

(No Model.)

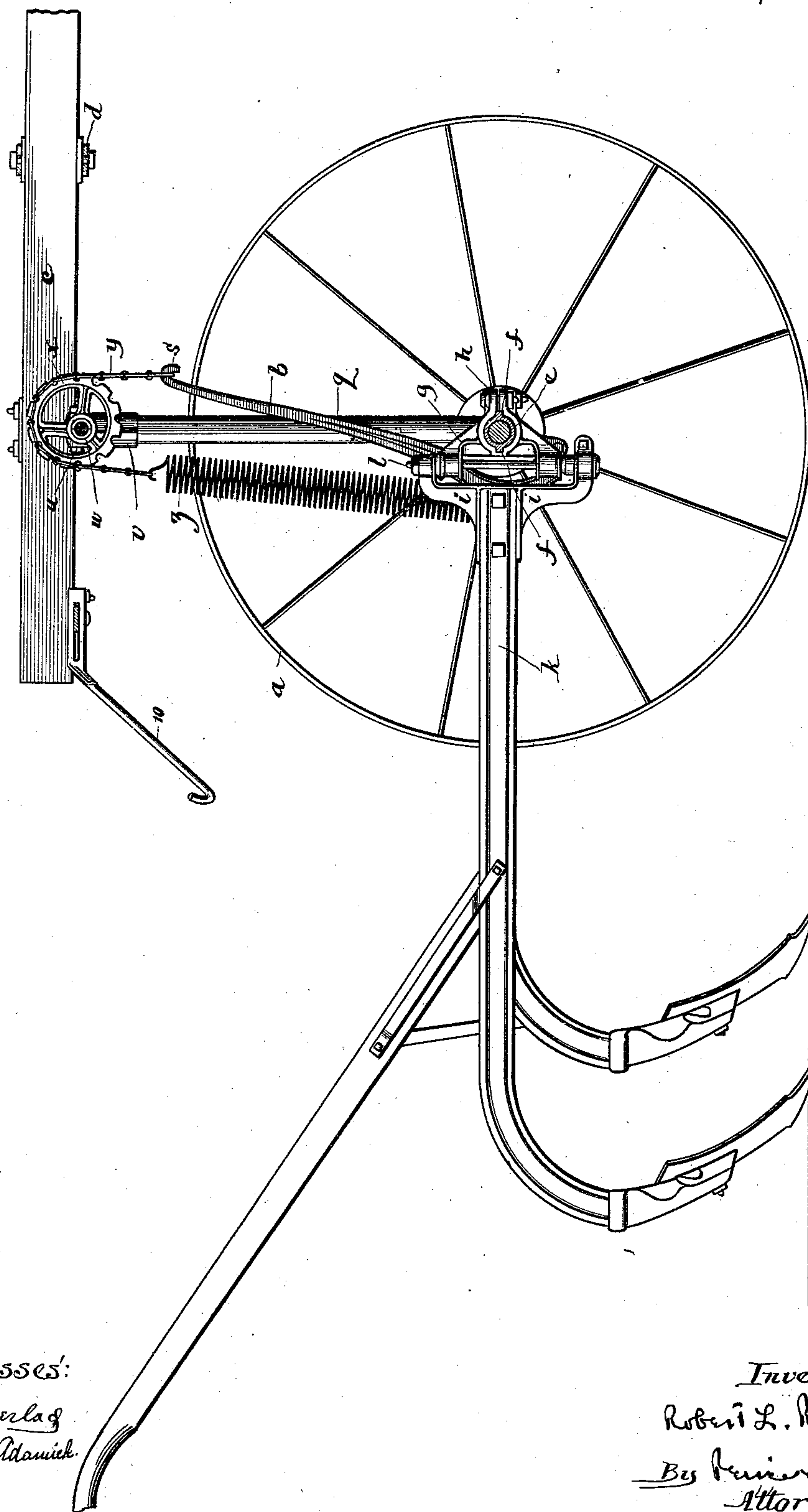
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R. L. RHEA.
WHEEL CULTIVATOR.

