June 17, 1930. W. J. FISHER 1,764,944

GROUND WORKING IMPLEMENT

Filed March 7, 1929 3 Sheets-Sheet 1

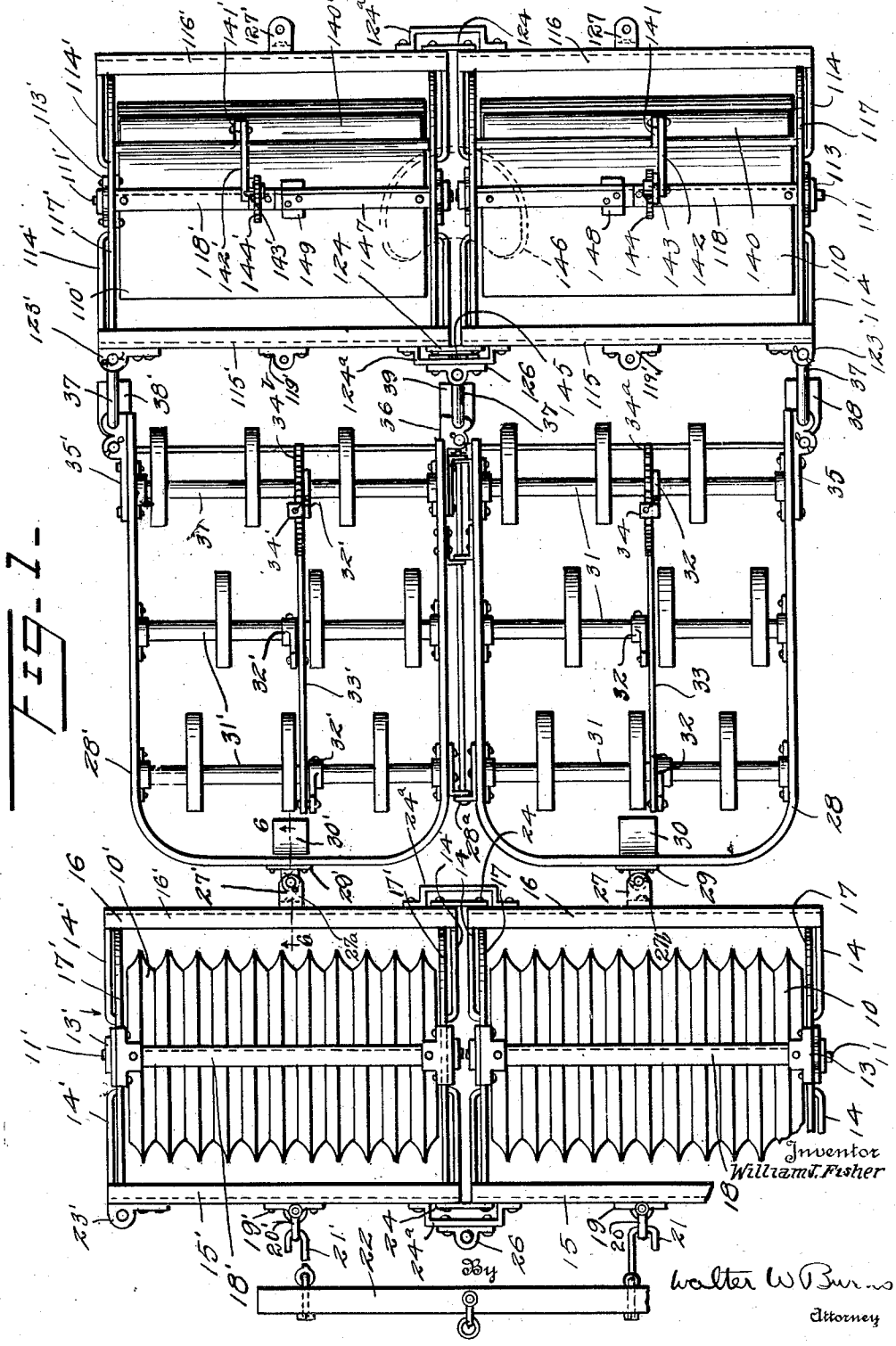


Fig. 1.

