(No Model.)

3 Sheets—Sheet 1.

A. W. BUTT.

CULTIVATOR.

No. 491,797. Patented Feb. 14, 1893.

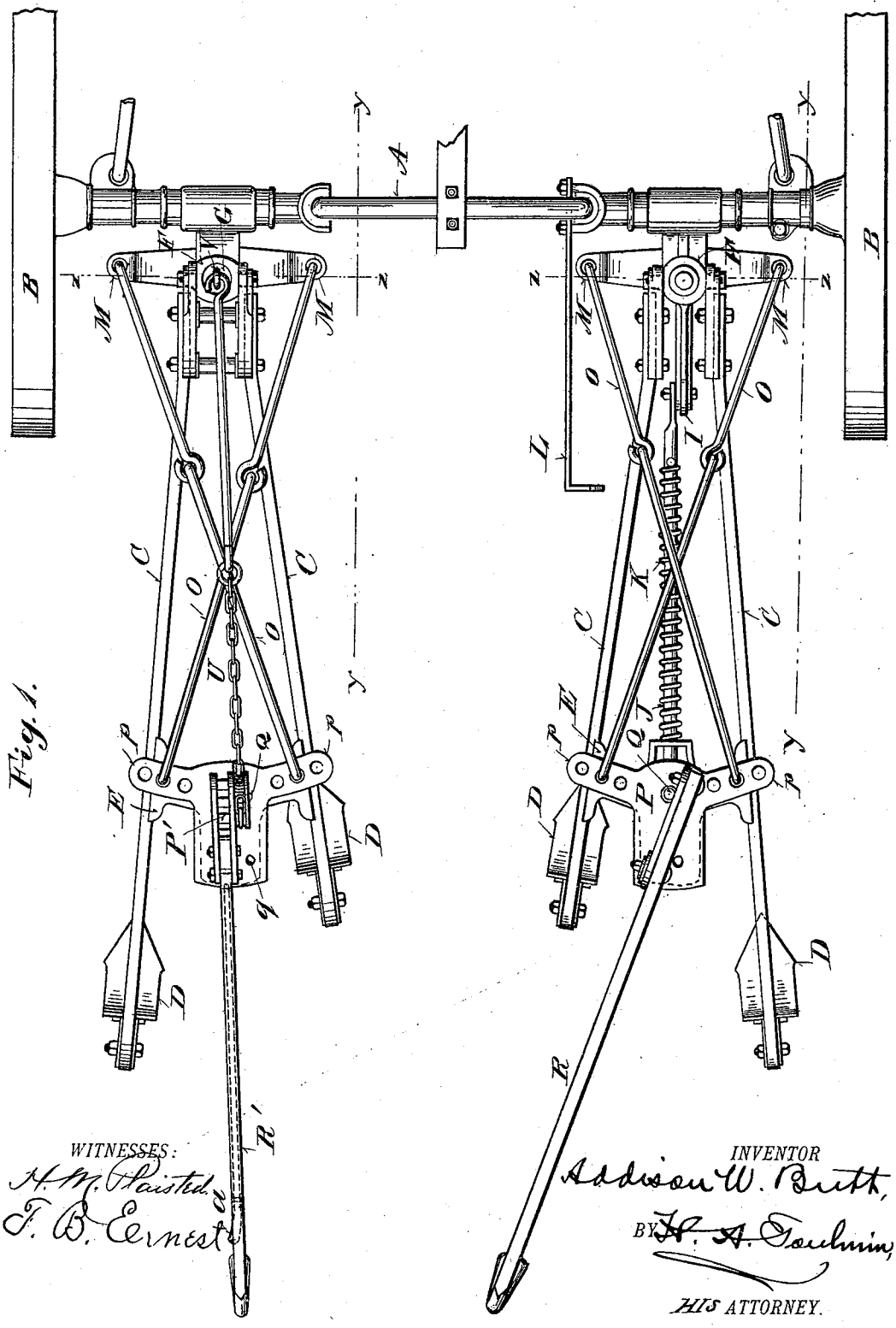

Fig. 1.

