W. S. GRAHAM.

LISTER PLOW.

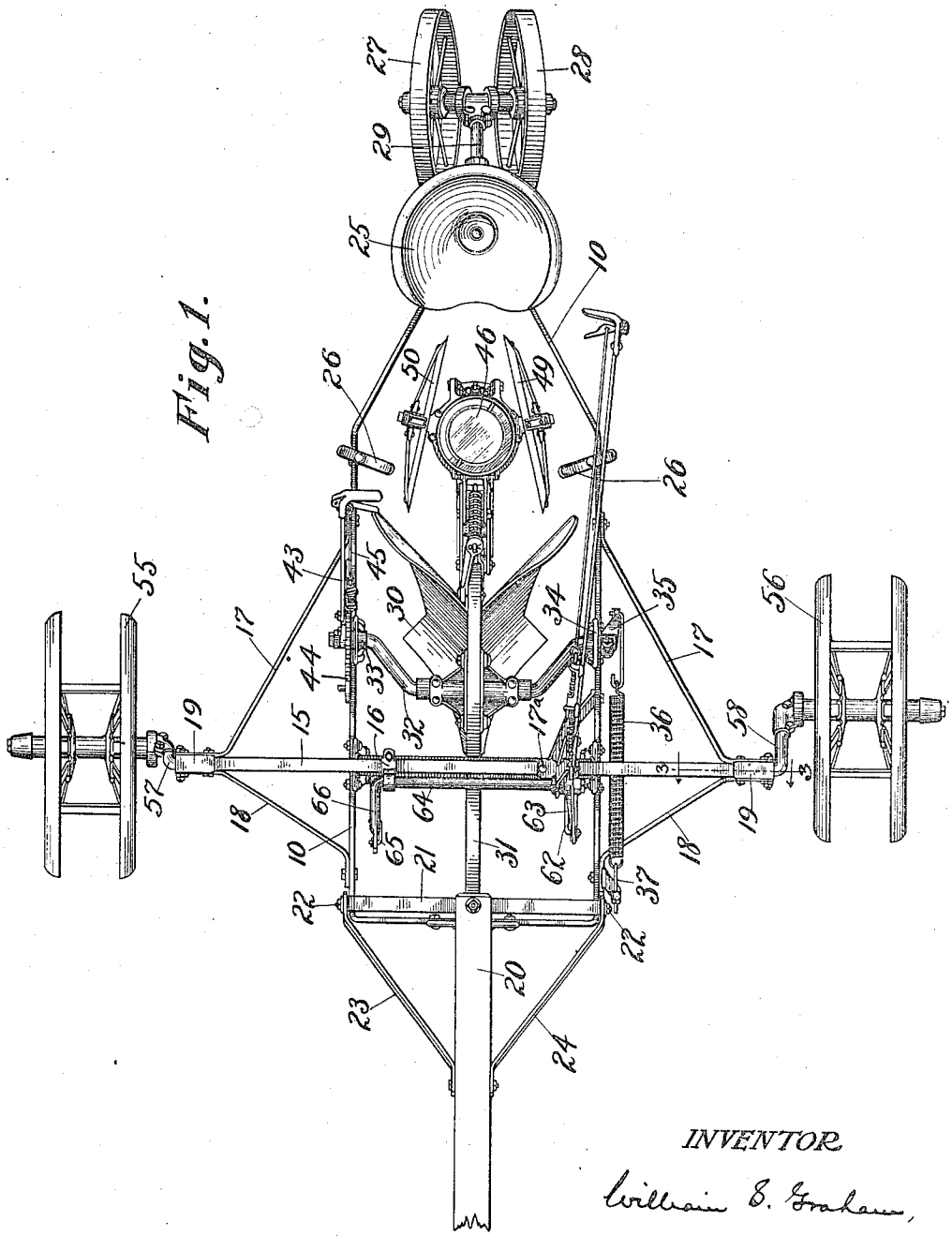
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1,249,067.

