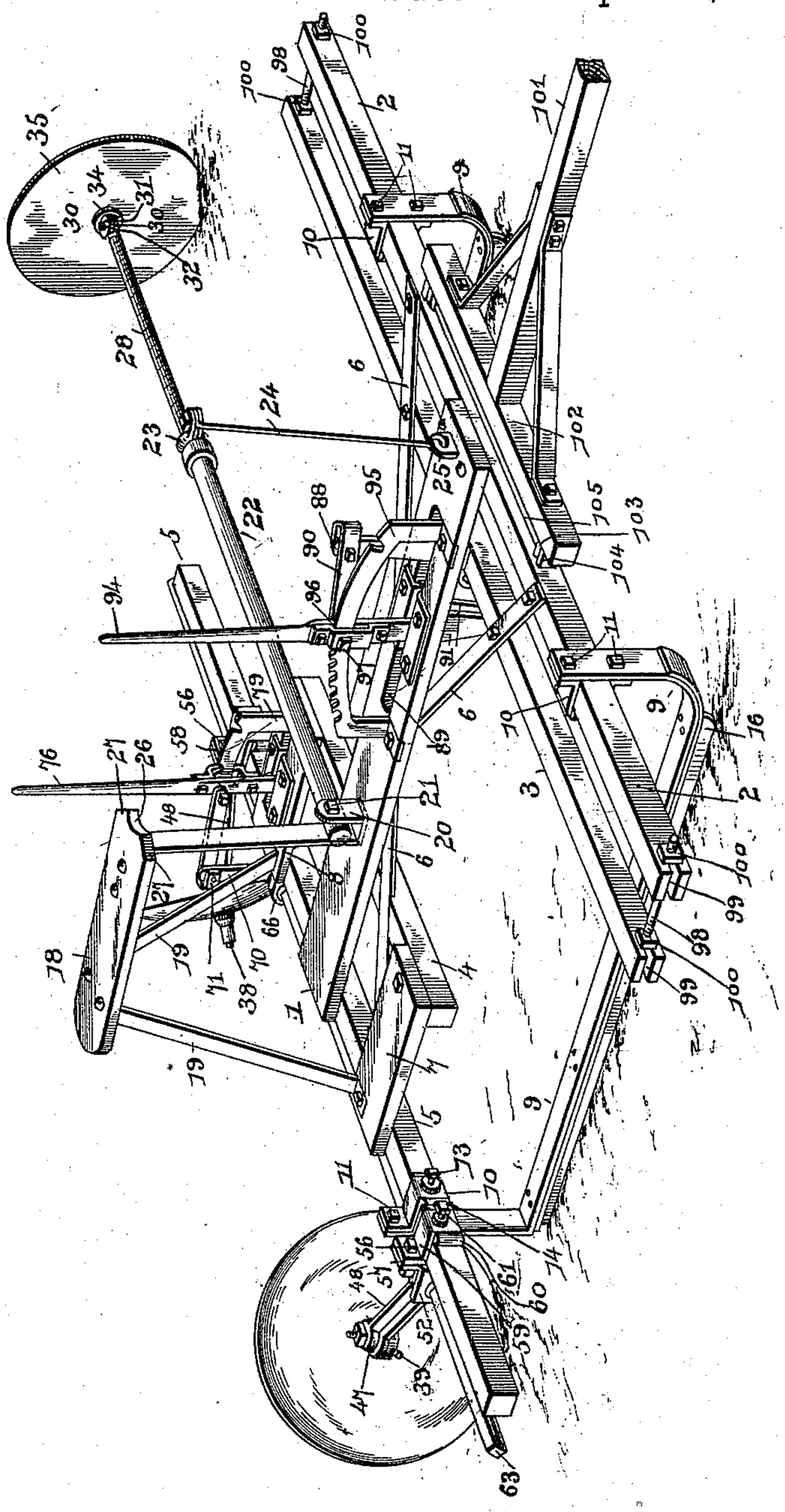
(No Model.) 4 Sheets—Sheet 1.

C. E. STEWART.

FURROW OPENING OR CLOSING MECHANISM.

No. 558,578. Patented Apr. 21, 1896.

FIG. 1.



Witnesses

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C. E. STEWART.

FURROW OPENING OR CLOSING MECHANISM.

No. 558,578. Patented Apr. 21, 1896.

