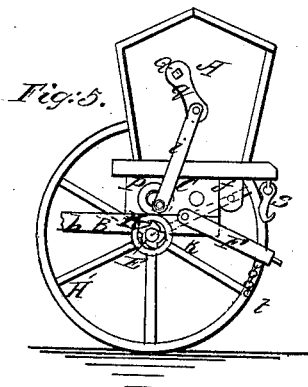
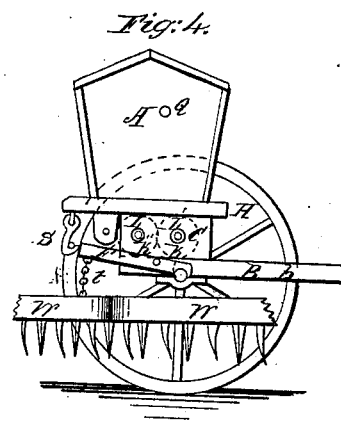
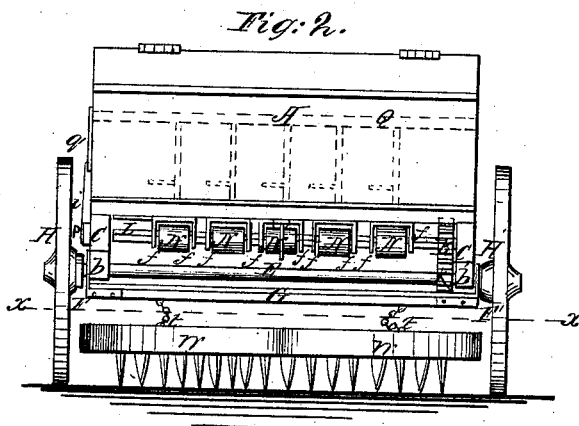
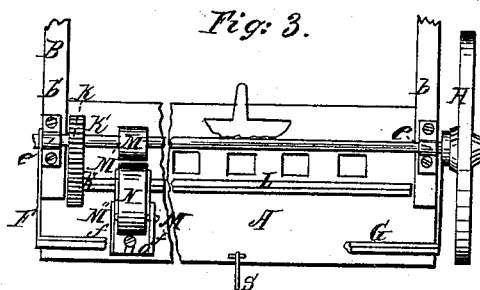
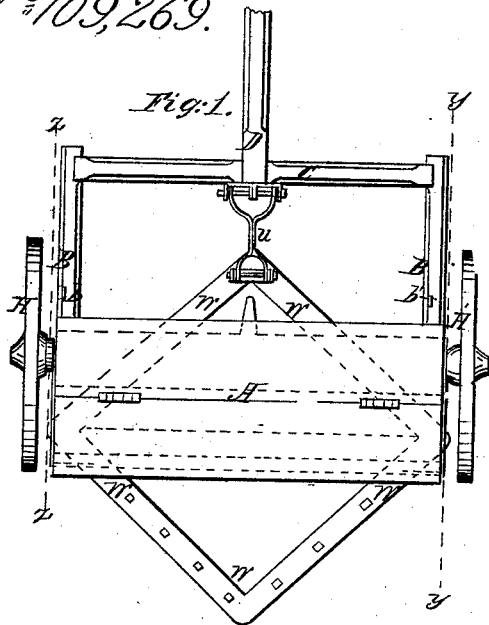


E. Stoner.

Grain Drill.

Nº 109,269.

Patented Nov. 15, 1870.



Witnesses

E. H. Young
Joseph Barb.

Inventor

Ezra Stoner

By David A. Sum
att'y.

United States Patent Office.

EZRA STONER, OF GREENCASTLE, PENNSYLVANIA.

Letters Patent No. 109,269, dated November 15, 1870.

IMPROVEMENT IN COMBINED HARROWS AND SEEDERS.

The Schedule referred to in these Letters Patent and making part of the same.

I, EZRA STONER, of Greencastle, in the county of Franklin and State of Pennsylvania, have invented an Improved Harrow and Seeder Combined, of which the following is a specification.