Patented Dec. 4, 1917.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

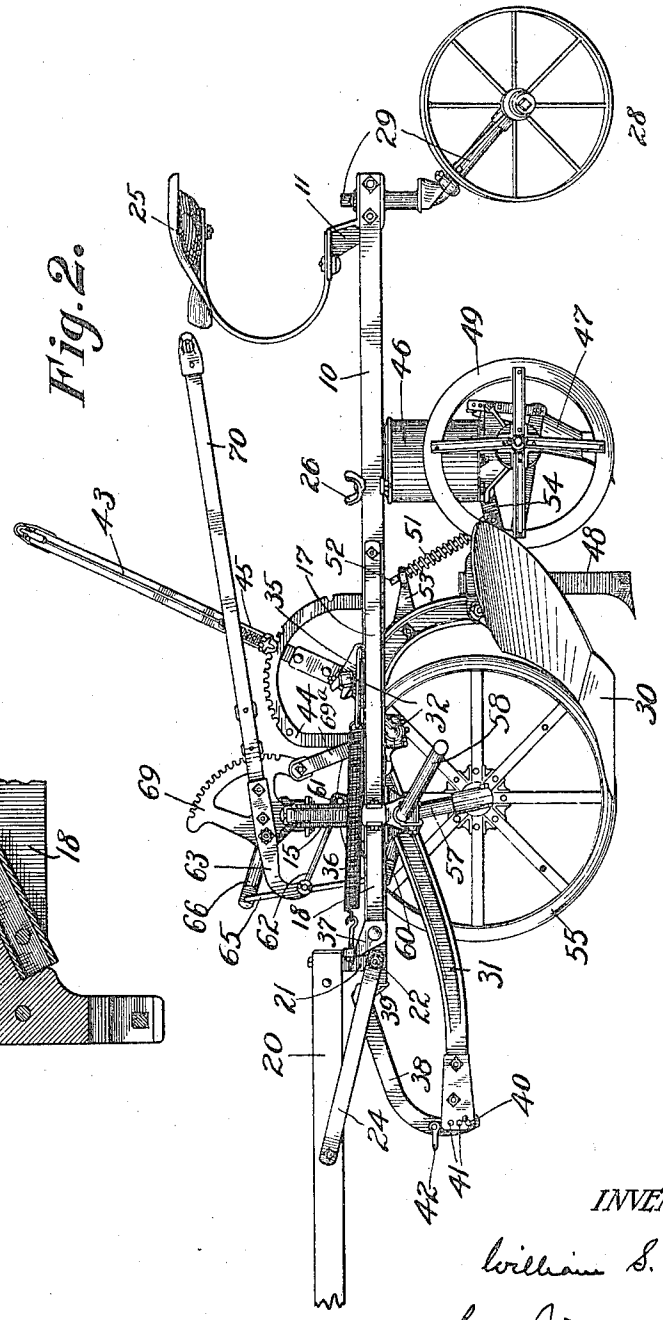


Fig. 3.

