

No. 670,166.

Patented Mar. 19, 1901.

C. W. WARNER.  
GANG PLOW.

(Application filed Sept. 25, 1899.)

(No Model.)

3 Sheets—Sheet 1.

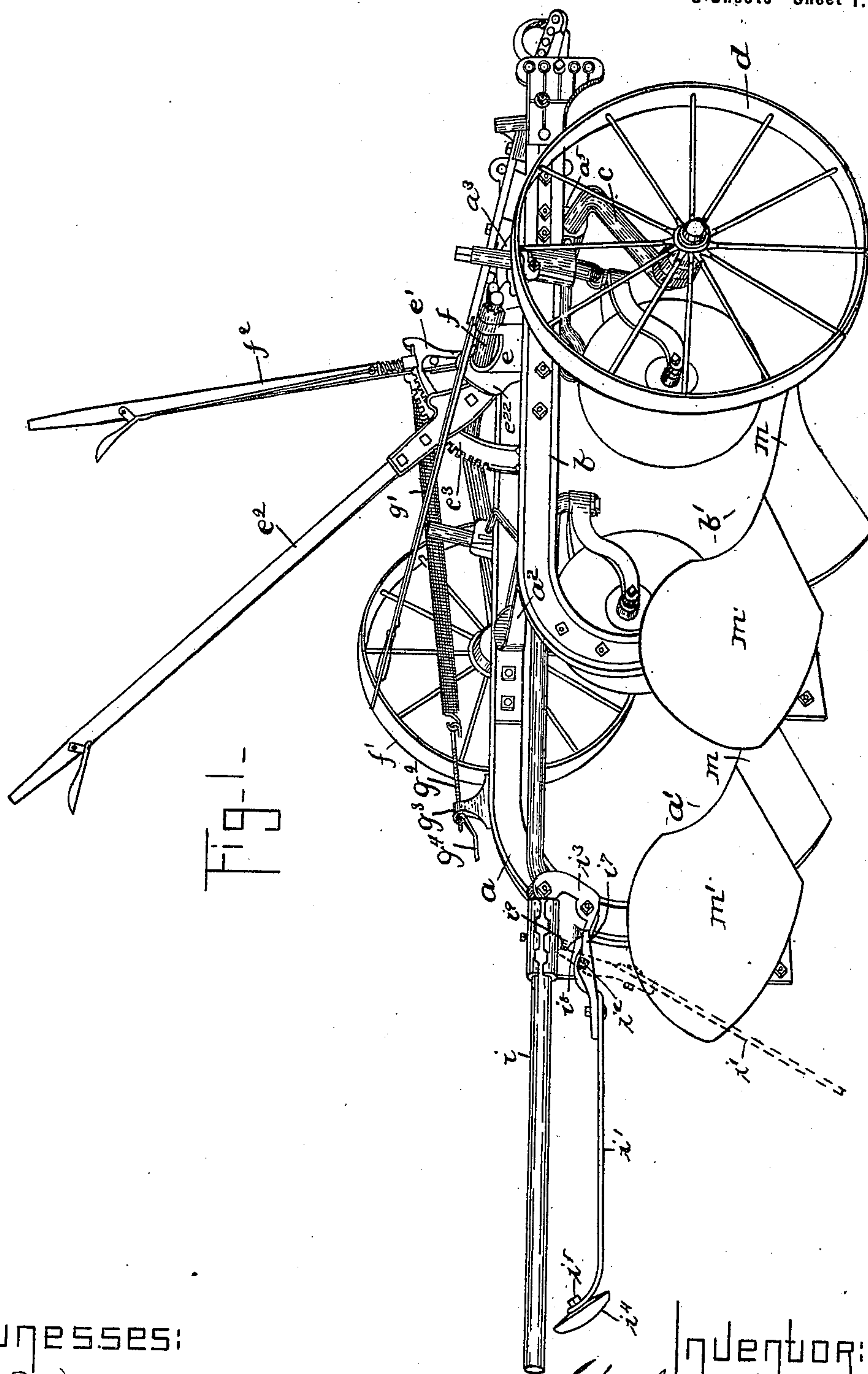


