

No. 738,816.

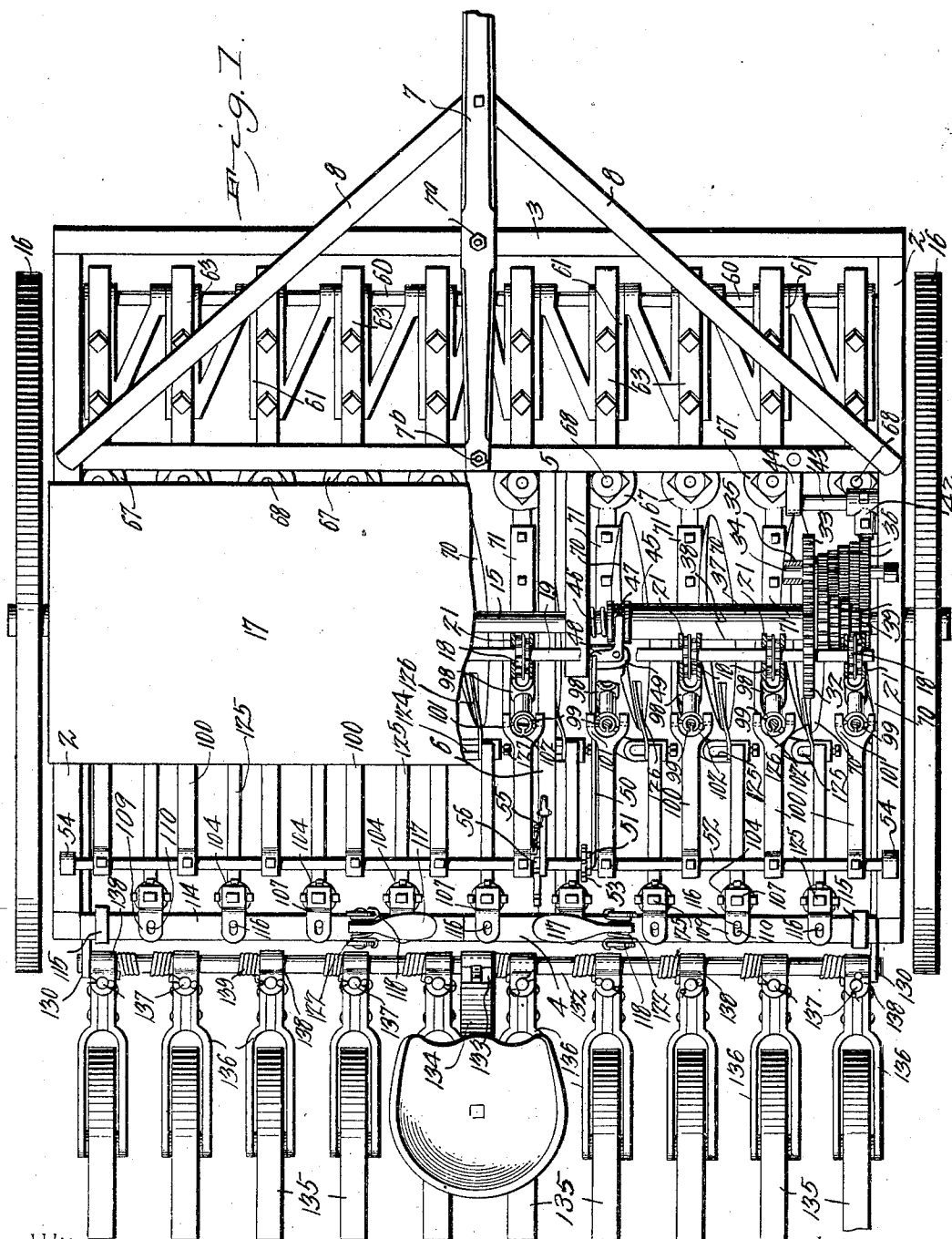
PATENTED SEPT. 15, 1903.

J. H. KINDSVATER.
GRAIN DRILL.

APPLICATION FILED JUNE 24, 1902.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses

Witnesses
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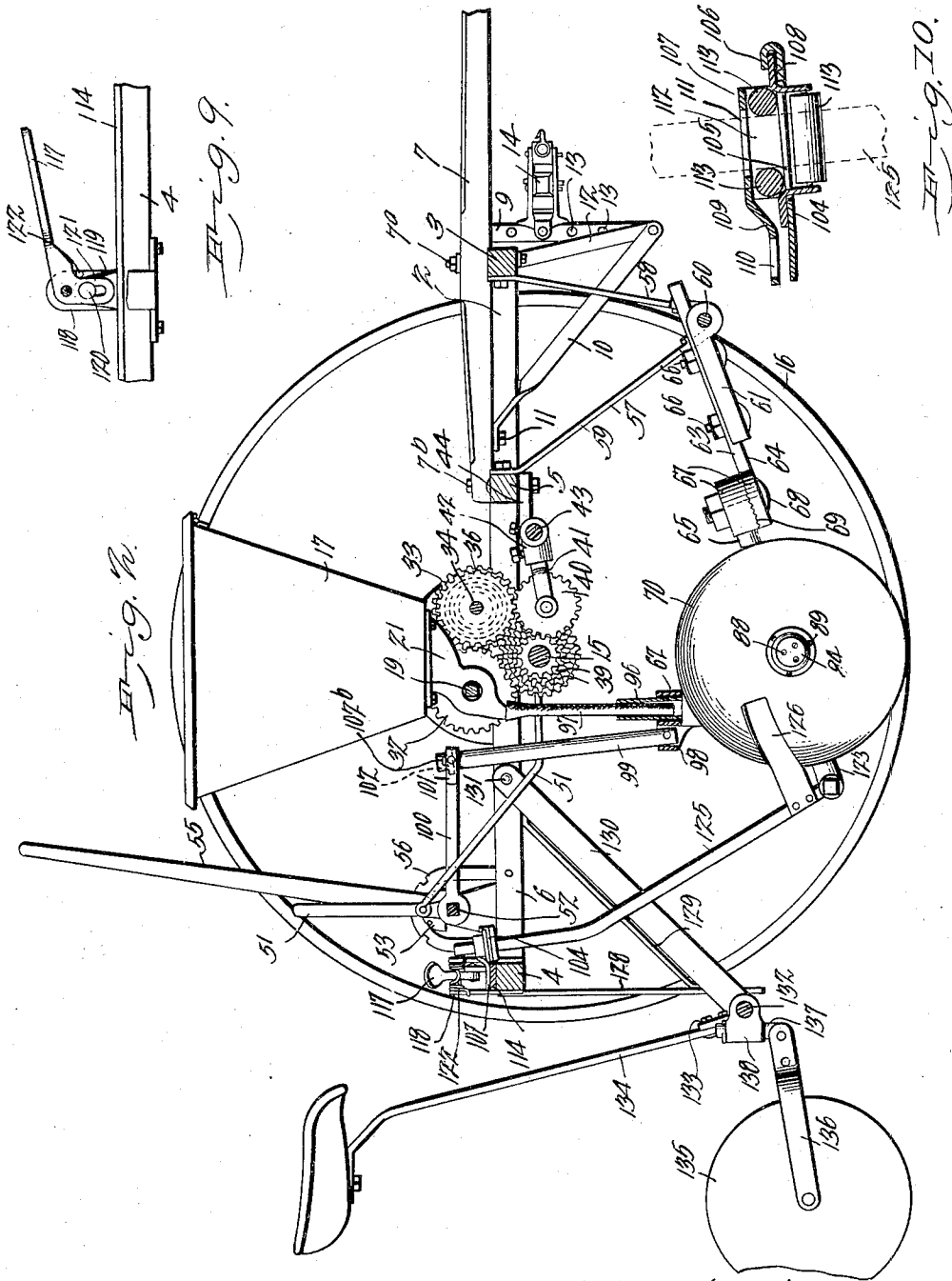
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4 SHEETS—SHEET 2.



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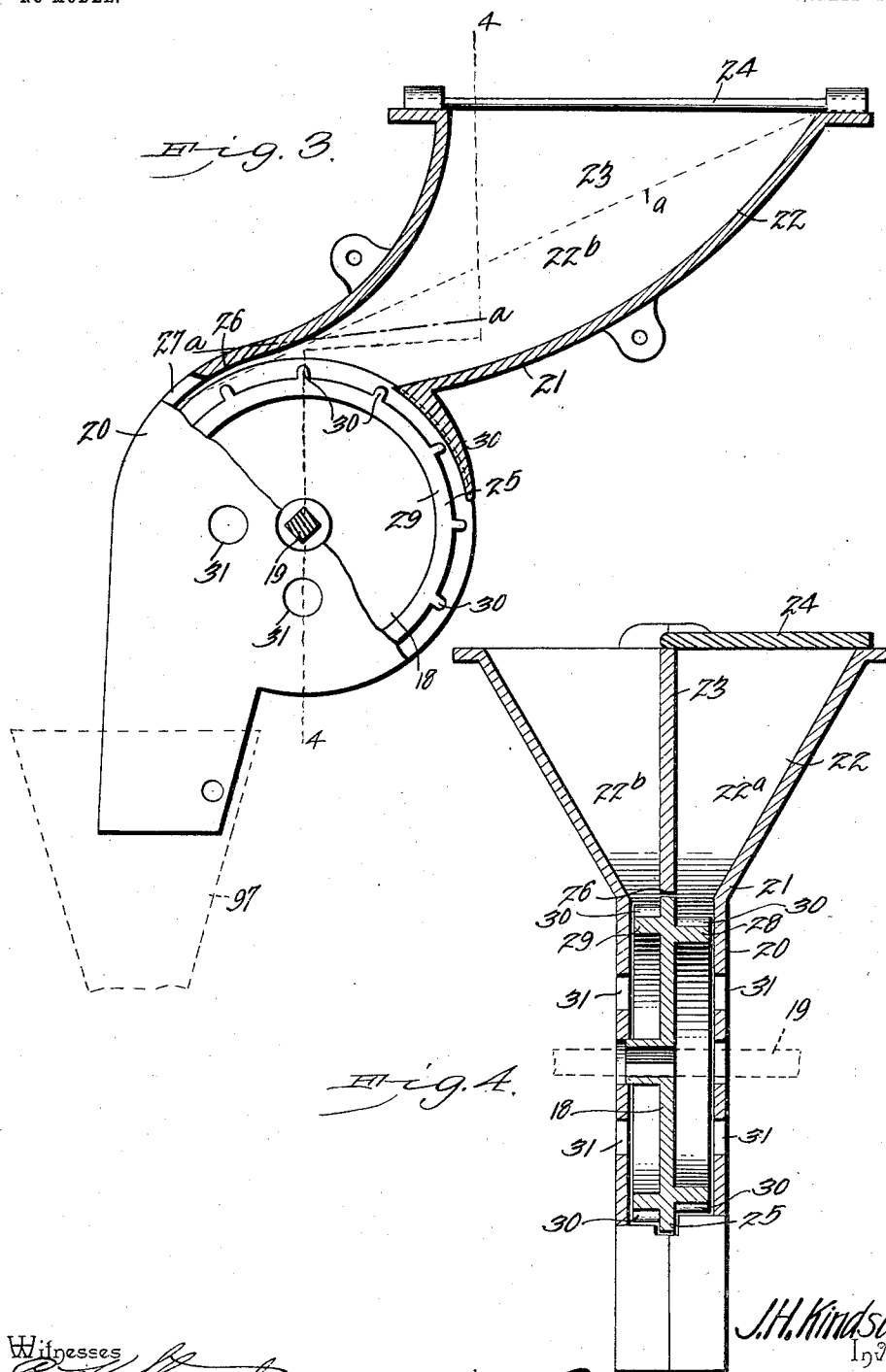
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4 SHEETS—SHEET 3.



