No. 648,954. Patented May 8, 1900.

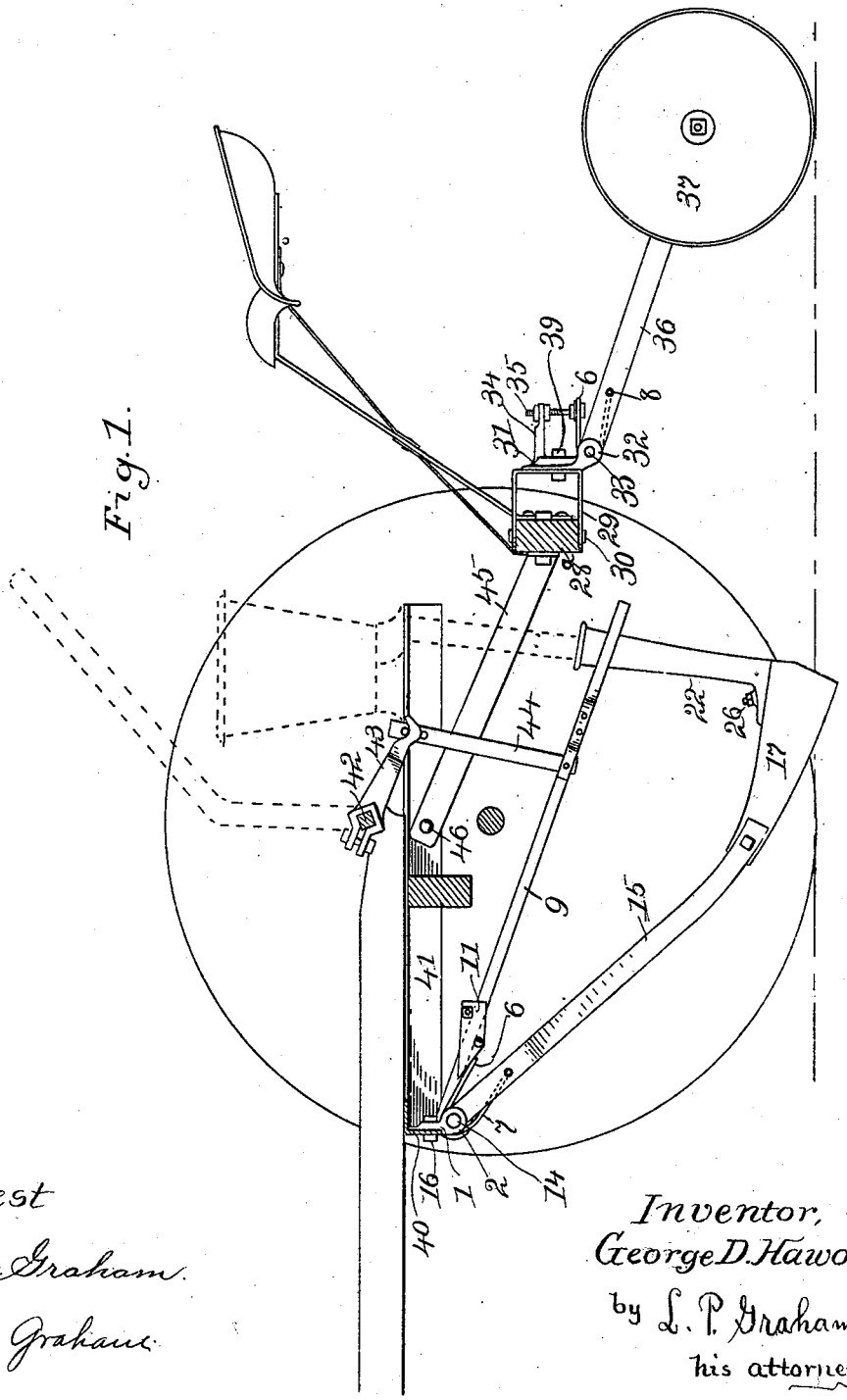
G. D. HAWORTH.

GRAIN DRILL.

(Application filed Feb. 12, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



Attest
Nora Graham.
Ina Graham.

Inventor,
George D. Haworth
by L. P. Graham
his attorney

No. 648,954. Patented May 8, 1900.

G. D. HAWORTH.

GRAIN DRILL.

