Sept. 9, 1941. O. E. CURTIS 2,255,380

CONVERTIBLE DISK HARROW

Filed July 19, 1939 4 Sheets-Sheet 1

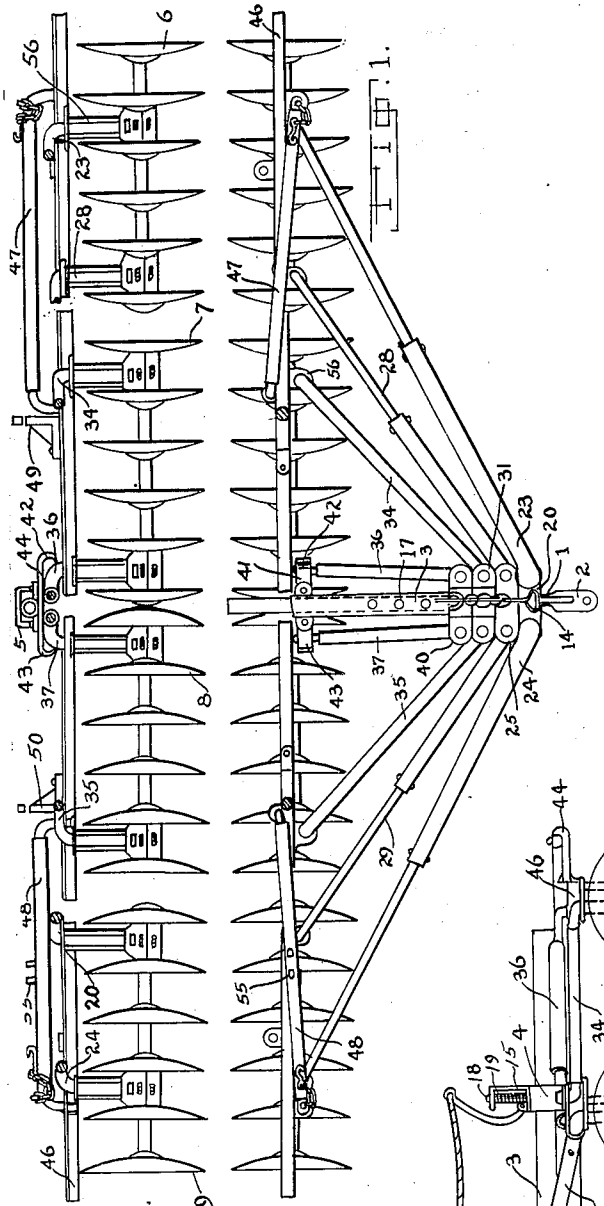


FIG. 1.

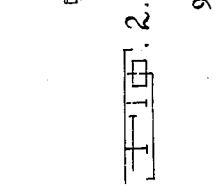


FIG. 2.

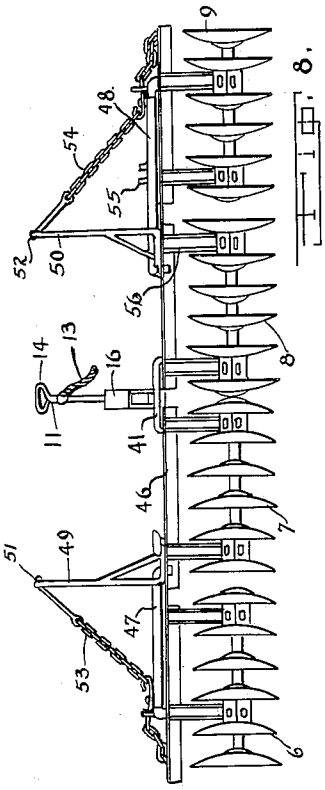


FIG. 8.

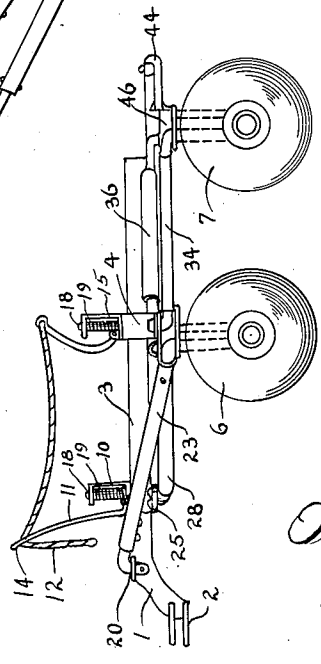


FIG. 5.

