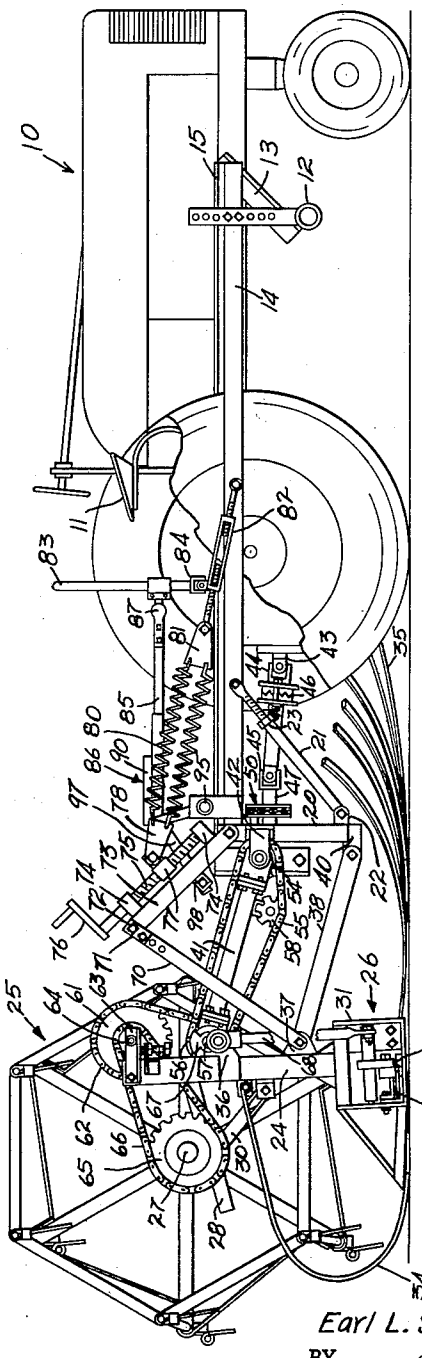
July 10, 1962 E. L. SCHEIDENHELM 3,043,076

