(No Model.)

6 Sheets—Sheet 1.

C. E. PATRIC.

GRAIN DRILL.

No. 543,049.

Patented July 23, 1895.

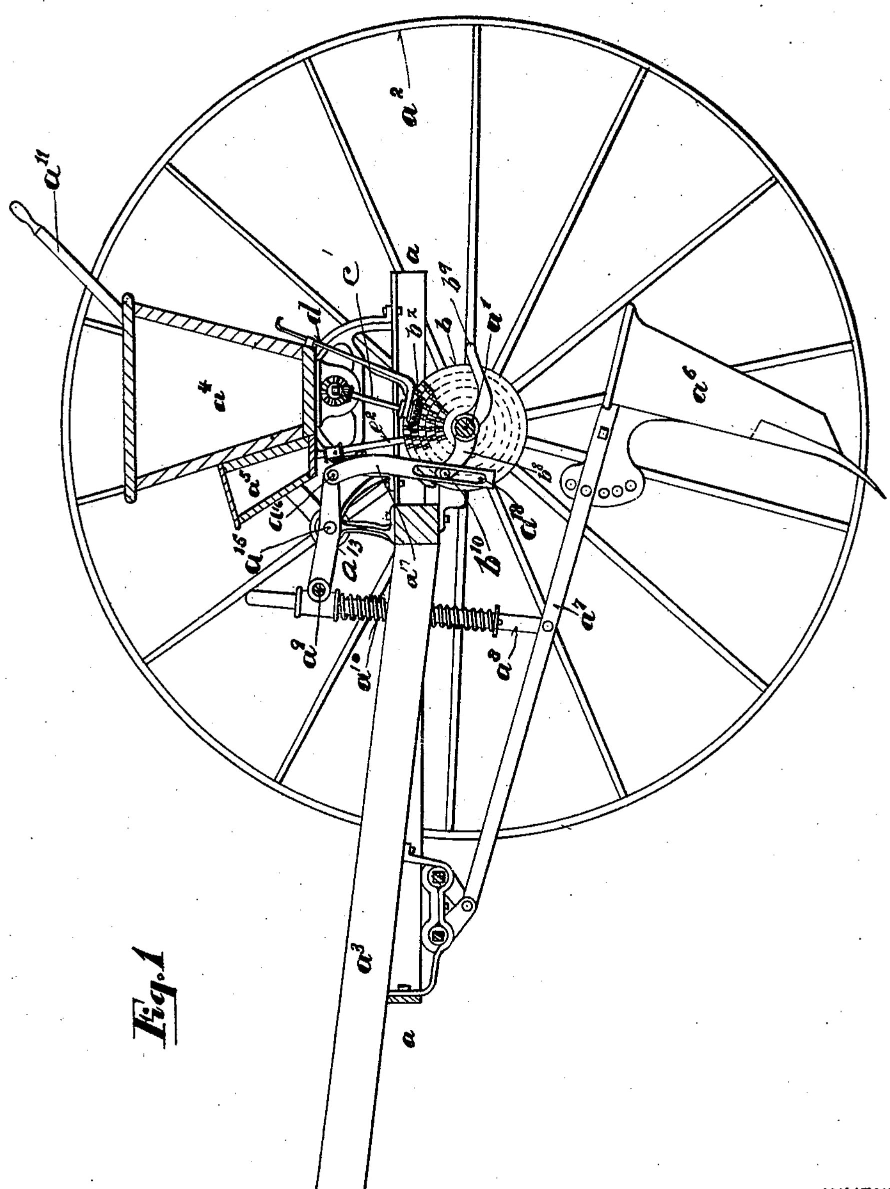

Fig. 1

WITNESSES:

Fred Ernst

Frank Statt

INVENTOR

Charles E. Patric

BY Stanley Lee Shepherd

ATTORNEYS

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C. E. PATRIC.

