Jan. 12, 1954 J. D. RUST 2,665,536

SPINDLE DRIVE FOR COTTON-PICKING MACHINES

Filed Oct. 5, 1951

4 Sheets-Sheet 1

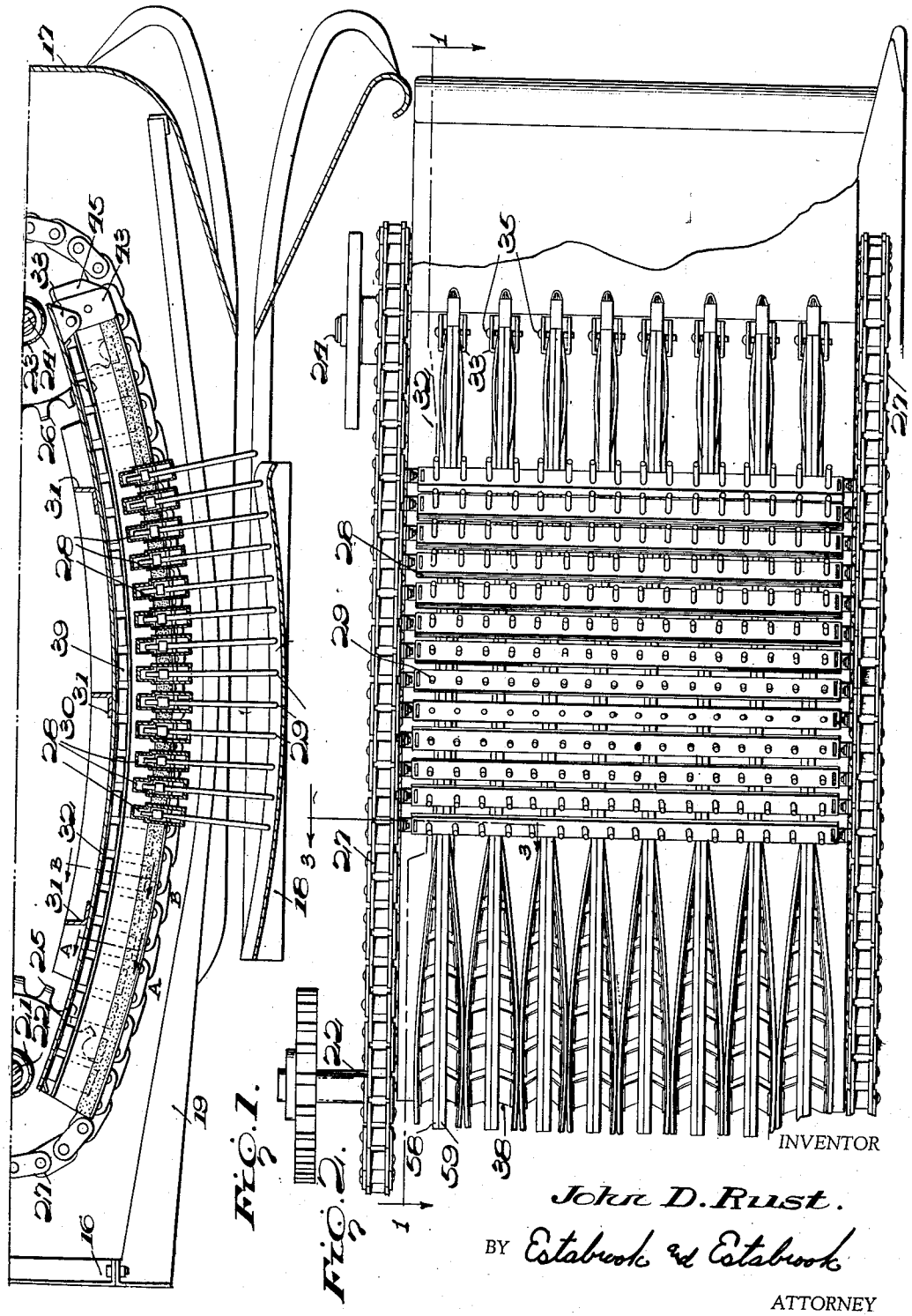

FIG. 1.

FIG. 2.

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4 Sheets-Sheet 2

FIG. 3.

