No. 754,167.

PATENTED MAR. 8, 1904.

G. L. ROBY.

GRAIN DRILL.

APPLICATION FILED FEB. 28, 1901.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

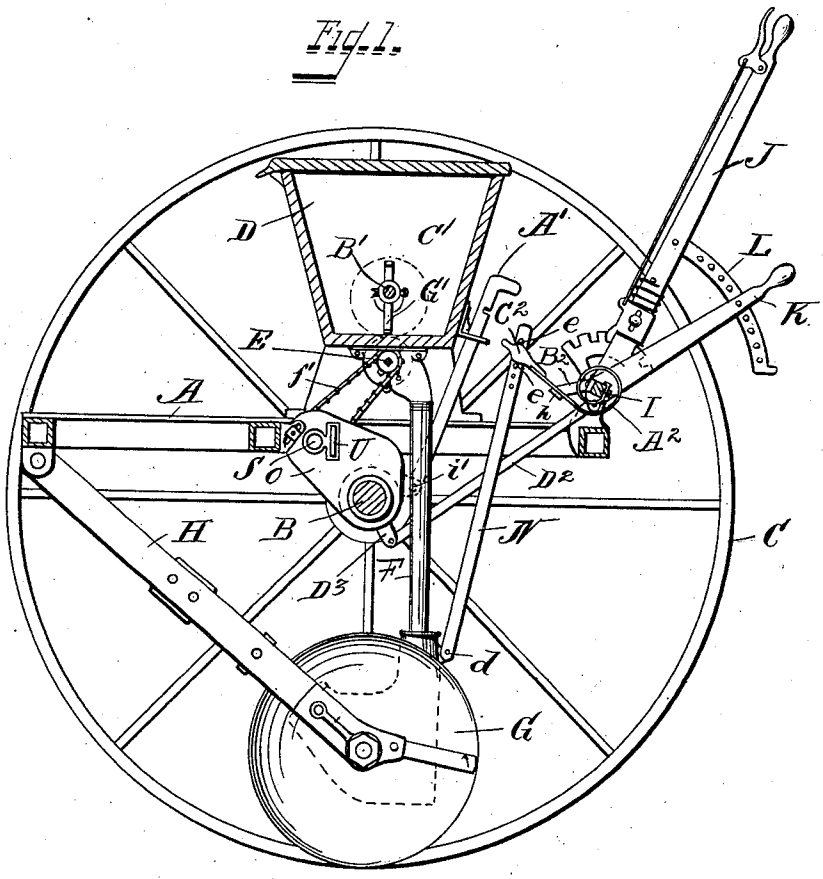
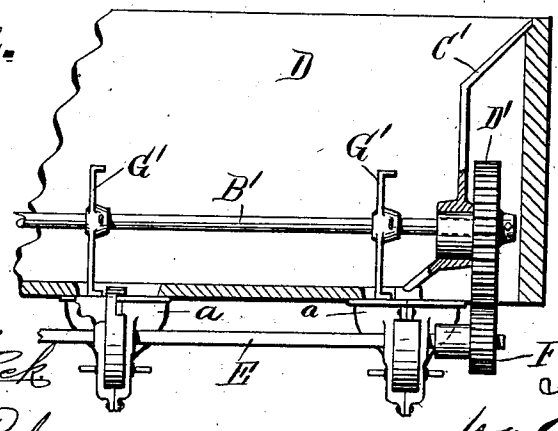


Fig. 2.



Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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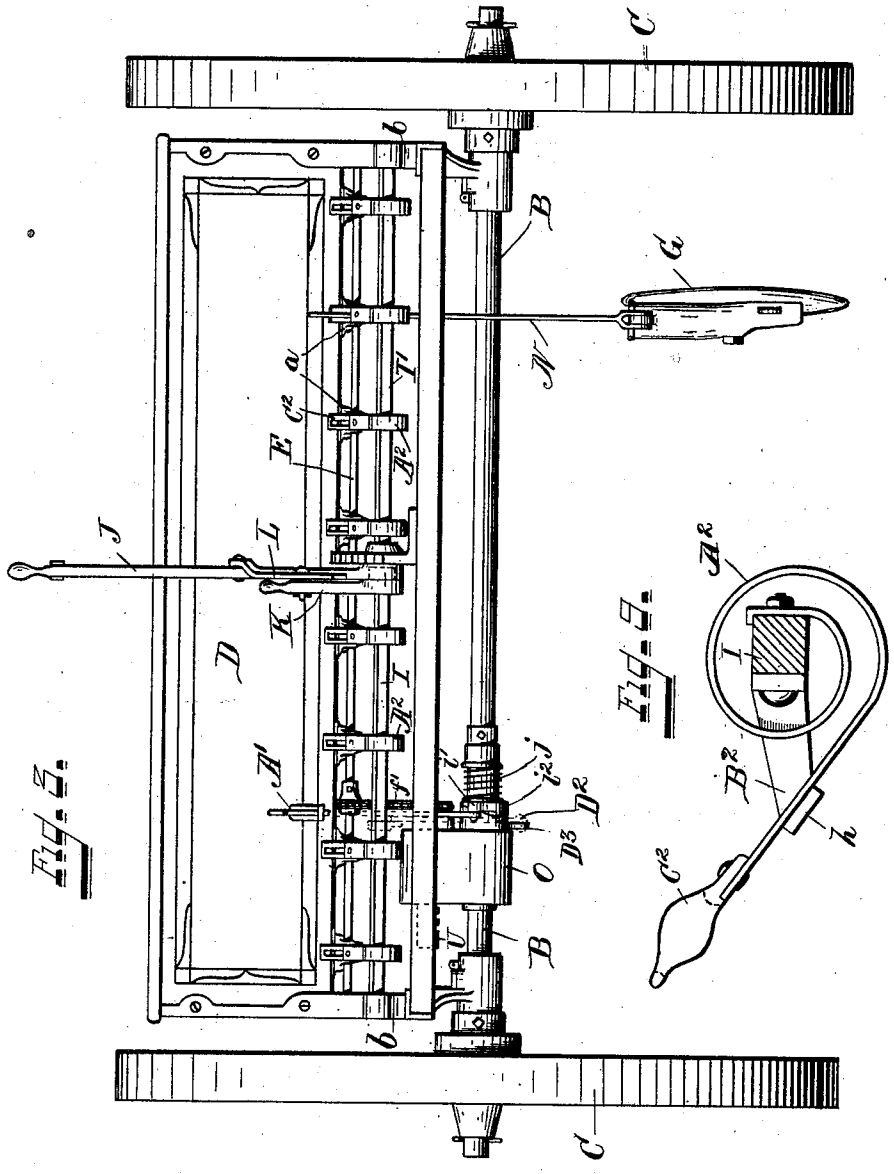
NO MODEL. 3 SHEETS—SHEET 2.



Witnesses.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 4.

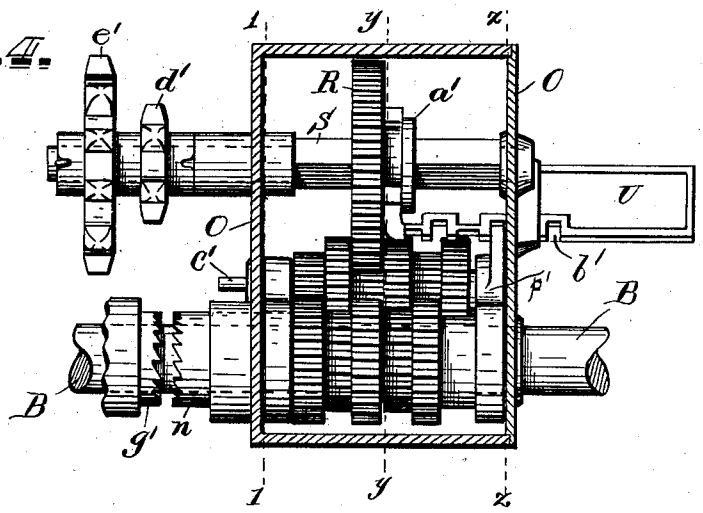


Fig. 5.

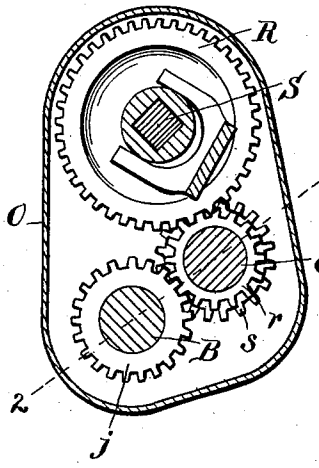


Fig. 6.

