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HYDROCARBON DISK CULTIVATOR.

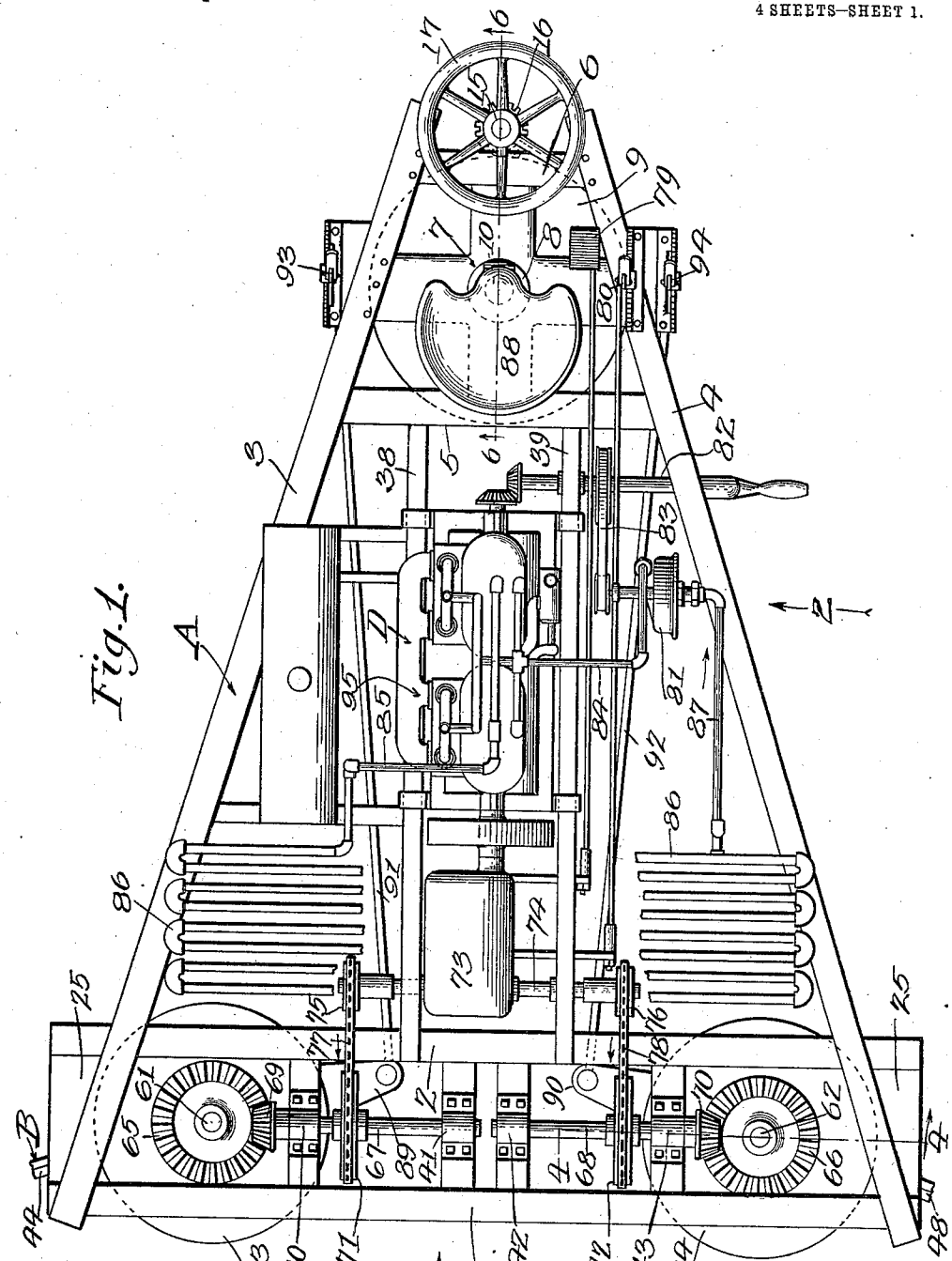
APPLICATION FILED NOV. 26, 1910.

