E. HOVEY.

LAND WORKER AND SEEDER.

APPLICATION FILED MAY 11, 1910.

1,021,929.

Patented Apr. 2, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

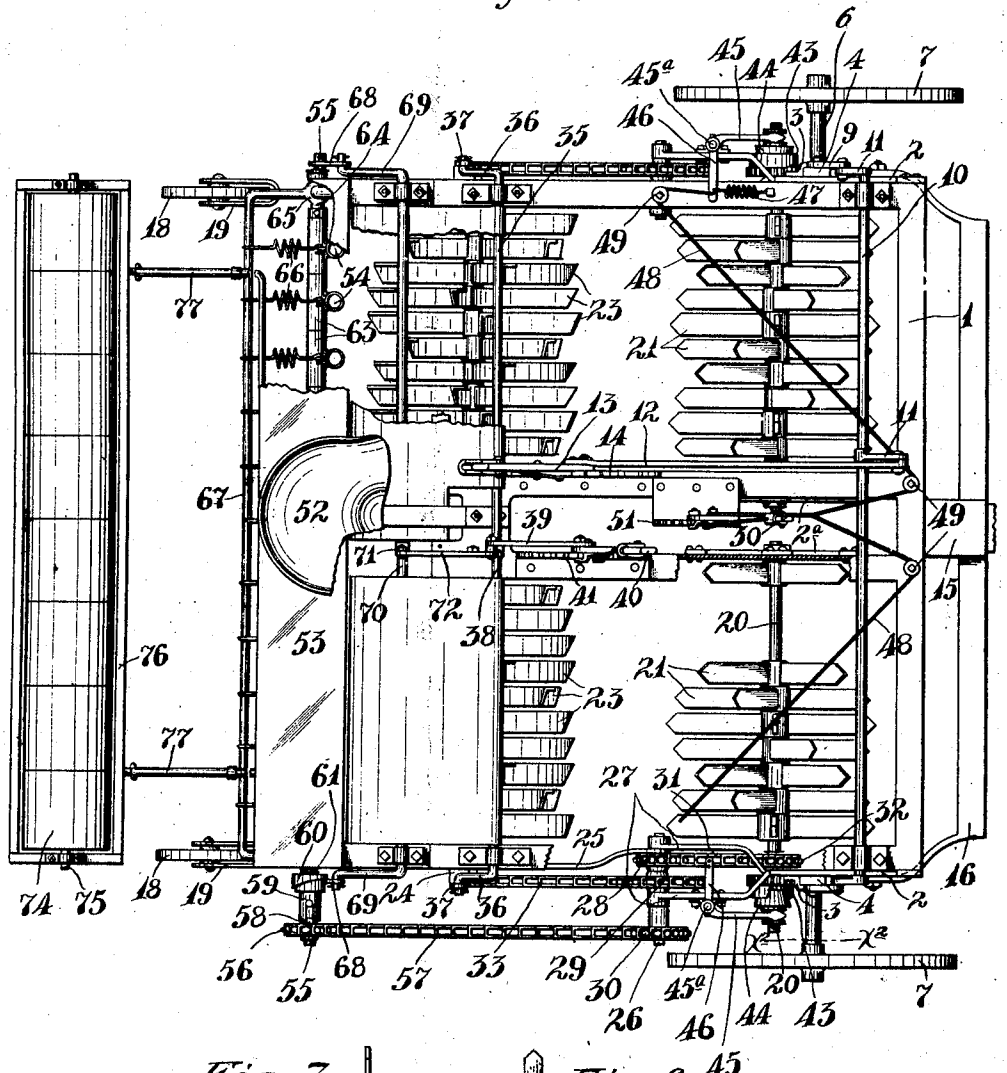


Fig. 7.

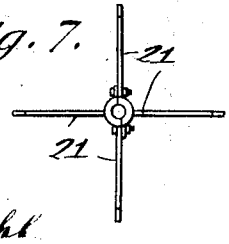
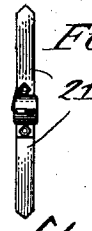


Fig. 8.



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2 SHEETS—SHEET 2.

Fig. 6.

Fig. 5.

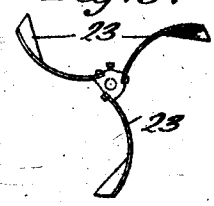


Fig. 2.

