

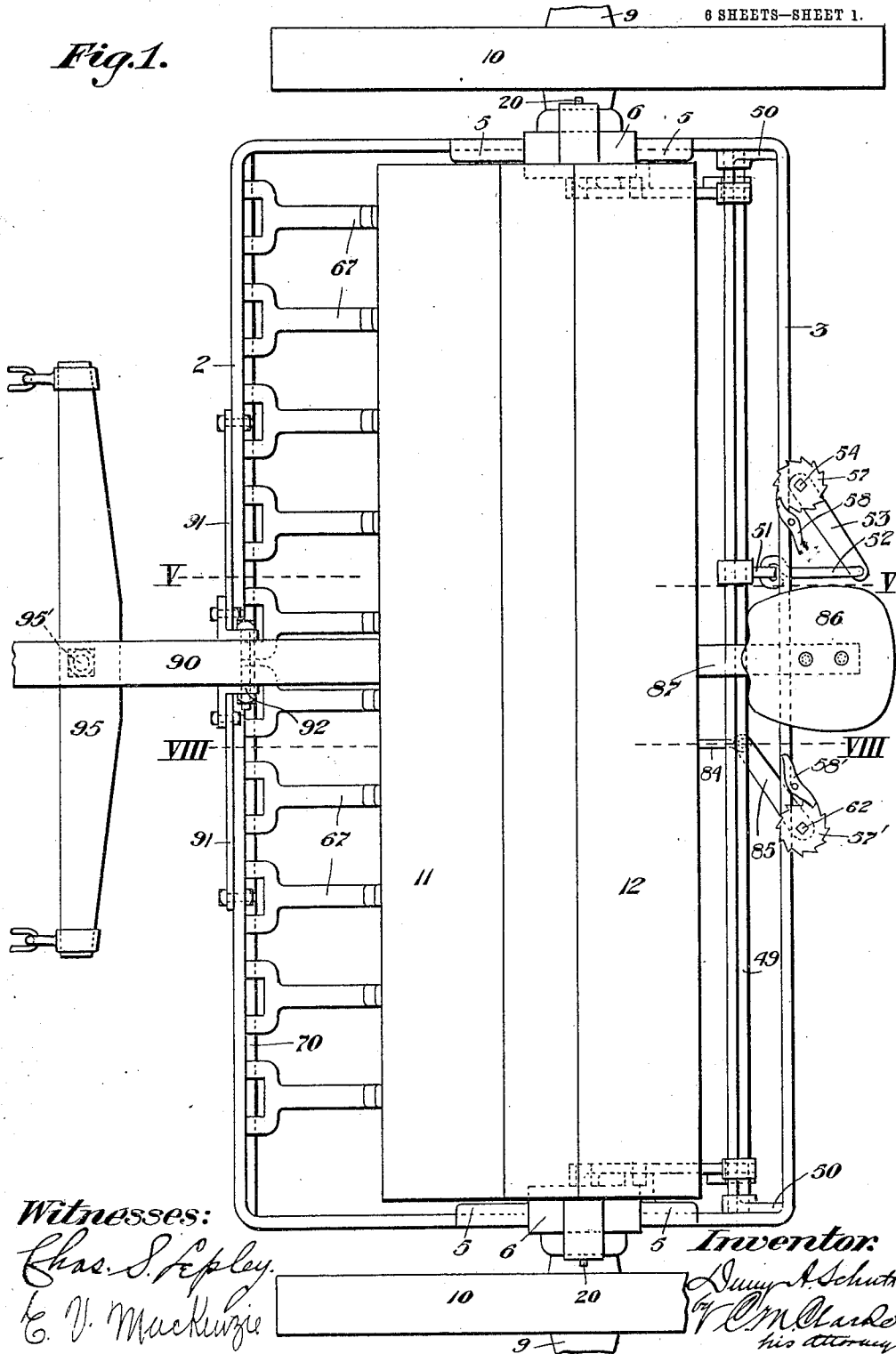
D. A. SCHUTT.
GRAIN DRILL.
APPLICATION FILED JUNE 27, 1907.

904,232.

Patented Nov. 17, 1908.

6 SHEETS—SHEET 1.

Fig. 1.



D. A. SCHUTT.
GRAIN DRILL.

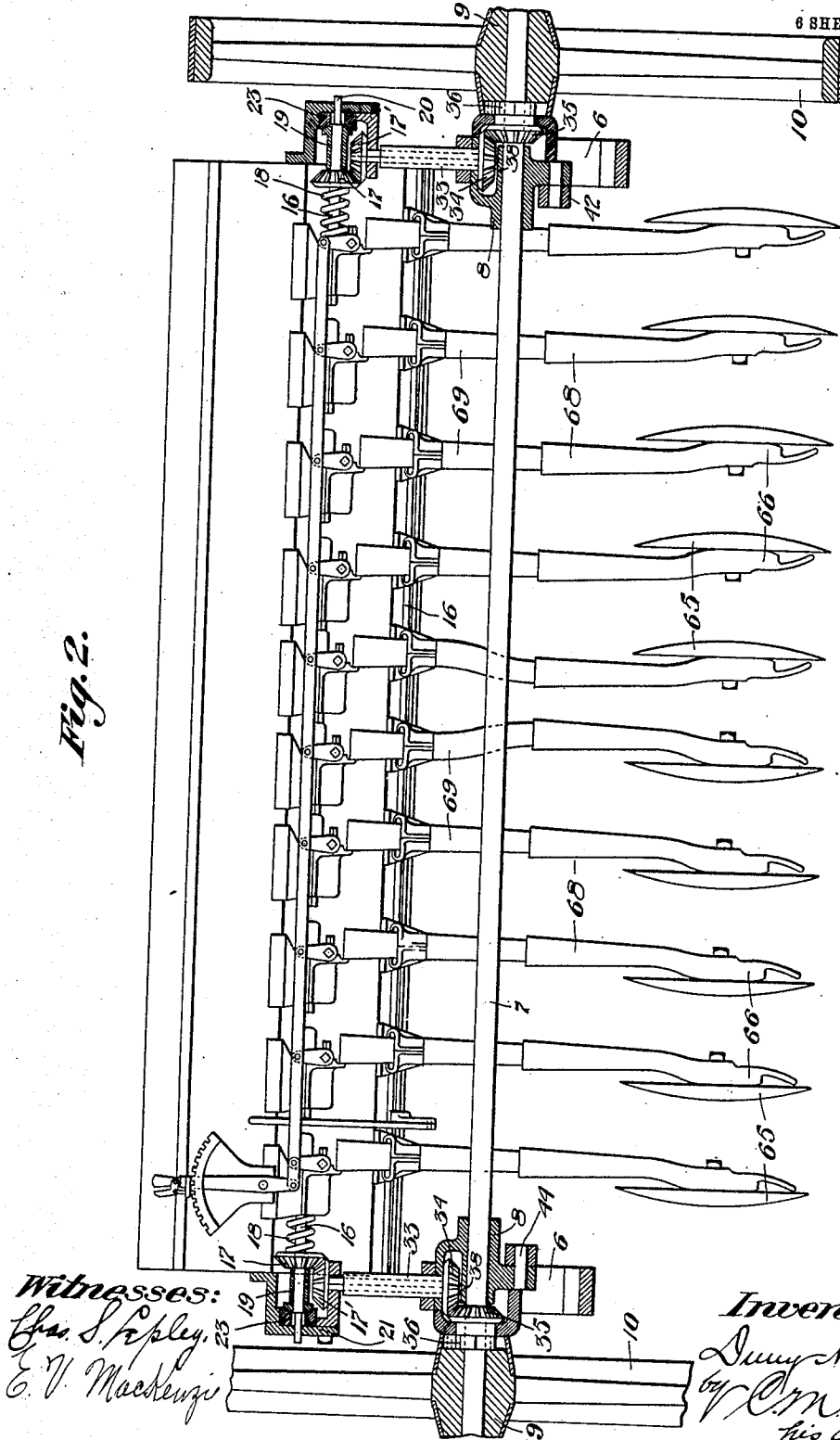
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6 SHEETS—SHEET 2.