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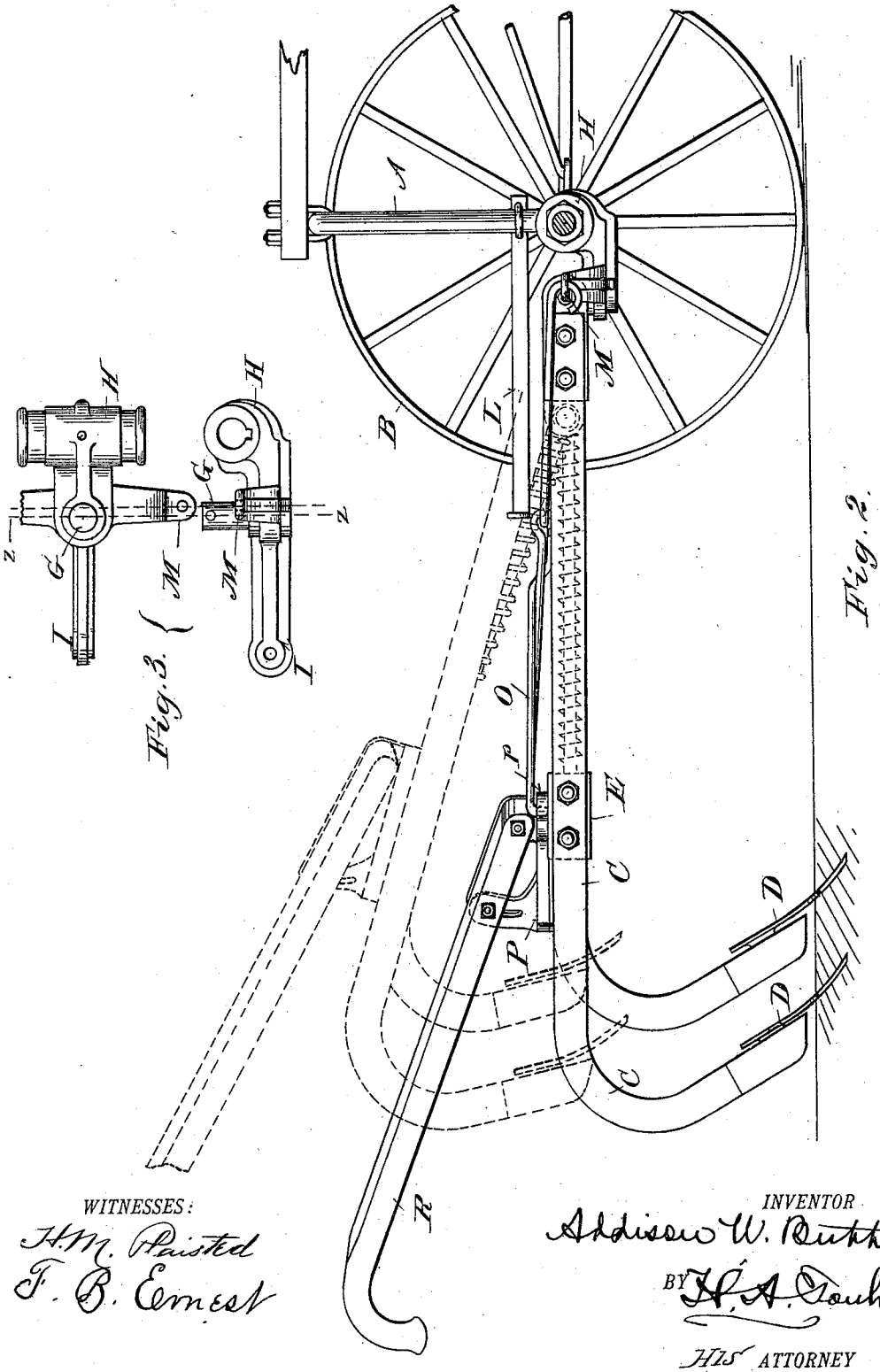

Fig. 2.

