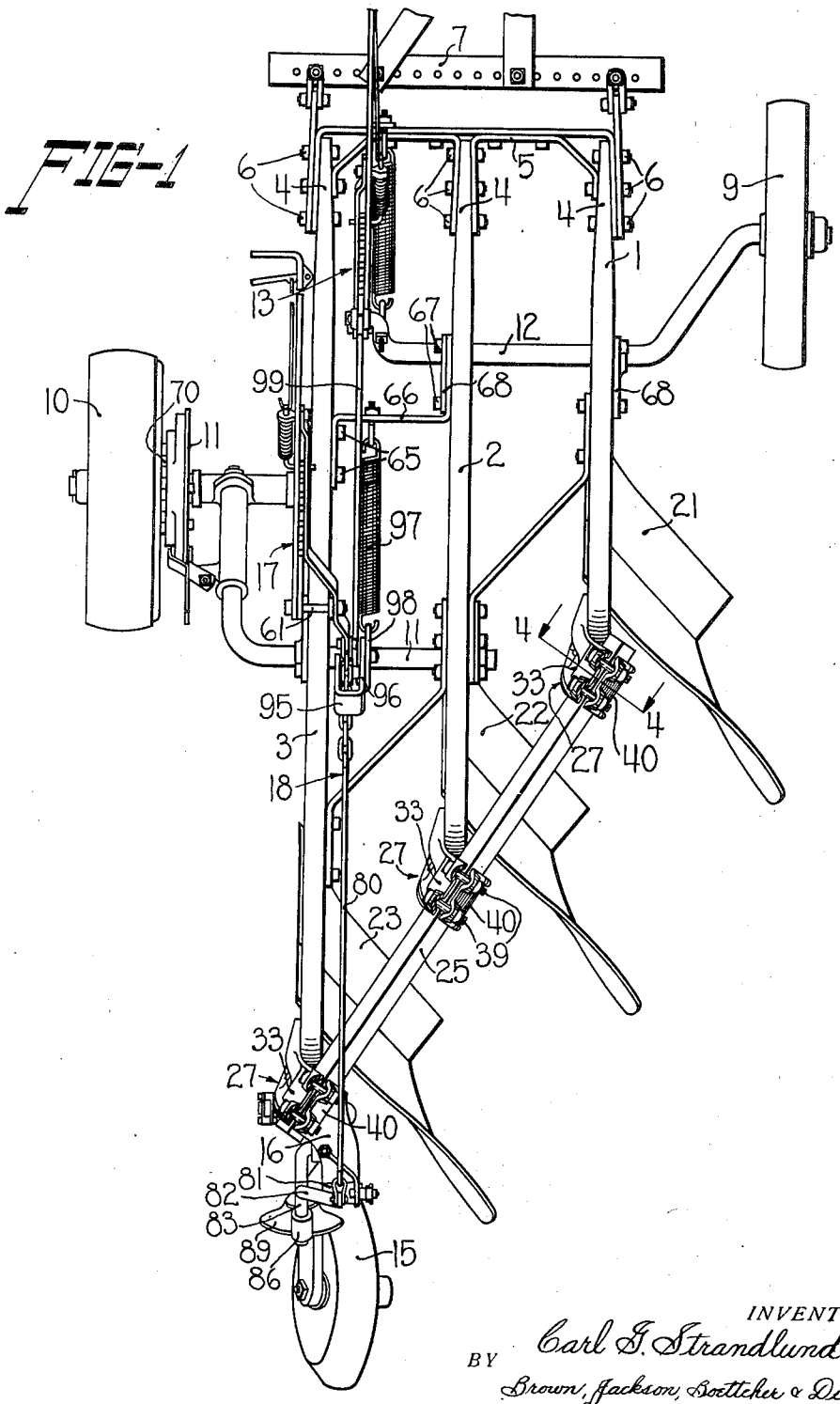
Nov. 14, 1939. C. G. STRANDLUND 2,179,528

PLOW

Original Filed Sept. 21, 1935 3 Sheets-Sheet 1

FIG-1



INVENTOR

BY Carl G. Strandlund

Brown, Jackson, Boettcher & Dienner

ATTORNEYS.

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PLOW

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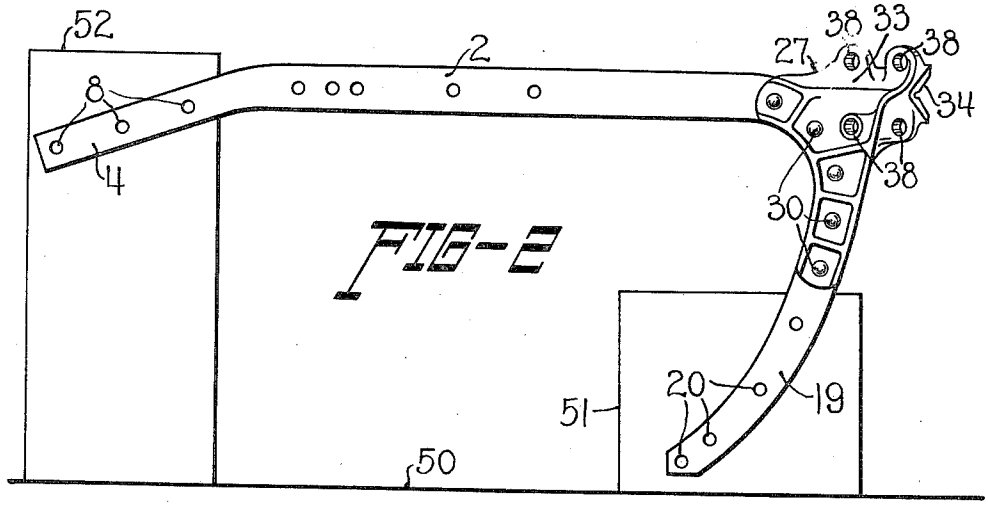


