(No Model.)

G. MOORE.

CULTIVATOR.

No. 478,624. Patented July 12, 1892.

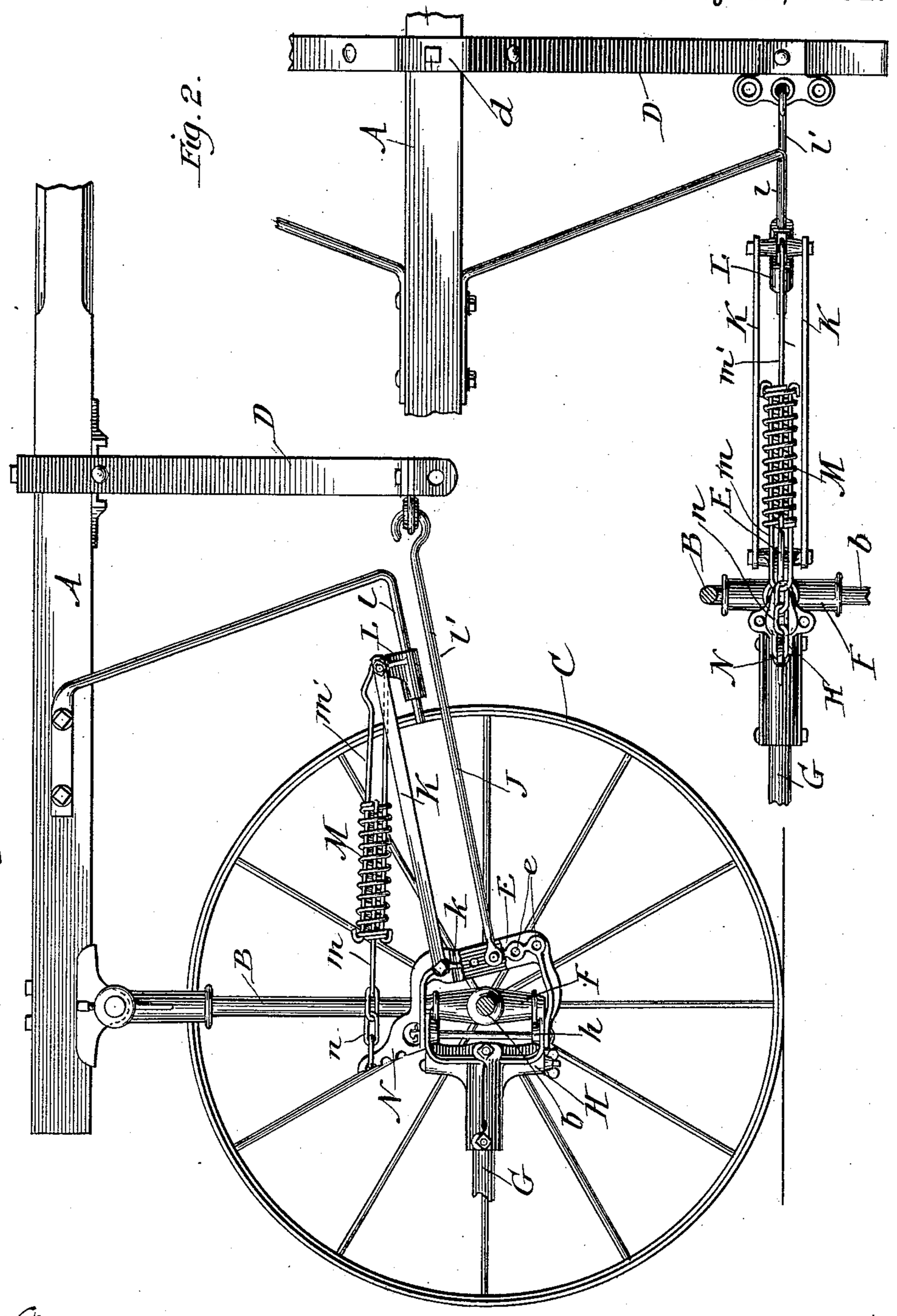

Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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CULTIVATOR.

SPECIFICATION forming part of Letters Patent No. 478,624, dated July 12, 1892.

