Nov. 11, 1958 J. H. WIGHAM Re. 24,565

FALLEN PLANT PICK-UP ATTACHMENT FOR COMBINES

Original Filed Oct. 6, 1952 2 Sheets-Sheet 1

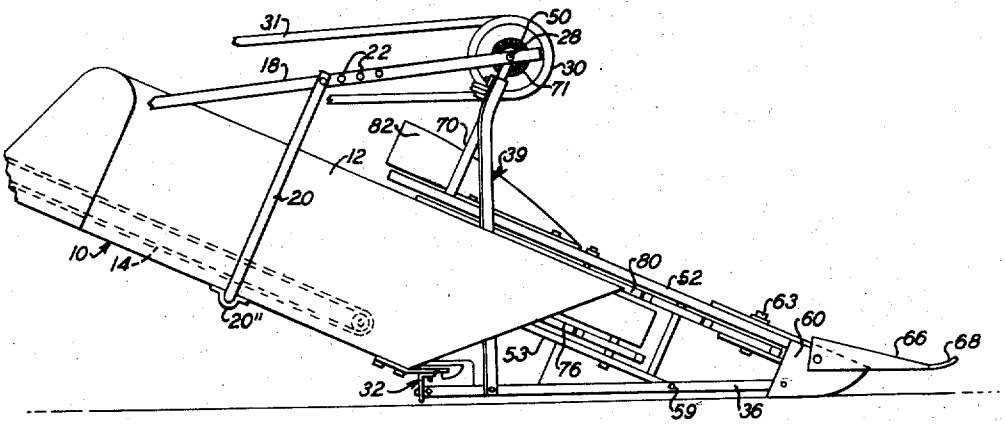


FIG. 1

