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COTTON PICKER SPINDLE STRUCTURE

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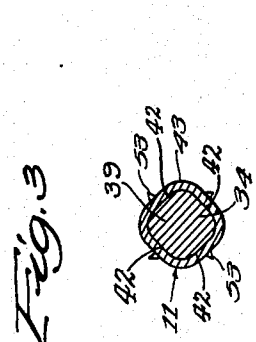


Fig. 3

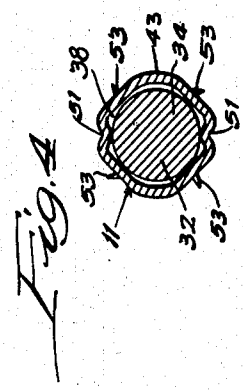


Fig. 4

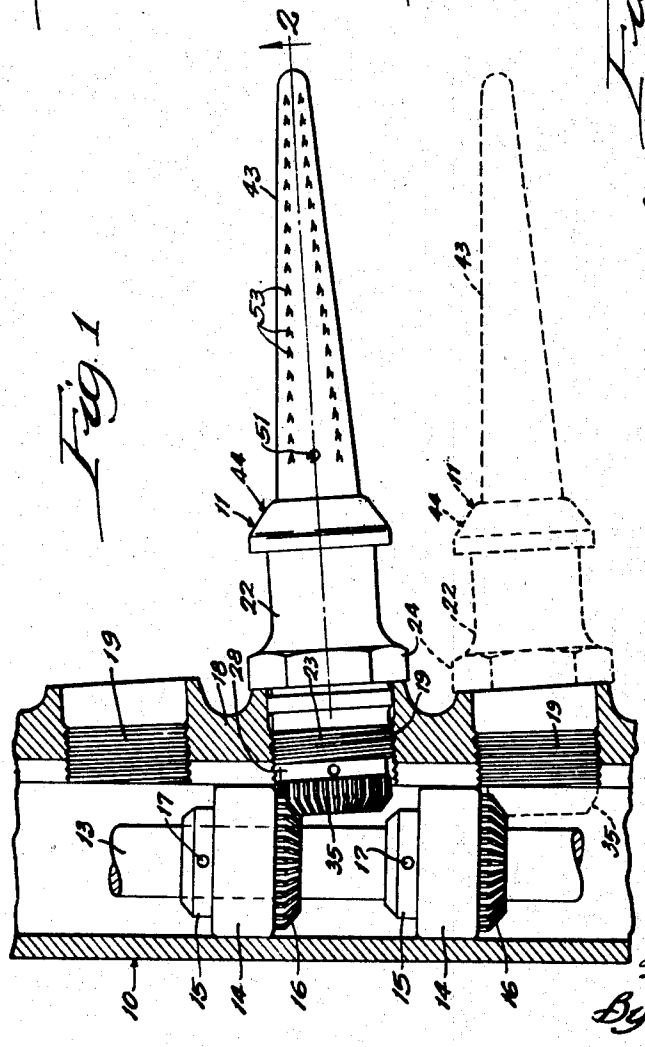


Fig. 1

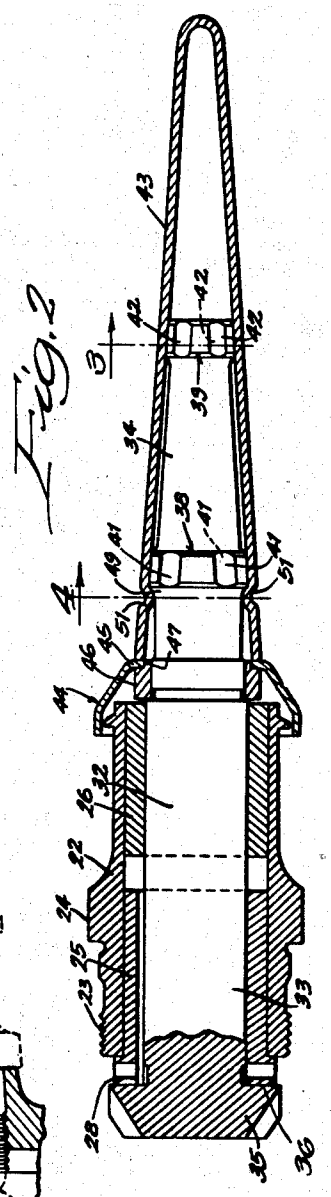


Fig. 2

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COTTON PICKER SPINDLE STRUCTURE

