J. B. BARTHOLOMEW.

GANG PLOW.

APPLICATION FILED MAY 15, 1913. RENEWED OCT. 12, 1916.

1,227,237.

Patented May 22, 1917.

4 SHEETS—SHEET 1.

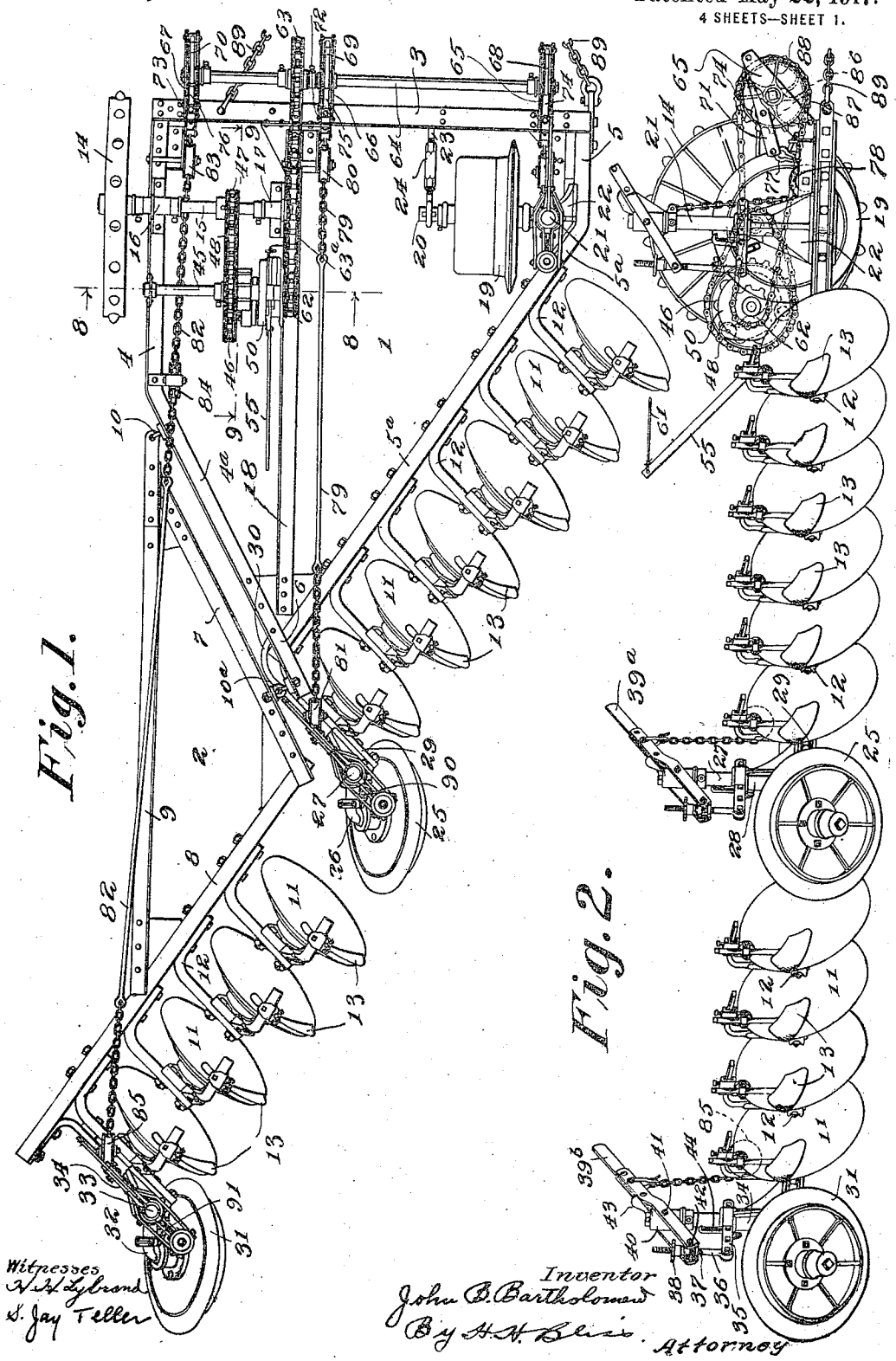


Fig. 1.