Fig. 2.



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6 SHEETS—SHEET 3.

Fig. 3.

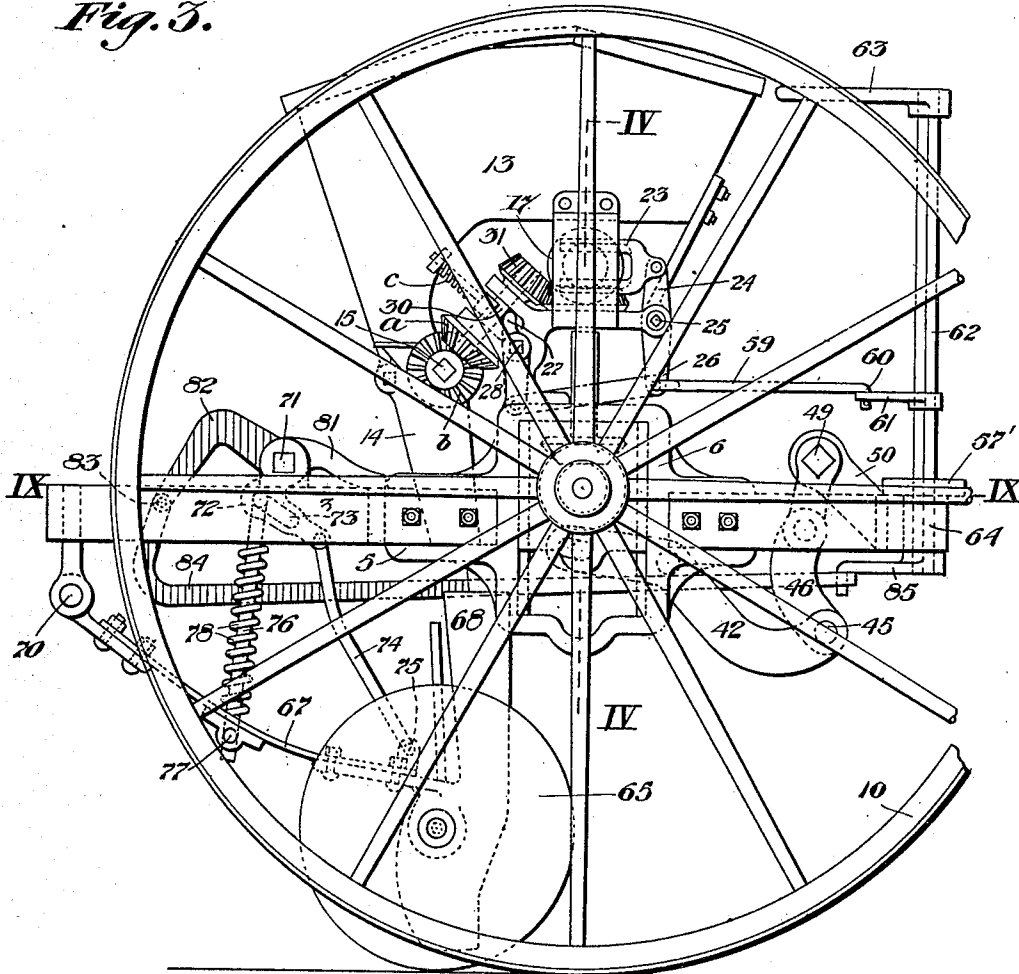
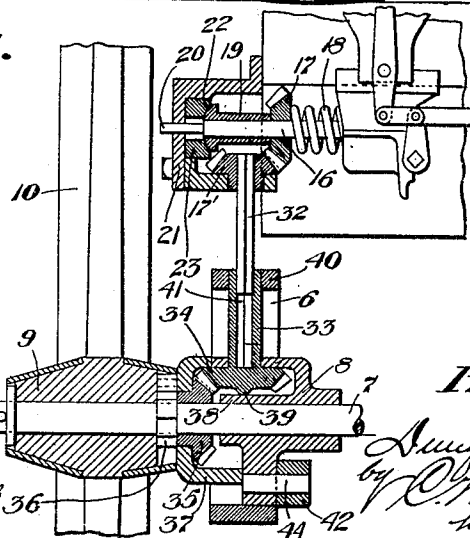


Fig. 4.



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Patented Nov. 17, 1908.

6 SHEETS—SHEET 4.

Fig. 5.