(Application filed Feb. 12, 1900.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

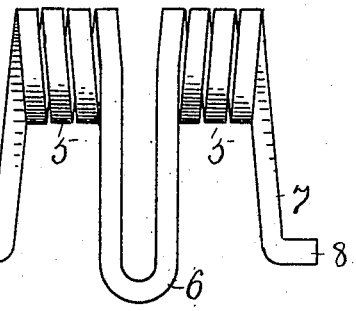


Fig. 3.

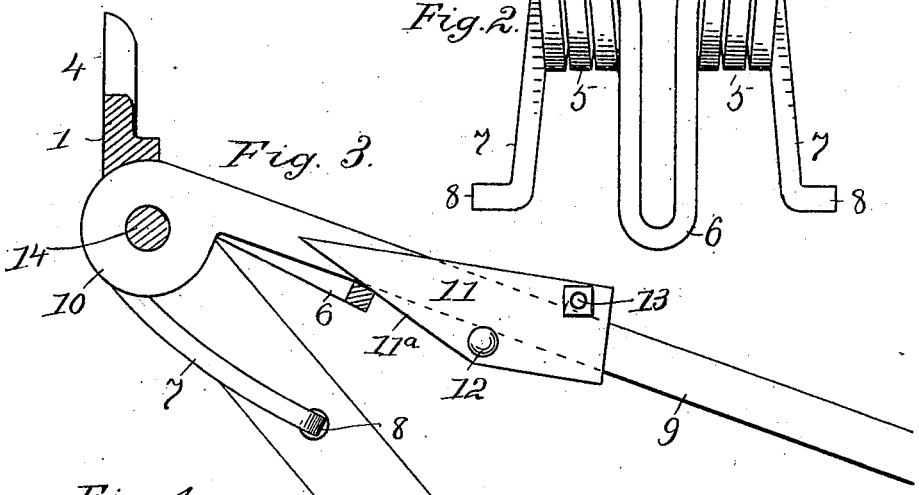
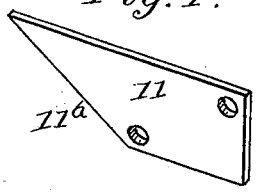


Fig. 4.



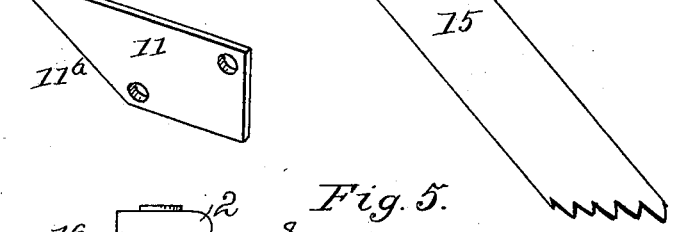


Fig. 5.

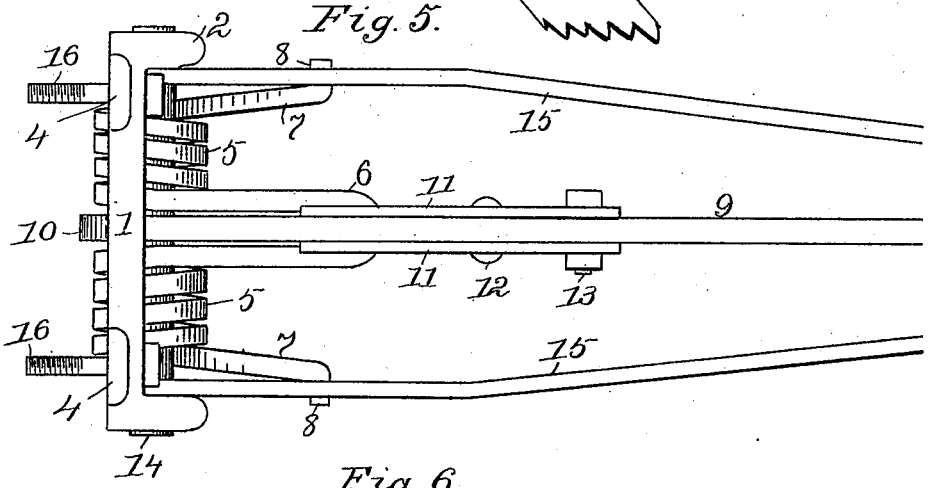
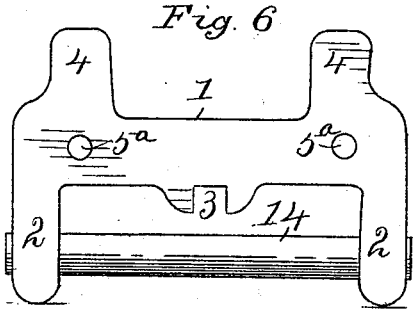


Fig. 6



Attest,
Nora Graham,
Ina Graham.