Application filed November 11, 1890. Serial No. 371,106. (No model.)

To all whom it may concern:

Be it known that I, GILPIN MOORE, a citizen of the United States, residing at Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Cultivators, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a cultivator; and Fig. 2 is a plan view.

This invention relates to cultivators having a spring lifting device which acts to raise the cultivator-beam. I have shown only such parts of a cultivator as are necessary to the illustration of my present invention.

Difficulty has hitherto been experienced in the use of lifting-springs in this class of cultivators from the fact that the spring is strained by every movement of the shovels in the ground.

The object of my present invention is to provide an improved spring lifting device for a cultivator, which will avoid the above objection by avoiding all unnecessary strain upon the spring and by using a compression-spring.

A further object of my invention is to provide an improved lifting device in which the variation in the leverage of the lifting device will correspond with the variation in the tension of the spring, and thereby compensate the power of the lifting device, so that the spring will practically exert the same lifting force on the beam in every position between the working position and the hang-up position.

A further object of my invention is to provide an improved spring lifting device for a cultivator which may be adjusted and whose adjustment will not be affected by the various operations of the cultivator.

A further object of my invention is to provide an improved spring lifting device for a cultivator which employs an interposed rigid rod, which is attached at one end to the coupling or beam, and to the opposite end of which is connected a spring, which spring at its other end is connected to the cultivator-coupling at a different distance from the center of oscillation than the attachment of the rod to said coupling. I accomplish these several objects as illustrated in the drawings and as hereinafter described. That which I claim as new will be pointed out in the claims.

In the drawings, A indicates a cultivator-tongue.

B indicates a cultivator-arch, which is provided with a wheel-spindle *b* upon each side.

C indicates the carrying-wheels of the cultivator. The arch B in the construction shown is a so-called "swinging arch." I do not, however, limit the application of my lifting device to a cultivator having a swinging arch, although it is particularly designed to be used upon cultivators of that class.

D indicates a draft-equalizer, which is pivoted to the tongue A by a bolt *d* in any of the usual or well-known ways. The form of the arch B and also of the draft-equalizer D may be varied, as desired.

G indicates a cultivator-beam, which at its forward end is provided with a swinging coupling-yoke H. This coupling-yoke H is clasped by a yoke E, and it in turn clasps at the top and bottom a spindle-coupling F, on which it is free to oscillate horizontally. The oscillating yoke E is pivoted to the coupling-yoke H by means of a vertical pivot-rod *h*. The construction and operation of these parts are similar to those of corresponding parts shown in Letters Patent No. 404,922, granted to me June 11, 1889.

J indicates a draft-rod, which at its forward end is attached to the draft-equalizer D, and at its rear end, as shown, is attached to the oscillating yoke E; but it may be attached to the beam-coupling or to the wheel-spindle. The yoke E may be provided with a number of adjusting-holes *e*, by which the point of attachment of the rod J to said yoke may be adjusted for purposes which will hereinafter appear.

The construction of the parts hereinbefore enumerated may be greatly varied, as my invention relates to the spring lifting device for the cultivator-beam G, and said spring-lifting device may be applied to most of the cultivators having parts equivalent to those already described.

K indicates a rigid rod or pair of bars attached at one end to the oscillating yoke E on a pivot *k* at a relatively short distance from

the spindle *b*, which is the center of oscillation. The rigid rod K is pivotally attached at its forward end to a sleeve or guide-block L, which is adapted to slide upon a suitable support *l*.

M indicates a spring, which is preferably a compression-spring. The front end of the spring M is connected by means of a stirrup *m*, passing through such spring, and a chain *n* to a hook or lever N, formed with or connected with the oscillating yoke E. The rear end of the spring M is connected by means of a stirrup *m'* to the forward end of the rod or bar K.