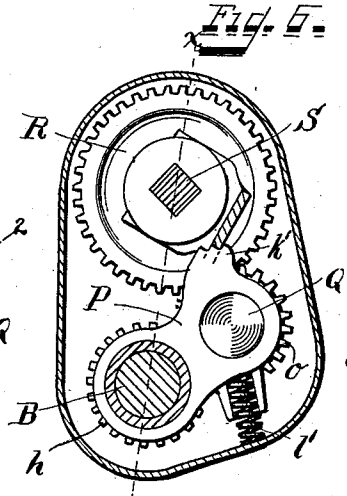


Fig. 7.

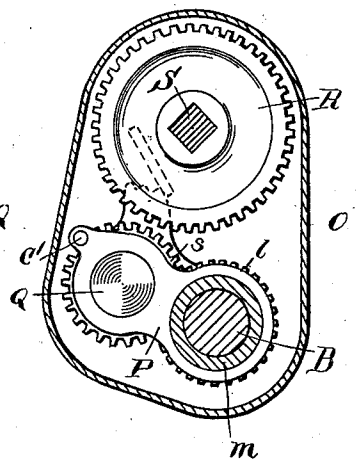
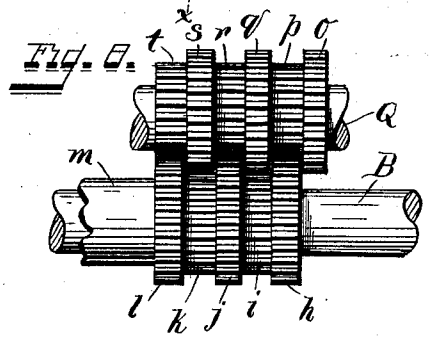


Fig. 8.



Witnesses.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 754,167. Patented March 8, 1904.

UNITED STATES PATENT OFFICE.

GEORGE L. ROBY, OF DAYTON, OHIO, ASSIGNOR TO THE STODDARD MANUFACTURING COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 754,167, dated March 8, 1904.

Application filed February 28, 1901. Serial No. 49,248. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. ROBY, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Grain-Drills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to force-feed grain-drills in which the feed-shaft is rotated by the traction of the machine, and more particularly to that class of grain-drills employing spring-pressure devices for the furrow-openers, whether the same be disks or hoes; and it has for its object the provision of novel means for obtaining a variable speed of the feed-shaft in a very simple and efficient manner and also in the details of construction and combination of the parts, all as will be hereinafter more fully set forth, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1, Sheet 1, is a sectional side elevation of a grain-drill embodying my invention. Fig. 2, Sheet 1, is a longitudinal section of one end of the hopper, showing the agitating mechanism for preventing the oats or other grain from banking over the feed-cups. Fig. 3, Sheet 2, is a rear elevation of the machine with parts omitted to better illustrate the remaining parts. Fig. 4, Sheet 3, is an enlarged sectional elevation of the variable-speed mechanism on the dotted line *x x* of Fig. 6 looking to the right. Fig. 5, Sheet 3, is a sectional elevation taken on the dotted line *y y* of Fig. 4 looking to the left. Fig. 6, Sheet 3, is a section view on the dotted line *z z* of Fig. 4 looking to the left. Fig. 7, Sheet 3, is a sectional view on the dotted line 1 1 at Fig. 4 looking to the right. Fig. 8, Sheet 3, is a detail plan view of the gears with the casing removed on the dotted line 2 2 of Fig. 5. Fig. 9, Sheet 2, is an enlarged detail side elevation, partly in section, of one of the spring-pressure devices and associated parts.

The same letters of reference are used to indicate identical parts in all the figures.