No. 547,681.

Patented Oct. 8, 1895.

Fig. 1.



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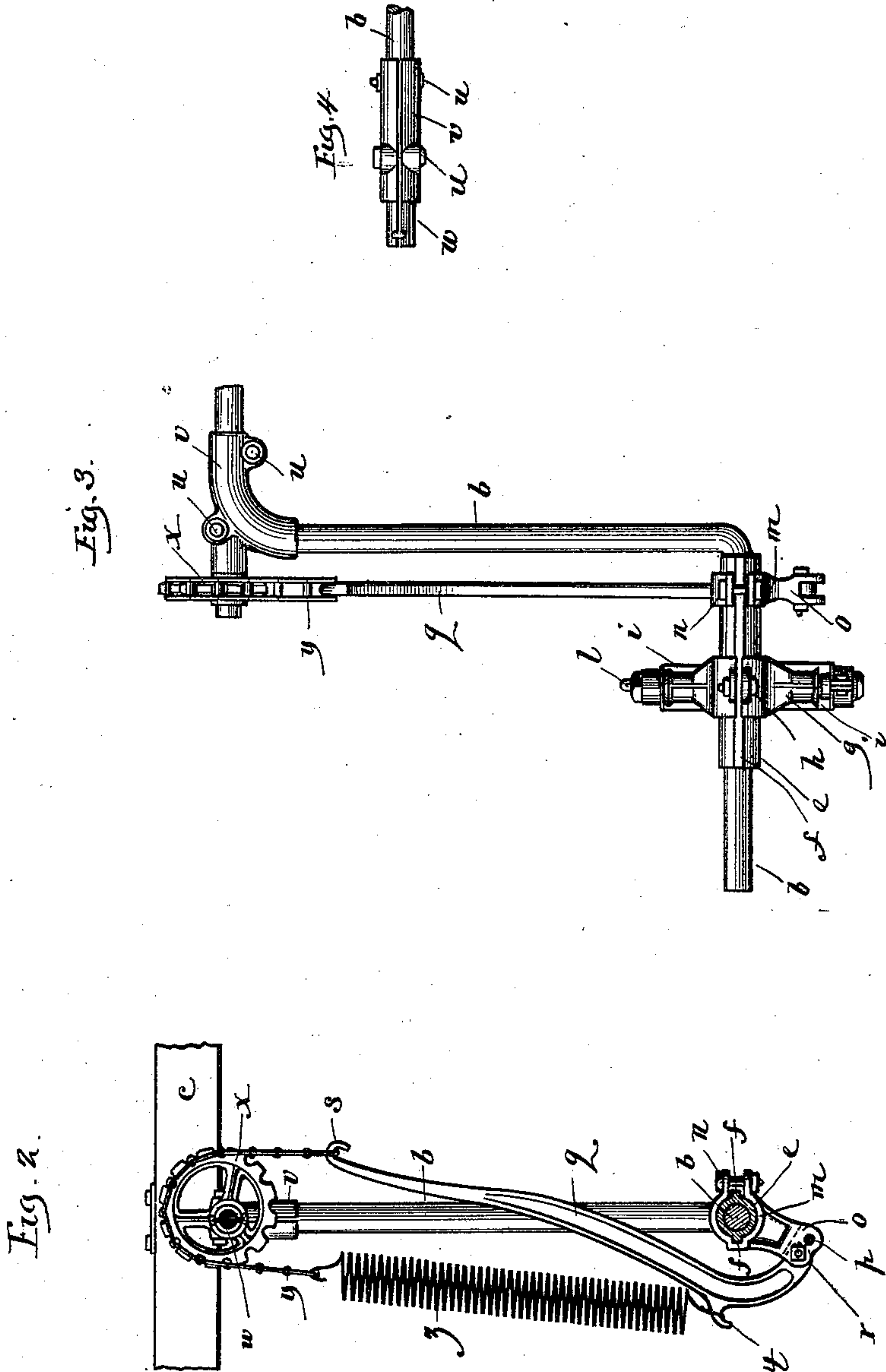
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UNITED STATES PATENT OFFICE.