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This invention has to do with spindles employed in cotton-picking machines and relates more particularly to a novel spindle assembly employing a spindle having a detachably mounted sleeve-like barb-bearing cap.

The picker spindle assemblies of the present invention are adaptable for use interchangeably with those used in a cotton-picking unit of the character displosed in United States Patent 2,140,631. These spindles, which rotate, have crop clutching portions which are barbed to enable them to better grasp the cotton fibers of matured bolls preparatory to winding the cotton thereonto and extracting it from the pods or bolls. When these barbs are sharp at their points the spindles are much more aggressive in gathering the crop, so as the barbs wear dull in use it ultimately becomes necessary to replace the barb-carrying parts of the spindles. An object of this invention is the provision of an improved spindle assembly wherein the barbs are formed upon a conveniently replaceable portion thereof which can be economically produced. The saving by such an improvement in the time and expense required for changing a set of spindles is very appreciable since there are six-hundred spindles in the larger units now produced.

During operation of the picking unit, the spindles are continuously rotated about their respective individual axes while bodily revolved for cyclical endwise projection into and withdrawal from the plant row. Another object is the provision of a spindle assembly with a rugged mounting on the spindles for the replaceable barb-bearing sleeves or caps whereby the latter are amply resistant to impairment by reactive forces received from study stalks of the cotton plants.

Another important object is the provision of a light-weight spindle structure wherein the replaceable barb-bearing cap is hollow and much of the space enclosed thereby remains unoccupied by the supporting portion therefor on its associated spindle. This construction, in addition to minimizing the amount of material discarded in a worn barb-bearing portion, has the advantage of also minimizing the inertia of the assemblies and hence the torque required to commence their rotation. Since the vehicle upon which the cotton-picking apparatus is started from rest simultaneously with the commencement of spindle rotation, the cumulative inertia of the great number of spindle assemblies is an appreciable factor in determining whether the engine of a desired standard vehicle (tractor) has adequate horsepower for carrying the apparatus.

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The above and other desirable objects inherent in and encompassed by the invention will be better understood after reading the ensuing description with reference to the annexed sheet of drawings, wherein:

Fig. 1 is a vertical sectional view taken through a spindle carrier bar containing driving means for spindle assemblies carried thereon and showing one of the spindle assemblies in side elevation and another in dotted outline;

Fig. 2 is a longitudinal sectional view taken through the spindle assembly shown in Fig. 1, upon the line 2 in that figure, said view illustrating a preferred spindle assembly constructed according to the principles of this invention;

Fig. 3 is a transverse sectional view taken on the line 3 of Fig. 2; and

Fig. 4 is a transverse sectional view taken on the line 4 of Fig. 2.

With continued reference to the drawings and particularly to Fig. 1, a section of a spindle carrier member or bar 10 is there illustrated with two spindle assemblies 11 of which the lower is shown in dotted outline. This spindle carrier member 10 is but one of several of such members embodied in a cotton-picking unit as that shown in the above mentioned United States Patent 2,140,631. Some existing machines employ a cotton-picking unit having fifteen of the bar-like carrier members 10, and each of these members 10 in such units is of a length to carry twenty of the spindle assemblies 11. During operation of the picking unit the bar-like carriers 10, while maintained in an upright position, are revolved about a closed horizontal path whereby the spindles, as 11, of each bar are projected into the cotton plant row during traversal of one portion of the path, withdrawn from the cotton plant row during traversal of another portion of the path, carried past a doffing mechanism for brushing the picked cotton from the spindles during their traversal of another portion of the path, and subjected to a moistening apparatus for moistening the spindles in a final portion of the path preparatory to again being projected into the cotton plant row in commencing a succeeding cycle.