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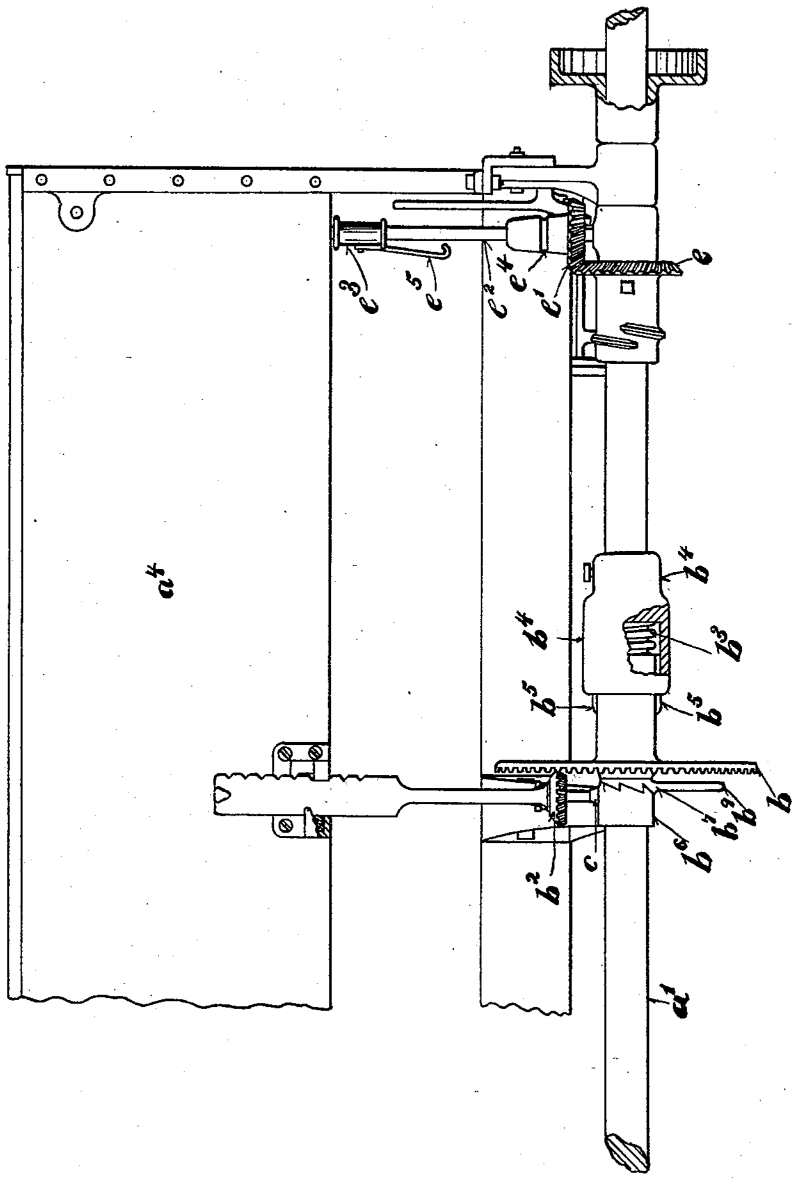

Fig. 2

WITNESSES:

Fred Ernest

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Charles E. Patric

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ATTORNEYS

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C. E. PATRIC.

GRAIN DRILL.

No. 543,049. Patented July 23, 1895.

