(No Model.) 2 Sheets—Sheet 1.

F. B. McCABE.

GRAIN DRILL.

No. 302,754. Patented July 29, 1884.

Fig. 1.

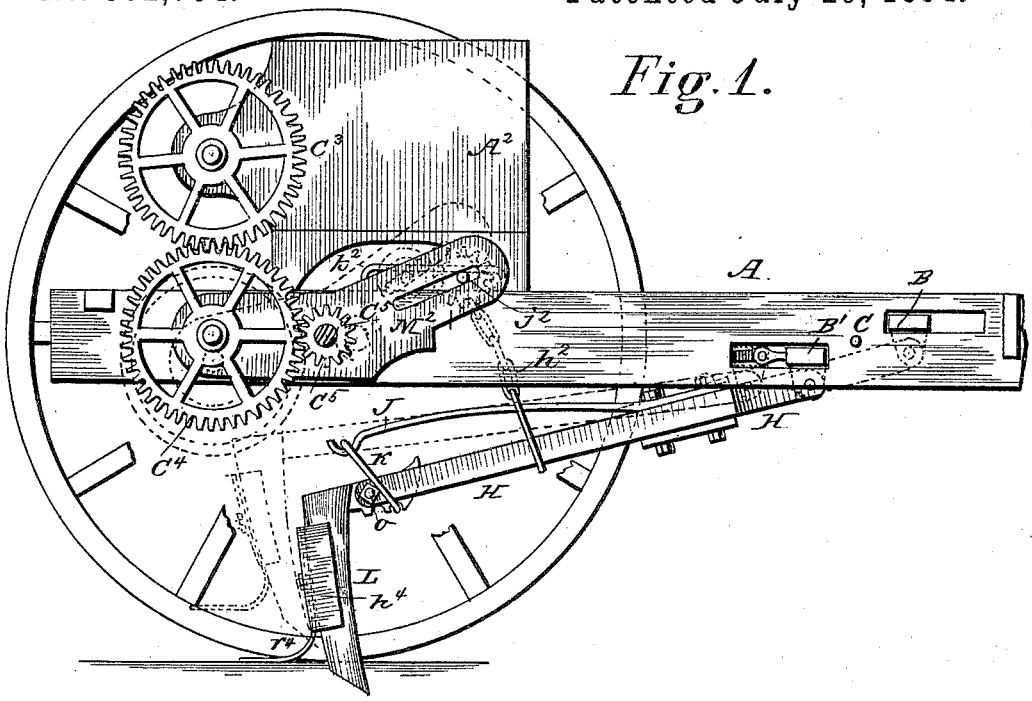
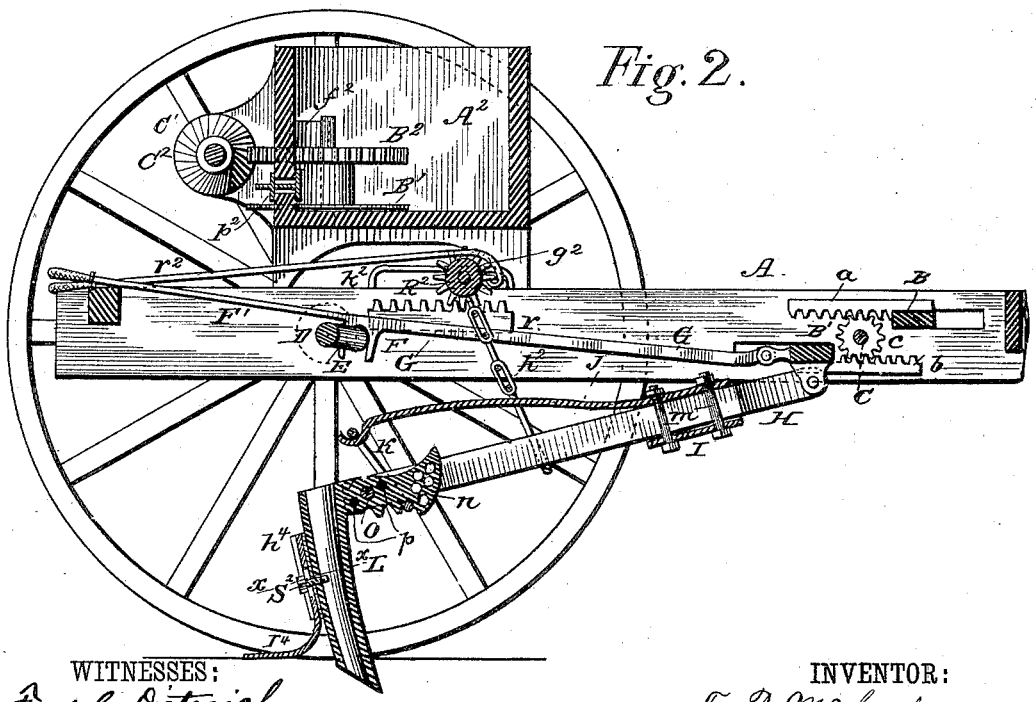