Oscar E. Curtis
INVENTOR

BY: A. B. McCall.
ATTORNEYS

Sept. 9, 1941. O. E. CURTIS 2,255,380

CONVERTIBLE DISK HARROW

Filed July 19, 1939 4 Sheets-Sheet 2

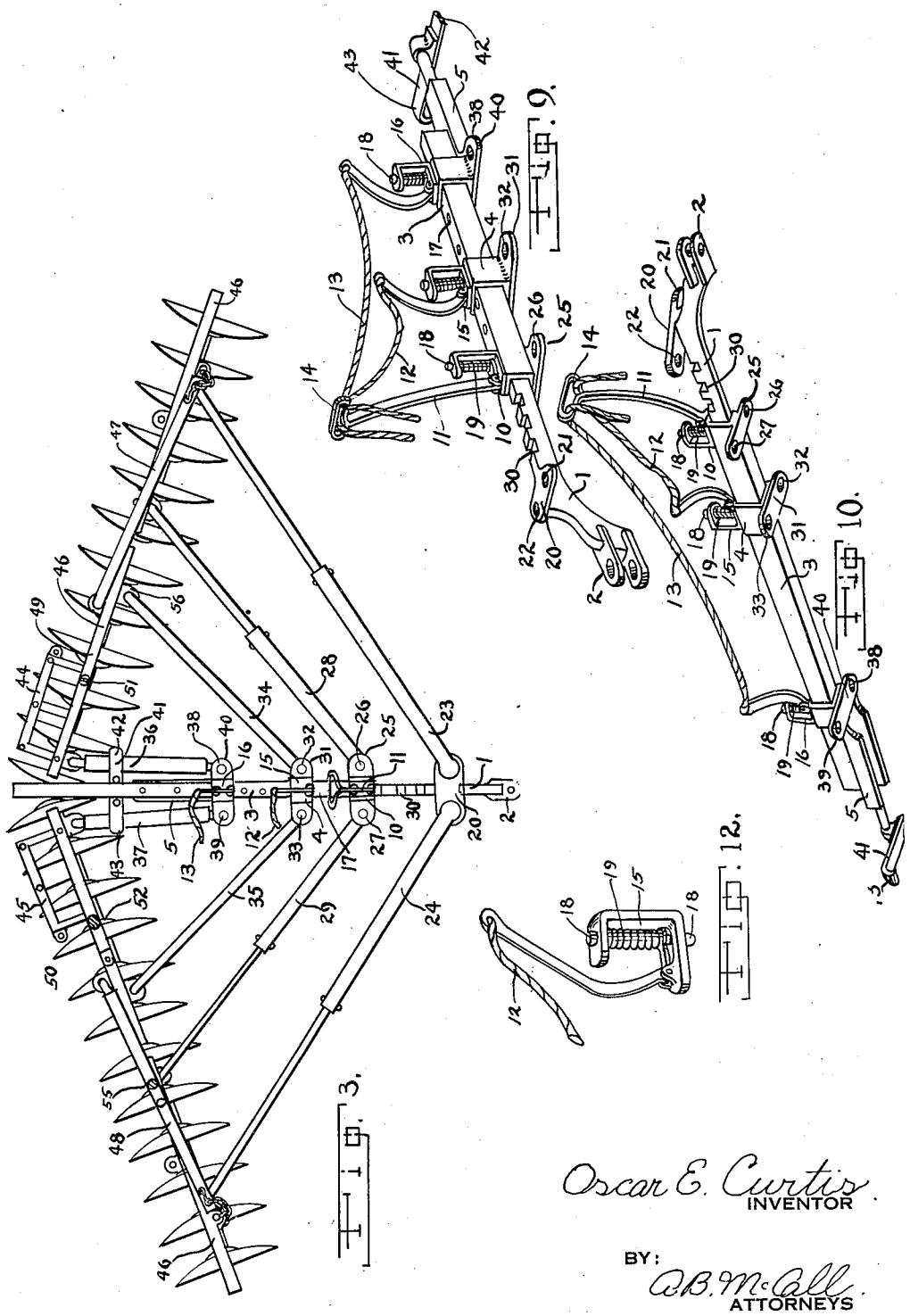


Fig. 9.

Fig. 10.

Fig. 12.

Fig. 3.

Oscar E. Curtis
INVENTOR

BY: O.B. McCall
ATTORNEYS

Sept. 9, 1941. O. E. CURTIS 2,255,380

CONVERTIBLE DISK HARROW

Filed July 19, 1939 4 Sheets-Sheet 3

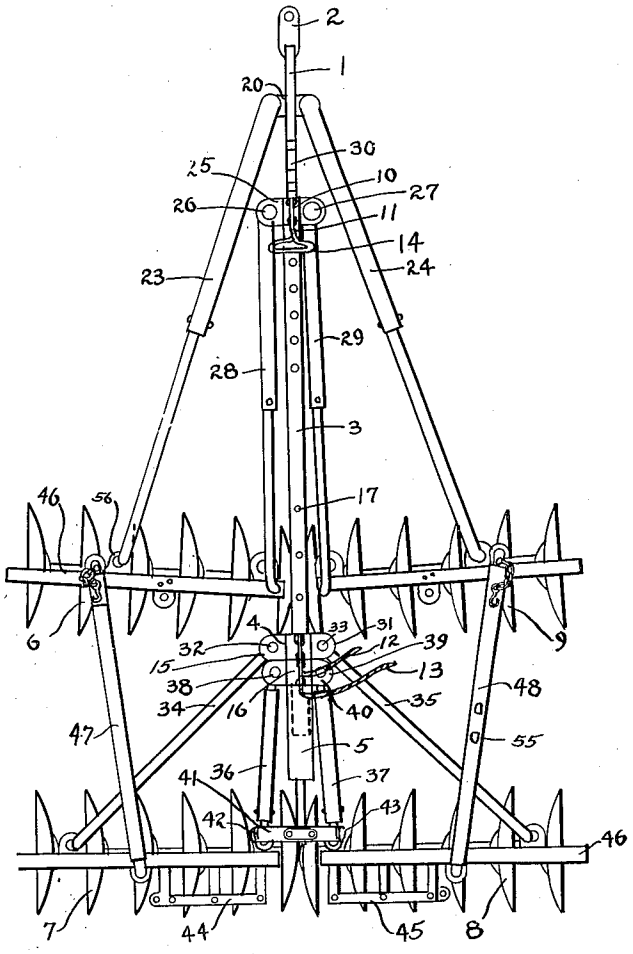


FIG. 4.