Fig. 3.

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(No Model.) 3 Sheets—Sheet 3.

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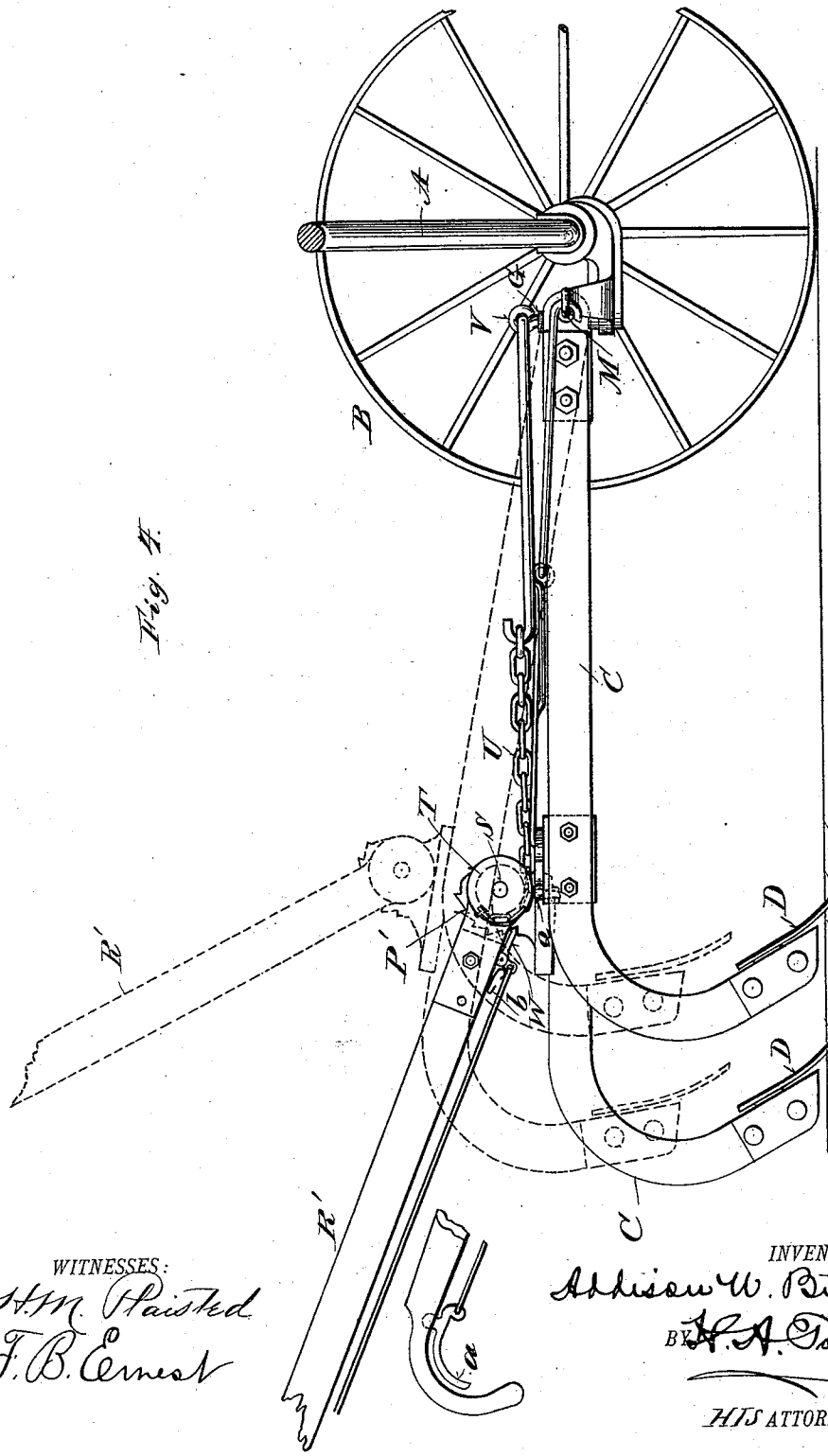

Fig. 4.

