

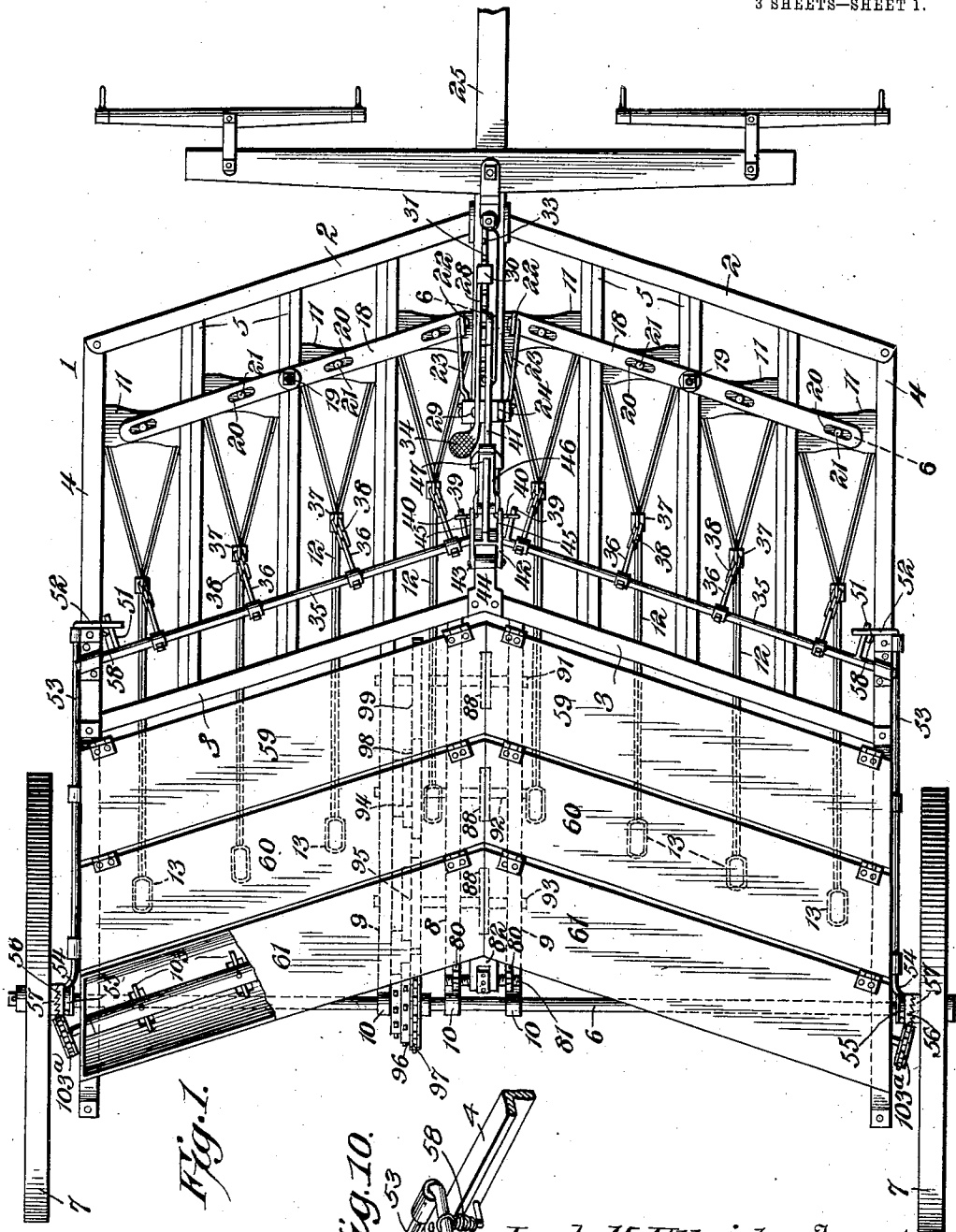
No. 824,763.

PATENTED JULY 3, 1906.