WINDROWER SUPPORT ASSEMBLY

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Fig. 1



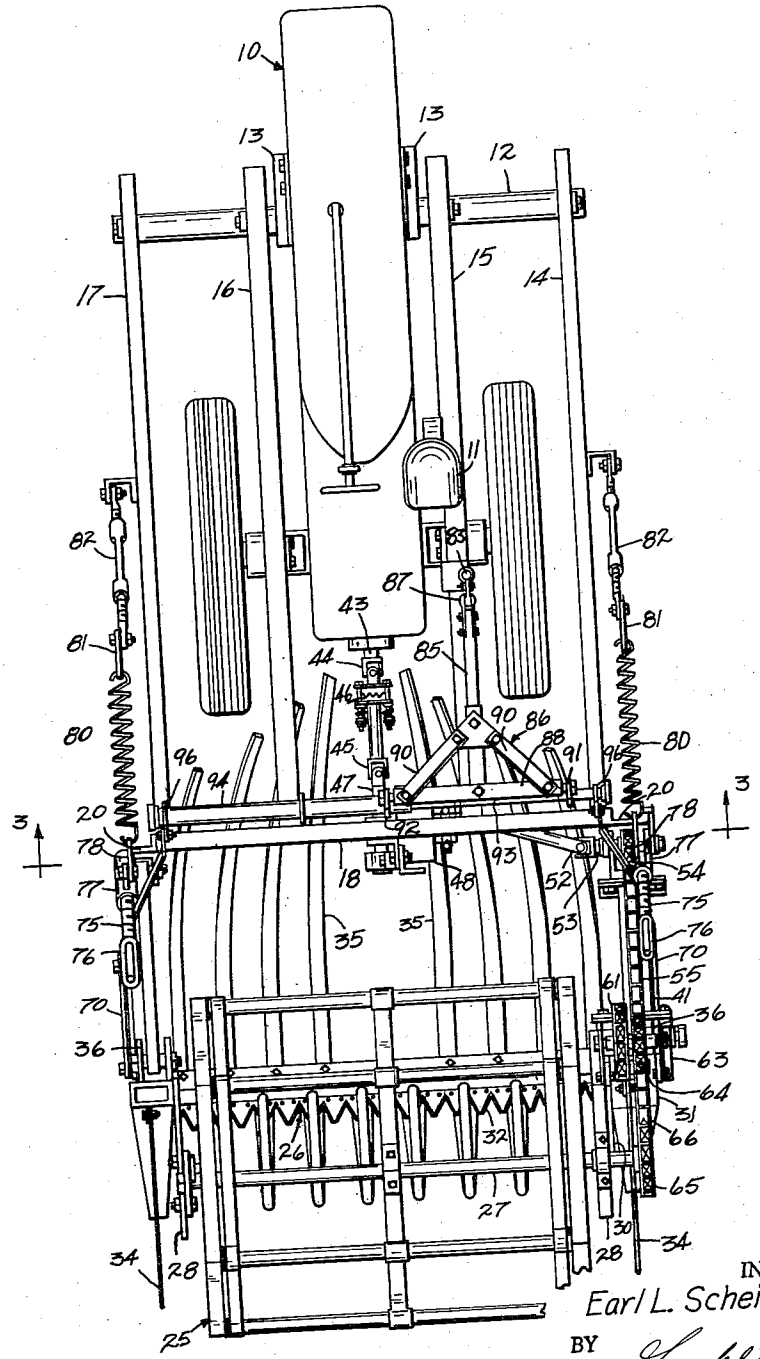
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WINDROWER SUPPORT ASSEMBLY

Filed June 6, 1960 5 Sheets-Sheet 2

Fig. 2



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WINDROWER SUPPORT ASSEMBLY

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Fig. 3

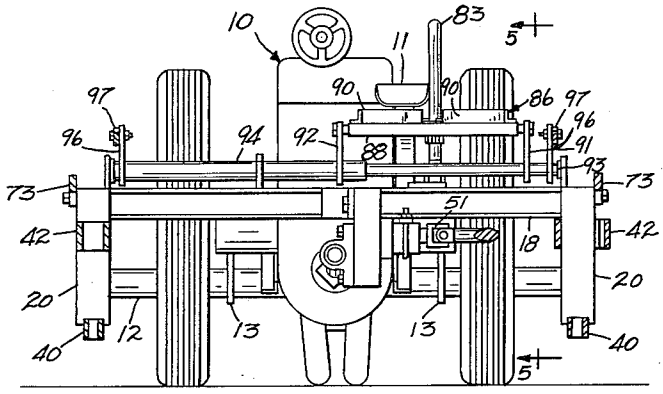
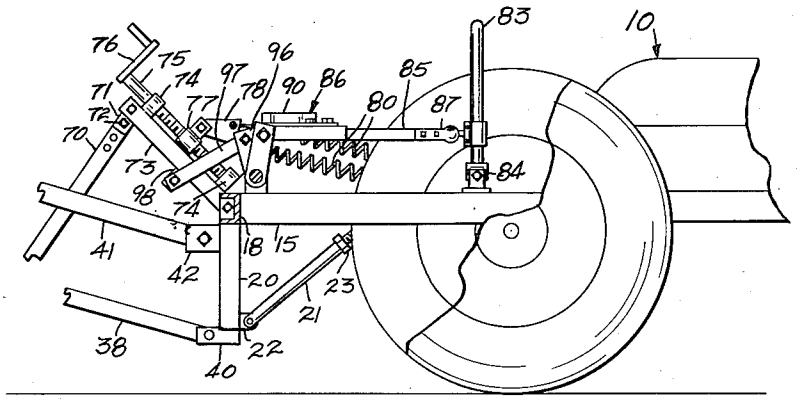