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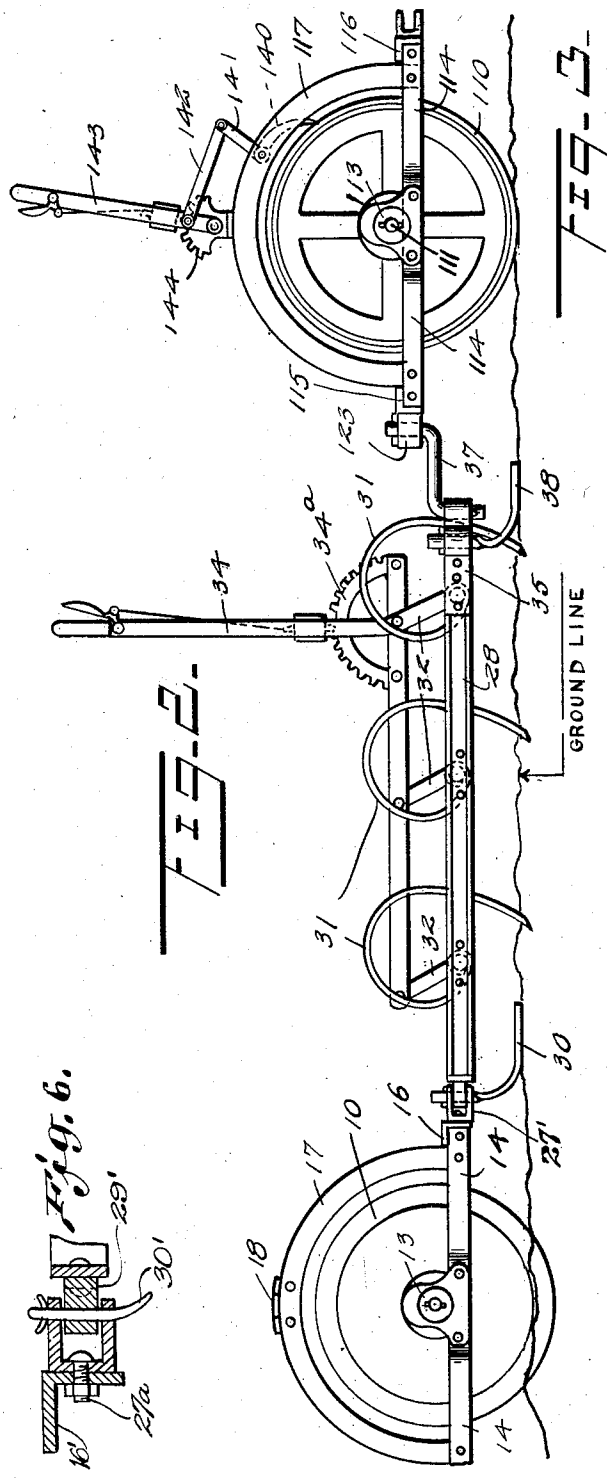


Fig. 2.