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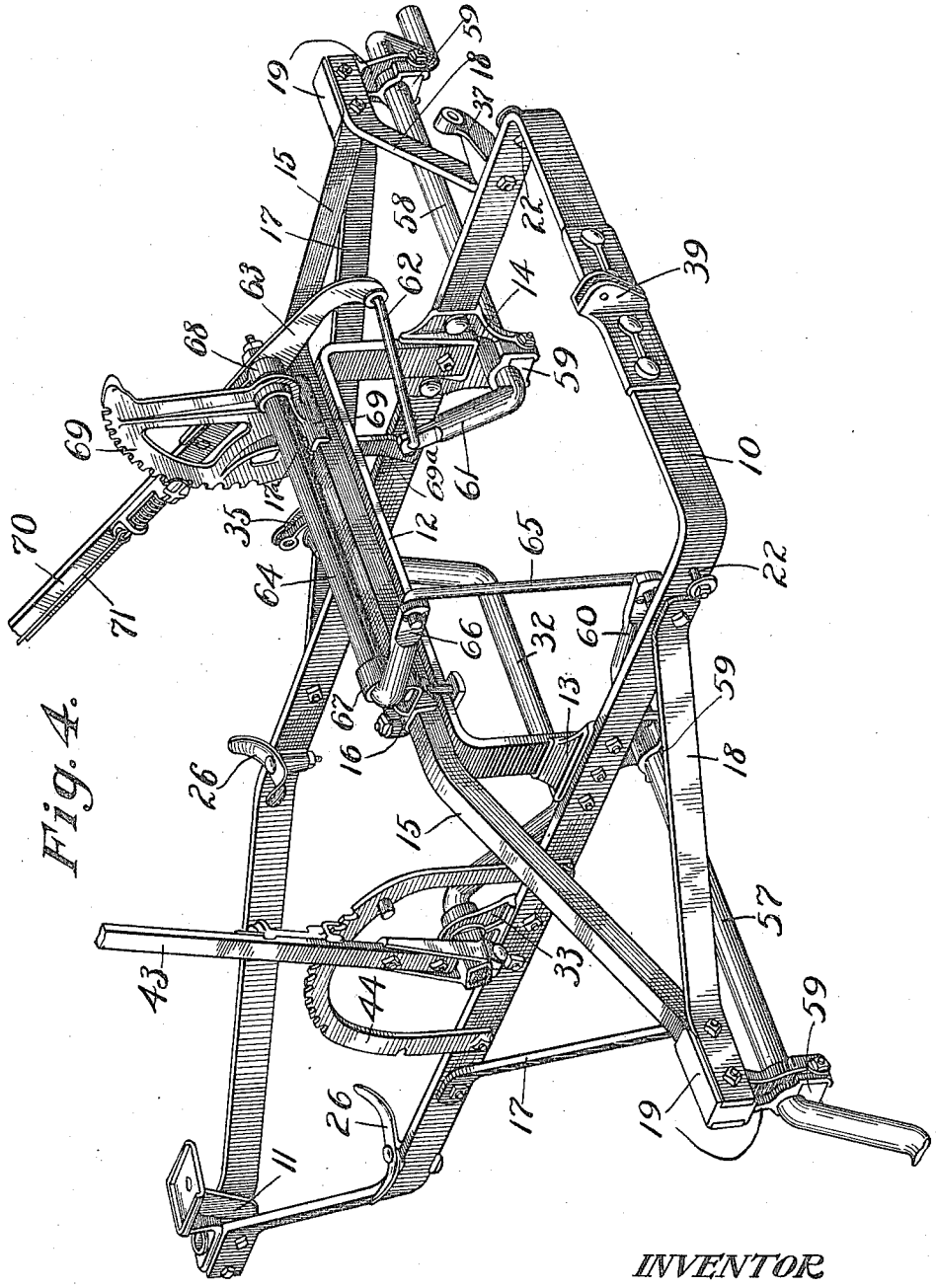


Fig. 4.

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UNITED STATES PATENT OFFICE.

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LISTER-PLOW.

1,249,067. Specification of Letters Patent. Patented Dec. 4, 1917.

Application filed May 29, 1915. Serial No. 31,156.

To all whom it may concern:

Be it known that I, WILLIAM S. GRAHAM, a citizen of the United States, residing at Canton, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Lister-Plows, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to lister plows of the general type shown in the patent to Shearer, No 894,802, granted July 28, 1908, and it has for one of its objects the provision of a new and improved form and arrangement of working parts by which the supporting wheels are adapted to be simultaneously adjusted in opposite directions relative to the frame. It is another object of my invention to provide a new and improved form of framework especially adapted to meet the requirements of a plow of this type. It is another object of my invention to improve devices of this type in sundry details hereinafter pointed out. The preferred means by which I have accomplished my objects are illustrated in the drawings and are hereinafter specifically described. That which I believe to be new and desire to cover by this application is set forth in the claims.

In the drawings:

Figure 1 is a top or plan view of a plow embodying my improvements;

Fig. 2 is a side view of the plow shown in Fig. 1, but with one of the supporting wheels removed therefrom for the sake of clearness of illustration;

Fig. 3 is an enlarged detail of a portion of the frame construction, being substantially a section taken on line 3—3 of Fig. 1, with the axle member and a bearing block removed; and

Fig. 4 is a perspective view of the framework of the plow with the ground working elements and various other parts removed therefrom.

Referring to the several figures of the drawings in which corresponding parts are indicated by the same reference characters,—

10 indicates a frame member comprising side bars converging toward their rear ends which are joined together on opposite sides of a bracket 11. An arch 12 has its lower ends connected to the side bars of the frame member 10 by means of brackets 13—14. A second arch 15, preferably in the form of a hollow pipe as shown in Fig. 3, is secured in position upon the arch 12 by means of a suitable clip 16 embracing the said two arches and a bolt 17^a passing through the said arches. The outer end of the arch member 15 at each side of the machine is connected by means of diagonally-disposed brace-bars 17—18 with the adjacent side bar of the frame 10. A bearing bracket 19 is secured between the outer ends of the brace-bars 17—18 at each side of the machine, each of said bearing brackets being shaped to fit snugly about the end of the arch and between the two brace-bars. By this arrangement of frame-parts, the frame as a whole is rendered exceedingly strong and rigid capable of resisting the various stressing forces brought to bear upon it.