Fig. 2.

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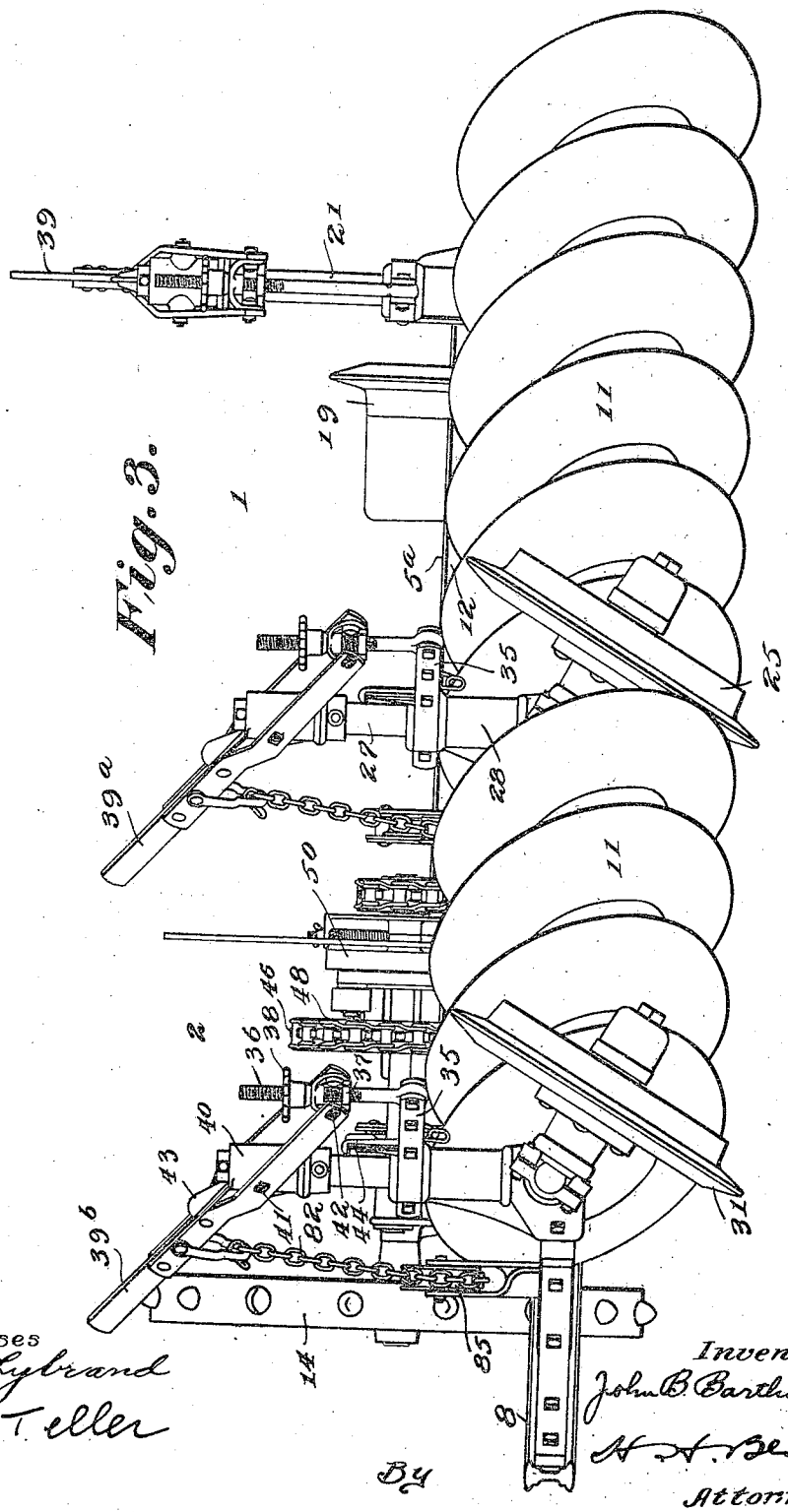
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 4.