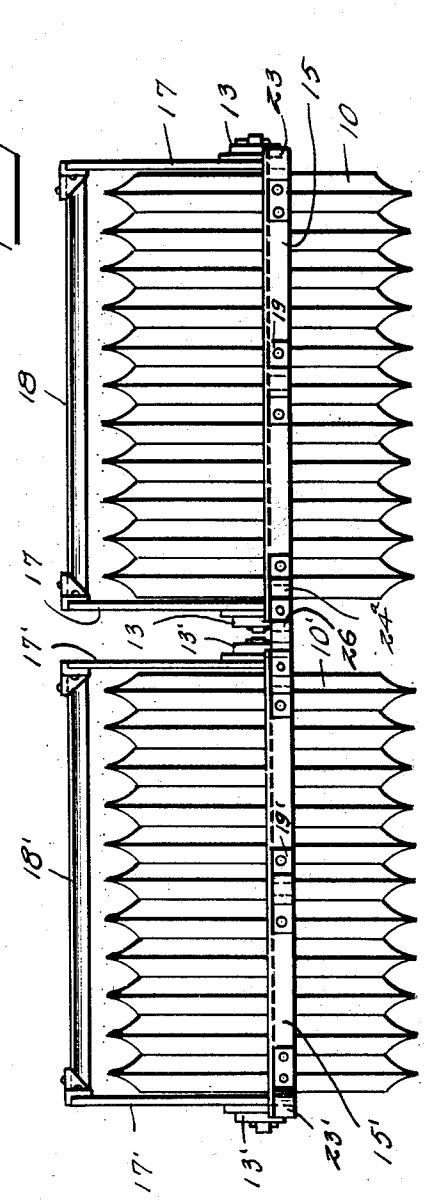


Fig. 3.

Fig. 6.

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Fig. 4.

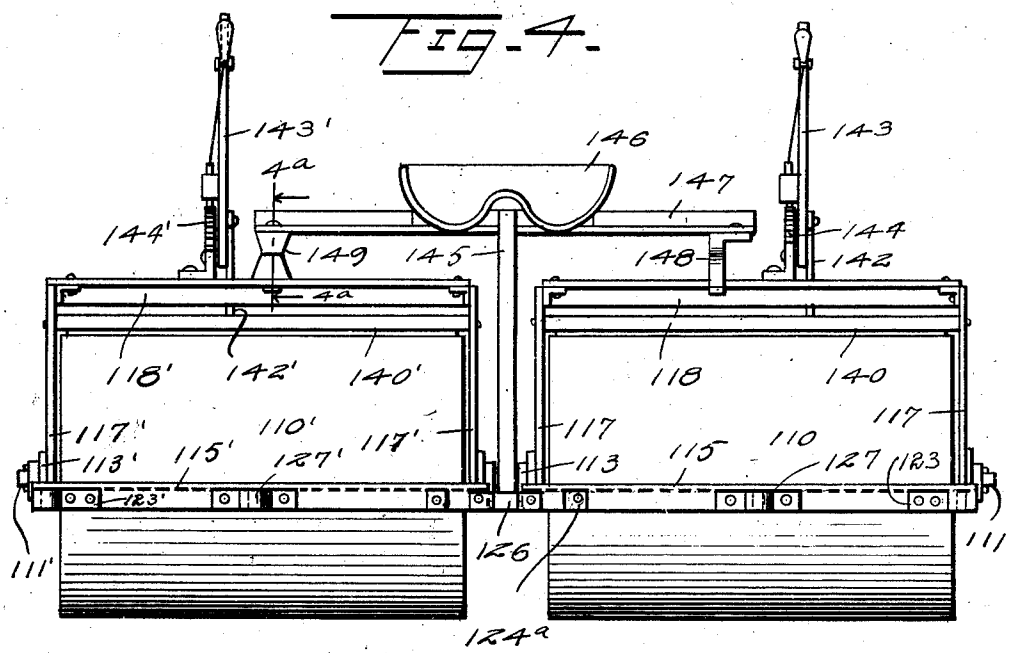


Fig. 5.

