3 Sheets--Sheet 1.

E. A. BEERS.

Gang-Plow.

No. 166,063. Patented July 27, 1875.

Fig. 1.

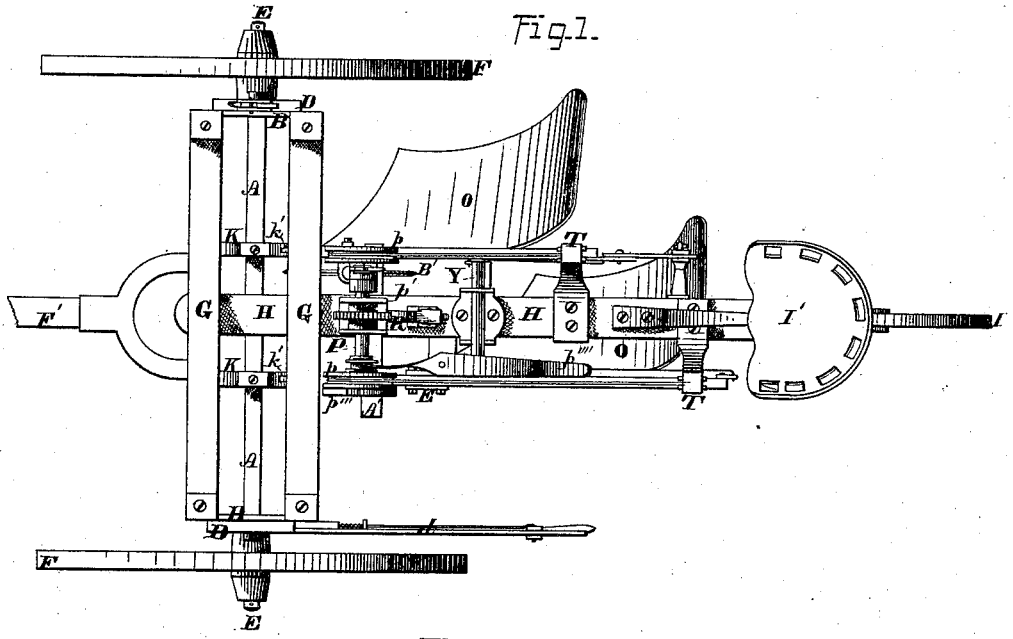
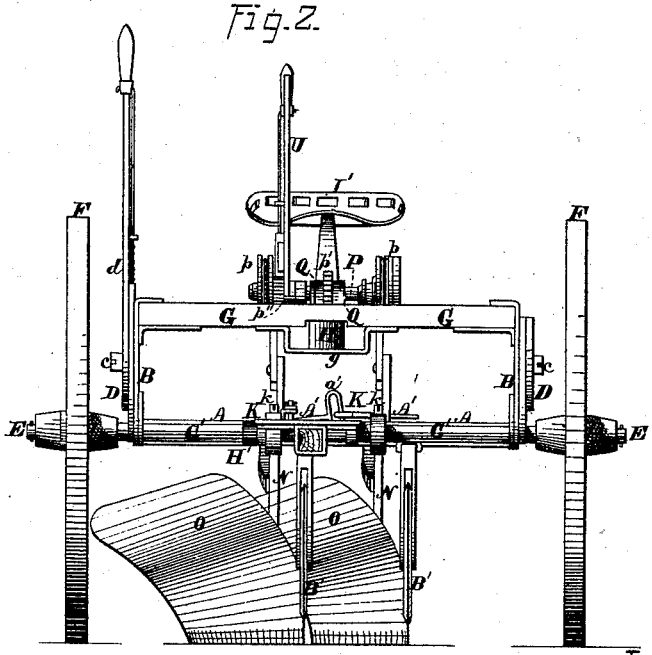


Fig. 2.



WITNESSES:
Jas. E. Hutchinson
John R. Young

INVENTOR.
Edwin A. Beers, by
Prindle & Lay his Attys

3 Sheets--Sheet 2.

E. A. BEERS.

Gang-Plow.

No. 166,063. Patented July 27, 1875.

Fig. 3.