FIG-2

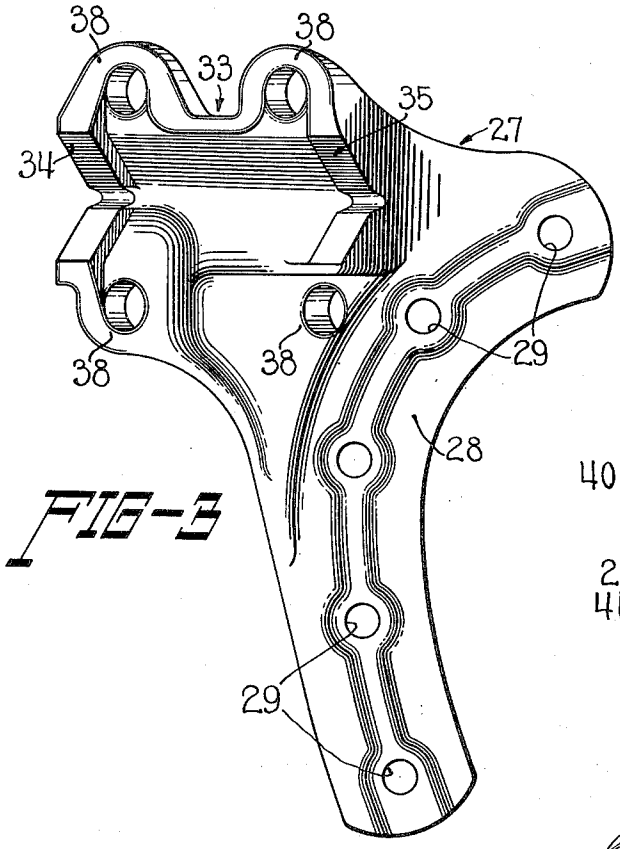


FIG-3

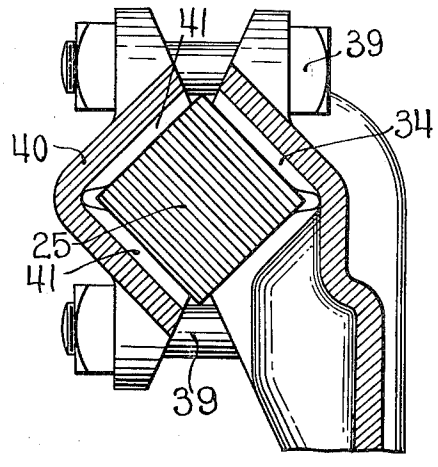


FIG-4

INVENTOR
Carl G. Strandlund

BY Brown, Jackson, Boettcher & Dienner
ATTORNEYS.

