

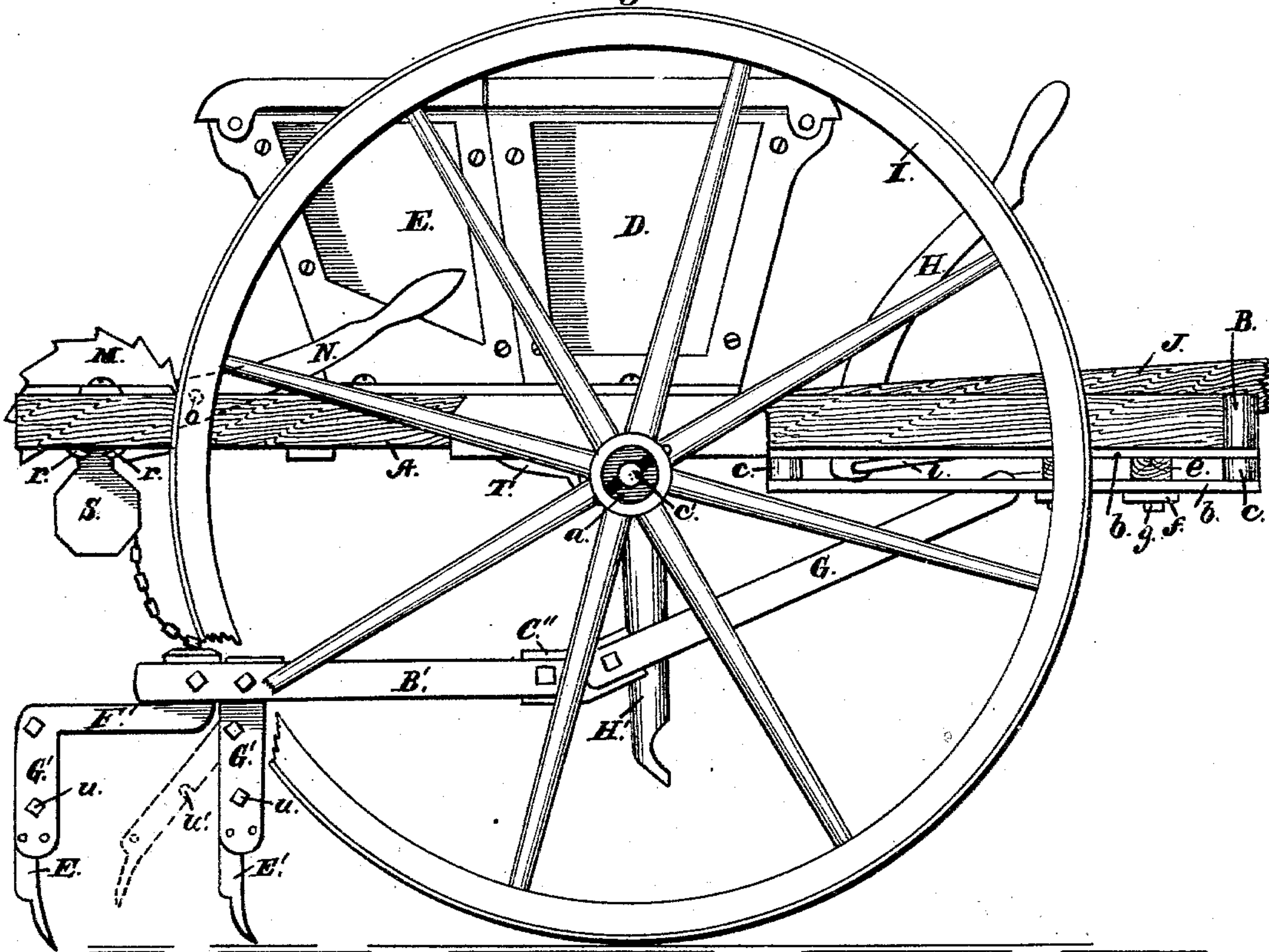
J. M. SMITH & H. W. C. THOMAS.

Grain Drill.

