

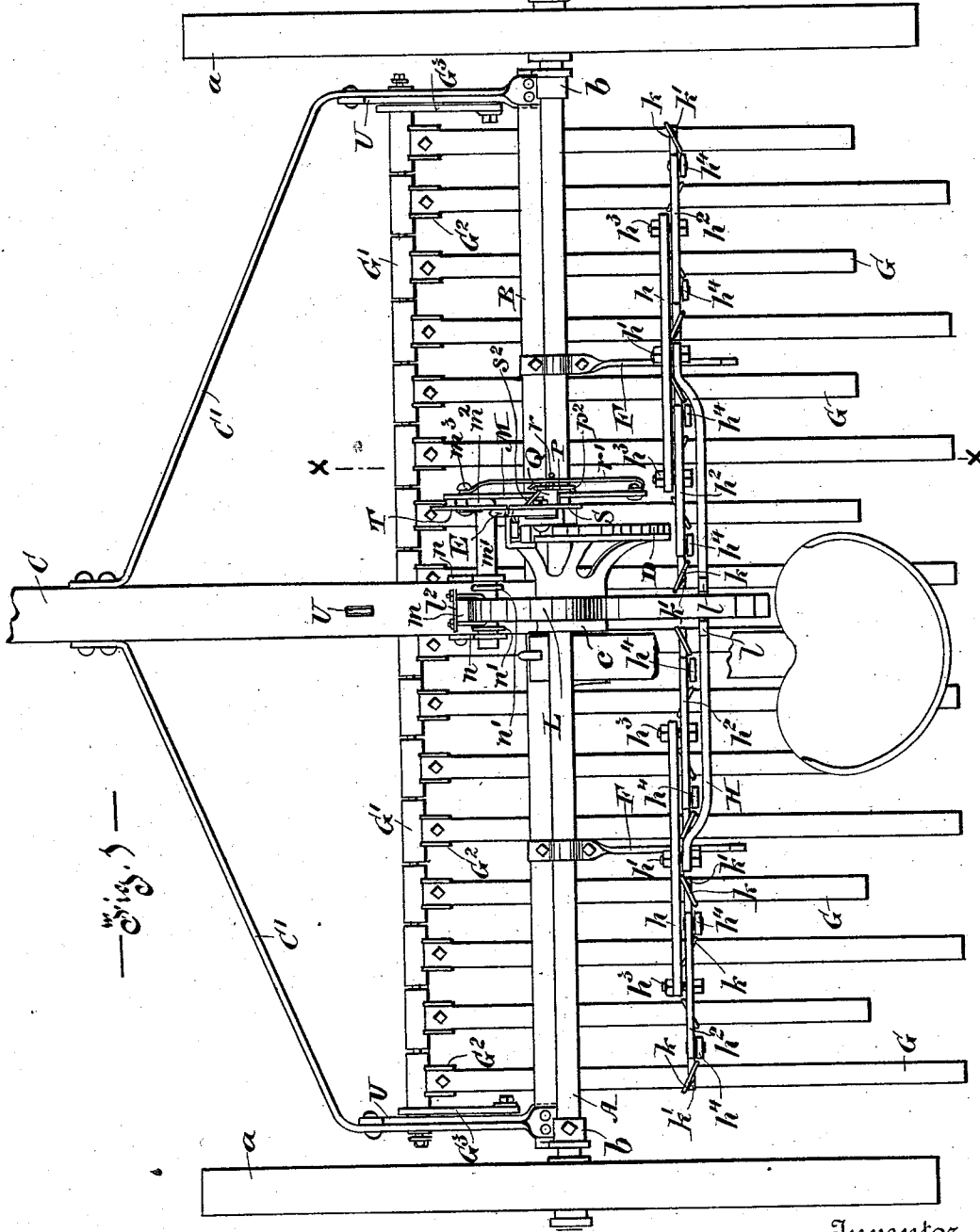
(No Model.)

3 Sheets—Sheet 1.

T. BELAIR.
CULTIVATOR.

No. 531,252.

Patented Dec. 18, 1894.