1,014,899.

Patented Jan. 16, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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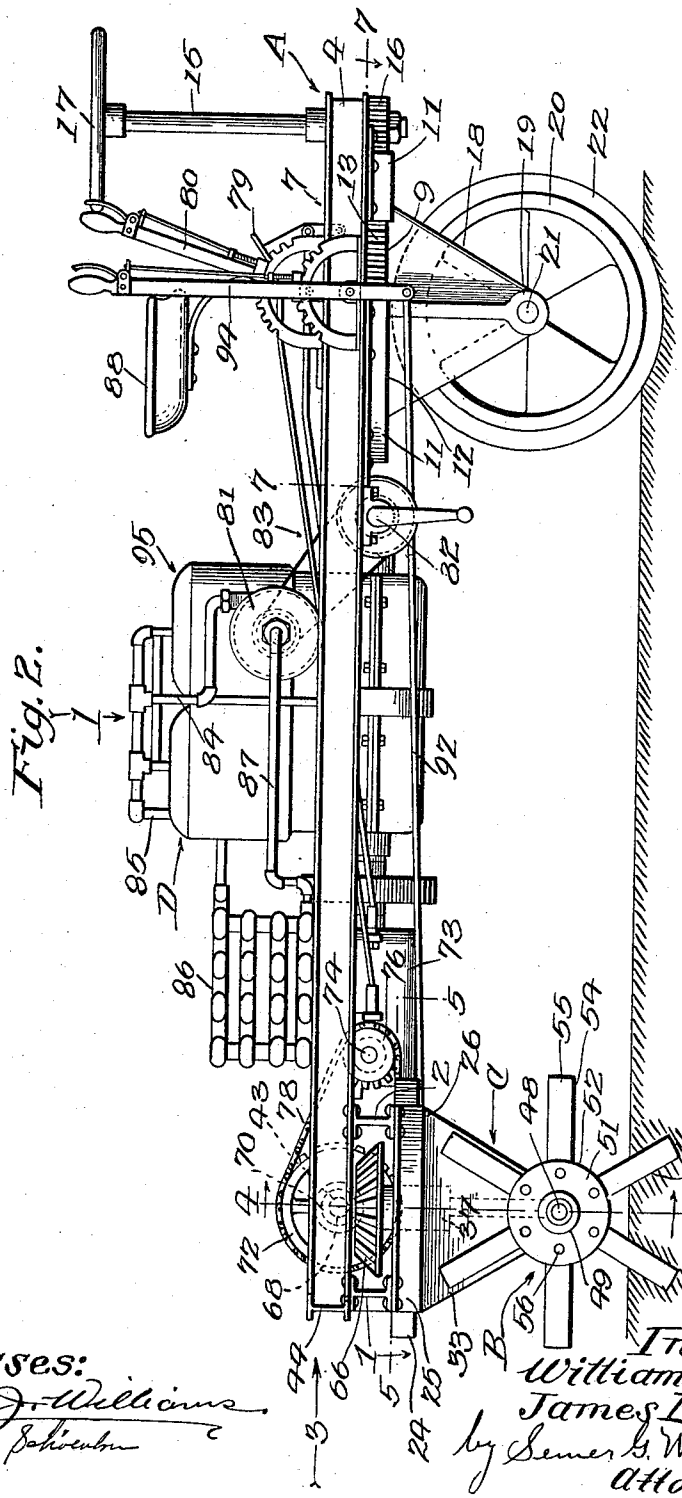
4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 1.

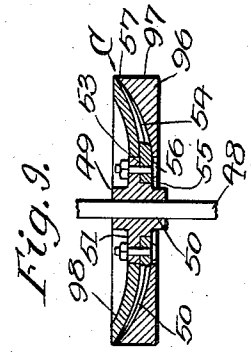

Fig. 3.

Fig. 2.

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4 SHEETS—SHEET 4.

Fig. 6.