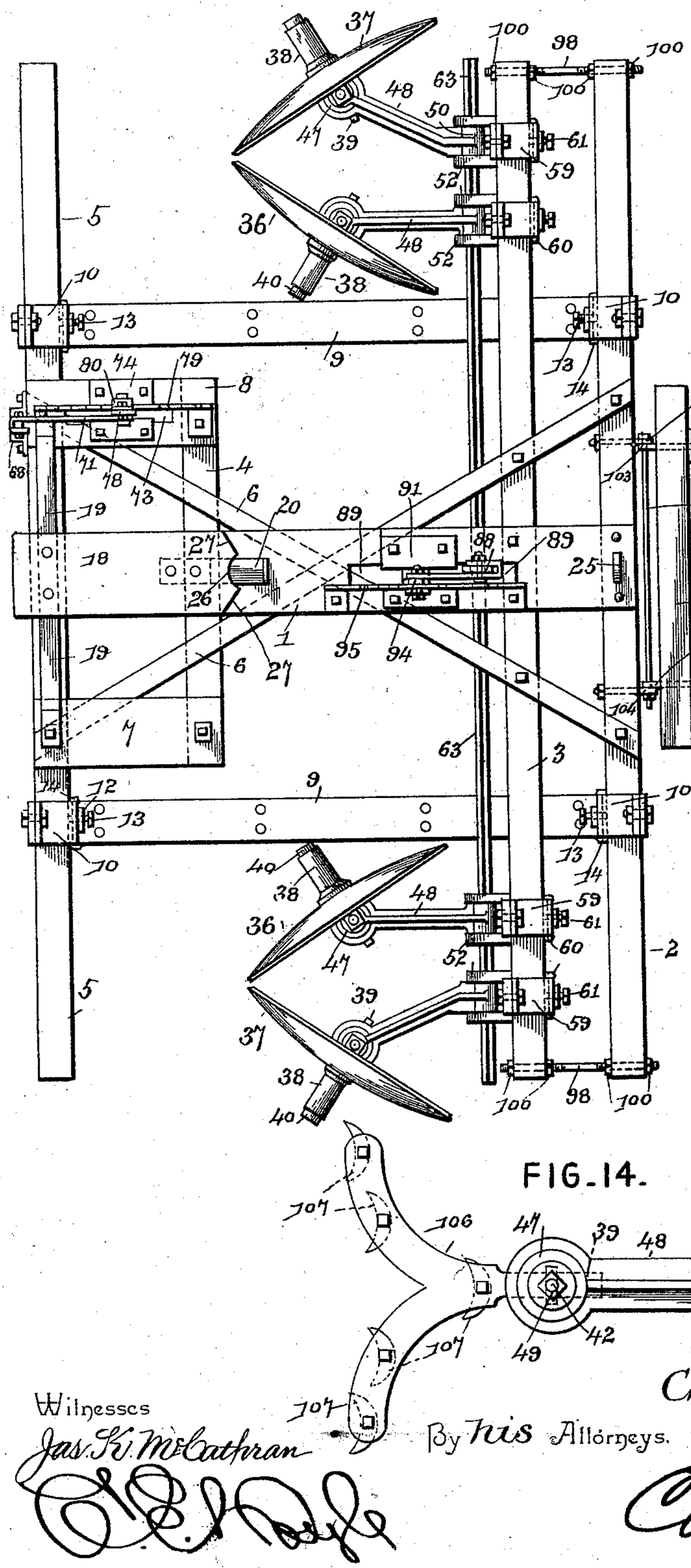

FIG. 2.

FIG. 15.

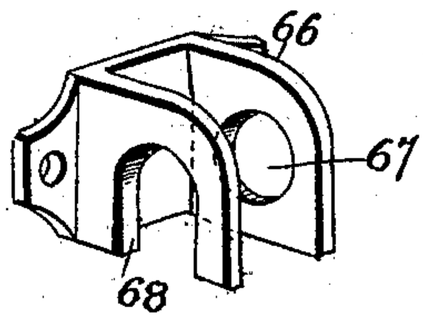

FIG. 14.

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(No Model.) 4 Sheets—Sheet 3.

C. E. STEWART.

FURROW OPENING OR CLOSING MECHANISM.

No. 558,578. Patented Apr. 21, 1896.

FIG. 3.

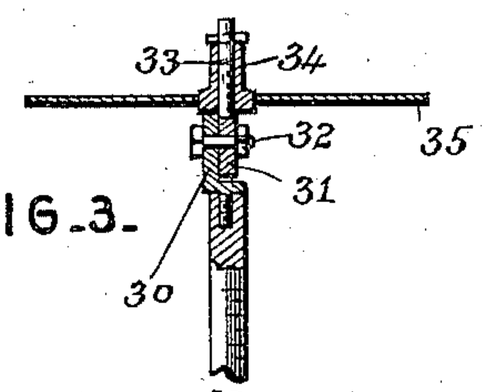
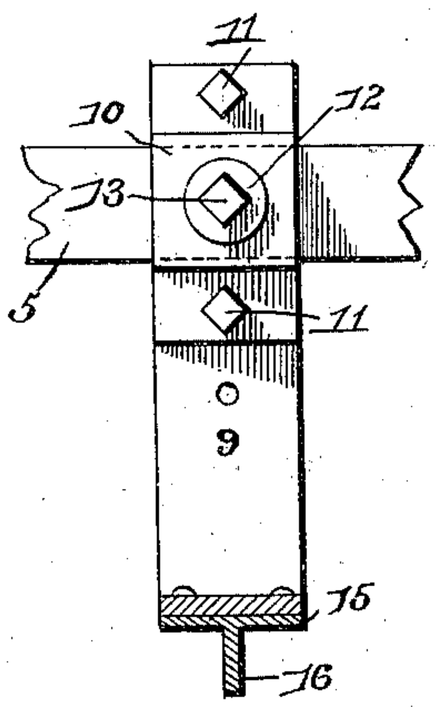


FIG. 11.



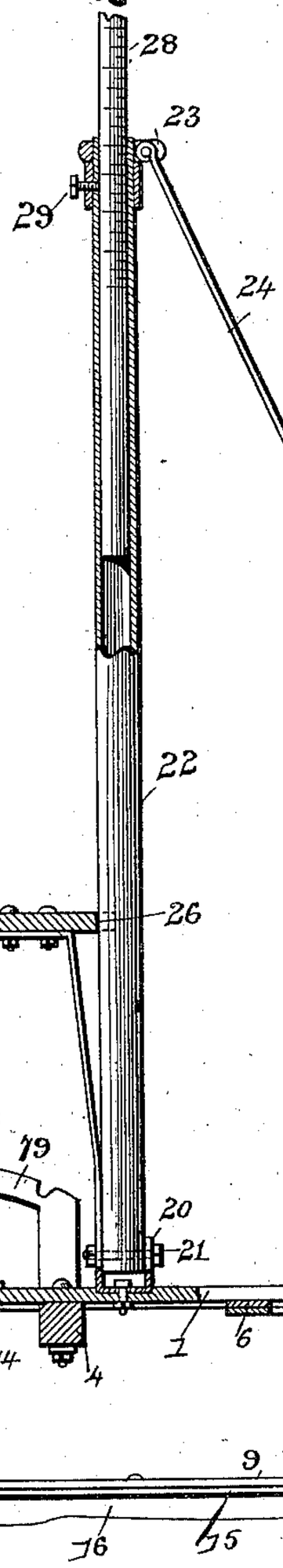


FIG. 12.