Fig. 1-

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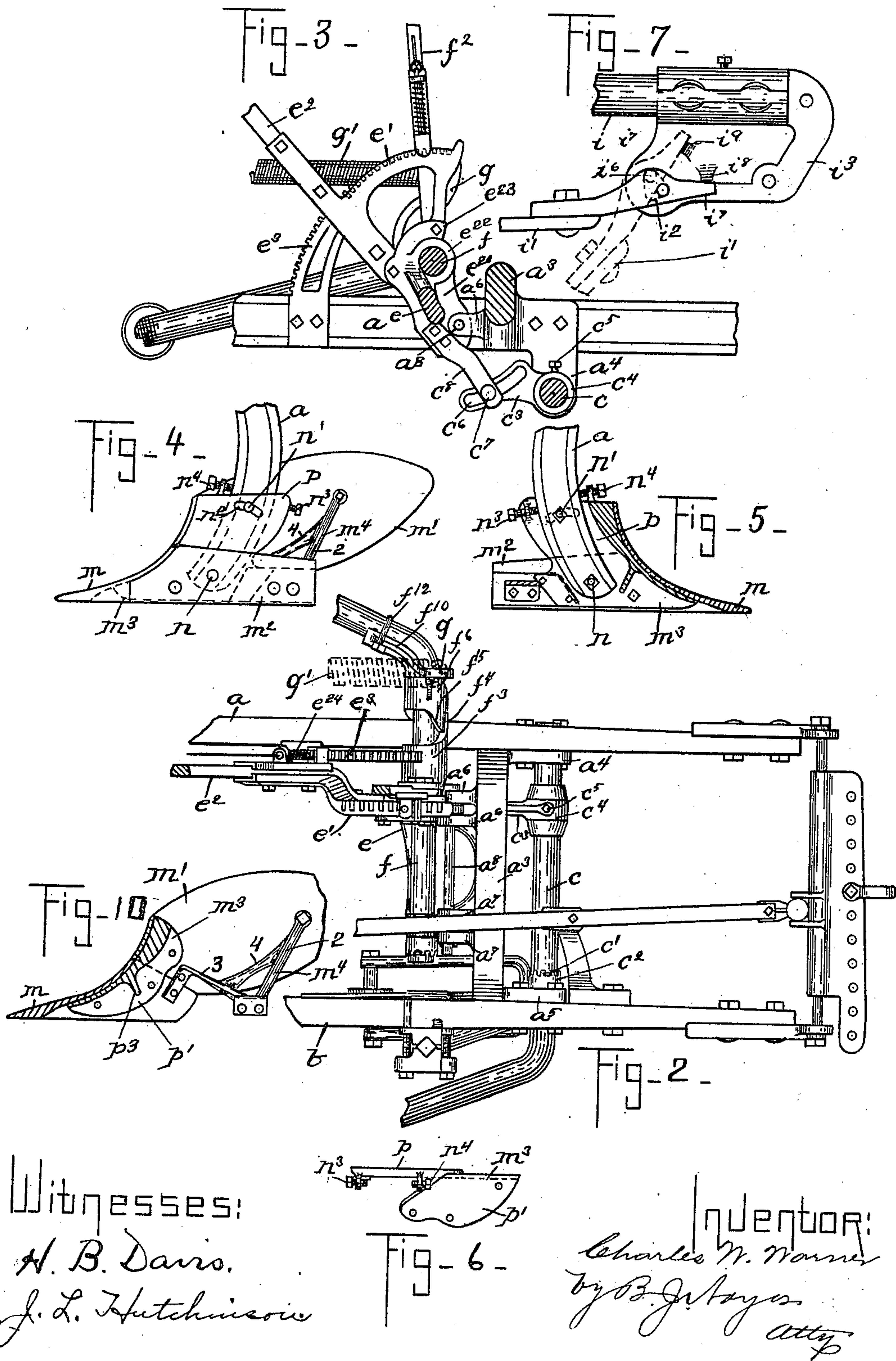
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3 Sheets—Sheet 3.