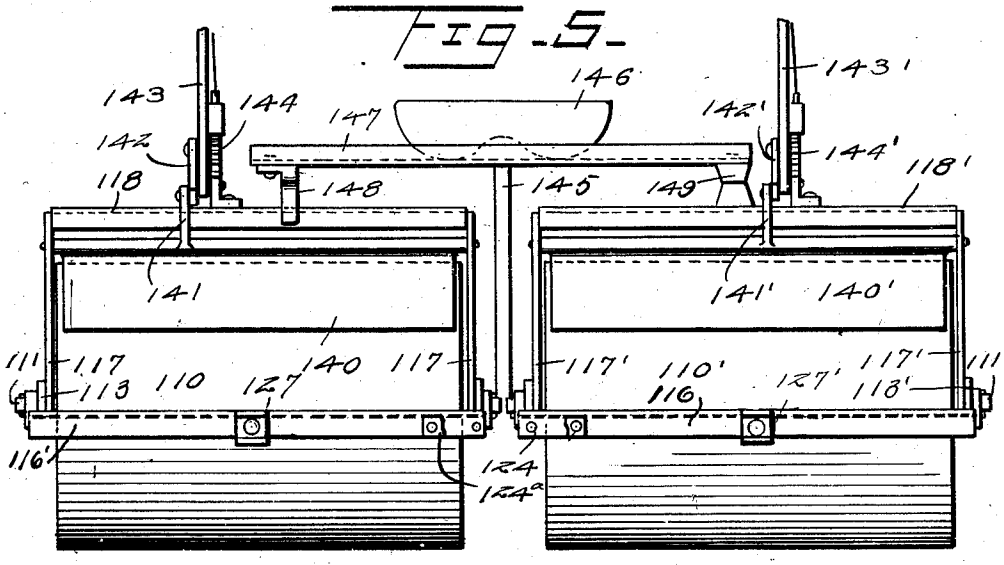
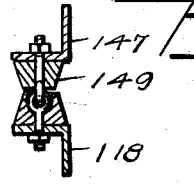


Fig. 4A.



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UNITED STATES PATENT OFFICE

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GROUND-WORKING IMPLEMENT

Application filed March 7, 1929. Serial No. 345,069.

This invention relates to ground working devices and particularly to those ground working devices which are adapted for harrowing, rolling and for breaking up clods at the same operation.

The tendency of modern practice in soil working and tilling devices is to work a wide path and to perform two or more operations at the same time. In making implements and machines of more complex type and of greater size, the problem is made more difficult because of the irregularities of the ground.

The primary object of this invention is the provision of an improved means for harrowing, rolling and clod breaking with means for effectively connecting the parts together while at the same time permitting of proper action on the irregular surface of the ground and also permitting of easy turning as at corners.

Other and further objects of my invention will be apparent from a reading of the complete specification and claims.

Referring to the drawing wherein is illustrated an embodiment of my invention,

Figure 1 is a plan view of this invention.

Figure 2 is a side view.

Figure 3 is a front elevation of one unit of the implement.

Figure 4 is a front view of another unit of the implement.

Figure 4^a is a detail view.

Figure 5 is a rear view of one of the units.

Figure 6 is a detail cross sectional view on the line 6—6 of Figure 1.

In the drawing, in order to show the various parts as large as possible, the widths of the elements have been made less than is preferred in practice. In practice, the cultipacker and roller elements would preferably be relatively longer on their axes than illustrated.

Similar reference characters refer to the same or similar parts throughout the views of the drawing.

In the herein illustrated embodiment of this invention, there are illustrated as a part of the complete implement a cultipacker, a spring tooth harrow and a roller, each being constructed in two parts.

In tractor-drawn soil working devices having great width, it has been found that more efficient results can be obtained by constructing the soil working devices in two parts. Such construction has a tendency to prevent the leaving of spaces between implement paths. With the increase in the width, and the increase in the number of devices comprising the implement, the problem of construction of a frame of proper strength and flexibility and of proper connections therefor, presents itself.

In the drawing 10, and 10′ designate the two elements which comprise the cultipacker which is illustrated as the forward device of the implement. The cultipacker elements 10, 10′ are mounted in suitable frames. At the ends of the elements 10, 10′ are trunnions 11, 11′ which are journaled for rotation in suitable bearings 13, 13′. Bolted to the bearings 13, 13′ are forwardly and rearwardly extending substantially identical frame members 14, 14′.