Each bar-like spindle assembly carrying member 10 encloses a drive shaft 13 supported upon bearing units 14. These bearing units 14 are disposed about the hubs 15 of spindle driving gears 16 secured by means of pins 17 for rotation with the shaft 13. The outer wall 18 of each spindle carrying member 10 has vertically spaced thread-

ed openings 19, respectively, for the spindle assemblies 11.

Each of the spindle assemblies 11 includes a hollow spindle holder member 22 having an exterior threaded section 23 at its inner end and a faceted section 24 for engagement by a wrench to facilitate screwing of the threaded section 23 into the threads of one of the holes 19 in the carrier bar 16. The spindle holding means 22 includes axially spaced bearing sleeves 25 and 26, respectively, at the inner and outer ends of such hollow holding means. A spindle 32 is inserted into the holder 22, outer end foremost, through the inner end opening of said holder to journal a shank 33 of the spindle in the sleeve-like bearing members 25 and 26 while projecting a picker sleeve supporting portion 34 outwardly of said holder. A gear 35 formed integrally with each spindle 32 is adapted to have its outermost face 36 bear against the associated bearing flange 28. When the holder 22 is screwed into the carrier member opening 19 therefor, the gear 35 will be advanced into mesh with its associated or companion gear 16.

The picker sleeve supporting portion 34 on the spindle of the illustrated spindle assembly, with which the other assemblies are identical, is provided with two radially enlarged faceted sections 38 and 39 having flat faces 41 and 42 engaging the inner sides of a picker spindle sleeve 43 which is polygonal in cross-section as illustrated in Fig. 3. These faceted sections 38 and 39 provide lateral support for the sleeve 43 and also prevent relative rotation between such sleeve and the spindle 32.

This sleeve 43 and a dust and moisture guard member 44 are assembled with the spindle 32 after the latter has been inserted through the holder 22. Said guard member is a generally conically shaped pressed steel structure having a hub 45 assembled with a spacer ring 46 at an annular shoulder 47 formed in the outer end of such ring.

The left end of the faceted spindle enlargement 38 constitutes a contoured sleeve or cap coupling section cooperating with circumferentially-spaced deformations 51 in the cap 43 to detachably retain the cap upon the spindle. While the deformable indentation means 51 serve to prevent accidental detachment of the sleeve-like cap and to secure such cap in mounted wedging relation on the axially-spaced mounting portions 38 and 39, they are distortable to expedite contemplated removal.

Sleeve-like caps 43 are provided with barbs 53 for grasping the cotton fibers to facilitate winding of these fibers onto the spindles preparatory to their extraction from the bolls. It is essential for the barbs 53 to be sharp at their points so they will give the spindle the aggressiveness desired in grasping the cotton. After the points on the barbs 53 are dulled in use, the spindle must be serviced by replacing the barb-bearing portion. Employment of the sleeve 43, which is detachably associated with the spindle portion 34, leads to an economy since only a small portion of the rotatable spindle part need be discarded. There is a further advantage in employing the barb-bearing sleeve 43, namely, that this sleeve has a hollow self-supporting barb-bearing portion projecting freely beyond the outer end of the solid spindles 32, whereby the weight of the projecting part of the spindle structure is minimized, reducing the inertia of the rotatable parts and thereby placing less starting load upon the engine and the driving connections between the engine and the picker unit.