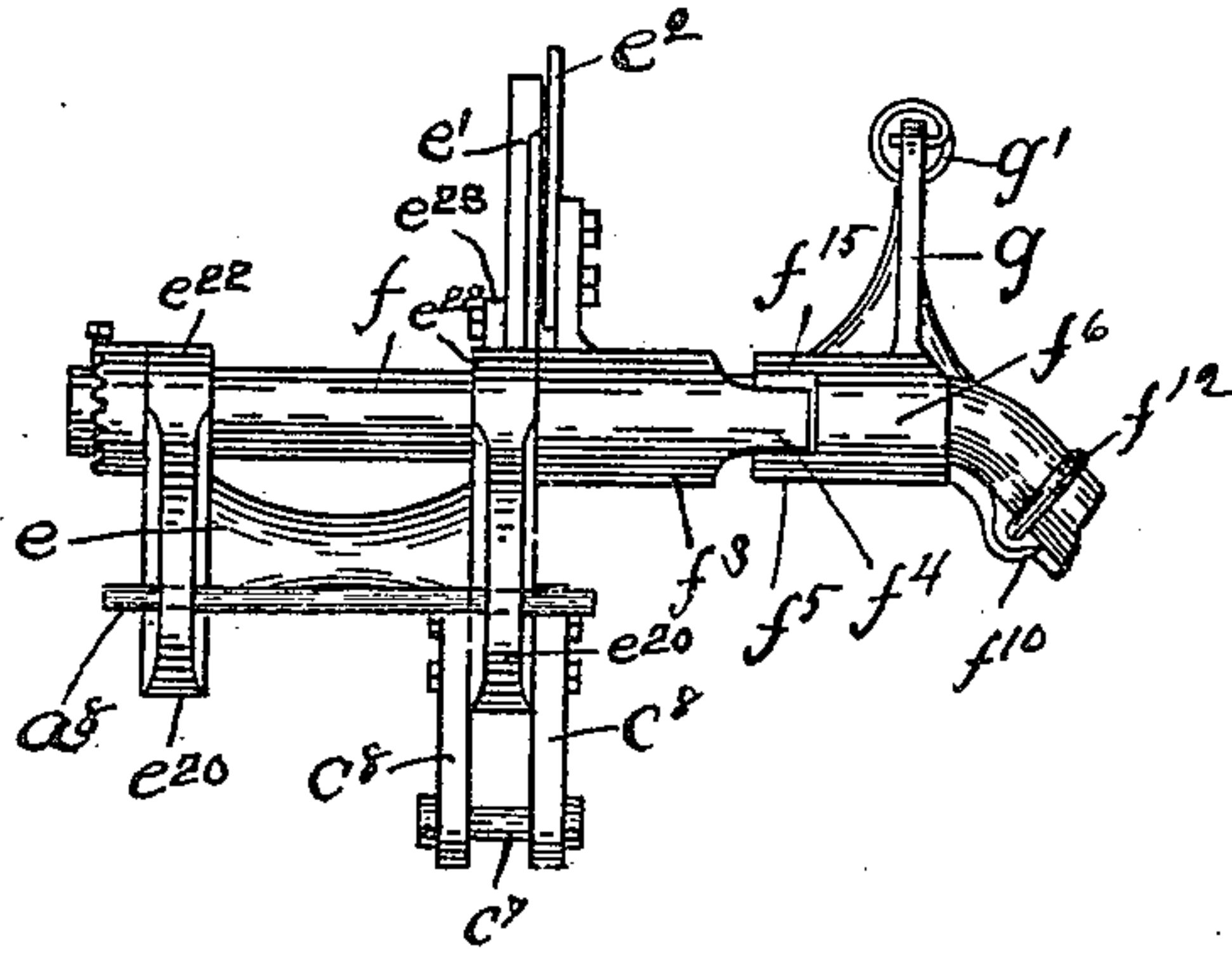
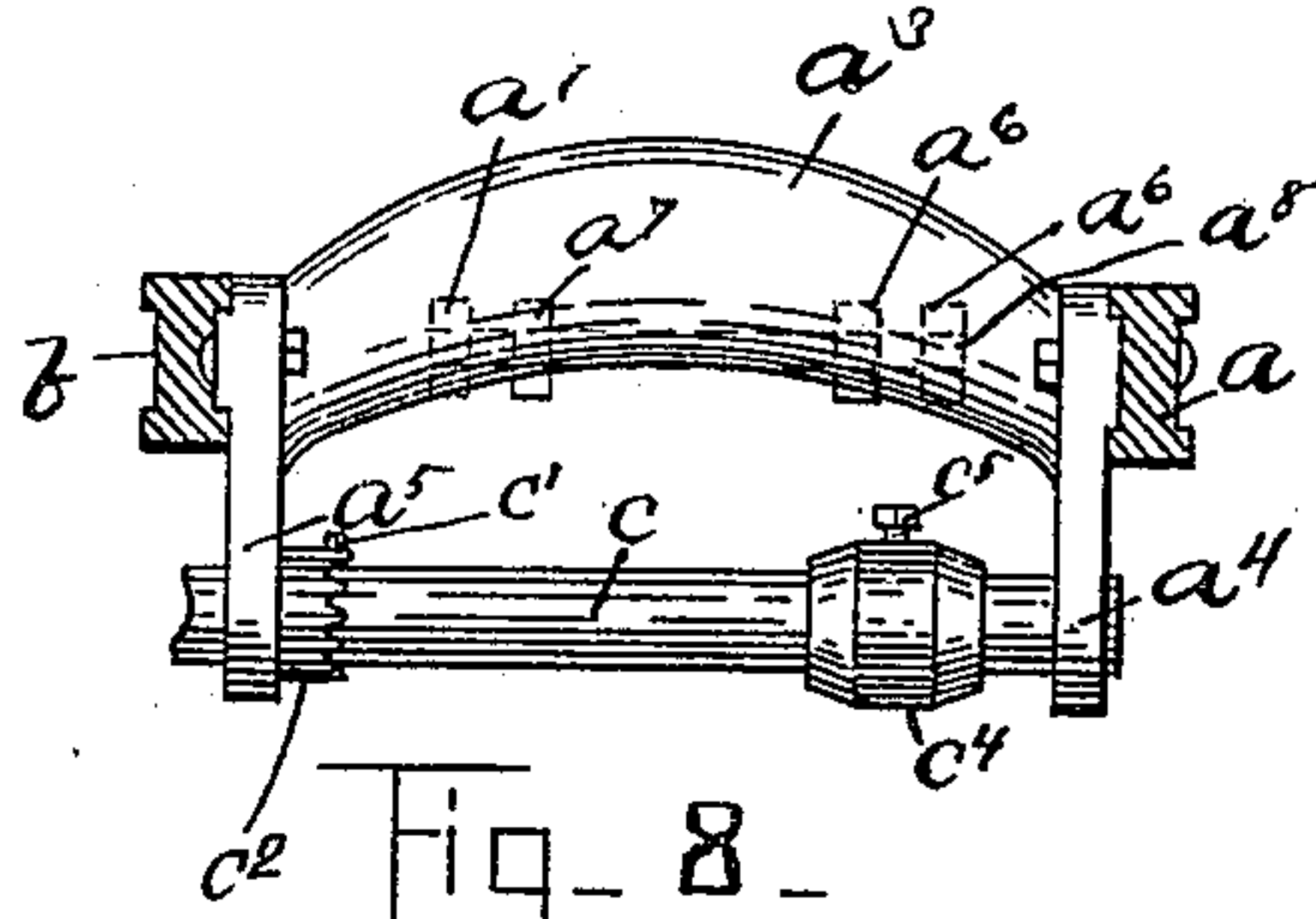