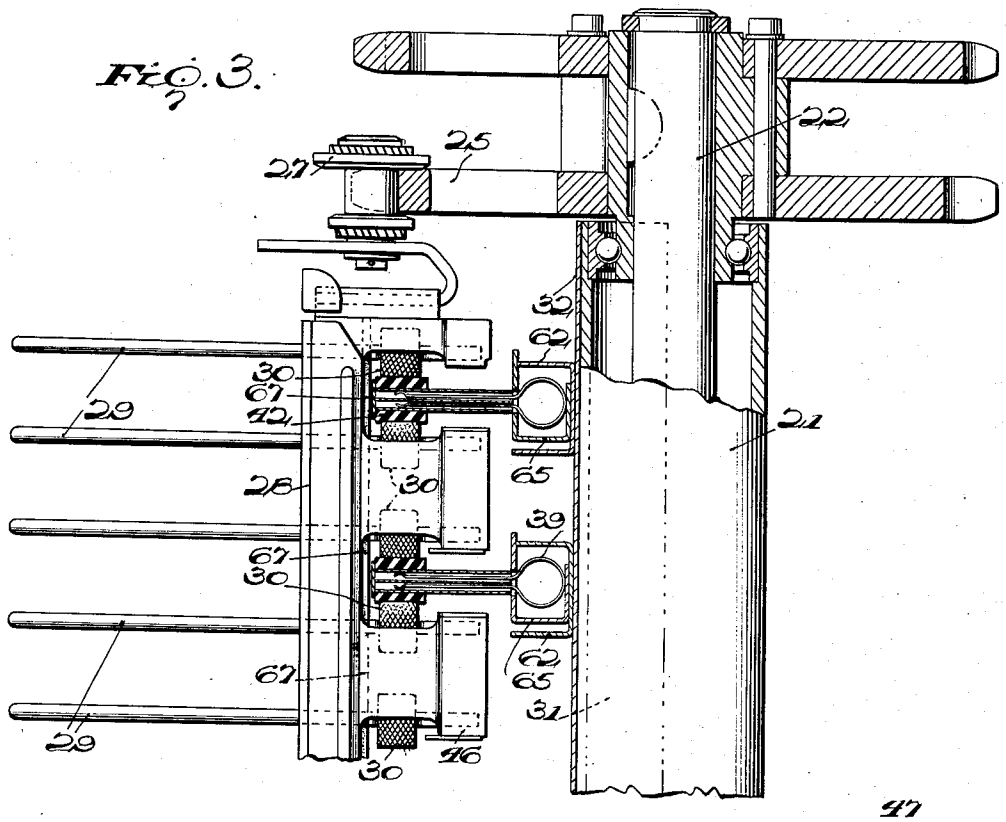


FIG. 4.

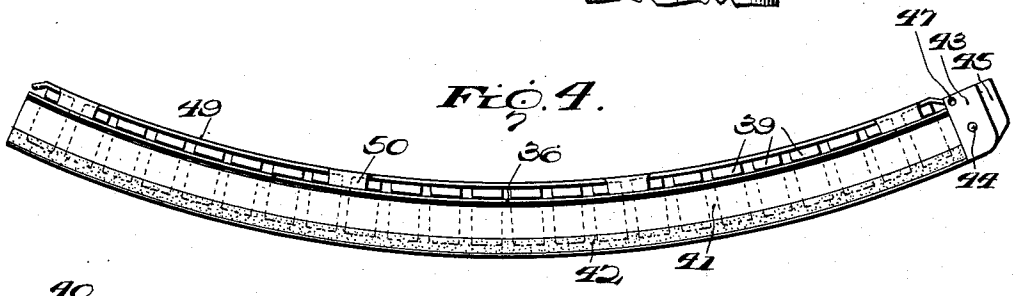


FIG. 5.

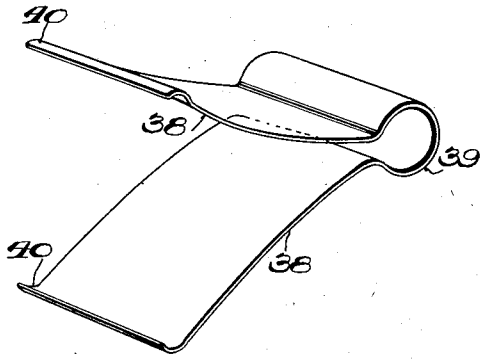


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FIG. 6.

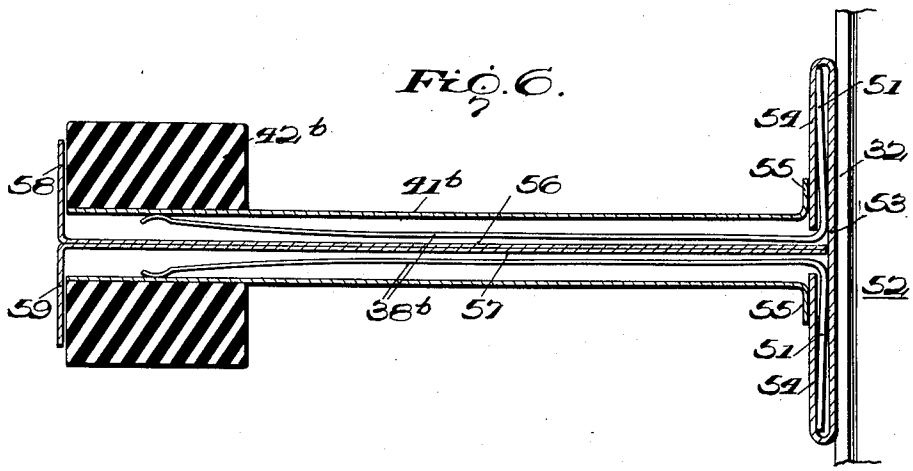
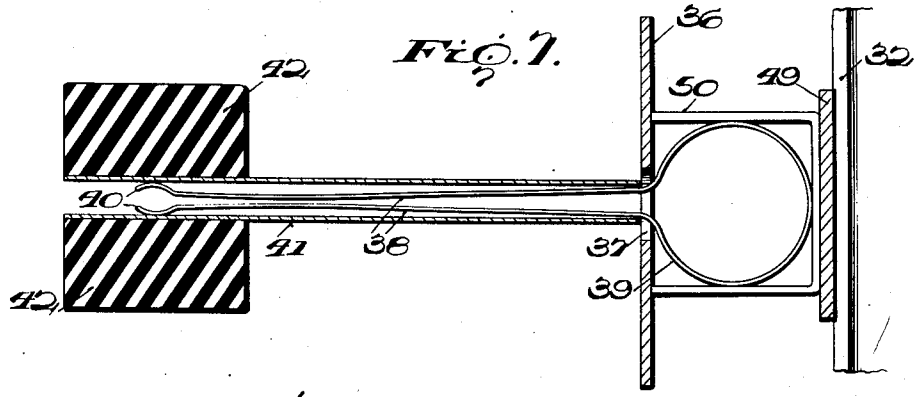



FIG. 7.