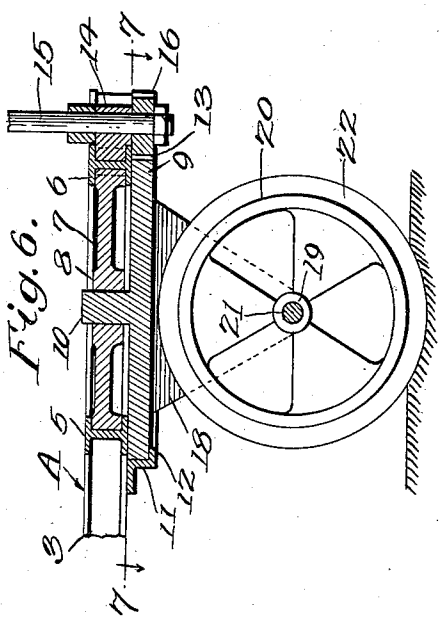


Fig. 7.

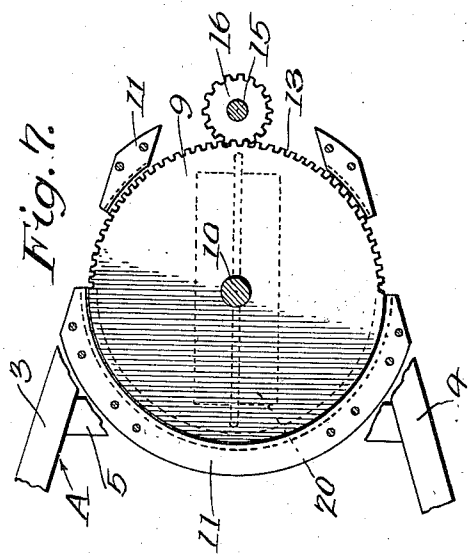


Fig. 4.

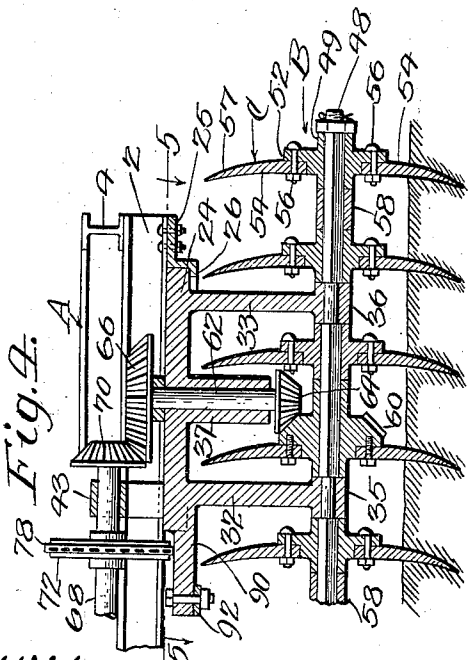
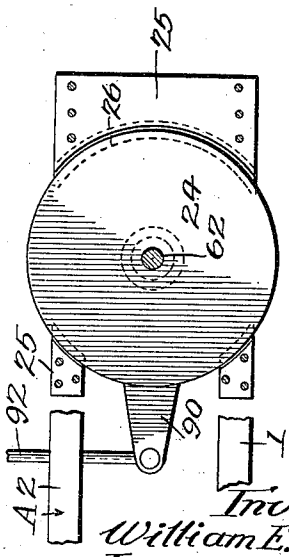


Fig. 5.



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UNITED STATES PATENT OFFICE.

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HYDROCARBON DISK CULTIVATOR.

1,014,899. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed November 26, 1910. Serial No. 594,305.

To all whom it may concern:

Be it known that we, WILLIAM E. NYE and JAMES E. CRAM, citizens of the United States, residing at Highland, California, have invented a new and useful Hydrocarbon Disk Cultivator, of which the following is a specification.

Our object is to construct a rotary disk cultivator propelled directly from a hydrocarbon engine; and our invention consists of the novel features herein shown, described and claimed.

We are aware that disk cultivators may have been drawn by traction engines but we are not aware that a self-contained machine has been constructed comprising cultivator disks mounted upon the shafts and a hydro-carbon engine connected directly to the shafts so as to drive the machine by rotating the shafts.