Connecting the forward ends of the respective pairs of frame members 14, 14′ are the cross frame members 15, 15′. Connecting the rear ends of the respective pairs of rear members 14, 14′ are the rear cross frame members 16, 16′.

Bow members 17, 17′ are secured adjacent the outer ends of the members 14, 14′ respectively. Connecting the upper portions of the pairs of bow-members 17 and 17′ are the top cross-connecting members 18, 18′.

At the forward side of the frame members 15, 15′ are secured suitable securing means to provide connection to the tractor when the unit is used in a forward position or to connect to a forward device when the cultipacker is used in rear of another ground working device.

The securing means for connection to the tractor are designated 19, 19′ respectively and are located in the middle of the frame members 15, 15′. To these securing means 19, 19′ may be secured devices 20, 20′ or other tractive elements for connection to suitable

connecting means as the links 21, 21′ and the equalizer bar 22.

At the outer ends of the frame members 15, 15′ are securing means 23, 23′.

The front frame members 15, 15′ are secured together by pivoted links 24, 24ª, the pivots being provided by bolts loosely securing the ends of the links to the inside ends of the front frame members 15, 15′ respectively. On the forward side of the connecting link 24ª is the securing member 26. The securing members 23, 26 and 23′ are provided with vertical openings to secure the cultipacker to the rear of the harrow frames when the cultipacker is used as a rear unit.

Secured loosely at the rear sides of the respective rear frame members 16, 16′, each by a single bolt, 27ª, 27ᵇ are U-shaped devices 27, 27′. These devices serve to connect the forward end of the harrow devices to the cultipacker.

Because of the movement permitted through this connection 27 or 27′, the unit forward as the cultipacker 10 is permitted to tilt from side to side relative to the unit following behind, as the harrow, to be now described.

The harrow devices comprise each a frame member 28, 28′ which is preferably of U-shape with the lower part of the U in a forward position. At the forwardmost point of these frames are securing members 29, 29′ which are secured to the U-shaped devices 27, 27′, respectively and loosely by the cylindrical shanks of guide shoes 30, 30′. The guide shoes are held in place by suitable cotter keys at their upper ends. In the connections 27, 29 and 27′, 29′ there is sufficient play to permit of the following of the contour of the ground.

Extending from side to side of the frame members 28, 28′ respectively are pivoted sets of spring harrow teeth 31, 31′. An arm 32, 32′ extends from each set of harrow teeth 31, 31′ in such a way as to be connected to parallel motion links 33, 33′ to cause movement of all of the teeth sets 31 together and all of the sets of teeth 31′ together.

The rearmost arm 32, 32′ of each harrow section is extended to form the levers 34, 34′. About the center of the connecting bolt between the rearmost lever 32, 32′ of each set and the respective rear ends of the links 33, 33′ are segmental racks 34ª, 34ᵇ. The levers 34, 34′ are provided with the usual detents and grip lever for operating the detents through suitable rods shown in Figure 2.

The detents cooperate with the notches of the racks 34ª, 34ᵇ. By releasing the detents from their cooperating notches, the desired angle of the teeth 31, 31′ may be obtained. When the gripping means are released the detents again register with their respective notches and the teeth are thereby held in the desired position.

The fronts of the frames 28, 28′ of the harrow sections are connected to the forward unit, each by a single connection as already described. They are connected together at their adjacent sides by angular parts secured to the sides and forming with the pivot rod hinge connections 28ª. At the rear end of the frame 28′, is located a connection 36, which is connected to the rear unit by the link 37. The outer rear corners of the frames 28, 28′ are connected to the respective rear units by links 37 and connections which are designated 35, 35′.

It will be noted that each of the connection members 35, 36 and 35′ has two openings, one of the connective openings being for connection to the respective Z-shaped members 37 and the others to receive bearing portions of guide shoes 38, 39 and 38′. The bottoms of these guide shoes rest upon the ground and provide a bearing support for the harrow frames 28, 28′.