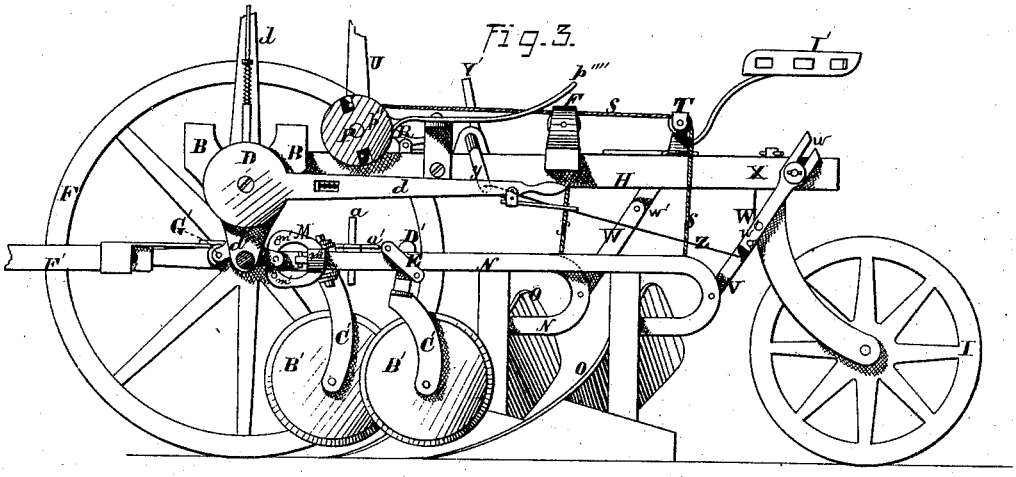


Fig. 4.

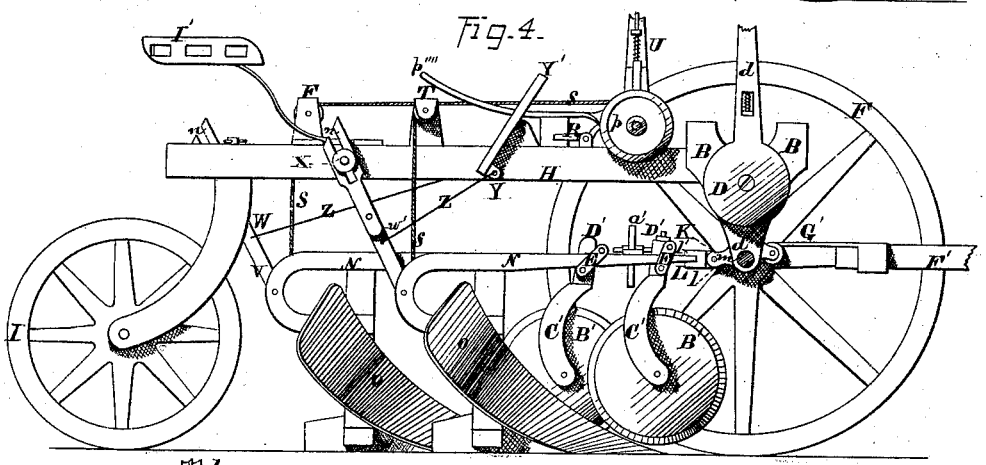
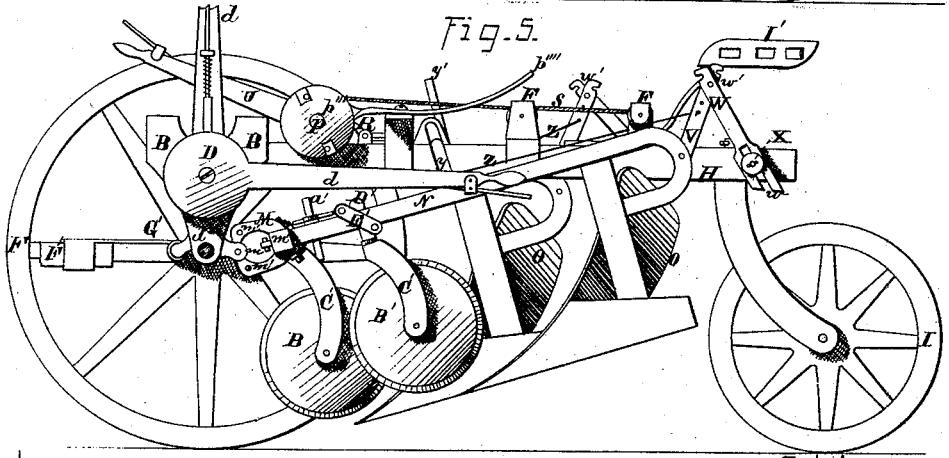


Fig. 5.



WITNESSES:
Jas. R. Hutchinson
John R. Young

INVENTOR.
Edwin A. Beers, by
Prindle & Dickie Attys

3 Sheets--Sheet 3.

E. A. BEERS.

Gang-Plow.