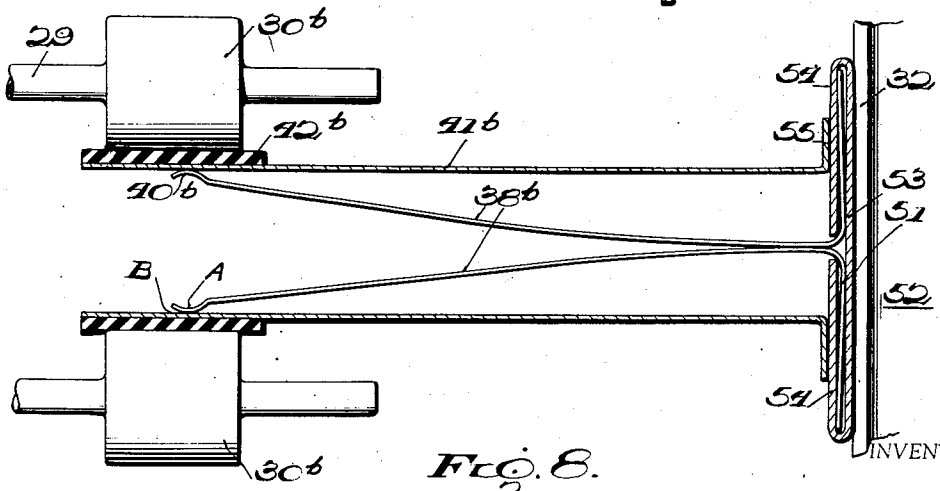




FIG. 8.

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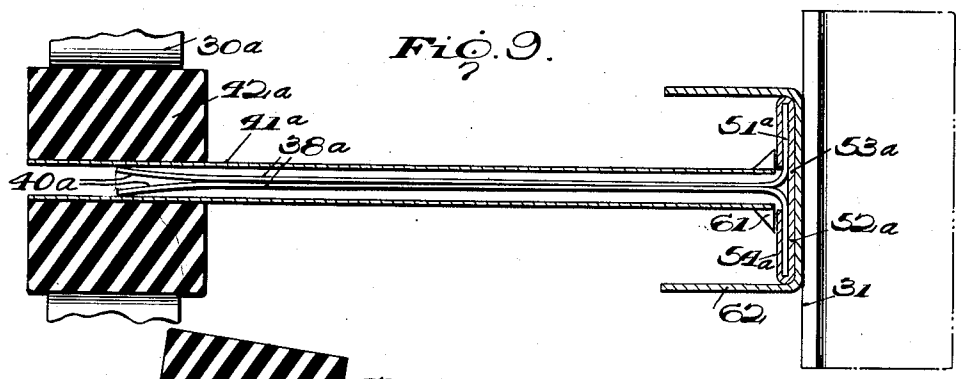


FIG. 9.

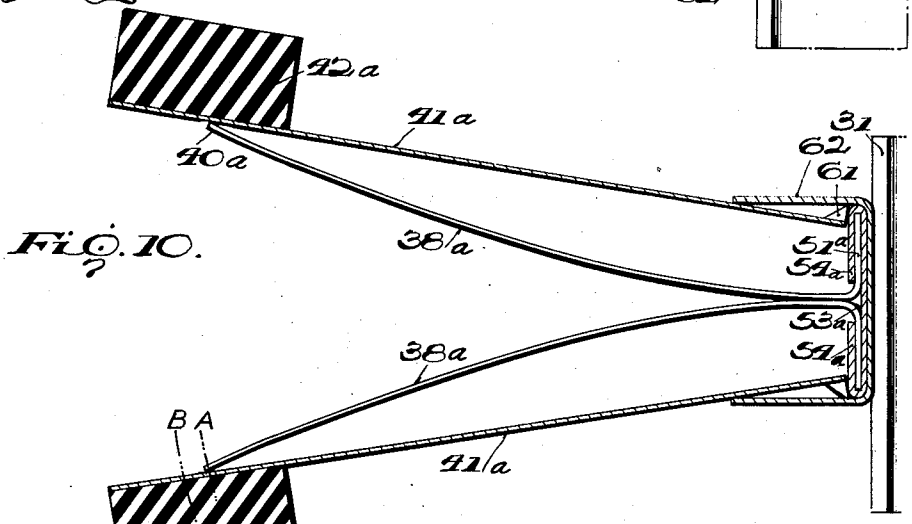


FIG. 10.

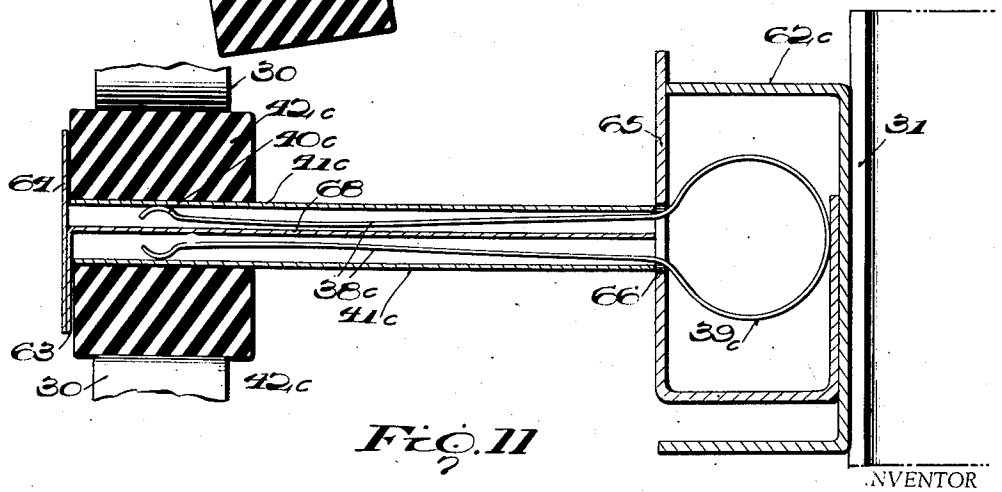


FIG. 11.

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# UNITED STATES PATENT OFFICE

2,665,536

## SPINDLE DRIVE FOR COTTON-PICKING MACHINES

John D. Rust, Pine Bluff, Ark.

Application October 5, 1951, Serial No. 249,857

23 Claims. (Cl. 56—42)

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The present invention relates broadly to a cotton picking machine and more specifically to driving means for effectively rotating the cotton picking spindles.