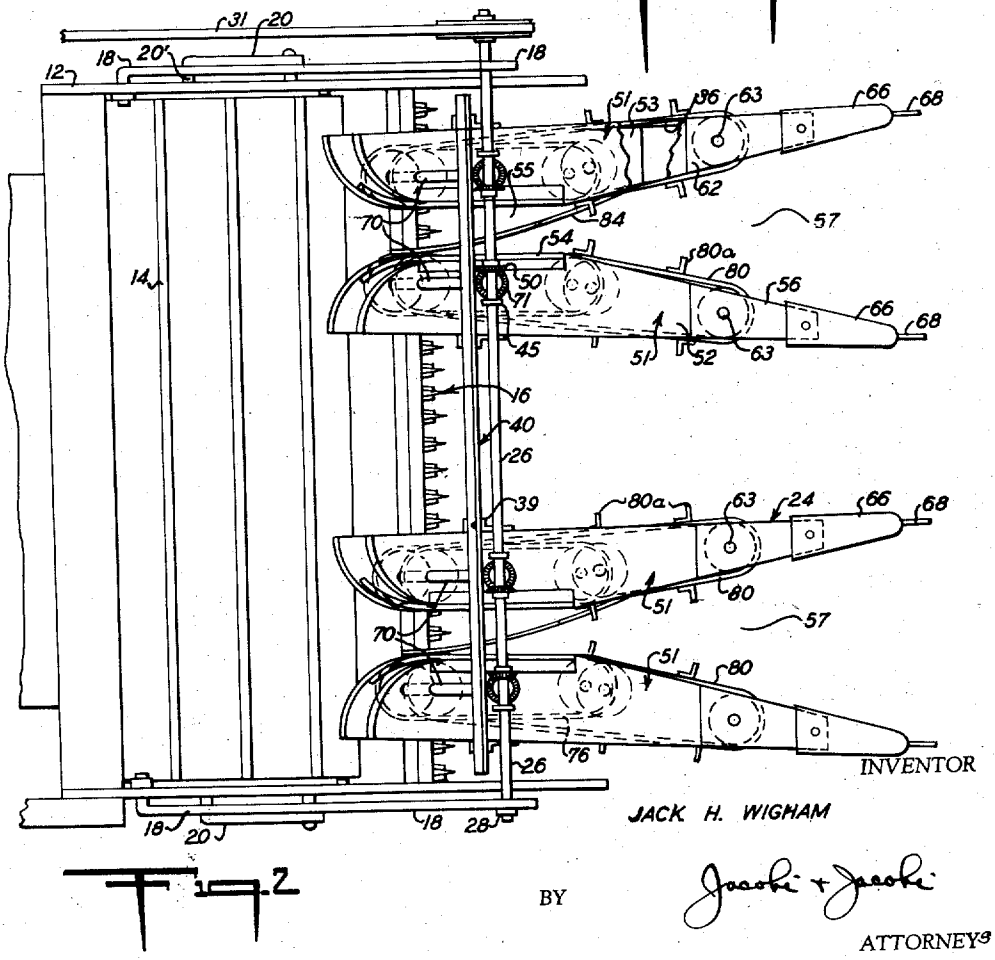


FIG. 2

INVENTOR
JACK H. WIGHAM

BY Jacobi & Jacobi

ATTORNEYS

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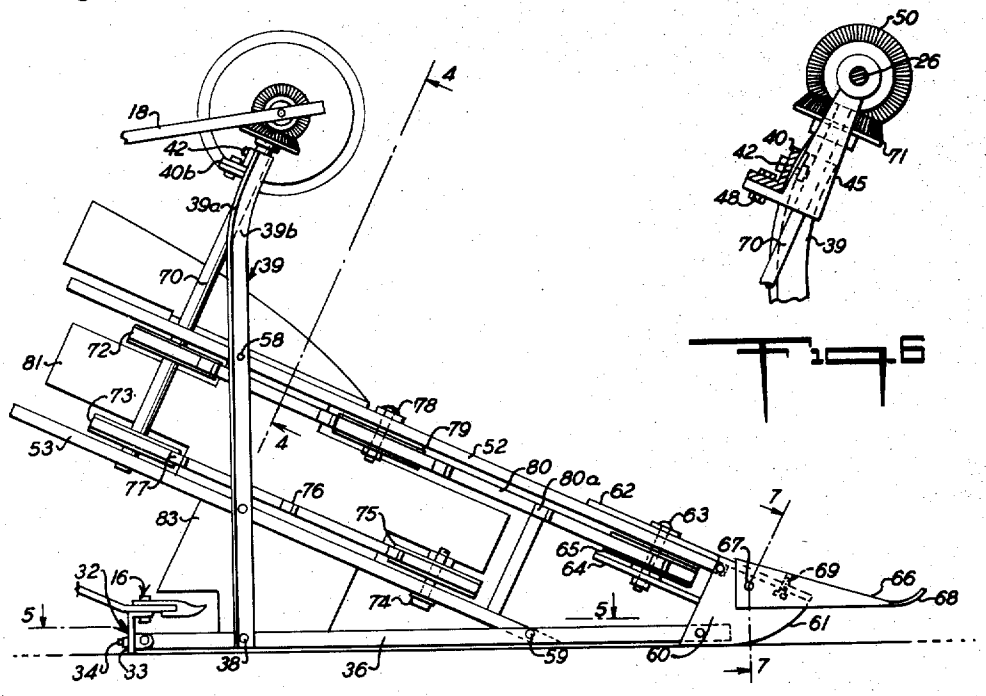