In a companion application we have shown, described and claimed broadly a mechanically driven disk cultivator and we do not wish to make such claims in this application.

In general terms our present invention consists of a suitable cultivator frame; cultivator shafts mounted in the frame; cultivator disks mounted rigidly upon the shafts and a hydro-carbon gas engine mounted upon the frame and connected to the shafts so as to rotate the shafts, thereby rotating the disks and propelling the machine.

In the drawings: Figure 1 is a top plan view of a hydro-carbon-gas-disk-cultivator embodying the principles of our invention and taken looking in the direction indicated by the arrows 1 in Figs. 2 and 3. Fig. 2 is a side elevation as seen looking in the direction indicated by the arrows 2 in Figs. 1 and 3. Fig. 3 is a rear elevation as seen looking in the direction indicated by the arrows 3 in Figs. 1 and 2. Fig. 4 is a vertical cross section on the lines 4—4 of Figs. 1 and 2. Fig. 5 is a broken horizontal section on the lines 5—5 of Figs. 2, 3 and 4. Fig. 6 is a vertical longitudinal sectional detail on the line 6—6 of Fig. 1. Fig. 7 is a broken horizontal section on the lines 7—7 of Figs. 2 and 6. Fig. 8 is a side elevation of one of the cultivator disks. Fig. 9 is a cross section on the line 9—9 of Fig. 8.

Referring to the drawings in detail: A hydro-carbon-gas-disk-cultivator embodying the principles of our invention comprises: A, a cultivator frame. B, cultivator shafts pivotally and rotatably mounted in the frame. C, toothed cultivator disks rigidly mounted upon the shafts. D, a hydro-carbon gas engine mounted upon the cultivator frame and connected to the cultivator shafts so as to rotate the shafts and drive the cultivator.

The details of the frame A are as follows: The main part of the frame is A-shaped in plan, the I-beams 1 and 2 are nearly as long as the space to be covered by the cultivator and they are placed in parallel horizontal positions about sixteen to twenty-four inches apart and the I-beams 3 and 4 are placed on top of the ends of the I-beams 1 and 2, said I-beams 3 and 4 coming nearer together at the forward ends. The I-beams 5 and 6 are inserted between the forward ends of the I-beams 3 and 4 and on the same level. The bearing-block 7 has four arms and said bearing-block is inserted between the I-beams 3 and 4 and between the I-beams 5 and 6 and on a level therewith. The vertical bearing 8 is formed at the center of the bearing-block 7. The steering-wheel-turntable 9 is a disk twenty-four or thirty inches in diameter and is placed under the I-beams 3, 4, 5 and 6 and has a pintle 10 extending upwardly from its center through the bearing 8. Housing-plates 11 are secured to the lower faces of the I-beams 3, 4, 5 and 6 and have flanges 12 extending under the edge of the turntable 9 so as to form a bearing for the turntable. Gear teeth 13 are formed upon the edge of the forward half of the turntable. A bearing 14 extends forwardly from the I-beam 6; a steering-post 15 is mounted vertically in the bearing 14 and a pinion 16, upon the lower end of the steering-post 15, meshes with the teeth 13 upon the turntable. A hand wheel 17 is fixed upon the outer end of the steering-post; so that by manipulating the hand-wheel 17 the turntable 9 is rotated. Posts 18 extend downwardly from the turntable 9, one on each side of the center, and axle bearings 19 are formed in the lower ends of the posts. The steering-wheel 20 is mounted between the posts and the axle 21 of the steering-wheel is mounted in the bearings 19; so that by manipulating the hand-wheel 17 the steer-

ing-wheel is turned to guide the machine. A central vertical flange 22 extends from the steering-wheel into the ground.