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

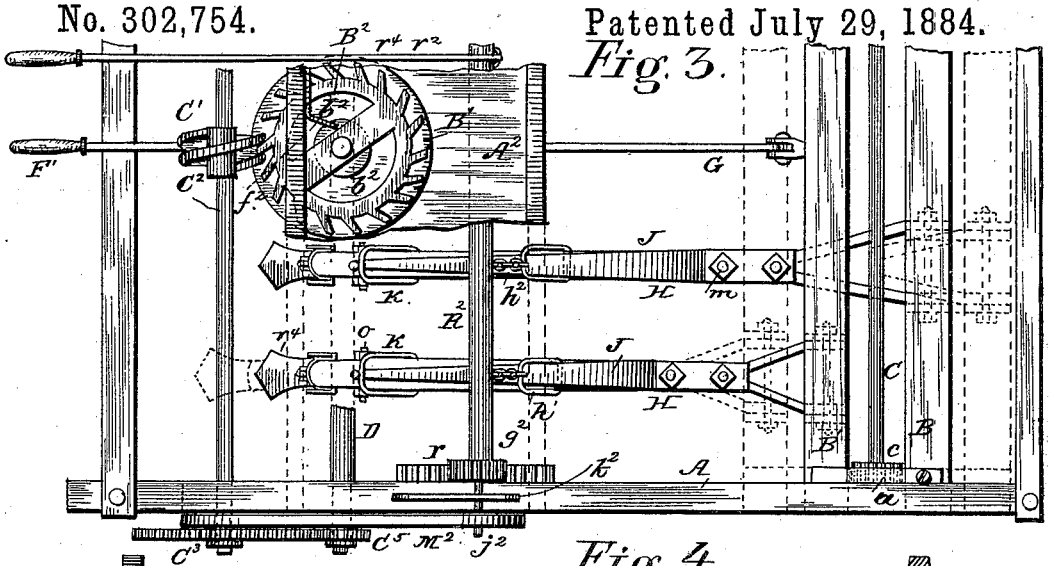


Fig. 4.

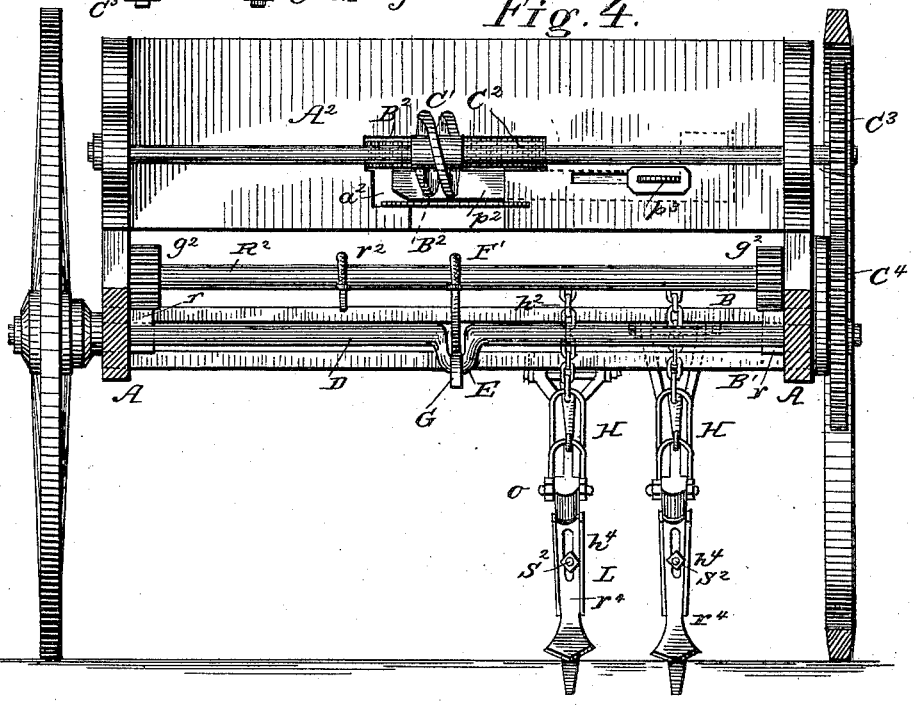
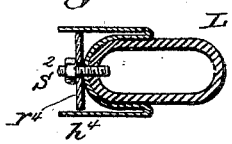