A tongue 20 is pivotally mounted upon the frame 10 by means of a transversely-extending bar 21 which is connected by means of bolts 22 to the said frame member 10, diagonally-disposed brace-bars 23—24 being employed for holding the tongue rigid laterally relative to the framework. A seat 25 of any suitable type is mounted upon the bracket 11. Foot-rests 26 are mounted upon the frame member 10 in convenient position relative to the seat 25. Caster wheel mechanism comprising wheels 27—28 inclined at a slight angle relative to each other are mounted by means of an axle member 29 in the bracket 11, the inclination of the axes of the wheels being such as to cause the wheels to converge toward their lowermost parts.

A double mold-board lister plow-body 30 is carried by the framework through the medium of a plow beam 31 of the ordinary type which is journaled upon the off-set portion of a crank axle 32, the ends of which are journaled upon the frame member 10 by means of bearing brackets 33—34. An arm 35 is mounted upon the squared outer end of the crank axle 32 at one side of the machine, being connected by means of a coiled spring 36 with an arm 37 mounted upon the frame member 10 near its forward end. As will be seen by an inspection of Fig. 2, the spring 36 tends to cause rotation of the crank axle 32 in clockwise direction in said figure. The forward end of the plow beam 31 has pivotally connected to it one end of the draft-bar 38, the opposite end of which is pivotally connected to a suitable plate 39 fixedly mounted upon the forward end of the frame

member 10. The draft-bar 38 is adapted to be adjusted up and down relative to the plow beam 31 by the insertion of the connecting pin 40 in any one of a plurality of openings, as will be readily understood. Draft means of any suitable type is adapted to be connected by means of a clevis 42 pivotally mounted upon the draft-bar 38. Upon the squared end of the crank axle 32 opposite to that upon which the arm 35 is mounted, there is fixedly mounted a lever 43 by which the said crank axle is adapted to be turned in its bearings 33—34. The lever 43 is adapted to be adjusted to any desired position relative to a segmental rack 44 mounted upon the frame member 10, the lever being adjustably held in position by means of spring latch mechanism 45 of any suitable type. By a manipulation of the lever 43 and the consequent turning of the crank axle member 32 the plow-body 30 will be raised or lowered out of or into operative ground-engaging position, as is desired, the spring 36 serving to assist in the plow-raising operation.

Mounted upon the plow beam 31 in rear of the plow-body 30 there is suitable seeding mechanism comprising a hopper 46 provided with seed dropping devices of any approved type, by which seeds are adapted to be dropped successively as desired through the shoe 47 into the furrow opened by the plow body 30, a colter 48 being carried immediately in advance of the shoe 47 to loosen the ground slightly at the point where the seeds are to be dropped. The seed dropping devices are preferably operated through the medium of covering devices 49—50 which are revolubly mounted relative to the hopper 46. One or both of the disks 49—50 is connected by any suitable train of mechanism with the seed dropping devices whereby upon the rotation of the disks 49—50 by their engagement with the ground the seed dropping mechanism is operated. A spring 51 is interposed upon a pin 52 between an arm 53 fixed upon the beam 31 and the arm 54 by which the seeding mechanism is movably connected with the plow beam, the said spring having the effect of holding the seeding mechanism yieldingly downward relative to the plow-body for proper engagement with the ground.