Fig-9-



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# UNITED STATES PATENT OFFICE.

CHARLES W. WARNER, OF MELROSE, MASSACHUSETTS.

## GANG-PLOW.

SPECIFICATION forming part of Letters Patent No. 670,166, dated March 19, 1901.

Application filed September 25, 1899. Serial No. 731,613. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. WARNER, of Melrose, county of Middlesex, and State of Massachusetts, have invented an Improvement in Gang-Plows, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to gang-plows, and has for its object to provide novel means of operating the axles bearing the furrow and land wheels independently and conjunctively; also, to provide novel means for supporting the wheels on the axles; also, to provide novel means for supporting the rear end of the machine when the wheels are adjusted to a position below the plow-bottoms, as when drawing the machine to and from the field; also, to construct a novel plow-bottom and to provide means for supporting it.

Figure 1 shows a perspective view of a gang-plow embodying this invention. Fig. 2 is a plan view of a portion of the gang-plow, showing particularly that portion thereof wherein my invention resides. Fig. 3 is a vertical sectional detail showing the two axles which bear the furrow and land wheels and the means for operating them. Figs. 4, 5, and 6 represent different details of one of the plow-bottoms. Fig. 7 is a detail showing the drag-arm broken off and its support at the rear end of the machine. Fig. 8 is a detail of the stationarily-supported frame which supports one of the bent axles. Fig. 9 is a detail of the rocker-frame supporting the other bent axle. Fig. 10 is a detail showing the moldboard and point and a brace which assists in connecting them together and which also supports the moldboard.

$a$  and  $b$  represent two plow-beams, which are rigidly secured together in any suitable manner and are adapted to support the plow-bottoms  $a'$   $b'$  at their rear ends.

$a^2$  represents one of the intermediate braces, by means of which the two plow-beams are secured together.

$a^3$  is a frame, herein shown as slightly arched, which is placed between and bolted or otherwise rigidly secured to the plow-beams  $a$   $b$  (see Figs. 1, 3, and 8) and which incidentally serves as another intermediate brace for

said beams, although not provided essentially for this purpose.

The frame  $a^3$  has two ears  $a^4$  and  $a^5$  depending from it, one at each end, said ears being thereby disposed adjacent the plow-beams  $a$   $b$ , and they are made long enough to project below said beams, and in said ears  $a^4$   $a^5$  a bent axle  $c$  has its bearings. The bent axle  $c$  is thus supported by fixed bearings, and it is prevented from moving endwise in said bearings by a pin  $c'$ , projecting from the axle and engaging a notched collar  $c^2$ , disposed on the axle adjacent the ear  $a^5$ . The axle  $c$  is bent in any desired manner and supports at its extremity the furrow-wheel  $d$ .