Having thus described the preferred embodiment of the invention, I claim:

1. In a cotton picker spindle structure; a rotatable spindle having a journal portion, a supporting portion disposed between said journal portion and an end of such spindle, and a non-circular transverse peripheral section associated with said supporting portion of the spindle; a hollow generally-conical barbed sleeve-like cap open at its large-diameter end, said cap having a non-circular transverse peripheral section and being telescoped over said end of the spindle, large-diameter end foremost, onto the spindle supporting portion incident to meshing the non-circular transverse peripheral sections for preventing relative rotation of the spindle and cap, said cap exceeding the sleeve-supporting portion in length whereby the hollow opposite end of the telescoped cap projects endwise beyond and is supported solely by said spindle supporting portion.

2. In a cotton picker spindle structure; a rotatable spindle having a journal portion and a sleeve-supporting portion disposed between said journal portion and an end of such spindle; and a sleeve-like cap having a hollow open-ended base portion at one end thereof telescoped endwise onto said sleeve-supporting portion for carriage thereby and rotation therewith, said cap having a hollow generally conical barb-bearing portion adjoining said base portion and reaching therefrom to the opposite end of such cap, and said cap exceeding said sleeve-supporting portion in length whereby the conical barb-bearing portion of the telescoped cap projects endwise from said end of the spindle.

3. In a cotton picker spindle structure; a rotatable spindle including a projecting sleeve-holding end portion having a peripherally contoured coupling section spaced axially inwardly from the free end of such portion; and a sleeve-like cap having a hollow open-ended base portion telescoped endwise over said free end of the spindle onto said sleeve-holding portion for carriage thereby and rotation therewith, said cap having a deformation interlocked with said contoured coupling section to prevent accidental endwise displacement of the cap from the spindle, and said cap also having a hollow self-supporting generally conical barb-bearing portion projecting freely endwise from the spindle beyond said end thereof.

4. In a cotton picker spindle structure; a rotatable spindle including a projecting sleeve-holding end portion having axially-spaced radially-enlarged mounting portions; and a sleeve-like cap having a hollow open-ended base portion telescoped endwise over said end portion into mounted relation on said mounting portions, and said cap also having a hollow self-supporting generally conical barb-bearing portion projecting freely endwise from the spindle beyond said end thereof.

5. In a cotton picker spindle structure; a rotatable spindle including a projecting sleeve-holding end portion having axially-spaced radially-enlarged mounting portions with sections of their circumferential periphery spaced unequally radially from the principal axis of such spindle; and a sleeve-like cap having a hollow open-ended base portion telescoped endwise over said end portion into mounted relation on said mounting portions, the inner periphery of said

base portion being contoured to mesh with the peripheral inequalities of said mounting portions to constrain the spindle and cap to rotate in unison, and said cap also having a hollow self-supporting generally conical barb-bearing portion projecting freely endwise from the spindle beyond said end thereof.

6. In a cotton picker spindle structure; a rotatable spindle including a projecting sleeve-holding end portion associated with an end thereof, said sleeve-holding portion having axially-spaced radially-enlarged mounting portions with facets on their circumferential peripheries one of said mounting portions being nearer to said end of the spindle than the other and being of less diameter than the other; and a sleeve-like conical cap having a hollow open-ended base portion telescoped endwise over said end portion, large end foremost over said end of the spindle, into mounted wedging relation on said mounting portions, the inner periphery of said base portion having facets resting upon the mounting portion facets to constrain the cap to rotate with the spindle.

7. In a cotton picker spindle structure; a rotatable spindle including a projecting sleeve-holding end portion having associated with an

end thereof, said sleeve-holding portion having axially-spaced radially-enlarged mounting portions one of said mounting portions being nearer to said end of the spindle than the other and being of less diameter than the other; a sleeve-like conical cap having a hollow open-ended base portion telescoped endwise over said end of the spindle into mounted wedging relation on said mounting portions, and deformable radial indentation means on said cap in clutching relation with one of said mounting portions to yieldably resist endwise removal of the cap from the spindle.

DAVID B. BAKER.

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