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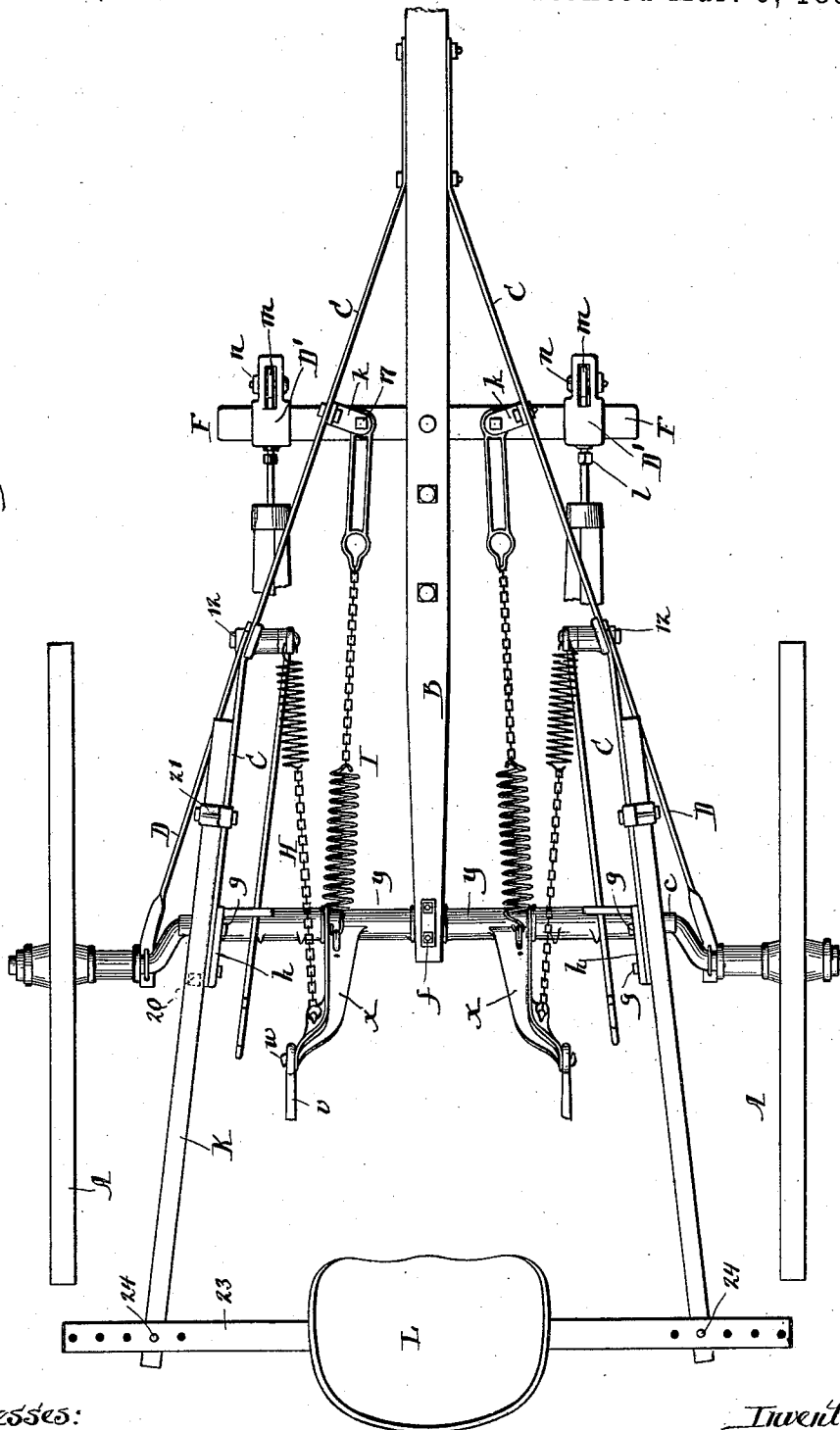
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W. SOBEY.
WHEEL CULTIVATOR.

No. 578,502.

Patented Mar. 9, 1897.

Fig. 1.



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(No Model.)