No. 166,063. Patented July 27, 1875.

Fig. 6.

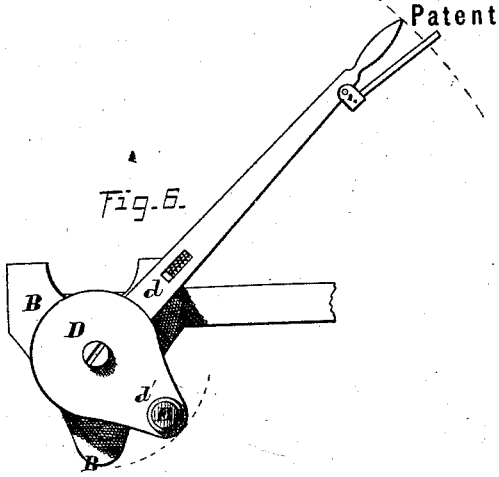


Fig. 7.

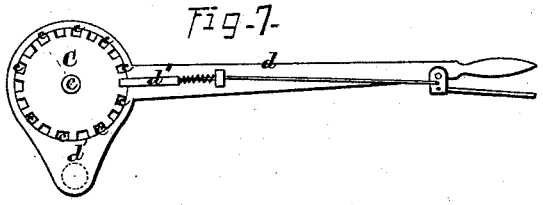


Fig. 8.

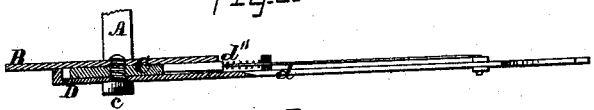


Fig. 9.

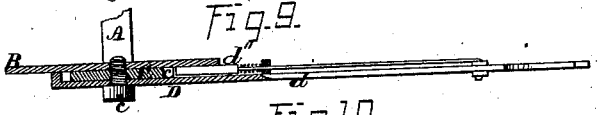


Fig 10

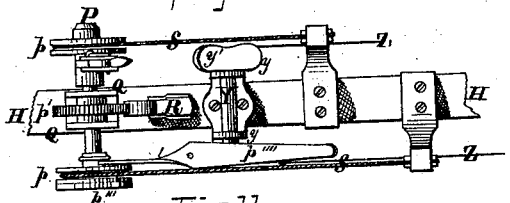
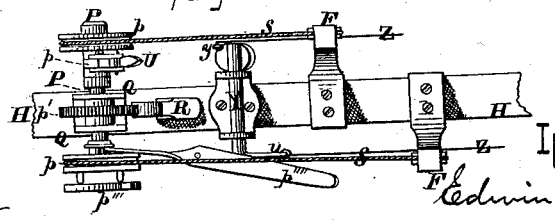


Fig 11.



WITNESSES=
Jas. E. Hutchinson
John R. Young

INVENTOR.
Edwin A. Beers, by
Prindle and Co. his Attys

UNITED STATES PATENT OFFICE.

EDWIN A. BEERS, OF DE KALB CENTRE, ILLINOIS.

IMPROVEMENT IN GANG-PLOWS.

Specification forming part of Letters Patent No. **166,063**, dated July 27, 1875; application filed June 17, 1875.

To all whom it may concern:

Be it known that I, EDWIN A. BEERS, of De Kalb Centre, in the county of De Kalb and in the State of Illinois, have invented certain new and useful Improvements on Gang-Plows; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan view of the upper side of my improved device. Fig. 2 is a front elevation of the same. Figs. 3 and 4 are elevations of opposite sides of said device, showing the plows in position for operation. Fig. 5 is a like view of the same with the plows raised so as to remove them from contact with the ground. Figs. 6 and 7 are elevations of the outer and inner sides, respectively, of one of the levers and crank-bearings for the forward bearing-wheel. Figs. 8 and 9 are longitudinal central sections of said levers, showing, respectively, the pawl released from and in engagement with the toothed locking-disk, and Figs. 10 and 11 are plan views of the upper side of the mechanism employed for moving the plows vertically, each view showing a differ position of parts.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement upon a similar machine for which Letters Patent No. 151,649 were issued to me upon the 2d day of June, 1874; and has for its object an increase in the efficiency, thoroughness, and ease of operation of the same, to which end it consists, principally, in the means employed for releasing the jointed bars used for holding the plows down to their work, substantially as and for the purpose hereinafter specified. It consists, further, in the means employed for insuring the relative lateral positions of the plow-beams, substantially as and for the purpose hereinafter shown.