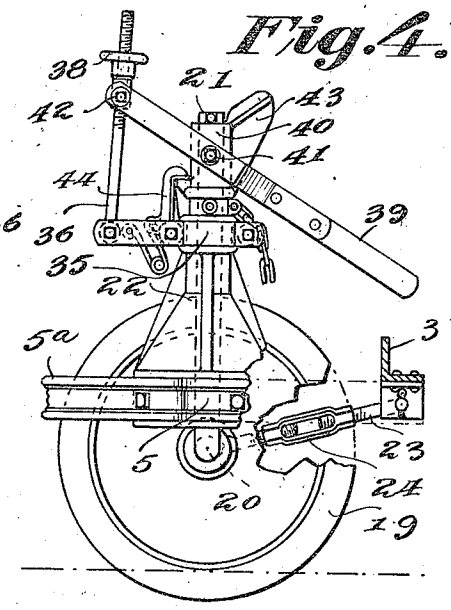


Fig. 5.

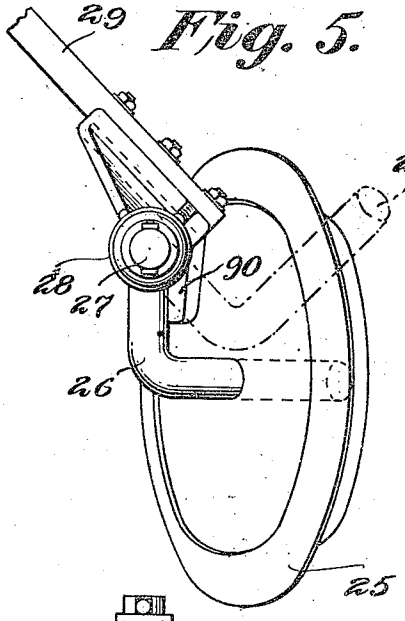


Fig. 6.

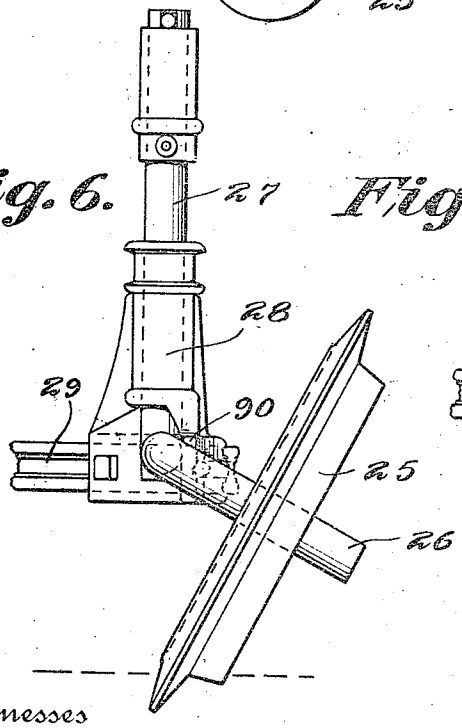
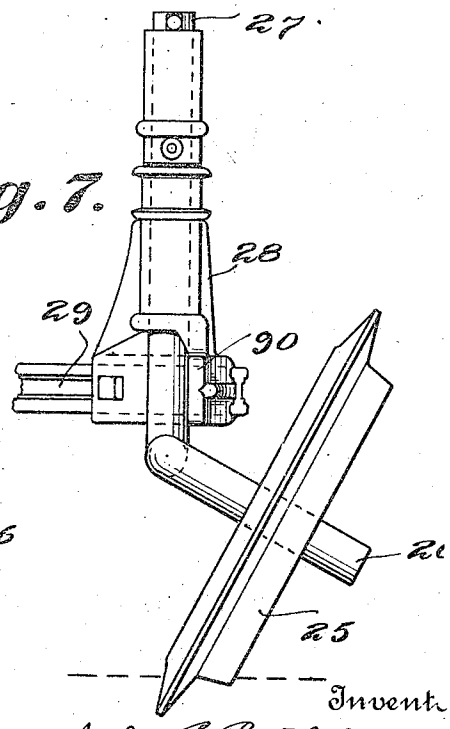


Fig. 7.