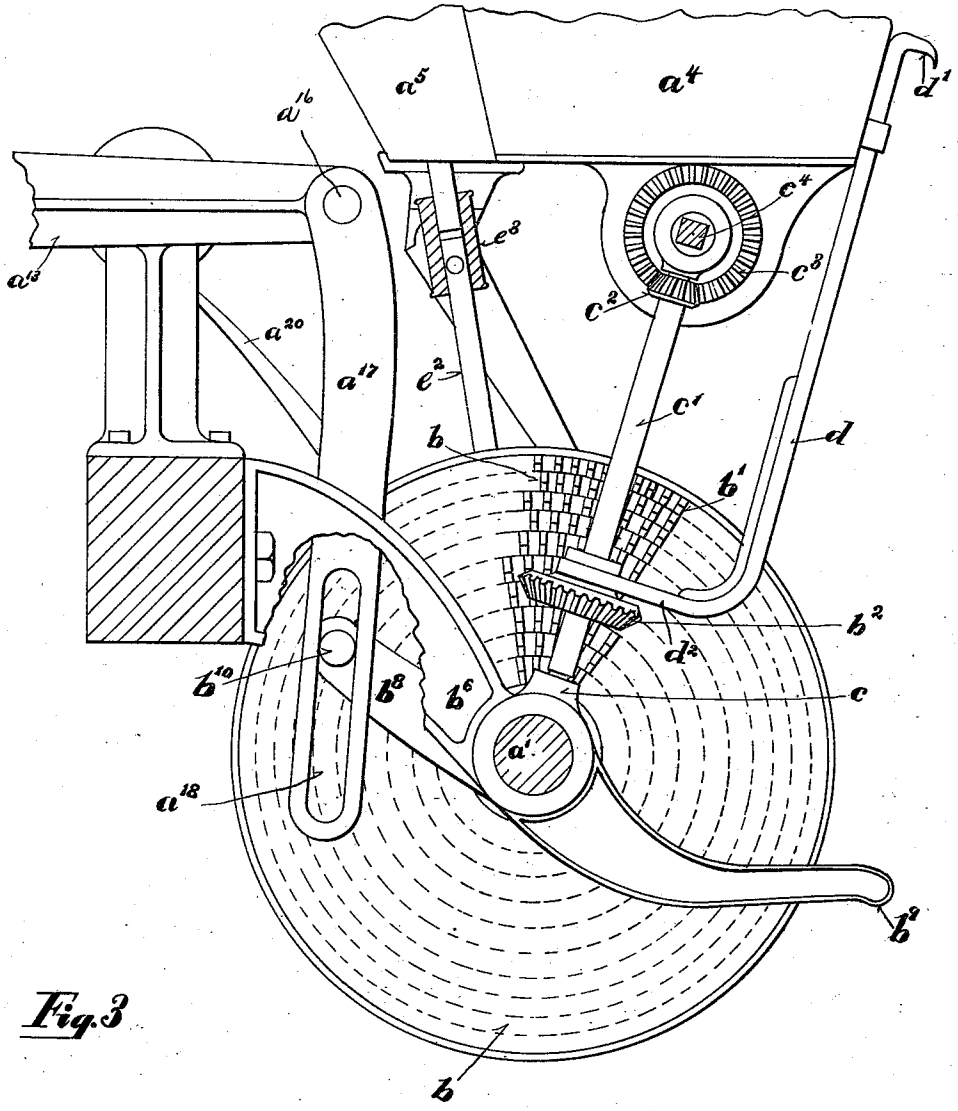

Fig. 3

WITNESSES:
Fred Ernst
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INVENTOR
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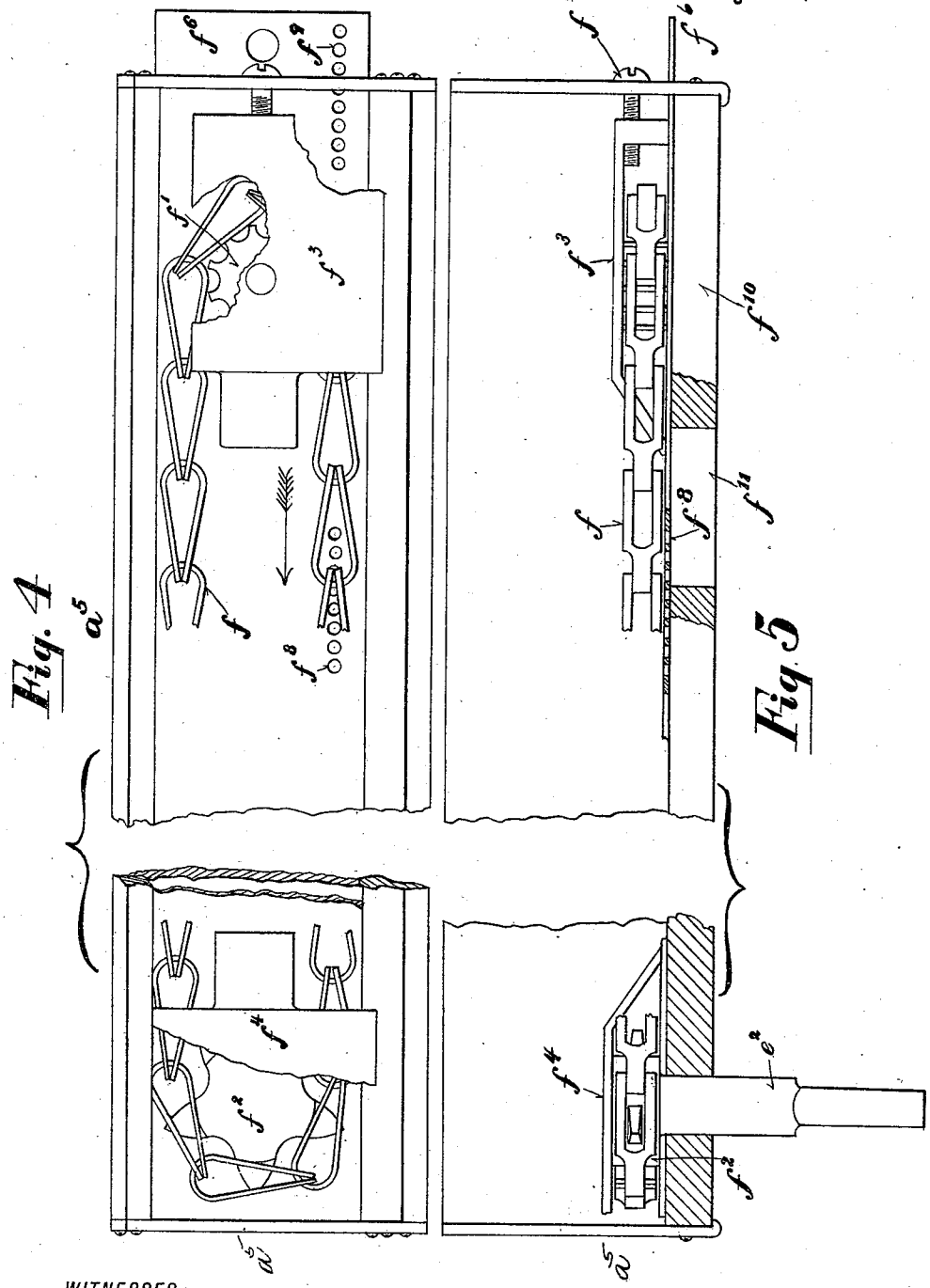
(No Model.) 6 Sheets—Sheet 4.