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UNITED STATES PATENT OFFICE.

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CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 491,797, dated February 14, 1893.

Application filed July 30, 1892. Serial No. 441,667. (No model.)

To all whom it may concern:

Be it known that I, ADDISON W. BUTT, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Cultivators, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to certain new and useful improvements in cultivators, and consists in the arrangement and construction of parts for securing leverage in operating the beams of the cultivator up and down and sidewise, the peculiarities and advantages of which will be hereinafter fully described and particularly pointed out and claimed.

In the accompanying drawings on which like reference letters indicate corresponding parts: Figure 1, represents a plan view of the rear of a cultivator having my improvements attached thereto: Fig. 2, a side view of one of the beams taken on the line *x x* of Fig. 1: Fig. 3, detail, plan and side views of a beam support and attaching horn; and Fig. 4, a side view of the other beam taken on the line *y y* Fig. 1.

In the operation of a cultivator, it is often difficult to move the hoes sidewise and out of the ground, when deeply buried therein. In any event the amount of force necessarily applied to the handles of the beam is considerable, rendering it difficult of operation in many cases by persons of ordinary strength.

It is the object of the present improvements, to so diminish the operative force applied to the handles of the beams, that the same effect and operation of the hoes may be secured with a minimum amount of exertion on the part of the operator, whereby a boy may be employed to run the cultivator with the same facility that a man could operate one of the ordinary type not supplied by my improvements. I have illustrated one construction, however, whereby my object is attained, and in the accompanying drawings the letter A designates the axle or arch of a cultivator supported by the carrying wheels B and provided with the ordinary attachments for securing a horse or other draft animal thereto. In order to facilitate the understanding and construction of my improvements, I have shown one beam with the means for securing leverage in guiding, and the other beam with the means for securing leverage in lifting together with the lever guide mechanism. I will first describe the lever guide mechanism.

Referring to Figs. 1 and 2, the beam branches C C carrying the hoes *d d* are braced by a cross bracket E, and pivoted at their forward ends to a stud collar F on a stud G carried by a pipe box H, shown and in detail in Fig. 3. A backward extension I, affords a pivotal point of support for a spring rod J carrying a spring K which acts in the usual manner to assist the raising of the beam, by extending itself when the beam is raised toward the dotted position in Fig. 2. The hook-bar L supports the beam when thus raised in the ordinary style. In the application of my improvements to this beam I provide horns or points of attachment M, preferably extending from the pipe box H, as shown in Figs. 1, 2 and 3, to which are attached rods O, or other connections, between said horns and a movable plate P pivoted at Q to the bracket E, and provided with the usual handle R for manipulating the beams. In the ordinary form this handle is fixed to the beam. In my form the handle is rotatable on its pivot Q, and provided with extensions P to which said rods or connections O, from horns M, are attached as shown in Figs. 1 and 2. These rods are crossed and the handle R together with the plate, P, constitutes a double lever fulcrumed at Q, to the rods O from said lever to the point of attachment at the horns M, effect a swinging or guiding action of the beam when the handle R is moved sidewise. The rods being crossed and suitably adjusted, will allow the beam to swing to its center G, at the same time the handle R moves about its fulcrum Q. The leverage obtained may be varied by adjusting the rods O in the holes shown in the extensions *p*. This leverage is increased the nearer the attachment of the rods or connections is made to the center pivot Q, since the leverage is proportional to the length of the handle R and the distance of the attachment of the rod from the center pivot Q which is the fulcrum of the double armed lever. This leverage has been ascer-

tained to be, in the size of lever tested, as fifty pounds is to ten pounds; this force or obstruction of fifty pounds at the hoe, can be moved by a pressure of ten pounds at the end of the handle R. Ordinarily, with the handle fixed to the beam, the moving force would be about thirty pounds under the same circumstances and conditions. This represents an amount of labor saved in the constant operation of guiding the beam, which can be readily appreciated. Not only does it render the guiding of the hoes easier, but it allows of the operation of the same by one who would otherwise be of insufficient strength, whereby a boy can do the work of a man with my improvements and much easier. By the adjustment of the connections in the plate extensions *p*, the leverage may be adapted to the requirements or desire of the operator. The swinging of the handles to produce the same movement of the hoes, is easier, the nearer the attachment of the connections O is made to the pivot Q.

