(No Model.) 2 Sheets—Sheet 1.

F. A. HEPWORTH & L. SANTANY.

SOIL PULVERIZER.

No. 353,491. Patented Nov. 30, 1886.

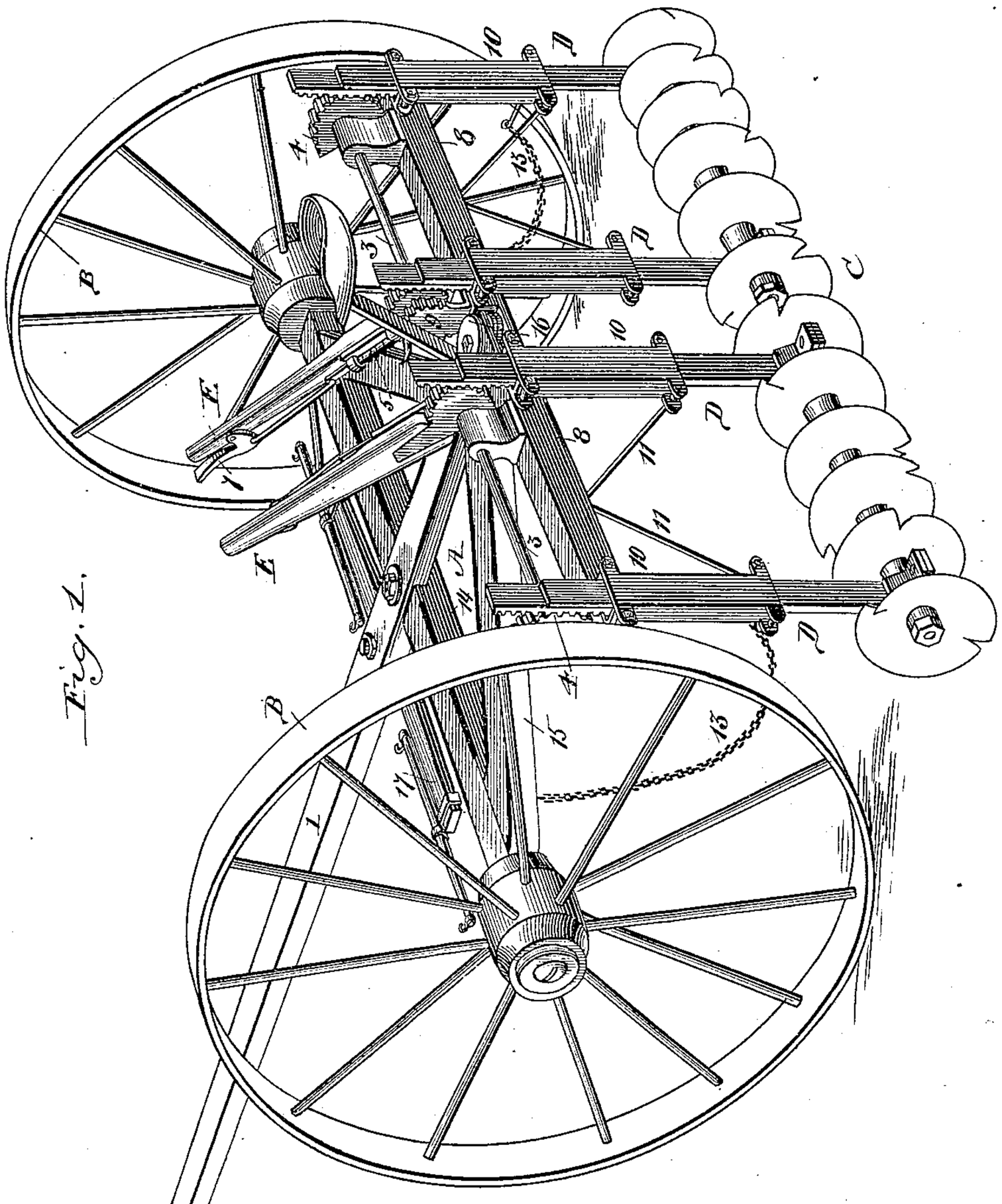