The bent axle  $c$  is adapted to be rocked to vary the position of the furrow-wheel relative to the plow-bottoms, and novel means are herein provided for rocking it. A short arm  $c^3$  (see Figs. 2 and 3) is formed or provided with a hub  $c^4$ , adapted to be placed upon the axle  $c$  and to be adjustably secured to said axle  $c$  by a set-screw  $c^5$ , and said arm  $c^3$  projects rearwardly and its rearwardly-extended portion is formed or provided with a curved slot  $c^6$ , which is adapted to receive a pin  $c^7$ , (see Figs. 3 and 9,) which may be a bolt attached to the extremities of a pair of arms  $c^8$   $c^8$ , both of which arms are rigidly connected to and operated by a set-lever to be described. The pin or bolt  $c^7$ , carried by said arms  $c^8$   $c^8$ , works freely along in said slot  $c^6$  as the arms bearing it move to and fro on the pivot of the set-lever, but the curvature of said slot  $c^6$  is more or less eccentric to said pivot, so that as the arms  $c^8$   $c^8$  move to and fro the arm  $c^3$  will be moved up and down to thereby rock the axle  $c$ . The arm  $c^3$  is made adjustable upon and relative to the axle  $c$ , so that the position of said axle  $c$  may be varied relative to the other parts of the apparatus.

The rigidly-supported frame  $a^3$  is formed or provided on its rear side with two pairs of ears  $a^6$  and  $a^7$ , and a horizontal rod  $a^8$ , which may be a long bolt, passes through the ears of both pairs and serves as a pivot-pin to support a rocker-frame  $e$ , (see Figs. 1, 2, 3, and 9,) yet I desire it to be understood that said rocker-frame may be pivotally supported in any other manner or may be otherwise hinged to the frame  $a^3$ , and, furthermore, that said



rocker-frame may be pivoted to any other suitable support provided for it other than the arm  $a^3$ . The rocker-frame  $e$ , as herein shown, consists of a cross-piece having at 5 each end an ear  $e^{20}$  projecting downward, and also an ear  $e^{22}$  projecting upward, and said downwardly-projecting ears  $e^{20}$  have holes through them which receive the pivot bolt or rod  $a^8$ , and said upwardly-projecting ears  $e^{22}$  10 have holes through them which receive the axle  $f$ . The rocker-frame  $e$ , which is thus adapted to bodily rock on the pivot  $a^8$ , is constructed to serve as and constitute a bearing or support for the bent axle  $f$ , which, like the 15 bent axle  $c$ , supports at its extremity the land-wheel  $f'$ , and as said rocker-frame  $e$  is rocked on its pivot the said axle bearing the land-wheel will be bodily raised and lowered in the arc of a circle about the pivot  $a^8$  as a 20 center, yet said axle  $f$  is also free to be turned or rocked on its own axis at all times, as will be described. The rocker-frame  $e$  has secured to it at one end a toothed segmental plate  $e'$ —as, for instance, said plate may be 25 bolted to a projection  $e^{23}$  on said frame—and a set-lever bar  $e^2$  is secured to said plate  $e'$ , which bears an ordinary spring-controlled dog or pawl  $e^{24}$ , adapted to engage one or another tooth of a toothed segment  $e^3$ , which is 30 rigidly secured to the plow-beam  $a$ . It will be seen that the set-lever  $e^2$  coöperates with the stationarily-supported toothed segment  $e^3$ , and that as it is moved the rocker-frame  $e$ , to which it is attached, will be moved by it 35 on the pivot  $a^8$ , and as said frame  $e$  is thus rocked the arms  $c^8$  borne by it will rock the axle  $c$ . The set-lever  $e^2$  is thus employed to rock the axle  $c$ , and by engaging the different teeth of the segment  $e^3$  will hold said axle  $c$  in whatever position the lever  $e^2$  may be set. 40 Furthermore, it will be seen that as the set-lever  $e^2$  is operated and the rocker-frame  $e$ , to which it is attached, correspondingly moved the axle  $f$ , borne by said rocker-frame  $e$ , will 45 be bodily moved in the arc of a circle about the pivot  $a^8$  as a center.