Fig. 5



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WINDROWER SUPPORT ASSEMBLY

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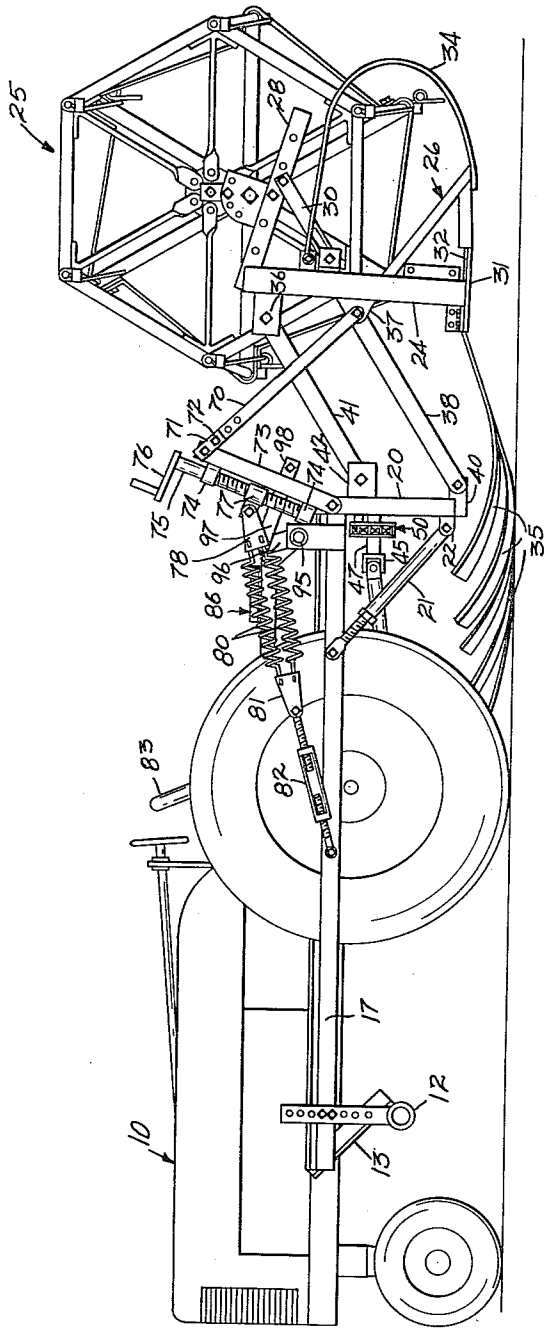