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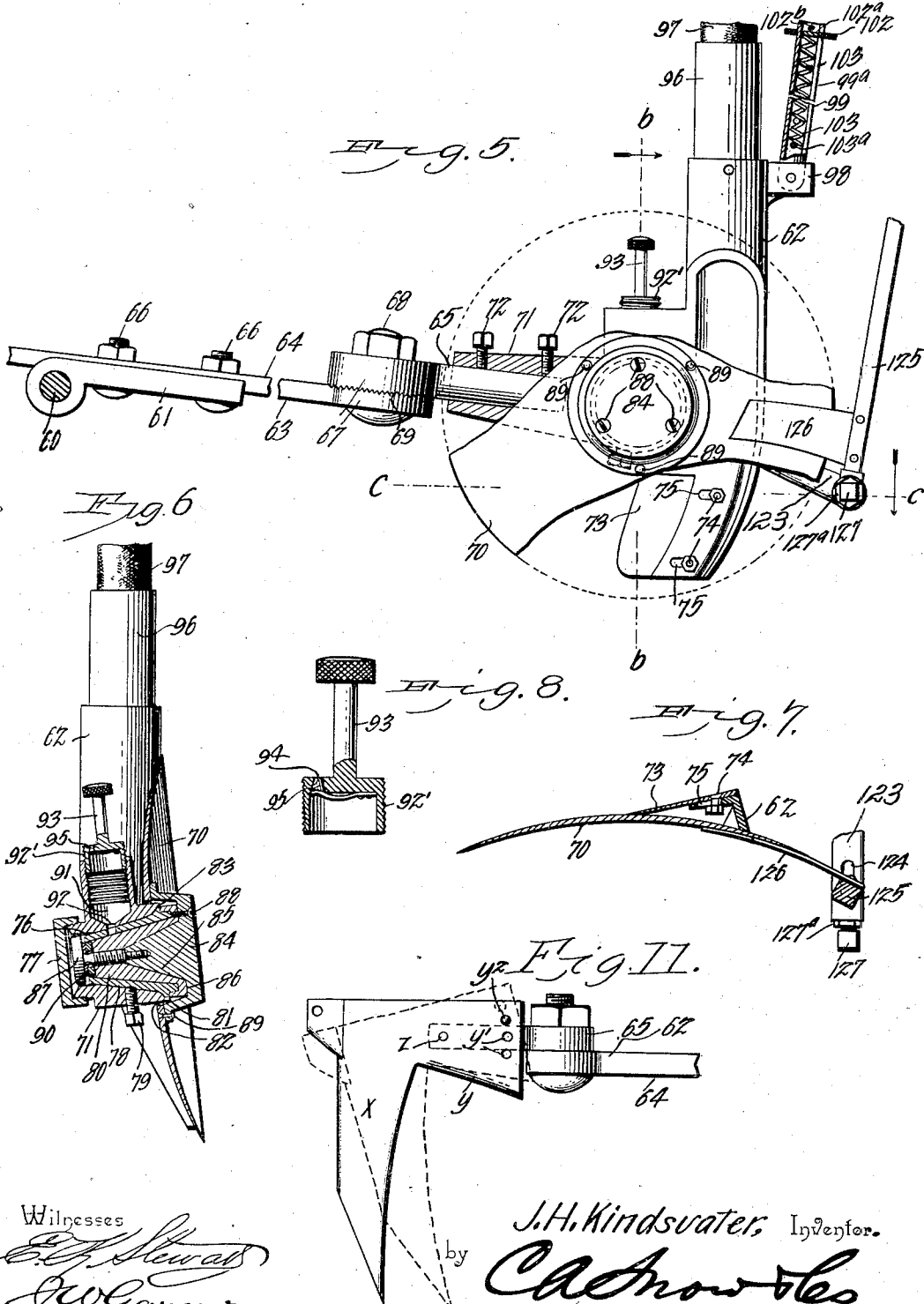
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN HENRY KINDSVATER, OF MANHATTAN, KANSAS.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 738,816, dated September 15, 1903.