The horns M from the pipe box H present points of attachment which should be in the line *z* through the axis of the stud G, as indicated in Fig. 3 when in the preferred construction. The forward ends of the guide-rod connections O, may, however, be otherwise attached, such as to some other part of the pipe-box or frame, if so desired; and the horns themselves may project from other portions of the frame than the pipe-box, to the required position or point of attachment. I do not limit myself therefore to any particular construction or arrangement in this portion of my device but claim it broadly.

While rods or links have been shown as forming the connection between the double armed lever and the horns, it is evident that chains may be similarly employed; also while the action of the handle R is to pull on the links O, a single link or straight bar may be employed as a connection in place of the crossed rods, and a pull and push transmitted through the bar connection to the horn or point of attachment. It will be observed that the point of attachment provided by the horn M is at one side, or eccentric to the vertical axis of the stud G. If it be on the stud G it is concentric with the axis thereof, no rotative effect would be given to the plate P; the farther the said pivot is located from said axis, thus the greater the eccentricity, the greater rotative effect it will have on the plate P, under the same circumstances. As above remarked, however, the leverage depends on the ratio of the length of the handle R and the distance of the rear end of the connection, from the fulcrum pivot Q. Thus it will be seen that a great advantage in guiding the hoes is secured by this construction and arrangement of parts. If from any cause, however, it be desired to fix the handle R, so that it may operate the beam in the usual way, the plate P may be readily coupled to the bracket by inserting a bolt or pin in a hole *q* matching a similar hole or recess in the bracket E, thereby fixing the handle as in the ordinary construction. This may be done in case of breakage or from any other cause.

In the operation of the cultivator between and around the hills of corn, the hoes are constantly guided from one side to the other, in and out, and up and down, to avoid rooting out the corn. I have described the operation of the lever guide and will now proceed to describe a lever lift, whereby the same easy raising of the beam is secured as the sidewise operation thereof.

Referring to Figs. 1 and 4 of the drawings, it will be seen that the beam-branches, on that side of the frame, are shown without the lifting spring and rod. In place of this ordinary device, I provide a lever handle R′ which is pivoted at S, to the plate P, to allow of the vertical movement of the handle. Attached to the lower end of the handle is a segment or disk T, grooved, or otherwise adapted to engage with a chain U, or other flexible connection, the other end of which is attached to some fixed point, such as an eye-bolt V, in the top of the stud G. The beam can thus swing laterally without changing the length of the connection U. The eye bolt V or other piece to which the forward end of the connection U is attached, may be supported from some other part of the frame than the stud G, but the point of attachment should lie in the axis of the stud. The lower end of the handle R′ is bifurcated or otherwise adapted to embrace a ratchet segment P′ of the plate P, and a pawl W operated by a finger catch near the upper end of the handle, is kept in engagement with said ratchet by a spring *b*. By lifting the handle R′ the pawl will engage with the corresponding ratchet tooth, and the segment or disk T, will wind up the chain thereon, thus shortening the connection and lifting the beam and hoes. The leverage obtained enables this to be done very easily, on account of the ratio between the length of the handle R′, and the radius of the segment T. The pivotal point of the plate P should be directly below the axis of the pivot S, whereby the movement of the handle R′ side-wise will not influence the connection U. This connection may be partly flexible and partly rigid, as by the chain and link shown, or it may be otherwise constructed. It will be observed that the lateral movement of the handle R′ is effected by the construction previously described and applied to the other beam, and that the lifting action and side-wise motion may both be accomplished independently of each other, as well as in conjunction; a universal movable action of the beam is thus secured which action is rendered very easy on account of the leverage obtained by the construction above described. By practical operation and tests, it has been found that this lever lift gives more than twice the effect of the power applied to the handle. Thus no material ob-