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Patented May 22, 1917.

4 SHEETS—SHEET 4.

Fig. 9.

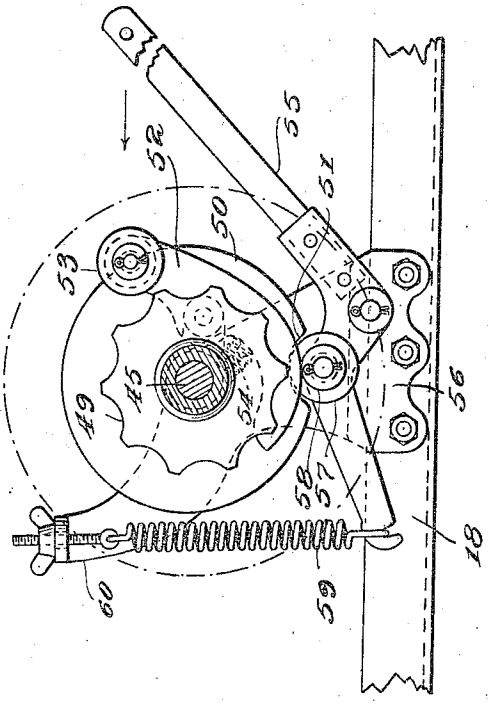


Fig. 8.

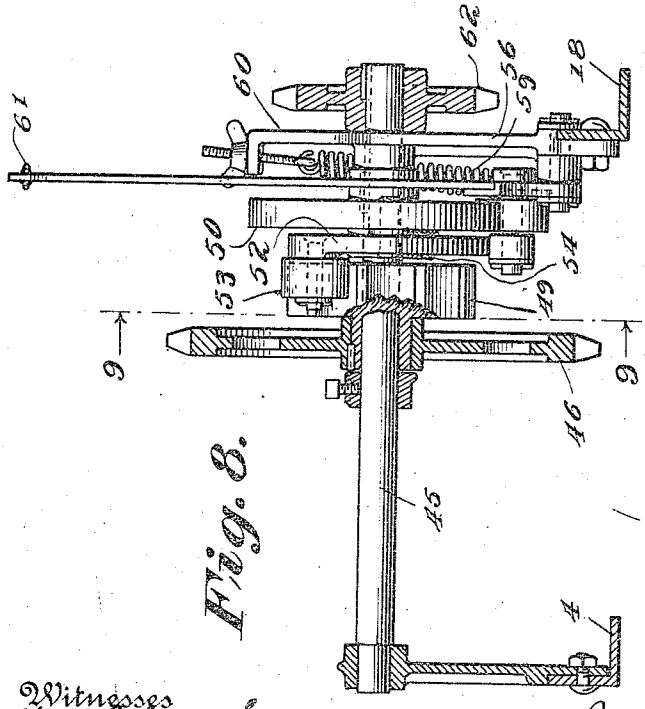
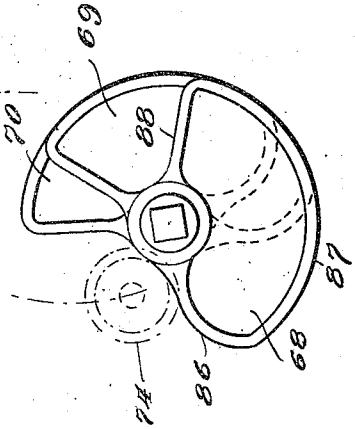


Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN B. BARTHOLOMEW, OF PEORIA, ILLINOIS, ASSIGNOR TO AVERY COMPANY, OF PEORIA, ILLINOIS, A CORPORATION OF ILLINOIS.

GANG-PLOW.

1,227,237. Specification of Letters Patent. Patented May 22, 1917.