Witnesses
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Inventor
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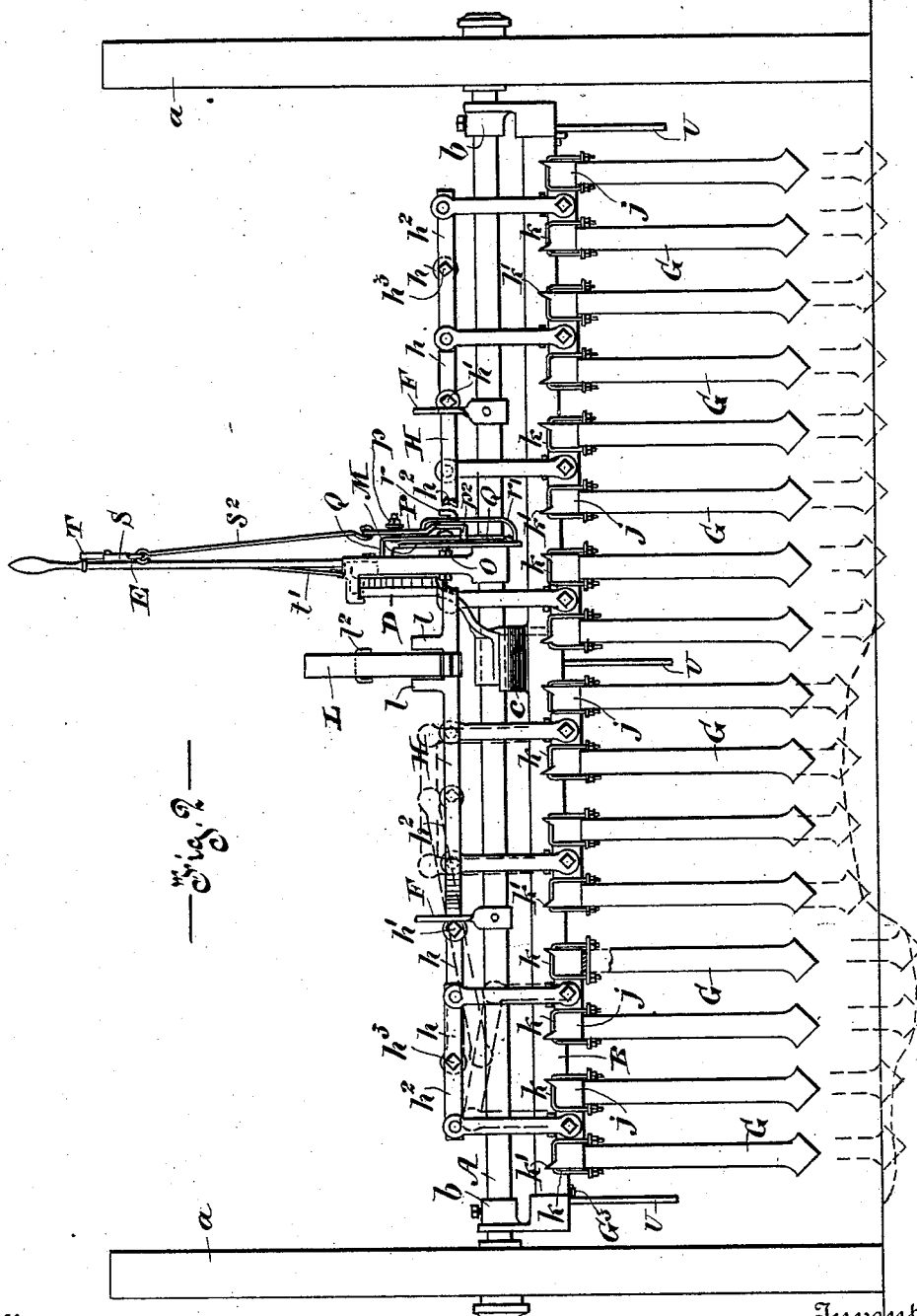
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3 Sheets—Sheet 2.