J. H. ULLRICK.
GRAIN DRILL.

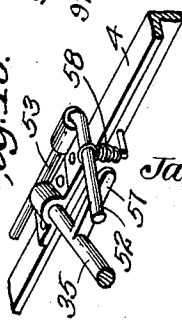
APPLICATION FILED SEPT. 14, 1905.

3 SHEETS—SHEET 1.



Witnesses
Howard D. Orr.
J. F. Riley

Fig. 10.



Jacob H. Ullrick, Inventor,

By

C. G. Siggers.

Attorney

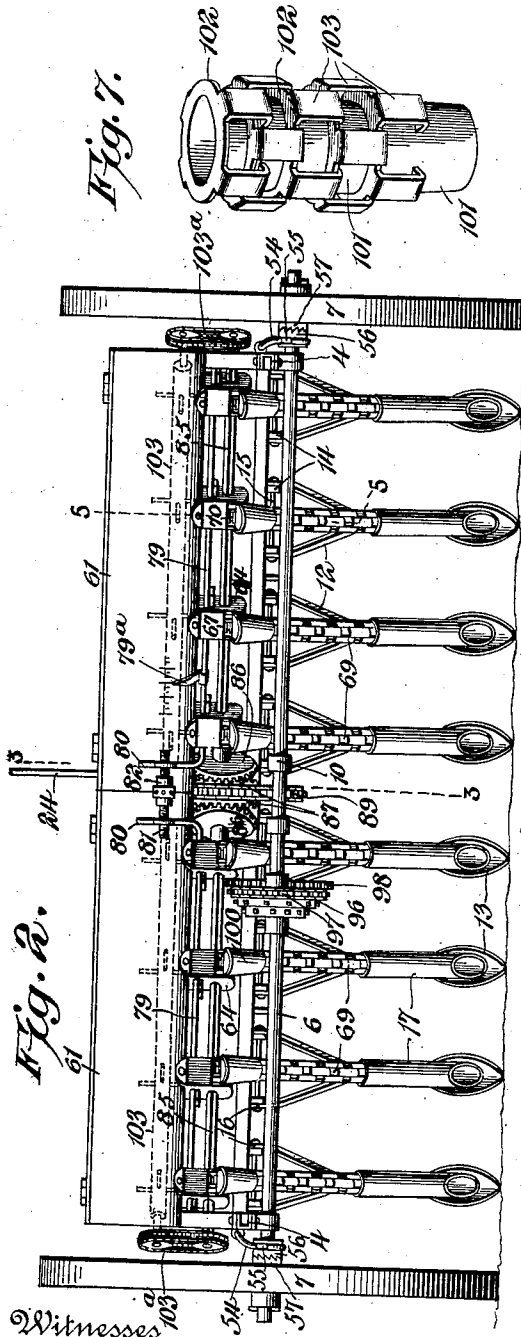
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3 SHEETS—SHEET 2.



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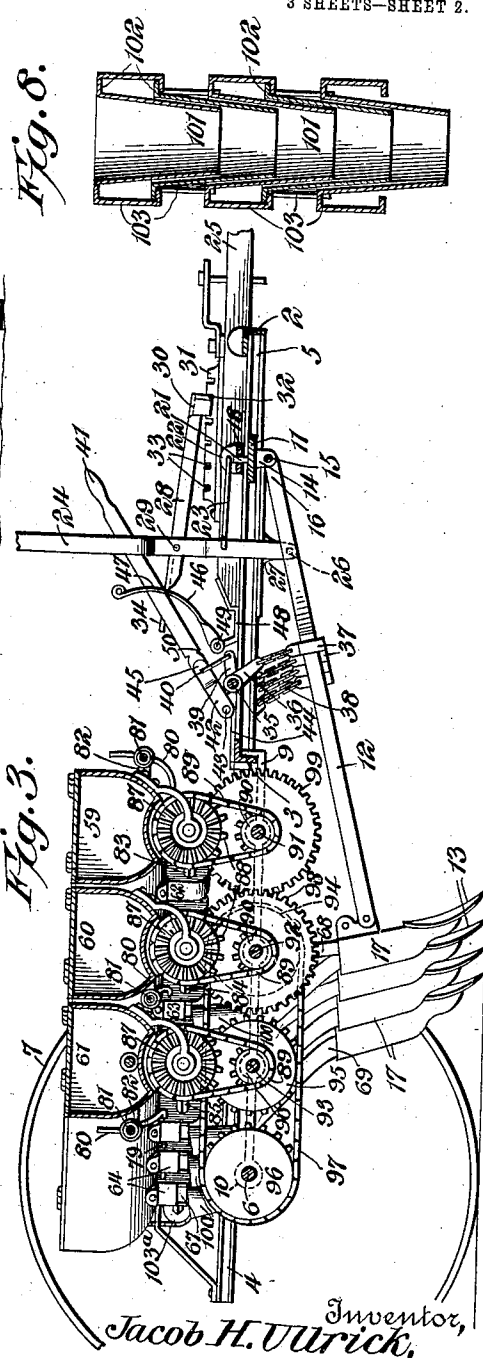