Nov. 14, 1939. C. G. STRANDLUND 2,179,528

PLOW

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FIG-5

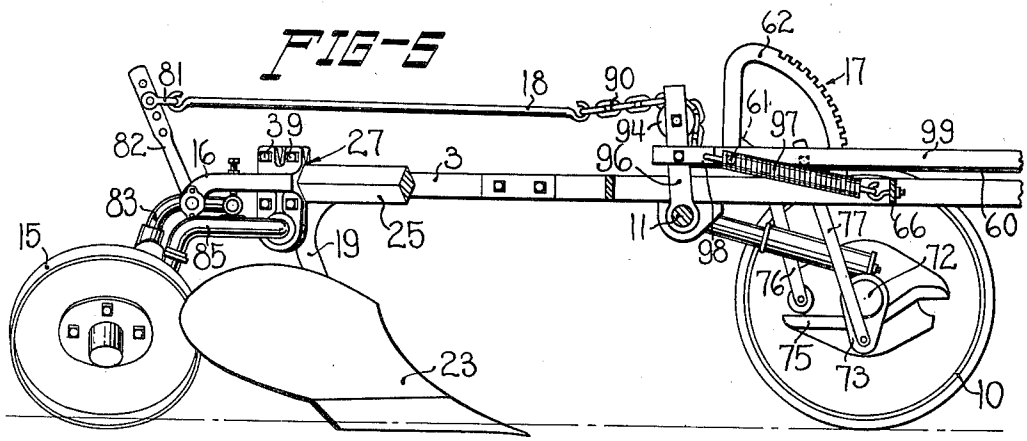


FIG-6

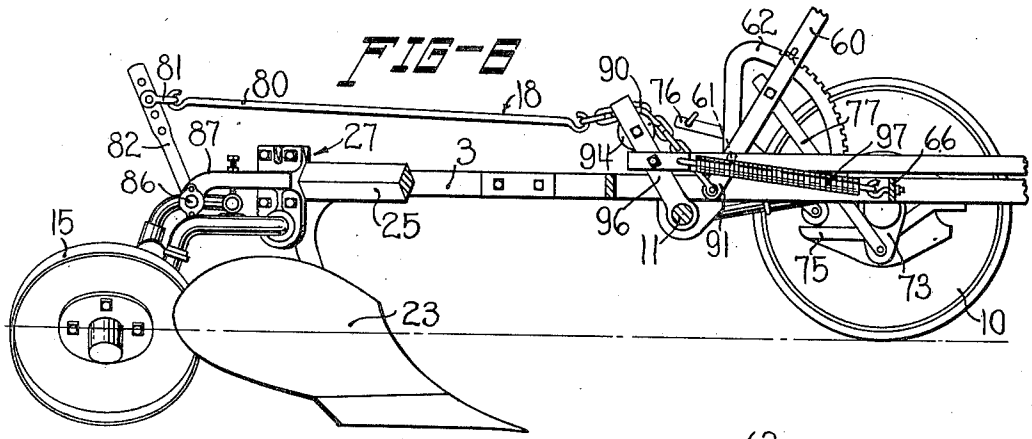
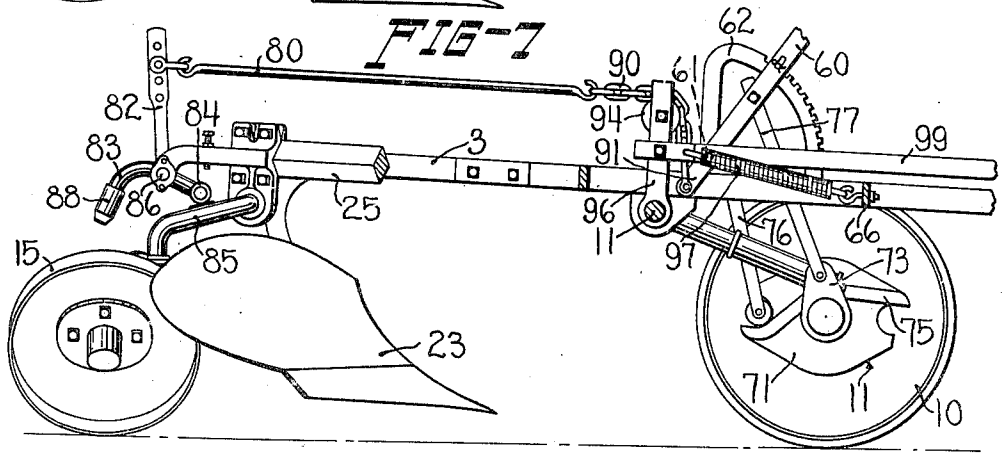


FIG-7



INVENTOR

BY Carl G. Strandlund

Brown, Jackson, Boettcher & Dienner

ATTORNEYS

Patented Nov. 14, 1939 2,179,528

UNITED STATES PATENT OFFICE

2,179,528

PLOW

Carl G. Strandlund, Moline, Ill., assignor to Deere & Company, Moline, Ill., a corporation of Illinois

Application September 21, 1935, Serial No. 41,508
Renewed January 20, 1939

30 Claims. (Cl. 97—102)

The present invention relates generally to plows and similar implements having tool beams, and more particularly is principally concerned with gang plows of the frameless type.

Heretofore, in the manufacture and assembly of plows, particularly of the frameless type, embodying a plurality of interconnected plow beams, it has been usual to provide a heavy face plate carrying a sufficient number of rigid brackets to receive the forward ends and the furrow opener receiving ends of the several beams. These brackets are secured in a sturdy and unyielding manner to the face plate so as to securely hold the ends of the several beams in the position with respect to each other that they are intended to occupy in the finished plow. It is necessary, particularly in plows of the frameless type, to reenforce the rear or upper curved portions of the several plow beams, by providing heavy braces between adjacent beams. The plow beams themselves are exceptionally strong and sturdy and are heat treated to secure and retain the strength required. However, in the manufacture and heat treating of the beams, slight warping or distortion is apt to occur so that while the draft and furrow opener receiving ends of the beam can be drilled to insure that the draft and furrow opener parts will be in the proper relative position, the curved brace receiving portion of the beam will not always be in the exact or proper position relative to the associated beams. In order to accommodate these variations prior to the present invention, in assembling a plow it was necessary to securely bolt the draft receiving and furrow opener receiving ends of the several beams to the proper standards on the assembly face plate, and then individually fit the relatively heavy reenforcing brace members between the brace receiving portions of the two, three, or more beams to be assembled together to form the plow. To fit the braces to the beams in this manner necessitated heating, hammering and bending the braces, in some instances a number of times, before they would be brought to the exact shape and dimension to fit properly between the particular beams being assembled together. Not only was this a relatively expensive and time consuming operation, but an even more serious disadvantage occurred as a result of this practice in that, after the plow had been in use for some time, if for any reason one of the plow beams had to be replaced, either due to wear, breakage, accident, or for any reason, difficulty was experienced in fitting a new beam into the plow. This difficulty occurred because of the aforementioned inaccuracies and distortions inherent in the beams themselves, making it necessary to reheat and reform one, and frequently two, of the brace members associated with the beam to be replaced.