Fig. 5



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UNITED STATES PATENT OFFICE.

FRANCIS B. McCABE, OF LEWISTOWN, PENNSYLVANIA.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 302,754, dated July 29, 1884.

Application filed October 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS B. McCABE, a citizen of the United States, residing at Lewistown, in the county of Mifflin and State of Pennsylvania, have invented a new and useful Improvement in Grain-Drills; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of a portion of the drill, with the near wheel removed and the other wheel broken partially away. Fig. 2 is a vertical section taken in the line of draft. Fig. 3 is a partial plan view showing one of the feeding devices within the fertilizer-box. Fig. 4 is a rear end elevation; and Fig. 5 is a cross-section through line *x x*, Fig. 2.

My invention relates to grain-drills; and it consists in the improved shifting devices for ranking and cleaning the hoes, and means for automatically working them; in the construction of an adjustable lock-spring hoe; in a fertilizing feeding device, and in a lifting device for the hoes, as will be fully described hereinafter.

In the drawings, A represents a part of the frame-work of a grain-drill, which frame-work is rectangular in shape. At one end of this frame-work are arranged two sliding bars, B B′, whose ends are contained in slots or recesses in the main frame, and which bars have in said slots or recesses a lateral sliding motion. To these bars the drag-bars H of the hoes are attached, one set of the drag-bars being attached to one of these sliding bars, and the intermediate or alternate set of drag-bars being attached to the other of said sliding bars. These bars have generally been rocked to clean the hoes. I make them to slide sidewise in their slots in the frame by means of toothed racks *a* and *b*, which project from said bars at each end on opposite sides of cog-wheels *c*, on the ends of an intermediate rotary shaft, C. This gearing causes the sliding movement of one bar to impart a reversed sliding movement to the other bar.

For imparting motion to the bars a shaft, D, with crank E, is made to operate through a rod, G, as shown. This eccentric-rod is made with a loop or bend, F, which may be either dropped upon the crank E of the main axle, to automatically shift the hoes and drag-bars, or be lifted out of contact by a handle, F′, so as to be operated by hand.

It will be perceived that the slide-bars move in a horizontal plane, and that the hoes may be changed from single to double rank, or vice versa. This is a great improvement over the rotary or rocking motion, for the reason that with the horizontal sliding adjustment the drill-teeth always remain at the same angle, and the grain is always deposited at a uniform depth, whether shifting the hoes or not. This is a notable advantage over the rotary bars, which sink the hoes so far in the ground that the grain is buried too deep. The length of the adjustment of the hoes is, furthermore, not limited as it is with the rocking bars.

Referring to the automatic shifting of the drag-bars, the slow motion imparted to the hoes by this method is preferable to that obtained by hand-power, for the reason that in the latter case the quick motion causes the grain to be bunched or thrown together, while in the former the grain is not sown alternately thick and thin, but is left more nearly uniform.

H represents one of the drag-bars of my lock-spring hoe. Such drag-bar is made of two pieces of metal clamped together at the front end by the vertical bolts *m m*, which pass between the two bars or sections, and pass through holes in a plate, I, underneath, and a spring, J, above, which spring extends nearly to the rear end of the drag-bar, and is hooked to receive a link or hoop, K.

