton picking and retaining area of the spindle to prevent cotton contact with lubricant contaminants.

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