The first part of my invention relates to the combination of an adjustable endless apron or band of rubber or other elastic material, with one of two pulleys or rollers, under each dropping-aperture in the bottom of a seed-hopper, the apron being stretched over a third pulley, secured parallel to the first two, in the rear thereof, the object of this part of my invention being to facilitate the discharge and distribution of the seeds.

The second part of my invention relates to an arrangement of spur-gearing, consisting of three equal-toothed wheels, meshing in train, and secured respectively upon the two parallel roller-shafts under the hopper and upon the axle of the machine, under one of them for the purpose of driving the roller-shafts; and to the combination with the axle of a lever secured at one end to the rear bar from which the harrow is in part suspended, and so pivoted to the frame-work at the end of the seeder, which carries the spur-gearing, as that the elevation of the rear bar to lift the harrow from the ground will cause the inner end of the lever to bear upon the axle, and to elevate the frame of the machine, and with it the toothed wheels upon its roller-shafts, so that they will be disengaged from their connection with the toothed wheel on the axle, (this upward movement of the frame from the axle being permitted by means of an extended vertical slot in the bearing or journal-box of the axle,) the object of this part of my invention being to relieve the rollers and aprons of the seeder from wear and tear when the machine is not in operation.

In the accompanying drawing—

Figure 1 is a top or plan view of my improved machine.

Figure 2, a rear elevation thereof.

Figure 3, an underneath view of the bottom of the hopper, &c., with all but one of the seeding-rollers removed.

Figure 4, a vertical section in line *y y* of fig. 2, giving an end view of the hopper, and illustrating the attachment and operation of the lever, gearing and un-gearing the toothed wheels on the axle and roller-shafts.

Figure 5, a vertical section in line *z z* of fig. 2, giving an elevation of the opposite end of the seed-hopper and of the devices for moving the agitators or stirrers within the same, and for connecting the wheel with the revolving axle of the machine.

A is a seed-hopper of usual form and construction, supported upon a frame, B, by means of interposed blocks, C C, at either end.

The frame B is constructed of the side-bars *b b'*, connected by a transverse bar, *c*, in front, to the center whereof a tongue or pole, D, is secured.

E is the axle of the machine, turning freely in suitable boxes, *e e'*, secured to the under side of the bars *b b'*, of the frame B, under the blocks C C, supporting the hopper.

H H' are wheels of ordinary construction, carrying the ends of the axle E.

The journal-box *e'*, at one end of the axle, is slotted vertically, so as to permit a movement of the bar *b'*, of the frame, independent of the axle.

F F' are arms or levers pivoted to the rear ends of the bars *b b'* of the frame, at a point on the outer face of each, in the rear of the axle.

These levers extend outward beyond the ends of the bars *b b'*, and are connected by a transverse bar, G.

The inner end of the lever F', pivoted to the bar *b'* over the slotted journal-box *e'*, is prolonged beyond its pivot so as to project over the axle inside of the wheel H', and to bear thereon when its outer end is raised. The axle thus serves as a fulcrum for the lever, which may thereby be made to lift the bar *b'*, and that end of the seed-hopper, so far above the axle as the length of the vertical slot in its journal-box will permit.

W is a harrow, formed of the rectangular frame *w w* and central cross-bar, the cross-bar, in common with the side-bars, being properly armed with teeth.

This harrow W is swung beneath the seeder A, by means of short chains, *t t*, (connecting its cross-bar with the rear bar G,) and an extended pivoted link, *u*, connecting its front angle with the front bar *c* of the frame B, immediately in the rear of the tongue D.

The chains *t t* are so proportioned as that, when the bar G is elevated so as to be caught by a hook, *s*, on the hopper, the harrow will be lifted entirely clear from the ground, so as to be readily transported from field to field. By dropping the bar G the harrow is left free to drag upon the soil. Its transverse bar strikes in the rear of the seed-apertures of the hopper, so that the seeds will be caught and distributed or buried by its teeth, the rear bars being armed with narrow shares in addition to the ordinary points, to facilitate the latter end.