The present invention constitutes a continuation-in-part of my application bearing Serial No. 691,780, filed August 20, 1946, and now abandoned.

While the driving means for effectively rotating the cotton picking spindles of the present invention is directed to cotton picking machines in general, it is particularly adapted for cotton picking units such as shown in Patents 2,085,046 of June 29, 1937, and 2,458,531 of June 11, 1949.

It has been found from experience that to effectively rotate the cotton picking spindles through rollers, which engage driving rails or tracks, that the rails or tracks must be continuously urged into engagement with the spindle rollers to insure a frictional contact at all points between the driving tracks and rollers. If the driving rails or tracks are not in continuous engagement with the spindle rollers at all times, during the path of movement of the spindles through the picking tunnel or plant passageway of the unit, then the spindles will not be continuously rotated so as to effectively engage and pick the cotton from the cotton plants.

Heretofore attempts have been made to construct and assemble cotton picking machines employing a friction drive for effecting continuous rotation of the spindles as they are moved through the picking tunnel of a cotton picking unit. Friction spindle drive devices employed heretofore in cotton picking machines, have not, to my knowledge been satisfactory.

In my prior Patent No. 2,440,450, of April 27, 1948, there is shown a drive rail construction wherein sponge rubber strips are disposed between the drive rails for continuously urging the drive rails into engagement with the spindle rollers. It was found from experience that when drive rails of this particular type were employed, in cotton picking units such as referred to hereinabove, the driving surface of said rails had to be formed of a relatively thin material in order to provide sufficient space between the coacting drive rails for the insertion of fabric strips and strips of sponge rubber. The sponge rubber strips had to be relatively thick so that when compressed between the spindle rollers the strips of sponge rubber would exert sufficient pressure for driving the spindle rollers. Thus, in the use of driving rails of this type the relatively thin driving surface of the rails soon became worn to

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the extent that they had to be replaced. Thus drive rails constructed in the manner as disclosed in my aforementioned patents were found to have only a relatively short life, necessitating frequent replacement of the driving rails, with the consequent result that the cotton picking machine was often idle.

It is, therefore, the primary object of the present invention to provide a driving rail construction wherein relatively thick driving rails bonded to thin flexible metal plates may be held in contact with the spindle drive rollers.

One of the objects of the present invention is to provide a cotton picking unit having drive rails with spring members arranged in closely spaced relation and interposed therebetween for constantly urging and retaining the drive rails in engagement with the spindle drive rollers.

Another object is to provide thin flexible driving plates of an arcuate or curved configuration having relatively thick resilient driving rails affixed thereto for engaging the spindle drive rollers.

Another object is to provide thin flexible driving plates having relatively thick rubber driving rails bonded thereto with a plurality of spaced flexible spring members arranged between the plates for yieldably holding the driving rails in constant engagement with the spindle drive rollers. The spring members are preferably formed of a pair of coacting arms, which, when compressed towards one another, will be in substantially spaced parallel relation and will occupy an extremely small space between the driving plates thereby enabling the rubber driving rails to occupy nearly the entire space between adjacent spindle rollers.

A further object is to provide a cotton picking unit having spindle driving rails bonded to thin metal plates with a plurality of thin spring members arranged between the plates and in sliding and rocking engagement therewith, said sliding and rocking engagement being necessary for inserting the driving rails into operative position in the unit and to allow the thin drive rail plates to spread apart in substantially spaced parallel relation as the driving rails gradually become thin due to wear.

A further object is to provide a cotton picking machine having a plurality of arcuate or curved shaped longitudinally extending drive rails mounted at one of their ends in the picking unit of said machine for enabling the drive rails to have a vertical floating movement when engaged by the spindle drive rollers.

A still further object is to provide a driving rail construction having spring members mounted therebetween and in sliding and rocking engagement therewith for constantly producing a uniform driving pressure on the spindle drive rollers regardless of inaccuracies due to manufacture or wear on the driving surface of the driving rails.

Other objects and advantages more or less ancillary to the foregoing and the manner in which all of the various objects are realized will appear in the following description which, considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

Referring to the drawings wherein the preferred embodiment of the invention is illustrated:

Figure 1 is a horizontal sectional view of a portion of a cotton picking unit with the top frame structure removed and showing one of the spindle drive rails with spindle rollers in engagement therewith, the view being taken on a plane indicated by line 1—1 of Figure 2;

Figure 2 is a side elevational view of the cotton picking unit of Figure 1 with the stalk crowder and stalk guards removed and showing a few spindle carrying slats positioned in operative relation on the spindle drive rail units;

Figure 3 is a vertical sectional view on an enlarged scale of a portion of the cotton picking unit of the present invention showing one form of drive rail construction, the view being taken on a plane indicated by line 3—3 of Figure 2;

Figure 4 is a top plan view of one of the drive rail units shown in Figure 2;

Figure 5 is an enlarged perspective view of one form of a spring member which is slidably mounted between the thin flexible plates of the drive rail unit;

Figure 6 is an enlarged sectional view of one form of spindle drive rail unit, the sectional view being taken on a plane indicated by line A—A of Figure 1;

Figure 7 is an enlarged sectional view of another form of a drive rail unit, the sectional view being taken on a plane indicated by line A—A of Figure 1;

Figure 8 is an enlarged sectional view of the drive rail unit shown in Figure 6 with certain of the elements omitted in the interest of clarity to show the relation of the various parts when the driving rails have been worn thin from usage;

Figure 9 is an enlarged sectional view of another form of a drive rail unit, the view being taken on a plane indicated by B—B of Figure 1;

Figure 10 is an enlarged sectional view of the drive rail unit of Figure 9 showing the drive rail unit in an inoperative position;

Figure 11 is an enlarged detail sectional view of the drive rail unit shown in Figure 3, the view being taken on a plane indicated by line B—B of Figure 1.