FIG. 1

FIG. 6

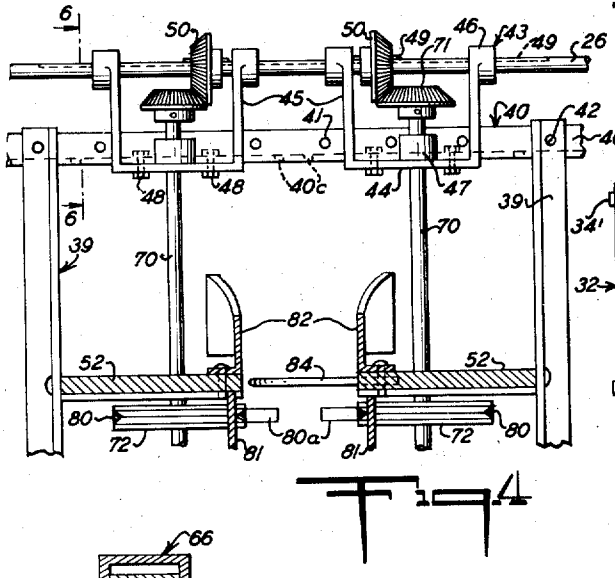


FIG. 4

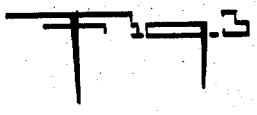


FIG. 3

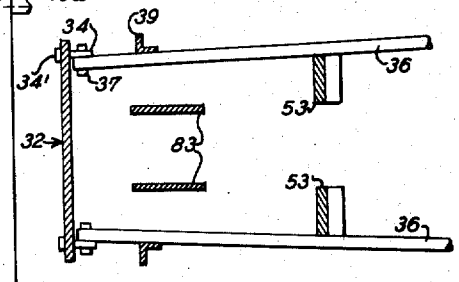


FIG. 5

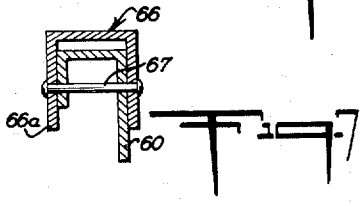


FIG. 7

INVENTOR

JACK H. WIGHAM

BY Jacobi & Jacobi

ATTORNEYS

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FALLEN PLANT PICK-UP ATTACHMENT FOR COMBINES

Jack H. Wigham, Panhandle, Tex.

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2 Claims. (Cl. 56—98)

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates generally to the class of harvesting machines and is directed particularly to an attachment for a combine.

The present combine attachment is designed for picking up grain crops which have fallen over or been beaten down by wind or rain.

In connection with the production of grain crops such as wheat, grain sorghums and the like a great deal of loss occurs as a result of the plant falling over or being beaten to the ground so that when the harvesting machine of the conventional type passes over the field much of the fallen plants are passed over. Consequently a large percentage of the grain remains in the field and becomes a loss to the farmer.

A principal object of the present invention is to provide an attachment for a combine machine which is substituted for the regular rotating reel which cooperates with the cutter to move the cut plants onto the combine conveyor belt, by means of which substitute attachment grain plants which have fallen to the ground can be elevated or raised up and fed to the cutter and then passed into the combine structure in the conventional manner to be thrashed.

Another object of the invention is to provide a combine attachment of the above described character which is designed in a novel manner whereby individual plant stalks can be engaged and raised to an upright or near standing position so as to be cut off and caught on the combine conveyor apron.

Still another object of the invention is to provide an attachment of the character stated wherein one or more pairs of forwardly extending elongate units are carried over and extend forwardly from the cutter to pass along the crop row and receive between the members of each pair the fallen grain, the said members of each of the units being relatively adjustable so as to adapt them to operate efficiently along thin or sparsely planted rows as well as upon thickly planted rows.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of the specification, with the understanding, however, that the invention is not to be limited to the exact details of construction shown and described since obvious modifications will occur to a person skilled in the art.

In the drawings:

Figure 1 is a view in side elevation of the forward end portion of a combine cutter and elevator apron showing attached thereto the mechanism of the present invention in place of the conventional reel.

Figure 2 is a view in top plan of the structure shown in Figure 1, a portion of the top plate of one of the pick-up units being broken away to show the termination of the shortened forward end of the bottom plate.

Figure 3 is a view in side elevation on an enlarged scale of the attachment with *certain parts omitted for greater clarity* [a portion only of the combine cutter bar].

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 3, on an enlarged scale.

Figure 5 is a horizontal section *on a reduced scale* taken substantially on the line 5—5 of Figure 3 through the two cooperating parts of a pick-up unit.

Figure 6 is a sectional view, on an enlarged scale, taken substantially on the line 6—6 of Figure 4.

Figure 7 is a section taken substantially on the line 7—7 of Figure 3.

Referring now more particularly to the drawings the numeral **10** generally designates the grain receiving apron structure of a conventional combine which comprises the forwardly directed spaced parallel side walls **12** between which is located the conveyor **14** which carries the cut grain into the combine for treatment.

Extending across the front edge of the bottom portion of the structure **10** is the usual or conventional cutter bar which is generally designated **16** and supported on an angle bar **32**, as best shown in Figure 3.

The numeral **18** designates two arms each of which is pivotally attached to a side wall **12** for vertical swinging movement. These arms support the conventional reel and reel shaft which for the application of the present invention are removed.

