J. M. SMITH & H. W. C. THOMAS.

Grain-Drill.

No. 200,227. Patented Feb. 12, 1878.

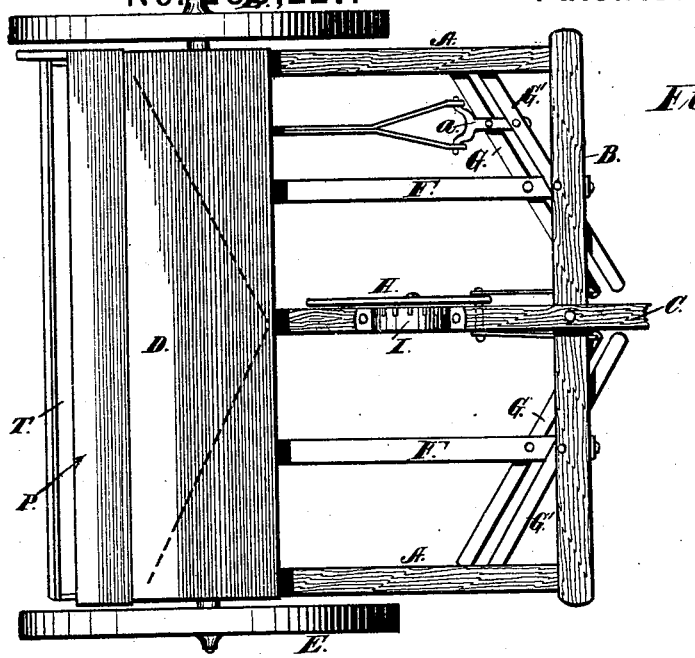


Fig. 1.

Fig. 5. Fig. 6.

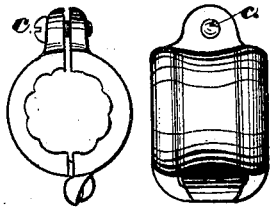


Fig. 4.

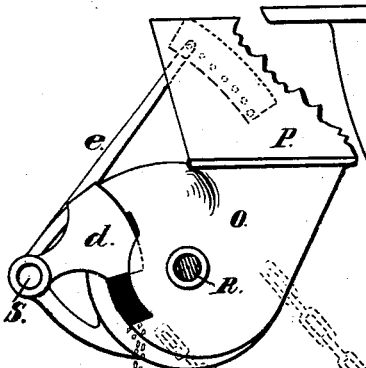


Fig. 2.

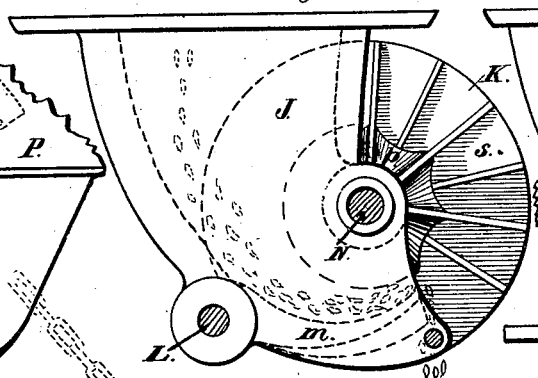


Fig. 3

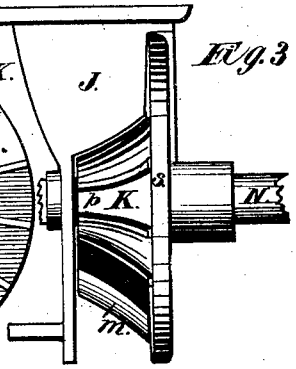


Fig. 7.

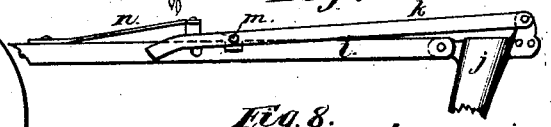
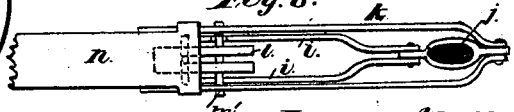


Fig. 8.



Witnesses;
Chas. M. Peck
Geo. Greulich

Inventors;
Joshua M. Smith
and
Henry W. C. Thomas
by their Attys
Peck & Co.

UNITED STATES PATENT OFFICE.

JOSHUA M. SMITH AND HENRY W. C. THOMAS, OF SPRINGFIELD, OHIO.

IMPROVEMENT IN GRAIN-DRILLS.

Specification forming part of Letters Patent No. **200,227**, dated February 12, 1878; application filed June 5, 1877.