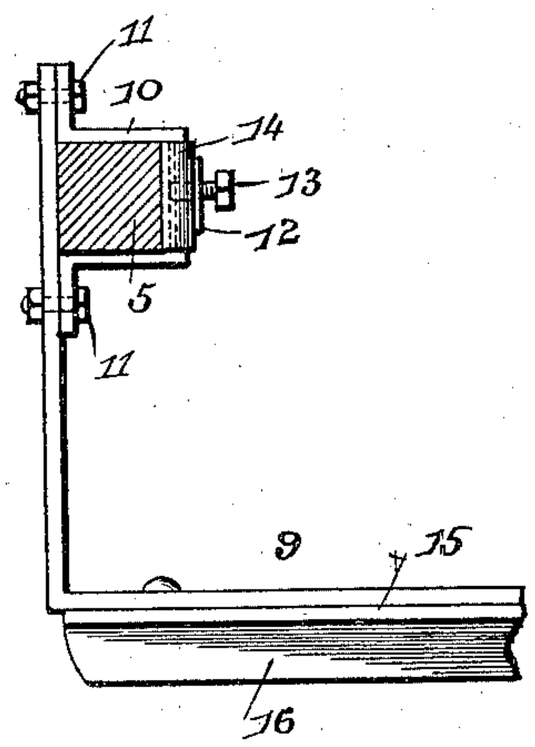
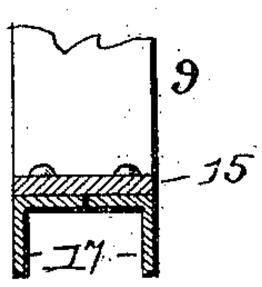


FIG. 13.



Witnesses

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FURROW OPENING OR CLOSING MECHANISM.

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FIG. 4.

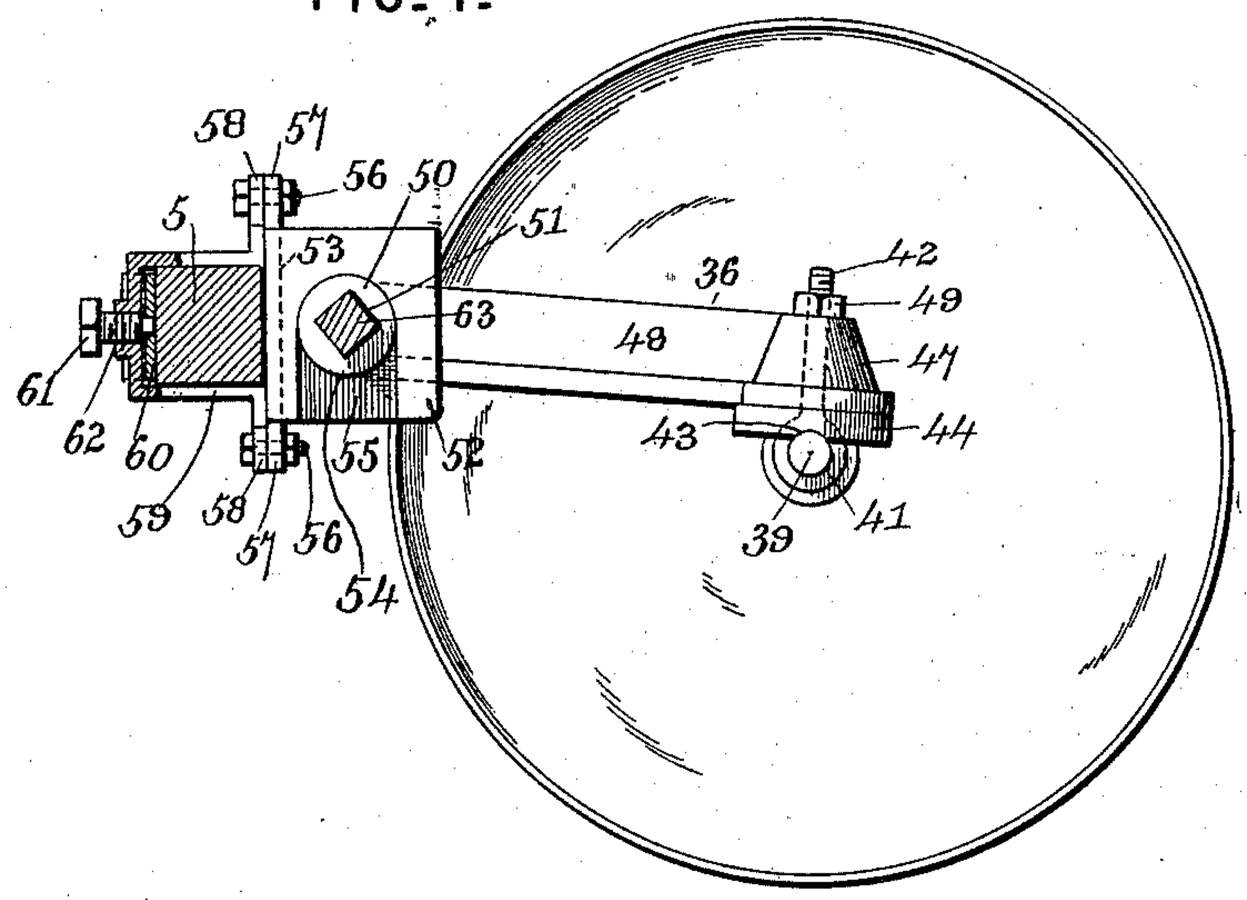


FIG. 5.