The numeral **20** designates pivoted braces or support struts which are attached to the structure **10** by inwardly angled lower end portions **20'**, engaged in eyes **20''** on the structure bottom and are adjustably connected at their upper ends as at **22** to the reel arms **18** to support the latter in vertically adjusted position.

In accordance with the present invention there are provided one, two or more pick-up units **24**, according to the size of the combine to which the invention is attached. Two such units are here illustrated but it is to be understood that the invention is not confined to the use of this number.

The units **24** are operated off of the driven reel shaft **26**, from which the reel has been removed and is journalled at its ends in bearings **28** carried by the arms **18**, as illustrated. One end of this shaft carries a pulley **30** with which is connected the drive belt **31** operated from a suitable part of the combine structure, not shown, in the conventional manner.

Disposed beneath and lengthwise of the cutter bar of the mower **16** is an angle bar support which is generally designated **32** and which is positioned with one flange or angle **33**, directed downwardly as is clearly shown in Figures 1 and 3. This downwardly directed flange **33** of the angle bar support has secured thereto a pair of forwardly directed hinge ears **34**, for each of the units **24**, which ears are suitably spaced in the direction of the length of the angle bar **32** as shown in Figure 5. These hinge ears **34** are attached to the flange **33** by means of bolts or the like **34'**.

Each pick-up unit comprises two forwardly extending frame arms **36** each of which is pivotally attached as at **37** to a hinge ear **34** to extend a substantial distance forwardly beyond the mower mechanism **16**.

Secured as at **38** to the rear end portion of each frame arm **36** is an upright post or standard **39** which is curved slightly forwardly at its upper end as illustrated. These posts are preferably formed of angle iron material whereby each provides a laterally extending flange **39a** and a forwardly extending flange **39b**.

Extending across and connecting the forwardly curving upper ends of the pair of posts or standards **39** of the unit is an angle iron rail **40** having one flange extending upwardly as indicated at **40a** and the other flange disposed to extend rearwardly as indicated at **40b**.

In the present showing the rail **40** has been provided to have sufficient length to extend across and connect the posts **39** of both of the units shown.

The upstanding flange **40a** of the rail **40** is provided with the longitudinally extending series of adjustment apertures **41** and this flange lies against the lateral flanges **39a** of the adjacent posts as shown so that securing bolts **42** may be passed through suitable apertures in the upper ends of the standards or posts **39** into selected ones of the apertures **41** to vary, as desired, the spacing between the pairs of posts.

Between the pair of posts **39** there are positioned two bearing units each of which is generally designated **43**. Each unit is of rectangular U-shaped form and the comprises a bracket or bottom plate **44** from each side of which rises an arm **45** which carries on its top end the bearing **46**. *Other types or forms of bearing supports may, of course, be utilized.*

At the center of the plate between the arms **45** is a vertical bearing **47** for the purpose hereinafter described.

The two bearing units **43** are disposed with the arms **45** against the upstanding flange portion **40a** of the rail **40** and a portion of the plate **44** extends across and is positioned against the underside of the flange of **40b**. This portion of flange **40b** is provided with a plurality of adjustment apertures **40c** to receive the securing bolts **48** which are extended through suitable apertures in the plates **44** whereby the plates, and consequently the bearing units, can be adjusted lengthwise of the rail **40**.

The shaft **26** extends through the aligned bearings **46** of the units **43** as shown in Figure 4 and thus is supported from the rail **40** in addition to being supported at its ends by the reel arms **18**.

The shaft **26** is provided with a key slot **49** and between each pair of arms **45** the shaft **26** carries a miter gear **50** which is slidably connected with the shaft **26** by a key **49a** engaged for movement longitudinally in the slot **49**. Thus it will be seen that the shaft will effect rotation of the gears **50** and the gears may be shifted lengthwise on the shaft as necessary.

Each of the pick-up units **24** comprises two spaced elongate feeder parts each of which is generally designated **51** and which are in spaced relation as shown in Figure 2. Each of the feeder parts **51** comprises the vertically spaced top and bottom plates **52** and **53** respectively, the rear edge portions of which are in substantially parallel relation as indicated at **54**, forming a throat **55** into which the picked up material is received, while the adjacent or opposing edges of the top and bottom plates forwardly of the straight parallel edges or portions **54**, are tapered as indicated at **56** so as to have a forwardly divergent relation providing the feeder or feed entrance **57** leading to the throat **55**.