Referring to the drawings there is shown in Figure 1 a portion of a Rust cotton picking unit having end frame members 16 and 17, with a stalk crowder 18 and stalk guards 19. A tubular housing 21 having a drive shaft 22, Figure 2, journaled therein and a tubular housing 23 having a driven shaft 24 journaled therein are suitably mounted on the frame structure of the picking unit. The shafts 22 and 24 have suitable sprockets mounted on the top and bottom ends thereof, but only a portion of the bottom sprockets are shown in Figure 1 with the sprocket 25 mounted on shaft 22 being the driving sprocket while sprocket 26 mounted on shaft 24 is a driven sprocket. The sprockets on shafts 22 and 24 have chains 27 entrained thereabout for carrying spindle slats 28, Figure 2, which in turn have spindles 29 journaled therein. The spindles 29 have spindle drive rollers 30 mounted on their inner ends, Figure 3.



The picking unit frame is provided wtih a plurality of vertically disposed frame posts 31, which are arranged in spaced relation between the tubular housings 21 and 23. The posts 31 are secured to the top and bottom frame members, not shown, of the cotton picking unit and are arranged in such a manner as to define a curved or arcuate path. The posts 31 have secured thereto in any suitable manner an arcuate shaped backing plate or curved inner wall 32 which extends between the top and bottom frame members and the tubular housings 21 and 23.

As shown in Figure 2, the forward end portion of the plate 32 adjacent the tubular housing 23 has a plurality of channel shaped brackets 33 secured thereto in vertically spaced relation. The brackets 33 may be secured to the plate or wall 32 by any suitable means. The brackets 33 have mounted therein on pins 35 the forward or entrant end of the spindle drive rail unit. It is to be understood that only the forward end of the plate 32 is provided with brackets 33 for supporting the drive rail units, Figure 4, which are of an arcuate or curved configuration conforming to the configuration of the wall 32 so that the wall serves as a limit stop or backing member.

The driving rail unit shown in Figures 1, 4, and 7 is of an arcuate or curved configuration and includes a spring supporting or retaining member 36, Figure 7, which is formed with a plurality of spaced slots 37 through which extend flexible spring arms or wings 38. The spring arms 38 terminate at their inner ends in a loop 39 with the arms 38 being retained in proper relation to each other by the member 36. The spring arms 38 are preferably slightly curved or rounded at their free or outer ends 40 for slidably engaging the lower or inner faces of a pair of thin flexible drive rail plates 41. However, instead of curving or rounding the outer ends 40 of the spring arms 38 said arms may terminate in flat or straight end portions 40a, as shown in Figures 9 and 10, which end portions have a sliding engagement with the inner faces of the flexible drive rail plates. The drive rail plates 41 have resilient drive rails 42 secured to their outer faces along the outer edge portions thereof. The resilient drive rails 42 are preferably formed of rubber which is bonded to the drive rail plates 41. The entrant or anchoring end of the drive rail plates 41 is preferably reinforced by securing to the inner and outer faces relatively heavy metal plates 43, Figure 4. The reinforcing plates 43 are secured to the inner and outer faces of the drive rail plates 41 by any suitable means. The two drive rail plates 41, of each drive rail unit, are joined together at their reinforced entrant ends by a rivet 44, Figure 4. The outer reinforcing plates 43 that are secured to the drive rail plates 41 are formed with an inwardly projecting flange 45 which serves as a safety guiding means for the spindle bearing supports 46, Figure 3. The reinforced end portions of the driving rail plates 41 are provided with a suitable aperture 47, Figure 4, through which the pin 35 is adapted to extend for supporting the spindle drive rail unit in the bracket 33, as shown in Figure 2. The looped portion 39 of the spring arms 38 are pro-

vided with a backing strip 49, Figure 4, which backing strip is adapted to slidably engage the wall 32 during the assemblying of the drive rail unit into its operative position. As shown in Figures 4 and 7, the backing strip 49 has a plurality of spaced clips 50 secured thereto, which are adapted to engage the looped portions 39 of some of the spring arms 38 for retaining the backing strip 49 in engagement with said looped portion of the spring arms.

In Figures 6 and 8 there is shown another form of a spindle drive rail unit. In Figure 6 the spring arms 38b have outwardly projecting flanges or foot portions 51 formed at their inner ends which are positioned within a spring retaining or supporting member 52. The spring retaining member 52 is similar in length and curvature to the spring retaining member 36 shown in Figure 4, and includes a backing portion 53 having inturned leg portions 54. The foot portions 51 of the spring arms 38b are positioned between the leg portions 54 and backing portion 53 of the retaining member 52 in approximately abutting engagement with the foot portions of adjacent spring arms throughout the length of the retaining member 52. In the form of the driving rail plates 41b, shown in Figure 6, the inner ends of the plates are formed with outwardly extending flanged portions 55 which are adapted to have a sliding engagement with the inturned leg portions 54. The spring arms 38b have interposed therebetween a T-shaped rib composed of a top plate 56 and a bottom plate 57 which are secured together throughout their longitudinal length by any suitable means. The outer edge of the top plate 56 is provided with an upturned flange portion 58 while the bottom plate 57 is provided with a downwardly extending flange portion 59 at its outer edge.

The drive rail unit shown in Figure 8 illustrates the relative positions of the spring arms 38b and drive rail plates 41b after the spindle drive rollers 30b have worn away most of the rubber drive rails. As shown in Figure 8 the drive rail plates 41b have been moved apart with respect to one another as the result of wear of the drive rails 42b. As the drive rail plates 41b are moved apart the outer ends 40b of the spring arms 38b will have a sliding movement from approximately the point B to the point A on the inner faces of the drive rail plates 41b as the spring arms force the plates apart, as clearly shown in Figure 8. The drive rail plates 41b will have a rocking engagement about the ends 40b of the spring arms so that the drive rail plates are maintained in substantially spaced parallel relation throughout the greater portion of their length. As the drive rail plates 41b are forced apart by the spring arms 38b the flanged portions 55 of the drive rail plates will slide over the leg portions 54 of the spring retaining member 52. It is essential that the drive rail plates 41b, of each drive rail unit, be maintained in substantially spaced parallel relation with one another throughout the greater portion of their length. If the drive rail plates should become canted or tilted the drive rail plates would become crimped and distorted due to their arcuate configuration, resulting in an uneffective engagement between the drive rails and the spindle drive rollers.