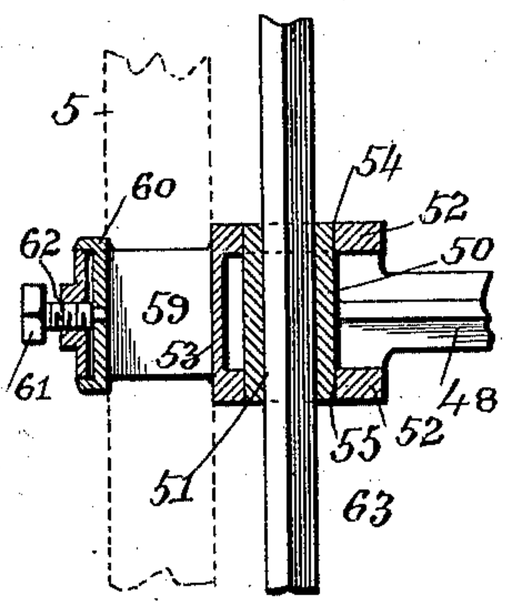


FIG. 6.

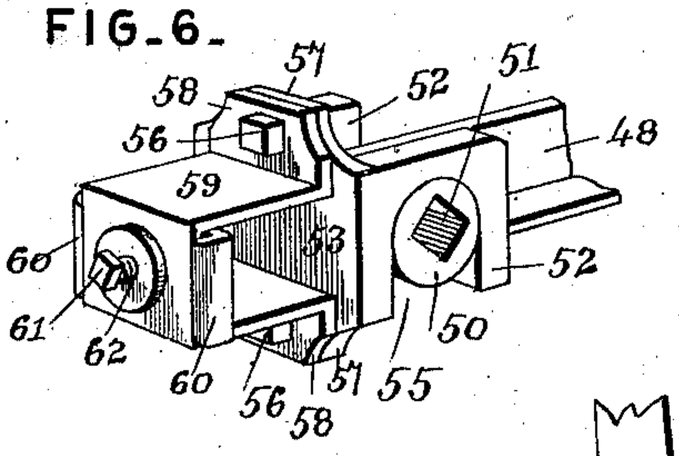


FIG. 10.

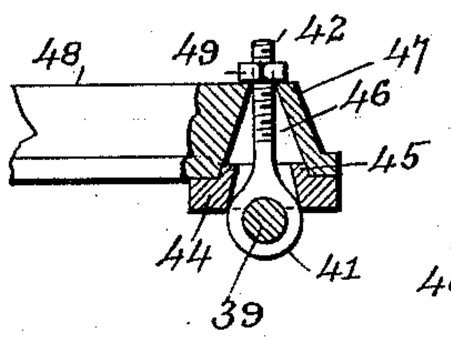


FIG. 9.

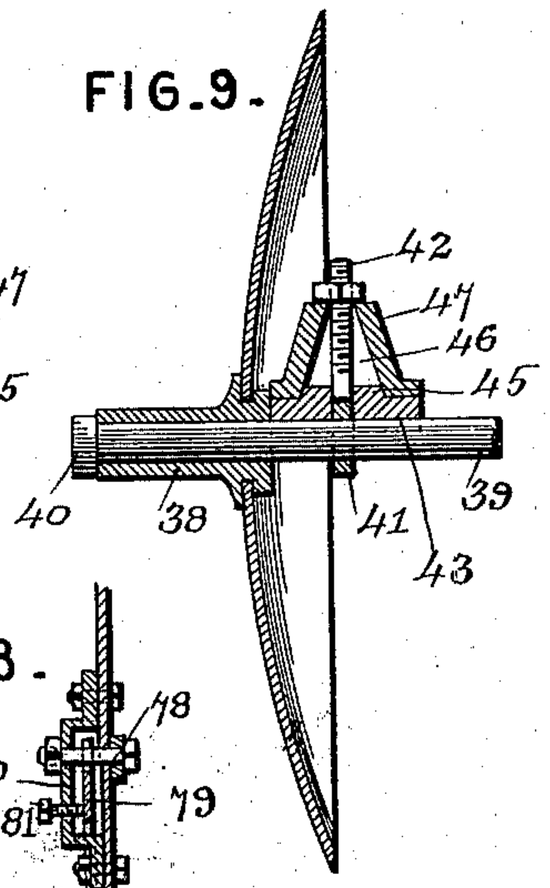


FIG. 7.