Oscar E. Curtis
INVENTOR

BY A. B. McCall
ATTORNEYS

Sept. 9, 1941. O. E. CURTIS 2,255,380

CONVERTIBLE DISK HARROW

Filed July 19, 1939 4 Sheets-Sheet 4

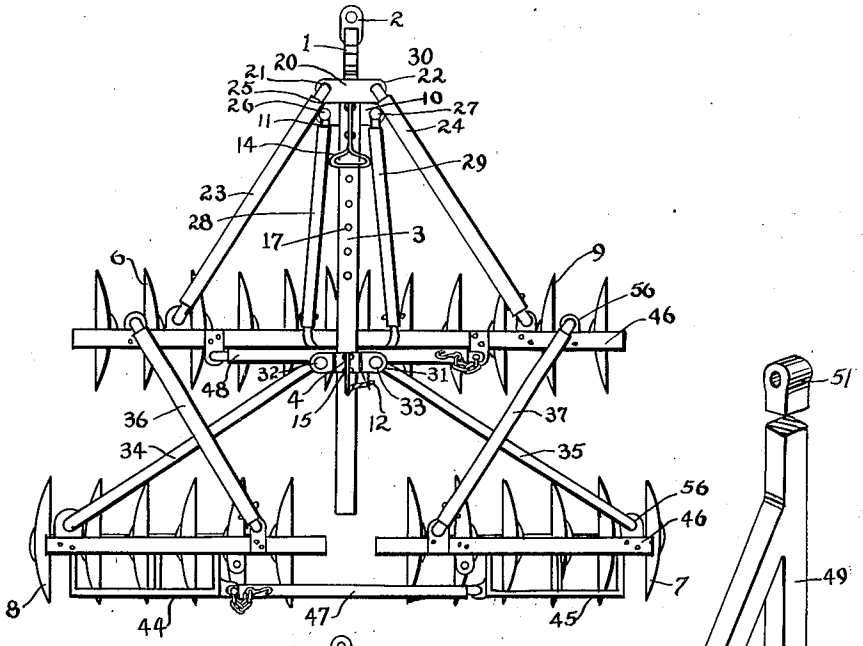


FIG. 6.

FIG. 11.

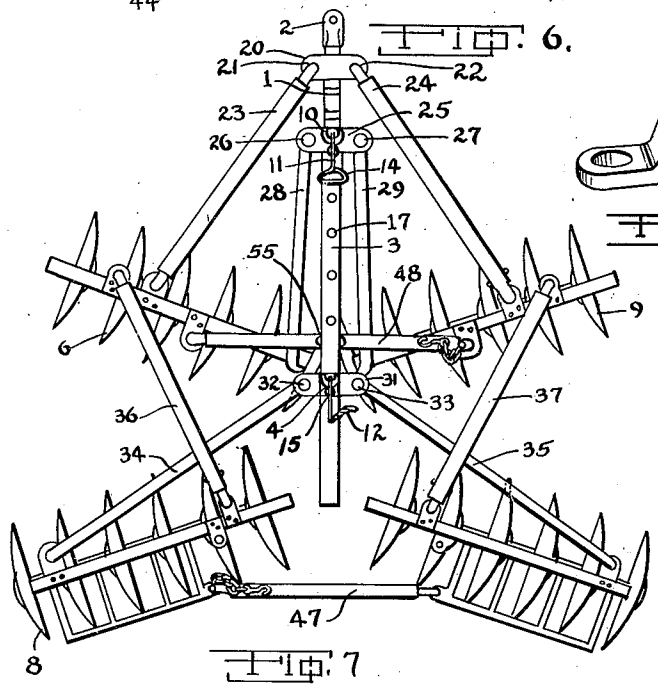


FIG. 7.

Inventor:
Oscar E. Curtis

By:
A. B. McCall
Attorney

Patented Sept. 9, 1941 2,255,380

UNITED STATES PATENT OFFICE

2,255,380

CONVERTIBLE DISK HARROW

Oscar E. Curtis, Mount Pulaski, Ill.

Application July 19, 1939, Serial No. 285,287

12 Claims. (Cl. 55—83)

My invention relates to convertible disk harrows; an object being to improve, to simplify and to refine the operative design and construction of such a disk harrow.

A further purpose of my invention is to provide in such an improved convertible disk harrow such mechanical details of its construction as will permit an easy, convenient and operatively practical control of the same in its several positions of adjustment under which it may be expected to be used.

A further purpose of my invention is to provide in such a convertible disk harrow such mechanical improvements and refinements as will not only enhance the appearance of such an implement, but such as will accomplish all of the purposes of mechanical operation found in the disk harrows of my invention which were covered by Patents No. 2,094,144, Sept. 28, 1937, and No. 2,109,769, March 1, 1938, and which will achieve such purposes in a greatly improved manner.

A particular purpose of this invention is to provide not only a disk harrow which may be operatively adjusted while in motion to a contracted position when desired, for passing through a farm gate and the like, but a disk harrow which may be adjusted in its operative position to provide in the same implement what is recognized in the art as a double-acting disk harrow and requiring only a negligible time to make such convertible adjustments wherein every mechanical change required for the same is a very simple, convenient and quick manipulation.

I attain the objects of my invention by the implement described in this specification, recited in the claims and illustrated in the accompanying drawings wherein like reference numerals refer to like parts in the several figures.

Referring to the figures:

Fig. 1 is a top view of my convertible disk harrow showing the same in its widest position of adjustment and shown without extra weight supporting shelves.