ROBERT L. RHEA, OF PEORIA, ILLINOIS, ASSIGNOR TO THE J. I. CASE PLOW WORKS, OF RACINE, WISCONSIN.

WHEEL-CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 547,681, dated October 8, 1895.

Application filed June 10, 1895. Serial No. 552,266. (No model.)

To all whom it may concern:

Be it known that I, ROBERT L. RHEA, a resident of Peoria, county of Peoria, State of Illinois, have invented certain new and useful
5 Improvements in Wheel-Cultivators, of which the following is hereby declared to be a full, clear, and exact description.

The invention relates to spring mechanism employed in wheel-cultivators to act as a
10 counterpoise for the shovel-beam and its adjuncts at various positions when the beam is raised or lowered about its pipe-coupler attachment upon the wheel-axle as a center.

The improvement provides simple and efficient means for changing the "balancing effect" of the lifting-spring, so that the gang-beam, with its shovels, is variably counterpoised, and thus the shovels, without extra
15 effort on the part of the operator, caused to run deep or shallow in the soil, according to the nature of the cultivation desired.

In the drawings like parts have like designation throughout.

Figure 1 is an elevation view of the improved device at the off side, the wheel being removed; Fig. 2, a detail elevation view of the off-side counterbalance mechanism; Fig. 3, a view of the same in front elevation, displaying, also, the beam pipe-coupler in place;
25 Fig. 4, a top view of two-part box for the eccentric-wheel.

As here shown, the carrying-wheels *a* for the cultivator sustain between them the ordinary arch-axle *b*, upon which is mounted the
35 tongue *c*, having the usual doubletree *d*, secured thereto. The lower or spindle members of the arch-axle carry the pipe-boxes *e*, turning freely thereon, and which are furnished with the opposite longitudinal fins or
40 ribs *f*. Bracket-coupler *g* engages with the rib *f* and is stoutly held in desired position upon box *e* by clamp-bolt *h*, which draws upon the wings of coupler *g*, and thus snugly pinches said coupler to a secure seat about the box *e*.
45 The eye-brackets at the back of coupler *g* afford a mount for the T-bar terminal *i* at the forward end of gang-beam *k*. Bolt *l* passes through the opposite eyes in the parts *g* *i*, by which provision the beam *k* is free to
50 swivel laterally about bolt *l* or to be shifted up and down, turning with box *e* about spin-

dle extension of arch-axle *b* as a center. Near its inner end the box *e* by the rib *f* thereon sustains a supplemental bracket *m*, which is fastened thereto by pinch-bolt *n*. Said supplemental bracket carries beneath a crank-
55 arm *o* with adjusting-holes *p* therein, which serve as fulcrum-seats for the pivot-bolt *r* of the radius-lever *q*. Said lever extends in substantially upright position from its fulcrum *p* *r* and at opposite sides of the axial
60 center of motion is furnished with the upper and lower hooks *s* *t*, to which the counterpoise-spring attachment is secured. At the upper bend of arch-axle *b* is clamped by bolts
65 *u* the two-part box *v*, having a spindle extension *w* thereon, which projects for a slight distance in relation parallel with the lower member of the arch-axle and affords a mount
70 for the eccentric pivot-wheel *x*. In the form shown pivot-wheel *x* has a sprocket-rim to engage with the links of the flexible connector or chain *y*, which attaches at one end to the
75 upper hook *s* of radius-lever *q* and at the other terminal to the end of coil-spring *z*, secured in turn beneath the lower hook *t* on the radius-lever.