C. E. PATRIC.

GRAIN DRILL.

No. 543,049. Patented July 23, 1895.



WITNESSES:

Fred Ernest

Frank Watt

INVENTOR

Charles E. Patric

BY

Bakewell & Shepherd

ATTORNEYS

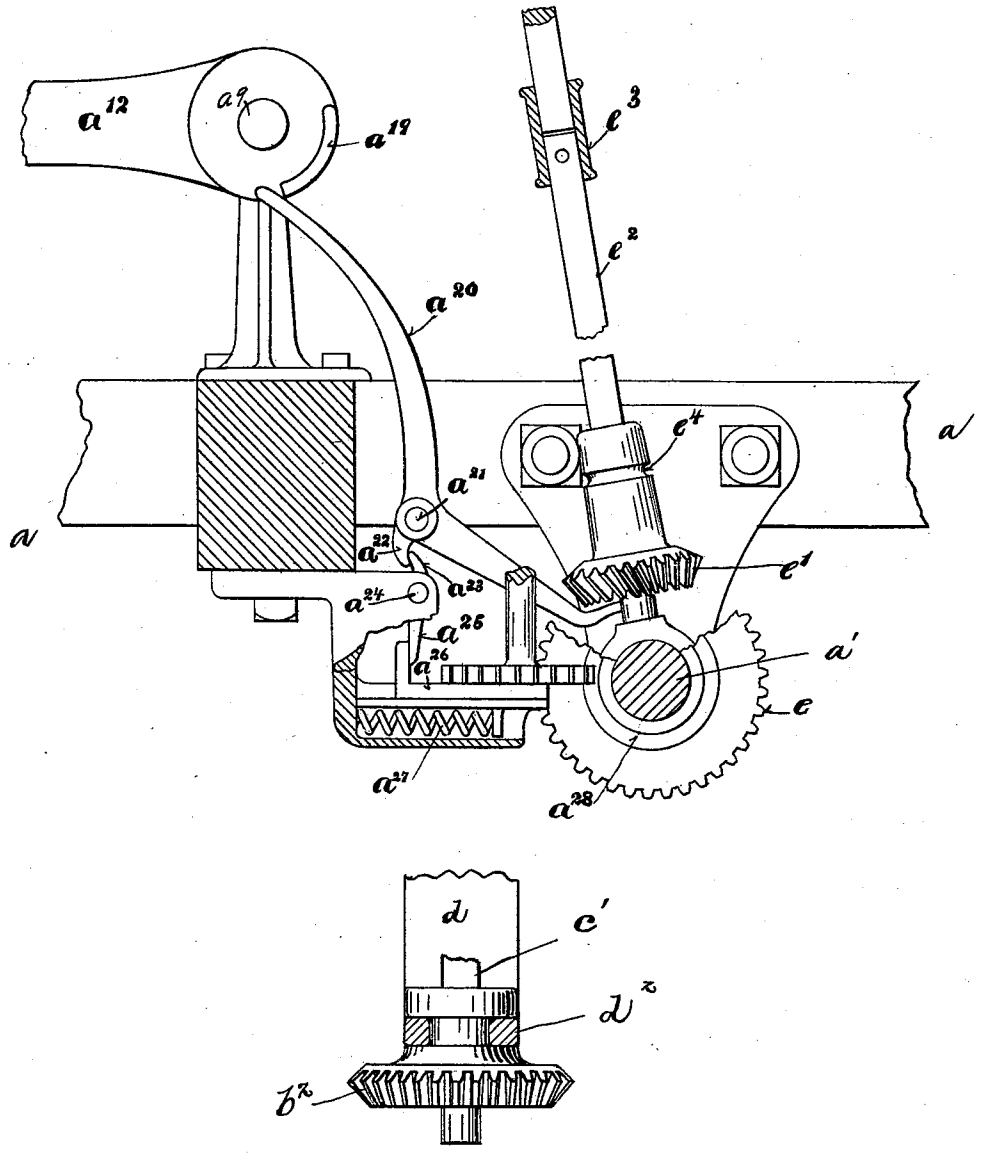
(No Model.) 6 Sheets—Sheet 5.

C. E. PATRIC.

GRAIN DRILL.