Fig. 2 is a front view of the same shown without the draw bar and its connections.

Fig. 3 is a top view of my convertible disk harrow shown in its operative extended V formation.

Fig. 4 is a top view of my disk harrow shown in contracted adjustment to permit the same to pass through a farm gate and the like.

Fig. 5 is a side view of my disk harrow shown in a contracted position.

Fig. 6 is a top view of my disk harrow shown in Fig. 5, with the inner disk gang members interchanged in their operative position.

Fig. 7 is a top view of the disk harrow shown in Fig. 6 but illustrating the disk gang members when operatively adjusted to a double-acting reverse V position.

Fig. 8 is a rear view of my disk harrow adjustment shown in Fig. 1.

Fig. 9 is a bird's eye view of the sectional draw bar construction illustrated in Fig. 8.

Fig. 10 is a bottom view in perspective detail illustrating the sectional draw bar of my disk harrow.

Fig. 11 is a detail of one of the upright supporting brackets connected by rod or chain to the outer disk gangs and adapted to limit the depth of cut which they may make.

Fig. 12 is a detail in perspective illustrating the detachable locking means on the sectional draw bar for holding the respective draw bar members into selected positions of operative adjustment and adapted to be controlled by rope pull.

Thus, in a detailed analysis of the construction of my convertible disk harrow implement, it will be observed in the drawings that the sectional draw bar consisting of an inner fixed member 1 has a forward pulling yoke 2 for its detachable connection with a tractor, an intermediate encompassing sleeve member 3, an adjustable collar 4 encompassing sleeve 3 and a rear terminal sleeve 5 which is removably carried as a rear section of the draw bar.

In conjunction with this type of draw bar construction, I am providing a pair of left disk gang sections 6 and 7 and a pair of right disk gang sections 8 and 9, while these disk gang sections are each adjustably connected with the draw bar sections in a manner permitting them to be adjusted at will while the implement is in motion.

When a longer lever 11 is used as a part of the construction of locking member 10, then pulling ropes 12 and 13 may be supported in loop 14 of lever 11. Collar member 4 has a locking member 15 connected for remote control by rope pull 12 while rear sleeve member 5 has a locking member 16 connected for remote control by rope 13.

It will be noted that each of these locking members engages one of the series of locking holes 17 in the draw bar sections by means of a plunger or pin 18 found in each locking member and held in its locked position by a coiled spring 19 exerting a downward pressure on such pins.

It will be noted that integral with the fixed

inner section 1 of the draw bar, I am providing a yoke 20 having a right eyelet 21 and a left eyelet 22 for the detachable pivotal engagement of extensible pulling arms 23 and 24 respectively and the sleeve section 3 of the draw bar has integral with locking member 10 a yoke member 25 having eyelets 26 and 27 for a detachable engagement of pulling arms 28 and 29.

It will be noted that plunger 18 and locking member 10 on sleeve 3 detachably engage notches 30 of the fixed front inner section 1 of the draw bar to permit the selective slidable adjustment of sleeve 3 on this fixed section 1 of the draw bar by the manipulation of upright lever 11 which controls plunger 18 of locking member 10 with spring 19 of this locking member 10 holding plunger 18 in the selected notch among notches 30 until it is optionally released for further adjustment of sleeve 3.

Thus, it will be observed in the drawings that pulling arms 23 and 24 are adjustably and detachably secured to the outer ends of disk gang members 6 and 9 respectively, while pulling arms 28 and 29 are respectively connected adjacent the inner ends of outer disk gang sections 6 and 9.

It will be noted that locking member 15 is integral with collar 4 which is adapted to be selectively adjusted by slidably moving the same upon sleeve 3 to the position where it is needed and after it is moved to the selected position then plunger 18 of locking member 15 engages one of the holes 17 in sleeve 3 to hold collar 4 in place until it may be again released by a pull on rope 12.

Collar 4 has an integral yoke 31 having an eyelet 32 on one side and eyelet 33 on the other for the detachable engagement of pulling arms 34 and 35 respectively which are pivotally and adjustably secured to the outer ends of the inner disk gang sections 7 and 8 respectively; while pulling arms 36 and 37 are respectively engaging eyelets 38 and 39 of yoke 40 forming a part of rear terminal sleeve 5 and its integral locking member 16 with a remote control rope 13 adapted to control the plunger 18 thereof when it engages and disengages locking holes 17 on sleeve 3.

Pulling arms 36 and 37 respectively and adjustably engage the inner disk gang sections 7 and 8 respectively adjacent their inner ends.

This rear terminal sleeve 5 of the sectional draw bar carries a transverse leveling bar 41 operatively connected therewith in a position permitting this bar 41 to operatively extend across the rear end of pulling arms 36 and 37 in order to aid in holding the inner ends of disk gang sections 7 and 8 to a more uniform depth in the soil.

This transverse bar 41 is preferably shaped at its opposite ends to define hook members 42 and 43 adapted to respectively limit the outward swing of the inner disk gang members 7 and 8 when they are in operation.

Although there may be no occasion to need any extra weights on my implement yet there may be situations involving soil conditions where some extra weight might be needed, and in order to provide for such conditions, I am illustrating a pair of weight supporting frame brackets 44 and 45 preferably carried by disk gang sections 7 and 8.

However, it is intended as a feature of merit in my convertible disk harrow implement to provide a construction and design thereof which may, in practically all instances and operating conditions, avoid the need of extra weights.

It will be noted that the frame 46 of my disk gang sections is supported by spaced upright bearing members 56 on each disk gang.