The cultivator-disk-turntables 23 and 24 are flat disks about twenty to twenty-four inches in diameter, placed under the ends of the I-beams 1 and 2 and housing-plates 25 are secured to the lower faces of the I-beams 1 and 2 and have flanges 26 extending under the edges of the turntables 23 and 24 so as to form bearings for the turntables to rotate in. Posts 27 and 28 extend downwardly from the turntable 23 and split-bearings 29 and 30 are formed at the lower ends of the posts. A central-vertical-bearing 31 extends up and down from the turntable 23. Posts 32 and 33 extend downwardly from the turntable 24 and split-bearings 35 and 36 are formed at the lower ends of the posts. A central-vertical-bearing 37 extends up and down from the turntable 24.

I-beams 38 and 39 are inserted longitudinally, one on each side of the center, with their rear ends resting upon the I-beam 2 and their forward ends secured to the I-beam 5, on a level therewith, these I-beams serving to support the hydro-carbon-gas-engine mechanism. Bearing-blocks 40 and 41 are inserted between the I-beams 1 and 2, on the left side of the longitudinal center, and similar bearing-blocks 42 and 43 are inserted between the I-beams 1 and 2 on the other side of the longitudinal center.

The details of the cultivator shafts B are as follows: The shaft 44 has rounded portions, one on each side of its longitudinal center and intermediate of its ends, said rounded portions being mounted in the bearings 29 and 30 and the remaining portions of the shaft being square in cross section, with the ends screw threaded to receive the nuts 46 and perforated to receive the spring cotters 47. The shaft 48 is identical in construction with the shaft 44, said shaft 48 being mounted in the bearings 35 and 36.

The details of the cultivator disks C are as follows: Each disk has a hub 49, having a square central opening 50 to fit the shafts 44 and 48. A web 51 extends from the hub 49 and has a flat periphery 52 which serves as a tread to engage the ground and limit the depth to which the teeth penetrate the ground. The webs 51 are about three inches wide on a tread face and six radial recesses 53 are formed on one side of each web to receive the bases of the teeth. The teeth 54 have rectangular heads 55 fitting in the recesses 53 and bolts 56 secure the heads in place. The heads 55 are about one half as thick as the web 51. The cutting portions 57 of the teeth extend outwardly from the heads 55 and are curved and are sharpened on their outer ends and two side edges; so that when seen in side elevation or in section the teeth are dishing, substantially on the same lines as an ordinary smooth edged cultivator disk. A cultivator disk constructed in this way will cut and chop up the ground better than a disk having a smooth edge and at the same time will furnish better traction force for propelling the machine. The cultivator disks are placed upon the shafts 44 and 48 and collars 58 are inserted between the disks where necessary to give the proper space between the disks. The nuts 46 are screwed upon the ends of the shafts and then the spring cotters 47 are inserted through the ends of the shafts to hold the nuts from unscrewing.

The details of the hydrocarbon engine mechanism are as follows: Beveled gears 59 and 60 are mounted in the shafts 44 and 48; shafts 61 and 62 are mounted in the bearings 31 and 37 and beveled gears 63 and 64, upon the lower ends of these shafts, mesh with the beveled gears 59 and 60. Large beveled gears 65 and 66 are fixed upon the upper ends of the shafts 61 and 62. Counter shafts 67 and 68 are mounted in the bearings 40, 41, 42 and 43 and beveled pinions 69 and 70, upon these counter shafts, mesh with the gears 65 and 66. Sprocket wheels 71 and 72 are fixed upon the shafts 67 and 68. The engine mechanism shown is a standard type of explosive engine and need not be described in detail. The clutch, the transmission gears and the differential gear are in the case 73 and the differential shaft 74, carrying the differential gear, extends through the case 73 and has sprocket wheels 75 and 76 connected to the sprocket wheels 71 and 72 by the chains 77 and 78. The foot lever 79 controls the clutch and the hand lever 80 controls the transmission gears to change the speed and reverse. A centrifugal pump 81 is driven from the starter shaft 82 by belt and pulleys 83 and the discharge end of the pump is connected to the water jacket by a pipe 84 and the water goes out of the water jacket, through the pipe 85, to the radiator coil 86, and the other end of the coil is connected to the intake end of the pump by a pipe 87. The seat 88 is mounted upon the bearing block 7 in a position convenient to the hand wheel 17. Arms 89 and 90 extend inwardly from the cultivator turntables 23 and 24 and rods 91 and 92 connect these arms to the hand levers 93 and 94; so that by manipulating the hand levers 93 and 94 the turntables 23 and 24 are rotated to swing the cultivator disks. The engine mechanism 95 and the transmission case 73 are mounted upon the I-beams 38 and 39.