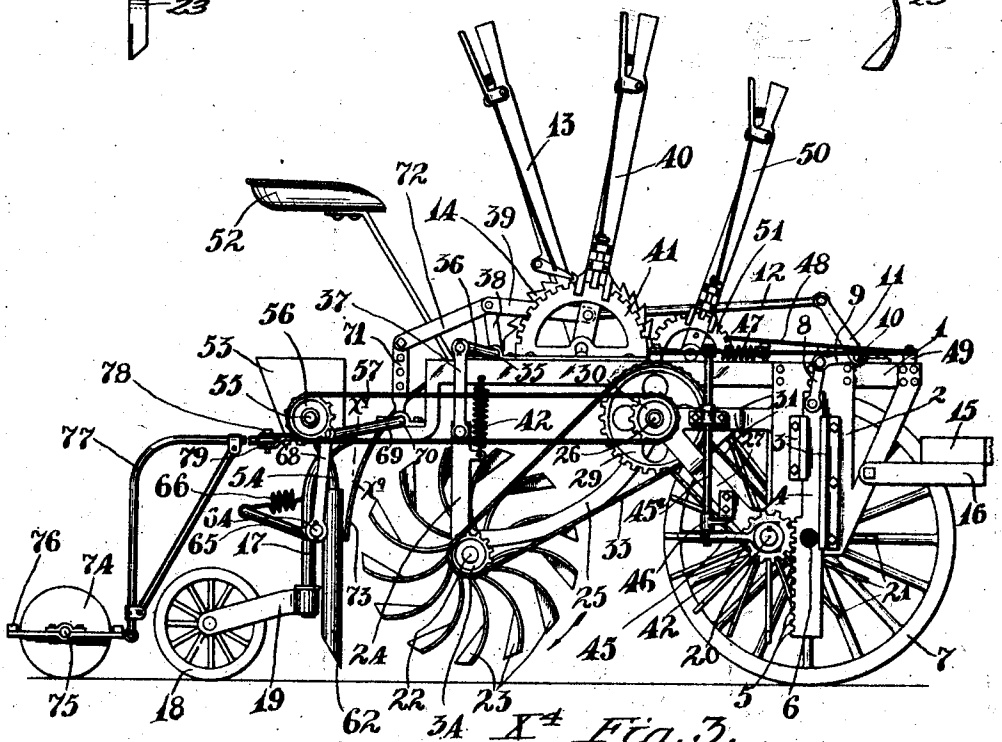


Fig. 3.

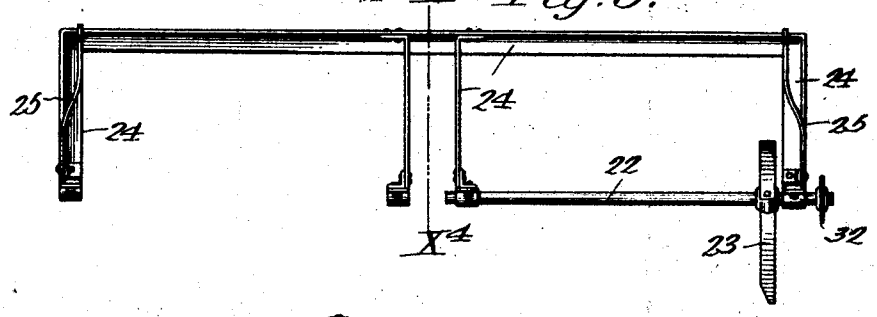
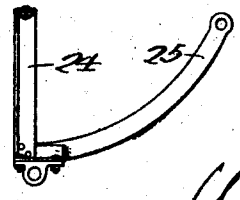


Fig. 4.



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UNITED STATES PATENT OFFICE.

EDWARD HOVEY, OF MINNEAPOLIS, MINNESOTA.

LAND-WORKER AND SEEDER.

1,021,929. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed May 11, 1910. Serial No. 560,557.