In the construction shown the stirrup *m'* is connected to the forward end of a pair of bars K and, as shown, upon the pivot by which said bars K are attached to the sleeve L; but this construction may be varied, as a single rod or bar K may be used and the stirrup *m'* otherwise attached to the sleeve. The construction shown, however, is the preferable construction. As shown, the sleeve or guide-block L slides upon a special support *l*, which construction is preferred; but, if desired, the sleeve or guide-block L may slide upon the draft-bar J, as at the point *l'*, the draft-bar serving as the support. As the spring M is a compression-spring it will be much more durable, and it will also be more effective, as it may be made much stronger. When the cultivator is balanced, the draft-rod J is pivotally connected to the front portion of the oscillating yoke E in a line with the center of oscillation, by which construction the yoke E will not be oscillated by the draft, and consequently the spring M will not under ordinary circumstances be affected, it being only affected by the necessary vertical swing of the coupling and cultivator-beam. Under ordinary circumstances, when the cultivator is resting upon the ground and the beam G is in a horizontal position, the tension of the spring M will be such as to exert a forward pressure upon the lever N. The tension of the spring will also pull backward on the sleeve L and bars K, and will act through the rigid bar K to exert a backward pressure upon the upper portion of the oscillating yoke E at the point *k*. Such force would, however, be less than the forward pull upon the lever N, owing to the fact that the leverage in the former instance is less than that in the latter by about the difference between the respective distances of the points N and *k* from the center of oscillation. The various adjustments are such that the weight of the cultivator beam and shovels will compensate for the difference between the forward and backward forces, by which construction the lifting force of the spring through the lever N will be exactly equaled by the backward or downward pressure through the bars K, together with the weight of the cultvator beam and shovels. When the cultivator-beam is lifted, the oscillating yoke E will be partially rotated or oscillated about the center of oscillation or spindle *b*. The lever N will thereby be thrown forward, and the point where the chain *n* is connected to said lever will be raised, thereby increasing the leverage of the forward pull of the spring M. By this operation the lever N will also be brought nearer to the sleeve L, and the chain *n* will be consequently slackened, permitting the spring M to expand. This will weaken the action of the spring. By the forward swinging of the yoke E the point *k* will be partially rotated about the center of oscillation and the point *k* will accordingly be moved lower down. The backward leverage will therefore be diminished, and at the same time the raising of the beam G will lessen the leverage of its weight. The various parts are so adjusted with relation to each other that the increasing of the leverage of the forward pull and the decreased leverage of the weight of the beam will be compensated by the decreased tension of the spring M. It is evident that if the yoke E should rotate sufficiently to throw the point *k* below a line drawn from the center of oscillation to the sleeve L the power exerted through the bars K would act below the center of oscillation and would act together with the pull of the spring M on the lever N to raise the beam G and the balance would be disturbed. In practice this would bring the cultivator-beam into such position as to be inoperative. When the beam is lifted, the bars K also tend to maintain the strength of the spring as they move the sleeve L forward and thereby compress the spring.

From the above description it will be seen that the spring M will at all times counterbalance the beam G, and when balanced the balance will not be affected by the oscillation of the yoke E, as the change in leverage of the various parts and the tension of the spring counterbalance each other.

Having thus described my invention, what I claim is—

1. In a cultivator, the combination, with a vertically-swinging beam and a swinging or oscillating coupling, of a spring connected at one end to the coupling, a guide connected to the other end of said spring, and an interposed rod pivoted at one end to said guide and at the other end pivoted to the coupling at a different distance from the center of oscillation or swinging than the point of attachment of the spring thereto, substantially as and for the purpose specified.

2. In a cultivator, the combination, with a vertically-swinging beam and a lever or hook connected with the swinging beam, of a lifting-spring connected at one end to said lever, a guide connected to the other end of said spring, and a rigid rod connected to said guide and at the other end pivotally connected to the swinging beam, whereby the variations in the tension of the spring and in the leverage compensate each other, substantially as described.

3. In a cultivator, the combination, with a

vertically-swinging beam and coupling, of a lifting-spring therefor, a guide connected to one end of said spring, an interposed rigid rod connected to said guide and to the coupling, and means for adjusting the leverage and tension of the spring, substantially as specified.

4. In a cultivator, the combination, with a vertically-swinging beam and coupling E, having a lever N, of a spring M, sleeve L, connected to the rear end of the spring M, guide *l*, and rod K, connected to the sleeve L and to the coupling E at a different distance from the center of oscillation than the point of attachment of the spring M to the lever N, substantially as and for the purpose specified.

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Witnesses:
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