It is obvious that in the operation of disk harrows that the toughness of the soil and a variation in surface conditions of the soil to be worked, there may arise certain field conditions wherein a momentary adjustment may be made in the operating position of certain disk gang sections to permit all of said sections to work together more efficiently for a more uniform depth of cut in the soil.

For this reason, I am providing a pair of upright brackets 49 and 50 each removably secured to the inner disk gang sections 7 and 8 respectively and it is to the top ends 51 and 52 respectively of these brackets 49 and 50 that I establish a control connection with the outer ends of the leveling and spacing bars 47 and 48 respectively through adjustable rods or chains 53 and 54. By this means, I am able to selectively adjust the cutting depth of the outer ends of disk gang sections 6 and 9, thus making it possible to control the uniformity of cutting depth of all the disk gang sections as the implement is pulled over the soil by a tractor.

When operating my convertible disk harrow on a farm in one field and another, there are occasions when it becomes necessary to move the implement through a gate or through some other form of relatively near passage. After the tractor has been pulling this implement over the field in its position of widest operative V adjustment, then it is obvious that it will amount to a substantial saving of time and a great convenience to be able to quickly and easily adjust the relative position of the respective disk gang sections while the implement is still in motion so as to materially reduce the width of the implement sufficient to permit the entire implement to pass through such a gate or other like passage between fields on a farm.

This is exactly what I am able to accomplish with my convertible disk harrow.

I achieve this novel and practical purpose by my disk harrow in the following manner:

The operator, when riding the seat of a tractor, with the disk gang sections adjusted to their widest operating V position, finds the sectional draw bar working in a position where locking members 10, 15, and 16 are slidably assembled in a forward group up adjacent the forward end of the inner fixed section 1 of the sectional draw bar, and in this position, these locking members are found to be registering at their respective forward position on the sectional draw bar.

However, when it is desired to reduce the width of the implement, enabling the same to pass through a farm gate then all that is necessary for the operator to do is to reach back with one hand while driving the tractor slowly and jerk on remote control ropes 12 and 13, releasing locking members 15 and 16 from their locked position on sleeve 3 of the sectional draw bar, with the result that the tractor will pull forward with the inner section 1 of the draw bar and with sleeve section thereof as it takes with it pulling arms 23 and 24 and 28 and 29; and these pulling arms being connected with the outer disk gang sections 6 and 9 will thus pull these two sections forwardly and they will each move inwardly on opposite sides of the sectional draw bar as they go forward and will come to a tandem position

with disk gang sections 6 and 9 respectively ahead of disk gang sections 7 and 8.

It is true that when remote control ropes 12 and 13 are jerked by the operator that this merely releases plungers 18 of the locking members 15 and 16 permitting the forward sections 1 and 3 of the draw bar to move forward with the tractor and the outer disk gang sections 6 and 9 and sleeve 3 slides through locking members 15 and 16, with this forward sliding movement of sleeve 3 stopping when the outer disk gang sections 6 and 9 are moved forward out of their V formation with the inner disk gang sections 7 and 8 moved over toward the draw bar until they are abutting end to end under the draw bar, or approximately in this close position.

At the same time, this forward movement of the forward sections of the draw bar when the remote control ropes 12 and 13 are released, will permit plunger 18 of locking member 16 to engage one of the rear holes 17 of sleeve section 3 of the draw bar so that the forward movement of sleeve 3 of the draw bar may pull the rear terminal sleeve 5 far enough forward to contact collar 4 with locking member 15, and this will result in aligning inner disk gang sections 7 and 8 in a horizontal alignment parallel with the newly aligned position of outer disk gang members 6 and 9 with both pairs of aligned disk gang sections disposed transverse to the direction of the draw bar.

In this position, the implement will easily pass through an ordinary farm gate. However, after passing through such a farm gate, it may be desired to again spread the implement to the position of its widest V adjustment, and when this is desired, then all that is necessary is for the tractor operator to remain in his seat and place the tractor in reverse for a slow movement while he manipulates the remote control ropes again.

Thus, when the tractor is pushing backward against the forward section 1 of the sectional draw bar and the operator is releasing locking members 15 and 16, by pulling on remote control ropes 12 and 13, then this rear motion of the tractor will cause arms 23, 24, 28 and 29 connected with disk gang members 6 and 9 respectively to push these outer disk gang members 6 and 9 rearwardly and outwardly until they are again aligned with the outer ends respectively of inner disk gang sections 7 and 8. Then, when in the final rear adjustment of the relative position of disk gang sections, it is desired to again place inner sections 7 and 8 into a rear V formation with each other, this is done by releasing remote control rope 13 to permit plunger 18 of lock member 16 to engage one of the holes 17 of sleeve 3 so that the rear push of the tractor will force the inner adjacent ends of the inner disk gang sections 7 and 8 rearwardly and they will move somewhat outwardly as they are pushed back until the hook members 42 and 43 at the respective ends of transverse bar 41 engage the inner pulling arms 36 and 37 respectively of inner disk gang sections 7 and 8.

Thus, in this position the implement is again ready to disk the soil operating in its widest V position of disking adjustment.

It will be observed in the drawings that the central spacing and leveling bar 48 connecting disk gang sections 6 and 9 is provided with an upright yoke 55 adapted to saddle under the rear end of sleeve 3 to aid in holding sleeve 3 in a position of desirable operative alignment behind the tractor for operative automatic adjustment with respect to the disk gang members. It will be further noted that when outer disk gang sections 6 and 9 are pulled forwardly and inwardly ahead of the inner disk gang sections 7 and 8 the leveling and spacing arm 47 swings around forward so that it is aligned in a position approximately parallel with the draw bar as it establishes a slidable spacing control connection between disk gang section 6 and section 7 in their newly adjusted tandem arrangement.