Fig. 4

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WINDROWER SUPPORT ASSEMBLY

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Fig. 6

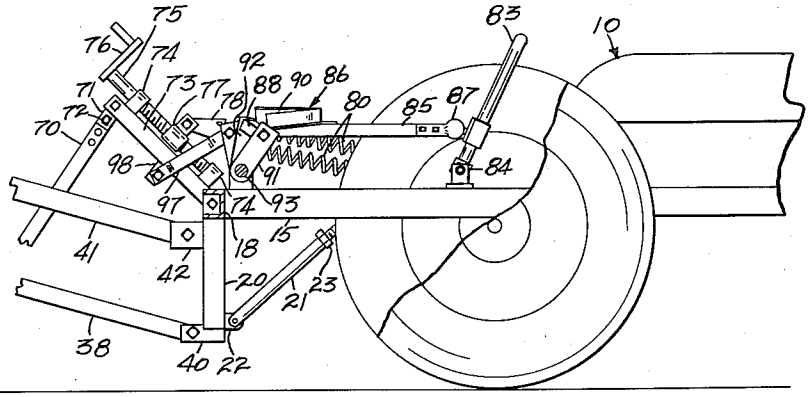
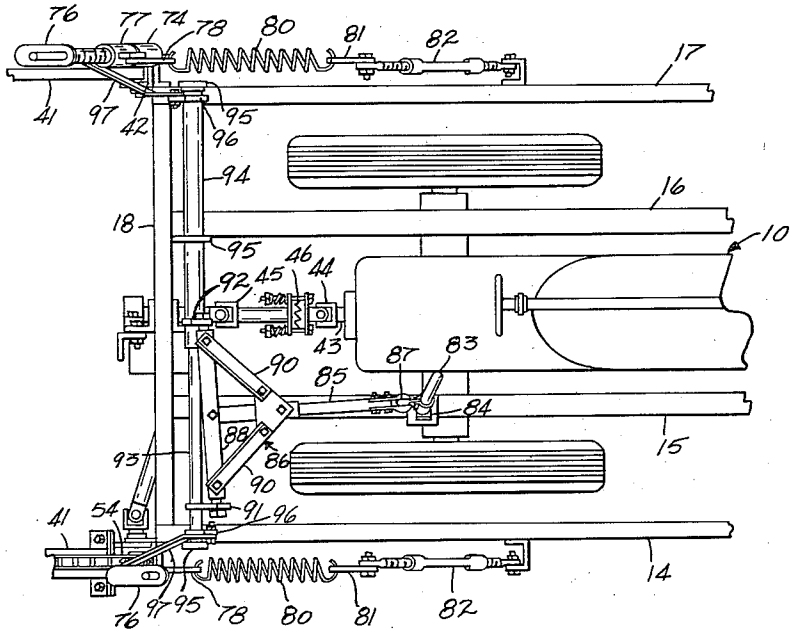


Fig. 7



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United States Patent Office 3,043,076 Patented July 10, 1962

3,043,076

WINDROWER SUPPORT ASSEMBLY

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Filed June 6, 1960, Ser. No. 34,126
3 Claims. (Cl. 56—192)

This invention relates to a novel assembly for supporting a harvesting windrower.

The invention contemplates a windrowing attachment for farm tractors utilizing a novel support structure which overcomes many of the obstacles to efficient operation posed by present machines. One such obstacle is the problem of fixed counterbalance mechanisms which do not adapt themselves to varying conditions, such as variations in the cutting depth. A second obstacle is the tendency of forwardly-mounted cutter bars to dig into the soil or other obstructing material during operation of the machine. A third obstacle is the rigidity of most supporting mechanisms which do not allow adjustment of the elevation of individual sides of the cutter bar.

It is a first object of this invention to provide a support by which the elevation of the reel and cutter bar assembly may be adjusted while maintaining the proper alignment between these components. This adjustment is provided by both temporary and semi-permanent controls so as to allow for initial elevational adjustment as well as for instantaneous adjustment during use in the field.

It is a second object of this invention to combine this adjustable support with a variable counterbalance mechanism so as to insure proper balance of the cantilevered assembly under all conditions.

Another object is to provide a support assembly which will automatically move the cutter bar assembly in an upward and backward direction when an obstruction is encountered in the field. This serves to relieve strain on the assembly and protects the machine from breakage.

Another object is to provide a support assembly which will allow for vertical movement of each end of the cutter bar individually or in concert, the movement being controlled by a single manual lever. This provides a simple, effective method of lifting the reel temporarily when such lifting is desired during use. The lever is placed at the operator's side so as to be operable without affecting the general operation of the machine.

These and other objects will be evident from the following detailed disclosure which describes a preferred form of windrower utilizing these inventive concepts. The embodiment shown in the accompanying drawings is merely illustrative and is not intended to limit the extent of the invention which is set forth in the concluding claims.