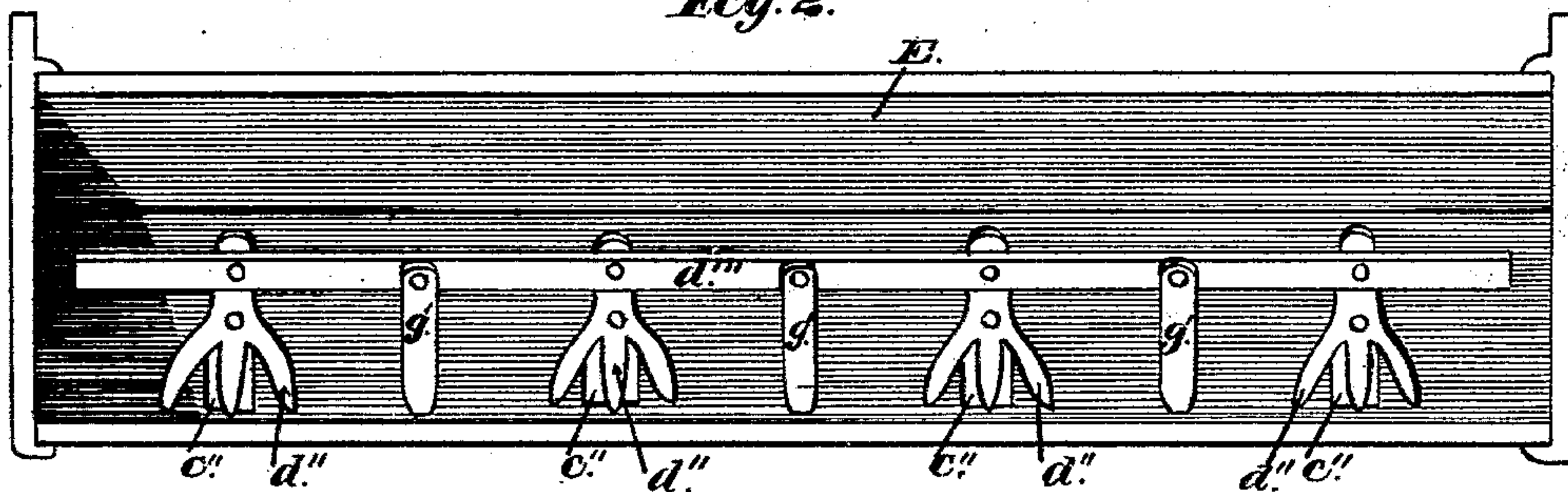
No. 210,719.

Patented Dec. 10, 1878.

*Fig. 1.*



*Fig. 2.*



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Fig. 3.