Between the rear end of the two sections of the drag-bar there is disposed the flange *n* of the hoe L, which flange is jointed to the drag-bar by a pivot-bolt, *o*. The under side of this flange has several notches, in either of which the link may be placed. By placing the link in the notch nearer the pivot-bolt the tension of the spring may be lessened on the hoe, and this adjustment also permits the inclination of the hoe to be varied, to run deeper or more shallow, as desired. When the hoe is deflected to the rear by an obstruction, it yields against the tension of the spring and is instantly restored to its former position. Owing to the angle at which the link is placed, the

spring becomes a lock-spring, and requires greater pressure to start it than at any other time thereafter. This is an important feature, as otherwise the drill-teeth might vibrate during the ordinary course of drilling the grain. Furthermore, as the movement of the spring is very slight, a spring of much greater rigidity can be used.

For getting a more decided effect in changing the angle of the hoe and causing the tooth to go more or less deep into the soil, I make several pivot-holes in the flange *n* of the hoe as at *p* and place the bolt *o* in one or the other, to set the hoe higher or lower.

I will now proceed to describe the feature which I call the "double force-feed fertilizer-sower."

A^2 is a fertilizer-box, in which is arranged on a vertical axis a flat disk, B′, and a toothed wheel, B^2, combined or connected together and protruding through the box. The disk-wheel may be secured to either the lower or upper part of the bed-plate of hopper-bottom. As shown, it is located on the latter. The bottom of hopper is cut away nearly equal in area to the circumference of lower wheel, in order to make less bearing and to prevent fertilizer from packing and obstructing the easy movement of the respective feed-wheels. The lower or disk wheel serves as a carrier, as does also the upper or toothed wheel, wherein lies the principle of a double force-feed. The fertilizer is carried out of hopper on the outer circumference of lower wheel, assisted by the upper or toothed wheel, through the discharge-orifice a^2, Fig. 4, which is located between the upper and lower wheels on the back board of hopper-box.

The toothed wheel serves a threefold office, to wit—it carries a limited portion of fertilizer through the discharge-orifice, whereupon it is dislodged on the bottom disk-wheel, to be finally dislodged and conveyed to the ground in the usual way. It serves as a pulverizer of lumpy fertilizers, and it propels the lower or disk wheel. It is driven by a spiral-flanged worm-wheel, C′, on shaft C^2, which derives its power from a cog-wheel, C^3 and C^4, and pinion C^5, located on main axle of drill. The flanges of worm-wheel gearing into the interdental spaces of the toothed wheel not only propel the same, but keep them clean. The two carrier-wheels combined in one have a greater feeding capacity to sow fertilizer than if separated and working independently of each other. The upper or toothed wheel is provided with two open slots, b^2, between the center and circumference, for the purpose of admitting any fertilizer to pass through to the bottom feed-wheel. From the nature of these two carrier-wheels it must be apparent that the fertilizer will be forced through the discharge-opening with a very positive effect. The little fertilizer that may be carried out of box in the interdental spaces of the upper or toothed wheel is of small consequence, as the feeding capacity depends entirely upon the amount of fertilizer which may be carried out between the upper and the lower wheels. The sliding gage-plate p^2 is for controlling the quantity of fertilizer to be sown, which may be increased or diminished from fifty to eight hundred pounds, or vice versa, to the acre. The quantity may be controlled when drill is in operation without a change of cog-wheels, which is done by moving the gage-plate p^2, by the thumb-piece p^3, on the outside of the box. The small flange f^2, which projects over the toothed wheel on the inside of hopper, is for the purpose of scraping off any fertilizer that may lodge on top of the toothed wheel, so that all the fertilizer may be fed out of hopper.