When operating in this position, it will be noted that leveling and spacing bar 48 in like manner connects disk gang sections 8 and 9 when section 9 is forwardly and inwardly moved to the new tandem position. Thus, leveling and spacing bars 47 and 48 serve as slidable spacing controls between the disk gangs in their new tandem position of adjustment.

In this tandem adjustment of the disk gang sections of my implement the upright brackets 49 and 50 with their adjustable chains or rods 51 and 52 respectively connected with the outer ends of leveling and spacing bars 47 and 48 respectively are not thus serving any particular essential function and will not do so until the disk gang sections 6 and 9 are again outwardly and rearwardly adjusted to the above mentioned V formation in the widest operating position for the implement.

Thus, when operating my implement in its widest working position of adjustment, the disk gang sections 6, 7, 8 and 9 are arranged in one single V formation and in this position of adjustment the disk cutter implement will cover a greater area as they go over the field; while the implement may be made more narrow to permit it to pass through a farm gate by making the details of adjustments that have been hereinabove described, and in making this narrow tandem adjustment the disk blades are run straight as they move through a gate, thus merely cutting the soil surface, while in this position moving through a gate.

However, in addition to the above mentioned selective adjustments made possible in the construction of my convertible disk harrow, I have so designed and constructed my convertible disk harrow as to permit a novel, practical and convenient operating adjustment to be made therein with the essential details of an arrangement of parts thereof for the new adjustment requiring only a comparatively short period of time.

In fact, with an understanding of the construction and fitting relation of the several parts of my implement it may require approximately twenty to thirty minutes to have them make the change over to an operating adjustment of the disk gang sections which I shall designate as a double-acting adjustment, wherein one pair of disk gang sections moving in a V formation, runs ahead of the second pair of disk gang sections moving in a reverse V formation with the angular adjustment of each, set to a position where the forward pair of disk gang sections will throw the soil outwardly as it cuts the surface thereof while the rear pair of disk gang sections will throw the soil back leaving the ground relatively uniform after it has been disk harrowed in this manner.

I achieve my purpose in this adjustment of my convertible disk harrow with its disk gang sections by making changes as follows:

It will be noted in this operative adjustment of my implement that I will not need to use rear terminal sleeve section 5 of my draw bar and it

will be thus removed from the rear end of sleeve section 3 of the draw bar. Obviously this removal of rear terminal sleeve 5 takes with it the locking member 16 which holds the sleeve 5 in selected positions of adjustment as it telescopically fits over the rear end of sleeve 3. Also with this adjustment, there will be no occasion to use the transverse leveling and spacing bar 41 which is operatively supported beneath this rear terminal sleeve section 5 of the draw bar.

In this operating position, also for the disk gang sections, there will be no occasion to use upright brackets 49 and 50 and their connecting chains or rods 51 and 52 and they will be removed along with rear terminal sleeve 5 and transverse leveling and spacing bar 41.

After the removal of these parts that are not needed, I then make decided changes in the operating position of the disk gang sections of my implement.

In order to change over from a single acting to a double-acting arrangement of my implement I find it more practical to start from the transport position shown in Figure 4 wherein outer disk gang members are abutting and I first shorten pulling arms 23, 24, 28 and 29. I then connect sections 6 and 9 by leveling and spacing bar 43 as is shown in Figure 6.

I next interchange the relative position of inner disk gang sections 7 and 8, connecting them together by a leveling and spacing bar 47, and pulling arms 34 and 35 in this new adjustment, are detachably connected respectively between the new inner ends of disk gang sections 7 and 8 and disk gang sections 6 and 9; which in their new adjustment are directly ahead of sections 7 and 8 respectively.

It will be seen that with the disk gang sections 6 and 9 thus adjusted in a V working arrangement, they will each cut the soil surface and draw it outwardly while disk gang sections 7 and 8 arranged in a reverse V operative formation and operating in an interchanged position that will very effectively throw the same soil back again in a substantially agitated condition.

Thus, in a careful analysis of the construction of my new implement, it will be found that I am providing a most practical and convenient arrangement of working parts, presenting not only the appearance of a more finished looking farm implement but especially capable of being selectively adjusted in positions of an operative assembly while the implement is being moved, preferably by a tractor, in the field; and after a series of extended practical tests, I have found that in all of the desired positions of adjustment, the several parts of my implement function perfectly and it has been found by repeated actual field tests to achieve in a most efficient and practical manner every purpose desired in such a farm implement.

Having thus described the nature of my invention, what I claim is:

1. A convertible disk harrow for selective operative adjustments while in motion and comprising two right and two left disk harrow sections and adjustable means for their interconnection, a sectional draw bar slidably adjustable and pivotally connected with said disk harrow sections, said draw bar at its forward end shaped for its detachable engagement with a tractor and the like, pulling arms establishing operative connection between said sectional draw bar and said disk harrow sections, locking means for the respective sections of said draw bar for their detachable engagement in selected positions of their longitudinal adjustment, said locking means on said draw bar sections provided with remote control means for their manipulation by a tractor driver when seated on the tractor, said implement thus adapted to be converted from a wide type disk harrow to a narrow tandem arrangement while in motion, by a forward pulling movement of said tractor and said implement further adapted to be readjusted back to a wide type implement by a rearward movement of said tractor against said draw bar.