In the drive rail unit shown in Figure 6 the entrant or anchoring ends of the drive rail plates 41b are reinforced in the same manner as the drive rail plates shown in Figure 4. The central T-shaped rib member, shown in Figure 6, is also



reinforced by sheet metal plates at its entrant end and the reinforced drive rail plates 41b and rib member are joined together at their entrant ends by rivets in the same manner as the drive rail plates shown in Figure 4. The entrant end of the drive rail unit shown in Figure 6 is provided with an aperture for anchoring the entrant end of the drive rail unit in the bracket 33. The central T-shaped rib member has been omitted from Figure 8 in the interest of clarity.

In Figures 9 and 10 there is shown another form of a drive rail unit. In the form of the drive rail unit shown in these figures the spring arms 38a with foot portions 51a are supported in a spring retaining member or base rib having the form of a flat slotted tube structure 52a which is similar in structure to the retaining member 52 shown in Figure 6. The spring arms 38, which have a slight outwardly curved configuration, terminate in flat or straight end portions 40a instead of the slightly curved or rounded ends 40 shown in Figure 5. The drive rail plates 41a, at their inner edges, are formed with outwardly extending projections 61 disposed in spaced relation with one another throughout the length of the drive rail plates. The projections 61 engage the inturned leg portions 54a of the spring retaining member 52a to insure that the inner edges of the drive rail plates will slide over the leg portions 54a and will not become wedged between the ends of the leg portions 54a and the portion of the spring arms 38a which extend between the leg portions 54a.

The spring retaining member 52a of the drive rail unit of Figure 9 is slidably mounted in a channel member 62 which is secured to the frame posts 31, Figure 1, by any suitable means. When using the drive rail unit shown in Figures 9 and 10 the backing plate or wall member 32 is not required, as the channel members 62 secured to the frame posts 31 serve as backing plate members for the spring retaining members 52a. When the channel members 62 are used the channel flanges of the forward end of the channel members are provided with suitable apertures for receiving the anchoring pins 35 to which the drive rail plates are anchored. In Figure 10 the drive rail unit illustrated in Figure 9 is shown in an inoperative position. The drive rail unit shown in Figure 10 clearly illustrates the fact that when the drive rail plates 41a are pressed towards one another, sufficiently to enable the unit to be inserted between the spindle rollers, the outer ends of the spring arms 38a will have a sliding movement along the inner faces of the drive rail plates while the drive rail plates will have a slight rocking movement on the ends 40a of the spring arms.

There is shown in Figures 3 and 11 another form of a drive rail unit. The spring arms 38c with the loop 39c and the drive rail plates 41c and drive rails 42c are similar to the spring arms and drive rail plates shown in the drive rail unit of Figure 7. The central T-shaped rib member 68, shown in Figure 11, is formed of a single piece of material with a downwardly extending flange 63 formed at the outer edge thereof. The flange 63 has a plate member 64 secured thereto which projects above the upper drive rail plate 41c. The inner ends of the spring arms 38c and the looped portion 39c are supported in a spring retaining member or base rib 65. The spring retaining member 65 is formed with a plurality of spaced slots 66 through which the inner ends of the spring arms 38c project and terminate in the loop 39c. The spring retaining member 65 is dis-

posed within a channel member 62c which is secured to the frame posts 31 in the same manner as the channel member shown in Figure 9. The entrant or anchoring end of the drive rail plates 41c and the central rib member are secured together in the same manner as the drive rail plates and central rib member shown in Figure 6 and the reinforced ends of the drive rail plates and central rib member of Figure 11 are anchored at their entrant end in the same manner as the drive rail unit of Figure 9. In Figure 3 there is shown the drive rail unit of Figure 11 in an operative position with the spindle drive rollers 30 engaging the driving rails 42c.

In the various forms of the drive rail unit shown in the present application the outer ends of the spring arms 38 are configured to have a line contact with the inner faces of the drive rail plates 41 at all times. With the drive rail units in their assembled and operative position the line contact, between the outer ends of the spring arms 38 and the inner faces of the drive rail plates 41, is approximately equally spaced from the inner and outer edges of the drive rails 42. Thus with the outer ends of the spring arms 38 so positioned with respect to the drive rail 42 the pressure exerted on the spindle drive rollers 30 is more evenly distributed over the roller surface.

In the form of the drive rail unit shown in Figures 6, 8, 9, and 10 the inner edges of the drive rail plates 41 are provided with flanged portions or projections which slidably engage the spring retaining member as the drive rail plates are moved apart through the action of the spring arms 38. In the form of drive rail unit shown in Figures 7 and 11 projections or flanged portions on the inner edges of the drive rail plates are not required because of the type of spring retaining member employed. However, the inner edges of the drive rail plates have a sliding engagement with the spring retaining member and are adapted to move over the spring retaining member as the spring arms force the drive rails apart. The sliding engagement of the inner edges of the drive rail plates with the spring retaining members assures that the drive rail plates of each drive rail unit will be maintained in substantially spaced parallel relation with one another throughout the greater portion of their length.