A set-lever  $f^2$  is attached to or projects from a hub  $f^3$ , which is loosely mounted upon the axle  $f$ , (see Figs. 2 and 9,) and said set-lever 50  $f^2$  has the usual or ordinary spring-controlled dog or pawl, which engages one or another tooth of the toothed segment  $e'$ , to which the set-lever  $e^2$  is attached. The set-lever  $f^2$  is provided as a means of turning the axle  $f$  on 55 its own axis, and to accomplish this result the hub  $f^3$  of the set-lever  $f^2$ , which is mounted loosely on the axle  $f$ , has a lateral projection  $f^4$ , which enters a wide space between two lateral projections  $f^5$  and  $f^{15}$  on a collar 60  $f^6$ , which is fixed to the axle  $f$ , so that as the set-lever  $f^2$  is moved on the axle  $f$  as a pivot the said axle  $f$  will be turned on its axis. Thus it will be seen that the axle  $f$  may be rocked independently of the axle  $c$  yet 65 may be moved bodily in the arc of a circle about the pivot  $a^8$  when the axle  $c$  is rocked. The collar  $f^6$  is secured to the bent axle  $f$  in

any suitable manner; but herein it is formed or provided with an arm  $f^{10}$ , (see Fig. 2,) which is bent or offset to correspond to the 70 bend in the axle  $f$ , and said arm  $f^{10}$  lies flat upon the offset portion of said bent axle, and a loop  $f^{12}$  passes around the offset portion of the axle, which is attached to said arm to securely hold it in place. The collar  $f^6$  has 75 projecting upwardly from it a short arm  $g$ , to the extremity of which one end of a long spiral spring  $g'$  is attached, the opposite end of said spring being attached to a screw-threaded rod  $g^2$ , which passes freely through 80 a hole formed or provided in a bracket  $g^3$ , and a crank-operated nut  $g^4$  is turned upon the outer end of said screw-rod  $g^2$ , which bears upon or against the bracket  $g^3$ , to thereby serve as a means of adjusting the tension of 85 the spring  $g'$ . The spring  $g'$ , pulling upon the arm  $g$  on the collar  $f^6$ , tends to turn the bent axle  $f$  on its axis, so that the projection  $f^{15}$  on said collar normally bears against the projection  $f^4$  on the hub  $f^3$ , the projection  $f^5$  90 at such time being a short distance from the projection  $f^4$ , for it will be seen that the space between the projections  $f^5$  and  $f^{15}$  is wider than the projection  $f^4$ . The bent axle  $f$  bears the land-wheel, and in traveling along if the 95 land-wheel passes over an obstacle it will be seen that said wheel may slightly lift the offset portion of the axle, turning the axle on its axis, such yielding movement being controlled by the spring  $g'$  and the extent of such 100 yielding movement being limited by the projection  $f^5$  striking the projection  $f^4$ . When the hub  $f^3$  is turned by either one of the set-levers  $e^2$  or  $f^2$  and its projection  $f^4$  brought into engagement with the projection  $f^5$  to act to 105 turn the axle on its axis, it will be seen that said spring  $g'$  will materially assist the operator in thus turning said axle. Consequently the spring  $g'$  has two functions—viz., to hold the axle in position to permit it to yield as the 110 wheel passes over an obstacle and also to assist the operator in turning the axle, and thereby serve as a lifting-spring.

At the rear end of the machine a lifting-bar 115  $i$  is provided. Also at the rear end of the machine a support is provided, which is adapted to be held in proper position to support the rear end of the machine, with the plow-bottoms, above the ground, to be used when drawing the machine to and from the field. 120 This rear support consists of an arm  $i'$ , (see Figs. 1 and 7,) pivoted at  $i^2$ , at a short distance from its end, to a plate  $i^3$ , bolted or otherwise secured to the beam  $a$ , and said arm  $i$  bears at its opposite end a disk  $i^4$ , having a convex 125 face, said disk being pivoted to the arm  $i'$  at  $i^5$ . The pivot-pin  $i^2$ , which may be a bolt, passes through a hole  $i^6$ , formed in the plate  $i^3$ , which is made substantially triangular in shape, so that the arm  $i'$  may be moved length- 130 wise and also up and down as it is swung up and down, as will be described. The arm  $i'$  is extended forward for a short distance beyond its pivot  $i^2$ , as at  $i^7$ , and two bosses  $i^8$   $i^9$