To all whom it may concern:

Be it known that we, JOSHUA M. SMITH and HENRY W. C. THOMAS, of Springfield, in the county of Clarke and State of Ohio, have invented certain new and useful Improvements in Grain-Drills; and we do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to that class of seed and grain drills in which it is desirable to change the ranks of the hoes to adapt them to the soil to be drilled, and in which the grain is directed through feeding-cups arranged under the hopper into the hoes.

Our improvements consist in connecting the drag-bars to sets of adjustable bars operated by a lever, so that the hoes can be shifted from a straight to a V-shaped or diagonal rank, in order to convey all collected rubbish off to the sides of the drill, where it is discharged; also, in the construction of an automatic spring-hoe; also, in the construction and arrangement of the grain-feed wheels with adjustable distributing-apertures; also, in the construction and arrangement of a grass-seed distributer and evener; and in a shaft-coupling, by means of which the seed-cups can be independently removed for any cause without taking the drill to pieces and removing the entire shaft; and in other details, all as will be herein described and specifically claimed.

To enable others skilled in the art to which our invention belongs to make and use the same, we would thus proceed to describe it, referring to the accompanying drawing, in which—

Figure 1 represents a plan view of our improved drill. Fig. 2 is a side elevation of our improved grain-feed wheel and appliances. Fig. 3 is an end elevation of the same. Fig. 4 is a side elevation of our improved grass-seed wheel, distributer, and operating devices. Figs. 5 and 6 are, respectively, end and side elevations of our improved shaft-coupling. Figs. 7 and 8 are, respectively, side and plan views of our improved spring-hoe.

The frame-work of our drill is of the ordinary construction, consisting of the side and end beams A and B, tongue C, hopper D, and supporting-wheels E. Half-way between each side beam and the tongue is bolted a flat metal bar, F, to the end beams, as represented. At the forward ends of these bars F are pivoted, one to the upper and the other to the under side of each, two wooden bars or beams, G G′, as seen in Fig. 1. These latter are united by the drag-bar staples *a*, which are pivoted between them, as seen. This arrangement always insures the parallelism of the bars G G′ and of the staples *a*, which is an essential feature of our invention.

A lever, H, pivoted to the side of the tongue, has its lower end connected to the abutting ends of the beams G or G′, and is retained at any desired point by means of a notched segment-plate, I, upon the tongue, as in Fig. 1.

The operation of this portion of our invention is as follows: When the lever H is thrown forward the beams G G′ lie in the same line, and the hoes are then in single rank; but when it is thrown backward, as seen in Fig. 1, the beams G G′ have their convergent ends thrown forward and their outer ends backward, as represented. This shifts the hoes from a straight to a V-shaped rank, as shown by the dotted lines in Fig. 1. By so shifting them all the rubbish which might otherwise cling to and obstruct the hoes is thrown off to each side, where it is discharged under the tread of the wheels. This we consider an essential and novel feature in the arrangement of the hoes, and one which is of great practical advantage.

The same result could be accomplished by having simply two parallel beams extending entirely across the front of the drill-frame, and pivoted at their middle or at either end to the frame, and having the pieces *a* connected to them, as before described. A lever connected to these bars could shift the hoes from a straight to a diagonal rank, whereby the collected rubbish would be diverted to the side; or the beams herein described might be shifted into two parallel diagonal ranks, for effecting the same result, inasmuch as we do not propose to limit ourselves to any particular shape of the rank of hoes further than that they must be inclined sufficiently to divert any collected rubbish to the side.

Our grain-feeder consists of a cup or shell, J, Figs. 2 and 3, of the shape shown, and

which is attached in the usual way to the under side of the seed-box or hopper. A portion of one side of the cup is cut away to admit the side of the feed-wheel K. This feed-wheel is bell-shaped, with a broad flange, as seen in Fig. 3. The periphery of the bell-shaped portion *p* is cut away to form depressions or cups, with intervening ridges, as shown, and upon the inner side of the flange *s* are radial ridges, slightly raised.

To regulate the quantity of grain drilled, we key upon a rock-shaft, L, that extends across the drill under the hopper, and has its bearings in the cups, as seen, adjustable bottom pieces or cut-offs *m*, shown by dotted lines in Fig. 2, and in end view, Fig. 3. The end edges of these cut-offs conform to the shape of the bell portion of the feed-wheels. An index-arm upon the end of the rock-shaft, in connection with a dial, enables the attendant to sow any ascertained quantity of grain.

For sowing oats this form of wheel and adjustable bottom is especially useful, as it prevents any bunching or choking of the grain.

We are aware that it is not new to pivot an adjustable cut-off operated by a rock-shaft in the bottom of a seed-cup, to vary the size of the discharge-aperture when such cut-off is between the sides of the cups and at right angles thereto.