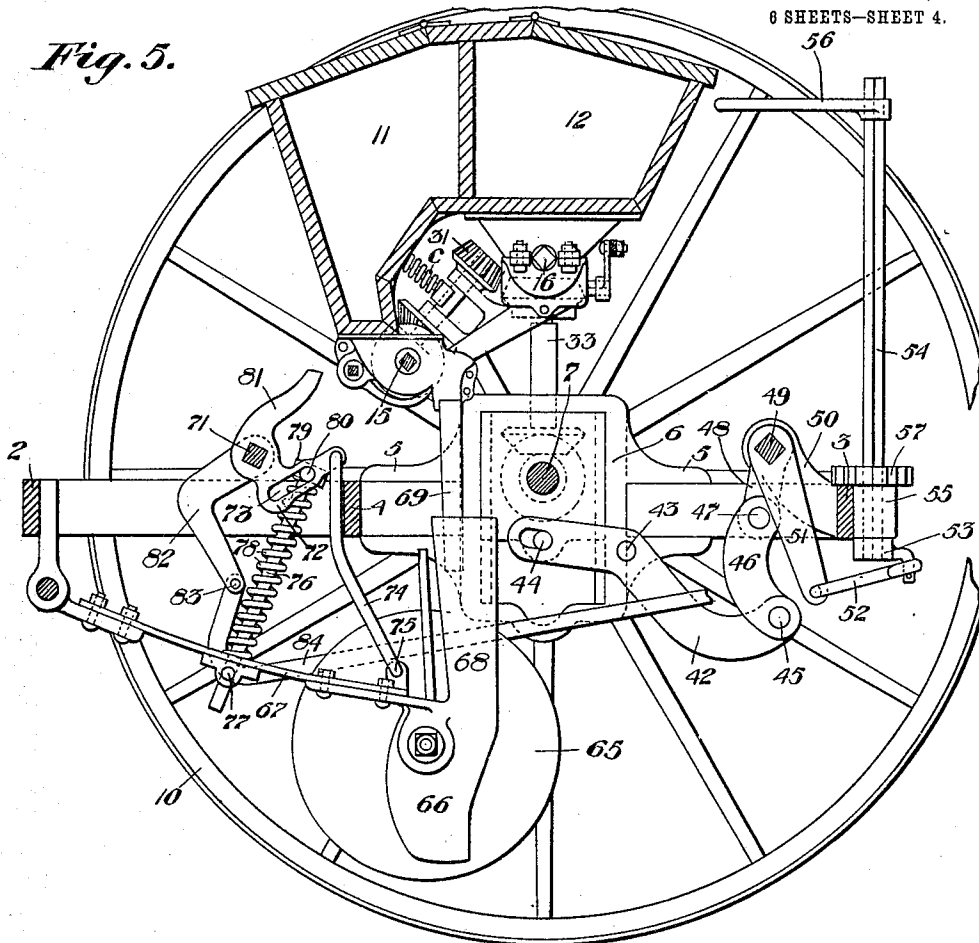
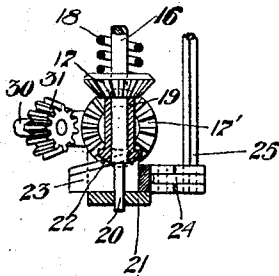


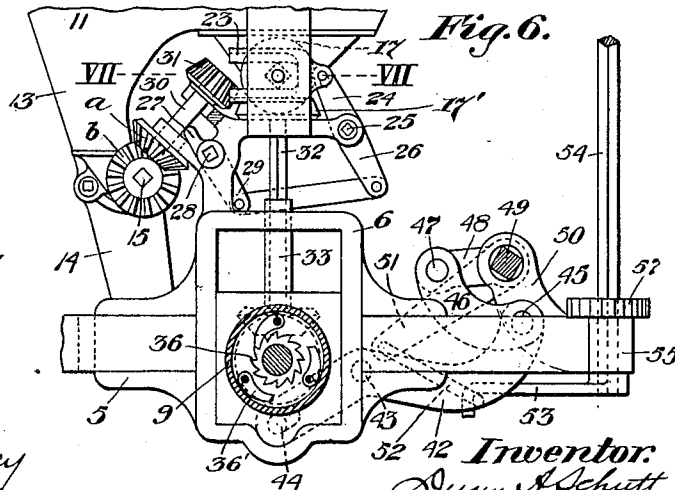
Fig. 7.



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Fig. 6.



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6 SHEETS—SHEET 5.

Fig. 8.

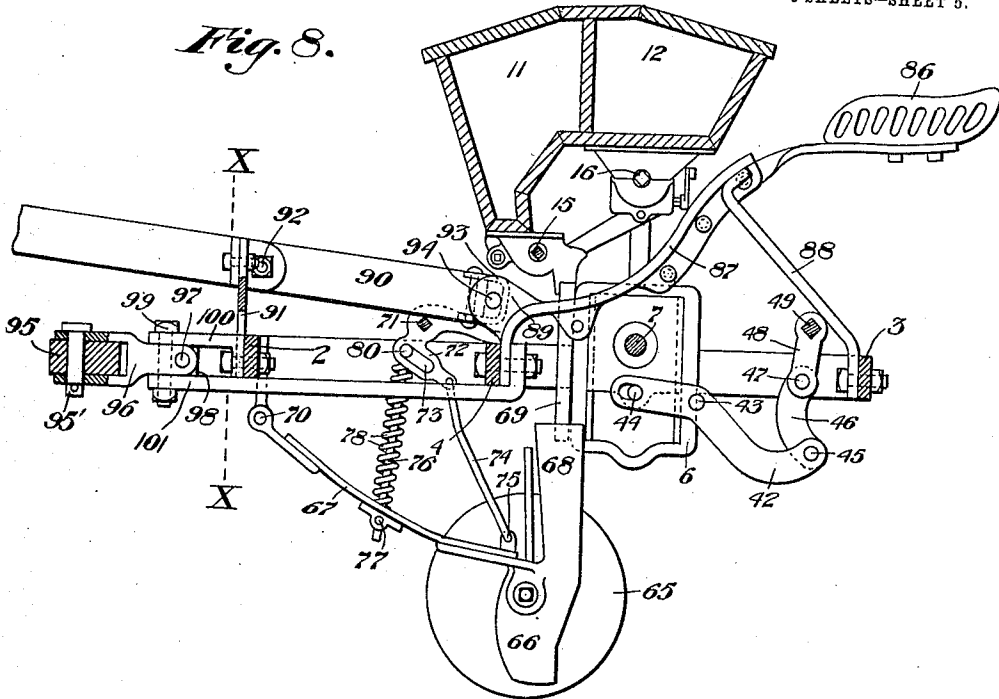


Fig. 9.