Application filed May 15, 1913, Serial No. 767,923. Renewed October 12, 1916. Serial No. 125,288.

To all whom it may concern:

Be it known that I, JOHN B. BARTHOLOMEW, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Gang-Plows, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in gang plows and especially to improvements in gang plows in which the furrow forming elements are disks. It will be understood, however, that my invention is not necessarily so limited.

One of the objects of the invention is to provide a plow of this character which is especially well adapted for following and plowing at an even depth, ground which is more or less uneven and rolling in character. Another object is to provide improved means whereby the furrow forming elements may be lifted out of plowing positions and whereby this lifting of the furrow forming elements may be effected successively, beginning with those at the rear end. The invention further contemplates the effecting of the lifting automatically and by means of power. Other objects will be apparent from the following specification and claims.

In the accompanying drawings I have shown the embodiment of my invention which I now deem preferable. It will be understood, however, that numerous changes and modifications may be made.

Of the drawings:

Figure 1 is a plan view of the entire plow.

Fig. 2 is a side elevation.

Fig. 3 is a rear elevation.

Fig. 4 is a fragmentary side view partly in section of the forward righthand supporting wheel and associated parts.

Fig. 5 is a fragmentary diagrammatic plan view of one of the rear supporting wheels and associated parts.

Fig. 6 is a fragmentary diagrammatic rear elevation of the parts shown in Fig. 5 with the frame in normal operative position.

Fig. 7 is a view similar to Fig. 6, but showing the frame in elevated position.

Fig. 8 is a fragmentary sectional view taken along the lines 8—8 of Fig. 1.

Fig. 9 is a fragmentary sectional view taken along lines 9—9 of Figs. 1 and 8.

Fig. 10 is a fragmentary diagrammatic view of the lifting cams taken from the righthand side of the machine.

Referring to the drawings, it will be noted that the main frame as shown, comprises two principal parts, 1 and 2. As to the details of these frame parts, there may be variations but in the construction shown, the forward part, 1, comprises a front cross-bar 3, and the side bars 4 and 5. The side-bar 4 extends rearward throughout a part of its length and is then bent inward to form the diagonal member 4^a. The side-bar 5 extends rearward for a short distance and is then bent inward to form the diagonal element 5^a. The rear ends of the diagonal elements 4^a are joined at 6.

The rear frame section 2 comprises a forward member 7 which is diagonally positioned parallel to the diagonal element 4^a of the front frame. The frame section 2 also has a diagonal element 8 which is connected at its forward end to the rear end of the element 7 and which is positioned parallel to the element 5^a of the front frame. A strut or brace 9, connects the forward end of the element 7 with the rear part of the element 8.

The two frame sections are flexibly connected together by means of hinge devices at 10 and 10^a.

While I have shown in the drawings but two frame sections, it will be understood that a larger number of sections may be used if found desirable. The manner of constructing and connecting such additional frame sections will be readily apparent.

Rigidly secured to the diagonal rear edge elements 5^a and 8 of the frame sections 1 and 2, are plowing or furrow forming elements 11—11. As shown, these plowing elements are rotatable disks which are connected to the frame parts by means of brackets 12—12. The disks can be connected to the brackets in any well-known or preferred manner and as this feature of the mechanism forms no part of my present invention, detailed description can be omitted. As shown, the disks 11—11 are provided with scrapers 13—13, but as to this feature also, there can be variation. In fact, so far as certain features of my invention are concerned, the disks may be omitted entirely and plowing elements of the moldboard type substituted.

For supporting the forward corner of the front frame section, which is opposite to the plowing elements, I provide a ground wheel 14 rigidly secured to a rotatable shaft 15. This shaft 15 is mounted in a bearing 16, secured to the frame member 4 and in a bearing 17, secured to a supplementary frame member 18, which extends from the front member 3 rearward to the point of connection between the members 4^a and 5^a. For supporting the opposite forward corner of the front frame section, I provide a ground wheel 19, which is loosely mounted on the axle 20. The axle 20 is connected with the vertical spindle 21, which is vertically slidable in a bearing aperture in a pedestal 22, secured to the frame element 5. Mechanism is provided for moving the spindle 21, together with the axle 20 and the wheel 19, vertically with respect to the bracket. This mechanism will be hereinafter described in detail. For preventing the axle 20 and the wheel 19 from swinging about the axis of the spindle 21, I provide the link or strut 23, which can be adjusted in length by means of the turn-buckle 24. In this way the axle 20 can be moved and the angle of the wheel, with respect to the line of draft, can be varied as desired.