Recognizing that, in the first instance, cumbersome and time consuming hand fitting and, in the second instance, reheating and reforming of the brace members when a beam is to be replaced in a plow, would not be necessary if, during the manufacture of the plow, the beams could be accurately formed to a given standard so as to be interchangeable, the present invention has for its principal object the provision of means insuring that each plow beam is exactly like and is replaceable with respect to every other plow beam corresponding thereto in the plow without requiring any individual fitting or reheating and reforming. More specifically, the present invention contemplates the provision of a method of constructing the beams of a gang plow in such a manner that when once ready to be assembled, all points of connection of the several beams occupy, in effect, standard positions with respect to each other, which are the same positions occupied by the corresponding connection points of all other beams adapted to be disposed in a similar position in the completed plow. Thus, if one or more of the beams of a completed plow must be replaced, all that needs to be done is to remove that beam and insert another one in its place. Since all points of connection of the new beam correspond exactly to the same points of connection on the old beam, no bending, heating, hammering or individual fitting is required.

A further object of the present invention is the provision of a thickened section or bracket at one of the points of connection on the beam, preferably the point which is the most likely to be distorted out of its proper position in the heat treating and manufacture of the beam itself. According to the preferred form of the present invention, the thickened section is disposed at the point on the beam to which the reenforcing brace members are usually attached, the thickened portions providing sufficient material that parts thereof may be machined or removed to various depths, so as to bring the point of attachment of the brace means to the exact or standard relation with respect to the front or draft receiving ends and the bottom or furrow opener receiving end of the beam. Once the bracket or other means affording the removable material has been milled away to the proper degree, the plow beam is then in a condition in

which it can be used to replace any other plow beam of the same kind, entirely irrespective of any distortion or inaccuracy which might have existed in the body of the plow beam itself. In other words, removing various amounts of material from the brace reeciving bracket compensates for inaccuracies and variations in the positions of that portion of the plow beam relative to the ends thereof.

An additional object of the present invention is to provide a plow structure having a constant rear lift, whereby regardless of the seting of the depth lever not only is the rear end of the plow lifted to the same height but the full range of movement of the lifting mechanism may be utilized in raising the rear end of the plow. Heretofore, in plows of this type it has been necessary to provide lost motion between the front and rear ends of the plow to accommodate various depth adjustments, and a substantial portion of the lifting range was used in taking up the lost motion. According to the principles of the present invention, the raising of the rear end is started just as soon as the lifting mechanism is actuated.

These and other objects and advantages of the present invention will be apparent to those skilled in the art after a consideration of the following detailed description of the preferred embodiment, taken in conjunction with the accompanying drawings.

In the drawings:

Figure 1 is a plan view of a frameless gang plow embodying beams constructed in accordance with and embodying the principles of the present invention;

Figure 2 illustrates one of the beams mounted on the assembly face plate with the brace receiving brackets bolted to the plow beam and ready to be milled to bring the brace receiving surfaces into the correct and standard relation, corresponding to all other beams, with respect to the front and furrow receiving ends of the beams;

Figure 3 is a perspective view of one of the brace receiving brackets with the clamping half of the brace receiving socket removed;

Figure 4 is a section taken approximately along the line 4—4 of Figure 1;

Figures 5 and 6 are side views of the plow in two different positions of depth adjustments; and

Figure 7 is a side view showing the inoperative or transport position of the plow to which it is raised by the lift mechanism irrespective of the depth adjustment.

Referring now to the drawings, it will be seen that Figure 1 shows a three-bottom frameless gang plow. The three plow beams are indicated by the reference numerals 1, 2 and 3, respectively, the forward ends 4 of the beams being connected together by suitable framework 5 fastened thereto by bolts 6 and receiving the propelling power from a draft frame 7 connected with or forming a part of the draft source, usually a tractor. As best shown in Figure 2, the forward ends of the several beams have holes 8 to reecive the bolts 6 which secure the framework 5 in place. The forward end of the plow is supported upon a front furrow wheel 9 and a land wheel 10, the latter including power lift mechanism and is mounted on a swingable crank axle 11. The furrow wheel 9 is journaled on a crank axle 12 whose position is controlled by landing adjusting mechanism 13, all more or less of conventional construction.

The rear end of the plow is supported upon a rear furrow wheel 15 supported in suitable rear axle frame bearing means 16 and controlled by adjusting mechanism 17 acting through linkage 18. The rear or downturned ends 19 (Figure 2) of the several beams have bolt holes 20 receiving the bolts or other means attaching the plow bodies or furrow openers 21, 22 and 23, respectively, to the several beams (Figure 1). As in the usual construction, at its rear portion each plow beam curves downwardly rather sharply in connecting the horizontal portion of the plow beam and the furrower opener receiving portions 19. These curved portions of the several plow beams are connected together by a strong rigid bar 25, preferably of square cross-section as best shown in Figure 4, and the brace or bar 25 is, according to the present invention, rigidly connected with each of the plow beams by a bracket, indicated in its entirety by the reference numeral 27.

Each of the brackets 27 comprises a bolting section 28 curved to fit against the upper rear portion of the associated plow beam and provided with a plurality of bolt holes 29 to receive bolts or rivets 30 (Figure 2) by which the bracket 27 is secured to the associated beam. The bracket 27 also includes a generally rearwardly disposed brace receiving section 33 having spaced thickened portions 34 and 35 in the form of V-shaped notches. The bracket section 33 also carries apertured portions 38 arranged to receive the clamping bolts 39 which secure a companion socket member or cap 40 in place, the latter having portions 41 providing V-shaped notches to engage and hold the brace bar 25 in position. As is shown in Figs. 1, 5, 6 and 7, the rear furrow wheel bearing support 16 is formed integral with the cap 40 for the bracket 27 of beam 3.