To all whom it may concern:

Be it known that I, EDWARD HOVEY, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Land-Workers and Seeders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its particular object to provide an efficient land worker and seeder, and to such ends, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the machine in its complete and preferred arrangement, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a plan view of the improved machine; Fig. 2 is a side elevation of the improved machine, with one wheel removed and with one axle sectioned on the line x^2 x^2 of Fig. 1; Fig. 3 is a detail view in front elevation showing a supplemental supporting frame for a driven toothed cylinder or shaft, and also parts of one of the said toothed cylinders; Fig. 4 is a section on the line x^4 x^4 of Fig. 3; Fig. 5 is a side elevation of one of the toothed driven cylinders; Fig. 6 is a front elevation of one of the sections of the said cylinder; Fig. 7 is a side elevation of a toothed driving cylinder or shaft; and Fig. 8 is a front elevation of one of the sections of the said driving cylinder.

The main frame 1 of the machine is a rectangular metallic structure, having at the front portions of its sides depending guide brackets 2 equipped with vertical guide channels 3. In the guide channels 3, vertical adjustable rack bars 4 having teeth 5, are mounted; and the lower portions of these rack bars, are provided with outwardly projecting trunnions 6, on which the front wheels 7 are journaled. The upper ends of the rack bars 4 are connected by links 8, to crank arms 9, of a rock shaft 10, journaled in suitable bearings of the frame 1, and provided at its intermediate portion with an upwardly extended arm 11. The arm 11 is connected by a rearwardly extended rod 12, to a latch lever 13 that is pivoted to and coöperates with a toothed lock segment 14 secured on the central portion of the frame 1. As is evident, by manipulation of the lever 13, the front portion of the frame 1 may be raised and lowered in respect to the front wheels 7.

The numeral 15 indicates a pole, having a pole bracket 16 pivotally connected to the frame brackets 2.

The sides of the frame 1 at their rear ends are provided with downwardly extended legs 17; and the rear portion of the machine is supported by caster wheels 18, having brackets 19 swiveled on the lower ends of the legs 17.

In this improved machine I employ toothed driving and toothed driven cylinders or shafts, which are arranged for engagement with the ground, the former serving to drive the latter. The toothed driving cylinders, as well as the toothed driven cylinders, are preferably divided or arranged in longitudinally spaced axially alined pairs or sections. As shown, each toothed driving cylinder comprises a shaft 20 and a multiplicity of flat radial blades or teeth 21. At their ends these cylinder shafts 20 are journaled in the outer frame brackets 2 and in similar inner frame brackets 2^a. Each driven toothed cylinder comprises a shaft 22 and curved teeth or blades 23, the outer ends of which latter are preferably sharpened and set obliquely so that they will readily cut into and disintegrate the ground.

The two axially alined shafts or shaft sections 22, (see particularly Figs. 2 and 3), are journaled in depending outer and intermediate legs of a supplemental frame 24. This supplemental frame 24, at its ends, is provided with forwardly projecting, rigidly secured arms 25, which at their front ends are shown as pivoted on short shafts 26 journaled in rear extensions 27 of the frame brackets 2. These shafts 26 are axially alined transversely of the machine, and each carries two sprockets, 28, 29 and one thereof also carries a third sprocket 30. Sprocket chains 31 run over the sprockets 28 and over the sprockets 32, secured on the corresponding shafts 20 of the toothed driving cylinders. Sprocket chains 33 run over the sprockets 29 and over sprockets 34 on the

outer ends of the shafts 22 of the driven toothed cylinders. The said sprocket and chain drives are so arranged that the driven toothed cylinder will be given about three rotations for each rotation of the driving toothed cylinder.

Mounted in suitable bearings on the main frame 1, overlying the supplemental frame 24, is a rock shaft 35, provided at its ends with rearwardly extended arms 36, that are connected by links 37 to the upper end portions of the said supplemental frame 24. At its central portion the rock shaft 35 has an upwardly extended arm 38 that is connected by a link 39 to a latch equipped lever 40 that coöperates with and is adapted to be held in different positions by a notched lock segment 41 rigidly secured on the central portion of the main frame 1. Coiled springs 42, (see Fig. 2) carry a part of the weight of the supplemental frame 24, and parts mounted thereon, from the sides of the main frame 1.