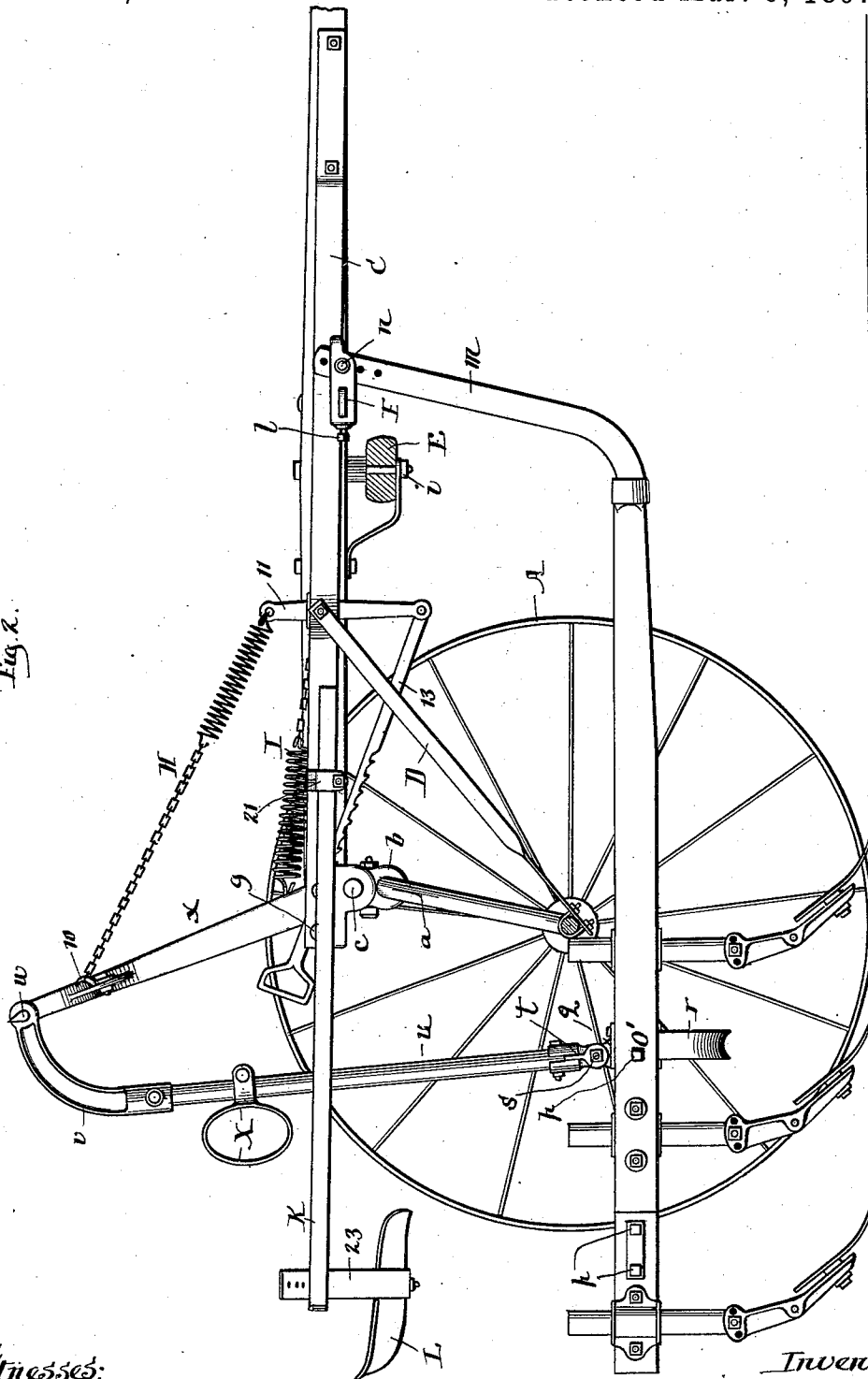
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Fig. 2.