In the manufacture and assembly of the plow, a relatively heavy face plate 50 is provided with assembly standards 51 and 52 for each beam of the completed plow. The standards and face plate serve as a jig to receive and securely hold in proper position the several beams. Figure 2 shows the intermediate beam 2 in position on the face plate 50. When all three of the beams, assuming the completed plow to be like the one illustrated in Figure 1, are secured in proper relative position on the face plate and held in that position thereby, the several brackets 27, which may be attached to the beam either before or after its mounting on the assembly base plate, are milled by a suitable tool which removes more or less material from the thickened portions 34 and 35 of the several brace receiving bracket sections. The amount of material removed in each case depends upon the amount of fore and aft or lateral distortion, if any, in the particular beam. For example, according to Figure 1, if the brace receiving part of any one of the beams is disposed more to the rear or to the right than is usual, then more material will be removed from the brace receiving portions of the bracket than will be removed if the beam is distorted or warped to the left or forwardly. It is to be noted that in most cases, the inaccuracy of any one beam is scarcely observable with the eye, being usually in the nature of a sixteenth of an inch or less. However, whatever the distortion may be, the removal of more or less material from the bracket of each beam brings the brace receiving portion of each beam in exactly the proper position with respect to the draft receiving end and furrow opener receiving end 19 of the beam, these last two points being firmly attached to the assembly standards 51 and 52 and held in proper position thereby, but without detracting from the

required strength and rigidity of the bracket. Since the milling tool is also properly positioned with respect to the face plate 50, it will be seen that the V-shaped sockets on the several brackets are in proper position to receive the square brace bar 25. Usually, so as to accommodate a straight bar, the sockets of the several brackets are brought into alignment by the milling operation, as illustrated in Figure 1. While this is the preferred form, it is to be understood that other shapes of brace bars may be used, and the brackets will be formed accordingly.

The depth adjusting mechanism 17 for the plow comprises a lever 60 pivoted at 61 on a sector 62 which is fixed to the beam 3 in any desired manner. Preferably, the forward portion of the sector 62 is bolted to the beam 3 by bolts 65 which are also employed for securing one end of the brace 66, the other end of the latter being secured by bolts 67 which also secure one of the brackets 68 in which the front furrow wheel axle 12 is journaled. The power lift mechanism includes a toothed constantly rotatable member 70 fixed to rotate with the wheel 10 and an intermittently rotatable member 71 to which is connected a shaft 72 and a power lift arm 73. Operation of the members 71, 72 and 73 is controlled by latch means 75 and a trip lever 76. A pitman 77 is connected at its upper end to the depth adjusting lever 60 and at its lower end is connected with the power lift crank 73.

The operation of the power lift mechanism is more or less conventional, swinging the trip lever 76 serving to free the latch 75. This connects the intermittently rotatable parts with the wheel 10 so that as the latter continues to roll, the pitman 77 exerts a thrust which, reacting against the plow frame through the lever 60, lifts the forward portion of the plow from the position shown in Figure 5 or Figure 6 to the position shown in Figure 7. At this time, assuming that the operator has released the trip lever 76, the other end of the latch 75 is engaged by the roller on the lower end of the trip lever so that the intermittently rotatable parts are then disconnected from the wheel 10, locking the plow in raised or inoperative position.

In order to have the rear end of the plow, adjacent which the furrow openers are disposed, not only raised to substantially the same point irrespective of the depth adjustment, whether in the position shown in Figure 5 or in Figure 6, or in any intermediate position of adjustment, but also to have the rear end of the plow begin to lift when the crank axle 11 begins to swing downwardly with respect to the frame, irrespective of the depth adjustment, the linkage means 18 has been devised. The linkage 18 consists of a rod 80 secured by a clevis 81 in any one of a number of holes formed in an arm 82 fixedly secured, as by welding, to a lever 83 having its forward end carrying a roller 84 bearing against a crank axle 85 at the rear end of which the rear furrow wheel 15 is mounted. The lever 83 is mounted on a pivot 86 carried on the bracket extension 16, and the rear end of the lever also carries a roller 88 that is adapted to engage in a bracket 89 carried by or formed integral with the support for the wheel 15, which support is journaled for lateral swinging movement on the rear downwardly directed portion of the crank axle 85 except when the rear end of the lever 83 secures the wheel 15 against castering. As shown in Figures 5 and 6, when the plow is in operating position the wheel 15 is held against castering.

The rear end construction just described embodies the same principles as those disclosed and claimed in the copending application of Emil F. Ohlendorf, Serial No. 712,874, filed February 26, 1934.

The forward end of the rod 80 is connected by means of a short section of chain 90 to the lower end 91 of the depth adjusting lever 60. The chain 90 passes over a roller 94 carried by the U-shaped upper end 95 of an arm 96 secured as by welding or the like to the crank axle 11. When the power lift mechanism is actuated to swing the crank axle 11 to the position shown in Figure 7, the arm 96 rocks forwardly and exerts a force on the chain 90 and the rod 80 and swings the arm 82 forwardly to raise the rear end of the plow relative to the rear furrow wheel 15, assisted by a spring 97 anchored at one end to the brace 66 and at its other end to the forwardly bent portion 98 at the rear end of a link 99 which extends forwardly to the landing adjustment 13 so as to cause the front furrow wheel crank axle 12 to swing downwardly when the crank axle 11 swings downwardly.