The rear ends of the links 37 are secured to connections on the rear element corresponding to the connections 23, 26 and 23′.

I will now describe the roller implement shown as the rear unit of the whole.

The roller implement comprises two rollers, 110 and 110′ constructed similarly to the cultipacker rollers 10, 10′ except that the rollers 110 and 110′ are illustrated as having smooth cylindrical surfaces.

The rollers 110, 110′ are provided with shafts or trunnions 111, 111′ respectively similar in operation to trunnions 11, 11. The bearings 113 and 113′ are similar in construction to the bearings 13, 13′ and are connected to forwardly and rearwardly extending frame members 114, 114′ similar to frame members 14, 14′. Forward frame members 115, 115′ are similar in construction to frame members 15, 15′ and rear frame members 116, 116′ are similar to frame members 16, 16′ already described. Connected to the forward frames 115, 115′ are securing means 123, 123′, pivoted links 124, 124ª and a securing member 126, similar in construction and operation, respectively to the parts 23, 23′, 24, 24ª, 26 already described.

The rear frames 116, 116′ are respectively provided with U-shaped members 127, 127′ constructed similarly to the U-shaped member 27 secured to the frame member 16. The adjacent ends of the frame members 116 and 116′ are connected together by links 124, and 124ª.

The frame members 114, 114′ have secured to them the bow-shaped members 117, 117′ and at the tops of the bow-shaped members 117, 117′ are top frame members 118, 118′.

Pivoted rearwardly of the top frame members 118, 118′ and in each pair of bow members 117 of one roller and 117′ of the other roller, are scraper devices 140, 140′. These

scrapers 140, 140′ are provided with arms 141, 141′.

These arms are connected to respective links 142, 142′ which are operated by hand levers 143, 143′ which are pivoted to segmental racks 144, 144′ which are bolted on the upper sides of the top frame members 118, 118′.

The hand levers 143, 143′ are provided with suitable grip levers, rods and detents to engage the openings of the segmental racks 144, 144′ to hold the scraper members in any desired adjusted position.

The frame members 14, 14′ and 114, 114′ are each made in one piece and depressed at the middle to receive its bearing.

A seat supporting bar 145 is secured to the pivoted link 124ª and supports a seat 146 which is secured to the center of a seat equalizer support 147. This support 147 is provided at one end with a casting 148 which is shaped to receive the support 147 and yet have a sliding engagement therewith. The opposite end of the support 147 is supported on the top frame member 118′ by two pads and a double eye bolt passing through the two pads, the frame member 118′ and the support 147 as shown at 149. Each of the pads is provided with a hole passing therethrough and also with a depression, the depressions being at 90° from each other and of a shape to receive the eyes of the eye bolts. The eye bolts which have their eyes linked are inserted, one in each depression and the parts are then assembled. The bottoms of the depressions are so located as to leave a slight clearance between adjacent sides of the pads when the nuts are tightened on the eye bolts, each of the eyes of the bolts being loose relative to the other. This permits of sufficient play between the parts.

The connection 149 permits of pivotal movement and the casting 148 permits of sliding movement. In this way the support 147 does not interfere with the operation of the two rollers over uneven ground.

It will be noted that with this invention, the three units will operate successfully over uneven ground without undue strains in the frame members. The first unit, as the cultipacker, is permitted, because of the connection 27 or 27′, to have a side to side tilting movement without bringing strains in the frames of the harrow or roller which follow. Such a side to side tilting movement might be the tilting movement which would result from one end of a cultipacker roller striking a stone or falling into a hole. At the same time that this independent movement is permitted by the forward connection, the connections 37 hold the rear ends of the harrows in their relation to the rollers which follow, and prevent the relative side tilting which the connections 27, 27′ facilitate.