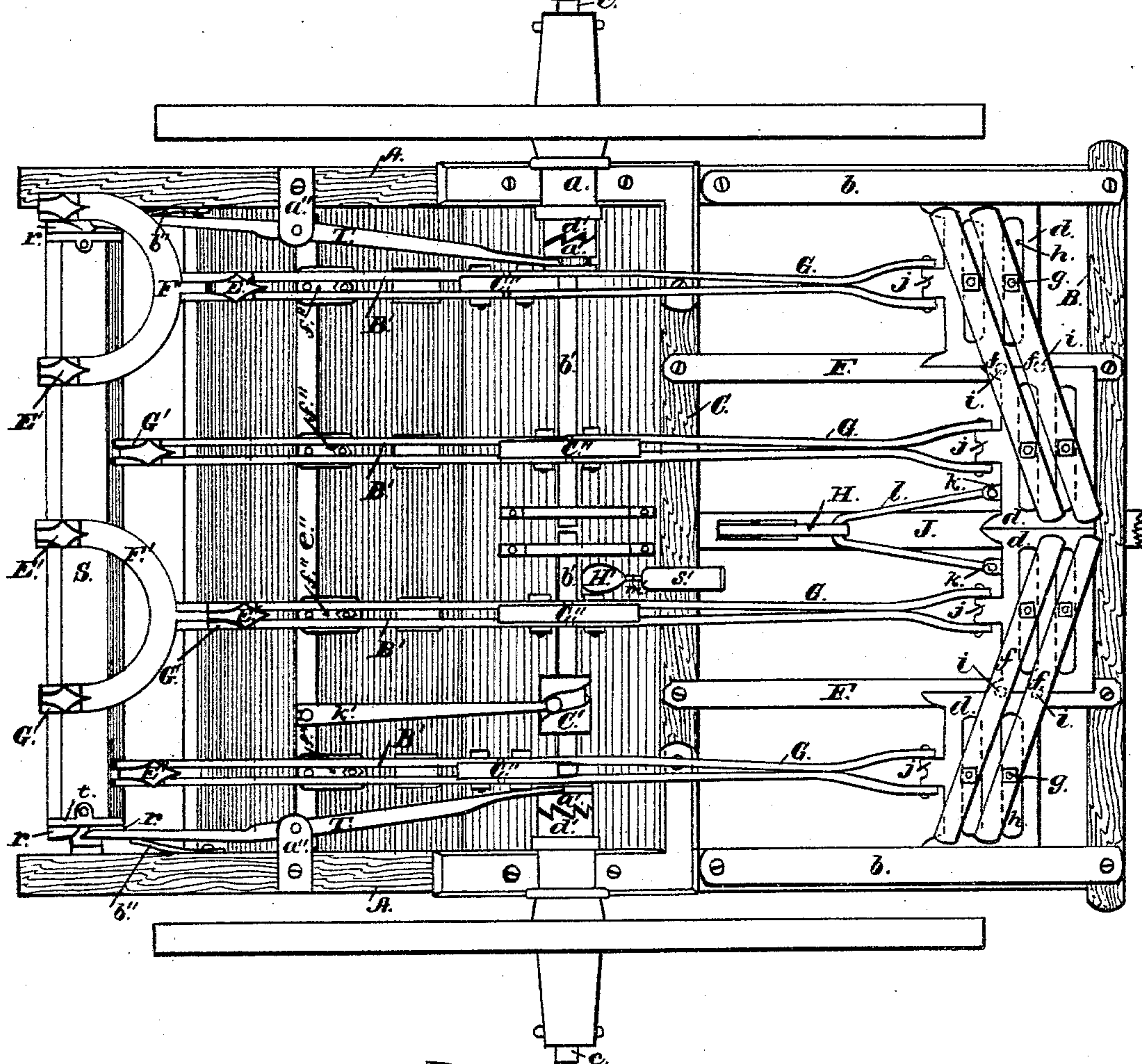
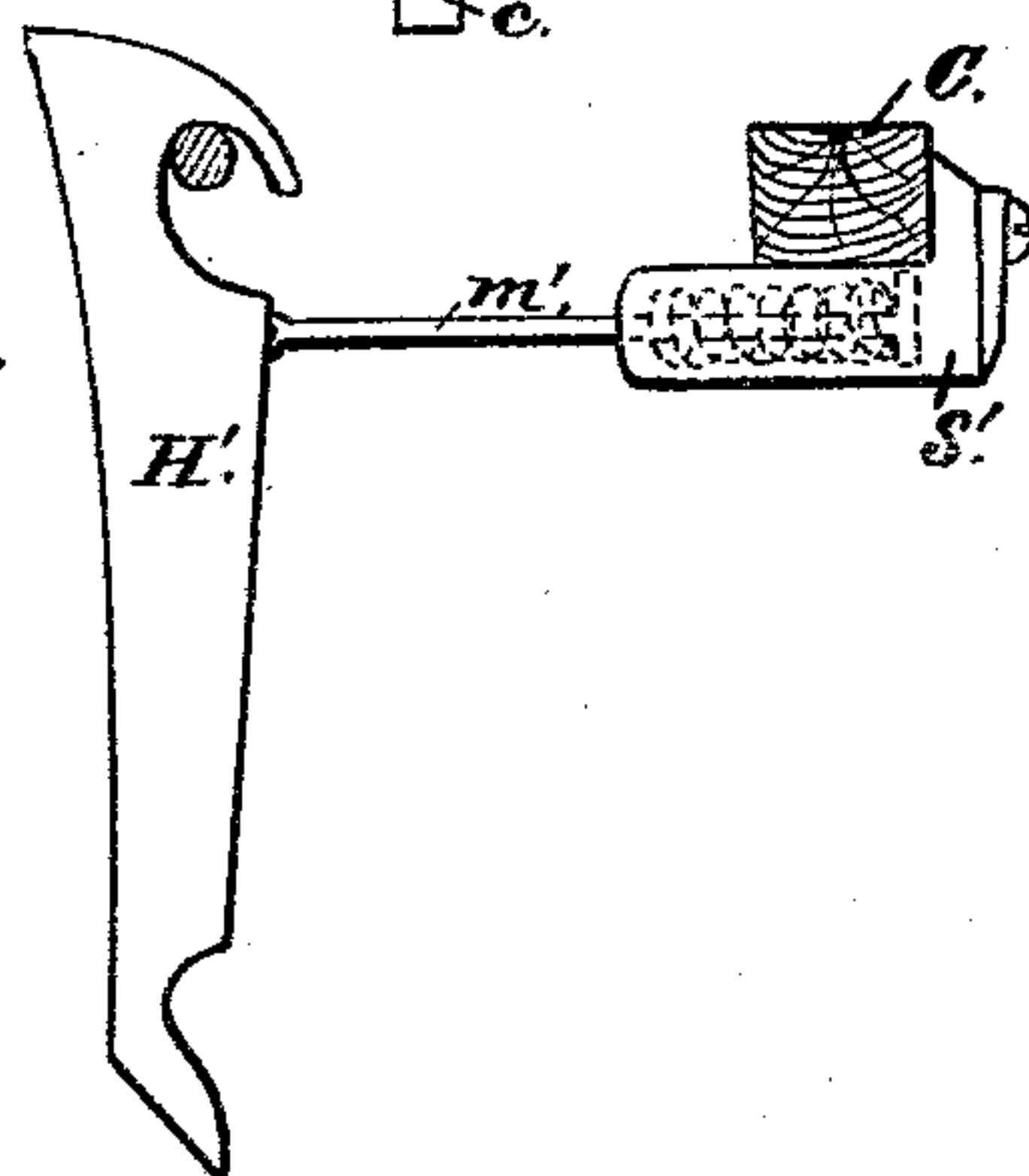