In the annexed drawings, A represents the axle of my machine, constructed, preferably, of or from a square bar of iron, and having attached to each end a standard, B, that extends vertically upward and has attached to or upon its outer face a circular toothed disk, C, which latter is provided with a central stud, *c*, that projects horizontally and laterally outward, and furnishes a bearing for and upon which is journaled a plate, D. The plate D incloses the outer face and periphery of the disk C, and is provided with two radial arms, *d* and *d'*, which are either placed in a line with each other, as seen in Fig. 4, or at a right angle, as shown in Fig. 3, for reasons hereinafter explained. The first arm *d* has such length and proportions as to enable it to be used for a lever, while the second arm *d'* is provided with a laterally and horizontally projecting axle-arm, E, upon which is journaled a ground-wheel, F.

As thus arranged, it will be seen that, by moving the plate D upon its pivotal bearing, the relative vertical positions of the axle-arm E and wheel F will be varied, as may be desired, within the scope of motion allowed.

When adjusted to position the bearing of the wheel F is secured in place by means of a detent, *d''*, that works longitudinally within suitable bearings upon the lever-arm *d*, and engages with the notches or teeth *c'* and *c'* of the disk C. A spring for holding the detent in engagement with the toothed disk, and a hand-lever for releasing the former from engagement with the latter, are provided and operated in the usual manner. At the upper ends of the standards B and B are attached two bars, G and G, which have lines parallel to each other and to the axle A. Upon the lower side of the front bar G is pivoted one end of a rail, H, which from thence extends rearward through a guide, *g*, attached to or upon the lower side of the rear bar G, and upon its rear end is provided with and supported upon a caster-wheel, I, of usual construction, said rail, cross-bars, standards, and axle thus forming the frame of the machine.

Upon and around the axle A are loosely fitted two blocks, K and K, which are each provided with a central opening that corresponds to the transverse size and shape of the axle, and are secured in position thereon by means of set-screws *k* and *k* that pass inward through said blocks and bear against said axle. Within the rear extended portion of each sliding block K, is provided a vertical slot, *k'*, that receives the corresponding tongue

l of a second block, L, which tongue is pivoted within said slot, so as to permit it and its block to move vertically in either direction. Within the rear end of the block L is provided a horizontal slot, *l'*, that receives a clevis, M, of the form shown in Figs. 3, 4, and 5, said clevis being connected with said block by means of a pin, *m*, that passes horizontally through the latter, and through one of a number of openings, *m'*, provided in said clevis. At the rear end of each clevis M is provided a round socket, *m''*, that receives the corresponding shaped journal *n* of a plow-beam, N, which journal extends through said socket, and is secured in longitudinal position by means of a pin, *n'*, that passes transversely through its forward end. A set-screw passing radially through the wall of said socket bears at its inner end against said journal, and prevents the latter from turning.

It will be seen that the connection of the plow-beams with the axle gives to them perfect freedom of lateral and vertical motion, while by means of the swivel connection between each beam and its clevis the plow O attached to the rear end of said beam can be turned so as to throw the soil to a greater or less distance. Should a plow strike a root or other obstruction the set-screws will permit the beam to turn, so as to disengage said plow before the strain becomes sufficient to cause any of the parts to break.

The width of the furrow is regulated by the adjustment of the blocks K and K upon the axle, said blocks being capable of movement within the limits required by the widest and narrowest furrows.

The plows are raised when not in use by means of the following-described mechanism: A shaft, P, is journaled within suitable bearings Q and Q that are attached to or upon the upper side of the rail H, and is provided at each end with a grooved wheel, *p*, and at its center with a toothed wheel, *p'*, with the latter of which a spring-pawl, R, is caused to engage. To each wheel *p* is attached one end of a chain, S, that from thence extends rearward over a pulley, T, journaled within a suitable support attached to the rail H, and has its opposite end attached to or upon a plow-beam, N, at or near the longitudinal center of the plow O.

As thus arranged, it will be seen that, by rotating the shaft P the chains S and S will be wound upon, or unwound from, the wheels *p* and *p*, and the plow-beams and plows correspondingly raised or lowered. The shaft P is turned forward, so as to raise the plows, by means of a lever, U, that is pivoted thereon, and is provided with a suitable detent, that engages with corresponding teeth that are formed upon the periphery of a wheel, *p''*, while to lower said plows it is only requisite that the detent R should be released from engagement with the ratchet-wheel *p'* by a slight pressure of the operator's foot.