As shown in Figures 1 and 3 the top and bottom plates **52** and **53** are in vertically spaced parallel relation and they are disposed at a forward and downward inclination between the pair of posts **39** to which they are secured by screws or bolts **58**.

The under or bottom plate **53** of each pair is also considerably shorter than the top plate **52** as shown in the two figures mentioned and the forward end of each bottom plate **53** is secured at the outer side thereof to the inner side of the adjacent frame arm **36** as indicated at **59**.

Each of the frame arms **36** as its forward end is joined to the outer edge of the overlying end of the adjacent top plate **52** by the vertical shoe plate **60** which has the forwardly and upwardly curving advancing edge **61**.

The top edge of this shoe plate **60** is joined to the inwardly extending top plate **62** which extends rearwardly over the top of the adjacent plate **52** and is secured in position by the pivot bolt **63** which passes downwardly through the adjacent plate **52** and is connected at its lower end to an arm **64** carried by and extending rearwardly from the shoe plate **60**. On this pivot bolt **63** is

rotatably mounted a pulley **65** the periphery of which on the feeder or entrance side thereof is approximately in the vertical plane of the adjacent edge **56** of the overlying plate **52**.

Positioned over and straddling the forward end of each shoe **60** and the forward end of the plate **62** connected therewith is the forwardly tapering channeled pick-up arm **66** which is positioned with the channel downwardly extending so that the side portions **66a** may have extended transversely therethrough and through the shoe **60**, the pivot pin **67**.

The pick up arm **66** extends a substantial distance beyond the forward end or point of the shoe plate **60** as shown in Figures 1 and 3 and carries at its forward end the slender forwardly and upwardly curving finger **68**.

Threaded through the plate **62** from the underside is an adjustment screw **69** which engages the underside of the arm **66** so that the arm may have its forward end raised or lowered thereby providing for vertical adjustment of the pick up portion of the feed unit member in addition to the raising and lowering facility provided by the pivoted reel arms **18** which when raised or lowered elevate or depress the entire attachment, turning the same on the pivots **37**.

Each of the vertical bearings **47** has extended therethrough the upper end of a vertical shaft **70** which extends downwardly through the rear ends of the underlying pair of plates **52** and **53**. The upper end of the shaft **70** carries the miter gear **71** which meshes with the adjacent gear **50** and at the lower end between the plates **52** and **53** the shaft has secured thereto the upper and lower belt pulleys **72** and **73** respectively. *While a bevel gear drive means has been shown and described, it is to be understood that other suitable power transmitting means may be employed.* The peripheries of these pulleys are adjacent to the inner edges **54** of the top and bottom plates of the two feeder parts as shown most clearly in Figure 2.

At the forward end of each of the bottom plates **53** there is fixed the projecting pivot bolt **74** on which is mounted, above the plate, the pulley **75**. This pulley is at the forward end of the throat **55** while the corresponding pulley **73** is at the rear end of the throat and trained around these pulleys is the endless belt **76** which carries the outwardly projecting fingers **77** which project into the throat on the inner run of the belt.

Each of the top plates **52** carries at the forward end of the throat **55** the fixed pivot pin or bolt **78** on which is supported, upon the underside of the plate **52**, the idler pulley **79**.

Trained around the pulleys **65** and **72** adjacent to each of the top plates **52** is the endless belt **80** which carries the outwardly projecting fingers **80a** and one run of this belt passes over the throat side of the adjacent idler pulley **79**. This idler pulley is so positioned that the fingers **80a** will extend into the feed space **57** and will also project into the throat **54** as the fingers move rearwardly.

Connected between each pair of top and bottom plates **52** and **53** at the inner edges thereof, particularly in the throat area **55**, is a sheet metal guard plate or wall **81** which functions to prevent the picked up plants from escaping from the belt fingers **77** and **80a** as the latter carry the plants through the throat toward the conveyor **14**.

Upon the top of each of the top plates **52** there is secured along the throat edge **54** the upstanding guard wing **82**. These wings are of gradually increasing height from the forward ends, which are positioned adjacent to the forward portion of the throat, and the rear ends curve laterally as shown in Figures 2 and 4 so that the plates open out or diverge at the back ends of the feeder parts.