struction is exerted by the earth on the hoes, either to the vertical motion or the sidewise movement of the same. In order to support the hoes out of the ground, it is only necessary to raise the handle R′, when the ratchet W will support the same automatically at the desired point of elevation. Furthermore if it be desired to take but a slight cut or cultivate to a certain depth in the ground it is only necessary to adjust the hoes to that depth, and then swing them sidewise as may be desired. They will therefore operate back and forth in a certain plane without going deeper or above said plane unless the handle be raised. This function is not possessed by the other or ordinary style of mounting the beam. It will be seen that the supporting hook L is therefore unnecessary. The hoes in their elevated position are shown in Fig. 4 dotted.

It will be observed that the lever lift may be operated with or without the lever guide mechanism. And that when the plate P is prevented from swinging by the insertion of a pin or bolt in the hole *q* the lifting mechanism is unaffected by this stoppage of the guiding mechanism. Also it will be observed that while each is independent of the other, both may be operated in combination and without interfering. For this reason it is preferred that the points of attachment of the connections O, that is the outer ends of the horns M, should lie substantially in the horizontal axis on which the beam moves vertically. This is shown in Fig. 4 in which the center of the horizontal axis is seen to coincide with, or pass through, the points M when the beam is in its normal position as shown. The connections O are never shortened or lengthened by the up and down motion of the beam. This is quite essential to the perfect operation of the device and I lay claim specially thereto.

It will be seen from Figs. 2 and 4 that the plate P pivoted to the swinging beam, the ends M of the horns, and the pivot G of the swinging beam, are located substantially in the same common level plane. The advantage of this is that the stress on the plate P in rotating it is exerted in one plane, without a tendency to twist the beam on the axis G of the swinging pivot. In other forms of beam in which the force applied to the handle pivot tends to tip the beam under the resistance of the hoes in moving from side to side, the vertical axis of the beam with the frame, requires to be of considerable length in order to resist said twisting tendency. With my device, however, the stress acts so readily in one common plane that the vertical axis of the beam does not require to be of such extreme length as in the other forms mentioned. This is of great advantage in the manufacture, operation and use of the machine. The hoes when traveling laterally, thus tend to maintain their proper inclination instead of canting or tipping from side to side as the beam is thus swung.

In the right hand gang, Fig. 1, only the lever guide improvements are shown applied to the cultivator, while an ordinary lifting spring is employed. In the left hand gang, however, the lever lift improvements are shown as well as the lever guide mechanism before described, thus combining the guide and lift constructions and giving facility of operation to the gang both laterally and vertically. Thus it will be seen that the lever guide or the lever lift may either be used independently of the other, or both may be combined in operating the same gang; also both gangs may be similarly or may be differently fitted out, with either a part or all of the above described improvements and thus secure either a portion or all of the corresponding advantages incident to such improvements.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is:

1. In a cultivator, the combination with a frame, and a horizontally swinging beam pivoted thereto, of a plate pivotally attached to said beam and rotated horizontally, a handle secured to said plate, and a rigid connection from a fixed portion of the frame to some portion of the plate, the point of attachment being adjustable at different distances from the axis of the plate, whereby the leverage over the beam in operating the handle may be adjusted to different ratios.

2. In a cultivator, the combination with a frame and a swinging beam pivoted thereto on a vertical axis, of a plate pivoted to said beam and having holes at various distances from the pivot, and on either side thereof, a crossed connection between said plate and fixed points of the machine, and means to rotate said plate, whereby the adjustable leverage is obtained on said beam.