No. 543,049. Patented July 23, 1895.

Fig. 6



WITNESSES:

Fred Ernest

Frank Statt

INVENTOR

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BY Thos. H. Shepherd

ATTORNEYS

(No Model.) 6 Sheets—Sheet 6.

C. E. PATRIC.

GRAIN DRILL.

No. 543,049. Patented July 23, 1895.

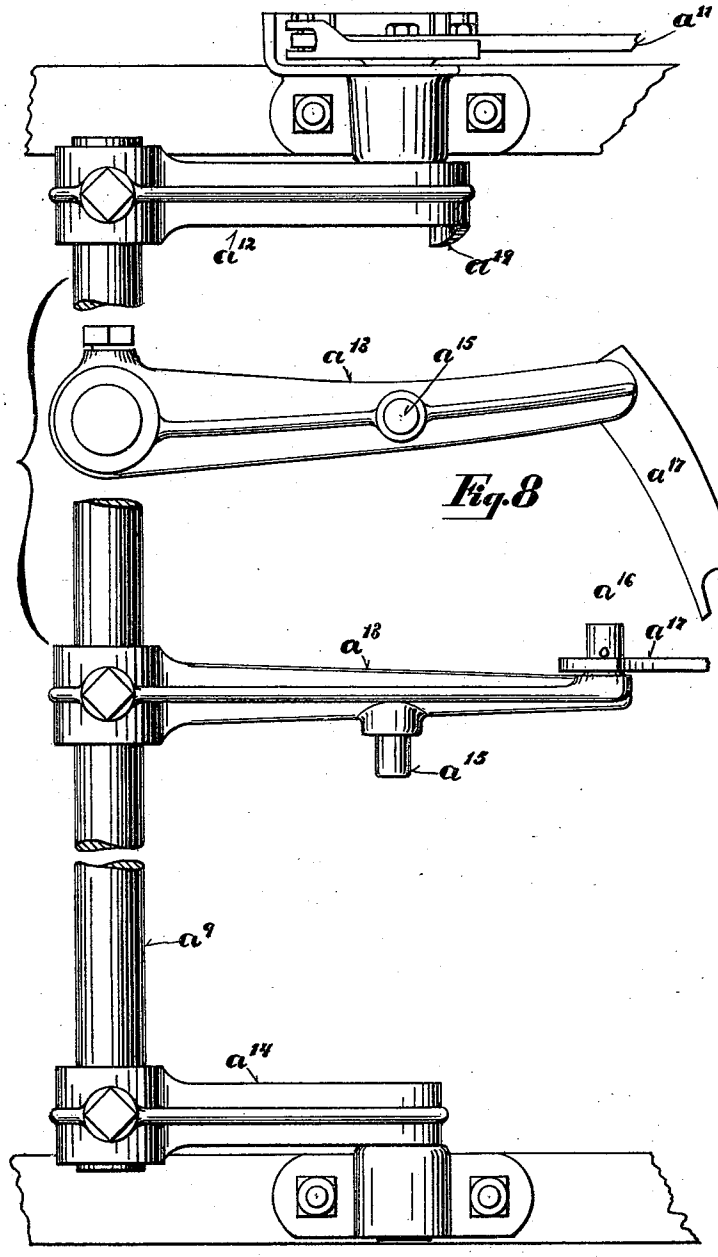

Fig. 8

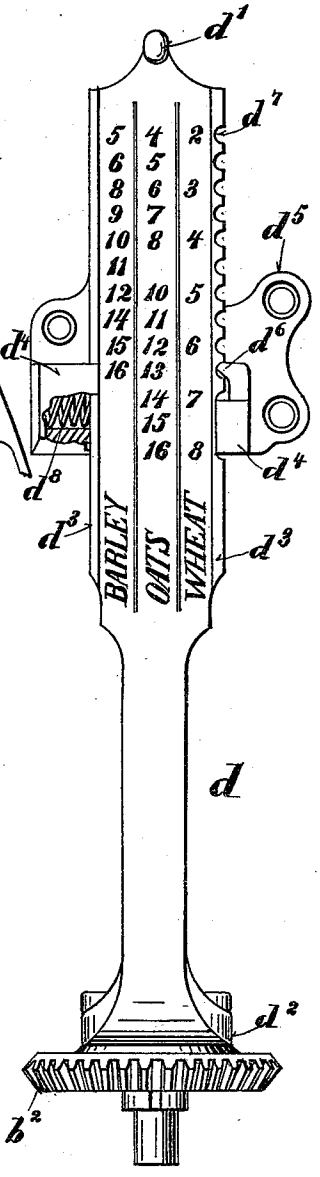

Fig. 9

Fig. 7

WITNESSES:

Fred Ernest

Frank Statt

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Charles E. Patric

BY Stanley & Shepherd

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES E. PATRIC, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE SUPERIOR DRILL COMPANY, OF SAME PLACE.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 543,049, dated July 23, 1895.