For supporting the rear part of the front frame section, I provide the third ground wheel 25, which is positioned at an angle to the vertical and so located that it is adapted to travel in the furrow formed by the last disk on the front frame section. This wheel 25, is mounted on an axle 26 which is connected to the vertical spindle 27. This spindle 27 is slidable in a vertical bearing aperture in a pedestal 28, which is secured to the frame by means of the bracket 29. In the form shown, this bracket 29 is an extension of the bracket 12 for the rear disk. As to this feature, there can be variation. Preferably the bracket 29 is reinforced by the bar indicated at 30. The spindle 27 together with the axle 26 and the wheel 25, can be moved vertically with respect to the frame by means of mechanism similar to that for the spindle 21. This mechanism will be described later.

The forward parts of the rear frame section 2 are supported by means of the hinges 10 and 10^a which connect them to the front frame section. The rear part of the rear frame section is supported by means of a ground wheel 31, which is mounted by means of an axle 32 and a spindle 33, similar respectively to the parts 26 and 27. The spindle 33 is mounted in a pedestal 34 which is similar to the pedestal 28 and is similarly secured to the frame section. The wheel 31 can be moved vertically with respect to the frame section by mechanism to be described.

Secured to each of the pedestals 22, 28 and 34, is a horizontally extending arm 35 to which is pivotally connected the lower end of a threaded rod 36. 37 is a yoke which is slidable on the rod 36 and which can be adjusted by means of the threaded hand wheel 38. 39 is a lever which is bifurcated at its rear end and embraces the sleeve 40 secured to the upper end of the spindle. The lever is pivoted to the sleeve at 41. The rear end of the lever is pivoted at 42 to the yoke 37 and a lug 43 on the sleeve 40 serves to limit the movement of the lever in one direction. From the foregoing description it will be obvious that the downward movement of the forward end of the lever will cause a corresponding downward movement of the spindle and of the wheel and axle with respect to the pedestal. However, as the wheel is in contact with the ground the result will be a lifting of the pedestal and of the adjacent frame parts with respect to the wheel. The relative positions of the wheel and of the frame parts can be adjusted by means of the hand wheel 38. For holding the pedestal and frame parts in lifted positions, I provide a spring held latch 44 which is adapted to engage a suitable lug on the sleeve 40. Each latch 44 is held by its spring either in operative or inoperative position as desired by the operator. When it is desired to hold the disks in elevated position the latches are manually thrown into their operative positions.

The controlling lever for the front wheel 19 is indicated as before noted, by 39. The lever for the middle wheel 25 is indicated by 39^a. The lever for the rear wheel 31 is indicated by 39^b. These levers can be operated manually by the plowman but I prefer to also provide means whereby the levers can be moved automatically by power and moved successively. As to the details of this lifting mechanism, there can be wide variation but for the purpose of illustration, I have shown a mechanism which is in many respects similar to that shown and described in my earlier co-pending application for gang plows, Serial No. 671,955, filed January 18, 1912.