are formed or provided on the side of the plate  $i^3$ , which are located a short distance apart, and said extension  $i^7$  of the cam  $i'$  is adapted to engage either one of said bosses  $i^8$  or  $i^9$ . As represented in full lines, the arm  $i'$  is elevated, and at such time the extension  $i^7$  bears upwardly against the lowermost boss  $i^8$  and the pivot  $i^2$  is located at the front side of the triangular opening. When, however, said arm  $i'$  is pulled rearwardly a short distance, in order that its extension  $i^7$  may disengage said boss  $i^8$ , the pivot-pin  $i^2$  will move along in the hole  $i^6$  to the opposite side thereof, and the said arm  $i'$  may then fall into the dotted-line position shown, so that the disk  $i^4$  will rest upon and drag along on the ground, and in moving into this position its extension  $i^7$  will pass beneath and by the boss  $i^9$ , and when striking the ground said arm  $i$  will be moved upward in the direction of its length and its pivot  $i^2$  will move upward into the upper end portion of the triangular opening  $i^6$ , and its extension  $i^7$  will then engage and bear downwardly upon the boss  $i^9$ . As the arm  $i'$  drags along on the ground in rear of the machine the disk will be revolved in one or the other direction, according as the machine is canted to one or the other side. When the rear end of the machine is lifted by means of the bar  $i$ , the drag-arm  $i'$  will hang by gravity, occupying a more or less vertical position, and at such time the extension  $i^7$  will disengage the boss  $i^9$ , the pivot  $i^2$  moving into the lower part of the triangular opening, and then said arm may be returned to its full-line position by hand and the machine lowered.

The plow-bottoms  $a' b'$ , two of which are herein shown, are made alike, so one only will be described. The plow-bottom (see Figs. 1, 4, 5, and 6) consists, essentially, of a point  $m$ , a moldboard  $m'$ , and a landside-plate  $m^2$ , these parts being secured to a frog  $m^3$  and also held assembled by a brace  $m^4$ . The beam to which the plow-bottom is attached extends down into the plow-bottom and a bolt  $n$  passes through the lower end of the beam and through the landside-plate  $m^2$ , thereby pivotally attaching the plow-bottom to the beam at such point. Another bolt  $n'$  passes through the beam a short distance above the bolt  $n$ , which passes through a slot  $n^2$  in the land side of the frog  $m^3$ , said slot curving in an arc about the bolt  $n$  as a center, thus providing for adjustment of the plow-bottom on the pivot-bolt  $n$ , the bolt  $n'$  moving along in said curved slot  $n^2$  when the nut is loosened and held in position of rest at any part of the slot when said nut is tightened.  $n^3 n^4$  represent two adjusting-screws which pass through ears on the frog  $m^3$ , which bear upon or against the opposite sides of the beam, they being employed when adjusting the plow-bottom on the pivot  $n$ .

The brace  $m^4$  consists of a single piece or casting and comprises two bars 2 3 and an intermediate bar 4 between said bars 2 3, the

bar 2 being attached to the landside-plate  $m^2$  and to the moldboard  $m'$  and the bar 3 being attached at one end to the moldboard  $m'$  and point  $m$  and at the opposite end to the landside-plate.

The frog  $m^3$  consists, essentially, of the vertical side piece or plate  $p$  and the oblique side piece or plate  $p'$ , and said frog is formed in a single piece or casting and has a brace  $p^3$  between its side pieces  $p$  and  $p'$ . The vertical side piece  $p$  is located at the land side of the plow-bottom and the forward end of the landside-plate  $m^2$  is secured to it, yet said side piece  $p$  also extends above said landside-plate  $m^2$  for a considerable distance, as represented in Figs. 4 and 5, and has formed in it the curved slot  $n^2$ , heretofore described, which is adapted to receive the bolt  $n'$ . The oblique side piece  $p'$  is curved or flared outwardly and has attached to it the moldboard  $m'$  and point  $m$ .

I claim—

1. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, a bent axle  $c$  supported by it carrying the furrow-wheel, a pivoted axle-bearing frame, and bent axle  $f$  borne by it carrying the land-wheel, means for rocking said frame and for holding it in different positions, and an intermediate connection between said pivoted frame and the bent axle  $c$  whereby the latter is operated by the former, substantially as described.

2. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, a bent axle  $c$  supported by it carrying the furrow-wheel, a pivoted axle-bearing frame and bent axle  $f$  borne by it carrying the land-wheel, means for locking said frame and for holding it in different positions, an intermediate connection between said pivoted frame and the bent axle  $c$  whereby the latter is operated by the former, and means for turning the bent axle  $f$  independently on its axis, substantially as described.

3. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with the bent axle  $c$  bearing a furrow-wheel, bearings therefor fixed to the plow-beams, a rocker-frame  $e$  and bent axle  $f$  borne by it carrying the land-wheel, means for rocking said frame  $e$  and for holding it in different positions, and intermediate connections between said rocker-frame  $e$  and bent axle  $c$  whereby the latter is operated by the former, and means for turning the bent axle  $f$  independently on its axis, substantially as described.

4. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, a bent axle  $c$  borne by it carrying a furrow-wheel, a pivoted axle-bearing frame and bent axle  $f$  borne by it carrying the land-wheel, a set-lever attached to said pivoted frame for rocking it, a toothed segment with which said



set-lever coöperates, intermediate connections between said pivoted frame and the bent axle *c* whereby the latter is operated by the former, and a set-lever for turning the bent axle *f* on its axis which coöperates with a tooth-segment borne by said pivoted frame, substantially as described.

5. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, bent axle *c* borne by it carrying a furrow-wheel, a rocker-frame pivoted to said stationarily-supported axle-bearing frame, bent axle *f* borne by it carrying a land-wheel, means for rocking said pivoted frame and for holding it in different positions, and intermediate connections between said pivoted frame and the bent axle *c* whereby the latter is operated by the former, and means for turning the bent axle *f* independently on its axis, substantially as described.

6. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, bent axle *c* borne by it carrying a furrow-wheel, a rocker-frame and bent axle *f* borne by it carrying a land-wheel, means for rocking said frame and for holding it in different positions, one or more arms *c*<sup>8</sup> carried by said rocker-frame bearing a pin and an arm secured to and projecting from the bent axle *c* having a slot curved eccentric to the pivot of the rocker-frame in which said pin works as the rocker-frame is moved on its pivot, substantially as described.

7. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with the bent axle *c* bearing a furrow-wheel, the frame *a*<sup>3</sup> secured to the plow-beams and serving as a bearing for said axle *c*, the rocker-frame *e* pivotally connected to said frame *a*<sup>3</sup>, means connecting said rocker-frame with the bent axle *c* whereby said axle is turned by the rocker-frame, a set-lever attached to said rocker-frame for rocking it, the bent axle *f* borne by said rocker-frame carrying a land-wheel, and a set-lever *f*<sup>2</sup> for turning said bent axle *f* on its axis which coöperates with a toothed segment carried by said rocker-frame, substantially as described.

8. In a gang-plow, plow-beams and plow-bottoms carried by them, combined with a stationarily-supported axle-bearing frame, a bent axle *c* supported by it carrying the furrow-wheel, a pivoted axle-bearing frame and bent axle *f* borne by it carrying the land-wheel, means for rocking said frame and for holding it in different positions, an intermediate connection between said pivoted frame and the bent axle *c*, whereby the latter is operated by

the former, means for turning the bent axle *f* independently on its axis, a spring *g*<sup>1</sup> connected to said axle *f* which holds it in position to permit said axle to yield as the wheel borne by it passes over obstacles and which also serves as a lifting-spring to assist the operator in turning the axle on its axis, substantially as described.

9. In a gang-plow, the pivoted drag-arm *i*<sup>1</sup> at the rear end of the machine bearing a roller *i*<sup>4</sup> turning on a substantially vertical axis when said roller is in contact with the ground, and having a convex bearing-face substantially as described.

10. In a gang-plow, the drag-arm *i*<sup>1</sup>, a plate having a substantially triangular hole *i*<sup>6</sup> for the pivot-pin of said arm and bosses *i*<sup>8</sup> and *i*<sup>9</sup> with which an extension *i*<sup>7</sup> on said arm coöperates to lock the arm in its two extreme positions, substantially as described.

11. A plow-bottom consisting of a point *m*, moldboard *m*<sup>1</sup>, landside-plate *m*<sup>2</sup>, and frog *m*<sup>3</sup> comprising the rearwardly-extended vertical side portion *p* to which the landside-plate *m* is secured, which projects above said landside-plate, and the forwardly-extended oblique portion *p*<sup>1</sup> to which the point and moldboard are secured, and means for connecting said plow-bottom to the beam consisting of a bolt passing through the beam and through the landside-plate and frog, and another bolt passing through the beam and through the portion *p* above the landside-plate, substantially as described.

12. A plow-bottom consisting of the point *m*, moldboard *m*<sup>1</sup>, landside-plate *m*<sup>2</sup>, and frog *m*<sup>3</sup> comprising the vertical side portion *p* to which the landside-plate *m* is secured, which projects above said landside-plate, and the oblique side portion *p*<sup>1</sup> to which the point and moldboard are secured, the pivot *n* for pivotally connecting the plow-bottom to the beam, which passes through the landside-plate and frog, an adjusting device for holding the plow-bottom in adjusted position on the beam comprising the bolt *n*<sup>1</sup> passing through the beam and through the portion *p* of the frog above the landside-plate, and the adjusting-screws *n*<sup>3</sup>, *n*<sup>4</sup>, turning in ears on said portion *p* of the frog, and a brace for additionally connecting together the several parts of the plow-bottom, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES W. WARNER.

Witnesses:

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