Application filed June 24, 1902. Serial No. 113,031. (No model.)

To all whom it may concern:

Be it known that I, JOHN HENRY KINDSVATER, a citizen of the United States, residing at Manhattan, in the county of Riley and State of Kansas, have invented a new and useful Grain-Drill, of which the following is a specification.

This invention relates to grain-drills and the like; and it has for its object to provide a machine of this class which shall possess superior advantages in point of simplicity, durability, and general efficiency.

With these and other ends in view the invention consists in the improved construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan view of a grain-drill embodying my improvements, a portion of the seedbox being removed to disclose subjacent mechanism. Fig. 2 is a vertical longitudinal sectional view of the same. Fig. 3 is a vertical longitudinal sectional detail view of one of the force-feed mechanisms. Fig. 4 is a transverse sectional view of the same, taken on a plane indicated by the line 4 4 of Fig. 3. Fig. 5 is a detail elevation, partly in section, of one of the drill-shoes and the disk which coacts therewith, also showing the draw-bar to which the drill-shoe is attached. Fig. 6 is a detail vertical sectional view of the same, taken on a plane indicated by the line *b b* of Fig. 5. Fig. 7 is a detail sectional view of the same, taken on a plane indicated by the line *c c* of Fig. 5. Fig. 8 is a detail view showing the construction of the piston which forms a part of the means for supplying lubricant to the disk bearing. Fig. 9 is a detail elevation, partly in section, showing one of the shifting bars and the foot-lever by which the same may be operated. Fig. 10 is a detail sectional view of one of the guide-brackets and revoluble guides for the rods which carry the disk scrapers. Fig. 11 is a detail view showing a drill-shoe attached to the rear section of a draw-bar.

In the embodiment of my invention here shown there is a frame 1 of rectangular form which comprises a pair of side bars 2, a cross-bar 3, which connects the front ends of the

side bars, a cross-bar 4, which connects the rear ends of the side bars, a cross-bar 5, which connects the side bars and is disposed at a suitable distance in rear of the front cross-bar 3, and a longitudinally-disposed bar 6, which connects the central portions of the cross-bars 4 5. The tongue 7 has its rear portion bolted on the cross-bars 3 5, as at 7^a 7^b. A pair of forwardly-converging brace-rods 8 have their rear ends secured to the sides of the frame 1 at a suitable distance from the front corners thereof, are secured also to the front cross-bar 3, which they cross, and have their front ends secured to opposite sides of the tongue, as shown in Fig. 1. A draft-bar 9, which is vertically disposed, or substantially so, has its upper end secured to the under side of the tongue 7 and has its lower end braced by means of a brace 10, the upper end of which is connected to the under side of the tongue, as at 11, and a pair of laterally-inclined side braces 12, which have their upper ends secured to the under side of the cross-bar 3. The said draft-bar has a plurality of openings 13, whereby the said draft-bar is adapted for the attachment of a doubletree 14 thereto at any desired vertical adjustment.

An axle-shaft 15 is journaled in suitable bearings, (not here shown,) which are on the under sides of the side bars 2 about midway between the front and rear sides of the frame. At the ends of the axle-shaft are supporting and traction wheels 16, by which the said axle-shaft is rotated when the machine is in motion. A seed box or hopper 17 of suitable construction is supported on the frame 1 above the axle-shaft 15 and is provided with a plurality of cups containing force-feed devices on its under side, each of which includes a wheel 18, that is rotated by a feed-shaft 19.

Each force-feed wheel 18 is disposed for revolution in the throat 20 of a casting 21, which has a hopper 22 at its upper side that registers with an opening in the bottom of the seedbox and which hopper is divided by a longitudinally-disposed partition-plate 23 into two compartments 22^a 22^b. A flap or cover 24 is pivotally mounted at its inner edge above the partition-plate 23 and is adapted

ed to be turned to cover either of the compartments of the hopper and uncover the other, as will be understood.