Fig. 3.

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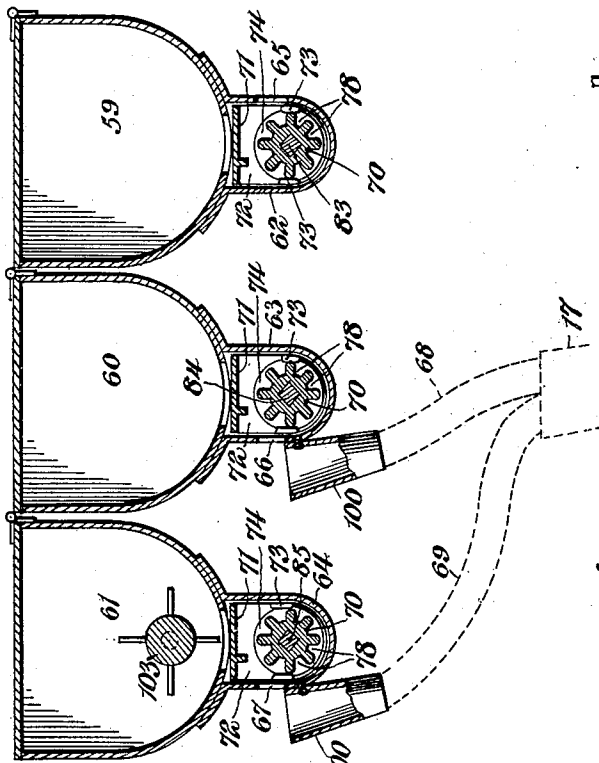


Fig. 5.

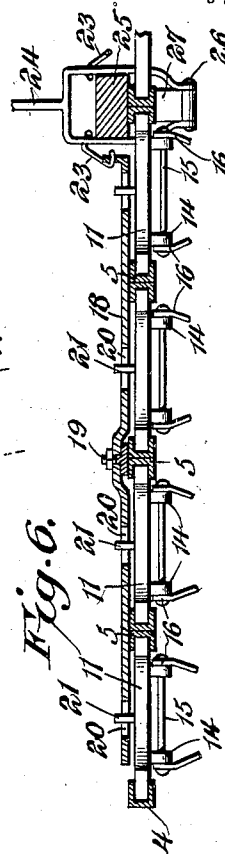


Fig. 6.

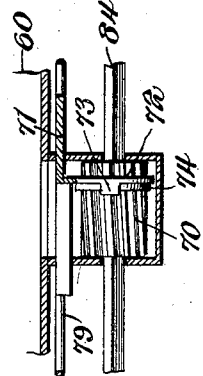


Fig. 9.