With the parts in position (shown by Fig. 1) the gang-beam is at a horizontal in readiness to cultivate the soil. The counterpoise-
80 spring *z* through radius-lever *q* and supplemental bracket *m* balances in measure the weight of beam *k* with its adjuncts. The weight of the beam is exerted through coupler *g* upon pipe-box *e* and tends to turn the latter
85 against the resistance of spring *z*. The resistance of the spring can be varied, and, as disclosed by Fig. 1, the rim of the pivot-wheel *x* is there shown with its maximum radii about vertically above its spindle-center *w*. View-
90 ing the rim of the wheel *x* as the point of suspension for the end of spring *z*, (through the medium of flexible connector *y*,) it is at once evident that the distension of such spring has about attained its highest limit; in other
95 words, the weight of the gang-beam and adjuncts is most nearly balanced, so that the cultivation will be light or shallow. On the other hand, if eccentric-wheel *x* be reversely set to bring its minor instead of its major radii
100 above spindle-mount *w* (with the gang-beam standing at a horizontal) exactly the

opposite condition must prevail from what has been detailed. The spring z being less distended acts with less force to balance the weight of the shovel, and in consequence the cultivation becomes deeper. In customary use of the device the set of eccentric-wheel x is such as to establish the minor radii of said wheel in position above spindle w at the time the beam is depressed—*i. e.*, when cultivating the soil—which means that spring z at such juncture ordinarily exerts its least power. The spring then being at its minor stretch, the eccentric nature of suspension-wheel x will increase the tension on lifting the gang-beam from such lowest position, since a gradual turn is imparted to wheel x through sprocket-chain y as the gang-beam rises. The turning of wheel x must bring its major radii more and more above the mount w , and by extreme set of the wheel x this presentation of the major radii above pivot w can occur to such effect that the “lifting effect” exerted by spring z upon beam k easily overcomes the relaxed tension due to the circumstance that the beam is moving radially upward about its box-coupler in nearer approach to spindle-mount w —that is, the shift of eccentric-wheel x to bring its major radii farther and farther above the level of mount w during the rise of the gang-beam compels the spring z to aid more and more in lifting said beam. Reversely, if the minor radii of lessening length on wheel x approach in turn for presentation to link-suspender y during the rise of the beam the balance-spring z tends to relax and to lift the less. By intermediate adjustment of eccentric-wheel x a neutral condition is established, in which the gang-beam is about nearly balanced throughout its whole range of play.

Variations such as here noted are due solely to the eccentric shift in point of ultimate suspension for the spring z above spindle-mount w and are quite independent of the familiar changes in tension which ensue by mere radial shift of the gang-beam about its pipe-coupler—*e. g.*, in release of spring z . To compensate for such loss in tension during the upward movement of the beam, it is well understood that crank-arm o on supplemental bracket m emerges from near its “dead-point” alignment below axis $q e$ and presents a “new leverage” or constantly better purchase for the application of the spring-coun-

terpoise during the rise of the beam and so far tends to offset the relaxing power of the spring.

By the present invention in form shown the advantages of the “dead-point” crank-arm o are retained, while to these are added the benefits attributable to the eccentric suspension-wheel w with its wide range of adjustment. By sustaining the beam k , as on hook 10, the spring z can be detached below from its hook f , the connector y be eased at eccentric-wheel z and such wheel be quickly adjusted to new relation, after which the several parts are restored to place and the counterpoise effect on the beam correspondingly changed.

Obviously the details of structure may be varied according to the skill of the mechanic without departure from the essentials of the invention.

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

1. The combination at the wheel-axle with its pipe-coupler to swivel mount the shovel-beam, of the radius lever fulcrumed upon a crank-arm of the pipe coupler, the coil-spring having one terminal secured to said lever, an eccentric pivot-wheel and a flexible connector attached at opposite end of said spring extended over said wheel and united with the radius lever, substantially as described.

2. The combination at the pipe-coupler with the gang-beam swiveled thereon, of the radius lever fulcrumed upon said coupler, the coil-spring and its flexible connector respectively united at opposite terminals with said radius lever and the eccentric pivot-wheel about which said connector is hung, substantially as described.

3. The combination at the pipe-coupler with the gang-beam swiveled thereon, of the radius lever fulcrumed upon said coupler, the coil-spring and its flexible chain-link connector respectively united at opposite terminals with said radius lever and the eccentric adjustable pivot-wheel about which said connector is variably hung, substantially as described.

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