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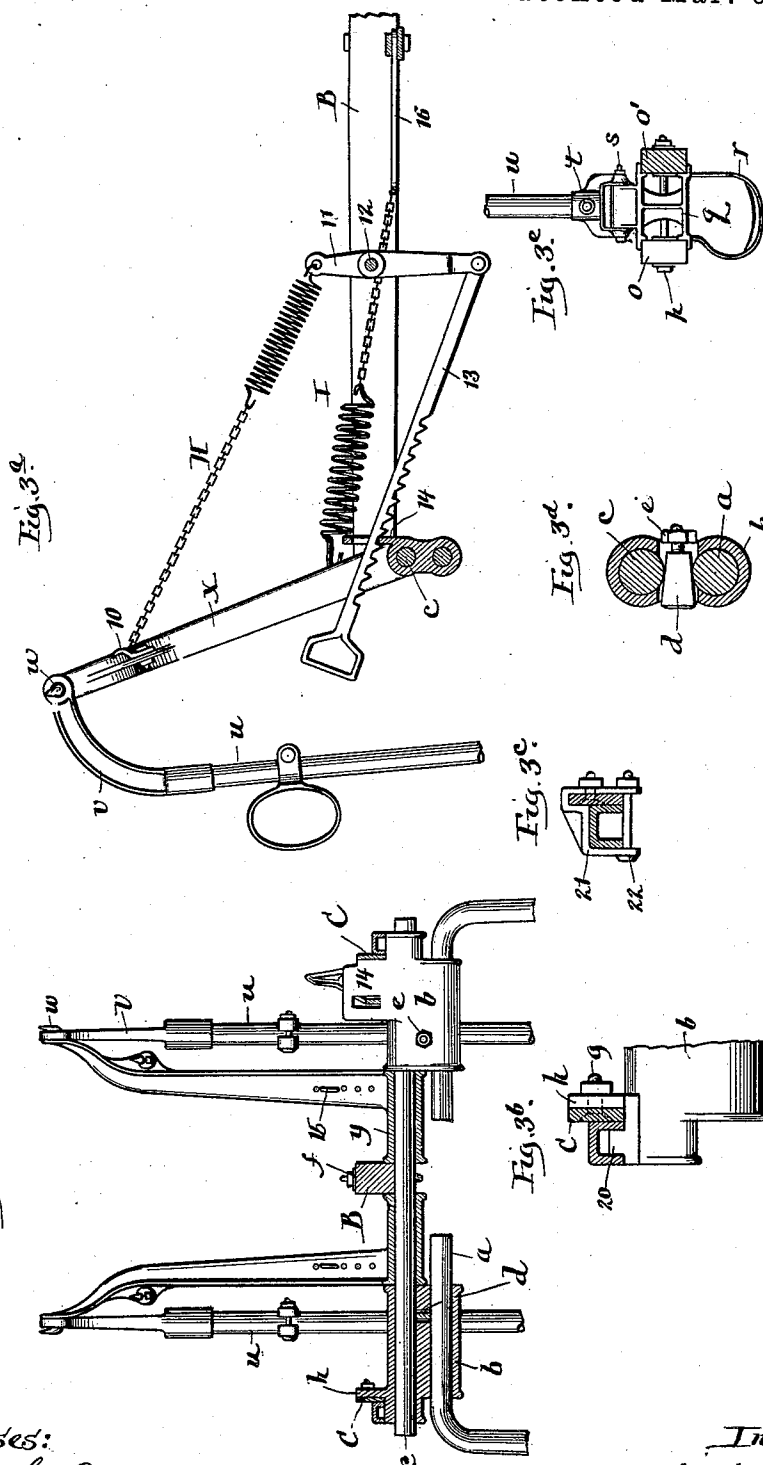
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W. SOBEY.
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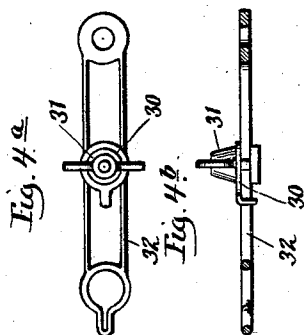
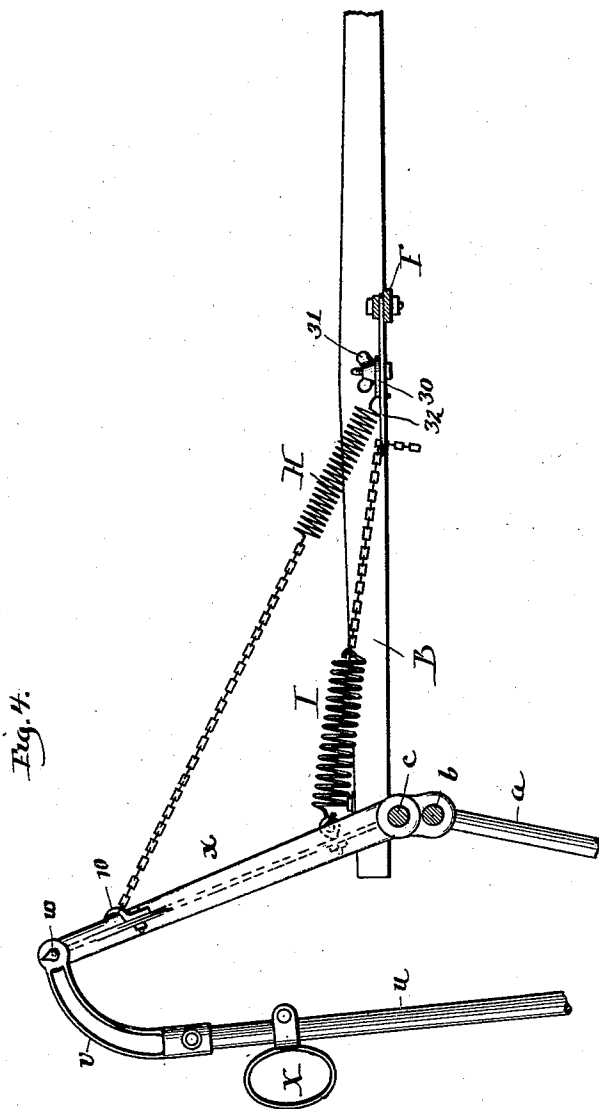
(No Model.)