The seed-wheel is provided with a peripheral annular flange 25, centrally disposed thereon and which registers with the partition-plate 23, as shown in Fig. 4. This flange 25 divides the throat 20 into two passages which communicate, respectively, with the compartments in the hopper. The outer side of the throat 20 is concentric with and closely approached by the flange 25 of the force-feed or seed wheel, as at 26, and is provided with an opening 27. The hopper 22 projects longitudinally from one side of the upper portion of the throat of the casting, as is clearly shown in Fig. 3 of the drawings, and hence enables any relatively long object, such as a stick or nail, which may be with the seed in the seedbox to be disposed at such an inclination in the hopper 22 as to cause it to be caught by the seed-wheel and moved by the power of the latter longitudinally through the opening 27, and thus prevent it from interfering with the operation of the seed-wheel. The position of such a foreign object while the same is being thus ejected from the force-feed mechanism is indicated by the inclined dotted line *aa* in Fig. 3. The seed-wheel is provided with laterally-extending annular flanges 28 29, which are disposed, respectively, in the passages of the throat 20, which communicates with the compartments 22^a 22^b of the hopper. The diameter of the flange 28 is somewhat less than that of the flange 29, so that the passage in the throat in which the said flange 28 is disposed is of greater capacity than that of the throat in which the flange 29 is disposed. When large grain is being drilled, the flap 24 is disposed to cover the compartment 22^b of the hopper, so that the grain from the seedbox will pass to the seed-wheel through the compartment 22^a. Each of the latter annular flanges of the seed-wheel is provided with transversely-disposed peripheral flights or ribs 30, which cause the grain to be forced through the throat or passage of the casting 21 by the rotation of the seed-wheel, as will be understood. The feed-shaft 19 is angular in cross-section, and each seed-wheel has a correspondingly-shaped central opening through which the feed-shaft extends, and hence the feed-wheels are rotated by the feed-shaft, as will be understood. In the sides of each casting 21 opposite the feed-wheel therein are openings 31, through which small foreign substances which may be commingled with the seed may be ejected. Any suitable number of the cups containing force-feed mechanisms above described may be employed, according to the size and desired capacity of the drill, and the same may be disposed at any desired distance apart. They are all operated by the feed-shaft 19.

I will now describe means whereby power

is communicated to the feed-shaft from the axle-shaft and whereby the feed-shaft and the seed-wheels driven thereby may be rotated at any desired rate of speed.

On the feed-shaft 19 is a spur-gear 32, which engages a similar gear 33 on a counter-shaft 34. Said counter-shaft is journaled in suitable bearings 35, which depend from the seedbox, at one end thereof. The said counter-shaft is provided with a plurality of spur-gears 36, which are of progressively-increased diameter as they recede from the gear 33.

On the axle-shaft 15 is loosely mounted a sleeve 37, (see Fig. 1,) which is formed at one end with clutch-notches 38 and is provided with a plurality of spur-gears 39 of progressively-diminished diameter as they approach the outer end of the sleeve, and the said series of gears 39 are disposed in line but out of contact with the gears 36 on the counter-shaft 34. The said gears 36 and 39 are differential-speed gears. A shifting idle gear 40 has its bearings in a fork 41, the arm of which is longitudinally adjustable in a support 42, which is shiftable on a supporting-shaft 43. The said shaft is fixed and supported on the frame 1 by any suitable devices. As here shown, the said shaft is carried by brackets 44, which are bolted to the under side of the cross-bar 5. The gear 40 is thus adapted to be engaged with any one of the gears 36 and any one of the gears 39 to cause power to be conveyed from the axle-shaft to the counter-shaft, and hence cause power to be conveyed from the counter-shaft to the feed-shaft which is geared thereto. By appropriately disposing the gear 40 the feed-shaft may be driven at any desired rate of speed, as will be understood, assuming that the sleeve 37 is in rotation with the axle-shaft 15.

A clutch 45 is splined on the axle-shaft and adapted to be moved into and out of engagement with the sleeve 37, so that the latter may be locked to or released from the axle-shaft. A spring 46 is here shown which normally moves said clutch into engagement with the sleeve 37. Said clutch has an annular groove 47, engaged by one arm of a bell-crank 48. The latter is carried by a suitable bearing 49, with which the frame 1 is provided, and the other arm thereof is connected by a rod 50 to a lever 51, which is mounted on a rock-shaft 52, that is provided with a segment 53. The said lever 51 has a suitable dog to engage the said segment 53, whereby said lever may be locked against motion. It will be understood that when the said lever 51 is operated the clutch 45 may be engaged with or disengaged from the sleeve 37, as may be desired. When the said clutch is disengaged from the said sleeve, the force-feed devices are thrown out of gear.

The shaft 52 is angular in cross-section and has spindles at its ends which are journaled in bearings 54 on the rear portion of the frame 1. To the said rock-shaft 52 is attached a

hand-lever 55, whereby it may be turned, and the said hand-lever is provided with a suitable dog, by which it may be engaged with a segment 56, that is here shown as carried by the bar 6. Thereby the lever 55, and hence the rock-shaft, may be maintained at any desired adjustment. Since the levers 51 and 55 are both connected to the rock-shaft, lever 51 when it is locked to its segment 53 may be moved simultaneously with the lever 55; but the lever 51 may be moved independently of the lever 55, and the latter may be operated to partly turn the rock-shaft independently of the lever 51 and its connections.