Loosely journaled on the outer ends of the shafts 20 of the driving toothed cylinders are spur pinions that mesh with the teeth 5 of the respective vertical movable rack bars 4. Each pinion 42 carries one member 43 of a friction clutch, the other member 44 of which is mounted to slide on and is keyed or otherwise held to rotate with the said shaft 20, and is adapted to be moved to and from operative position by a suitable bell crank. Each of the said bell cranks, as shown, is made up of a shipper arm 45, an upper arm 46, and a vertical shaft 45^a, which latter is mounted in suitable bearings on rear extensions of the frame brackets 2. Coiled springs 47 applied to the inwardly extended arms 46 of the bell cranks and to the sides of the frame 1 yieldingly hold the coöperating clutch members 43 and 44 separated. To the inwardly extended arms 46 of the said bell cranks, for action in opposition to the springs 47, are attached operating cables or wires 48. These cables 48 run over suitable guide sheaves 49 on the frame 1 and are attached to a common operating latch equipped lever 50 that is adapted to be held in different positions by a coöperating lock segment 51 secured to the central portion of the frame-work 1. The driver's seat 52 is suitably applied to the rear central portion of the frame-work 1.

The machine so far described is a complete machine operative to reduce the ground to condition for planting, that is, it will do the work both of a plow and of a harrow, and often the machine will be used for such purposes only.

To adapt the machine to simultaneously reduce the soil to condition for seeding and to seed the same, seeding adjustments are provided, and these, in the preferred form, will now be described.

A transversely extended seed box 53, such as used in ordinary seeding machines, is secured on the rearwardly extended portion of the main frame 1 and seed feeding devices of ordinary construction, such as customarily used in seeding machines, are arranged to work within the seed box to deliver the seeds to depending spouts 54, which are preferably flexible. Of the parts of the feed device, it is only necessary, for the purpose of this case, to note the feed shaft 55, which is provided at one end with a sprocket 56, over which and the sprocket 30 on one of the shafts 26, runs a sprocket 57. The sprocket 56 is loose on the feed shaft 55 and is provided with a half clutch 58 that is adapted to be engaged by a coöperating half clutch 59 that is slidably mounted on said shaft 55 and provided with a cam head 60. (See Fig. 1.) A coiled spring 61 compressed between the cam head 60 and the adjacent end of the seed box 53 tends to hold the half clutch 59 engaged with the half clutch 58, thereby coupling the sprocket 56 with the shaft 55 for rotation therewith.

The seed spouts 54 deliver into the upper ends of seed boots 62, the lower ends of which are adapted to be inserted into the ground, when lowered. These seed boots 62, near their upper ends, are provided with horizontal bearing sleeves 63, that are independently pivoted on a horizontal transverse supporting shaft 64, the ends of which are provided with eyes 65 arranged to slide vertically upon the legs 17 of the frame 1. The seed boots 62 are yieldingly held in operative positions, by coiled springs 66 attached to the upper ends thereof, as best shown in Fig. 1, and attached to a rearwardly extended bale 67, the arms of which are rigidly secured to the eyes 65 of the shaft 64. These springs hold the seed boots in operative positions at all times, except when a rock, root or other abnormal obstruction is encountered. At such times, they will yield and prevent breakage of the machine.

At its extreme ends the boot supporting shaft 64 is connected by links 68 to the crank formed ends 69 of a transverse rock shaft 70 mounted in suitable bearings on the rear portion of the frame 1 and provided at its intermediate portion with an upwardly extended arm 71. This arm 71 is connected by a link 72 to the arm 38 of the rock shaft 35, so that vertical movements will be imparted to the seed boots 62 from the lever 40 simultaneously with the vertical movements imparted to the driven toothed cylinders. Preferably the arm 71 is provided with a multiplicity of perforations to provide an adjustable connection between the arm 71 and link 72, whereby different extents of vertical movements may be imparted to the seed boots under predetermined vertical movements of the auxiliary frame 24.

A curved shield or dash-board 73 is secured to the upper rear portion of the frame 1 and extends downward between the upper portions of the seed boots 62 and the upper portion of the driven toothed cylinder, for a purpose which will presently appear.