4 Sheets—Sheet 4.

W. SOBEY.
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UNITED STATES PATENT OFFICE.

WILLIAM SOBEY, OF RACINE, WISCONSIN, ASSIGNOR TO THE J. I. CASE PLOW WORKS, OF SAME PLACE.

WHEEL-CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 578,502, dated March 9, 1897.

Application filed September 18, 1896. Serial No. 606,283. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM SOBEY, of the city and county of Racine, State of Wisconsin, have invented certain new and useful Improvements in Wheel-Cultivators, of which the following is hereby declared to be a full, clear, and exact description.

The invention relates to wheel-cultivators which carry independent shovel-beams for opposite sides of the plant-row. Familiar structures of this sort now in common use have the gang-beams swung in front of the wheel-axle—i. e., at the forward end of the main frame—while at the rear each beam swings from an upright radius-arm rocking on the axle or on the main frame adjacent thereto. A suspension-rod pivoted to the upper or free end of the radius-arm attaches pivotally below to the appropriate gang-beam. The beam is thus sustained at front and rear in “hammock” fashion to easily respond to the guidance of the driver’s foot as he rides behind on the cross-seat at the mid-line of the machine. To counterpoise the weight of the gang-beam and thereby to lighten the work of the operator, a reaction-spring has been heretofore extended between the upper end of the suspension-rod and thence forward to some convenient point on the main frame. Again, it has been proposed to employ separate springs at each beam, one of which attaches to a hook on the upright radius-arm toward the free end thereof and at its opposite terminal attaches to the fixed bracket upon which the heel of the radius-arm journals. The spring extends substantially in line parallel with the radius-arm, and its chief function is to aid in maintaining the gang-beam and shovels above the soil. The companion and more powerful spring is interposed near the foot of the suspension-rod and runs forward beneath the main frame to the bracket at which the front end of the gang-beam swings. This additional spring is alleged to act in opposition to the driver’s foot as an aid in governing the depth of cultivation.

The present improvement is of the two-spring variety, the upper spring being made to extend forward from near the free end of the rocking radius-arm, preferably, while the lower spring attaches to the radius-arm in

relation near to the heel or pivot thereof. At the front both springs are connected to some suitable point constituting in effect a part of the main frame. The upper spring comes into effective play as a “regulator” for the shovels in the soil to govern the suction thereof, while the lower companion spring is chiefly a “lifter” to assist in counterbalancing the gang-beam when the beam is raised above the ground. The relative arrangement of the parts is such that the power of the regulator becomes greater and greater as the power of the lifter lessens, and vice versa, by which expedient the operator without undue effort can quickly shift the shovels in the soil by easy command of the regulator-spring, while the lifter-spring comes more and more to his aid as a counterpoise for the weight of the beam on raising the shovels from working position.