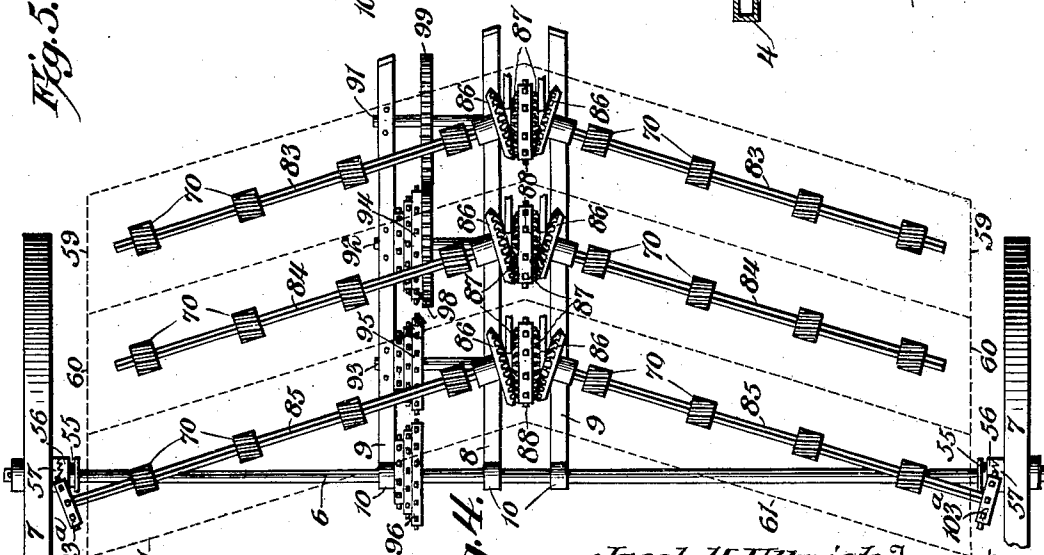


Fig. 4.

Jacob H. Ullrick, Inventor,

Witnesses

Howard D. Orr
J. F. R. Day

By
C. G. Siggers
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UNITED STATES PATENT OFFICE.

JACOB HENRY ULLRICK, OF NASHVILLE, TENNESSEE.

GRAIN-DRILL.

No. 824,763.

Specification of Letters Patent.

Patented July 3, 1906.

Application filed September 14, 1905. Serial No. 278,441.

To all whom it may concern:

Be it known that I, JACOB HENRY ULLRICK, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented a new and useful Grain-Drill, of which the following is a specification.

The invention relates to improvements in grain-drills.

The object of the present invention is to improve the construction of grain-drills and to provide a simple and comparatively inexpensive machine adapted to sow various kinds of grass-seed broadcast and various kinds of grain in drills and to distribute fertilizer in the drills simultaneously with the sowing of the grain.

A further object of the invention is to provide a machine of this character adapted to operate effectively on both clean and trashy ground and capable of ready adjustment for arranging the hoes or other drilling devices, such as disks, either in a perfectly straight line for clean ground or in substantially V form for throwing off the trash at the sides of the grain-drill.

Also the invention has for its object to provide a grain-drill in which the hoes or other drilling device may be readily adjusted to throw them into and out of operation and to arrange them at the desired depth and in which the machine will be positively operated when turning in either direction.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a plan view of a grain-drill constructed in accordance with this invention. Fig. 2 is a rear elevation of the same. Fig. 3 is a longitudinal sectional view taken substantially on the line 3 3 of Fig. 2. Fig. 4 is a detail plan view illustrating the arrangement of the gearing for operating the feed-rolls. Fig. 5 is an enlarged detail sectional view taken substantially on the line 5 5 of Fig. 2. Fig. 6 is a transverse sectional view taken substantially on the

line 6 6 of Fig. 1. Figs. 7 and 8 are detail views illustrating the construction of the flexible seed spout or tube. Fig. 9 is a detail sectional view illustrating the construction of the force-feed mechanism. Fig. 10 is a detail view illustrating the construction of the springs for holding the slidable clutch sections or members in engagement with the clutch members or sections of the carrying-wheels.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 designates the main or supporting frame, which is of angular form, being substantially V form in plan view and provided at opposite sides of the center with transverse bars 2 and 3, arranged at an angle and diverging rearwardly and connected by outer and intermediate longitudinal guide-bars 4 and 5, suitably secured to the transverse bars 2 and 3. The outer bars 4 are extended in rear of the bars 3 and are suitably secured to a transverse shaft or axle 6, which is provided at its ends with carrying-wheels 7. The central portion of the main or supporting frame is provided with a rearward extension composed of intermediate and side longitudinal bars 8 and 9, secured at their front ends to the transverse bars 3 and provided at their rear ends with suitable bearings 10 for the reception of the shaft or axle 6.