In the drawings:

FIGURE 1 is a side view of the harvesting windrower mounted on a tractor, with a portion of one tire and wheel broken away;

FIGURE 2 is a top view of the harvesting windrower;

FIGURE 3 is a sectional view taken along line 3—3 in FIGURE 2;

FIGURE 4 is a side view of the harvesting windrower taken from the side opposite to that shown in FIGURE 1, with the cutter bar assembly in a raised position;

FIGURE 5 is a fragmentary view taken substantially along line 5—5 in FIGURE 3;

FIGURE 6 is a view similar to FIGURE 5 showing one side of the control mechanism in a raised position; and

FIGURE 7 is a fragmentary top view showing the control mechanism with one side of the cutter bar in a raised position.

The general details of the harvesting windrower are best seen in FIGURES 1, 2 and 4. The machine is adapted to cut and rake crops, depositing them in a narrow path for future processing. It is adapted to be mounted on a conventional frame tractor which is designated as **10**. The tractor in operation will travel in its normal reverse direction, the seat and controls being reversed in the usual fashion to enable the driver to face the forward direction of travel during operation. The driver's seat is denoted as **11**. In order to avoid confusion, the direction of travel denoted by the arrow beneath FIGURE 1 shall consistently be referred to herein as the forward direction, and the normal orientation of the tractor shall be ignored.

The windrower is carried by a rigid frame adapted to be secured to the mounting brackets of the tractor **10**. This frame consists of a forward transverse member **12**, two mounting brackets **13** fixed to tractor **10** and member **12**, four longitudinal supports **14**, **15**, **16**, **17** and a forward cross member **18**, all of which are rigidly joined to form a fixed supporting framework relative to tractor **10**.

Mounted at the forward end of each longitudinal support **14** and **17**, and extending downward vertically therefrom, are two vertical elements **20**. Elements **20** constitute the first components of each parallelogram support. Since each support is a mirror image of the corresponding support on the opposite side of the machine, reference will be made to one side in singular fashion with the stipulation that the same numerals shall designate corresponding parts in both side structures.

The vertical elements **20** are pivotally connected at their upper ends to the respective longitudinal supports **14** and **17**. Telescopic adjustable braces **21** extend between an ear **22** formed on element **20** and aligned support **14** or **17**. Brace **21** fixes the vertical relationship of element **20**, but allows for adjustment of this vertical angle when desired by adjustment of nut **23** to lengthen or shorten the brace **21**.

Mounted forward of element **20** is a second parallel vertical element **24** which carries the reel **25** and the cutter bar assembly **26**. The reel **25** is fully described in U.S. Patent No. 2,795,921 issued on June 18, 1957, to H. D. Hume for Tine Mountings for Harvester Reel. Reel **25** is supported by a central shaft **27** which is bearingly mounted by adjustable braces **28** and **30** which in turn are adapted to be fixed to element **24**.

The cutter bar assembly **26** is composed of a stationary section **31** fixed to the lower end of element **24** and a reciprocating section **32** slidably mounted on section **31**. The reciprocating section is controlled by a crank arm **33** pivotally joined thereto and pivotally supported by the walls of section **31**. Each side of the machine is also provided with a curved guide **34** which defines the extent of cut taken by the machine. Trailing rearwardly from section **31** are a series of curved fingers **35** which are designed to gather the cut crops into a central windrow. Since the specific details of reel **25**, cutter bar assembly **26**, guides **34** and and fingers **35** do not constitute a part of this invention, further elaboration will be deleted.

The vertical element **24** is provided with upper and lower rear ears **36**, **37**. Pivotally joined to ear **37** is a first link **38** which is pivoted at its remaining end to a bottom ear **40** fixed to element **20**. Parallel to link **38** and pivoted to ear **36**, is a second link **41** which is pivoted to an upper ear **42** formed on element **20**. Thus it can be seen that a parallelogram support is provided constituted by the four sides **20**, **24**, **38** and **41**.