The machine as a whole is supported by wheels 55—56 which are journaled upon the horizontal portions of crank axles 57—58, respectively. The said axle members 57—58 are journaled in the brackets 19 and the brackets 13—14. Each of these brackets is provided with a bearing block 59 which cooperates with the bracket for revolubly supporting the axle members, said axle members being readily removable from the frame by the withdrawal of the blocks 59 from the brackets. The axle members 57—58 are provided at their inner ends with arms or levers 60—61, respectively. The arm or lever 61 of the axle member 58 is pivotally connected by means of a link 62 with an arm or lever 63 which is rigidly mounted upon a rock-shaft 64 which is journaled adjacent to the central portion of the arch 15. The arm or lever 60 of the axle member 57 is pivotally connected by means of a link 65 to an arm or lever 66 also rigidly connected with the rock-shaft 64, in the construction shown the arm or lever 66 being formed integrally with the rock-shaft 64. The rock-shaft 64 is journaled upon the framework by means of a sleeve 67 forming a part of the clip 16, and a sleeve 68 forming a part of a segmental rack member 69 which is secured by means of the bolt 17^a upon the arch member 15. An arm 69^a also connects the rack member 69 with the frame member 10 for bracing the rack member securely in position. A lever 70 is rigidly connected to the upper or rear end of the arm 63, being adapted to be secured by means of spring-latch mechanism 71 at any desired point along the segmental rack 69.

Upon the downward movement of the front ends of the arms 63—66 through the upward movement of the lever 70, the axle member 58 will be turned in clockwise direction in Fig. 2 while the axle member 57 is turned at the same time in counterclockwise direction. By this movement the crank portions of the said axle members are brought to point in the same direction relative to the frame member 10, at which time the wheels 55 and 56 will be held at the same vertical elevation relative to the framework. By the continued downward movement of the arms 63—66 the wheel 56 is carried downward into position lower than the newly assumed position of the wheel 55. Upon the downward movement of the lever 70 the wheel 56 would again be raised and the wheel 55 again lowered into the position shown in the drawings. Inasmuch as the crank portions of the axle members 57—58 are of substantially the same length, and the arms 66—63 are likewise of substantially the same effective length, the result is attained that upon the movement of the lever 70 the amount of movement of one of the wheels 55—56 is substantially the same as that of the other one of said wheels. Inasmuch as one of the wheels is always moving upward when the other moves downward, the middle point of the arch member 15 and likewise the middle point of the crank axle 32 are maintained at substantially the same level as the wheels are adjusted up and down relative to the frame.

The plow, as shown in Fig. 1, is in condition for work with the wheel 55 running in the furrow laid open by the plow-body 30 upon a previous trip across the field, the

wheel 55 being held in a lowered position relative to the wheel 56 which runs upon the unplowed ground thus maintaining the frame member 10 in leveled condition. The colter or subsoiler 48 loosens the soil in the bottom of the furrow opened by the plow-body 30; and the disks 49—50 by their rotation due to their engagement with the ground in the bottom of the furrow cause the seeding mechanism to be actuated as desired for dropping the requisite number of kernels. The disks 49—50 also serve to throw a limited amount of loose dirt over the seeds delivered by the seeding mechanism, and the caster wheels 27—28 serve to pack the earth down slightly adjacent to the seeds. When the side of the field is reached, the plow body 30 and the seeding mechanism are raised out of engagement with the ground through the medium of the lever 43, and the lever 70 is given an upward movement to bring the wheels 55—56 to the same level relative to the frame member 10, this being accomplished by bringing the crank arms of the axle members 57 and 58 upon which the wheels 55—56 are mounted into position to point in the same direction from the axis of said axle members. The machine is then turned to bring the wheel 56 into the furrow opened by the just completed trip across the field, with the wheel 55 in position to run upon the unplowed ground. At about the time when the wheel 56 enters the furrow, the lever 70 is given a further upward movement to further lower the wheel 56 and raise the wheel 55 so as to bring the frame member 10 again into its normal level condition. At the proper time the plow-body 30 and the seeding mechanism are again lowered so as to cause the plow-body to enter the ground for opening a new furrow. By reason of one of the wheels 55—56 working upon each trip across the field in the furrow opened by the preceding trip across the field, the machine is easily guided to keep the furrows in parallelism, each of the wheels 55—56 being broad enough to substantially fill the furrow from side to side thereof.

While I have shown each of the axle members 57—58 as formed integrally with its operating arm 60—61, it will be understood that I do not wish to restrict myself to that particular construction except as hereinafter specifically claimed, it being understood that my broader claims contemplate the use of any suitable offset connection between the links 65—62 and the axle members 57—58, respectively.