It is to be noted that the lower end 91 of the depth adjusting lever 60 extends downwardly below the pivot 61. This, together with the chain 90 and the lever 96, serves to compensate for any depth adjustment while insuring that not only will the rear end of the plow be raised to substantially the same position, irrespective of the depth adjustment, but also the lifting movement of the rear end of the plow will be initiated at the same time that the lifting movement of the front end of the plow is initiated. Thus, no matter what may be the position of depth adjustment that the plow may be in, the moment the power lift mechanism is actuated to raise the front end, the rear end also begins to lift, yet when the plow is in operating position the rear furrow wheel 15 occupies the same position with respect to the furrow opener 23. For example, if the plow is adjusted for deep plowing, as in Figure 6, the arms 60 and 96 are swung backwardly, but the lower end 91 of the adjusting lever 60 being below the pivot 61, swings forward, thereby taking up any slack which might otherwise occur by virtue of the rearward position of the arm 96. In Figure 5, on the other hand, when the plow is adjusted for shallow plowing, the rear end 91 of the depth adjusting lever 60 is in its rearmost position, but any slack in the chain 91 is taken up by virtue of the fact that the arm 96 has been swung upwardly almost to a vertical position. In other words, the parts are so arranged with respect to the depth adjusting lever that when the latter is adjusted to swing the crank axle 11 to one position, the attachment of the connection to the rear wheel controlling apparatus is such that it occupies about the same position that it does when the depth adjusting lever 60 is adjusted to swing the crank axle 11 to some other position.

After the plow has been in use, or at any time, if it should be necessary to replace either of the beams 1, 2, or 3, all that it is necessary to do is to unbolt the associated parts and insert another beam for the corresponding position in the plow. Since the replacing beam has its bracket 27 properly milled so that the brace receiving surface thereof lies in exactly the same position

with respect to the brace bar 25 as the corresponding surface of the bracket on the old beam, no difficulty will be encountered in inserting the new beam; nor will it be necessary to heat, bend, or individually fit any of the parts of the plow to accommodate the new beam.

By virtue of the present invention, the several furrow openers are firmly and rigidly held in proper position throughout the entire life of the implement and, even if one of the beams or more than one has to be replaced, such replacement will not necessitate any reforming of the parts, but the new beam can be bolted into position and when this is done and the furrow opener attached to the new beam, the furrow opener will be in exactly the proper position with respect to the other furrow openers, as was the furrow opener when attached to the original beam.

While I have shown and described above the structure in which the principles of the present invention have preferably been embodied, it is to be understood that my invention is not to be limited to the specific details shown and described but that, in fact, widely different means may be employed in the practice of the broader aspects of my invention.

What I claim, therefore, and desire to secure by Letters Patent is:

1. In a plow, a plurality of longitudinally extending beams having depending portions at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams, means connecting the rear ends of said beams comprising a bracket fixed to the rear end of each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, and an adjustable furrow wheel carried by one of said brackets for supporting the rear end of the plow.

2. In a plow, a plurality of longitudinally extending beams having depending portions at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams, a swingable crank axle journaled for rocking movement on said beams, means connecting the rear ends of said beams comprising a bracket fixed to the rear end of each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, an adjustable furrow wheel carried by one of said brackets for supporting the rear end of the plow, and lift mechanism interconnected with said crank axle and said adjustable furrow wheel.

3. In a plow, a plurality of longitudinally extending beams of different lengths and having depending portions at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams together substantially in transverse alignment, a swingable crank axle journaled for rocking movement on the two longer of said beams, means connecting the rear ends of all of said beams comprising a bracket fixed to the rear end of each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, an adjustable rear furrow wheel carried by the bracket on the beam that extends the farthest rearwardly, and depth adjusting means associated with said crank axle and said rear furrow wheel and including a part mounted on said one beam.

4. In a plow, a plurality of longitudinally extending beams of different lengths and having depending portions at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams together substantially in transverse alignment, a swingable crank axle journaled for rocking movement on the two longer of said beams, means connecting the rear ends of all of said beams comprising a bracket fixed to the rear end of each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, an adjustable rear furrow wheel carried by the bracket on the beam that extends the farthest rearwardly, depth adjusting means associated with said crank axle and said rear furrow wheel and including a part mounted on said one beam, and power lift mechanism carried by said crank axle and reacting against said depth adjusting mechanism for raising both ends of said plow at the same time.

5. In a plow, a plurality of longitudinally extending beams having depending portions at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams, means connecting the rear ends of said beams comprising a bracket fixed to the rear end of each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, a swingable crank axle journaled for rocking movement on certain of said beams, an adjustable furrow wheel carried by one of said brackets for supporting the rear end of the plow, a depth adjusting lever pivoted on the beam carrying said one bracket and having an end extending beyond its pivot, means connecting said lever and adjustable furrow wheel and including a flexible member connected with the extended end of said adjusting lever, an arm on said crank axle bearing against said flexible member, and means for swinging said crank axle to begin raising both ends of the plow at the same time.

6. In a plow, a plurality of longitudinally extending beams, a swingable crank axle journaled for rocking movement on said beams forward of the rear ends thereof, an adjustable furrow wheel mounted on the rear end of one of said beams for vertical movement with respect thereto, a depth adjusting lever pivoted on said one beam and having an end extending beyond its pivot, means connecting said lever and adjustable furrow wheel and including a flexible member connected with the extended end of said adjusting lever, an arm on said crank axle bearing against said flexible member, and power lift means mounted on said crank axle and acting against said adjusting lever and through said arm against said flexible member so as to begin raising both ends of the plow at the same time.