Referring in detail to the lifting mechanism 45 is a short jack shaft parallel to the shaft 15, upon which the ground wheel 14 is mounted. Loosely mounted on the jack shaft 45 is a sprocket wheel 46 in line with a sprocket wheel 47 on the shaft 15. A chain 48 passes over these two wheels. Secured to the sprocket wheel 46 is a notched or serrated disk 49 and adjacent this disk and keyed to the shaft 45 is a large circular disk 50 formed at one point in its periphery with a rounded notch 51. A dog 52 is pivotally mounted on the disk 50. The head of the dog carries a laterally extending roller 53 arranged to engage with the notched periphery of the disk 49, and a spring 54 which is interposed between the hub of the disk 49

and the dog 52, tends to press the roller 53 into engagement with the disk 49. A lever 55 is pivotally mounted on the bearing bracket 56 beneath the disk 49 and carries a roller 57 adapted to ride upon the periphery of said disk. The lever also carries the roller 58 which is disposed in the plane of the dog 52. 59 is a coil spring interposed between the end of the lever 55 and an extension 60 of the bearing bracket 56 and tends to press the roller 57 radially inward against the disk 50. The upper end of the lever 55 has connected to it a rope or cord 61, which extends forward to some convenient point within the reach of the operator.

By referring to Fig. 8 it will be seen that when the roller 57 lies within the notch 51 in the disk 50 the roller 58 is in position to engage the rounded back or tail of the dog 52 and swings the dog on its pivot so that the roller 53 is withdrawn from engagement with the continuously rotating notched disk 49. If now the driver pulls on the rope 61 to swing the upper end of the lever 55 forward, the rollers 57 and 58 will be swung downward and the spring 54 will expand and cause the dog 52 to swing the roller 53 into engagement with the rotating disk 49. In this way a driving connection is effected between the disk 49 and the disk 50 so that the rotation of the former is transmitted to the latter.

The rotation of the disk 50 causes the notch 51 to be immediately moved away from the roller 57 so that when the rope 61 is released by the driver and the spring 59 tends to return the lever 55 to its initial position, such a return is prevented by the engagement of the roller 57 with the circular periphery of the disk 50. But as the disk 50 nears the end of its revolution the roller 57 rides suddenly into the notch 51 under the action of the spring 59 and in this movement the roller 58 is caused to strike the tail of the dog 52 and to cause the disengagement of the roller 53 from the disk 49.

Thus, by a simple pull upon the cord 61, the rotation of the disk 50 is started and at the end of a single revolution is automatically stopped. Connected to the disk 50 and to the shaft 45 is a sprocket wheel 62 which is in line with a sprocket wheel 63 on a transverse shaft 64 at the forward end of the frame. 63^a is a chain passing over the sprocket wheels 62 and 63. This shaft 64 is mounted in suitable bearings secured to the brackets 65, 66 and 67 mounted on the front member 3 of the frame. The ratio between the diameters of the sprocket wheels 62 and 63 is such that the shaft 64 is given a half revolution for every complete revolution of the shaft 45. Each of the brackets 65, 66 and 67, is formed in two parts and between the parts of the several brackets there are mounted cams 68, 69 and 70. Pivoted to the forward outer ends of the brackets 65, 66 and 67 are levers 71, 72 and 73 which carry rollers 74, 75 and 76 adapted to engage respectively with the cams 68, 69 and 70. Connected to the rear end of the lever 71 is a chain 77 which extends over a suitable pulley 78 and is connected to the spindle 21. A chain 79 is connected to the rear end of the lever 72. This chain extends over suitable pulleys 80 and 81 and is connected to the lever 39^a for the wheel 25. A chain 82, is connected to the rear end of the lever 73. This chain extends over suitable pulleys 83 and 84 and 85 and is connected to the lever 39^b for the rear wheel 31.

Each of the cams, 68, 69 and 70, is formed with an active lifting portion 86, an inactive sustaining portion 87 and an inactive dropping portion 88. It will therefore be clear that as each cam rotates it engages the corresponding roller to swing the corresponding lever and move the corresponding wheel downward with respect to the frame. After the movement of the lever is once effected the lever will be held in lifted position during the next succeeding part of the rotation of the cam. Upon further rotation of the cam the lever will be released and permitted to return to the lower position as shown in Fig. 2.