During turning, the connections 37 facilitate the turning movement by permitting relative bodily movement in a horizontal plane and when these members 37 are, themselves, located in parallel, vertical planes as shown, the fore and aft axes of forward movement of the two devices as the harrow and roler are thrown out of alignment while still maintaining these axes in parallel reation during the turning operation.

While there is shown and described in detail an embodiment of this invention, it is to be understood that the invention is not limited to the details shown and that modifications and changes may be made without departing from the spirit of the invention and within the scope of the appended claims.

Having described the invention, what is claimed and desired to have secured by Letters Patent is:—

1. An earth working implement comprising a series of devices connected together for operation, one behind another, in the line of travel, the connection between one device and another device forward thereof comprising means to permit tilting of either device from side to side relative to the other, another connection between two devices comprising means to prevent tilting from side to side relative to each other but permit of relative swinging from side to side so that the axes are out of alignment with each other during turning.

2. An earth working implement comprising a series of devices connected together for operation, one behind another, in the line of travel, the connection between one device and another device forward thereof, comprising means to permit tilting of either device from side to side relative to the other, the connection between this device and the one at the rear comprising means to prevent tilting from side to side relative to each other but permit of relative swinging from side to side so that the axes are out of alignment with each other during turning.

3. An earth working implement comprising a series of devices connected together for operation successively over the same ground with their fore and aft axes substantially coincidental, the connection between one device and another device forward thereof comprising means to permit tilting of either device from side to side relative to the other, another connection between two devices comprising means to prevent tilting from side to side relatively to each other, one of the connections comprising means to permit swinging of one device relatively to the other in a horizontal plane during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

4. An earth working implement comprising a series of devices connected together for operation successively over the same ground

with their fore and aft axes substantially coincidental, the connection between one device and another device forward thereof comprising means to permit tilting of either device from side to side relative to the other, another connection between two devices comprising means to prevent tilting from side to side relatively to each other, the second mentioned connection comprising means to permit swinging of one device relative to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

5. An earth working implement comprising a series of devices connected together for operation successively over the same ground with their fore and aft axes substantially coincidental, these devices comprising a harrow device between two roller devices, the connection between the harrow device and one roller device comprising means to permit tilting of either device from side to side relatively to the other, another connection between the harrow and the other roller device comprising means to prevent tilting of the two devices from side to side relatively to each other, while still permitting relative bodily movement in a horizontal plane.

6. An earth working implement comprising a series of devices connected together for operation successively over the same ground with their fore and aft axes substantially coincidental, these devices comprising a harrow device between two roller devices, the connection between the harrow device and one roller device comprising means to permit tilting of either device from side to side relatively to the other, another connection between the harrow and the other roller device comprising means to prevent tilting of the two devices from side to side relatively to each other, one of the connections comprising means to permit swinging of one device relatively to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

7. An earth working implement comprising a series of devices connected together for operation succesively over the same ground with their fore and aft axes substantially coincidental, these devices comprising a harrow device between a cultipacker roller device and a relatively smooth roller device, the connection between the harrow device and one roller device comprising means to permit tilting of either device from side to side relatively to the other, another connection between the harrow and the other roller device comprising means to prevent tilting of the two devices from side to side relative to each other, while still permitting relative bodily movement in a horizontal plane.

8. An earth working implement comprising a series of devices connected together for operation successively over the same ground with their fore and aft axes substantially coincidental, these devices comprising a harrow device between a cultipacker roller device and a relatively smooth roller device, the connection between the harrow device and one roller device comprising means to permit tilting of either device from side to side relatively to the other, another connection between the harrow and the other roller device comprising means to prevent tilting of the two devices from side to side relative to each other, one of the connections comprising means to permit swinging of one device relatively to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

9. An earth working implement comprising a series of devices connected together for operation, one behind another in the line of travel, each device being in two side-by-side parts jointed together for independent movement at their outer ends in a vertical plane, the connection between one device and another forward thereof comprising means to permit of the independent tilting of one of the jointed parts of one device relatively to an adjacent jointed part which traverses the same path, another connection between two parts of two of the devices, one ahead of the other, comprising means to prevent tilting from side to side relative to each other.