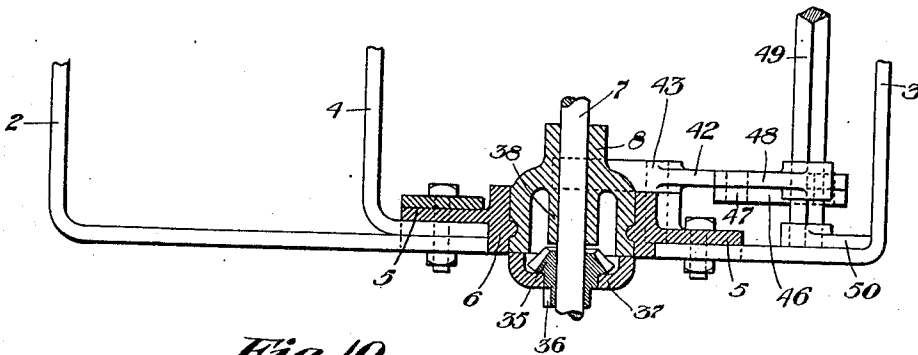
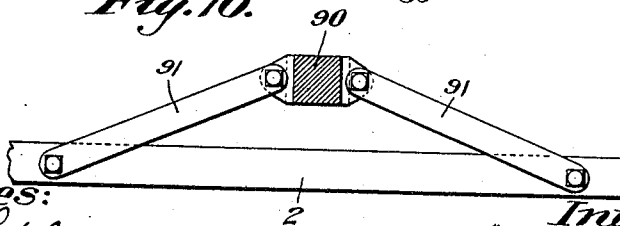


Fig. 10.



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GRAIN DRILL.

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6 SHEETS—SHEET 6.

Fig. 11.

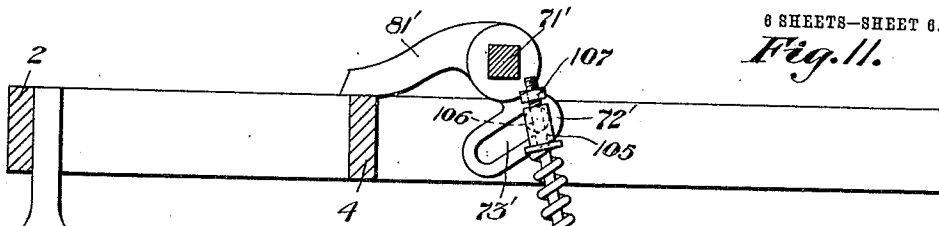


Fig. 13.

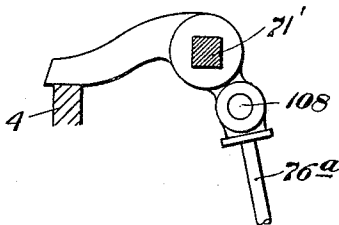
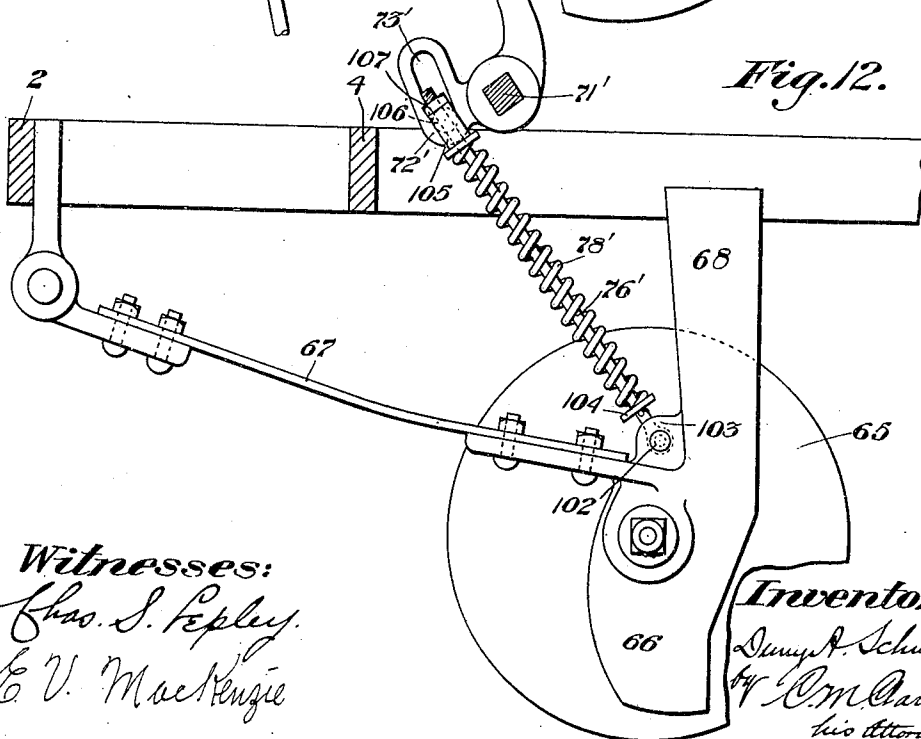


Fig. 12.



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UNITED STATES PATENT OFFICE.

DUNY A. SCHUTT, OF PERU, INDIANA.

GRAIN-DRILL.

No. 904,232.

Specification of Letters Patent.

Patented Nov. 17, 1908.

Application filed June 27, 1907. Serial No. 381,084.

To all whom it may concern:

Be it known that I, DUNY A. SCHUTT, a citizen of the United States, residing at Peru, in the county of Miami and State of Indiana, have invented certain new and useful Improvements in Grain-Drills, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention refers to improvements in grain drills for the purpose of planting grain or seed and it has for its object to provide an apparatus of this class which will properly distribute the grain or fertilizer or both; to provide simple and efficient means for driving the mechanism from one or both of the supporting traction wheels, depending on the direction of travel; means for simultaneously lifting the feeding disks and for throwing the feeding mechanism out of gear; means for raising and lowering the frame with relation to the supporting wheels; means for providing resilient mounting for the disks and hangers; means for flexibly connecting the tongue and draft gear, and various other features of improvement as shall be more fully hereinafter described.

The present invention embodies improvements in that class of mechanism set forth in my copending application filed Dec. 6th, 1906, bearing the Serial Number 346663.