From the front side of the frame 1 depends a series of hangers 57, which are preferably of the construction shown in Fig. 2 and have the front and rear arms 58 59, which are respectively bolted at their upper ends to the cross-bars 3 5. A transversely-disposed bar 60 is supported by and is secured to said hangers, and on the said bar and between the said hangers are pivoted a series of laterally-disposed brackets 61. The preferred construction of these brackets is shown in Figs. 1 and 2. The drill-shoes 62 are connected to the said brackets 61 by draw-bars 63, each of which comprises a front section 64 and a rear section 65. Each section 64 is bolted and longitudinally adjustable on one of the brackets 61, for this purpose being provided with bolt-holes for the bolts 66. The meeting ends of the sections 64 65 are overlapped and provided with circular heads 67, which are pivotally connected together by a bolt 68, and the said heads are provided on their opposing sides with mutually-engaging radial corrugations 69, whereby the said sections 64 65 may be secured together at any desired angle. This enables the rear sections 65 of the draw-bars to be disposed obliquely with reference to the line of draft to correspondingly dispose the furrowing-disks 70, which are carried by the drill-shoes. Each drill-shoe is formed with a forwardly-extending arm 71, having a longitudinal bore therein to receive the rear section 65 of one of the draw-bars. The said section 65 is cylindrical in form, so that the drill-shoe is adapted to be turned thereon to dispose the disk 70 at any desired inclination. The arm 71 is provided with set-screws 72 to engage the section 65, and thereby secure the drill-shoe and disk when adjusted. By providing for the longitudinal adjustment of the draw-bars, as hereinbefore described, the drill-shoes and disks may be set to run either abreast of each other, as shown in Fig. 1, or one behind another alternately throughout the series. Each drill-shoe is tubular in form and is cut away on the side next the convex side of its disk 70, the disk closing the cut-away side of the drill-shoe, so that a passage for the seed is formed between the shoe and the disk. The front edge of the shoe where it bears against the revolving disk is formed by a shield or plate 73, which is secured to the lower portion of

the shoe by bolts 74, and the said bolts operate in longitudinal slots 75, with which the shoe is provided, so that the shield or plate may be adjusted to bear appropriately against the convex side of the disk and to compensate for the wear of said shield or plate, so that the same may be at all times maintained in close relation to the disk to prevent the space between the disk and the shoe from becoming filled with earth or otherwise obstructed.

The arm 71 of each of the drill-shoes is provided with a transverse tapered bore 76, the larger end of which is at the side of the arm 71 on which the disk is disposed. The outer smaller end of the bore is closed by a screw-cap 77. In the bore is fitted a tapered bushing 78, which is secured in the bore against endwise movement and against revolution by a set-screw 79, which operates in a threaded opening in the arm 71 and engages the bushing. In the latter revolves a sleeve 80, which is correspondingly tapered and is provided at its larger inner end on its outer side with an annular groove 81, which receives and fits snugly on the larger end of the bushing. The disk has a central opening 82 of sufficient size to enable it to clear the lateral flange 83 of the arm 71, which flange is concentric with the tapered bore. In the concaved side of the disk is a cap 84, which has a conical spindle 85, that bears in the sleeve 80, and the said cap is provided with an annular groove or recess 86 at the base of the conical spindle, which recess receives the larger end of the sleeve 80. A headed screw 87 connects and secures the spindle 85 to the sleeve 80, and the head of the said screw is disposed opposite the smaller end of the bushing 78 and forms a flange, which in coaction with the said bushing 78 secures the sleeve 80 in the said bushing, and thereby secures the disk firmly to the arm 71, while permitting the disk to rotate. The cap 84 of the disk is secured to the sleeve 80, as by screws or rivets 88, and the said cap is secured to the disk, as by rivets 89. The caps 84 77 close the opposite ends of the bore, prevent leakage of the lubricant, and prevent the ingress of dust and other foreign particles. Washers 90 of suitable thickness and of a suitable number—one or more—are placed on the shank of the screw 87, between the head thereof and the smaller end of the sleeve 80. As the latter wears one of the washers may be removed and others substituted from time to time to take up the space between the head of the screw 87 and the inner end of the bushing. By thus providing a bearing which is closed at both ends for the disk the lubricant is retained in the bearing, which is a very important advantage, as it enables the bearing to be constantly and sufficiently lubricated. An interiorly-screw-threaded lubricant-chamber 91 is formed in the upper side of the arm 71 and has at its lower end a reduced opening 92, which communicates with a similar opening in the bush-

ing, and thus enables lubricant to be conveyed from the lubricant-chamber to the surface of the sleeve 80. In the open upper end of the lubricant-chamber is a screw-piston 92', which is preferably hollow and open on its inner side, as here shown, and is formed with a headed stem 93, by means of which it may be turned. This piston enables hard lubricant to be used for the bearing of the disk.