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Witnesses

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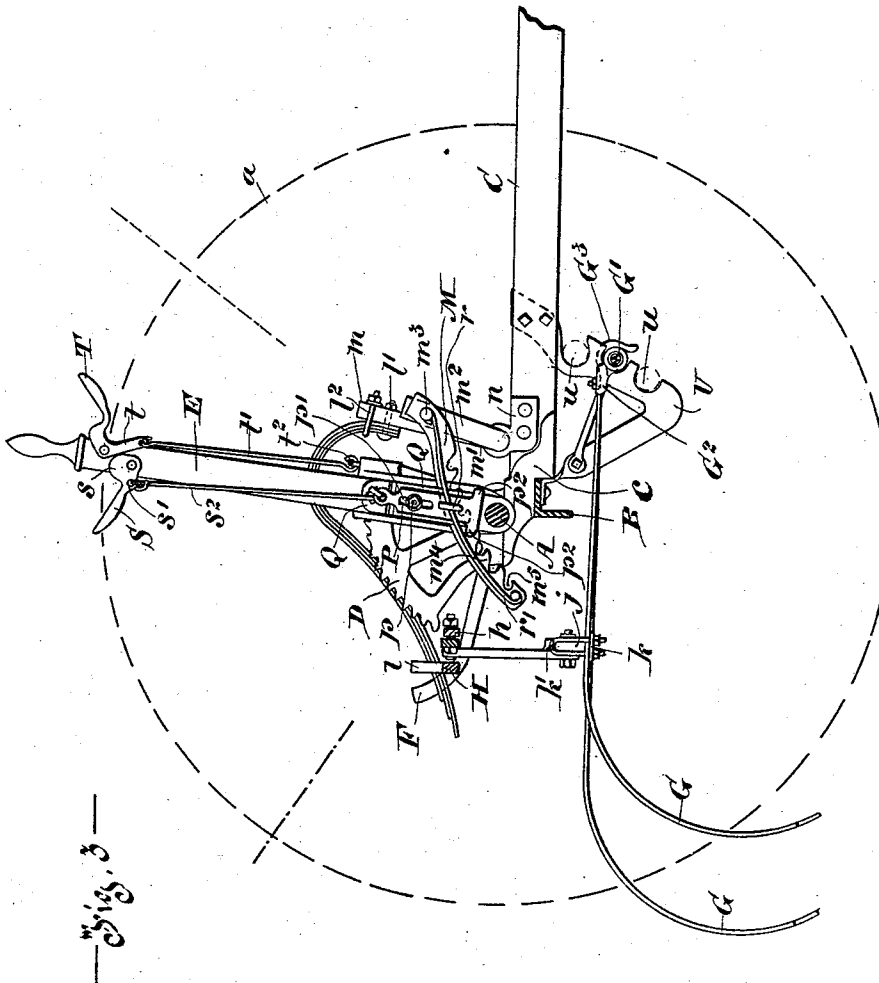
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T. BELAIR.
CULTIVATOR.

3 Sheets—Sheet 3.

No. 531,252.

Patented Dec. 18, 1894.



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UNITED STATES PATENT OFFICE.

THOMAS BELAIR, OF MONTREAL, CANADA.

CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 531,252, dated December 18, 1894.

Application filed January 2, 1894. Serial No. 495,466. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BELAIR, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Cultivators; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to the means used for imparting downward pressure to the fingers, the mechanism for regulating such pressure and means for adjusting the pitch of the fingers in order to change their working angle relatively to the ground.

The object of the invention is to simplify and render more effective the parts just mentioned and to these ends the invention may be said to consist, firstly, in substituting for the usual series of individually operating springs acting upon each finger or a section comprising a small number of them, a single spring arranged to exert its force upon an intermediate pressure distributor and carrier for the fingers, constructed substantially on the principle of the whiffle-tree which has the effect of distributing the force of the spring to every finger and of maintaining the pressure upon the fingers whatever their position may be owing to unevenness of the ground; secondly, in combining with the usual lever for raising and lowering such fingers and with the pressure spring just mentioned, of mechanism for regulating the pressure of such spring, and, thirdly, in providing a graduated bearing or holder for the shaft to which the fingers are attached in order to allow of the adjustment of the working angle of such fingers.

For full comprehension however of the invention, reference must be had to the annexed drawings, forming a part of this specification, in which like symbols indicate corresponding parts, and wherein—

Figure 1 is a plan view of a cultivator embodying my invention; Fig. 2, a rear elevation of same, partly broken away, and Fig. 3 a vertical section of same on line *xx* Fig. 1.

A is the usual axle of the cultivator and *a a* the ground wheels.

B is the frame piece or angle as usual extending the full width of the cultivator between the wheels, and localized or held in

place as usual by the collars *b b* set in place on the axle A.