7. In a plow, a plurality of longitudinally extending beams adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams, means connecting the rear portions of said beams comprising a bracket fixed to each beam, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, and a furrow wheel carried by the rear bracket for supporting the rear end of the plow.

8. In a plow, a plurality of longitudinally extending beams adapted to have plow bottoms fixed thereto, means connecting the forward ends of said beams, a swingable crank axle journaled for rocking movement on said beams, means connecting the rear portions of said beams comprising a bracket fixed to each beam, said brackets having sockets disposed in alignment with each

other, and a bar clamped to said brackets in said sockets, an adjustable furrow wheel carried by one of said brackets for supporting the rear end of the plow, lift mechanism connected to swing said crank axle, and means connecting said swingable crank axle with said adjustable furrow wheel.

9. A plow comprising a tool beam, a furrow opener carried thereby, a rear furrow wheel adjustably supporting the rear end of the plow, a crank axle pivotally connected with said beam, a wheel journaled on said crank axle, means connecting said crank axle and said rear furrow wheel for causing both of said wheels to move simultaneously when said crank axle is swung about its pivot, and depth adjusting means connected to vary the effective length of said connecting means while swinging said crank axle so that the rear end of the plow is lifted the same height regardless of the position of the depth adjusting means.

10. A plow comprising a tool beam, a furrow opener carried thereby, a rear furrow wheel adjustably supporting the rear end of the plow, a crank axle pivotally connected with said beam, means connecting said crank axle and rear furrow wheel for simultaneous movement, means to swing said crank axle and said rear furrow wheel for moving said tool beam and furrow opener into and out of transport position, depth adjusting means connected with said crank axle for adjusting the depth of operation of said furrow opener by swinging the crank axle, and means connecting said depth adjusting means and said connecting means so as to adjust the latter when depth adjustment is effected, whereby the initiation and extent of movement of the rear furrow wheel when said crank axle is swung to move the tool beam into and out of transport position is substantially the same regardless of the depth adjustment.

11. A plow comprising a tool beam, a furrow opener carried thereby, a rear furrow wheel adjustably supporting the rear end of the plow, a crank axle pivotally connected with said beam, a depth adjusting lever pivoted on the beam and having an end extending beyond its pivot, means connecting said lever and adjustable furrow wheel and including a flexible member connected with the extended end of said adjusting lever, an arm on said crank axle bearing against said flexible member, and means for swinging said crank axle to begin raising both ends of the plow at the same time.

12. A plow comprising a tool beam, a furrow opener carried thereby, a rear furrow wheel adjustably supporting the rear end of the plow, a crank axle pivotally connected with said beam, means including connections between said crank axle and rear furrow wheel for swinging the latter and said crank axle to raise and lower said beam into and out of transport position, depth adjusting means connected to swing said crank axle independently of said raising and lowering means, and means actuated by said depth adjusting means for adjusting said connections so that movement of said raising and lowering means causes substantially the same movement of said crank axle and furrow wheel independently of the position of said depth adjusting means.

13. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section, a brace receiving section adapted to have material removed therefrom after the bracket is bolted to the plow beam, and a section carried by the bracket and serving as a rear furrow wheel support.

14. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section, a brace receiving section adapted to have material removed therefrom after the bracket is bolted to the plow beam, a crank axle receiving section, and a lever receiving section extending rearwardly of said crank axle receiving section.

15. In a plow, a beam, and a brace receiving bracket adapted to be secured to the rear portion of the beam above the furrow opener receiving portion thereof, said bracket including a section adapted to be bolted to the plow beam and a V-shaped notched portion establishing a brace receiving surface in the proper relative position with respect to the forward end and the furrow opener receiving end of the beam, said V-shaped portion having said thickness sufficient to permit the removal of the parts thereof without detracting from the necessary strength of the bracket, whereby said brace receiving surface is established in the proper position relative to said ends of the beam notwithstanding warpage of the beam.

16. A plow comprising a tool beam, a furrow opener carried thereby, a rear furrow wheel adjustably supporting the rear end of the plow, a crank axle pivotally connected with said beam, means connecting said crank axle and rear furrow wheel for simultaneous movement to raise and lower said beam into and out of transport position in response to swinging movement of said crank axle through a given range, said connecting means being movable relative to said crank axle, depth adjusting means connected to said crank axle to swing the same relative to said beam, and means actuated by movement of said depth adjusting means for shifting said connecting means relative to said crank axle an amount corresponding to the movement of said crank axle resulting from the actuation of the depth adjusting means, whereby the rear furrow wheel takes the same position when the crank axle is rocked to raise the plow into transport position regardless of the position of said depth adjusting means.

17. In a plow, a plurality of longitudinally extending beams having depending sections at their rear ends adapted to have plow bottoms fixed thereto, means connecting the forward portions of said beams, means connecting said sections comprising a bracket fixed to each section, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, and a furrow wheel carried by one of said brackets for supporting the rear end of the plow.

18. In a plow, a plurality of longitudinally extending beams having sections to which plow bottoms are adapted to be fixed, means connecting the forward portions of said beams, a swingable crank axle journaled for rocking movement on said beams, a ground wheel mounted on said axle at one side of the plow, means connecting the rear portions of said beams comprising a bracket fixed to each plow bottom receiving section, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, an adjustable furrow wheel carried by the bracket at said one side of the plow, lift mechanism connected to swing said crank axle, and means connecting said swingable crank axle with said adjustable furrow wheel.