By reason of having the rock-shaft 64 journaled opposite the front face of the arch 15 instead of being centered directly over the arch, and by having the arms 63—66 extend in the same direction away from the arch, I am enabled to swing the rock-shaft without interfering with the arch while at the same time locating the rock-shaft in close proximity to the horizontally-extending portion of the arch. By having the rock-shaft mounted in this way close to the arch, I secure a maximum of strength. By locating the arms 63—66 opposite the horizontally-extending upper portions of the arches 12—15 between the vertically-extending arms of the arches, I am enabled to have convenient connection with the axle members 57—58, also between the arms of the arch 12, by the use of arms 60—61 formed integral with the axle members, whereby the lower ends of the arms of the arch 12 are capable of being used in connection with the side portions of the frame 10 for providing bearings for the inner ends of the axle members without the necessity of providing separately formed arms upon the axle members for such connection. By reason of having the arms 63—66 extend in the same direction from the rock-shaft so that upon the rocking of the rock-shaft 64 the links 62—65 at opposite sides of the frame either pull in unison or push in unison upon the axle members, any tendency to twist one side of the frame relative to the other side is avoided. When the links are used for pulling upon the axle members upon a stroke of the lever 70 in one direction, any tendency to twist the frame through the force exerted through one link is largely offset by the tendency to twist the frame in the opposite direction by the force exerted through the other link; and a similar compensation is effected when the links are used for pushing upon the axle members upon a stroke of the lever 70 in the opposite direction.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. In a lister plow, the combination of a frame member, a transverse arch connecting the side portions of said frame member, a second arch connected to said first-named arch and extending at the sides beyond said first-named arch, axle members journaled on said second arch and on said first-named frame member, carrying wheels mounted on said axle members, a rock-shaft journaled on said second arch, means for rocking said rock-shaft, and connections between said rock-shaft and said axle members for rotating said axle members.

2. In a lister plow, the combination of a frame member, a transverse arch connecting the side portions of said frame member, a second transverse arch connected to said first-named arch and extending beyond the sides of said frame member, crank axle members revolubly mounted on said frame and said second-named arch at opposite sides of the plow, being spaced apart transversely of the plow, carrying wheels journaled on

said axle members, a plow-body connected with said frame and movable up and down relative to said frame, a rock-shaft journaled transversely of said second-named arch, means for rotating said rock-shaft, arms mounted on said rock-shaft and extending forward therefrom adapted to be swung up and down by the rocking movement of said rock-shaft, and connections between said arms and said axle members respectively for moving said carrying wheels vertically in opposite directions upon the rocking of said rock-shaft.

3. In a lister plow, the combination of a frame member, an arch extending across a short distance above said frame member and having its end portions extending diagonally downward and outward beyond the sides of said frame member, means for supporting said arch firmly in position above said frame member, means connecting together the end portions of said arch for preventing them from spreading apart laterally relative to each other, crank axle members revolubly mounted on said frame member and the end portions of said arch at opposite sides of the plow, being spaced apart transversely of the plow, carrying wheels journaled on offset portions of said axle members, a plow-body connected with said frame and movable up and down relative thereto, a rock-shaft journaled transversely of the frame, means for rocking said rock-shaft, arms carried by said rock-shaft and extending substantially horizontally therefrom adapted to be swung up and down by the rocking movement of said rock-shaft, and connections between said arms and offset portions of said axle members respectively for moving said carrying wheels vertically in opposite directions upon the rocking of said rock-shaft.

4. In a lister plow, the combination of a frame member, a transverse arch extending across said frame member, integral axle members each comprising an arm turned at an angle at one end and an offset axle portion at the opposite end, brackets connecting the ends of said arch to the side portions of said frame member, bearing blocks removably carried by said brackets adapted in cooperation with said brackets to removably support the inner ends of said axle members respectively, other means for supporting the outer ends of said axle members, carrying wheels mounted on said axle members, and means for moving said axle members so as to give said carrying wheels simultaneous vertical movements in opposite directions.

5. In a lister plow, the combination of a frame member, a transverse arch extending across said frame member, integral axle members each comprising an arm turned at an angle at one end and an offset axle portion at the opposite end, a second transverse arch connected to said first-named arch and extending at its ends beyond the ends of said first-named arch, brackets connecting the ends of said first-named arch to the side portions of said frame members, other brackets connected to the end portions of said second arch, bearing blocks removably carried by said brackets respectively adapted in cooperation with said brackets to removably support said axle members, carrying wheels mounted on said axle members, and means for giving said axle members simultaneous vertical movements in opposite directions.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."