Application filed May 12, 1893. Serial No. 473,979. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. PATRIC, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented a certain new and useful Improvement in Grain-Drills, of which the following is a specification.

My invention relates to improvements in grain-drills.

The object of my invention is to provide improvements in the driving mechanism, by means of which the seed devices may be operated at different speeds, the constructions and arrangements being such that the feeding devices will be automatically thrown out of gear when the hoes or shoes are elevated out of the operative position.

A further object of my invention is to provide improved devices for feeding the seed from the hopper to the seed-tubes.

A further object of my invention is to provide novel means for operating the feeding devices, which shall be readily adjustable and capable of operating to perform the functions in different positions of adjustment.

My invention consists, essentially, in the various constructions and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, in which like parts are referred to by similar letters of reference, Figure 1 is a sectional elevation of a grain-drill embodying my invention. Fig. 2 is a rear elevation of a portion of the same. Fig. 3 is a transverse sectional view, on an enlarged scale, of a portion of the same, showing the devices for transmitting a variable motion from the power-wheels to the seeding devices and the arrangement for automatically disengaging the same when desired. Fig. 4 is a plan view of my improved seeding device. Fig. 5 is a sectional elevation of the same. Fig. 6 is a sectional elevation view of a portion of the operating mechanism in detail, illustrating the devices for disengaging some of the driving parts automatically when the shoes are elevated. Figs. 7 and 8 are detail views of portions of the shoe or hoe lifting devices and their connections for automatically disengaging the driving mechanism. Fig. 9 is a detail view showing the devices for changing the speed to vary the quantity of seed sown.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, a a represent a main frame.

a' is the main axle, and a^2 the supporting and driving wheels arranged at each end on said axle and adapted to support the same and transmit motion thereto.

a^3 is the tongue, connected to the main frame in the usual manner.

a^4 is the main seed-hopper, and a^5 the grass-seed hopper.

a^6 represents the shoes or hoes, connected in the usual manner to the main frame by the drag-bars a^7, stirrups or links a^8 being adapted to connect said drag-bars to a rock-shaft a^9 to raise and lower said hoes, springs a^{10} being employed on said links or stirrups in the usual manner for exerting pressure on said hoes.

The shaft a', as before described, is driven in the usual manner from the driving-wheels a^2, suitable ratchet devices being provided between the wheels and shaft to cause said shaft to turn with said wheels when the machine is moving in a forward direction only and permit said wheels to turn independent of said shaft when the machine is moving in a backward direction. Mounted on the main axle a', near the center, is a disk-wheel b, provided with concentric rows of gear-teeth b', adapted to engage similar teeth in a pinion b^2, the pitch-line of said gears being such that the pinion will engage in any one of the concentric rows b' of teeth. The disk-wheel b is adapted to be held against the pinion b^2 by a spring b^3, arranged in a cup-shaped sleeve b^4, secured to the axle and adapted to bear against the end of the hub of the disk-wheel b, said hub being projected into said sleeve for this purpose and preferably provided with spline connections b^5, which cause the disk-wheel b, sleeve b^4, and shaft a' to turn together, but permit a longitudinal movement of the disk-wheel on the shaft and in relation to the sleeve b^4. At one side of the disk-wheel b is a bearing-support b^6 for the axle a', provided at one end with a ratchet-shaped clutch-face adapted to engage with a similar clutch-

face on a clutch-collar b^7, said clutch-collar being provided with oppositely-extending arms b^8 b^9, the construction being such that a rotative movement of the clutch-collar about the axle produces, through the operation of the ratchet clutch-faces, a longitudinal movement of the disk-wheel on the shaft, so as to disengage the pinion b^2 therefrom. The axle-bearing b^6, which is connected to the cross-bar of the main frame a a, is provided with an auxiliary bearing or step c, in which is journaled the end of a short shaft c', preferably formed square in cross-section and on which the pinion b^2 is adapted to slide longitudinally, the pinion b^2 being provided with an opening corresponding in shape to said shaft, which causes said pinion and shaft to turn together in any position of adjustment along said shaft. The shaft c' is provided at the top with a pinion c^2, which meshes with a similar gear c^3 on the feed-shaft c^4, which carries the ordinary feeding devices of the feed-cups.