Inventor
George D. Haworth,
by L. P. Graham
his attorney.

No. 648,954. Patented May 8, 1900.

G. D. HAWORTH.

GRAIN DRILL.

(Application filed Feb. 12, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

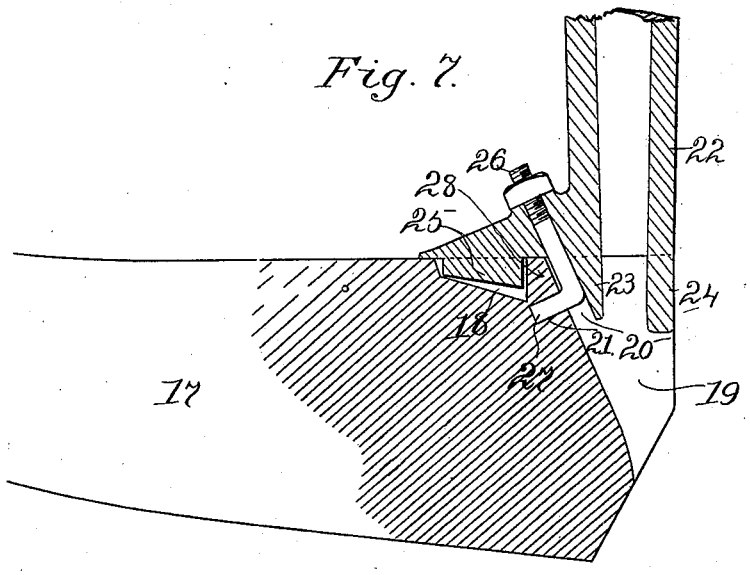
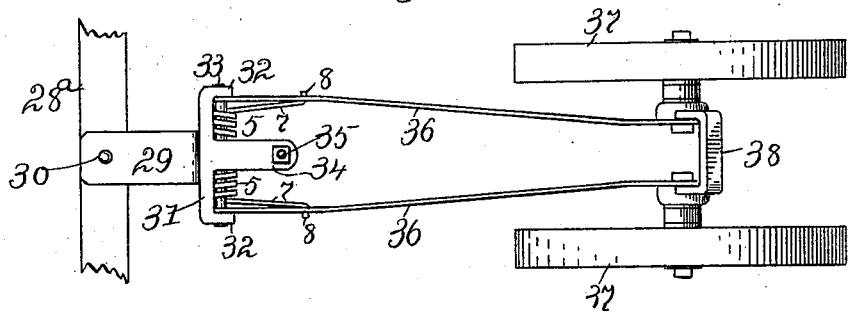


Fig. 8.



Attest,
Nora Graham.
Ina Graham.

Inventor
George D. Haworth
by L. P. Graham
his attorney

UNITED STATES PATENT OFFICE.

GEORGE D. HAWORTH, OF CHICAGO, ILLINOIS.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 648,954, dated May 8, 1900.

Application filed February 12, 1900. Serial No. 4,970. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. HAWORTH, of the city of Chicago, in the State of Illinois, have invented certain new and useful Improvements in Grain-Drills, of which the following is a specification.

This invention relates in part to means for applying yielding pressure to the runners or furrow-formers of grain-drills, in part to means for detachably securing furrow-forming runners to their shanks, and in part to mechanism for giving proper motion and pressure to press-wheels which track the furrow-openers.

The invention is exemplified in the structure hereinafter described, and it is defined in the appended claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of the different features of my invention. Fig. 2 is a detail of one of the springs used to transmit pressure yieldingly to the furrow-forming runners and to the press-wheels. Fig. 3 is a vertical section through the front end of one of the furrow-opener frames. Fig. 4 is a detail of a part of the tension-adjuster for the springs of the furrow-openers. Fig. 5 is a plan of the front end of a frame of a furrow-opener. Fig. 6 is a front elevation of a bracket used to attach a frame of a furrow-opener to a cross-bar of the drill. Fig. 7 is a section through a runner and a part of the shank thereof, illustrating the means employed to detachably fasten the runner to the shank. Fig. 8 is a plan of a pair of press-wheels and the frame thereof.