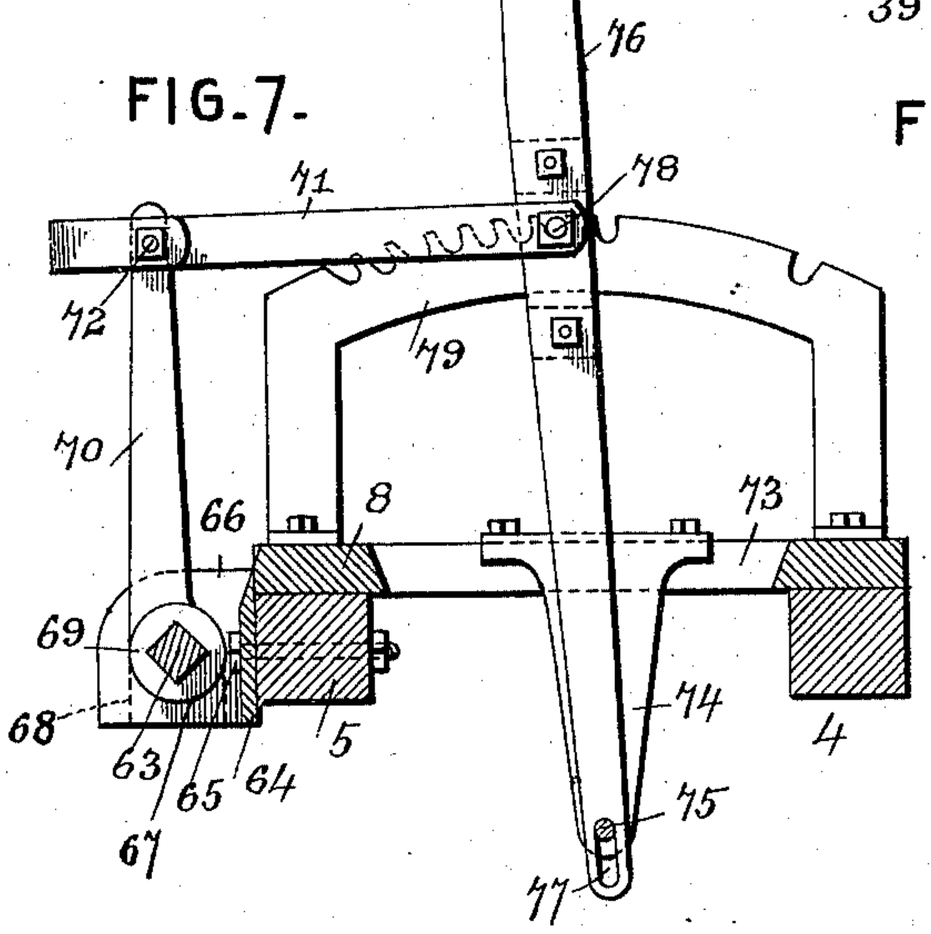
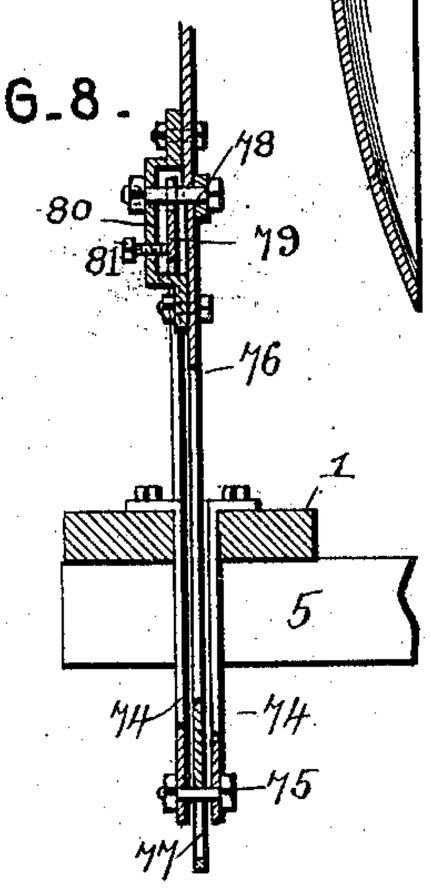


FIG. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. STEWART, OF CAMDEN, NEW JERSEY.

FURROW OPENING OR CLOSING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 558,578, dated April 21, 1896.

Application filed February 27, 1895. Serial No. 539,905. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. STEWART, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented a new and useful Furrow Opening or Closing Machine, of which the following is a specification.

The invention relates to an improvement in that class of furrow opening and closing machines whereby the frame of the machine is mounted on runners, and provided with a marker by which the position of the return path of the machine is indicated.

The object of this invention is to make various improvements in the construction and arrangement thereof to the end that it will be more simple and durable and capable of performing more efficiently the work for which such machines are designed.

To these ends the invention consists in certain novel features of construction and combination of parts, as will be more fully described hereinafter, and finally embodied in the claims.

In the drawings, Figure 1 represents a perspective view of my invention, showing it adjusted for opening the furrows. Fig. 2 is a plan view showing the adjustment whereby the machine is adapted for closing the furrows, the marking attachment being omitted. Fig. 3 is a longitudinal section of my machine on the line 3 3 of Fig. 2, showing it in the adjustment of Fig. 1 and showing the indicating-boom raised out of operative position. Fig. 4 is a detail section taken through one of the beams upon which one of the furrow-opening disks is mounted and illustrating the connection of said disk to the beam. Fig. 5 is a detail section taken parallel with the rock-shaft by which the disks are supported. Fig. 6 is a detail perspective of the means whereby the disks are connected to the rock-shaft. Fig. 7 is a detail side view of the lever for oscillating the rock-shaft by which the disks are supported and of the mechanism associated with said lever whereby it may be locked at various adjustments. Fig. 8 is a detail transverse section of the same. Fig. 9 is a detail section of one of the disks. Fig. 10 is a similar section at right angles to the plane of Fig. 9. Fig. 11 is a detail front view of a bracket for securing the runners to the frame. Fig. 12 is a detail side view of the same. Fig. 13 is a detail sectional view illustrating a modified construction of runner. Fig. 14 is a view illustrating a modification whereby the machine may be converted into a harrow. Fig. 15 is a detail view of one of the bearing-brackets.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

The machine is adapted to open furrows for the reception of seed and fertilizer and subsequently to close the same. The machine in its various adjustments is the same in structure, the only difference being a variation in the location of some of its elements, and in the description I will first refer to it as in the adjustment of Fig. 1 and subsequently explain the changes which are necessary to adapt the machine for closing the furrows.

The reference-numeral 1 indicates a central longitudinal beam, which extends the entire length of the machine and forms the main element of the frame, and bolted to the under side thereof are the parallel transverse beams 2, 3, 4, and 5, the beams 2 and 3 being located adjacent to each other at the front end of the beam 1. The beam 4 is shorter than the remaining transverse beams, and is located at a point approximately one-third of the length of the beam 1 from its rear end, while the beam 5 is arranged at the rear extremity of the beam 1.