The nature of the invention will appear in detail from the description following and be more particularly pointed out by claims at its conclusion.

On the drawings which accompany like parts bear like designation throughout.

Figure 1 is a plan view of one form of the invention. Fig. 2 is a side elevation at the “off” side with the wheel-spindle and the draft-evener in cross-section; Fig. 3, an elevation view (parts in section) at the arch of the U-axle, looking toward the rear; Fig. 3^a, a side view with the arch-axle in section, displaying the spring-lifter and the spring-regulator with their adjuncts in connected relation to the radius-arm; Fig. 3^b, an enlarged detail view (parts in section) at the saddle-mount for the seat-bar and side bar on top of the wheel-axle; Fig. 3^c, a cross-section view at the pinch-clip adjustably clamping the seat-bar to the side bar; Fig. 3^d, a cross-section view at the wedge-piece for uniting the divided arch of the axle with its coupler; Fig. 3^e, a detail rear view (part in section) at the junction of the lower end of the suspension-rod with the dual members of the gang-beam; Fig. 4, a side view corresponding with Fig. 3^a, showing a modified structure; Figs. 4^a and 4^b, plan and section views of an adjusting-plate for the spring mechanism.

In familiar fashion the carrying-wheels A

journal upon spindles at the lower horizontal terminals of the arch-axle. Each spindle-piece of the inverted-U axle has at its upper end an inward bend *a*, which fits snugly within a long hole in union-coupler *b*, Fig. 3. Above the bend *a* and between opposite couplers *b* extends a tie-rod *c*, also received within elongated bearings in the couplers. A wedge *d*, Fig. 3^a, rests in a cross-slot at each coupler and bears at opposite faces against tie-rod *c* and bend *a* of the spindle member. Set-nut *e* on the wedge-piece encounters the face of coupler *b* to rigidly unite in assigned position the cross-rod *c* and spindle-piece of the divided arch-bar. By such expedient the "tread" of the cultivator-wheels can be varied at will in keeping with the width between plant-rows.

As here shown, the main frame of the cultivator comprises a team-pole B, stoutly secured by clip *f* to axle cross-rod *c*, together with side bars C, which in front are strapped at opposite sides of pole B and at the rear are each bent slightly inward and secured by countersunk bolts *g* to the upright flange *h* of union-coupler *b*. Braces D, Figs. 1 and 2, stoutly unite side bars C with the spindle-terminals of the U-axle. Draft-evenner E, pivoted by hammer-strap *i* to the pole, Fig. 2, affords suitable attachment for the single-trees.

Against pole B in advance of the draft-evenner is bolted the fore-reach F, Fig. 1, held rigidly by angle-brackets *k*, secured to the reach and to the side bars C, respectively. Sliding blocks D', fitted to the fore-reach and kept in place by set-screw *l*, Fig. 1, receive within a slot at the front part thereof the upper terminal *m* of the gang-beams. A series of holes in the terminal *m* coact with the pivot-bolt *n*, carried by the slide-block D, to adjust the height of the gang-beam.

Toward the rear each gang-beam consists of two horizontal members *o o'*, Fig. 3^a, stoutly united by cross-bolt *p* and by intermediate casting *q*, seated at the edges of the beam members *o o'*. The stirrup *r* for the driver's foot has its shanks extended between the front and rear lips of casting *q* and is hung upon the through-bolt *p*. At its top the casting *q* affords pivot-seat *s* for the fork *t*, fastened at the lower end of suspension-rod *u*. The upper end of the suspension-rod *u* is furnished with the curved terminal *v*, having an eye at its tip to pivotally receive a hook *w* on the free end of the rocking radius-arm *x*. The heel of the radius-arm *x* terminates in sleeve *y*, loosely mounted upon the cross-arm *c* of the arch-axle.