The drive for the reel and cutter bar assembly is located on one side of the machine and is taken from the power take-off shaft **43** of tractor **10**. Shaft **43** is connected through two universal joints **44**, **45** and a torque-limiting coupling **46** to a stub shaft **47** rotatably journalled below

the cross member 18. Stub shaft 47 drives a gear box 48 by means of a sprocket and chain assembly 50. The output of gear box 48 is transmitted by means of universal joints 51, 52 and a short shaft 53, to a driving sprocket 54 mounted on the pivotal shaft of ear 42. A chain 55 is entrained around sprocket 54 and connects to a sprocket 56 fixed to the pivotal shaft 57 and ear 36. An idler sprocket 58 rotatably and adjustably mounted below link 41 serves to take up slack in chain 55.

Also fixed to shaft 57 is a second sprocket which drives a larger sprocket 61 by means of chain 62. Sprocket 61 is journalled on an extension 63 fixed to element 24. Fixed to rotate with sprocket 61 is a smaller sprocket 64 which drives a chain 66 connecting it with a larger sprocket 65 fixed to the central shaft 27 of reel 25. This results in reel 25 being driven at a decreased rate of rotation.

Shaft 57 also has fixed thereto a driving eccentric and counterweight 67 which pivots a bar 68 pivotally joined to an arm fixed to crank 33. Rotation of shaft 57 is thus converted to reciprocating motion of cutter bar section 32.

It is important to note that the drive for the reel 25 and cutter bar assembly 26 is pivoted about the pivot points of the parallelogram support structure, enabling one to adjust the position of the structure without disturbing the drive connections.

The elevational and counterweight controls for the parallelogram support structure will now be described. A first movable support 70 is pivoted at its lower end to the connection between link 38 and ear 37 which is formed on element 24. An extension 71 is secured to support 70 and provides for adjustment of the length of the support by means of bolts 72. Extension 71 is pivoted at its upper end to an arm 73, whose lower end is pivoted to the upper end of element 20. Mounted in parallel fashion on arm 73, by means of bearings 74, is a threaded shaft 75 capped by a crank arm 76 for manual turning. Threadably mounted on shaft 75 is a collar 77 having an ear formed thereon to which is pivoted a first spring mount 78. Secured to spring mount 78 are two tension springs 80 which are stretched between mount 78 and a second spring mount 81. Mount 81 is pivotally connected to the longitudinal frame member 14 by means of an adjustable turnbuckle 82.

Springs 80 may be of any number desired, and provide the counterbalance force for the reel 25 and cutter bar assembly 26. The tension on springs 80 may be selectively adjusted by turning crank 76. In this fashion the weight of the cantilevered assembly may be balanced by springs 80 so that the cutter bar assembly 26 will "float" and can rise when an obstruction is encountered. Coarse adjustment is provided by turnbuckle 82 and by lengthening the combined lengths of support 70 and extension 71. The height of cutter bar 26 above ground is then manually adjusted by use of crank 76, which simultaneously varies the spring moment arm and the spring tension in springs 80.

A manual apparatus for raising the cutter bar apparatus 26 is provided by means of a single lever 83 mounted near the operator's position and pivoted to longitudinal frame member 15 by means of a universal joint 84. Joint 84 allows lever 83 to be pivoted in any direction. Lever 83 is connected to the stem 85 of a horizontal T-frame 86 by means of a spherical ball and socket connection 87. The stem 85 is rigidly joined to a cross-member 88 by means of braces 90. The ends of cross member 88 are provided with two loosely pivoted downwardly extending arms 91, 92 which are respectively fixed to transverse tubular shafts 93, 94 which are bearingly mounted on the transverse frame member 18 by means of bearings 95. Shafts 93, 94 are coaxial, shaft 93 being rotatably journalled within shaft 94. Fixed to the ends of shafts 93, 94 are upstanding crank arms 96 to which are pivoted movable links 97 which are pivoted at their lower ends to ears 98 formed on arms 73. Thus it can be seen that pivotal motion of shafts 93, 94 will result in raising or lowering one or both arms 73, and consequently, the entire reel 25 and cutter bar assembly 26.