By turning the piston the lubricant can be compressed to such an extent as to cause it to feed the bearing. To adapt the lubricant-chamber to feed oil as a lubricant to the disk bearing, the chamber should preferably be filled with suitable fibrous material, such as hemp. This may be compressed by the piston 92' to cause it to feed the oil to the bearing. To enable the oil to be readily placed in the lubricant-chamber without the necessity of removing the piston 92', I provide the latter with an opening 94 of sufficient size to receive the nozzle of an oil-can and provide a spring-pressed plug 95 to close the said opening. This plug and the opening 94 taper upwardly, so that the opening is sufficiently closed by the plug to prevent the escape of oil from the lubricant-chamber, and this construction also enables the plug 95 to be moved downwardly by the nozzle of the oil-can and enable oil to be readily supplied to the lubricant-chamber through the opening 94.

In the upper tubular end of each drill-shoe 62 is a section of pipe 96, which forms a vertical extension of the drill-shoe and is adapted for the reception of the lower portion of the usual flexible tube 97, through which the grain or seed is supplied to the drill-shoe from the force-feed mechanism. By the employment of the section of pipe 96 the weight of the drill-shoe may be materially reduced and a corresponding economy effected. Each drill-shoe has a boss 98 on its rear side at its upper end, to which is pivoted the lower end of a guide-tube 99. The rock-shaft 52 is provided with a plurality of forwardly-extending rock-arms 100, one for each drill-shoe, and each of the said rock-arms has its front end forked, as at 101. The upper end of each guide-tube 99 is disposed in the fork of one of the arms 100 and is provided with a traveler 102, which is engaged by the said fork. In each guide-tube is a coiled extensible spring 103, the lower end of which bears on a split spring-pin 103^a, disposed in appropriate openings or slots 99^a, with which the guide-tube is provided, there being a series of said openings, whereby the pin 103^a may be adjusted to regulate the tension of the spring. The traveler 102 has an arm 102^a, that operates in a slot 99^b in the guide-tube and bears on the upper end of the spring. A split spring-pin 102^b in openings near the upper end of the guide-tube prevents the traveler from becoming unshipped therefrom when the disk is raised. The traveler is raised and lowered by the rock-arm when the lever 55 is

operated, and when the machine is in operation the spring exerts downward pressure on the drill-shoe to keep the disk in operative engagement with the soil. It will be understood that by turning the hand-lever 55 rearwardly to cause the rock-shaft 52 to elevate the front ends of the rock-arms 100 the drill-shoes and the disks carried thereby will be raised from the earth. It will also be understood that when the drill-shoes and disks are lowered to their operative position the tension or pressure of the springs thereon may be regulated by adjusting the lever 55.

On the rear cross-bar 4 are secured a plurality of forwardly-extending brackets 104, which correspond in number with the drill-shoes and each of which has a circular opening 105 and a circular guideway 106 (see Fig. 10) on its upper side. On each of the said brackets is secured a revoluble guide which has a circular bearing-flange 108, engaged by the circular guideway 106, and is provided with a rearwardly-extending arm 109, having a slot 110, and is further provided with an angular opening 111 and with angularly-disposed vertical walls 112, which extend through the opening in the bracket, are within the radius thereof, and are provided with two pairs of antifriction-rollers 113, which are disposed at right angles to each other and in different vertical planes. One pair of the said rollers is above the bracket and the other pair of rollers is below the bracket. A longitudinally-movable shifting bar 114 is disposed on the upper side of the bar 4 and engaged by suitable guides 115. The said shifting bar is connected to the arms 109 of the guides 107 by studs 116, which operate in the slots 110. In practice two of the said shifting bars are preferably employed, one for the brackets and guides 107 on each side of the machine and as shown in Fig. 1. A foot-lever 117 is provided for each of the shifting bars 114. Each of the said foot-levers is mounted in a suitable bearing 118, which bearing may also form a guide for the shifting bar, and the latter has an upstanding lug 119, connected by a stud or bolt 120 to a slotted arm 121 of the foot-lever. A spring 122 (see Figs. 2 and 9) is provided for each foot-lever to bear against the same in such manner as to normally elevate the foot-lever and move the shifting bar in one direction.

Each drill-shoe has a rearwardly-extending arm 123 (see Figs. 5 and 7) attached thereto on the side opposite the disk. The said arm has its rear portion extended laterally beyond the concaved side of the disk and provided with an adjusting-slot 124. A rod 125, which is angular in cross-section, has its lower end provided with a bearing-spindle that operates in the slot 124. To the said rod is attached a scraper 126, which is adapted to bear against the concaved side of the disk. The provision of the slot 124 enables the lower end of the rod 125 to be adjusted in the arm 123

as may be required to cause the scraper 126 to bear against the disk, and this adjustment is effected by means of a set-screw 127 and lock-nut 127^a, as shown in Fig. 7. The upper 5 portion of the rod 125 passes through the opening in one of the revoluble guides 107 and between the opposing sides of the pairs of anti-friction-rollers 113, carried by the said revoluble guide. The said rods 125 are thus 10 adapted to move endwise in the guides 107 and between the anti-friction-rollers to permit the drill-shoes and disks to be raised and lowered in the manner hereinbefore described. The angular cross-sectional shape of the rods 15 125 and the corresponding disposition of the anti-friction-rollers by which they are engaged enables the said rods 125 to be turned when the shifting bars 114 are operated, as hereinbefore described, to turn the guides 107, 20 and hence the scrapers 126, carried by the said bars, may be released from or caused to bear against the disks, as may be necessary, when the machine is in operation.