A hook 10, bolted to radius-arm *x* in relative position approximating the free end of such arm receives one extremity of the spring-regulator H. Said regulator at its opposite terminal is fastened to the shifter 11, pivoted, as at 12, on side bar C. The opposite end of shifter 11 is controlled by rack-link 13, the teeth of which engage with the slotted exten-

sion 14 of the union-coupler *b*. On resetting the link 13 at the selected tooth, as desired, the shifter 11, through spring-regulator H, raises or lowers the gang-beam, and thus promptly relieves the operator from undue exertion in cultivating at proper depth on a side hill in dead furrows or the like. The stout spring-lifter I attaches, as at 15, to the radius-arm *x* in position relatively near the heel thereof and extends forward to the adjusting-plate 32, bolted, as at 17, to the fore-reach.

The seat-bars K (preferably in channel form) snugly fit over the lug 20 of the saddle at the top of the union-coupler *b* on the arch-axle. The forward end of the seat-bars is inclosed by spring-clip 21, having bolt 22, Fig. 3^a, to retain the seat-bar in assigned position against the adjacent side bar C. At the rear the seat L for the driver is carried by a cross-spring 23, adjustably sustained by pintles 24 from the opposite seat-bars K.

With the parts in place, as shown by Figs. 2 and 3^a, the shovels barely touch the surface of the soil. By thrusting against handle X on suspension-rod *u* the radius-arm *x* swings forward about its pivot *y c* and thus through suspension-rod *u* raises the particular gang-beam to riding position. As approach is made to such position the pivot *w* at the free end of the radius-arm becomes directly alined with pivot *c* for the heel of said arm and with pivot *s* at the junction of the suspension-rod and gang-beam. When pivot *w* swings farther forward beyond this "dead-line," the weight of the beam, &c., acts to quickly lower the free end of the radius-arm until the parts are finally at rest, with the suspension-rod bearing against the coupler *b* upon the U-axle. The curved tip *v* at the upper end of suspension-rod *u* enables pivot *w* to clear the dead-line before said rod can come prematurely into contact with the arch-axle.

By proper adjustment the spring-lifter I remains in play until the dead-line is reached in the forward movement of the radius-arm.

The advance of the radius-arm toward the dead-line constantly lessens the tension of the spring-lifter. This loss is corrected by reason of the direction of the pull and the point of attachment for the lifter at the radius-arm. Being applied near the heel of the arm, the short leverage of the lifter is exerted at best advantage during the traverse of the radius-arm past the vertical. Hence the counterbalancing effect of the spring-lifter remains practically uniform throughout the shift. On the contrary, if the shovels are forced into the soil from the position shown by Figs. 2 and 3^a, it is the spring-regulator H which comes more and more into play. At the surface of the soil said regulator may be properly adjusted to stay "off-tension." As the beam is lowered the regulator, with its long leverage upon radius-arm *x* at hook 10, exerts an increasing power, whereas the lifter I, although distended, proportion-

ately exerts its force with lessening effect. The radius-arm is receding from the vertical, so that the attachment of the lifter at short leverage tends constantly to minimize its pulling action.

Operating in the soil the "suction" of the shovels is substantially counteracted by spring-regulator H. On releasing the shifter 11 the corresponding beam is quickly lowered through regulator H to ease the operator from any excessive thrust in cultivation along a side hill in a dead furrow or a swale. The shifter can be reversed at will to restore the gang-beams to even position for work on a level field.

Since gravity and suction unite to keep the shovels below ground, it is plain that some expedient other than the stiff rack-link 13—*e. g.*, a flexible chain cable with catch-hook or the like—can be used to control the shifter. In brief, it is not essential that the hand-control device for the shifter shall be stiff.

Obviously the shifter is not resorted to for the general purpose of throwing the gang-beams into or out of the ground, but is merely used as a supplement to relieve the rider from the discomfort of uneven exertion in working over a low piece at one side of the machine. Like the ordinary type of hammock cultivators the shovel-beams are moved from riding to working position and vice versa through the medium of handles X on suspension-rods *u* and the swing imparted thereby to radius-arms *x*. Once in the soil the pressure of the driver's feet in gang-stirrups *r* suffices to maintain the shovels at desired depth and by sidewise play causes the beams to swing in hammock fashion from pivots *n w* in dodging along crooked rows.