C is the tongue of the machine also secured in the usual manner by means of the connecting shoe or socket piece *c*, carried by the frame piece B, receiving the inner end of the tongue and furnishing an eye or sleeve through which the axle A passes, C' being the usual braces between the tongue C and frame piece B.

D is the usual ratchet toothed segment projecting up from the connecting shoe piece *c*, being either cast in one with or bolted to same and serving as part of the mechanism for locking the operating lever E in different positions as formerly. This operating lever E is rigidly mounted as usual upon the axle A and the lifting arms F F for raising the fingers G are also rigidly set upon such axle and in particular positions for purposes hereinafter mentioned.

Instead of the midway supports and series of spring pressure devices connected with the frame piece *c* as previously, I use the mechanism now to be described: I construct what may be properly termed a whiffle-tree intermediate pressure distributor and carrier device in that it comprises a central horizontal main bar H, two secondary horizontal bars *h h* pivoted at their centers by bolts *h'* to the extremities of the main bar, and four horizontal tertiary bars *h² h³* in turn pivoted at their centers by bolts *h³* to the secondary bars. These tertiary bars in turn support at their extremities vertically hanging links *h⁴* having their upper ends loosely pivoted to such extremities while to their lower ends are rigidly connected, horizontal cross-bars *j* midway of their length. On each of these cross bars are hung two shackles or clips *k* preferably of the yoke and bar construction, suitable projections *k'* on the upper corners of the bars holding them in place, and these clips pass under each of the fingers G which are thus held between the bottom edges of the cross bars and the lower sides of the clips. The main bar H rests on top of the lifting arms F F which are arranged in such positions on either side of the center of the machine as to be located practically beneath the extremities of such main bar (which it is desired shall be located centrally of the machine)

and as near the pivot points of the secondary bars h h as possible in order to avoid any interference with the vertical oscillation of the inner ends of such bars in a downward direction. Thus far a midway support or carrier for the fingers G which is not connected with the frame piece in any way has been described and this arrangement, as will be readily apparent, allows the spring pressure or downwardly impelling force for the fingers to be concentrated and applied at a single point, viz., the center of the main bar H with the result that a much simpler construction is possible, a better distribution of the spring pressure secured and the ready regulation of that pressure insured.

As a pressure device I prefer to use a leaf spring L , composed of a sufficient number of leaves, and having its outer free end bearing centrally of the upper surface of the main bar H between localizing lugs l l cast thereon, while its inner end is secured by bolt l' and clamp l^2 to an upwardly projecting arm m from a rock shaft m' which also carries a second arm m^2 and is loosely mounted in bearing plates n n bolted on the sides of the tongue C , staples n' n' fitting over it and driven into the upper side of the tongue acting as an extra security for holding it in place.

I will now describe the means for regulating the pressure of the spring device just described:—The arm m^2 has loosely pivoted at m^3 to its side a curved bar M having a lower edge formed with what may appropriately be termed saw teeth m^4 furnishing notches m^5 to engage a pin or bolt O projecting from the side of the lever E near its lower end which pin normally supports and holds such curved bar at any point along its length that may be found necessary in order to increase or diminish the degree of pressure exerted by the spring device, an increase being secured by diminishing the distance between the pin and the pivot point m^3 of the curved bar M and a diminishment by the reverse action, the position of the parts shown in Fig. 3 being that required for little more than an ordinary degree.

In order to change the position of the bar M , a slide P is carried by the lever E and arranged to work on the outside of a shield or plate Q secured to the side of the lever and bent to afford a space between it and the side of the lever for such bar M to work through, as shown in Fig. 2, the slide P being localized by means of a bolt p passing through a slot p' in the slide screwed into the shield Q and furnished with a retaining nut on its outer end, and the lugs p^2 at the lower end of the slide turned over to bear upon the side edges of the shield. This slide carries on its outer face a hooked finger r that bears under a rod extension r' corresponding in length to the curved bar and which is secured at each end to same, being bent to pass on the outside of

the slide P so as to be engaged by such hooked finger r at any point along its length.

Just below the handle portion of lever E are pivoted two thumb or finger levers S T as shown in Fig. 3 the former of which has an eccentric or cam-shaped body portion s and an eye s' to allow of the attachment to it of a connecting rod s^2 extending up from an eye in the top end of the slide P whereby such slide is operated.