Referring to the drawings:—Figure 1 is a plan view of the complete machine. Fig. 2 is a rear elevation, portions of the mechanism being shown in section, the back frame seat, etc., having been removed. Fig. 3 is an enlarged end elevation, showing the frame of the machine in its lowermost position and indicating the working position of the disks. Fig. 4 is a vertical sectional detail view on the line IV. IV. of Fig. 3. Fig. 5 is a transverse vertical section on the line V. V. of Fig. 1, showing the frame lowered with relation to the supporting axle, the disks being raised. Fig. 6 is a similar detail view, showing the frame raised with relation to the axle. Fig. 7 is a horizontal sectional view on the line VII. VII. of Fig. 6. Fig. 8 is a transverse vertical sectional view through the middle of the machine on the line VIII. VIII. of Fig. 1. Fig. 9 is an enlarged horizontal sectional view indicated by the line IX. IX. of Fig. 3. Fig. 10 is a vertical detail sectional view indicated by the line X. X. of Fig. 8. Figs. 11 and 12 are detail views on an enlarged

scale showing a modified construction or mounting of the disk hangers. Fig. 13 is a detailed view of one of the lifting levers, not slotted.

The main frame of the machine consists of front and back bars 2, 3 and an intermediate transverse bar 4, bars 2 and 4 being secured at the front and bar 3 being secured at the back, at both sides of the machine, to oppositely disposed flanges 5, 5, of the housing boxes 6.

7 is the main supporting axle of the machine, mounted at each side in the axle boxes 8, said axle having mounted upon it at each end, by hubs 9, the supporting traction wheels 10 of usual construction. The wheels 10 are provided at the inner ends of their hubs with ratchet driving mechanism for imparting movement on forward travel of the machine to the feeding mechanism, as hereinafter described.

Housing boxes 6, with which the bars 2, 3 and 4 are connected, support the entire framework of the machine and its superimposed and depending mechanism, said housings and framework being arranged for vertical adjustment with relation to the axle bearings, to any degree desired and are thus capable of adjustment with relation to the surface of the ground.

11 and 12 represent the grain and grain boxes respectively, which are mounted transversely of the machine upon suitable end plates or frames 13 supported by legs 14 upwardly from the inner sides of forward flanges 5 of the housings 6, or in any other suitable manner. The grain and fertilizer, or either, are fed by feeding mechanism actuated by shafts 15, 16 respectively, said shafts being preferably separated at their middle portions, and each section with its feed wheels driven by the gearing at each outer end.

The fertilizer feed shafts 16, which may conveniently be square or splined, are provided at their ends with longitudinally movable or sliding bevel gears 17 normally held in mesh with driving bevel gears 17' by spring 18 and arranged to be depressed backwardly to throw them out of gear by a sleeve 19. Sleeve 19 is mounted on the outer end of shaft 16 by a reduced extension 20 extending through end plate 21, forming a part of or secured to the lower portion of the grain and fertilizer box plate 13. Sleeve 19 is preferably beveled or coniform as at 22,

providing a bearing for the fork-shaped unshipping wedge 23 mounted transversely across the inner side of plate 21. The wedge 23 is actuated by lever 24 pivoted at 25 and having a depending crank extension 26. Likewise grain feed shaft 15 is adapted to be thrown out of gear by means of a dog 27 mounted on shaft 28 provided with a crank arm 29, said dog 27 being arranged to bear upwardly underneath shaft 30 of the driving gear 31 employed to transmit motion to the said grain feed shaft 15, thus throwing gear 31 out of mesh with gear 17'. Shaft 30 and gear 31 are normally pressed downwardly into operative position by spring *c* bearing against shaft 30 and a fixed abutment, it being understood that shaft 30 is mounted in slotted bearings.

Motion is imparted to bevel gear 17 and to bevel gear 31 (on shaft 30) simultaneously by driving bevel 17' when said gears 17 and 31 are in mesh therewith. Driving bevel 17' is mounted at the upper end of the square or splined shaft 32 with which slidably engages the hub 33 of bevel gear 34 in mesh with driving bevel 35. Said bevel 35 is loosely journaled on the axle 7 and is provided at the outer end of its hub with a series of ratchet teeth 36 adapted to be engaged, on forward motion of the machine, by pawls 36' of the wheel hubs, more clearly shown in Fig. 6.

The wheels 10 are journaled by their hubs on the outer ends of the stationary axle 7, being free to rotate in either direction, but by the pawl and ratchet teeth construction which I have just described, will only impart feeding motion to the gearing and the grain and fertilizer feed mechanism when running in a forward direction.

The axle 7 is mounted at each side of the machine in axle boxes 8 as stated, and the outer portion of each axle box is closed by a removable cap 37 whereby the various parts may be taken apart. The axle box 8 is, as shown, made of considerable length to embrace the axle and is provided with an extension 38 upon which rests a projecting button or knob 39 of gear 34 whereby said gear is normally maintained in mesh with driving gear 35. Its hub 33 extends upwardly through the upper bearing portion 40 of the housing 6, having a sliding bearing therein, and said hub is lengthened as shown and embraces the square shaft 32 by a corresponding squared central socket 41, sufficient space being left between the top of bearing 40 and the lower side of the hub of driving gear 17', to permit of the necessary vertical play. By this construction it will be seen that the frame of the machine and housing 6 may be vertically adjusted with relation to the axle boxes 8, while still maintaining driving transmission between gear 35 and gear 17' at each side. For the purpose of effecting

said vertical adjustment I employ a lever 42 pivoted at 43 to the inner side of housing 6, and at 44 the terminal of lever 42 is slotted and engages a stud fixed to the lower side of axle box 8, the other end of lever 42 being pivoted at 45 to a link 46 which in turn is pivoted at 47 to crank arm 48 mounted on shaft 49. Said shaft is preferably squared, extending transversely of the machine at the back through suitable thimble bearings in brackets 50, and is actuated by the operator through a lever 51. Said lever is connected by a link 52 with a crank 53 mounted on the lower end of vertical spindle 54 mounted in suitable bearings 55 and provided with an operating handle lever 56.

57 is a ratchet wheel, locked by a foot-operated spring-pressed pawl 58, whereby the position of lever 51 and the relative positions of the axle box and housings are maintained. It will be understood that such construction is used at both sides of the machine, and that upon operating spindle 54, the connections 44 acting as fulcrums, the entire frame of the machine may be raised and lowered by reason of its being supported by pivotal connections 43. By this means the adjustment of the machine towards or from the ground level may be accurately regulated.