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

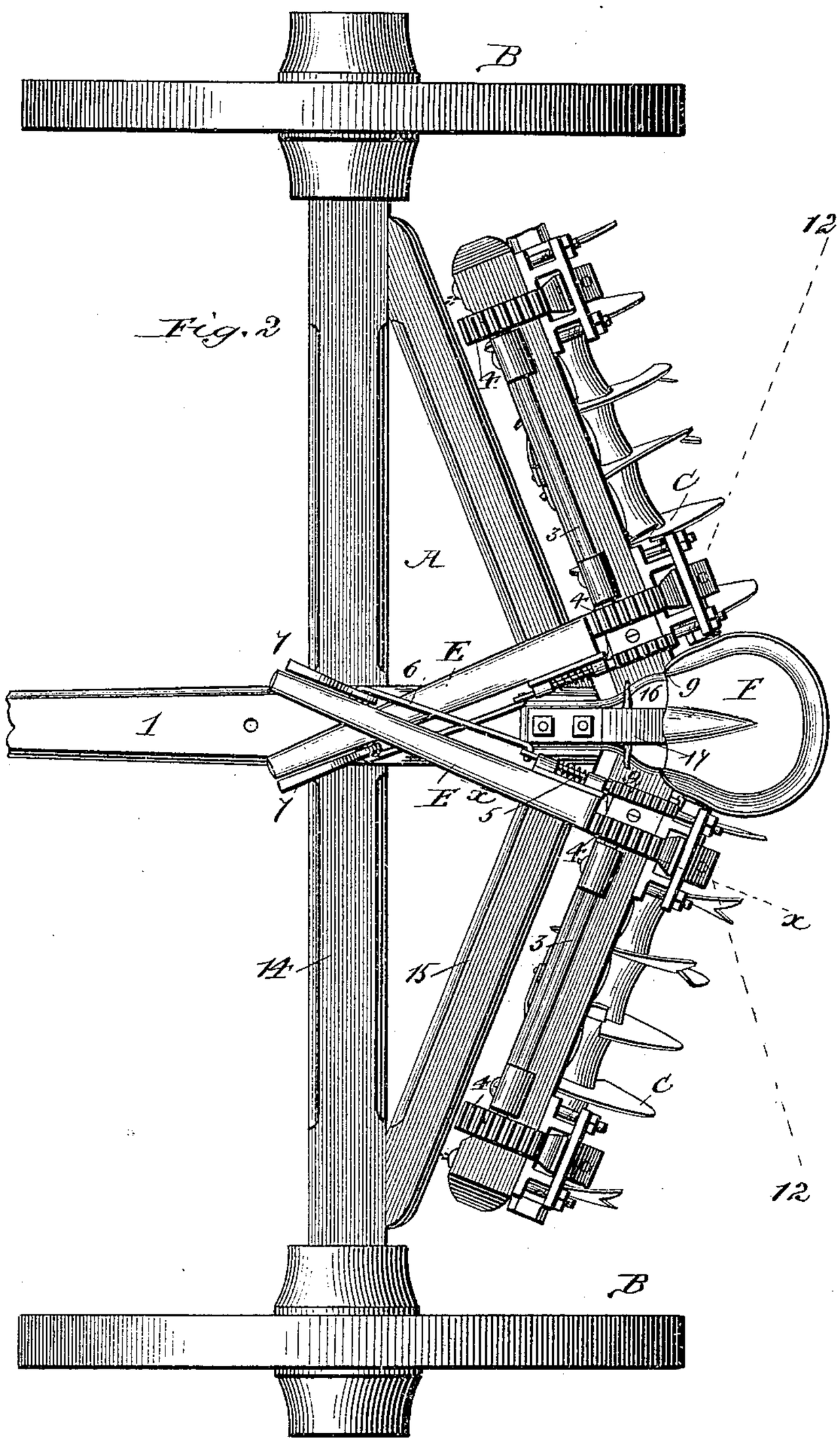
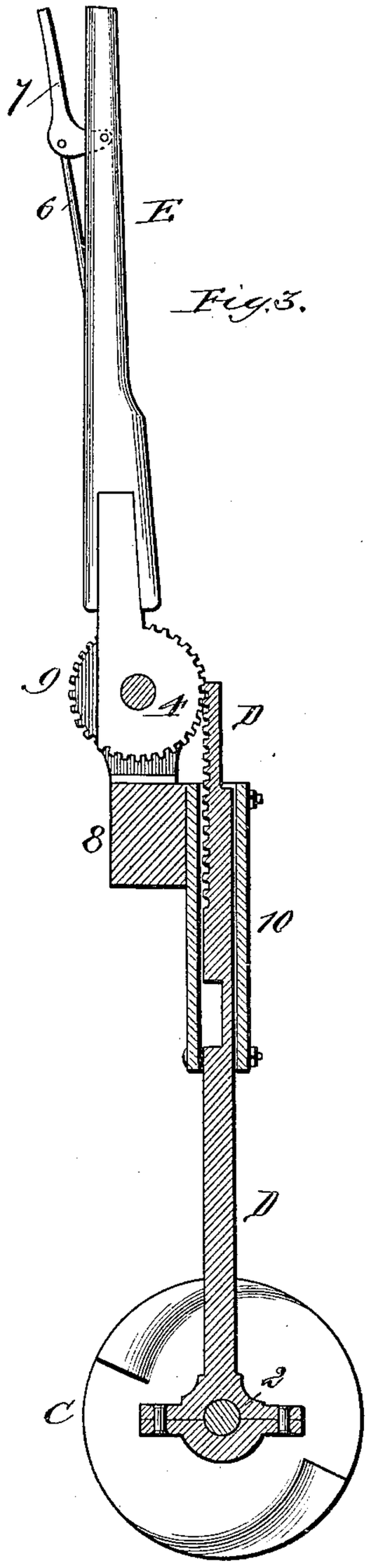