The furrow-openers each comprise a runner 17, which is preferably made of cast-steel, for reasons that will hereinafter appear. A pair of bars 15 connect with the front end of the runner. They extend upward and forward when in place in the drill and they diverge as they extend. At their front ends they pivot on a short shaft 14, which is sustained at its ends in lugs 2 on a bracket 1. The bracket is attachable to the front cross-bar 40 of the frame 41 of the drill, and as a matter of preference it is shaped somewhat as shown in Fig. 6 of the drawings. In this figure the lugs 2 are made long enough to leave sufficient space between the main bar 1 and the shaft 14, carried by the lugs, to admit the coils 5 of the spring. (Shown in Fig. 2.) A notch is shown at 3 in the center of the bracket and above the shaft. Bolt-holes are shown at 5^a, and at 4 are shown upward-extended fingers, which increase the bearing-surface of the bracket without adding materially to its weight. A lever 9 is pivoted on the center of shaft 14, and its pivotal bearing 10 is a circular disk, which engages the notch 3 of the bracket. The lever is used to depress the runner 17, and pressure is transmitted yieldingly from the lever to the bars 15 of the runner through a duplex spring 5, 6, 7, and 8. This spring is mounted on the shaft 14, with its coils 5 one on each side of the head 10 of lever 9. The extended loop 6, which connects one coil with the other, lies under lever 9, and the side extensions 7 each engage a bar 15 through a short crank-bend 8. As a matter of preference the cranked ends 8 of the springs extend through holes in bars 15; but any provision by which the extensions 7 are made to bear downward on the bars when downward pressure is applied to the lever is sufficient. The lever extends rearward alongside the shank 22 of the runner. It is preferably forked to straddle the shank, and pressure is applied to it somewhere near the shank. Means for applying pressure to the lever is well known, and it forms no part of this invention; but a preferred structure for this purpose consists of a cross-shaft 42, having an arm 43 for each runner and a connecting-bar 44 between each arm 43 and a corresponding lever 9. The cross-shaft is rocked by the driver of the drill to apply whatever pressure is required while the runners are in the ground and to raise the runners out of the ground when an end of the field is reached.

The lever 9 is practically non-elastic. It is fulcrumed loosely on the shaft 14, and it is held in a central position on the shaft by engaging the notch 3. (Shown in Fig. 6.) The bars 15 are also non-elastic, and so the springs alone supply the yielding peculiarity needed to permit the runners to properly conform to the varying ground-surface. The springs are comparatively long and quite sensitive, and they meet the requirements of yielding transmitters of pressure from the levers 9 to the runners in a satisfactory manner.

The bracket constitutes a frame in which

the shaft, the spring, the lever 9, and the bars 15 may be assembled and secured together, and the different runner-frames so assembled are attached to the cross-bar 40 by means of bolts 16. If one runner-frame or any part thereof requires repairing or replacing, the loosening of two bolts permits the separation of the runner-frame from the main-drill frame.

To provide for adjusting the tension of the springs of the runner-frames, I have provided a pair of plates 11, beveled underneath at their front ends, as shown at 11ª, and these plates I clamp onto lever 9, adjacent to the spring, by means of a rivet 12 and a bolt 13 or by two bolts. When I wish to increase the tension of the spring, I loosen the plates, force them forward until the rear end of central extension 6 is suitably depressed by inclined-plane action, and then clamp the plates firmly onto the lever.

The runner 17 is cast with its rear end forked to form the seed-passage 19. (Shown in Fig. 7.) The front wall of the seed-passage inclines downward and backward. A hole 21 extends into such wall near the upper end thereof and at approximate right angles therewith, and a depression 18 is formed in the upper surface of the runner in front of the front wall of the seed-passage. The shank 22 has extensions 23 and 24, which fit into the seed-passage of the runner, and it also has a block 25, adapted to rest in recess 18. A bolt 26 passes through the foot of the shank in front of extension 23 and in line with the front wall of seed-passage 19, and its head end is bent at right angles at 27 to engage hole 21. When the parts are in the position shown in Fig. 7, the extensions 23 and 24 sustain the shank sidewise, the partition 28 prevents block 25 from moving backward, and the bolt holds the shank from rising away from the runner. Whenever the bolt is loosened, so that the block 25 rises clear of partition 28, the hooked end of the bolt may be disengaged from the runner and the parts separated.