10. An earth working implement comprising a series of devices connected together for operation, one behind another in the line of travel, each device being in two side-by-side parts jointed together for independent movement at their outer ends in a vertical plane, the connection between one device and another forward thereof comprising means to permit of the independent tilting of one of the jointed parts of one device relatively to an adjacent jointed part which traverses the same path, another connection between the first mentioned device and a third device in the rear of the first mentioned device, comprising means to prevent tilting from side to side relative to each other.

11. An earth working implement comprising a series of devices connected together for operation, one behind another in the line of travel, each device being in two side-by-side parts jointed together for independent movement at their outer ends in a vertical plane, the connection between one device and another forward thereof, comprising means to permit of the independent tilting of one of the jointed parts of one device relatively to an adjacent jointed part which traverses the same path, another connection between two parts of two of the devices, one ahead of the

other, comprising means to prevent tilting from side to side relative to each other, the connection between two of the devices comprising means to permit swinging of one device relative to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

12. An earth working implement comprising a series of devices connected together for operation, one behind another in line of travel, each device being in two side-by-side parts jointed together for independent movement at their outer ends in a vertical plane, the connection between one device and another forward thereof, comprising means to permit of the independent tilting of one of the jointed parts of one device relatively to an adjacent jointed part which traverses the same path, another connection between two parts of two of the devices, one ahead of the other, comprising means to prevent tilting from side to side relative to each other; the second mentioned connection comprising means to permit swinging of one device relative to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

13. An earth working implement comprising a series of devices connected together for operation, one behind another in line of travel, comprising a harrow device between two roller devices, the harrow and roller devices each being in two relatively movable jointed parts, the connection between the harrow device and one roller device comprising means to permit tilting of either part of either device, from side to side, relatively to the corresponding part of the other device, another connection between the harrow and the other roller device comprising means to prevent tilting of the corresponding parts of the devices from side to side relatively to each other, while still permitting relative bodily movement in a horizontal plane.

14. An earth working implement comprising a series of devices connected together for operation, one behind another in line of travel, comprising a harrow device between two roller devices, the harrow and roller devices each being in two relatively movable jointed parts, the connection between the harrow device and one roller device comprising means to permit tilting of either part of either device, from side to side, relatively to the corresponding part of the other device, another connection between the harrow and the other roller device comprising means to prevent tilting of the corresponding parts of the devices from side to side relatively to each other, one of the connections comprising means to permit swinging of one device relatively to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

15. An earth working implement comprising a series of devices connected together for operation, one behind another in line of travel, these devices comprising a harrow device between a cultipacker roller device and a relatively smooth roller device, the harrow and roller devices being each in two relatively movable jointed parts, the connection between the harrow device and one roller device comprising means to permit tilting of either part of either device from side to side relatively to the corresponding part of the other device, another connection between the harrow and the other roller device comprising means to prevent tilting of the corresponding parts of the devices from side to side relatively to each other.

16. An earth working implement comprising a series of devices connected together for operation, one behind another in line of travel, these devices comprising a harrow device between a cultipacker roller device and a relatively smooth roller device, the harrow and roller devices being each in two relatively movable jointed parts, the connection between the harrow device and one roller device comprising means to permit tilting of either part of either device from side to side relatively to the corresponding part of the other device, another connection between the harrow and the other roller device comprising means to prevent tilting of the corresponding parts of the devices from side to side relatively to each other, one of the connections comprising means to permit swinging of one device relatively to the other in a horizontal plane, during turning, to throw the axes out of alignment while still maintaining the axes in parallel relation during the turning operation.

In testimony whereof I hereunto affix my signature.

WILLIAM J. FISHER.