The above-described apparatus allows either end of the cutter bar assembly 26 to be raised individually or in concert. If lever 83 is pivoted in a transverse motion only as shown in FIGURE 7, one arm 91 or 92 will remain stationary due to the resistance to downward motion offered by the springs 80 on its side. Thus it will serve as the reaction member for pivotal movement of cross member 88, which will then pivot the remaining shaft 93 or 94 to thereby lift the corresponding side of cutter bar assembly 26.

If lever 83 is moved in a forward or rearward direction, direct lifting of both ends of cutter bar assembly 26 will occur by overriding the springs 80. Thus complete control of the elevation of the cantilevered apparatus is always in the hands of the operator.

It is most important to note that the links 38 and 41 in the parallelogram assemblies are directed from element 20 in a forward and upward direction. Thus when an obstruction is encountered during forward movement of the assembly, the rearward force exerted on cutter bar assembly 26 will automatically push the cutter bar assembly 26 upward and rearward as the parallelogram folds in response thereto. This provides a necessary safety factor in protecting the cutter blades and is independent of the operator's controls.

Thus it can be seen that a practical and highly effective support apparatus has been derived for a harvesting windrower. Since minor mechanical changes are possible without detracting from the intended scope of this invention, only the following claims are to define the invention.

Having thus described my invention, I claim:

1. A supporting structure for a windrowing apparatus, comprising:
a rigid frame adapted to be fixed to the frame of a vehicle;
a pair of parallelogram assemblies respectively mounted at each side of the frame at the front end thereof, each of said assemblies including a first element fixed to said frame, a second element spaced forwardly from said first element, and a pair of spaced parallel braces each pivotally connected to said first and second elements, said braces being extended forwardly and upwardly from their connections with said first element;
counterbalance means operatively connected between said rigid frame and said assemblies;
and manual lifting means mounted on said rigid frame independently connected to said parallelogram assemblies adapted to selectively vary the elevation of said second elements relative to said frame individually or in concert.

2. A windrower supporting structure, comprising:
a rigid frame adapted to be fixedly secured to the frame of a vehicle;
a pair of vertical supports fixed to the forward end of said frame in transversely spaced locations;
a pair of parallel supporting links located at each side of said frame and pivotally joined to each of said supports at one end thereof, said links being extended forwardly and upwardly from their respective connections to said supports;
a pair of transversely spaced vertical side elements respectively carried by said pairs of links at the forward ends thereof;
and elevational control means mounted on said frame and operatively connected to said side elements, including a pair of coaxial transverse shafts terminating respectively at each side of said frame and rotatably mounted thereon, individual cranks arms fixed to the shafts, means operatively connected to said

crank arms and to said side elements adapted to elevationally control the side elements responsive to rotation of said shafts, and a single manually operable lever mounted on said frame and connected to said shafts adapted to selectively pivot each of said shafts about its axis individually or in concert.

3. A windrower supporting structure, comprising:

a rigid frame adapted to be fixedly secured to the frame of a vehicle;

a pair of vertical suports fixed to the forward end of said frame in transversely spaced locations;

a pair of parallel supporting links located at each side of said frame and joined to each of said supports at one end thereof, said links being extended forwardly and upwardly from their respective connections to said supports;

a pair of transversely spaced vertical side elements respectively carried by said pairs of links at the forward ends thereof;

and elevational control means including a pair of coaxial transverse shafts terminating respectively at each side of said rigid frame and rotatably mounted thereon, a crank arm fixed to the side end of each of said shafts and operatively connected to the aligned side member, a pair of upstanding bars fixed respectively to each of said shafts, a manual lever mounted on said rigid frame rearwardly of said shafts, the connection of said lever to said frame constituting a universal joint, and a horizontal T frame having the ends of its cross member respectively pivoted to said upstanding bars and having the end of its stem member pivotally connected to said lever above said universal joint.

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