The press-wheels 37 are arranged in pairs. They have side swing and tilting motion, so as to properly track the runners, and they are given yielding pressure in a manner somewhat similar to that given the runners. A cross-bar 28ª is swung from the main frame 41 by means of stiff links 45, one of which is shown pivoted at 46 in Fig. 1. Loop-straps 29 are swung on pivots 30 in cross-bar 28ª, and brackets 31 are pivotally connected with the ends of the loop-straps by means of horizontal bolts, one of which is shown at 39 in Fig. 1. Each bracket 31 has end lugs 32, in which are sustained the ends of a shaft 33, and it also has a central rearward extension 34 at its upper edge. A pair of bars 36 journal on the ends of shaft 33 inside lugs 32, and a spring similar to that hereinbefore described is carried on the shaft between bars 36. The side extensions 7 of the spring engage bars 36, and the central extension 6 is adjustably connected with extension 34 of the bracket by means of a bolt 35.

The press-wheels are connected together by a yoke 38. They swing sidewise on pivot 30, they tilt on bolt 39, and they receive pressure yieldingly through the intervention of the spring.

The bar 28ª sustains the weight of the driver, and this weight is transmitted to the press-wheels.

I claim—

1. A furrow-opener having an upward-extended seed-tube and forward-extended draft-bars, a stiff depressing-lever pivotally connected with the front ends of the draft-bars and extended back to the seed-tube, and an intermediate spring.

2. A furrow-opener having an upward-extended seed-tube and forward-extended draft-bars, a stiff depressing-lever pivotally connected with the front ends of the draft-bars and extended back to the seed-tube, and an intermediate spring on the pivot of the lever.

3. A furrow-opening runner, draft-bars therefor, a shaft on which the forward ends of the draft-bars are mounted, a runner-depressing lever fulcrumed on the shaft between the draft-bars and a coiled spring on the shaft having one end in engagement with the depressing-lever and the other end in engagement with a draft-bar.

4. A furrow-opening runner, draft-bars therefor, a shaft on which the forward ends of the draft-bars are mounted, a runner-depressing lever fulcrumed on the shaft between the draft-bars and a two-coil spring on the shaft with the coils one on each side of the lever, the ends in engagement with the draft-bars and a central loop extended rearward under the lever.

5. A bracket attachable to a cross-bar, a shaft held at its ends in lugs of the bracket, a runner, draft-bars for the runner the front ends of which are mounted on the shaft, a runner-depressing lever fulcrumed on the shaft between the draft-bars and a two-coil spring on the shaft with the coils one on each side of the lever, the ends in engagement with the draft-bars and a central loop extended rearward under the lever.

6. A furrow-opener, a depressing-lever for the furrow-opener pivotally connected with the forward extension thereof, an intermediate spring to transmit pressure from the lever to the furrow-opener, such spring having an extension below the lever and a slide with an inclined end adjustable on the lever and against the extension of the spring.

7. A furrow-opener, a depressing-lever for the furrow-opener pivotally connected with the forward extension thereof, an intermediate spring to transmit pressure from the lever to the furrow-opener, such spring having an extension below the lever, and a pair of plates with inclined ends clamped onto the lever adjacent to the extension of the spring.

8. A furrow-opening runner divided at its rear end to form a seed-passage, such runner having a hole in the front wall of the seed-passage and also having a recess in its upper surface in front of the seed-passage and separate therefrom, a shank having a foot from the under surface of which a block extends into the recess in the upper surface of the runner and an L-bolt extending through the foot of the shank and engaging the hole in the front wall of the seed-passage of the runner.

9. A furrow-opening runner divided at its rear end to form a seed-passage, such runner having a ledge or projection in its crotch, a shank extended into the crotch of the runner, a foot on the shank bearing against the upper surface of the runner and a bolt extending through the foot of the shank with its head in engagement with the ledge of the runner.

10. In a seed-drill the combination of a cross-bar, a loop-strap connected with the cross-bar by means of a vertical pivot-pin, a bracket joined to the swinging end of the loop-strap by means of a horizontal pivot-pin, a pair of press-wheels hitched to the bracket and a spring connection between the bracket and the draft-bars of the wheels whereby pressure imparted to the wheels through the bracket is made yielding.

11. In a seed-drill, the combination of a press-wheel, draft-bars therefor, a bracket with which the front ends of the draft-bars connect pivotally, a rearward extension of the bracket, a coiled spring having a central loop extended below the rearward extension of the bracket and also having side extensions engaging the draft-bars, and a strut-bolt adjustably connecting the loop of the spring with the extension of the bracket.

In testimony whereof I sign my name in the presence of two subscribing witnesses.

GEO. D. HAWORTH.

Witnesses:
CLARENCE A. PATTISON,
THEO. B. PATTISON.