The cams 68, 69 and 70 are angularly spaced on the shaft so that during rotation the cam 68 first comes into action then the cam 69 and finally the cam 70. It will be understood from the foregoing description that the shaft 64 is rotated through a half revolution at each actuation of the clutch. During one half-revolution the active parts of the cams are brought into engagement with the rollers and the three wheels 19, 25 and 31 are moved successively to cause a successive lift of the adjacent parts of the frame and of the adjacent plowing elements. At the end of the first half-revolution the rollers are still engaged by the cams and the frame parts and plowing elements are maintained in lifted positions. During the next half-revolution the cams successively disengage the rollers and permit the levers to move and release the frame parts and plowing elements and permit them to return successively to plowing positions.

The plow as a whole can be hauled in any approved manner as by means of a suitable tractor or traction engine. Chains 89—89 are provided for the hauling of the plow. To facilitate the turning of the plow as a whole at the ends of the furrows or at the corners of a field, the wheels 25 and 31 are so mounted that they can swing laterally when the frame sections are in lifted positions. It will be noted that lugs 90 and 91 are provided which serve to hold the wheels against swinging when the frame sections

are in plowing position. However, these lugs disengage the wheels when the frame sections are lifted and free movement of the wheels is therefore possible.

As before pointed out the wheel 19 can be adjusted angularly so as to tend to a greater or less extent to move the plow laterally and to hold the plowing elements up to their work.

What I claim is:—

1. In a gang plow, the combination of a frame having a diagonally disposed rear edge part, a plurality of furrow forming elements fixedly connected to the said rear edge part of the frame in a diagonally disposed series, movably connected wheels at the ends of the said series for supporting the rear edge parts of the frame, means for supporting the opposite forward parts of the frame, and power actuated means acting automatically to move the said wheels successively downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground.

2. In a gang plow, the combination of a frame having a diagonally disposed rear edge part, a plurality of furrow forming elements fixedly connected to the said rear edge part of the frame in a diagonally disposed series, movably connected wheels at the ends of the said series for supporting the rear edge parts of the frame, means for supporting the opposite forward parts of the frame, and power actuated means for successively moving the wheels downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground and for successively releasing the said wheels from the frame parts to permit the said parts to return to plowing positions.

3. In a gang plow, the combination of a frame having a diagonally disposed rear edge part, a plurality of furrow forming elements fixedly connected to the said rear edge part of the frame in a diagonally disposed series, movably connected wheels at the ends of the said series for supporting the rear edge parts of the frame, a ground wheel for supporting the opposite forward parts of the said frame, and means connected with the said forward ground wheel for successively moving the other wheels downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground.

4. In a gang plow, the combination of a plurality of frame sections flexibly connected together and each having a diagonally disposed rear edge part, a plurality of groups of furrow forming elements, the elements of each group being fixedly connected in a diagonally disposed series to the rear edge part of one section, wheels for supporting the rear edge part of the frame sections, the said wheels being positioned respectively at the ends of the said groups of furrow forming elements, means for supporting the opposite forward parts of the said frame sections, and power actuated means acting automatically to move the said wheels successively downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground.

5. In a gang plow, the combination of a plurality of frame sections flexibly connected together and each having a diagonally disposed rear edge part, a plurality of groups of furrow forming elements, the elements of each group being fixedly connected in a diagonally disposed series to the rear edge part of one section, wheels for supporting the rear edge part of the frame sections, the said wheels being positioned respectively at the ends of the said groups of furrow forming elements, means for supporting the opposite forward parts of the said frame sections, and power actuated means for successively moving the wheels downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground and for successively releasing the said wheels from the frame parts to permit the said parts to return to plowing positions.

6. In a gang plow, the combination of a plurality of frame sections flexibly connected together and each having a diagonally disposed rear edge part, a plurality of groups of furrow forming elements, the elements of each group being fixedly connected in a diagonally disposed series to the rear edge part of one section, wheels for supporting the rear edge part of the frame sections, the said wheels being positioned respectively at the ends of the said groups of furrow forming elements, a ground wheel for supporting the opposite forward parts of the said frame sections, and means connected with the said forward ground wheel for successively moving the wheels downward with respect to the adjacent frame parts whereby the said parts are lifted with respect to the ground.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN B. BARTHOLOMEW.

Witnesses:

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F. A. Gundlach.