6 indicates two diagonal braces, which are secured at extremities to the beams 2 and 5, cross each other at a point beneath the middle of the beam 1, and are connected to the beams 3 and 4 at the points of their intersection with the same. Fixed to the upper side of the beam 4, at each end thereof, are the plates 7 and 8, which extend rearwardly to the beam 5 and are secured thereto by bolts. The plate 8 carries a lever for actuating the furrow-manipulating disks when located at the rear end of the machine, as will be described more fully hereinafter.

The machine is supported upon runners 9, which have their ends bent upwardly to properly elevate the frame. These elevated ends of the runners are provided with devices whereby they may be adjustably connected to the frame, and in the construction illustrated

these devices consist each of a U-shaped clip 10, having laterally-extended feet lying snugly against the upright ends of the respective runners, and held in such position by means of bolts 11, which pass through the feet and runners, as may be seen by reference to the drawings, Figs. 1, 2, 3, 11, and 12. Each clip is provided at its center or looped portion with a boss 12, which surrounds an opening screw-threaded to receive the set-screw 13. This set-screw has its inner end rotatably mounted in a shoe 14, which slides between the parallel arms of the clip, and which is adapted to be forced against the beam 2 or 5, which extends through the clip to firmly connect the parts. The ends of the shoes 14 project beyond their respective clips and are bent to lie against the edges of the clips, as shown in Figs. 1, 2, and 12, and by these means the shoes are steadied in their movements.

It has been found in practice that the runners of machines of this class are apt to wear out frequently, and thus necessitate the frequent renewal thereof at a considerable expense, and I propose to overcome this disadvantage by providing the runners with shoes, which are separable from the runners and may be replaced at a less cost than the runners. Fig. 11 illustrates one form of a shoe 15, which is angular and consists of T-iron secured to the under side of the runner by bolts and so arranged that the rib 16 will depend perpendicularly from the tread of the runner, to bear upon the ground and support the weight of the machine.

The modification of Fig. 13 embodies angle-irons 17 instead of a T-iron, arranged with one side snug against the under side of the runner and the remaining side projecting downwardly to form parallel ribs.

18 indicates a seat for the driver supported on metal arms 19, located one at the front and two at the rear of the seat, the rear arms being formed of a substantially U-shaped bar, while the front arm is upturned at its lower end to form a tongue 20, spaced from the body portion of the arm. Passing through the tongue 20 and through the main part of the front arm 19 is a bolt 21, which serves to mount a boom 22 for swinging movement to either side of the machine. This boom is formed, preferably, of metallic piping and has a collar 23 fixed to its upper end, to which the brace-rod 24 is connected, and this brace-rod extends forwardly to an eye 25, located at the front extremity of the beam 1. The arms 19 are resilient or yielding and resist rearward movement of the seat 18, and the front extremity of the seat is formed with a notch 26 and adjacent inclined faces 27. By these means the boom 22, when swung to a vertical position, will automatically fall into the notch 26 and be held in a raised position. The purpose of the boom 22 is to carry a marker by which the line for guiding the return of the machine may be formed, and by swinging the boom to either side of the machine, the marker (hereinafter described) will form the line upon either side of its path. Slidably mounted for longitudinal adjustment within the boom 22 is the extension-beam 28, which is of a length equal to that of the boom, and which is held at various adjustments by means of a set-screw 29, passing through the outer end of the boom and engaging the beam 28. The beam 28 is graduated throughout its length to indicate measurements. Carried by the outer end of the beam 28 is an ear 30, offset to cause its inner face to lie in a line with the center of the beam 28, and arranged parallel and in contact therewith is a swivel plate 31, the two being connected by a central bolt 32, which serves as a means for clamping the swivel at the desired adjustment. Formed integral with the swivel 31 and projecting from the side thereof is a spindle 33, upon which the hub 34 of the marker-wheel 35 is rotatably mounted. The hub 34 is held in place by means of a pin passing through the outer end of the spindle. The marker-wheel 35 is plain or flat and is adapted to rest at its periphery on the ground and rotate as the machine progresses. By means of the adjustable swivel 31, the wheel 35 may be arranged in a position out of parallel with the runners 9 to drag along the surface of the ground and thus form a wider mark than otherwise, which can be more plainly seen by the driver. This construction is illustrated in Figs. 1 and 3.

The furrow-manipulating disks 36 and 37 employed in connection with my machine are of concavo-convex construction and are carried by supporting-arms 48, the disks 36 being supported by straight arms, while the disks 37 are supported by laterally-deflected arms. Each disk is provided at its center with an axially-elongated hub 38 for the spindle 39, said spindle having at one end a head 40, against which the outer end of the hub bears, while the inner end of the spindle is received in the eye 41 of the eyebolt 42. The eye 41 is alined with a diametrical groove 43 in a rotary bearing-plate 44, said plate having on its inner or upper side a concentric circular projection 45, through which the eyebolt 42 passes, and the projection fits in an opening 46, formed in the enlargement 47 of the supporting-arm 48. It will be understood that the numeral 48 refers to all of the supporting-arms whether straight or angular. The eyebolt 42 projects through the opening 46 and is held in place and the bearing-plate 44 clamped against its seat on the enlargement 47, by means of a nut 49 engaged with the end of the bolt. By these means the spindle 39, which extends through the eye 41 and rests in the groove 43, is connected to the end of the arm 48, so that the disks 36 and 37 may be adjusted to any inclination with relation to their arms. The purpose of the elongated hubs is to strengthen the bearing of the disks and prevent them from becoming loose.