While some of the forms of the drive rail unit disclosed in the present application show a central T-shaped rib or plate interposed between the spring arms 38, it is to be understood that the drive rail unit of the present invention may be employed with or without such a central plate or rib. The flanged portions of the central plate or rib which lie along the outer edge of the driving rails 42, as shown in Figures 6 and 11, constitute a wear surface for the spindle slats 28 as the spindle slats are moved over the driving rail 42. As shown in Figure 3, the portion of the spindle slats 28 between adjacent spindle rollers 30 is provided with a hard wearing surface 67, which may be formed of fiberboard. The wearing surface 67 may engage the outer face of the flange provided on the central plate or rib member and thus prevent wear on the outer edges of the driving rails 42.

With the drive rail units assembled in the manner as shown in Figures 6, 7, 9, or 11 the drive rail units may be inserted within the picking side of the cotton picking unit in the manner as illustrated in Figure 2. As shown in Figure 2 some of the spindle slats are removed from the chain 27 at the front and rear ends of the picking side of the picking unit. With the slats so removed the entrant or anchoring end of the drive rail unit is inserted between adjacent spindle drive rollers as shown in Figure 3. The drive rail unit so inserted is forced towards the forward end of the picking unit until the aperture 47 in the anchoring end of the drive rail unit is brought into such position that the pins 35 may be inserted through channel member 62 or bracket 33 and the aperture 47 so as to anchor the drive rail unit. During the process of mounting the drive rail unit into its operative position in the slat 28 the spindle rollers 30 in engaging the drive rails 42 and pressing the drive rail plates towards one another cause the outer ends of the spring arms 38 to slide along the inner faces of the drive rail plates. It has been found from experience that in order to insert the drive rail units, of the present invention, into their operative position, that the outer ends of the spring arms must have a sliding engagement with the inner faces of the drive rail plates so that said plates may be pressed toward one another.

Referring to Figure 10 the drive rail unit is shown in an inoperative position. When the drive rail plates are pressed towards one another through the engagement of the spindle rollers with the drive rails the outer ends 40a of the spring arms 38a will have a sliding engagement with the inner faces of the drive rail plates and move from approximately point A to point B as the drive rail plates are pressed towards one another when the drive rail unit is being inserted into its operative position. If the outer ends of the spring arms were secured in any manner whatsoever to the drive rail plates it would be impossible for the drive rail unit to be inserted into its operative position.

During the operation of the cotton picking unit the spindle slats 28, carried by the endless chains 27, will move the spindle drive rollers 30 over the entrant end of the drive rail unit and into engagement with the driving rails 42. It is to be borne in mind that the connection of the drive rail anchor plates 41 on the pins 35 is at the inner edge portion of the drive rail unit so that the outer edge portion of the drive rail unit is disposed outwardly from the brackets 33 with the driving rails 42 secured to the outer edge portions of the driving rail plates 41. Thus, as the spindle drive rollers 30 move over the entrant end portion of the driving rail plates 41 they engage the driving rails 42 and the frictional contact of the rollers 30 with the driving rails 42 causes the spindles 29 to be rotated and consequently pick the cotton from the plants. As the spindle rollers 30 continue to move over the driving rails 42 the rails will gradually become worn, and thus to insure that the driving rails are constantly and continuously in engagement with the spindle rollers 30 the driving rail plates 41 are continuously forced apart or outwardly through the action of the spring arms 38. As wear occurs on the drive rails 42 the sliding and rocking engagement of the outer ends of the spring arms 38 with the inner faces of the drive rail plates 41 will permit the spring arms 38 to force the drive rail plates apart to compensate for such wear while maintaining the drive rail plates in substantially spaced parallel relation with one another.

What I claim is:

1. In a cotton picking unit having a plurality of picking spindles, a driving unit for said spindles including a support, a pair of thin flexible

plates, said plates being connected together at one end with said end connected to said support, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said drive rails into engagement with the spindles.

2. In a cotton picking unit having a plurality of picking spindles, a driving unit for said spindles including a support, a pair of thin flexible plates, said plates being connected together at one end with said end connected to said support, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said drive rails into engagement with the spindles, said plates having a rocking movement about the outer ends of said spring arms for maintaining said plates in substantially spaced parallel relation throughout the greater portion of their length.

3. In a cotton picking unit having a plurality of picking spindles, a drive rail unit for said spindles including a support, a spring retaining member, a pair of drive rail plates, a central plate interposed between said drive rail plates, said drive rail plates and central plate connected together at one end with said end connected to said support, drive rails secured to the drive rail plates for rotating said spindles, a pair of spring arms having one end mounted in said spring retaining member, the other end of each of said spring arms extending between said central plate and each of said drive rail plates, said drive rail plates slidably engaging said spring arms for retaining said drive rail plates in substantially spaced parallel relation and said drive rails in engagement with said spindles.

4. In a cotton picking unit having a plurality of picking spindles, a driving unit for said spindles including a support, a spring retaining member, a pair of thin flexible plates, said plates being connected together at one end with said end connected to said support, flanged portions provided on one edge of said plates, said flanged portions slidably engaging said spring retaining member, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, one end of said spring arms being mounted in said spring retaining member, the other end of said spring arms slidably engaging said plates for urging said drive rails into engagement with said spindles.

5. In a cotton picking unit having a plurality of picking spindles, a drive rail unit for said spindles including a backing member, a spring retaining member engaging said backing member, a pair of thin flexible plates, one edge of said plates slidably engaging said spring retaining member, said plates being connected together at one end with said end connected to said backing member, drive rails affixed to said plates for rotating said spindles, spring arms positioned between said plates, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for maintaining said plates in substantially spaced parallel relation throughout the greater portion of their length.

6. In a cotton picking unit having a plurality of picking spindles, a drive rail unit for said spindles including a support, a backing member engageable with said support, a spring retaining member, a pair of plates, said plates being secured at one end with said end connected to said support, said plates having an edge slidably engageable with said spring retaining member, relatively thick resilient drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, one end of said spring arms being mounted in and carried by said retaining member, spaced clips mounted on said backing member and engaging said one end of said spring arms, the other end of said spring arms slidably engaging said plates for moving said plates apart as the thickness of said drive rails is reduced.