The lever T is of bell crank form and pivoted in such a position relatively to the lever S that the one t of its arms will be in contact with the cam portion s thereof and thereby render it possible to operate both levers simultaneously by drawing inward the lever S . An eye is formed in the end of the arm t of lever T to receive the upper end of a connecting rod t' the lower end of which is connected to the usual spring operated locking piece l^2 carried by the lever E and adapted to engage the toothed segment D in the usual manner.

The reasons for forming the lever S so as to operate the lever T simultaneously with it are, to save time in regulating the spring pressure and for convenience since it would be well nigh impossible with one hand to readily operate both levers independently or reach for the lever T while holding in the lever S as will be readily apparent.

In order that the working angle of the fingers G relatively to the ground may be varied to suit different conditions of the earth, I use the depending bracket frames U preferably in V-form having the end of one leg bolted to the frame piece B and the end of the other leg of the central one, by means of a slot to the inside of the tongue C while the other legs of the outer bracket frames are bolted to the braces C' . In the front side of the forward legs any desired number of notches u are made to form a graduated holder for the shaft or frame bar G' to which the bases or inner ends of the fingers G are connected in the usual way by sockets G^2 , three of such notches being shown in this case and the bar being located in the middle one.

Any suitable catch such as the pivoted hook G^3 is used to prevent accidental displacement of the bar G' from the notch in which it may be placed.

The operation of the machine is as follows: The spring L in its normal position does not exert any pressure upon bar H . To lower the fingers to the ground so that they will work without any additional pressure than their own weight as would be the case when working soft ground the lever E must be thrown back as usual, the distance required to lower the lifting arms F F carrying such fingers, through axle A , till they (the fingers) rest on the ground, the lever being first disengaged from the toothed segment D by raising locking piece a^2 through the operation of lever T and the curved bar M raised from and there-

fore disengaged from pin O through the operation of lever S, the two levers S and T being, in this case, operated simultaneously, through the cam portion s of lever S, by lever S.

To work ground of a slight degree of hardness and where very little spring pressure on the fingers will be required besides their own weight, it will be necessary after having commenced to lower the fingers as above described to release lever S when lever E has reached the position shown in chain line in Fig. 3. By releasing lever S curved bar M will be allowed to engage pin O through which the lever E will by drawing arm m^2 of rock shaft m' , cause spring L to bear upon the main bar H and through it and its auxiliary bars, be distributed as before described over all the fingers.

To work very hard ground it will be necessary to operate only lever T (as the formation of the teeth of curved bar M will allow the pin O to travel over them in a forward direction without registering) then push lever E forward to the position shown by dotted line Fig. 3, when the extreme forward notch of curved bar M will engage with pin O and the shortest distance be established between lever E and the rock shaft m' . Lever E is then thrown back till the last tooth in segment D is reached when on lever T being released lever E will hold rock-shaft m' in such a position as will give full pressure of spring L to the fingers.

To raise the fingers in any case it will be only necessary to operate lever S which will (as before described) release lever E from curved segment B and through its cam portion s, operate lever T to raise and disengage curved rod M from pin O and therefore allow lever E to be thrown into its normal forward position (shown in full lines in Fig. 3) thereby through axle A and arms F F lifting the fingers from the ground. To change the working angle of these fingers G the hook G^3 is raised and the bar G' lifted out of the notch in the brackets U in which it may have been placed and located in either of the other notches.

What I claim is as follows:

1. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting framing, the combination with same, of an intermediate pressure distributor, connected with said fingers and adapted to receive a depressing force at a single point and to distribute and maintain it upon each finger, with a leaf spring and a movable carrier for same to furnish such depressing force.

2. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting framing, the combination with same, of an intermediate pressure distributor composed of a series of equalizing bars including a main bar to receive the depressing force at a single point, and bars con-

nected with said fingers, the device adapted to distribute the depressing force received by its main bar to and maintain it upon each finger, with a leaf spring and a movable carrier for same to furnish such depressing force.

3. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting framing, the combination with same, of an intermediate pressure distributor of substantially whiffle-tree construction connected with said fingers, a leaf spring and a movable carrier for same, located centrally of the machine and exerting a depressing force upon the pressure distributor for the purpose set forth.

4. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting frame pieces, the combination with same of an intermediate pressure distributor connected with said fingers, a spring pressure device located centrally of the machine and exerting a depressing force upon the pressure distributor and means for regulating the degree of such depressing force for the purpose set forth.

5. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting frame pieces, the combination with same, of the intermediate pressure distributor comprising a main stationary bar and movable bars pivoted to the stationary bar; connections between the movable bars and said fingers and a spring pressure device located centrally of the machine and exerting a depressing force upon the main stationary bar of the distributor.

6. In a cultivator or like implement having a series of depressible working fingers, and suitable supporting frame pieces, the combination with same of the intermediate pressure distributor, comprising a main stationary bar and movable bars pivoted to the stationary bar; connections between the movable bars and said fingers and a spring pressure device located centrally of the machine and exerting a depressing force upon the main stationary bar of the distributor, and means for regulating the degree of such depressing force for the purpose set forth.

7. In a cultivator or like implement having a series of depressible working fingers suitable frame pieces and a rotatable axle, the combination with same, of lifting mechanism, a pressure distributor connected with said fingers and supported at times by said lifting mechanism, and an operating lever projecting from said axle and adapted to rotate same for the purposes set forth.

8. In a cultivator or like implement having a series of depressible working fingers suitable frame pieces and a rotary axle, the combination with same, of lifting arms projecting from said axle, a pressure distributor connected with said fingers and supported at times by said lifting arms, and an operating lever projecting from said axle and adapted to rotate same for the purposes set forth.

9. In a cultivator or like implement having a series of depressible working fingers, suitable supporting frame pieces, a rotatable axle, and an operating lever, the combination with
 5 such parts, of a pressure distributor connected with said fingers and a spring exerting a depressing force upon said distributor, a movable carrier or mounting for said spring, and a connection between said operating lever and
 10 said carrier for the purposes set forth.

10. In a cultivator, or like implement having a series of depressible working fingers, suitable supporting frame pieces, a rotatable axle, and an operating lever, the combination
 15 with such parts, of a pressure distributor connected with said fingers, a spring exerting a depressing force upon said distributor, a movable carrier or mounting for said spring and an adjustable connection between said lever
 20 and said carrier for the purposes set forth.

11. In a cultivator, the combination with the operating lever and the movable carrier of the spring pressure device of the adjustable connection between them in the form of a
 25 bar pivoted at one end to said carrier and having notches on its lower edge to engage a projection from said lever with means for disengaging said bar from said projection for the purpose set forth.

12. In a cultivator, the combination with the operating lever and the movable carrier, of the spring pressure device, of the notched adjustable bar pivoted to the carrier and engaging a projection from said lever, a lifting
 30 slide carried by said lever and provided with a projection to engage an extension from said bar and a thumb lever and connection for operating said slide for the purpose set forth.

13. In a cultivator, the combination with
 40 the operating lever, the means for locking it

in position, the spring pressure device, the pivotal carrier for same, the adjustable bar connection between said lever and said carrier, and the slide for disengaging said bar connection from said lever,—of the cam lever
 45 S and bell crank lever T pivoted to said operating lever and the former adapted upon being drawn inward to operate the latter as and for the purposes set forth.

14. A cultivator or like implement having
 50 suitable supporting framing, all its working fingers directly attached at their bases or inactive ends to a common removable shaft straight throughout its length; and a graduated notched bearing or holder secured to
 55 the framing of the cultivator to carry said shaft, for the purpose set forth.

15. A cultivator or like implement having suitable supporting framing, all its working
 60 fingers directly attached at their bases or inactive ends to a common removable shaft straight throughout its length; depending brackets U secured to the framing of the cultivator and having notches formed in the edge
 65 thereof to receive said shaft, and means for retaining it in place.

16. A cultivator or like implement having suitable supporting framing, all its working
 70 fingers directly attached at their bases or inactive ends to a common removable shaft straight throughout its length; depending brackets U secured to the framing of the cultivator and having notches formed in the edge thereof to receive said shaft, and a pivoted
 hook G² for retaining it in place.

Montreal, November 27, 1893.

THOMAS BELAIR.

In presence of—

FRED. J. SEARS,
 O. W. M. N. LOANE.