The longitudinal guide-bars 4 and 5 are provided with top and bottom flanges forming grooves or ways for the ends of slides 11, to which are connected drag bars or beams 12. The guide-bars 5 are arranged in pairs and are fitted back to back, as clearly shown in Fig. 6 of the drawings; but I bars or beams having opposite flanges may be employed instead of separate bars or beams, as will be readily apparent.

The slides, which move longitudinally of the machine to arrange drill-holes 13 or other form of furrow-opener either in a straight line or in V form, are provided at opposite sides with depending lugs or ears 14, which are perforated for the reception of pivots or pintles 15 for connecting the front ends of the drag bars or beams to the slides. The drag bars or beams are preferably composed of two sides or members provided with forwardly-converging front portions having their terminals 16 arranged at the outer faces of the lugs or ears 14 and pivoted to the same by the said pivots or pintles 15, where-

by the drag bars or beams are adapted to swing upwardly and downwardly for throwing the drill-hoes into and out of operation and for arranging them at the desired depth.

5 The drill-hoes 13, which are provided with tubular shanks or stocks 17, are suitably secured to the rear ends of the drag bars or beams, and when the machine is operating on clean ground they may be arranged in a straight line; but when the grain-drill is used
10 on trashy ground the hoes are arranged in V form, those at opposite sides of the center forming two rows, which diverge rearwardly and which are adapted to work the trash laterally and discharge the same at the sides of the machine. This adjustment of the hoes is effected by means of a pair of levers 18, disposed transversely of the grain-drill and located at opposite sides of the median line
15 thereof and centrally pivoted, by means of bolts 19 or other suitable fastening devices, to the adjacent longitudinal guide-bars 5.

The transversely-disposed levers, which are arranged substantially in a horizontal position,
25 are provided at intervals with longitudinal slots 20 for the reception of studs or projections 21 of the slides, which move longitudinally of the machine. The studs or projections extend from the upper faces of the slides, and when the transverse levers
30 are oscillated the slides at one arm of each lever will be moved backward and forward and those at the opposite arm will be simultaneously moved in the opposite direction. By swinging the levers in alinement transversely
35 of the machine the drill-hoes or other devices carried by the rear ends of the drag bars or beams may be instantly brought into a straight line, and by swinging the inner arms of the levers forwardly to the position
40 illustrated in Fig. 1 of the drawings the drill-hoes will be arranged in V form. Any trash collected by the hoes in the latter position will be worked to the sides of the grain-drill and discharged thereat. The movement of
45 the carrying-wheels assists in effecting this discharge, as the hoes are located between the same.

The inner ends of the transverse levers are
50 upturned to form ears 22, and they are connected by links 23 with the sides of a forked or bifurcated shifting lever 24. The front ends of the links or rods are angularly bent and have transverse portions arranged in the perforations of the ears 22. The forked or
55 bifurcated portion of the shifting lever 24 straddles the rear end of a draft beam or tongue 25 and is pivoted by a transverse pin 26 to a bracket 27, which is secured to the bottoms of the central guide-bars 5 and which is provided with a depending portion having a perforation or opening for the reception of the pivot-pin 26. The rear ends of the links 23 are provided with eyes which
60 are linked into perforations of the sides of