In addition to the guard plates or walls **81** the inner edges of the lower plates **53** are secured thereto along the extent of the throat **55**, the depending sheet metal walls or guards **83**. As previously pointed out the guard

plates or walls **81** are to prevent the plants from falling or falling laterally as they pass through the throat and the wings **82** and lower guard walls **83** also cooperate with the walls or plate **81** to ensure the maintenance of the lifted plants in proper elevated position to be cut by the cutter mechanism.

From the foregoing it is believed that it will be readily apparent that the forward ends of the parts **51** of the pick-up units may be readily raised or lowered by the conventional means provided for elevating the reel which the present attachment replaces, the units when being raised or lowered pivoting on the pivot bolts connected with the angle bar which is secured along the underside of the cutter mechanism.

Also the forward ends of the pick-up arms **66** may be lowered to bring the fingers **68** into close contact with the ground so that plants lying down on the ground can be easily raised and since the machine is designed so as to have the pick-up units pass along the plant rows, the fallen plants will enter the feeder entrances **57** and be gradually moved toward the center of the throat **55** and during this movement the fingers of the endless belts on the two sides of the throat will engage the plant and assist in raising it to upright position so that it can be easily cut by the cutter mechanism.

In order to facilitate the handling of single plants and to maintain them in upright position where the width of the throat **55** might be such as would allow the plant to lean over to one side, one of the feeder parts **51** has secured to the tapered edge portion **56** of the top plate **52**, an end of an elongate resilient arm **84** which extends rearwardly and obliquely across the width of the throat **55** as shown in Figure 2, the rear end of the arm being in close proximity to or engaging the rear portion of the edge **54** of the opposite plate **52**. Thus the plants when brought into the throat will be gradually squeezed between the resilient arm **84** and the opposing edge of the top plate **52** and thus be firmly held in upright position when the cutter blades of the cutting mechanism come into contact with the stalk thereof. It will be seen upon reference to Figure 2 that the point of engagement of the arm **84** with the inner edge of the top plate **52** is directly above the cutter glades so that the plant stalk will thus be firmly held in raised position when the blades engages it.

I claim:

1. In a plant pickup attachment for combines, including a cutter bar *mounted at the forward end thereof* [and a conveyor behind the cutter bar of the combine]; *said attachment comprising* an angle bar carried by said cutter bar and having a depending flange, a pair of elongate arms spacedly pivoted to said flange for vertical swinging movements and extending forwardly therefrom, a pair of forwardly directed and tapered pickup units, one of said units being supported on each of said arms, a ground engaging shoe *secured to* [at] the forward end of each of said units, a pickup element projecting forwardly from each of said shoes and having vertical pivot connections therewith, means *on each unit engaging the associated pick-up element* for adjusting the height of each of the pickup elements relative to the ground, an endless belt carried by each of said units and having laterally directed fingers projecting *therefrom* [from the outer side thereof], said units being divergent in the forward direction so as to provide a relatively narrow throat between the rear end portions of the same, a standard rising from each of said arms, a rail extending between and connecting [the upper end portions of] said standards, U-shaped brackets rising from said rail, a bearing carried *by* [at the free end of] each of the arms of said brackets, a shaft journalled in said bearings, power transmitting means *connecting* [between] said shaft and each of said belts, and other means *connected to said shaft* for applying power *thereto* [to said shaft].

2. In a plant pickup attachment for combines, including a cutter bar mounted at the forward end thereof; said attachment comprising an angle bar carried by said cutter bar and having a depending flange, a pair of elongate arms spacedly pivoted to said flange for vertical swinging movements and extending forwardly therefrom, a pair of forwardly directed and tapered pickup units, one of said units being supported on each of said arms, a ground engaging shoe secured to the forward end of each of said units, a pickup element projecting forwardly from each of said shoes and having vertical pivot connections therewith, means on each unit engaging the associated pickup element for adjusting the height of each of the pickup elements relative to the ground, an endless belt carried by each of said units and having laterally directed fingers projecting therefrom, said units being divergent in the forward direction so as to provide a relatively narrow throat between the rear end portions of the same, a standard rising from each of said arms, a rail extending between and connecting said standards, bearings carried by said rail, shafts journalled in said bearings, power transmitting means connecting said shafts and said belts and means connected to said shafts for transmitting power thereto.

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