Fig. 3.



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UNITED STATES PATENT OFFICE.

FRED A. HEPWORTH AND LOU SANTANY, OF AURORA, ILLINOIS.

SOIL-PULVERIZER.

SPECIFICATION forming part of Letters Patent No. 353,491, dated November 30, 1886.

Application filed May 7, 1886. Serial No. 201,458. (No model.)

To all whom it may concern:

Be it known that we, FRED A. HEPWORTH and LOU SANTANY, citizens of the United States, residing at Aurora, county of Kane, and State of Illinois, have invented certain new and useful Improvements in Soil-Pulverizers, of which the following is a specification.

This invention relates to apparatus or machines for pulverizing or disintegrating the soil, particularly after the same has been plowed, and has for its several objects, first, to provide novel and efficient means whereby a series of rotary pulverizing devices may be raised and lowered at will in order to vary the depth at which it is desired they shall penetrate the soil; second, to provide means whereby the pulverizing devices may at will be adjusted to various angles relatively to the line of progression, whereby the soil may be thrown toward or away from the center, and thereby properly leveled, and all depressions—such, for example, as furrows—filled and leveled off; third, to provide certain novel and improved details, all tending to the general efficiency and serviceability of the machine.

To these and other useful ends our said invention consists in matters hereinafter described, and particularly pointed out in the claims.

In an apparatus or machine embodying the principles of our invention the pulverizing devices are supported from a wheeled body-frame, and means are provided whereby the pulverizing devices may be raised and lowered independently of the body-frame, in order to vary the depth at which it is desired they shall enter the soil or to raise them clear of the latter. The adjusting devices for raising and lowering the pulverizing devices are placed under control of the driver, who can occupy a seat supported upon the main frame. The pulverizing devices, while practically carried by the main frame, are more immediately supported from or carried by a pair of swinging supports, to which end the pulverizing devices are separated into two sets or gangs, one set being upon an axle carried by one horizontally-swinging support, and the other set being secured upon an axle which is carried by the other swinging support, whereby the two swinging supports may be swung forward or to the rear for the purposes of throwing the soil away from or toward the center; or, if desired, the supports can be held in a plane at right angles to the line of progression, so that the soil shall be evenly distributed.

Other features will be hereinafter more fully disclosed.

In the drawings illustrating an apparatus constructed in accordance with the principles of our invention, Figure 1 represents said apparatus or machine in perspective. Fig. 2 is a top plan view, and Fig. 3 is a detailed section taken on a vertical plane indicated by the line *x x*, Fig. 2, said view serving to illustrate one of the rack-bars in its lowest position with one of the hand-levers swung up to the highest point.