the forked or bifurcated portion of the shifting lever. The shifting lever is adapted to be swung backward and forward to oscillate the transverse slide-actuating lever, and it is locked in the desired adjustment by means
70 of a foot-lever 28, disposed longitudinally of the machine and fulcrumed near its rear end on the shifting lever by means of a rivet 29 or other suitable fastening device and having a substantially U-shaped front portion
75 30. The front portion 30, which straddles a longitudinal ratchet-bar 31, is provided with a transverse flange or engaging portion 32, adapted to drop into any one of a series of notches or recesses 33 of the ratchet-bar 31.
80 The front arm of the ratchet-engaging lever is heavier than the rear arm, so that the front end will be maintained in engagement with the rack-bar by gravity. The rear end of the lever 28 is provided with a foot-plate 34,
85 adapted to be readily depressed by the driver, a suitable seat being in practice provided for his accommodation.

The drag bars or beams are swung upward and downward to throw the hoes into and out
90 of operation by means of a pair of oppositely-disposed rock-shafts 35, journaled in suitable bearings at the center and sides of the supporting-frame. These rock-shafts are arranged
95 at an angle and diverge rearwardly and are provided at intervals with downwardly and forwardly projecting arms 36, which are connected with the drag bars or beams. The drag bars or beams are preferably arranged in loops or stirrups 37, which are suspended
100 from the arms 36 by short chains 38 or other suitable flexible connections. The rock-shafts are also provided at their inner ends with short arms 39, which are connected by links 40 with an operating-lever 41. The
105 operating-lever 41 has a lower forked or bifurcated portion 42, the sides of which are offset from the plane of the upper or body portion of the lever and which are pivoted to the main or supporting frame by a transverse pin
110 43. The pin 43 passes through an eye of a plate 44, which is secured to the main or supporting frame at the adjacent ends of the transverse bars 3. The operating-lever is provided at the sides of the lower forked or bifurcated portion 42 with a pair of oppositely-disposed upwardly-extending arms 45, which
115 are connected to the links 40. When the operating-lever 41 is swung downward from the position illustrated in Fig. 3 of the drawings, the rock-shafts will be partially rotated, and the arms 36 will be swung upward for raising the drag bars or beams. The drag bars or beams are adapted to slide through the stirrups or loops, so that the longitudinal adjustment of the former will not interfere with the
120 operation of the mechanism for raising and lowering the drag bars or beams. The operating-lever is locked at the end of its rearward movement by means of a pivoted dog
130

46, extending upwardly from the main or supporting frame at a point in rear of the draft bar or beam and provided with a slot 47, through which the operating-lever 41 passes. The lower end of the pawl or dog 46 is forked or bifurcated to receive an upwardly-extending portion of a plate 48 and is secured to the same by a pivot or pin 49. The plate 48 is secured to the central guide-bars 5, its front end being extended over the rear end of the draft bar or beam and its rear end being bent upwardly to form a support for the pawl or dog. The operating-lever 41 is provided with a notch 50, forming a shoulder for engaging the pawl or dog at the lower end of the slot 47, whereby the lever 41 is locked against forward movement. The lever may be provided with other notches, or any other suitable means may be employed for locking the drag bars or beams at an intermediate point for controlling the depth of the hoes.

The transverse rock-shafts are provided adjacent to their outer ends with short arms 51, which are located beneath and arranged to engage front arms 52 of longitudinal rock-shafts 53, journaled in suitable bearings at opposite sides of the main or supporting frame and extending rearward to points adjacent to the shaft or axle and provided thereat with depending laterally-movable arms 54, which are curved or hook-shaped for engaging the grooves 55 of slidable clutch sections or members 56, which engage clutch-faces 57 of the carrying-wheels. The hubs of the carrying-wheels are extended at their inner sides to form clutch sections or members for co-operating with the slidable clutch sections or members 56, and the latter are provided with teeth forming clutch-faces for interlocking with those of the carrying-wheels. The slidable clutch sections or members 56 are connected with the shaft or axle by a suitable key and keyway or other suitable means for permitting the slidable clutch sections or members to move into and out of engagement with the clutch sections or members of the wheels. The slidable clutch sections or members are yieldably held in engagement with the clutch sections or members of the carrying-wheels by means of coiled springs 58, (see Fig. 10,) connected with the front arms of the longitudinally-disposed rock-shafts. This construction will permit the carrying-wheels to move in either direction, and when turning the grain-drill the carrying-wheels at the outer side of the machine, or the side describing the greater circle, positively actuates the feed mechanism hereinafter described. The machine is also adapted to be backed without operating the said feed mechanism, and when the operating-lever 41 is swung backward to its rear-most position the front arms of the longitudinal rock-shafts will be swung upward and