I will now describe the means for lifting and lowering the hoes. It consists of a roller-bar, R^2, with small cog-wheel g^2 on both ends, and attached thereto. Toothed racks *r* are attached to the side-bars of the frame for the gears g^2 to work in, and an actuating-rod, r^2, serves to pull the roller-bar R^2 to the rear, which roller is attached to the drag-bar by a chain, h^2. When the hoes are to be hoisted or lowered, the rod r^2, which is attached to the roller-bar, may be pulled backward or moved forward. The roller-bar is made to move not only around its axis, but also in a straight line between two given points, by which is imparted to it a double-acting capacity to take up the slack of chains which connect the drag-bars with the same, so as to hoist the hoes when turning in the field. The gudgeons or journals j^2, which are secured to and project from either ends of roller-bar, are guided in keepers k^2, and made to work in the open slots of arms M^2, which are hung upon the main axle and carry the gears that transmit power from the pinion on the main shaft to the wheel on the fertilizer-shaft. The slot in the arms N^2 is inclined, so that when the roller-bar is moved back or forth the projecting gudgeons of roller-bar working therein throw the idler-wheels out of and into gear with the cog-wheels which propel this fertilizer or grain shaft. By moving the roller-bar backward, the feeding devices may be shut off, and by reversing the motion, they may be started to sow. The actuating-rod r^2 may be secured to either end of roller-bar, or at any intermediate point thereon, the middle being preferred.

I will now describe the means for regulating the depth of planting the grain. It consists of a screw-bolt, S^2, or threaded stud, with nut secured to rear part of hoe; also a concaved shoe or holder, h^4, and a runner-bar, r^4, with a slot in its upper end, through which passes bolt or stud S^2. To the rear of hoe are secured the screw-bolt, flanged shoe, and the runner or regulator bar. The flanges of shoe are made to fit into the curved circumference of hoe, and the regulator-bar is made to fit into the vertical recess of shoe or holder. The runner-bar is secured so as to have no lateral action, and so as to move in a direct line or in the drill-row. The runner-bar is curved at lower end, which runs on the ground to

keep the hoe from burying the grain deeper than desired. The curved end may be made from one to three inches wide, and, traveling in the drill track or row, the earth is packed over the grain deposited therein, causing the same to stool out better and grow more thriftily. Besides, it is not liable to be winter-killed. The runner-bar may be made of any suitable material, ordinary iron (wrought) or steel being preferred. The oblong slot in runner or regulator bar is for the purpose of regulating the depth of the grain. By moving the bar up more or less the depth of grain may be increased or made to go deeper in the ground. By moving it downward the grain may be sown more shallow. The regulator may be set to sow the grain any depth from one-half to five inches deep.

The application of this device may readily be made to old drills as well as to new ones.

The great advantages over similar devices are simplicity, cheapness, and effectiveness.

This device will not climb over clods to lift the point of hoe out of ground, and thereby deposit the grain on the surface, instead of beneath the same, and it cannot choke up with trash while in transit. The drill will run lighter with this attachment to the hoes than without it, for, by keeping the points of hoes near the surface, there is less resistance to be overcome in drawing the machine.

Having thus described my invention, what I claim as new is—

1. The rectilinearly-sliding shifting-bars B B′, arranged transversely to the line of draft, and having independent toothed racks *a a* and *b b*, arranged parallel with the line of draft, one set above the other, in combination with cog-wheels *c*, arranged between the racks, for reversing the movement of the bars, and the drag-bars H of the hoes, connected alternately to the two shifting-bars, as shown and described.

2. The combination, with the drag-bar and the pivoted hoe having a front flange, with notches, of the link K, hooked beneath the flange of the hoe, and the spring J, arranged longitudinally upon the top of the drag-bar, and having its rear end hooked beneath the upper end of the link, as and for the purpose described.

3. The angled or diagonal link, in combination with the spring and the drill-hoe having a flange with notches, as described.

4. The combination, with the fertilizer-box, of the double force-feed consisting of a disk and a toothed wheel placed above the disk connected together, and both being arranged to work through the side of the box, as described.

5. The combination of the disk and toothed wheel connected together and working through the side of the box, a gage-slide, and a worm-shaft and worm meshing with the toothed wheel, and adapted to receive its motion from the axle, substantially as described.

6. The combination, with the drag-bars, of the roller-bar R^2, having cog-gears g^2 at its ends, chains connecting the drag-bars to the roller, and rack-teeth on the main frame, whereby the drag-bars are lifted by the combined rotary and rectilinear movement of the roller, as described.

7. The combination, with the rack-bars on the main frame and the roller-bar R^2, having cog-teeth on its ends, and gudgeons or journals j^2, of the slotted arms M^2, hung upon the main axle and carrying a cog-wheel transmitting motion from the main axle to the fertilizer-shaft, to disconnect the latter when the hoes are raised, as described.

FRANCIS B. McCABE.

Witnesses:
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S. J. BRISBIN.