2. A convertible disk harrow for selective operative adjustments while in motion and comprising two right and two left disk gang sections, interconnected by telescopically adjustable leveling and spacing bars, a sectional draw bar whose sections are telescopically connected for optional selective adjustment while the implement is in motion, pulling arms establishing operative connection between said disk gang sections and said sectional draw bar, locking means for the detachable engagement of said draw bar sections in selected positions of telescopical adjustment and remote control means and said locking means adapted to extend the control of said locking means up to a point within easy convenient reach of a tractor driver when pulling said implement, said convertible disk harrow thus adapted to be changed from a wide position of operative adjustment to a narrow tandem position while in a forward motion and further adapted to be readjusted from a narrow tandem position back to a wide operating position of adjustment by a rearward movement of said tractor against said draw bar.

3. A convertible disk harrow for optional selective adjustment while in motion and comprising two right and two left disk harrow sections, a longitudinally slidable draw bar made in sections and operatively connected with said disk harrow sections by means permitting the pivotal adjustment of said disk harrow sections, means integral with the forward end of said draw bar for its detachable connection with a tractor, locking means operatively mounted intermediate the ends of said sectional draw bar, a slidably adjustable leveling and spacing bar pivotally and adjustably connecting each of said disk harrow sections, and right and left pulling arms establishing operative pivotal connection between said disk harrow sections and said draw bar sections; said pulling arms and said leveling and spacing bars providing the means permitting said disk harrow to be converted from a wide type disk harrow implement to a narrow tandem disk harrow implement by a forward pulling movement of said tractor and also permitting a readjustment of said disk harrow, when desired by a rearward movement of said tractor.

4. A convertible disk harrow comprising in combination, two right and two left disk harrow sections pivotally and adjustably connected and a telescopically adjustable and sectional draw bar controllably connected therewith; said draw bar provided with means at its forward end for its attachment to a source of motive power; said adjustable sections of said draw bar each provided with detachable locking means for operatively and detachably securing the sections in selected positions of longitudinal adjustment, a fixed pulling yoke at the forward end of said draw bar and a right and left pivotally adjustable pulling arm extending rearwardly from said yoke, one of said draw bar sections shaped to de-

fine a longitudinal sleeve encompassing an interfixed section thereof and provided at its forward end with one of said locking means adapted to detachably engage a selected stop member out of a plurality thereof, longitudinally aligned adjacent the forward end of the fixed portion of said draw bar; said locking means provided with a fixed yoke pivotally engaging a right and left longitudinally adjustable pulling arm, a second locking means rearward of the first and shaped to define a collar encompassing and slidably supported on said sleeve section of said draw bar, a rope and spring actuated trigger on said collar and said sleeve provided with a plurality of longitudinally aligned holes for the detachable selective engagement of said trigger, a pulling yoke defining an integral part of said collar and a right and left pulling arm each pivotally adjustable in its connection with said yoke of said collar, said left pulling arms pivotally and respectively engaging said left disk gang sections and said right pulling arms pivotally engaging said right disk gang sections respectively, a plurality of leveling and spacing bars establishing pivotal and operative connection between said disk gang sections and bearing members on said sections for the operative engagement of said right and left pulling arms and said leveling and spacing bars, and serving as a means of angular adjustment with relation to said draw bar and relation to each other, and operatively serving as a means by which said disk gangs may be moved when in use; said leveling and spacing bars adapted to aid in holding said disk gang sections into selected positions of operative adjustment and also limit the depth of cut for portions of the disk gang sections and a pair of upright removable brackets secured to the frame portion of said inner disk gang sections respectively and adjustably connected by their top ends respectively with the outer ends of said leveling and spacing bars pivotally connecting with said outer disk gang sections and controlling the depth of cut thereof.

5. A convertible disk harrow for cultivating the soil while operatively connected with a tractor and comprising in cooperative combination a sectional draw bar and a plurality of disk gangs, with adjacent disk gangs connected by leveling and spacing bars, said disk gangs adjustably connected with said sectional draw bar in a manner permitting selective operative adjustment of the draw bar sections and the respective disk gangs while the disk harrow implement is in tractor controlled motion, and a plurality of remote controlled detachable locking means respectively operative on said draw bar sections for detachably holding said sections into selected positions of operative adjustment and for optionally and selectively releasing said sections when adjustments are desired with such remote control means easily accessible to the tractor driver when the tractor is operatively connected with said implement.

6. A convertible disk harrow for cultivating the soil while operatively connected with a tractor and comprising in cooperative combination a sectional draw bar and a plurality of disk gangs, with adjacent disk gangs connected by leveling and spacing bars, said disk gangs adjustably connected with said sectional draw bar in a manner permitting selective operative adjustment of the draw bar sections and the respective disk gangs while the disk harrow implement is in tractor controlled motion, and a plurality of remote controlled detachable locking means respectively operative on said draw bar sections for detachably holding said sections into selected positions of operative adjustment, and a plurality of upright brackets removably secured in predetermined position on selected disk gang members and having their top ends adjustably and detachably connected respectively with adjacent disk gang members.