the slidable members or sections of the clutches will be carried out of engagement with the clutch sections or members of the wheels for throwing the machine out of operation. This is automatically effected when the hoes are swung upward out of the ground.

The grain-drill is provided with three sets of seed-hoppers 59, 60, and 61, having hinged tops and arranged at an angle to a central line. The members of each set of seed-hoppers diverge rearwardly and are arranged in parallelism with the transverse bars 2 and 3 of the main or supporting frame. The front hoppers are designed for containing any kind of grass-seed—such as clover, timothy, and the like—which are sown broadcast. The intermediate hoppers are designed for containing any kind of grain—such as wheat, barley, oats, and the like—which are sown in drills, and the rear hoppers are provided for fertilizer, which is distributed in the drills simultaneously with the grain. However, provision is made, as hereinafter explained, for sowing the grain and distributing the fertilizer broadcast.

The hoppers are provided at intervals with depending seed cups or casings 62, 63, and 64. The front seed cups or casings 62 are provided at the front with discharge-openings 65 for sowing the grass-seed broadcast, and the intermediate and rear cups or casings 63 and 64 are provided at the back with discharge-openings 66 and 67. Flexible spouts or tubes 68 and 69 are detachably mounted adjacent to the openings to receive the grain and the fertilizer which are simultaneously delivered to the tubular shanks or stems 17 of the furrow-openers.

Each of the hoppers is provided with a force-feed cylinder constructed substantially the same as that shown and described in an application for patent filed by me on or about July 26, 1905, Serial No. 271,341, and provided with a feed-roll 70, having spirally-arranged ribs or teeth forming intervening spirally-arranged feed-grooves. The hoppers are provided at their bottoms with suitable discharge-openings communicating with the cups or casings, and the seed or fertilizer which drops from the hoppers upon the feed-rolls is carried to the discharge-openings of the cups or casings and is expelled or discharged therefrom in a continuous uniform uninterrupted stream. The discharge of the contents of the hopper is controlled by a slide 71, provided with a depending portion or collar or rosette 72, having a circular opening to receive the feed-roll. The depending portion or collar is also provided at opposite sides of the opening with approximately L-shaped lugs 73, which loosely embrace a disk 74, having a central opening and provided thereat with inwardly-extending tapering projections 78, adapted to slide in the grooves of the feed-roll for varying the length of the

effective portion of the same. The disk which rotates with the feed-roll is carried by the slide, and as the slide moves inward to reduce the size of the stream the disk moves inward and correspondingly reduces the length of the exposed portions of the grooves of the feed-roll. The slides are connected with operating-rods 79, piercing the cups or casings and provided at their inner ends with arms 80, (see Fig. 2,) having threaded perforations and engaged by an adjusting-screw 81. The adjusting-screw, which is provided with right and left hand threaded portions for engaging the operating-rods 79, has a central enlargement or head and is journaled in suitable bearings of a yoke 82. The central portion or head is provided with sockets and is adapted to be engaged by a spanner or other suitable tool for rotating the adjusting-screw, whereby the operating-rod and the slides are simultaneously moved inwardly or outwardly. When the operating-rods are moved inwardly, the size of the stream is decreased, and an outward movement of the operating-rods increases the size of the stream. One of the operating-rods is provided with a suitable indicator 79^a, arranged to move over a scale for indicating the position of the slides.