The disk-bearing arms 48 are provided at their inner ends with transverse hollow shafts

50, having cross-sectionally-angular bores 51. These hollow shafts are mounted in bearings in ears 52, which are preferably formed integral with a base-plate 53, said ears and base combining to form a bearing-bracket, and it will be understood that one of these brackets is employed for each of the arms 48. One of the ears 52 of each pair has formed therein a round opening or bearing 54, which snugly receives one end of the hollow shaft 50, while the other ear 52 has an open-sided or elongated opening 55 formed in it, the upper portion of which is transversely alined with the opening 54 to receive the other end of the said shaft. The opening 55 is extended to the lower edge of the ear in which it is formed, whereby in seating a hollow shaft 50 the disk-bearing arm is arranged parallel with the longitudinal disposition of the opening 55, so that the shaft may be moved longitudinally into the opening 54. After the shaft 50 has been seated in its bearings the arm may be swung up to extend at right angles to the slot or opening 55. The shaft will now be held in place, temporarily, by reason of the binding thereof in the opening 54. The bearing-brackets are secured in place by bolts 56, which pass through openings in ears 57, formed integral with the base-plate 53, and also through openings in ears 58 of clips 59, which engage the beams of the frame. The clips 59 are similar to the clips 10, above described as forming members of the clamps employed for fastening the extremities of the runners 9. They are of a size to embrace the beams 5 and 3 and are fitted with followers 60, whereby the beams may be clamped in place, and these followers are operated by set-screws 61, which pass through bossed openings 62 in the clips. The followers are also similar in construction and manner of mounting to the shoes or followers 14 above set forth. Thus it will be seen that the furrow-manipulating disks may be mounted on the beams 3 and 5 so as to be capable of swinging in a vertical line, or upon a horizontal transverse axis, the same being also capable of adjustment on a vertical axis by reason of the bearing-plate 44, and by this latter adjustment the width of the furrow is regulated, while the former adjustment regulates the depth of the same.

The means for turning the hollow shafts whereby the disks are adjusted vertically consist of a rock-shaft 63 and the means for oscillating it. It will be observed that the clips 59 embrace a transverse beam of the frame and that they, and consequently the shafts 50, are transversely alined. This alinement of the trunnions 50 makes it possible for the rock-shaft 63 to be passed through the bores 51, said rock-shaft being of a length equal with that of the beams 5 and 3 and square in cross-section to fit snugly within said bores.

64 indicates a bracket having ears perforated to receive bolts 65, which pass through and secure the bracket to the beam 5, and the horizontally-alined arms 66 of the bracket are provided, respectively, with a round opening 67 and an elongated opening or open-sided bearing 68, the upper part of the latter being alined with the opening or bearing 67. This construction is similar to that of the brackets 52, and its purpose is the same—namely, to permit a hollow shaft 69 to be removably arranged in the bearings. The shaft 69 has a cross-sectionally angular bore through which the rock-shaft 63 passes. Fixed rigidly to or formed integral with the shaft 69 is an arm 70, which is located between the arms 66, and which projects upwardly for a short distance above the beam 5.

Pivotally connected to the upper end of the arm 70 is the link 71, which has its rear end bent to form a loop or hook embracing the arm and engaged by a bolt 72. The plate 8 is longitudinally slotted, as shown at 73, and depending from the plate through the slot are metallic arms or plates 74, which decrease in width toward their lower extremities and are provided with a transverse connecting-bolt 75. This bolt serves to pivotally mount a lever 76, which is provided with a longitudinal slot 77 to receive the same. To this lever 76 the link 71 is pivotally connected at its forward end by means of a bolt 78. Rising from the plate 8 is a ratchet or toothed segment 79, the teeth of which are adapted to be engaged by the bolt 78, which thus serves the additional function of securing the lever at the desired adjustment. 80 indicates a guide-plate, which is bolted to the lever 76 and embraces the segment to hold the lever in operative position. The lever will drop by gravity to cause the bolt 78 to engage with the teeth of the segment. To move the lever it must be raised until the bolt 78 is disengaged from the teeth. A set-screw 81 is carried by the guide-plate 80, to impinge against the surface of the segment 79 and permanently lock the lever at a given adjustment, as may be desirable at times.

By throwing the lever rearwardly the disks connected to the rock-shaft will be moved down and forced into the ground, while by swinging the lever in the opposite direction the movement of the disks will be reversed.

When the machine is adjusted for opening the furrows, two of the disks and contiguous parts are dispensed with and the remaining two are connected to the rock-shaft 63, in alinement with the longitudinal disposition of the runners, said rock-shaft being arranged contiguous to the beam 5. It will be seen that the interval between the furrows may be adjusted or regulated with perfect ease and that the depth of the furrow, together with the width, may be respectively varied by means of the rock-shaft 63 and the peculiar construction of the means for connecting the disks to the arms 48. When the machine is operating to open the furrows, the boom 22 is swung horizontally, so that the marker-wheel

35 will be in operative position, and by adjusting said marker-wheel the distance between the furrows may be regulated.

Fixed to the rear side of the beam 3 at its center is a bracket 82 having arms 83, provided, respectively, with a round opening or bearing 84 and an elongated opening or open-sided bearing 85 for the reception of a hollow shaft 86, which is formed with an angular bore 87 and carries an arm 88. This arm projects upwardly through a longitudinal slot 89, formed in the beam 1, and has a link 90 pivotally connected to it. 91 indicates plates arranged upon opposite sides of the slot 89 and extending downwardly therethrough to support a transverse bolt 92, which passes through a slot 93 in a lever 94. The lever 94 coöperates with a toothed segment 95, fixed to the beam 1, and is connected by the link 90 with the arm 88, and said lever also carries a guide-plate 96, which embraces the segment 95.

97 indicates a set-screw which is passed through the plate 96 and which operates to clamp the lever to the segment when desired.

When it is desired to adjust the machine for closing furrows, the disks 36 and 37 are mounted on the beam 3, the rock-shaft 63 having previously been disconnected from the beam 5 and passed through the hollow shaft 86, so as to lie parallel with and directly adjacent to the beam 3. Two pairs of disks are employed for closing the furrows. 98 indicates two double stud-bolts, which are arranged one at each end of the beams 2 and 3 and fitted in slots 99 in said ends, said bolts being provided with nuts 100, which bear against the sides of the beams. When the machine is adjusted for closing the furrows, the boom 22 and its attachments are dispensed with, as shown in Fig. 2, since they will be unnecessary and would only serve to encumber and burden the machine.