7. A convertible disk harrow for cultivating the soil while operatively connected with a tractor and comprising in cooperative combination a sectional draw bar and a plurality of disk gangs including an inner and an outer right disk gang section and an inner and an outer left disk gang section, leveling and spacing bars adjustably connecting operatively adjacent sections of said disk gangs and providing means for selectively spacing said gangs and for operatively holding the same to a relatively uniform depth of soil cut, and adjustable pulling arms connecting the same with said sectional draw bar, detachable locking members on said draw bar, sections and each connected by remote control to a position within easy reach of the tractor driver and connected with said draw bar and said disk gang sections by means permitting selective slidable adjustment of the draw bar sections and selective operative adjustment of said disk gangs while said implement is in tractor controlled motion and a pair of upright brackets removably secured each respectively on the inner left and inner right disk gang members and having their top ends adjustably and detachably connected respectively adjacent the outer ends of the outer right and outer left disk gang members.

8. A convertible disk harrow comprising a sectional draw bar, with each section thereof provided with means permitting its selective slidable adjustment, a plurality of disk gangs, a plurality of pulling yokes, operatively supported respectively by said sections of said draw bar, a plurality of detachable and adjustable pulling arms establishing connection between said disk gangs and said draw bar sections and a plurality of bearing attachments on each of said disk gangs for detachably connecting said pulling arms thereto, a plurality of slidably adjustable leveling and spacing bars operatively and detachably connecting adjacent pairs of said disk gangs, detachable remote controlled means for releasing and selectively adjusting and holding said draw bar sections into selected positions of slidable adjustment; whereby said disk gangs may be quickly adjusted to a selected operating position whether that be a double-acting contracted position or a position of maximum spread for preparing the soil; and whereby said convertible implement may also be readily contracted to permit its passing through a farm gate.

9. In a convertible disk harrow for selective adjustments while in motion, the combination with a sectional draw bar whose sections are relatively slidable in their adjustable fitting relation, of a pair of inner and a pair of outer disk gangs adjustably and operatively hooked together, and a plurality of detachable and adjustable pulling arms respectively establishing adjustable selective operative connection between one of said disk gangs and one of said draw bar sections, adjustable leveling and spacing bars establishing connection between adjacent disk gangs, and upright brackets removably carried by said inner gangs and each provided with an

adjustable support arm connected with an adjacent outer disk gang for the selective leveling adjustment of said outer disk gang.

10. In a convertible disk harrow, the combination with a sectional draw bar whose sections are telescopically slidable in their adjustable fitting relation, of a pair of inner and a pair of outer disk gangs adjustably and operatively hooked together and a plurality of detachable and adjustable pulling arms respectively establishing operative connection between the disk gangs and said draw bar sections, means for detachably securing the forward end of said pulling arms to said draw bar sections and means for detachably connecting said disk gangs with the other end of said pulling arms; whereby said disk gangs may be readily adjusted to a selected operative position to define a double-acting disk harrow wherein the axis of each of said gangs is disposed at an angle with said draw bar or said disk gangs may be operatively aligned in a single-acting V formation with said pulling arms operatively adjusted thereto in position to uniformly distribute the application of pulling power to said disk gangs; locking members on said draw bar sections and each connected by remote control means for convenient manipulation by a tractor driver, for holding the draw bar sections into and releasing them from selected positions of slidable adjustment and upright brackets adjustably connecting said inner gangs with said outer gangs for their relative leveling adjustment.

11. In a disk harrow a convertible frame comprising two inner disk gangs and two outer disk gangs, pivotally and adjustably connected, an inner fixed draw bar, the front end of which is shaped to define a pulling yoke to be coupled to a tractor and a pair of hinged extensible arms pivotally connected to the outer ends of said outer disk gangs, a slidable sleeve section of said draw bar telescopically housing said inner draw bar section, a locking means on said sleeve section of said draw bar and operatively fixed at the forward end thereof, a pair of pulling arms establishing pivotal connection between said locking means on said sleeve draw bar section and the inner ends of said outer gangs, a second remote control locking means slidably encompassing said sleeve section of said draw bar and inner extensible arms establishing pivotal connection between said second locking means and the outer ends of said inner disk gangs, a third locking member and a rear terminal sleeve and a pair of inner pulling arms establishing detachable connection between said third locking member and the inner ends of said inner disk gangs, a pair of leveling and spacing bars respectively establishing a spacing connection between said inner and said outer disk gangs, a transverse pivoted leveling and spacing bar carried by said draw bar and extending to the right and left in operative contact with said inner extensible arms, for their automatic leveling adjustment and said bar hooked down at its ends to limit the outward swing of said arms, an upright bracket on each of said inner disk gangs and adjustment links establishing connection between the top of said brackets and the outer portion of said outer disk gangs for the selective leveling adjustment of said outer disk gangs.

12. In a convertible double-acting disk harrow the combination comprising a sectional draw bar, whose sections are relatively slidable in their adjustable fitting relation and a plurality of disk gangs operatively and adjustably hooked together, a plurality of detachable and extensible arms respectively establishing adjustable operative connection between said disk gangs and said draw bar sections; said disk gangs arranged in a manner defining a pair of interchanged inner disk gang members transverse to the draw bar, also defining a pair of outer disk gangs contracted to an abutting position and transverse to the draw bar; said interchanged inner disk gang members behind said outer disk gangs, and said outer disk gangs respectively connected operatively by a leveling and spacing bar, said outer disk gangs connected to the forward end of said draw bar by extensible arms and said interchanged inner disk gangs pivotally connected with said draw bar, and said extensible arms detachably connected with said outer disk gang sections, said sections having remote controlled locking means for their selective adjustment from a tractor when pulling said disk harrow; whereby when thus connected, said disk gang members may be made to assume an operating position with the interchanged inner disk gangs set to define a rear V and with said outer disk gangs defining a forward V.

OSCAR E. CURTIS.