Referring again to the means for driving the grain and fertilizer feed mechanism, the fertilizer feed mechanism being already apparent, driven gear 31 imparts power through shaft 30 and bevel gear *a* to bevel gear *b* on shaft 15, when the gears are all in mesh. In order to throw out both the grain and fertilizer feed from the machine the levers 26 and 29 are actuated simultaneously, or one or the other may be actuated alone by disconnecting the other, by means of connecting rod or link 59 pivotally attached at its other end 60 to the crank arm 61 mounted on spindle 62 having an operating lever or handle 63 at its upper end. Said spindle 62 is, like spindle 54, mounted in bearing 64 at the back of the machine and is also provided with a ratchet wheel 57' and foot-actuated pawl 58', whereby its position may be fixed at all times.

Spindle 62 is designed to perform the double function of throwing out the grain and fertilizer feeds and of simultaneously lifting the feeding disks of the apparatus, and on the other hand of simultaneously throwing in the grain and fertilizer feeds and lowering the disks, so that feeding of the grain or fertilizer, or both, can only be supplied to the disks when they are in position for operation in the ground.

65 are the feeding disks journaled for rotation upon the hub of the disk hanger 66 carried at the rear end of drag bar 67 and provided with upwardly extending conduits 68 to which grain or fertilizer, or both, are

supplied by means of flexible tubes 69 from the feeding mechanism, in the well known manner. The drag bars 67 are pivotally mounted at 70 upon a suitable pivotal bearing shaft or support depending below the front portion of the machine, and all the drag bars, disk hangers, and disks are designed to be raised and lowered simultaneously by the operator. For such purpose I provide a rock shaft 71, preferably squared, extending transversely across the machine at its front upper portion, mounted in suitable bearings and provided with a series of downwardly extending levers 72. Said levers are preferably slotted as at 73, and connected at their outer ends with connecting rods 74 which in turn are pivotally connected at 75 with the disk hangers.

76 are a series of pins or rods pivotally connected at 77 with the drag bars 67 and having surrounding pressure springs 78 bearing upwardly against blocks 79 having a sliding engagement with slots 73 by pins 80. By this construction it will be seen that there is at all times provided a resilient cushioning downwardly-pressed bearing against the upper side of the drag bars, tending to positively insert the disks downwardly into the earth all at the same time, with means for lifting the disk hangers and disks against the said resilient pressure. Levers 72 are also provided with limiting arms 81 adapted to bear upon the upper edge of the bar 4 when the disks are lowered, as shown in Fig. 3, and to be lifted upwardly therefrom when the disks are raised as in Fig. 5. By means of such arms 81 it will be seen that the entire strain is taken off of the lifting mechanism and the disks are positively supported in position for operation.

Levers 72 and all of the disks are actuated upon rotation of rock shaft 71. To accomplish this I employ a lever arm 82 pivotally connected at 83 with arm 84, which arm in turn is connected at its rear end with crank 85 on the lower end of spindle 62 and capable of operation like crank 53. The connecting ends of lever 82 and rod 84 are of elbow form whereby to facilitate the operation and provide sufficient clearance for the other parts of the mechanism.

By the construction above described it will be seen that the grain and fertilizer feeds and the raising and lowering of the disks, are controlled from the single spindle 62. Said spindle and spindle 54 are, as shown in Fig. 1, located at one side and the other respectively of the driver's seat 86, so as to be within easy reach of the operator.

87 is a curved bar or bars extending upwardly and backwardly from the main cross bar 4, connected by brace 88 with back bar 3, and supporting the driver's seat, said bar 87 having at its forward lower portion upwardly and inwardly projecting cheeks 89.

90 represents the tongue of the machine supported by bracket arms 91 upwardly above the front bar 2 and pivotally supported at 92 upon a transverse bolt connecting the flanges of brackets 91. At its rear end tongue 90 is provided with a strap 93 surrounding a bolt 94 extending across from one cheek 89 to the other, and by this construction it will be seen that considerable vertical play is provided within strap 93 whereby the forward end of the tongue may be raised or lowered to a considerable extent. This is a feature of great advantage in adjusting the tongue to the horses and renders the work of drawing the machine easy.

95 is the double-tree, not mounted on the tongue as is ordinarily the case, but directly attached to the main frame. The tree 95 is pivotally mounted by king bolt 95' within the upper and lower sides of a clevis 96 vertically pivoted at 97 in block 98 secured by bolt 99 between an upper plate 100 secured to bar 2 and a lower bar 101 extending forwardly from underneath the main bar 4. By this construction it will be seen that the power of the draft horses is imparted directly to the main body portion of the machine, a feature of advantage contributing to the durability, flexibility and ease of operation.

In Figs. 11 and 12 I have shown a modified construction whereby the raising and lowering of the disk hangers and disks and also the maintaining of the resilient cushioning pressure is secured by a single mechanism. Upon rock shaft 71' are mounted the levers 72' provided with a slot 73' and the integral supporting extensions 81' adapted to bear upon the main bar 4. Said bar 4 is located somewhat forwardly in the machine and the mechanism is arranged in reverse of that already designed, it being understood that the rock shaft 71' is however actuated by the same lever connection. Rod 76' is pivotally mounted at 102 between cheeks 103 cast integral with the disk hanger, rod 76' being similarly surrounded by coil spring 78' bearing downwardly against the washer disk 104 secured by cotter pin or otherwise to rod 76'. At its upper end rod 75' passes through and has a sliding bearing in block 105 of stem 106 which passes through slot 73'. Spindle 76' extends upwardly through and beyond the block 104 and is provided with a limiting nut 107 so located as to bear down on top of block 105, when the disk hanger is lifted, as in Fig. 12, but which may be pushed upwardly above said block more or less owing to the operation on uneven ground. The upper end of stem 76' is threaded for a considerable distance whereby the nut may be set to any desired position to adjust the mechanism to suit the ground etc. An advantage in the slotted

construction of lever 72' is that the stem 106 of the lifting block 105 may, if necessary, slide into the slot, providing ample clearance and freedom of motion while greatly facilitating the lifting operation. Thus assuming the stem 107 to have slipped from one end to the other of the slot, when the lever is operated pin 106 will slide along in the slot while the wedge-like action of the lever as it is lifted will greatly ease the operation. By this construction, I also avoid the necessity of the supplemental connecting rod 74 and secure the raising of the disk by the same means, through which the downward cushioning pressure is exerted. In Fig. 13 I also show a modified construction of lifting lever wherein the slot is eliminated, the connecting rod being pivoted to the lever as at 108, and good results may be had with this arrangement, the construction otherwise being the same as already described.