101 indicates the tongue of the machine, which has at its inner end a cross-bar 102, provided with bolts having eyes 103, which match with eyes 104 in bolts in the beam 2, a transverse bar or rod 105 being passed through the several eyes.

Fig. 14 illustrates a harrow or cultivator arm, which may be substituted for the disks on the arms 48, the V-shaped plates 106 of said arm being attached in their stead. To these plates 106 the harrow-teeth 107 are connected. In using the machine for a harrow it will be necessary, perhaps, to increase the number of arms 48, so that the cultivation of the ground will be more complete. It will also be advisable to connect them to both the beams 3 and 5, which may be done by duplicating the rock-shaft 63.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. In a machine of the class described, the combination with a frame, of one or more sets of transversely-alined bearing-brackets, a transverse rock-shaft removably mounted in the bearing-brackets of one set, and arms carried by the rock-shaft, a furrow-manipulating disk mounted upon each arm, means for adjusting said disk angularly in a horizontal plane, and operating connections for the rock-shaft to vary the vertical position of the disk, substantially as specified.

2. In a machine of the class described, the combination of a frame having parallel adjacent front beams 2 and 3, a transverse rear beam 5, and runners connected at their front ends to the foremost front beam and at their rear ends to the rear beam, one or more sets of tranversely-alined bearing-brackets supported by the frame, a rock-shaft removably mounted in the bearing-brackets of one set, arms secured to the rock-shaft, furrow-manipulating disks mounted upon the arms, means for horizontally adjusting the disks angularly with relation to the arms, and operating connections for the rock-shaft, substantially as specified.

3. In a machine of the class described, the combination of a frame having parallel beams 2 and 3, a transverse rear beam, runners, and clamps for adjustably securing the front and rear ends of the runners, respectively, to the foremost front beam and to the rear beam, whereby the runners may be laterally adjusted, transversely-alined bearing-brackets, a rock-shaft removably mounted in said bearing-brackets, arms carried by the rock-shaft, furrow-manipulating disks adjustably mounted upon the arms, and means for operating the rock-shaft, substantially as specified.

4. In a machine of the class described, the combination of a frame having parallel front and rear transverse beams connected by longitudinally-disposed runners, a central longitudinal beam connecting said transverse beams, centrally-intersecting crossed braces secured at their front ends to the front and at their rear ends to the rear beams upon opposite sides of the centers thereof, transversely-alined bearing-brackets supported by a transverse beam, a rock-shaft removably mounted in said bearing-brackets, arms carried by the rock-shaft, furrow-manipulating disks adjustably mounted upon the arms, and operating connections for the rock-shaft, substantially as specified.

5. In a machine of the class described, the combination with a frame having a transverse beam, of a plurality of clips constructed to fit upon the beam and adapted for movement longitudinally thereof, screw-actuated followers mounted in said clips to bear against the beam and secure the clips at the desired adjustment, bearing-brackets secured in place by said clips and having parallel ears pro-

vided with transversely-alined bearings, one ear of each bracket having a round bearing and the other ear having an open-sided bearing, disk-bearing arms provided with terminal transverse hollow shafts mounted at their extremities, respectively, in said round and open bearings, said shafts having cross-sectionally-angular bores, a cross-sectionally-angular rock-shaft fitting in the bores of a plurality of alined hollow shafts to maintain the latter in place in their bearings, and means connected to the rock-shaft whereby it may be operated to change the vertical positions of the disk-bearing arms, substantially as specified.

6. In a machine of the class described, the combination with a frame, and cultivating devices, of a seat mounted upon the frame and having spring-metal standards or supports 19 to allow forward and rearward yielding movement, and a marking device having a boom pivotally mounted upon the frame to swing laterally in a vertical plane and carrying a marking-disk, said seat being provided at the end contiguous to the plane of movement of the boom with a notch to engage the boom when the latter is in its elevated or inoperative position, the spring action of the seat-standards serving to hold the boom in the notch, substantially as specified.

7. In a machine of the class described, the combination with a frame, and cultivating devices, of longitudinally-disposed runners, and shoes detachably secured to the runners and having depending flat parallel-sided ribs and lateral ribs, said lateral ribs being together equal in width to the lower surfaces of the runners, substantially as specified.

8. In a machine of the class described, the combination with a frame having a transverse beam, of a plurality of alined bearings supported by the beam, arms provided with hollow angularly-bored shafts mounted in said bearings, disks carried by said arms, a common cross-sectionally-angular rock-shaft extending through the bores of all of the hollow shafts and holding the latter in place in their bearings, and means for turning the rock-shaft to vary the elevation of the disks, substantially as specified.

9. In a machine of the class described, the combination with a frame having a transverse beam, of a plurality of bearing-brackets secured to said beam, each bracket having contiguous bearings, one of which is open-sided, hollow angularly-bored shafts mounted in said contiguous bearings, disk-supporting arms carried by said hollow shafts, a single angular rock-shaft extending through the bores of the hollow shafts and holding the latter in place in their bearings, and means for operating the rock-shaft to vary the elevation of the disk-supporting arms, substantially as specified.

10. In a machine of the class described, the combination with a frame, of transversely-alined hollow shafts mounted in bearings on the frame and carrying disks, a rock-shaft removably fitted in the bores of the hollow shafts to impart rotary motion thereto, and operating devices connected to the rock-shaft whereby the furrow opening and closing devices may be vertically adjusted, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES E. STEWART.

Witnesses:
FRANK GOFF,
THOS. H. JOINER.