7. In a cotton picking unit having a plurality of picking spindles, a drive rail unit for said spindles including a backing member, a spring retaining member engaging said backing member, said spring retaining member having a pair of inturned leg portions, a pair of plates, said plates being connected together at one end with said end connected to said backing member, one edge of said plates slidably engaging the inturned leg portions of said spring retaining member, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, said spring arms having foot portions formed on one end with said one end mounted within said spring retaining member, the other end of said spring arms slidably engaging said plates for urging said drive rails into engagement with the spindles.

8. In a cotton picking unit having a plurality of picking spindles, a drive rail unit for said spindles including a support, a spring retaining member including a backing portion and inturned leg portions engaging said support, a pair of spring arms mounted in said spring retaining member, said spring arms having outwardly projecting flanges provided on one end with the flanges positioned between the backing member and the inturned leg portions of said spring retaining member, a pair of plates, said plates being connected together at one end with said end connected to said support, drive rails secured to said plates for rotating said spindles, one edge portion of said plates having projections thereon for slidably engaging the leg portions of said spring retaining member, the other edge portion of said plates slidably engaging the other end of said spring arms for moving the projections on said plates over the said leg portions and said drive rails into engagement with said spindles.

9. In a cotton picking unit wherein a travelling conveyor having spindle-carrying slats and spindles with rollers is provided with means for rotating the spindles: the improvement which includes a fixed channel iron, at least one spindle drive unit, said unit including a spring retaining member floatably held in said fixed channel iron, rail-carrying plates extending from said spring retaining member to a position between the spindle rollers of two sets of spindles, leaf springs mounted in said spring retaining member and extending between said rail carrying plates, and spindle-roller-engaging drive rails mounted on said rail-carrying plates and held to engage said rollers under pressure by said springs.

10. A spindle drive unit comprising a spring retaining member, a pair of drive rail carrying

plates, a plurality of sets of diverging spring wings mounted in said spring retaining member and arranged to extend between said drive rail carrying plates, a central T-rib plate located between said diverging spring wings, said pair of drive-rail-carrying plates located between the head of the T-rib plate and said spring retaining member, and drive rails on said drive-rail-carrying plates adjacent the head of said T-rib plate.

11. A spindle drive unit comprising a spring retaining member, a pair of drive rail carrying plates, a plurality of sets of diverging spring wings mounted in said spring retaining member and arranged to extend between said drive rail carrying plates, a central T-rib plate located between said diverging spring wings and drive rails on said drive-rail-carrying plates adjacent the head of said T-rib plate.

12. A drive unit according to claim 11 wherein said spring retaining member comprises a body having spring wings mounted therein and wherein said spring wings are provided with means to retain them in said spring retaining member.

13. A spindle drive unit according to claim 10 wherein one end of said central T-rib and one end of each of said drive-rail-carrying side plates are secured together.

14. A spindle drive unit according to claim 10 wherein one each of the ends of said central T-rib and said drive-rail-carrying side plates are secured together and have their secured ends rounded to facilitate the entrance of the spindle rollers onto the drive rails when in operating position in a cotton picking unit.

15. A spindle drive unit according to claim 9 wherein means are provided for holding the unit against movement in the longitudinal direction of the fixed channel iron while in operation.

16. An improvement according to claim 9 wherein means are provided, at the ends of spindle drive units which are engaged first by the rollers, for engagement with a fixed abutment pin to hold the units against movement in the longitudinal direction of the fixed channel iron while in operation.

17. A spindle drive mechanism comprising a fixed channel iron, a spindle drive unit which includes a spring retaining member positioned in said fixed channel iron, pairs of leaf springs mounted in said spring retaining member and projecting therefrom, a pair of plates carrying spindle-roller-engaging rails engageable with said springs.

18. In a cotton picking unit having a plurality of picking spindles, a plurality of driving units for said spindles, a support for said driving units, each driving unit including a pair of thin flexible plates, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said driving rails into engagement with the spindles and means for preventing said driving units from moving along said support.

19. In a cotton picking unit having a plurality of picking spindles, a plurality of driving units for said spindles, a support for said driving units, each driving unit including a pair of thin flexible plates, means for connecting said plates together to prevent longitudinal movement of said plates with respect to each other but providing for lateral movement with respect to each other, drive rails secured to said plates for rotating said spindles, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said driving rails into engagement with the spindles and means for preventing said driving units from moving along said support.

20. A spindle drive unit including a pair of thin flexible plates, drive rails secured to said plates, spring arms positioned between said plates, said plates being adapted to move toward and from one another, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said drive rails apart and for maintaining said plates in spaced and substantially parallel relation with one another.

21. A spindle drive unit including a spring retaining member having a backing portion and inturned leg portions, a pair of thin flexible plates having one edge portion slidably engaging said leg portions, said plates being adapted to move toward and from one another, spindle drive rails secured to said plates, a pair of spring arms positioned between said plates, said spring arms having outwardly projecting flanges formed on one end thereof with said flanges positioned between said backing portion and said inturned leg portions, the other end of said spring arms slidably engaging said plates for urging the other edge portion of said plates apart and simultaneously sliding the first mentioned edge portion of said plates over said leg portions.

22. A spindle drive unit including a pair of thin flexible plates, said plates being connected together at one of their ends, drive rails secured to said plates, said plates being adapted to move toward and from one another throughout the greater portion of their length, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, and the other end of said spring arms slidably engaging said plates.

23. A spindle drive unit adapted to be mounted in a cotton picking unit having a longitudinally extending plant passageway, said spindle drive unit including a pair of thin flexible plates, drive rails secured to said plates, said plates being adapted to move toward and from one another, spring arms positioned between said plates, a spring retaining member, one end of said spring arms being mounted in said retaining member, the other end of said spring arms slidably engaging said plates for urging said rails apart, and means for detachably mounting said plates on said picking unit for preventing said plates from moving longitudinally of said tunnel .

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