Referring to Figs. 1 and 3, A is the main frame of the drill of the usual or any suitable construction, supported on an axle B, having on its end the usual carrying-wheels C, which are united to the axle by ratchet-and-pawl mechanism in a well-known manner in this class of machines to cause the rotation of the axle forward when the machine is drawn forward or is being turned and to release it from rotation when the machine is being backed. D is the hopper carried upon the main frame and provided in its bottom with a series of openings, to which are united in the usual or any suitable manner the feed-cups *a*, containing the usual or any suitably-constructed force-feed wheels fast upon a shaft E, suitably journaled to the under side of the hopper and extending through openings in all the cups *a* after a manner well known in grain-drill construction. The feed-shaft E and feed-wheels carried thereby are rotated by driving mechanism from the axle B in a manner to be hereinafter described to feed the grain in a constant regulated stream from the hopper down through the feed-cups into usual spouts F, suspended therefrom, which convey it to depositing-channels either in the boots of hoes which form the furrow-openers or to sides of disks G near the ground, which disks form the furrow-openers, the disk hoes being well known as interchangeable means for forming the furrows in grain-drills and both of which are carried on independent drag-bars H, whose forward ends are pivoted usually to the forward cross-bar of the main frame A, as indicated in Fig. 1.

The description of the machine so far is of a well-known type and familiar to those skilled in the art, and I will now proceed to describe the first feature of my invention, which relates to the speed-changing mechanism for the feed-shaft, illustrated more particularly in Figs. 4 to 8, where surrounding the axle B and adjustably supported by the main frame A is a box O, containing in its lower end a series of double gears *h i j k* and a single gear *l* on a sleeve *m*, extending through the sides of the box and carrying one portion of a clutch

member n, (see Figs. 4 and 8,) said clutch, sleeve, and gear l being loose upon the axle B. In a frame P within the box O, which frame is hung to vibrate concentric with the axle B, is journaled a counter-shaft Q, carrying pairs of gears of unequal size o p q r and s t, meshing with the gears h i j k l, respectively. The gears o p q r s t are all loose upon the counter Q, and meshing with any one of them, according to adjustment, is a gear R, fast, but free to slide upon, a second counter-shaft S, journaled in the box O and having a circumferentially-grooved collar a', to which is attached a gage-plate U, projecting through a slot in the side of the box and provided with locking-notches b' to hold the gear R in any of its adjusted positions. The frame P carries a pin c', projecting through a slot in the side of the box O, by means of which the frame can be vibrated to throw its gears into and out of mesh with the gears on the axle B and to permit the sliding of the gear R when said frame is depressed. The projecting end of the counter-shaft S has fast upon it two sprocket-wheels d' e' of different diameters, either one of which is connected at a time by a drive-chain f', Fig. 1, with a sprocket-wheel on the feed-shaft E. Fast upon the axle B, but free to slide thereon, is a clutch member g', Fig. 4, adapted to be engaged with or disengaged from the clutch-sleeve n by means of a lever A', whose upper end is held in a guide upon the hopper D and whose lower end is pivoted to an arm i', Figs. 1 and 3, hung upon the axle B and carrying a cam-hub i^2, engaging the sliding clutch member g', which is normally held in engagement with the other clutch member n by means of a coiled spring j, Fig. 3, upon the axle B. Upon drawing up the lever A' the two clutch members are disengaged to stop the rotation of the counter-shaft S and feed-shaft E, and upon pressing down said lever A' the two clutch members are thrown into engagement by the spring j to impart the rotation of the axle to the feed-shaft E, as will be readily understood.

The above-described clutch-operating mechanism is for purposes of stopping and starting the feed while the machine is at work in the field with the furrow-openers pressed into the ground; but in order to disengage the clutch mechanism to stop the feed by the raising of the furrow-openers from the ground or automatically I provide a link D^2, Figs. 1 and 3, pivoted at its upper rear end to a crank-arm on the shaft I and at its lower forward end to a lug D^3 on a cam-sleeve hung concentric with the clutch members and bearing against the cam i^2 in such manner that when the shafts I I' are rocked backward to raise the furrow-openers the clutch members are disengaged through the medium of the link D^2.