Fig. 4.



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# UNITED STATES PATENT OFFICE

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## IMPROVEMENT IN GRAIN-DRILLS.

Specification forming part of Letters Patent No. **210,719**, dated December 10, 1878; application filed February 28, 1878.

*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 is an improvement in seeding-machines that are especially designed for sowing broadcast; and consists, particularly, in the construction of certain parts, and in the general arrangement of the whole, as will be herein set forth.

In the accompanying drawings, Figure 1, Sheet 1, is a side elevation of our improved seeding-machine. Fig. 2, Sheet 1, is a plan view of the fertilizer-hopper with the lid removed to exhibit the agitating devices. Fig. 3, Sheet 2, is a bottom-plan view of the machine. Fig. 4, Sheet 2, is a side elevation of our improved spring-hoe.

Corresponding letters of reference indicate like parts in all the figures.

The frame-work of our machine is of the usual construction, consisting of the side beams A and the cross-beams B and C. These beams support the hoppers, of which D is for grain and E for guano or any other fertilizer. Bolted upon the beams A are the hollow wheel-spindles *a*, upon which the carriage-wheels I revolve.

To the under side of each of the beams A, between the beams B and C, is secured a pair of parallel guide-plates, *b*, separated by washers *c* at each end, as seen in Fig. 1. Across the front of the frame, in the same plane with the lower of these plates, lie a series of flat rectangular metal plates, *d*, with ends abutting, as indicated. These plates are held in the same plane, and in juxtaposition by parallel bars *e* and *f*, of which two sets, *e*, are of wood, and lie upon the plates, and two sets, *f*, of metal, and lie under the plates, and coincident with the others. These bars are connected by bolts *g*, which pass through longitudinal parallel slots *h* in the plates *d*, as shown in Fig. 3.

The outer ends of the bars *e* on each side of the frame pass between the guide-plates *b*, as seen in Fig. 1.