To provide for readily adjusting the pinion b^2 along the shaft c', so that it will engage either of the concentric rows b' of gear-teeth in the disk-wheel b, I employ a sliding support d, provided at the top with a hook-shaped handle d' and formed at the bottom with an inwardly-projecting portion d^2, substantially at right angles to the main body, and bifurcated at its outer end to embrace the hub of the pinion b^2, which is provided with a peripheral groove to receive the forked portion of said support. The upper portion of the support d is provided on opposite sides with guides or ways d^3, adapted to fit and slide in corresponding ways d^4 in a stop-plate d^5, secured to the rear of the main hopper a^4. This stop-plate is provided on one side with a projecting lug d^6, adapted to engage in any one of a series of notches d^7 formed on one side of the support d, a spring d^8 being adapted to press said support laterally to cause it to engage with said projecting lug. In changing the pinion b^2, therefore, to the different rows of teeth the clutch-collar b^7 is turned on the axle until the disk is pressed longitudinally, so as to clear said pinion. The pinion is then moved to the desired position by the operator, who takes hold of the hook-shaped handle d' and presses the support d laterally against the spring d^8 until said support is disengaged from the lug or projection d^6, after which the pinion may be moved to any desired position by a longitudinal movement of the sliding support and retained in this position by the engaging projection which immediately engages with one of the notches d^7 by the action of the spring d^8 against said support.

The power to drive the seeding mechanism in the grass-seed hopper a^5 is derived from a beveled gear e, also on the main axle a', said gear being adapted to mesh with a pinion e', slidingly mounted on a shaft e^2, connected by a coupling e^3 to the feeding mechanism, as hereinafter more fully described.

The pinion e' is provided in its hub with a peripheral groove e^4, adapted to be engaged by a spring-hook e^5, supported on the coupling e^3 when said pinion is elevated on the shaft e^2, means being thus furnished for retaining the pinion e' out of mesh with the driving-gear when it is desired to stop the operation of the seeding mechanism in the grass-seed hopper.

To provide for automatically stopping the feeding devices when the shoes or hoes are elevated out of the ground, I establish a connection from the driving-gear of each of the seeding devices to the rock-shaft a^9, which raises and lowers the shoes or hoes when operated by the hand-lever a^{11}. This I accomplish as follows: The rock-shaft a^9 is supported on arms a^{12} a^{13} a^{14}, preferably three in number, located respectively at the ends and center of said shaft a^9. Each of said arms is provided with a suitable trunnion about which the rock-shaft turns. The central arm a^{13} is extended rearwardly beyond the trunnion a^{15} and is provided with a projecting stud a^{16}, on which is pivoted the end of a connecting-link a^{17}, which is provided at its lower end with a slotted opening a^{18}, adapted to fit over a projecting stud b^{10} on the arm b^8 of the clutch-collar b^7. The arm a^{12} of the rock-shaft a^9 is provided on one side with a cam-shaped projection a^{19}, which, as the arm is revolved, comes in contact with the projecting end of a bell-crank lever a^{20}, pivoted at a^{21} to the frame, and adapted to contact at its opposite end with the bottom of the pinion e' of the grass-seeder driving-gear and raise said pinion on the shaft e^2, so as to disengage it from the driving-gear e. The bell-crank lever a^{20} is provided with a projection a^{22}, which contacts with a finger a^{23} on a short rock-shaft a^{24}, carrying at its opposite end a projection a^{25}, which engages with the end of a sliding bearing a^{26}, which carries the gearing used to communicate motion to a land-measure, a spring a^{27} being adapted to press said gear into contact with a worm a^{28} on the main axle. The result of this construction is that whenever the rock-shaft a^9 is moved to such a position as will raise the shoes or hoes out of the ground the driving-gears of the respective parts heretofore enumerated will be automatically disengaged and automatically re-engaged when the shoes are lowered to the position for operation. The slotted opening a^{18} in the link a^{17} and the cam projection a^{19} permit a limited movement of the rock-shaft in either direction without disturbing the driving connections. These constructions also permit an independent operation of the respective devices for engaging and disengaging the respective driving mechanisms when the shoes are in the working position. This movement is sufficient to adjust the shoes up or down to secure the proper depth of planting, the disengaging devices being operated only when the rock-shaft is moved to such an extent as to remove the shoes from the ground or out of

the planting position. The pinion e', which drives the grass-seeder, is adapted to return to its normal position of engagement by gravity when released by the bell-crank lever a^{20}. In order to insure its proper engagement with the gear e, I construct the teeth in the respective gears e and e' in the nature of a spiral—that is to say, the teeth are inclined to the plane of the axis of the shaft with the points of the teeth of the pinion extending backward in the direction in which the pinion revolves. The result of this construction is that the driving force of the gear e against the pinion tends, by reason of the inclination of the teeth, to draw the gears into closer mesh, so that as soon as the teeth engage at their upper and lower extremities, respectively, they will be by the driving force drawn into complete engagement.