Our cut-off, it will be noticed, is confined between the flange of the feed-wheel and the side of the cup, and is not at right angles therewith, but inclined, as represented, for the purpose of preventing any bunching of the grain, for by this arrangement the discharging-channel is bound by two distributing-surfaces, and is a decided advantage. The shaft N, driven by the supporting-wheels and any suitable gearing, has its bearings in the seed-cups, and is divided into sections carrying one or more of the feed-wheels. To unite these sections, we provide the coupling, Figs. 5 and 6. This coupling is a sleeve in two parts, with a fluted bore. At the bottom the two parts are hinged together by a lug and ear, as shown, and are clamped together, as shown, at the top by a set-screw, *c*. The coupling is fitted upon the joints of the shaft, and, by means of the set-screw, firmly unites them. The advantage of this arrangement is that, if any of the feed wheels or cups are broken or disordered, they can be removed, with their section of the shaft, without requiring the displacement of the entire set.

O, Fig. 4, represents one of our grass-seed feed-cups which are secured to the bottom of the grass-seed hopper P. A feed-wheel similar to the one above described, or of any suitable construction, may be employed and operated by a shaft, R, that receives motion from the shaft N through the medium of sprocket-wheels and a chain. (Represented in dotted lines, Fig. 4.) S is a rock-shaft, having its bearings in the cups O, and provided with segmental arms or pieces *d*, that fit into circumferential discharge-slots in the cup, as shown. By means of an index-arm, *e*, and dial suitably arranged, the segments *d* can be made to open or close the discharge-orifices at the will of the attendant. Just under the openings in the feed-cups is hung, in any convenient manner, a reciprocating trough or distributer, T, Figs. 1 and 4. The bottom of this trough is fluted, and the bottom edge of its rear side is cut away to form openings, through which the grass-seed or grain can pass. The trough receives longitudinal reciprocating motion by means of a cam-wheel, *g*, with zigzag periphery, upon the shaft N, acting against a slotted bearing, *h*, projecting from the bottom of the trough.

The remaining feature of our invention consists of the spring-hoe, Figs. 7 and 8. Between the ends of the drag-bar beams *i*, in the rear, is pivoted the hoe *j*, in the usual manner. *k k* are two flat bars which converge in the rear, and are pivoted to a projecting ear upon the rear top side of the hoe, as shown. Between the bars *i*, as shown, about half-way of their length, is pivoted an arm, *l*, of the shape represented, and the bars *k* are united by a pivot, *m'*, which passes through the arm *l* at a point a little in the rear of its pivot. A flat steel spring, *n*, secured to the bars *i*, presses upon the ends of the bars *k*, just over the pivot of the arm *l*, as shown. This arrangement of the bars forms a toggle-joint which is easily held in place by the spring, unless the hoe meets with a heavy obstruction or sudden jar, which would break the toggle-joint and allow the hoe to trip and safely pass the obstacle, when the force of the spring would again reset it for use.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent—

1. In a grain-drill, two bars or sets of bars, G G', to which the drag-bars are attached, pivoted in the frame of the machine, whereby they may be swung by a lever or equivalent device to change the hoes from a straight to a V-shaped or diagonal rank, or vice versa, as set forth.

2. The pivotal connecting pieces or staples *a*, pivoted to the bars G G', as set forth, whereby the parallelism of both is maintained, substantially in the manner and for the purpose specified.

3. The arrangement and combination, with the feed-wheel K, of the inclined segmental cut-off *m* upon the rock-shaft L, whereby the discharge-channel is composed of two distributing-surfaces, and can be regulated at will, substantially as and for the purpose set forth.

4. The combination, with the seed-cup and feed-wheel of a grain-drill, of a sectional shaft, united by couplings, whereby one or more cups may be disconnected and removed without disturbing the whole set, substantially in the manner specified.

5. The sleeve-coupling herein described, consisting of the hinged sections with a fluted

bore, and clamped upon the shaft by a set-screw, *c*, in the manner and for the purpose specified.

6. The combination, with the driving-shaft of a grain-drill, provided with suitable connecting-gearing, of the reciprocating distributing-trough T, hung under the discharge-orifices of the seed-cups, in the manner and for the purpose specified.

7. The herein-described spring-hoe, composed of the drag-bar *i*, pivoted arm *l*, bars *k*, and spring *n*, the parts being connected and united to the hoe, substantially as and for the purpose specified.

Witness our hands this 21st day of May, A. D. 1877.

JOSHUA M. SMITH.
HENRY W. C. THOMAS.

Witnesses:
O. B. JOHNSON,
JAMES JOHNSON, Jr.