To hold the plows in vertical position when in the ground, I pivot loosely to the rear end of either or both plow-beams N a short bar, V, within the rear end of which I swivel one end of a second bar, W, the opposite end of which latter is provided with an open slot, *w*, that enables it to pass over a stud or pin, X, that projects laterally outward from the rear end of the rail H, the length of said slot being such as to cause its inner end to bear upon said pin when said plow is in the desired position, and resist, in a direct line, the upward pressure of the latter. A head upon the outer end of the stud X holds the slotted bar W in lateral position.

In order that the bar W may offer no obstacle to the elevation of the plow, when necessary, a knuckle-joint, *w'*, formed at its longitudinal center, permits said bar to fold together, and assume the position shown in Fig. 5. The weight of the brace-bar W is sufficient to keep its joint in position when the plows are in use; and when it is necessary to raise the latter, said jointed center must be raised until its pivotal bearing is thrown out of line with the ends. To effect this result, I journal transversely upon the upper side of the rail H a shaft, Y, and upon each end of the latter provide an arm, *y*, that, when in its normal position, extends downward in nearly a vertical line. From the end of each of said arms *y* and *y* a rod, Z, extends rearward, and is connected with the corresponding bar W at or near its knuckle-joint *w'*. If, now, the shaft Y is turned so as to throw the ends of its arms *y* and *y'* forward, the jointed bars W and W will be thrown out of line, so as to enable the plows to be raised; or, if said bars are already out of line, they may be restored to their normal position by turning said shaft in an opposite direction. A foot-lever, *y'*, secured to, and extending upward and downward from, one end of the shaft Y, enables the same to be operated by the foot of the driver.

In order that the plows may be secured in relative lateral position, and at the same time may have freedom of motion vertically, a bar, A', is secured to or upon the upper side of each beam N, and, extending laterally inward, is provided with a loop, *a'*, which is arranged in a line at a right angle to said bar, and engages with a corresponding loop, *a'*, of the opposite bar A'. The loops *a'* and *a'* have each a length equal to the motion of its plow-beam N, and, being arranged at a right angle to each other, permit either vertical or longitudinal motion of said beams.

For some purposes it may be found advantageous to arrange the plows so as that either one or both may be raised at one time.

This result is effected by journaling one of the grooved wheels *p* loosely upon the shaft P, and causing a sliding clutch, *p'''*, to engage said wheel whenever it is desired to connect the same with said shaft. A lever, *p''''*, suit-

ably pivoted upon the frame, and having its forward forked end in engagement with the clutch p''', and its rear end within reach of the driver's foot, affords a convenient means whereby said clutch may be manipulated.

As thus arranged, it will be seen that when the plows are raised by releasing the clutch p''', the plow upon the corresponding side will be released, and permitted to drop to the ground, without change of the position of the opposite plow.

In front of each plow O I place a rolling colter, B′, which is pivoted within a standard, C′, and the latter journaled like a caster-frame within a vertical bar, D′. The bar D′ is connected with the beam N by means of a clamp, E′, that encircles both parts, and enables the angle of said bar to be varied at will.

It will be noticed that the bearing-wheels are journaled in such manner as to enable each to be thrown in front or in rear of the axle, by which means each wheel may be caused to center near the point of its plow, and the latter caused to run at an equal depth, whatever the character of the surface of the ground.

In use, the right-hand wheel is thrown forward and the left-hand wheel in rear of the axle, such variations in their relative height being produced as to cause the machine to run horizontally while said left-hand wheel is in a furrow and said right-hand wheel is upon the unplowed ground.

The pole F′ is pivoted at its rear (divided end) to or upon a rod, G′, that is secured at its ends within suitable lugs, which extend forward from the lower ends of the standards B and B, said rod being parallel with the axle A.

The length of the rod G′ between its end bearings is much greater than the width of the rear end of the pole, so that the latter may be adjusted in either direction as much as may be requisite in order to vary the line of draft.

When adjusted to place, the pole is secured in lateral position by means of two collars, H′ and H′, that are placed upon opposite sides of the ends of said pole, and are held in place by suitable set-screws.

A seat, I′, attached to the rail H, completes the machine, the operation and advantages of which have been sufficiently set forth.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In combination with the jointed bars W and W, the shaft Y, provided with the arms y and y, and foot-lever y', and connected to or with said bars by means of the rods Z and Z, substantially as and for the purpose specified.

2. In combination with the plow-beams N and N, the bars A′ and A′, secured to or upon said beams, and provided at their inner ends with the interlocking loops a' and a', substantially as and for the purpose shown.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of June, 1875.

EDWIN A. BEERS.

Witnesses:
JOHN C. GARNER,
HENRY H. WAGNER.