To provide for feeding the grass-seed from the hopper a^5, I preferably employ an endless chain f, adapted to pass over suitable sprocket-wheels f' f^2, arranged at each end of the hopper, one of said sprocket-wheels f^2 being connected directly to the driving-shaft e^2 by the coupling e^3, each of said sprocket-wheels being inclosed in a suitable housing f^3 f^4 in the bottom of the hopper, one of which f^3 is adjustable longitudinally by means of an adjusting-screw f^5 to tighten the chain. The chain f is located completely in the hopper and travels both ways therein, thus thoroughly distributing the grass-seed in the hopper. Arranged in the bottom of the hopper is a sliding plate f^6, which is perforated at suitable intervals with a series of openings f^8, each series of openings being located directly below the line of travel of one strand of the chain f and each of said openings being adapted to permit a definite quantity of seed to pass through in a given time. One series of openings is used for each hoe or shoe, an additional series f^9 being provided at or near the end of the plate which projects slightly through the end of the hopper. The plate f^6 slides directly on the bottom f^{10} of the hopper. This bottom is formed at suitable intervals corresponding to the series of perforations with slotted openings f^{11}, corresponding in length to the distance between the first and last perforation of each series. When the plate is pushed clear in, the perforations of all the series are closed by the bottom f^{10}. When the plate f^6 is pulled out until one perforation shows at the end of the hopper, then one perforation of each series comes opposite the slotted openings f^{11} and permits the seed to feed through said opening. When all the openings of the series f^9 are exposed at the end of the hopper, then all the openings in each series are arranged above the slotted openings f^{11}, so that any desired degree of regulation may be secured by adjusting the required number of perforations above the slotted openings.

As before stated, the chain f travels directly above the respective series of perforations. This chain is preferably formed of a series of links, the sides of each of which are inclined to each other, so as to form a V or wedge shaped opening extending through the same. The links are each perforated laterally to receive the next succeeding link, which is threaded through the same in a well-known manner. That portion of the chain which passes over the feeding-openings travels in the direction of the arrow in Fig. 4—*i. e.*, with the larger portion of the V or wedge shaped opening of each link in advance. The grass-seed falling by gravity to the bottom of the hopper fills the respective links, and as the chain is advanced is formed through the respective openings as the chain passes over the same, the action of the chain being aided by the wedge-shaped openings of the links, which tends to crowd the seed into a narrower compass, and thus by reason of the weight of the seed above the chain to force it through said openings in a uniform and constant stream.

The seeding device herein described is especially adapted for sowing grass-seed and has been found especially efficient for this purpose. It is obvious, however, that it may be used for sowing other kinds of grain for which it may be found adapted, and while I have described it here only in connection with the grass-seeder it is not my intention by any means to limit it to this particular use.

The arrangement of the driving mechanism of the grass-seeder, together with the coupling e^3, furnishes the means for readily connecting and detaching said driving mechanism in attaching or detaching the seeder.

It will be seen that as above described I produce a grain-drill the operating parts of which are extremely simple and adapted to be easily and quickly adjusted to the work to be performed. In describing these parts I have set forth those constructions which have been found to be the most desirable in practical operation; but it is not my intention to limit my invention to those specific constructions, as it is quite obvious that they may be variously modified without departing from the spirit of my invention.

Having thus described my invention, I claim—

1. In a grain drill, the combination of a rock shaft and lifting lever, connections from said rock shaft to a series of shoes or hoes, a main shaft having a laterally movable disk wheel forming a driving connection from said main shaft to the feeding devices, a clutch lever adapted by a movement thereof to produce a lateral movement of said disk wheel to throw it into or out of gear, as described, a crank arm on the rock shaft, and a link connection from said crank arm to said clutch lever, said link being provided with a slotted opening adapted to permit an independent movement of the clutch lever, but cause said

clutch lever to move by the movement of said rock shaft when moved to a predetermined position, substantially as specified.

2. The combination with a revolving shaft and a gear thereon, a pinion adapted to engage said gear, a shaft on which said pinion is slidingly mounted, said gear and pinion being formed with inclined or spirally-shaped teeth, the inclination of said teeth being such as to draw the gear and pinion into closer engagement by the driving force of said gear, substantially as specified.

3. The combination with a seed hopper having a movable sliding plate in the bottom thereof, perforations in said plate arranged in series at intervals in the length thereof, one series of perforations being arranged on the plate so as to extend beyond the end of the hopper and adjacent thereto, an endless chain mounted wholly within said hopper and adapted to travel therein with the respective strands of said chain passing in opposite directions from end to end of said hopper, with one of said strands above the line of the respective series of perforations, said chain being formed of a series of links having flat sides and wedge-shaped openings, substantially as and for the purpose specified.

CHARLES E. PATRIC.

In presence of—
JOHN L. PLUMMER,
FRANK WATT.