Referring by letter to the several figures of the drawings, in which like letters denote like parts, A indicates the main or body frame, which is supported upon wheels B and provided with an appropriate pole or tongue, 1.

C indicates a series of rotary devices adapted for disintegrating or pulverizing the soil and carried by the wheeled body-frame. The pulverizing devices are so carried that they may be raised and lowered independently of the body-frame, in order to vary the depth to which they shall penetrate the soil, and to such end we provide the upright rack-bars D, which are susceptible of vertical adjustment, and which at their lower ends are provided with bearings 2, from which the rotary pulverizing devices are supported. These rack-bars are conveniently raised and lowered by means of hand-levers E, which are placed within convenient reach of the driver, who may occupy a seat, F, that is supported upon the body-frame. A simple and efficient mechanism for placing a pair of these rack-bars D under the control of a hand-lever consists of a horizontally-arranged rock-shaft, 3, provided with gear-segments 4, which engage said rack-bars, the handle or hand-lever E being in such case desirably secured to one of said gear-segments.

It is desirable that the pulverizing devices shall be maintained in their raised or lowered position without special effort on the part of the driver, and to such end a suitable construction of locking device will be employed,

the construction herein shown consisting of an ordinary spring-controlled sliding latch, 5, arranged to engage one of the gear-segments and connected by a link, 6, with a thumb-lever, 7, upon the hand-lever to which said latch is allotted and upon which it works in appropriate bearings. Broadly considered, the pulverizing devices are supported from and carried by the body-frame, and are adjustable vertically and independently thereof by a lever. Provision is, however, herein made whereby the pulverizing devices may be set at various angles to the line of progression, so that the soil may, when desired, be thrown either toward or away from the center, as required. To such end the series of pulverizing devices is divided into two separate sets, the axle of one set being journaled in bearings at the lower end of one pair of rack-bars D, and the axle of the other set being correspondingly journaled in bearings upon another pair of said rack-bars. These two pairs of rack-bars are respectively carried by one and the other of two horizontally-arranged swinging bars, 8, which are pivoted at their inner adjacent ends upon the body-frame.

The devices for raising and lowering the rotary pulverizers are supported upon the swinging bars 8, upon which latter the fixed gears or racks 9 for the latches 5 are also secured. In this way the hand-levers which are carried by the swinging bars 8 can be employed for swinging said bars either forward or to the rear, as well as for the purpose of raising and lowering the pulverizing devices. The vertically-sliding rack-bars D work through and are guided and properly steadied by the trunks or guides 10, that are secured to the bars 8, and desirably braced by rods 11.

By reason of the foregoing arrangement the axles of the rotary pulverizing devices can be maintained in a line at right angles to the line of progression, as in Fig. 1, or thrown forward, so as to converge rearwardly, and thereby lie in acute angles to the line of progression. On the other hand, said axles may be swung back into the position indicated by dotted lines 12, Fig. 2, in which position said axles will converge toward the front of the machine and lie in obtuse angles to the line of progression. Where the soil that is to be pulverized lies substantially even, the pulverizing devices can be held in the position shown in Fig. 1. Where the soil is to be thrown toward the center, either or both sets of pulverizing devices may be brought into the position shown in Fig. 2, full lines; and where the soil is to be thrown outwardly or to one or both sides either or both sets of pulverizers may be brought into the position indicated by the dotted lines 12.

It will be observed that one set of pulverizers can be brought into one position relative to the line of progression and the other set of pulverizers brought into a different position, according to the requirements of the ground.

In order to swing either set or gang of pulverizers, it is desirable to first raise the same clear of the ground, after which the hinged or pivoted bar from which the said set or gang of pulverizers is carried can be swung round so as to place the gang of pulverizers at the desired angle to the line of progression. Said bars can be either swung round by force applied to the hand-levers or to the bars themselves, as may be found most convenient.