The regulator-spring H may attach at pivot *w* or again (within limits) upon suspension-rod *u v*; but the latter plan is objectionable, since the gang-beam system swings from pivot *w*, and its easy side play, as in dodging crooked rows, is obstructed if the regulator H be attached to suspension-rod *u v* farther and farther below pivot *w*. The work upon the operator is materially lessened by affixing regulator H to radius-arm *x*, as shown. The tension of the spring does not then interfere with the ready lateral play of the gang-beam.

In the modified machine, Fig. 4, the shifter 11 is discarded and the front end of spring-regulator H is hooked instead onto the slide 30, secured by thumb-nut 31 to the adjusting-plate 32. Slide 30 permits the tension, or rather the operative length, of regulator H to be varied at will and in such respect attains merely the same result which at the opposite terminal ensues on engaging hook 10 with a different link of the chain. Slide 30 merely affords a nicer adjustment. The slide does not perform the function of shifter 11, since the latter is at instant command of the driver from his seat through the medium of rack-link 13.

Obviously the details of structure can be

varied according to the mechanic's skill without essential departure from the invention.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In cultivators, the combination with the main frame and its wheel-axle, of the shovel-beams swung from said frame at its forward end, the upright radius-arm, the suspension-rod pivotally joined back of the axle to the radius-arm and shovel-beam respectively, and the spring-lifter extended from the frame in substantially horizontal direction and united at the rear to said radius-arm near the pivot thereof, whereby the rocking shift of such radius-arm, as the shovel-beam rises toward riding position, promotes the leverage of said spring-lifter and maintains the counterpoise effect thereof, substantially as described.

2. In cultivators, the combination with the main frame and its wheel-axle, of the shovel-beam swung from said frame at its forward end, the upright radius-arm, the suspension-rod having a curved upper terminal and pivotally joined back of the axle to the radius-arm and shovel-beam respectively, and the spring-lifter extended from the frame in substantially horizontal direction and united at the rear to said radius-arm near the pivot thereof, substantially as described.

3. In cultivators, the combination with the main frame and its wheel-axle, of the shovel-beam swung from said frame at its forward end, the upright radius-arm, the spring-lifter united to said arm near the pivot thereof and extended to the frame, the suspension-rod pivotally joined back of the axle to the radius-arm and shovel-beam respectively and the spring-regulator extending from the frame and at the rear united to the radius-arm near the suspension-rod pivot thereon, substantially as described.

4. In cultivators, the combination with the main frame and its wheel-axle of the shovel-beam swung from said frame at its forward end, the upright radius-arm, the suspension-rod pivotally joined back of the axle to the radius-arm and shovel-beam respectively, the spring-regulator extended forward from the radius-arm, the rocking shifter connected thereto, and the rack-link within the driver's control to vary the position of said shifter, substantially as described.

5. In cultivators, the combination with the main frame and its wheel-axle of the shovel-beam swung from said frame at its forward end, the upright radius-arm, the suspension-rod pivotally joined back of the axle to the radius-arm and shovel-beam respectively, the spring-regulator extended forward from the radius-arm, the shifter uniting said regulator at front with the main frame, and suitable means under control from the driver's seat on the machine to vary the position of such shifter, substantially as described.

6. In cultivators, the combination with the spindle members for the main wheels, and

with the transverse tie-rod of the union-couplers interposed between said members and rod to join them together, the team-pole secured centrally to the tie-rod and the rocking radius-arms to sustain the gang-beams at the rear, said arms being sleeved upon the tie-rod, between the pole and couplers respectively, substantially as described.

7. In cultivators, the combination with the spindle members for the main wheels, and with the transverse tie-rod of the union-couplers interposed between said members and rod to join them together and the cross-wedges abutting against the parts named to hold them

rigidly in assigned relation, substantially as described. 15

8. In cultivators, the combination with the U-axle for the carrying-wheels having saddle-lugs at the arch bends of said axle, of the main-frame side bars secured to the axle adjacent said lugs and the channel-form seat-bars fitting over such lugs and at their forward ends adjustably clipped to the side bars, substantially as described. 20

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