One side of the frame P is provided with a shouldered offset k', Fig. 6, to engage any one of the notches b' in the slide U to lock the latter and that gear R when adjusted laterally. The box O, as seen in Fig. 1, is so disposed upon the axle that when the frame P is vibrated in either direction the gears upon its counter-shaft Q will remain in or out of mesh with the gear R, though I prefer to use a spring, as l', Fig. 6, normally tending to press the counter-shaft Q toward the counter-shaft S. It results from this construction that when the gear R is in mesh with the gear t the feed-shaft E will be driven at its lowest speed, and when it is in mesh with the gear o it will be driven at its highest speed, and under the arrangement shown six different speeds are given to the feed-shaft, according to the adjustment of the gear R, and by shifting the drive-chain f' from the sprocket e' to the sprocket d' six other different speeds may be given to the speed-shaft, thus making it possible by very simple mechanism and in a very simple manner to impart twelve different speeds to the feed-shaft to suit the requirements of the character and quantity of grain to be drilled per acre. The shifting of the gear R through the medium of the bar U is done by hand, and at the same time the pin c' is pressed down to disengage the gears on the shaft Q from the gear R while the shifting is taking place, as will be readily understood. The box O is adjustably secured to the frame of the machine, as seen at p', by means of a set-screw, which enables it to be swung on the axle B when the drive-chain f' is shifted from the one sprocket to the other, and thereby the tension of said drive-chain is adjusted.

The remaining feature of my invention not herein claimed, illustrated particularly in Figs. 1 and 2, relates to the agitating mechanism in the hopper for preventing the bridging of the grain, such as bearded oats, across the top of the feed-cups, and to this end I employ a straight horizontal shaft B', journaled in removable brackets C' in the ends of the hopper, and which shaft passes eccentrically through a hub journaled in one of said brackets and projecting from a gear-wheel D' in the space between the bracket C' and the end of the hopper, which gear-wheel meshes with a pinion F', fast upon the feed-shaft E, as seen in Fig. 2. Fastened upon the shaft B' are a series of arms G', in pairs, of which one member is longer than the other, and each pair of which is arranged over each feed-cup opening, the ends of said arms being of such distance from the shaft as to travel through a true circle, (indicated by the dotted line of Fig. 1,) notwithstanding the eccentric rotation of the shaft B'. These arms G' in their downward travel partially enter the mouths of the feed-cups with a sweeping motion, and thereby prevent the bridging of the grain and

insure its proper feeding into the cup, as will be readily understood. When not drilling grain having a tendency to bridge, the brackets C′ and shaft B′ carried thereby may be bodily removed from the hopper.

Having thus fully described my invention, I claim—

1. In a grain-drill, the combination of a series of feed-distributing wheels, a shaft for rotating the same, a shaft constantly driven by the forward traction of the machine, a set of gears side by side on said shaft, a second set of gears adapted to mesh with the aforesaid gears on a counter-shaft, and a third gear on a shaft connected with the feed-shaft and adjustable with the second set of gears, whereby upon shifting said third gear different speeds can be imparted to the feed-shaft, substantially as described.

2. In a grain-drill, the combination of a series of feed-distributing wheels, a shaft for rotating the same, a shaft constantly driven by the forward traction of the machine, a set of gears side by side on said shaft, a second set of gears adapted to mesh with the aforesaid gears on a counter-shaft, a third gear on a shaft connected with the feed-shaft and adjustable with said second set of gears, and means for engaging and disengaging said second set of gears and the third gear to permit the lateral adjustment of the third gear, substantially as described.

3. In a grain-drill, the combination of a series of feed-distributing wheels, a shaft for rotating the same, a shaft constantly driven by the forward traction of the machine, a set of gears side by side on said shaft, a second set of gears adapted to mesh with the aforesaid gears on a counter-shaft, a third gear on a shaft connected with the feed-shaft and adjustable with said second set of gears, a gage-plate for adjusting and locking said third gear, and means for engaging and disengaging said second set of gears and the third gear to permit the lateral adjustment of the third gear, substantially as described.

4. In a grain-drill, the combination of a series of feed-distributing wheels, a shaft for rotating the same, a shaft constantly driven by the forward traction of the machine, a set of gears side by side on said shaft, a second set of gears adapted to mesh with the aforesaid set of gears on a counter-shaft, a third gear on a shaft connected with the feed-shaft and adjustable with the second set of gears, and a box for inclosing said gears, substantially as described.

5. In a grain-drill, the combination of a series of feed-distributing wheels, a shaft for rotating the same, a shaft constantly driven by the forward traction of the machine, a set of gears side by side on said shaft, a second set of gears adapted to mesh with the aforesaid set of gears on a counter-shaft, a third gear on a shaft connected with the feed-shaft by gears of different diameter and adjustable with the second set of gears, and an adjustable box for inclosing said gears and regulating the distance between the last-named counter-shaft and feed-shaft, substantially as described.

GEORGE L. ROBY.

Witnesses:
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GUS. G. HAMPSON.