When it is desired to move the machine from one field to another it is important that means be provided for throwing the cultivator disks out of contact with the ground and the means we have provided is shown in Figs. 8 and 9. Segmental shoes 96 fit against the convex sides of the teeth,

there being preferably three segments forming a circle and having tread surfaces 97, and segmental shoes 98 fit against the concave sides of the teeth 54 and are secured to the shoes 96 by bolts 99. It is obvious that the shoes 96 and 98 may be placed upon any of the intermediate cultivator disks, the treads 97 of the wheels thus produced, extending beyond the points of the cultivator teeth and running upon the ground, will raise the cultivator teeth out of contact with the ground and then the machine will run along the road like an automobile.

It is obvious that the details of construction may be varied in many ways without departing from the spirit of our invention. The form of construction of the cultivator disks may be varied. The disks may be set winding upon the shafts so as to form a continuous contact with the ground and prevent the jumping motion upon hard ground; the connection between the power mechanism and the cultivator disks may be changed; a single cultivator shaft may be used instead of two shafts; the mechanism for swinging the cultivator shafts may be changed; other means may be employed for holding the cultivator disks off the ground and there are many other changes in form and detail which may be made as desired.

In the companion application filed November 10th, 1910, Serial #591578 for mechanically driven disk cultivator we have shown, described and claimed broadly, a mechanically driven disk cultivator, and we do not wish to make such claims in this application.

We claim:

1. In a disk cultivator, a frame comprising two parallel cross I-beams mounted some distance apart, two longitudinal I-beams placed on top of the ends of the cross I-beams and coming nearer together at their forward ends, a second two cross I-beams inserted between the forward ends of the longitudinal I-beams and on the same level, a bearing block inserted between the forward ends of the longitudinal I-beams and between the second pair of cross I-beams and on the level therewith, a vertical bearing at the center of the bearing block, a steering wheel turn table mounted under the forward ends of the longitudinal I-beams and under the second pair of cross I-beams, a pintle extending upwardly from the steering wheel turn table through said bearing, housing plates secured to the lower faces of the I-beams and having flanges extending under the edge of the steering wheel turn table, and a wheel for supporting the steering wheel turn table.

2. In a disk cultivator, a frame comprising two parallel cross I-beams mounted some distance apart, two longitudinal I-beams placed on top of the ends of the cross I-beams and coming nearer together at their forward ends, a second two cross I-beams inserted between the forward ends of the longitudinal I-beams and on the same level, a bearing block inserted between the forward ends of the longitudinal I-beams and between the second pair of cross I-beams and on the level therewith, a vertical bearing at the center of the bearing block, a steering wheel turntable mounted under the forward ends of the longitudinal I-beams and under the second pair of cross I-beams, a pintle extending upwardly from the steering wheel turntable through said bearing, housing plates secured to the lower faces of the I-beams and having flanges extending under the edge of the steering wheel turntable, a wheel for supporting the steering wheel turntable, gear teeth upon the periphery of the steering wheel turntable, a steering post rigidly mounted, and a pinion upon the steering post meshing with the teeth upon the steering wheel turntable.

3. In a disk cultivator, a frame comprising two parallel cross I-beams mounted some distance apart, two longitudinal I-beams mounted on top of the ends of the cross I-beams and coming nearer together at their forward ends, cultivator disk turntables mounted under the ends of the cross I-beams, posts extending downwardly from the cultivator disk turn tables, cultivator shafts mounted in the lower ends of the posts, arms extending laterally from the cultivator disk turntables and hand levers mounted upon the longitudinal I-beams and connected to said arms.

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