3. In a cultivator, the combination with a frame having a pipe-box mounted thereon provided with a vertical stud, and lateral extending horns adjacent to the stud, of a swinging beam mounted on said stud, a lever pivoted to said beam and having lateral extensions on each side of the pivot, and a crossed connection between said extensions and said horns for the purpose described.

4. The herein described pipe-box, the same consisting of a sleeve mounted on the frame and provided with a vertical stud and lateral extending horns adjacent thereto.

5. In a cultivator the hereindescribed pipe-box, the same consisting of a sleeve adapted to be mounted on the frame, and provided with a vertical stud for the cultivator beam, and with lateral extensions affording points of attachment lying in a plane passing substantially through the axis of the stud.

6. In a cultivator, the combination with the frame of a vertically swinging beam pivoted thereto, of a lever consisting of a winding

segment pivotally connected to said beam, a flexible connection between said segment and a fixed point of the machine, and means to rotate said segment to wind up said connection and lift said beam.

7. In a cultivator, the combination with the frame and a vertically swinging beam, of a lever handle pivoted to said beam on a horizontal axis and rising to lift the beam, a ratchet segment adjacent thereto, a stop pawl carried by said handle and engaging with said ratchet, a disk or winding segment on said lever handle, and a flexible connection between said disk or winding segment and a fixed point on the machine for the purpose described.

8. In a cultivator, the combination with the frame and a vertically and horizontally swinging beam connected therewith, of a plate pivoted to said beam on a vertical axis and having a ratchet segment, a handle pivoted to said segment and adapted to be maintained in its adjusted position thereon, when operating vertically and to oscillate said plate horizontally, an operative connection between said plate and a point on the machine in line with the horizontal axis of the beam, and an operative connection between said lever handle and a point in line with the vertical axis of the beam, for the purpose described.

9. In a cultivator, the combination with the frame and a vertically and horizontally swinging beam pivoted thereto, of a plate pivoted to said beam on a vertical axis, a handle pivoted to said plate on a horizontal axis and adapted to oscillate the plate as well as move vertically, and connections between the frame and said plate and handle respectively, whereby the operation of the handle will effect a swinging of the beam in any direction.

10. In a cultivator, the combination with the frame, and cultivator beam, and a pipe-box mounted on the frame and provided with a vertical and lateral extension adjacent thereto, of a stud collar fitting over said stud and constituting a horizontal beam pivot, an oscillating plate pivoted to the beam on a vertical axis and having various points of attachment at equal distances from the pivot thereof, a crossed connection between said plate and the lateral extensions of the pipe-box, a lever handle pivoted to said plate on a horizontal axis and adapted to oscillate the plate, and a connection between said lever handle and the vertical stud of the pipe-box substantially as and for the purpose described.

11. In a cultivator, the combination with the frame and a horizontally swinging beam pivoted thereto, consisting of branches carrying hoes, and connecting brackets between said branches, of an oscillating plate pivoted to said bracket and operative connections between said plate and frame, the said bracket and plate being provided with matching holes or recesses whereby the same may be interlocked and the oscillation of the plate itself prevented.

12. In a cultivator, the combination with a swinging beam pivoted thereto and having hoes, of a plate pivoted to said beam, a connection at one side of the pivot of the plate, from said plate to a fixed point on the machine, the said connection lying in substantially the same plane as the point to which the swinging beam is pivoted, and means to oscillate said plate, whereby the strain on the beam in swinging from side to side acts practically on the same level and without tendency to twist the beam on the pivot point of the machine.

13. In a cultivator, the combination, with a frame and a horizontally swinging beam, of a lever handle mounted on a pivot carried by the beam, and a connection, running from the handle to the frame, on which the handle acts, when moved laterally on its pivot, to swing the beam sidewise.

14. In a cultivator, the combination with a frame and a vertically swinging beam connected thereto, of a lever handle carried by the beam and operating a segment or winding-surface, and a connection attached to the frame and adapted to be shortened by being wound on said segment or surface, and thereby lift the beam.

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

ADDISON W. BUTT.

Witnesses:

OLIVER H. MILLER,

H. M. PLAISTED.