To close the furrows made by the seed boots 62, and to pack the ground over the planted seeds, a roller is preferably arranged to travel at the rear of the said seed boots and back of the caster wheels 18. This roller 74 is preferably made up of a multiplicity of sections journaled on a shaft 75, held by a rectangular frame 76, the front edge of which is pivotally connected, for both vertical and horizontal movements, to the lower ends of a pair of coupling brackets 77, shown as of triangular form. The upper and forwardly extended ends of the brackets 77 are detachably pivoted at 78 to rearwardly extended forks 79 secured to the rear side portions of the frame 1. These pivots 78 permit the brackets 77 to swing laterally when the machine is turning the corner or traveling on a curved line.

It will be noted that the upper end of the right hand link 68 stands in position to engage the oblique surface of the cam head 60, so that when the shaft 65 shall have been given approximtely one-half rotation, under advance movements of the machine, the sliding half clutch 55 will be disengaged from the half clutch 58 of the loose continuous driven sprocket 56. The purpose accomplished by this construction is to automatically stop the feeding action when the seed boots and toothed driven cylinder are raised into in-operative positions and to automatically throw the feed mechanism into action whenever the said seed boots and cylinders are lowered into operative positions.

The teeth 21 of the driving toothed cylinders are adapted to be simultaneously lowered into contact with the ground by a forward movement of the lever 13, which allows the forward portion of the main frame 1 to lower. The teeth 21 will not only engage the ground, but will enter quite deeply into the ground and under forward movement of the machine will cut and pulverize the ground to a very considerable extent and turn upward more or less thereof. The rotation of the said driving or front toothd cylinder positively rotates the driven or rear toothed cylinder at a relatively high speed in the same direction, to-wit: in the direction of the arrow marked thereon in Fig. 2. By rearward movement of the lever 40 the rear or driven toothed cylinder and the seed boots 62 may be lowered into the ground to the desired extent. This high rotation of the driven toothed cylinder will cut and finely pulverize the ground and leave the same in as good or better conditon than ground that has been well plowed and well harrowed. The cylinder teeth 23 will throw the pulverized dirt rearward and upward in a fine shower, most of which will be intercepted by the dash-board 73, but a part of this shower of dirt will be thrown rearward under the dash-board and between the seed boots to properly cover the seed deposited in the furrows formed by the said seed boots. By the roller 74, which follows the seed boots, the furrows will be closed and the ground properly packed over the planted seeds.

As is obvious, the rear toothed cylinder and the seed boots will be simultaneously raised into in-operative positions by a forward movement of the lever 40. When it is desired to raise the front portion of the frame 1 from its lowered position, the lever 50 is moved rearward so as to simultaneously connect the clutch members 43 and 44. This, under forward movement of the machine and the resulting rotation of the front toothed cylinder, will cause the pinions 42 to travel upward on the rack bars 4 and thereby lift the front portion of the said frame 1 until the points of the teeth 21 are brought to the surface of the ground, after which the further upward movement of the front portion of the said frame 1 and of the said front toothed cylinders must be completed by rearward movement of the lever 13.

What I claim is:

1. In a machine of the kind described, the combination with a truck having a vertically adjustable main frame and a supplemental frame carried by said main frame, means for independently adjusting said main and supplemental frames, toothed cylinders mounted on said main and supplemental frames, for independent movements into and out of contact with the ground, and a driving connection from the one toothed cylinder to the other toothed cylinder arranged to drive the two cylinders at different speeds, substantially as described.

2. In a machine of the kind described, the combination with a truck having a vertically adjustable main frame and a supplemental frame carried by said main frame, means for independently adjusting said main and supplemental frames, toothed cylinders mounted on said main and supplemental frames for independent movements into and out of contact with the ground, driving gear from the toothed cylinder on said main frame to the toothed cylinder on said supplemental frame, arranged to drive the latter noted cylinder at a higher rate of speed than the former, substantially as described.

3. In a machine of the kind described, the combination with a truck frame and a truck wheel, of a rack bar mounted for vertical adjustment on said frame, and provided with a trunnion, on which said wheel is journaled,

of a toothed cylinder journaled on said main frame and movable vertically therewith into and out of contact with the ground, a pinion loosely mounted in respect to said cylinder and in mesh with the said rack bar, and a clutch for connecting said pinion for rotation with said cylinder, whereby the said toothed cylinder will be raised out of the ground under the forward movement of the machine, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD HOVEY.

Witnesses:
HARRY D. KILGORE,
F. D. MERCHANT.