K is a spur-wheel, secured to the axle inside of the block C'.

L L', (see fig. 4,) are two parallel shafts, made of rectangular bars, extending between the blocks C C', both in the same horizontal plane, one of them being placed over the axle E.

K' K" are toothed wheels, each equal in diameter to the spur-wheel K, which are secured upon the shafts L L' over said wheel K, and in the same vertical plane

so that, when the hopper and its shafts *L L'* are dropped down upon the axle, the toothed wheel *K'* of the shaft *L'*, gearing into the toothed wheel on *L*, will also gear into the spur-wheel *K* on the axle *E*. Hence, when the harrow is dropped to take hold of the ground, the spur-gearing is complete, and the shafts *L L'* will revolve in unison with the axle, while the elevation of the harrow by the lifting of the bar *G* will, through the movement of its lever *F'*, unship the gearing and leave the axle free to turn independently of the roller-shafts *L L'*.

M M' are rollers, secured in pairs, one upon each shaft, under each dropping-aperture in the bottom of the hopper, along its entire length.

M is a pulley of equal diameter with said rollers, revolving in a suitable bracket, *ff*, secured to the under side of a plate, *O*, sliding in ways upon the under side of the hopper, in the rear of each pair of rollers.

N is an elastic band of rubber, passing over the pulley *M* and the roller *M'* nearest thereto. This band may be tightened or loosened by means of the sliding plate *O*, which is secured by a set-screw, *g*, working through a slot in the plate *O*, as shown in fig. 3.

P (see fig. 5) is a disk, secured eccentrically on the outer side of the end of the hopper *A*, in the projecting end of the shaft *K*.

Q (see dotted lines, fig. 2,) is a rocking-shaft, extending longitudinally through the hopper, and set in motion by means of a crank, *g*, upon its outer end, connected, by a link, *i*, to the eccentric *P*. Upon this rocking-shaft *Q* is placed a series of arms or stirrers, one over each seeding aperture, which, from the rocking movement of the shaft, are made to swing back and forth in the hopper over said apertures, to agitate the grain and prevent it from clogging as it passes out.

The wheels *H H'* may be fastened upon the axle *E*, or may be left free to turn thereon. In the latter case I fix a pawl, *R*, upon the inner end of the hub of the wheel, (see fig. 5,) to engage a concentric ratchet, *k*, upon the axle, the teeth of the ratchet being so in-

clined, and the pawl so adjusted with reference thereto, as that, when the machine is carried forward, the pawl will engage the ratchet and cause the axle to revolve with the wheel; but in case of a reverse movement, the wheel will turn upon the axle independently thereof.

The dropping-apertures in the bottom of the hopper are opened, closed, and adjusted by means of suitable slides, in the usual manner. The employment of the horizontally-moving elastic bands *NN*, in combination with an opposite roller, *M*, under the seed-apertures, insures a more perfect and regular delivery of the seeds than is attained by the ordinary devices.

The front teeth of the harrow open the soil and prepare it for the reception of the seed, while the teeth and shares on its transverse and rear bars bury and cover the seeds dropped in front thereof.

By properly adjusting the seed-apertures in the bottom of the hopper, the quantity of seed to be sown is perfectly controlled.

Although my machine is especially adapted for sowing broadcast, I, nevertheless, can readily adapt it for sowing in drills, by securing thereto the ordinary drill-tubes in proper position under the apron under each aperture.

I claim as my invention—

1. The combination of an elastic endless apron with rollers and pulleys under each dropping-aperture in the hopper of a seeding-machine, said apron being arranged and made to operate substantially as and for the purpose herein set forth.

2. The combination of the lever *F'* with the end of the axle *E* and with the frame *V* of a seeding-machine, substantially as and for the purpose herein set forth.

EZRA STONER.

Witnesses:

JOHN KAUFFMAN,
S. H. ELLY.