19. In a plow, a plurality of longitudinally extending laterally spaced tool carrying beams, a bracket secured to each of said beams adjacent the rear end thereof, each of said brackets including a portion having V-shaped sockets spaced apart and in alignment with one other, said brackets being disposed on said beams so as to bring the sockets of all of said brackets in alignment with each other, a continuous straight bar of rectangular cross section adapted to fit in the aligned V-shaped sockets of the several brackets, and means for clamping said bar rigidly in said sockets to each of said brackets.

20. In a plow, a plurality of longitudinally extending laterally spaced tool carrying beams, a downwardly extending tool carrying shank fixed adjacent the rear end of each of said beams, a brace receiving bracket bolted to each of said shanks, each bracket including spaced portions having aligned V-shaped sockets, the sockets of the several brackets being in alignment, a brace comprising a continuous straight bar of square cross section adapted to coincide with the sides of the aligned V-shaped sockets, and means for clamping said brace rigidly in the sockets of said brackets to secure the several beams into one rigid unitary frame.

21. In a plow, a plurality of laterally spaced, longitudinally extending beams, a downwardly extending tool carrying shank supported adjacent the rear end of each beam, said beams being of progressively longer lengths from one side of the plow to the other and the forward ends of said beams being secured in transverse alignment whereby said shanks are aligned obliquely to the direction of travel, a brace receiving bracket bolted to each of said shanks, each bracket including spaced portions having aligned V-shaped sockets, the sockets of the several brackets being in alignment obliquely of the direction of travel, a brace comprising a continuous straight bar of square cross section adapted to coincide with the sides of the aligned V-shaped sockets, and means for clamping said brace rigidly in the sockets of said brackets to secure the several beams into one rigid unitary frame.

22. In a plow, a plurality of longitudinally extending beams having sections to which plow bottoms are adapted to be fixed, a pair of swingable crank axles journaled for rocking movement on said beams, said crank axles extending in opposite directions and providing ground wheel receiving axle sections at opposite sides of the plow, ground wheels journaled on said axle sections, an arm portion carried by each of said crank axles, means connecting said arm portions together for causing said crank axles to swing together, means connecting the rear portions of said beams comprising a bracket fixed to each plow bottom receiving section, said brackets having sockets disposed in alignment with each other, and a bar clamped to said brackets in said sockets, an adjustable furrow wheel carried by the bracket at one side of the plow, lift mechanism connected to swing both of said crank axles, and means operated by the swinging movement of one of said crank axles for shifting said adjustable furrow wheel.

23. The combination set forth in claim 22 in which said connecting means between the crank axles is adjustable to afford landing adjustment between said ground wheels.

24. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section and a brace receiving section including a pair of thickened portions establishing spaced parts adapted to have material removed therefrom.

25. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section and a brace receiving section including a pair of thickened portions establishing spaced V-shaped notches adapted to have material removed therefrom.

26. An article of manufacture comprising a brace receiving bracket for a plow beam or the like comprising a body portion including a section adapted to be secured to the plow beam and a socket section formed integral therewith and having spaced V-shaped notches arranged to receive a brace, and a companion socket member having V-shaped notches and adapted to be bolted to said first socket section of the bracket.

27. An article of manufacture comprising a brace receiving bracket for a plow beam or the like comprising a body portion including a section adapted to be secured to the plow beam and a socket section formed integral therewith and having a V-shaped notch arranged to receive a brace, and a companion socket member also having a V-shaped notch and adapted to be bolted to said first socket section of the bracket.

28. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section and a brace receiving section including portions having a substantial quantity of excess material, whereby some material may be removed therefrom in the manufacture of the plow to establish a brace receiving surface in the proper position with respect to the ends of the plow beam and without detracting from the necessary strength and rigidity of said bracket, irrespective of slight variations in the positions of the portion of the beam to which the bracket is to be bolted.

29. An article of manufacture comprising a brace receiving bracket for a plow beam, said bracket including a bolting section and a brace receiving section including V-shaped notched portions having a substantial quantity of excess material, whereby some material may be removed from the V-shaped notched portions in the manufacture of the plow to establish a brace receiving surface in the proper position with respect to the ends of the plow beam and without detracting from the necessary strength and rigidity of said bracket, irrespective of slight variations in the positions of the portions of the beam to which the bracket is to be bolted.

30. In an implement, a pair of longitudinally disposed, laterally spaced ground working tool carrying beams, bracket members fixed to said beams, respectively, a transversely disposed bracing member for interconnecting said beams to form a unitary rigid frame, said bracket members having aligned recesses to receive said bracing member, securing caps adapted to embrace the bracing member and having means for rigidly fastening said caps to said bracket members, respectively, one of said caps having a supporting portion fixed thereto, and means for connecting an operating element of said implement to said supporting portion.

CARL G. STRANDLUND.

CERTIFICATE OF CORRECTION.

Patent No. 2,179,528. November 14, 1939.

CARL G. STRANDLUND.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 29, for "if one" read if any one; page 2, first column, line 65, for "reecive" read receive; page 6, first column, line 6, claim 19, for the word "one" read each; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 19th day of December, A. D. 1939.

Henry Van Arsdale,

(Seal) Acting Commissioner of Patents.