F F are two parallel metal bars, bolted to the under sides of the beams B and C at points just over the middle of the two sets of bars *e*, respectively, the latter being pivoted to them by the bolts *i*. On the rear edges of each of the plates *d* are ears or lugs *j*, to which the drag-bars G are pivoted, Fig. 3.

To the abutting ends of the bars *e* are pivoted short metal bars *k*, which are parallel to each other and to the bars F. Into an aperture in the rear end of each of these bars *k* is inserted the end of a link, *l*, Fig. 3, which passes through the lower end of a lever, H, pivoted in a mortise in the tongue J, and extending upwardly, as shown in Fig. 1. Now, by moving this lever, the bars *e* and *f*, turning upon their pivots *i*, are made to assume a straight or a V-shaped line. When these are straight, the rear edges of the plates *d* are all in line, but when they are shifted by the lever to a V-shaped line, then the abutting ends of the plates *d*, by reason of their arrangement and connection, slide upon each other and assume the position shown in Fig. 3. This construction of parts enables us to shift the hoes from a straight to a V-shaped rank, at pleasure; and, further, the drag-bars in shifting move in straight lines back and forth without approaching each other.

S is the ordinary lifting-bar, provided with chains for raising the rear ends of the drag-bars in the usual way. This bar is hung between the rear ends of the side beams A, to which it is pivoted by means of end plates, whose lower ends are formed into cam-disks *r*, of the shape shown. These disks are pivoted on the one side to a plate, *t*, and on the other to a segmental ratchet, M, bolted upon the end of the beam A. On the pivot which connects the cam-disk to the ratchet, and between them, is pivoted, by means of a slot, a lever, N, provided with a catch or dog, *o*, which engages with the segmental ratchet. The slot in the lever allows it sufficient play to engage or disengage the dog with the ratchet. By means of this lever the lifting-bar can be swung upon its pivot to regulate the height of the hoes and their depth of penetration.

Through the hollow wheel-spindles *a* pass short stub-axles *c'*, which rotate within them.



The outer ends of these stub-axles project from the spindles, as do likewise the hubs of the wheels I, which last are keyed to the stub-axles by means of pins passed through their extremities, as indicated. Keyed upon the inner ends of the stub-axles, just on the inner side of the beams A, are clutches  $d'$ , Fig. 3. Hung to the under side of the hopper, in line with the stub-axles  $c'$ , and in suitable brackets, are two shafts,  $b'$ , with ends abutting half-way between the beams A, and having their outer ends abutting against the inner ends of the stub-axles. Upon the outer ends of this divided shaft  $b'$  are fitted loose clutches  $a'$ , which are connected by feathers to the shafts  $b'$ . In bearing-ears  $a''$ , bolted to the beams A, as shown in Fig. 3, are pivoted two levers, T, of the shape indicated. The forward ends of these levers are forked, and the prongs lie in annular grooves in the clutches  $a'$ , as shown. The rear ends of these levers rest against the cam-disks  $r$ , and are held pressed against them by the springs  $b''$ , of any suitable construction, connected to the beams A. Upon raising the lifting-bar S, by means of the lever N, the cam-disks  $r$  press upon the ends of the levers T, and hold the clutches  $a'$  from engagement with the clutches  $d'$ . Upon lowering the lifting-bar, however, and with it the hoes or cultivator-teeth, the cam-disks release the ends of the levers T, which are then pressed out by the springs  $b''$ , thereby sliding the clutches  $a'$  into engagement with the clutches  $d'$ , so that the revolution of the wheels I causes the shafts  $b'$  to rotate.

The bottom of the fertilizer-hopper E slants forward at an angle of about thirty degrees. At or near the bottom of this slope are equidistant apertures  $c''$ , whose size may be regulated by a slide of any suitable construction, which is also capable of entirely closing them when desired. Over each of these apertures is a trifurcated agitator,  $d''$ , pivoted to the bottom of the hopper, as seen in Fig. 2.

A bar,  $d'''$ , rests upon the rear ends of these agitators, to which each of them is pivoted, so that the longitudinal reciprocation of the bar will cause the horizontal vibration of the agitators. Half-way between each of the agitators is a finger,  $g'$ , rigidly attached to the bar  $d'''$ , as shown. As the bar  $d'''$  reciprocates, the agitators and fingers just described approach and recede from each other, for the purpose of keeping the guano or other fertilizer in constant motion, and preventing it from bridging over the outlets. By slanting the bottom, as described, all of the contents of the hopper will find its way to the discharge-outlets.