The various advantages and improvements of my invention will be fully appreciated by all those familiar with this class of apparatus. The machine is under the complete control of the operator; it provides against waste of grain or fertilizer; gives a construction capable of an accurate degree of adjustment to suit all conditions of ground level, providing a well balanced machine, reducing the work of the horses to a minimum, and simplifying the construction in many essential respects. The size, details, design, or other features of the invention may be varied or changed by the skilled mechanic, and I do not desire to be limited to the exact construction shown, as many of these elements may be altered to suit varying conditions.

What I claim is:

1. A grain drill provided with a plurality of seeding disks, a rock shaft having a corresponding plurality of levers operatively connected therewith and provided with a rest device and an actuating lever, an operating element provided with a lever, and a connecting rod attached to said lever and having its terminal connected with said actuating lever.

2. A grain drill provided with a plurality of seeding disks and hangers having forwardly extending drag bars, a rock shaft having a corresponding plurality of slotted levers operatively connected with the disk hangers and provided with a rest device, pressure springs and rods therefor engaging the hanger bars and slotted levers respectively, an operating spindle, and lever mechanism connecting said spindle with the rock shaft.

3. A grain drill provided with a plurality of seeding disks and hangers having forwardly extending drag bars, a rock shaft having a corresponding plurality of slotted levers operatively connected with the disk

hangers and provided with a rest device, pressure springs and rods therefor engaging the hanger bars and slotted levers respectively, an operating spindle provided with a lever, a lever mounted on the rock shaft, and means connecting said levers.

4. A grain drill provided with a plurality of seeding disks and hangers having forwardly extending drag bars, a rock shaft having a corresponding plurality of slotted levers operatively connected with the disk hangers and provided with a rest device, pressure springs and rods therefor engaging the hanger bars and slotted levers respectively, an operating spindle provided with a lever, a lever mounted on the rock shaft, means connecting said levers, and ratchet-and-pawl mechanism controlling the operating spindle.

5. A grain drill provided with a series of depending hanger bars, hangers and disks; a rock shaft provided with a corresponding series of levers and a rest device, means connecting said levers with the hanger bars having interposed cushioning springs, an operating spindle, and a connecting rod operable by said spindle and connected with a lever secured on the rock shaft, substantially as set forth.

6. A grain drill provided with a series of depending hanger bars, hangers and disks, a rock shaft provided with a corresponding series of levers having rest extensions, means connecting said levers with the hanger bars, and interposed cushioning springs.

7. A grain drill provided with a main framework having a cross-bar 4, a series of depending hanger bars mounted in front of said bar and provided with disk hangers and disks, a rock shaft mounted in bearings on the main framework and provided with levers, means adapted to engage the cross bar to arrest said levers, and means connecting the levers with the hanger bars.

8. A grain drill provided with a main framework having a cross bar 4, a series of depending hanger bars mounted in front of said bar and provided with disk hangers and disks, a rock shaft mounted in bearings on the main framework and provided with levers, means adapted to engage the cross bar to arrest said levers, means connecting the levers with the hanger bars, and cushioning springs interposed between the levers and the hanger bars.

9. A grain drill provided with a main framework having a cross bar 4, a series of depending hanger bars mounted in front of said bar and provided with disk hangers and disks, a rock shaft mounted in bearings on the main framework and provided with levers having rest extensions, and means connecting the levers with the hanger bars.

10. In a grain drill, the combination with a series of vertically adjustable disks, a

cross bar, and an actuating rock shaft; of a series of levers mounted on the rock shaft provided with rest extensions and operatively connected with the disks.

5 11. In a grain drill, the combination with a series of vertically adjustable disks, a cross bar, and an actuating rock shaft; of a series of levers mounted on the rock shaft provided with rest extensions, and operatively connected with the disks, with interposed cushioning springs.

10 12. In a grain drill, the combination with a series of vertically adjustable disks, and an actuating rock shaft; of a series of levers mounted on the rock shaft having closed-end slots and connecting terminals, downwardly pressing means operatively connected with the disks having sliding connections with the slots of said levers, and upwardly lifting means connected with the disks and with the lever terminals.

15 13. In a grain drill, the combination with a vertically movable disk hanger and disk, of a slotted lifting lever, a block slidably mounted in said lever, a lifting rod connected with the hanger, passing through said block and having a terminal nut, and a cushioning spring engaging an abutment on the rod and bearing against said block, substantially as set forth.

20 14. In a grain drill, the combination with a vertically movable disk hanger and disk, of a slotted lifting lever having a rest arm, a block slidably mounted in said lever, a lifting rod connected with the hanger, passing through said block and having a terminal nut, and a cushioning spring engaging an abutment on the rod and bearing against said block, substantially as set forth.

25 15. In a grain drill, the combination with the continuous axle and axle boxes therefor, of a main frame slidably embracing the axle boxes, levers fulcrumed on the main frame and operatively engaging the axle boxes for adjusting the main frame with relation thereto, a rock shaft mounted transversely of the main frame, levers secured on said rock shaft, links connecting said levers with said fulcrumed levers, and means for actuating the rock shaft.

30 16. In a grain drill, the combination with the axle boxes and a continuous axle mounted therein provided with supporting traction wheels, of a main frame slidably embracing the axle boxes, levers fulcrumed on the main frame and having slotted terminals operatively engaging studs on the axle boxes, a rock shaft extending transversely of the machine, means operatively connecting the rock shaft with said levers, and means for actuating the rock shaft.

35 17. In a grain drill, the combination with the axle and axle boxes, of a main frame slidably embracing the axle boxes, levers fulcrumed on the main frame and operatively engaging the axle boxes, a rock shaft extending transversely of the machine, means operatively connecting the rock shaft with said levers, and means for actuating the rock shaft.

actively engaging the axle boxes, a rock shaft extending transversely of the machine, means operatively connecting the rock shaft with said levers, and a vertically arranged operating spindle and lever mechanism connecting said spindle with the rock shaft.

18. In a grain drill, the combination with the axle and axle boxes, of a main frame provided with rigidly attached vertically adjustable housings embracing the axle boxes, levers pivoted to the housings and axle boxes respectively, and means provided with a vertically arranged rotatable operating spindle for actuating said levers, substantially as set forth.

19. In a grain drill, the combination with the axle and axle boxes, of a main frame provided with rigidly attached vertically adjustable housings embracing the axle boxes, levers pivoted to the housings and axle boxes respectively, a rock shaft provided with levers connected to said levers, and means provided with a vertically arranged rotatable operating spindle for actuating said rock shaft, substantially as set forth.