At the rear corners of the frame 1 are a 25 pair of depending vertical guides 128, each of which has a suitable inclined brace 129 on its front side. A pair of downwardly and rearwardly inclined arms 130 have their upper ends pivotally connected to the inner sides of the bars 2, as at 131. The rear portions of the said arms 130 bear against the inner vertical sides of the guides 128, and the rear ends of the said arms 130 are connected together 30 by a bar 132. To the center of the said bar is secured a support 133, to which the lower end of the seat-supporting bar 134 is secured. Press-wheels 135, of which a suitable number is provided, one to run in rear of each of the disks 70, are each mounted for revolution 40 in a trail-fork 136, which has a vertical spindle 137 at its front end. On the bar 132 are pivoted blocks 138, each of which forms a bearing for the spindle 137 of one of the trail-forks. Thereby the press-wheels are adapted 45 to move vertically and turn laterally independently of each other. Coiled springs 139 are placed on the bar 132. One end of each of said springs is secured to said bar, and the other end thereof is secured to one of the 50 blocks 138, and the springs exert downward pressure on the press-wheels, but permit them to rise to pass over obstructions.

I have herein shown and described the drill-shoes provided with concavo-convex 55 disks, which coact therewith; but within the scope of my invention the drill-shoes may be adapted to open the drills for the grain and may be pivoted to the rear ends of the section 65 of the draw-bars and adjusted to run 60 at any desired angle. In Fig. 11 I show such a drill-shoe x , having an arm y projecting from its front side at its upper end, said arm being hollow to receive the section 65, which is pivoted thereto at z , and the sides of the 65 arm have adjusting-openings y' for the reception of a pin y^2 to bear on the section 65,

and thereby secure the drill-shoe either in a vertical position or at any desired inclination.

Having thus described my invention, I 70 claim—

1. In a grain-drill, a casing having a hopper, with front and rear walls inclined longitudinally thereof, and converging rearwardly and a discharge-throat having an opening 75 in the rear side thereof, in combination with a revoluble seed-wheel in the discharge-throat and having peripheral flights, for the purpose set forth, substantially as described.

2. In a grain-drill, a casing having a hopper, with front and rear walls inclined longitudinally thereof and converging rearwardly, a longitudinal partition dividing the hopper into two compartments, and a discharge-throat leading from said compartments 85 having an opening 27 in the rear side thereof, in combination with a revoluble seed-wheel in the discharge-throat, having an annular peripheral flange 25 in line with the partition, and dividing the throat into two passages, 90 lateral annular flanges of unequal diameter, to vary the capacity of said throat-passages, and flights on said lateral annular flanges, substantially as described.

3. In a grain-drill, a casing having a hopper with inclined front and rear walls converging rearwardly, a discharge-throat, and a seed-wheel journaled in said throat. 95

4. In a grain-drill, a casing having a hopper with front and rear walls converging rearwardly, a discharge-throat, means for discharging seed through said throat, and an opening in the rear side of said throat in approximate alinement with the bottom of the hopper. 100

5. In a grain-drill, a casing having a hopper with front and rear walls converging rearwardly, a discharge-throat, a seed-wheel journaled in said throat, and openings in the side of the latter. 105

6. In a grain-drill, a casing having a hopper with rearwardly-converging front and rear walls, a partition in said hopper, a discharge-throat, a seed-wheel journaled in said throat and having flights of different diameter in alinement with the compartments 115 of the hopper, and means for operating said seed-wheel at differential rates of speed.

7. In a grain-drill, the combination of a seed-dropping mechanism, a clutch to throw 120 the same in and out of gear, a pivoted draw-bar, a drill-shoe secured thereto, a rock-shaft having an arm connected to the drill-shoe to raise and lower the latter, a lever to turn said rock-shaft, means to lock said lever, a 125 lever having its fulcrum carried by the rock-shaft, a connection between the last-mentioned lever and the clutch to operate the latter, and means to lock the last-mentioned lever to and disengage the same from the 130 rock-shaft substantially as described.

8. In a grain-drill, the combination of a

vertically-movable drill-shoe, a guide-tube
connected pivotally therewith, said tube be-
ing provided with vertical slots, a coiled ex-
tensile spring in the said guide-tube, a trav-
5 eler movable vertically in the slots of the
guide-tube and bearing on the upper end of
the spring, a rock-shaft, an arm extending
from said rock-shaft and connected with the
traveler, means for limiting the movement
10 of the latter upwardly in the guide-tube, an

operating-lever for the rock-shaft, and means
for locking said lever and the parts operated
thereby at various points of adjustment.

In testimony that I claim the foregoing as
my own I have hereto affixed my signature in 15
the presence of two witnesses.

JOHN HENRY KINDSVATER.

Witnesses:

LOUIS WABNITZ,
JOHN T. PARKER.