On the under side of the hopper, directly under the bar  $d'''$ , is a similar bar,  $e''$ , pivoted to short arms  $f''$ , Fig. 3, which have their ends respectively pivoted to the bolts which pivot the agitators in the hopper. The bolt which connects the bar to one of the arms  $f''$  passes through a slot in the bottom of the hopper and into the bar  $d'''$ , thus uniting the bars  $d'''$  and  $e''$ . These bars and the agitating devices

are caused to vibrate by means of a lever or arm,  $k'$ , pivoted to the bar  $e''$  and the hopper, as indicated in Fig. 3. The opposite end of this arm is rounded and travels in the groove of a worm, C', keyed upon either section of the shaft  $b'$ , as shown. The revolution of the shaft causes the arm  $k'$  to vibrate, which in turn actuates the agitating-fingers in the hopper, as before stated.

Between the rear ends of each of the drag-bars G are bolted joint-pieces C'', of the shape shown, and to each of these joint-pieces is bolted a pair of extension-bars, B', as indicated. Between the rear ends of the extension-bars are bolted the standards G', having flanged heads, which rest upon the bars B', and also having vertical slots through them, as shown. They may be made of two pieces, which are clamped together by a bolt which unites them to the extension-bars, as is seen in the drawing.

The cultivator hoes or teeth E' are pivoted at or near their tops in the slots of the standards, and they are held in working position by clamping-bolts  $u$ , which pass through the standards and through the recesses  $w'$ , shown by dotted lines in Fig. 1. These bolts are sufficient to clamp the teeth between the spring-arms of the standards, and thus friction-brakes are formed capable of holding the teeth in working position until an obstacle is met, such as a stump or large stone, when they will yield and swing back upon their pivots, as indicated by the dotted lines in Fig. 1. If desired, holes may be drilled through the standards and the teeth, into which ordinary brake-pins may be inserted.

In order to increase the number of teeth without adding additional drag-bars, we provide cross-pieces F', which can be bolted to each alternate extension-bar B', as shown, and which may be straight, or semicircular, or of any desired shape. The ends of these cross-pieces are bent down to form standards, which are slotted just as those previously described, and in which the cultivator-teeth are pivoted, as shown. By this means we can increase or diminish the number of teeth without changing the number of drag-bars.

For sowing seed from the hopper D we employ a series of conduits, H', of the shape indicated, which are hung either upon the shafts  $b'$  or upon suitable pivots arranged under the hopper. The grain flows from openings in the bottom of the hopper through these tubes to the ground, and is covered in by the cultivator-teeth, which follow in the rear.

To retain the tubes in position we employ cylindrical brackets  $s'$ , bolted to the cross-beam C, which contains sliding rods or links  $m'$ , held in by spiral or other springs. The rear ends of these links are united to the conduits H', as shown. When an obstruction is encountered, the lower ends of these conducting-tubes yield and swing back until it is passed, when they are drawn into position again by the springs.



We claim as follows:

1. The plates *d*, to which the drag-bars are attached *seriatim*, abutting each other, and actuated by sets of shifting-bars *e* and *f*, to shift the hoes from a straight to a V-shaped or diagonal rank, as set forth.

2. The guide-plates *b*, between which the ends of the bars *e* are confined, in combination with the plates *d* and the bars *e* and *f*, the whole constructed and arranged as specified.

3. The lifting-lever *N*, provided with the catch *o* and pivotal slot *p*, in combination with the lifting-bar *S* and segmental ratchet *M*, substantially as specified.

4. The hollow spindles *a*, in combination with the wheels *I*, whose hubs extend beyond the spindles and are keyed to the ends of the stub-axles *c'*, provided on their inner ends with clutches *d'*, the whole constructed and arranged substantially as specified.

Witness our hands this 31st day of January, A. D. 1878.

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HENRY W. C. THOMAS.

Witnesses:

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