While various means could be employed for maintaining the disk-gangs or sets of pulverizers in any one of the working positions herein referred to, we have shown chains 13 as a means for attaining such desired end. The chains may be attached at one end to the swinging bars 8, or, as herein shown, to the guides 10, from whence they are carried forward and hooked or hitched onto the body-frame in any suitable way—as, for example, the body-frame can be provided with a pair of hooks onto which the chains may be caught. These chains not only prevent the sets of pulverizers or disk-gangs from being swung too far to the rear, but, by varying the length of chain between the hooks and the sets of pulverizers, the latter can be held in any of the working positions herein mentioned.

The rotary pulverizing devices are desirably in the nature of rotary cutting-disks slitted radially, and having at such points their peripheral portions bent laterally in opposite directions, so as to increase the extent of their cutting action and more effectively disintegrate all portions of the soil that is to be pulverized. We do not, however, confine ourselves to this particular construction, since we may use other forms of rotary cutters, which would prove serviceable in the present connection.

The body-frame herein shown presents a light, substantial, and simple construction, and is principally composed of the axle 14 and a pair of bars, 15, secured at their outer ends to the axle at points near the ends of the latter, and from said points arranged to converge toward the rear of the machine; and to these members may be added the tongue or pole, which is secured to the axle, and which extends back to the point of junction between the inner ends of the bar or bars 15, at which said point said bars and pole can be rigidly bolted or otherwise secured together. Plates 16, which afford bearings for the pivot of bars 8, are secured at the point of junction between the rear end of the tongue and the bar or bars 15, and as a simple expedient the bolts that are employed for securing said bearing-plate can also be employed for securing together the bar or bars 15 and the tongue or pole. These said bolts are also herein utilized as a means for securing the standard 17 of the driver's seat, F.

The body-frame constitutes a tilting support or carrier for the pulverizing devices, which are arranged in rear of said tilting-support, whereby the weight of the pulverizing devices, combined with the weight of the mechanism for adjusting the same and the weight

of the driver, who is seated in rear of the axle, serves to cause the pulverizers, when lowered, to readily penetrate the soil. The evener-bar 17 is preferably attached to the under side of the bar or pole, as in Fig. 1, so as to avoid raising the pulverizing devices irrespective of their adjustment, although, where found desirable, the evener-bar or whiffletree may be pivotally secured upon the upper side of the tongue or pole.

What we claim as our invention is—

1. In a soil-pulverizer, a set of rotary pulverizing devices secured upon an axle, vertically-sliding rack-bars D, provided with bearings for said axle, a rock-shaft provided with gear-segments engaging the rack-bars, and a hand-lever for actuating the rock-shaft, substantially as described.

2. In a soil-pulverizer, the two sets of rotary pulverizing devices carried by horizontally-swinging supports which are pivotally attached to a wheeled body-frame, substantially as described.

3. In a soil-pulverizer, the two sets of rotary pulverizing devices carried by and adjustable vertically and independently of swinging supports which are pivotally attached to a wheeled body-frame, substantially as described.

4. In a soil-pulverizer, the two sets of pulverizing devices carried by horizontally-swinging supports which are pivotally attached to a wheeled body-frame, and hand-levers for swinging said supports, substantially as described.

5. In a soil-pulverizer, the two sets of rotary pulverizing devices supported from and adjustable in height independently of a pair of swinging supports which are pivotally attached to a wheeled body-frame, and means, substantially as described, for raising and lowering the pulverizing devices, for the purpose set forth.

6. The combination, with the wheeled body-frame, of the horizontally-swinging bars 8, pivoted thereto, the vertically-sliding rack-bars working through guides, which are attached to said horizontal swinging bars, the rotary pulverizing-disks carried by axles which have their bearings on the rack-bars, and means for lowering and raising the rack-bars, substantially as described.

7. The combination, with a wheeled body-frame, of the pair of horizontally-swinging bars pivoted to said body-frame in rear of the axle thereof, pulverizing devices adjustably supported from said swinging bars, and means for raising and lowering the pulverizing devices, substantially as described.

8. The combination, with a wheeled body-frame, of the horizontally-swinging bars pivoted thereto, the trunks or guides 10, secured to said bars, the rotary pulverizing devices carried by the rack-bars which are arranged to work through said guides, and means, substantially as described, for raising and lowering the rack-bars, for the purpose set forth.

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