20. In a grain drill, the combination with the axle and axle boxes, of a main frame provided with attached vertically adjustable housings embracing the axle boxes, levers pivoted to the housings and axle boxes respectively, a rock shaft provided with levers connected to said levers, a vertical spindle provided with a lever, and means operatively connecting said lever with the rock shaft, substantially as set forth.

21. In a grain drill, the combination with the axle and axle boxes, of a main frame provided with attached vertically adjustable housings embracing the axle boxes, levers pivoted to the housings and axle boxes respectively, a rock shaft operatively connected to said levers, a vertical spindle provided with a lever, means operatively connecting said lever with the rock shaft, and ratchet-and-pawl mechanism for controlling the spindle, substantially as set forth.

22. In a grain drill, the combination with vertically adjustable disks, axle driven gearing, a rock shaft, and lever mechanism connected with the rock shaft and with the disks for lifting them, of means for feeding the disks and gearing for said means embodying a telescoping connection of the axle driven gearing, and a single operating element arranged to actuate the rock shaft to lift the disks and to simultaneously render the feed gearing inoperative.

23. In a grain drill, the combination with vertically adjustable disks, axle driven gearing, a rock shaft, and lever mechanism connected with the rock shaft and with the disks for lifting them, of means for feeding the disks and gearing for said means embodying a telescoping connection of the axle

driven gearing, and a single operating element arranged to actuate the rock shaft to lower the disks and to simultaneously render the feed gearing operative.

24. In a grain drill, the combination of the frame-work, the supporting axle, axle-driven gearing, vertically adjustable disks, a rock shaft and lever mechanism connected therewith and with the disks, feeding mechanism in driving engagement with the axle driven gearing and embodying a telescoping connection and a shifting gear, and an operating device arranged to simultaneously shift said gear and to actuate the rock shaft.

25. In a grain drill, the combination of the framework, the supporting axle, axle-driven gearing, vertically adjustable disks, a rock shaft and lever mechanism connected therewith and with the disks, feeding mechanism in driving engagement with the axle driven gearing and embodying a telescoping connection and a slidingly mounted shifting gear, and an operating device arranged to simultaneously shift said gear and to actuate the rock shaft.

26. In a grain drill, the combination of the framework, the supporting axle, axle-driven gearing, vertically adjustable disks, feeding mechanism in driving engagement with the axle driven gearing and embodying a telescoping connection and a laterally movable shifting gear, a rock shaft provided with slotted levers connected with the disks and having spring devices arranged to exert downward pressure on the disks, and an operating device and mechanism connected therewith and with the movable shifting gear and the rock shaft arranged to simultaneously actuate said parts, substantially as set forth.

27. In a grain drill, the combination of vertically adjustable disks and operating means therefor, a rotatable feed-mechanism-actuating shaft, a slidingly mounted shifting gear thereon, a driving gear meshing therewith, a telescoping connection geared with the axle of the machine, a wedge device adapted to press the shifting gear backwardly from the driving gear, and an operating spindle connected with the disk-operating means and with said wedge device, substantially as set forth.

28. In a grain drill, the combination of vertically adjustable disks and operating means therefor, a rotatable feed-mechanism-actuating shaft, a slidingly mounted shifting gear thereon, a driving gear meshing therewith, a telescoping connection geared with the axle of the machine, a wedge device adapted to press the shifting gear backwardly from the driving gear, a spring arranged to replace the shifting gear, and an operating spindle connected with the disk-operating means and with said wedge device, substantially as set forth.

29. In a grain drill, the combination of vertically adjustable disks and operating means therefor, a rotatable feed-mechanism-actuating shaft, a gear thereon, a laterally movable shaft mounted at one end in a slotted bearing and having a gear at one end meshing with said gear and a gear at the other end meshing with a driving gear, means adapted to move said shaft laterally to un-mesh one of said gears, and an operating spindle connected with the disk operating means and with said means, substantially as set forth.

30. In a grain drill, the combination of vertically adjustable disks and operating means therefor, a rotatable feed-mechanism-actuating shaft, a gear thereon, a laterally movable shaft mounted at one end in a slotted bearing and having a gear at one end meshing with said gear and a gear at the other end meshing with a driving gear, means adapted to move said shaft laterally to un-mesh one of said gears, a spring arranged to replace said shaft and gear, and an operating spindle connected with the disk operating means and with said means, substantially as set forth.

31. A grain drill provided with a rotatable feed-mechanism-actuating-shaft and disk raising mechanism, a gear on said shaft, a laterally movable shaft mounted in a slotted bearing and having a gear at one end meshing with said gear and a gear at the other end meshing with a driving gear, a shifting dog arranged to press said shaft laterally, lever mechanism for actuating said dog, and an operating device connected with the disk raising mechanism and with said lever mechanism, substantially as set forth.

32. In a grain drill, the combination with a series of vertically adjustable disks, a rock shaft and raising and lowering mechanism connected therewith and with the disks, feeding mechanism arranged to deliver material to said disks, means for actuating said feeding mechanism from the running gear embodying a telescoping connection, means for rendering the feeding mechanism operative or inoperative, and an actuating element operatively connected with said rock shaft and said last named means arranged to simultaneously actuate the disk raising and lowering mechanism and the feed controlling mechanism, substantially as set forth.

33. In a grain drill, the combination with the supporting axle, main frame, vertically adjustable disks, and feeding mechanism gearing; of an operating spindle and connected mechanism for vertically adjusting the main frame, and an operating spindle and connected mechanism for adjusting the disks and feeding mechanism gearing, substantially as set forth.

34. A grain drill provided with axle boxes, an axle and traction wheels, vertically

adjustable housing supporting the main frame, feeding mechanism arranged to rise and fall with the main frame, gearing arranged to drive the feeding mechanism from the traction wheels, and intervening telescoping connections between the axle gearing and the feed-mechanism gearing, substantially as set forth.

35. In a grain drill, the combination with the axle box, axle and traction wheel; of a vertically adjustable housing embracing the axle box, a bevel gear driven by the traction wheel, and a bevel gear meshing therewith

provided with an extension passing upwardly through the axle box and housing and in telescoping driving engagement with a shaft adapted to impart motion to the feeding mechanism, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

DUNY A. SCHUTT.

Witnesses:

NELLIE M. STITT,
NOTT N. ANTRIN.