The hoppers are provided with shafts 83, 84, and 85, arranged at an angle to correspond to the arrangement of the hoppers and extending through the feed-rolls, which may be fixed to the shafts in any desired manner. The inner ends of each pair of feed-shafts are provided with beveled gears 86, which mesh with opposite beveled teeth 87 of a compound or double-face gear that is also provided with intermediate sprocket-teeth 88. The sprocket-teeth 88 are connected by sprocket-chains 89 with sprocket-pinions 90 of the lower shafts 91, 92, and 93, disposed transversely of the machine and connected by gearing with the shaft or axle, as hereinafter explained. The transverse shafts 91, 92, and 93 are journaled in suitable bearings of the central extension of the main or supporting frame, and the lower pinions 90 are removable for enabling gears of different diameters to be employed for driving the force-feed mechanism at the desired speed. The force-feed mechanism of the several hoppers may be driven at different speeds, and one or more may be thrown out of operation by removing the sprocket-chain 89.

The axle or shaft and the transverse shafts 92 and 93 are provided with sprocket-gears 94, 95, and 96, having sets of sprocket-teeth of different diameters and adapted to receive a connecting sprocket-chain 97, which extends over the tops of the sprocket-wheels 94, 95, and 96 and under the bottom of the same and which simultaneously communicates motion from the shaft or axle to the transverse shafts 92 and 93. The sprocket-wheel 94 is also provided with spur-teeth 98,

which mesh with a spur-gear 99 of the front transverse shaft 91. The spur-gearing reverses the motion of the front transverse shaft 91 for discharging the seed through the front openings of the seed cups or casings 65. The sprocket-chain 97 is adapted to be changed from one set of sprocket-teeth to another for changing the speed, so that the desired amount of seed and fertilizer will be discharged.

Each of the spouts or tubes 68 and 69 is flexible and is provided with a tapered upper section or head 100, forming an enlarged flaring mouth to receive the grain or fertilizer. The flexible spout or tube is composed of a plurality of tapering telescopic sections 101, provided at their upper or enlarged ends with outwardly-extending annular flanges 102 and having substantially hook-shaped tongues 103 arranged at intervals and extending downwardly from the flanges. The tongues of one section or member engage beneath the flange of the next lower section or member at points between the tongues thereof, the space between the tongues being greater than the width of the latter to permit the sections or members to have a limited rotary movement on each other. The sections or members telescope or move longitudinally on each other and are capable of the said rotary movements and are also adapted to rock or tilt. By this construction a flexible tube of great strength and durability is provided, and the said tube is adapted to adjust itself automatically to the movement of the drill-hoes. The lower ends of the flexible tubes or spouts are fitted in the upper ends of the tubular shanks 17 of the drill-hoes, and when it is desired to change the grain-drill into a broadcast seeder and fertilizer-distributor the bolts or other fastening devices for securing the upper sections or heads 100 of the flexible spouts or tubes are detached and the lower ends of the spouts or tubes are lifted out of the tubular shanks of the drill-hoes. The grain and the fertilizer will then be distributed broadcast.

The machine will distribute fertilizer and sow grass-seed and grain simultaneously, or one or more of the hoppers may be thrown out of operation, as before explained. By changing the gears of the lower transverse shafts 91, 92, and 93 the machine may be arranged for sowing different amounts of grain and fertilizer per acre.

The fertilizer-hoppers are preferably provided with agitators 103, consisting of shafts journaled in suitable bearings of the ends of the hoppers and provided with radially-arranged arms. The agitators, which are located above the openings of the bottoms of the fertilizer-hoppers, are connected by suitable gearing 103^a with the feed-shafts of the fertilizer-distributor. Although sprocket-gearing 103^a is shown for connecting the agi-

tators with the feed-shafts, it will be apparent that any other form of gearing may be employed, if desired.

In practice the gearing will be housed within suitable casings of sheet metal to protect them from dust and dirt; but these have been omitted in the accompanying drawings for convenience of illustration.

The particular construction of drag-bars and the means for adjusting the same to arrange the drag-bars either in a straight line or in an approximately V form are not claimed in the present application, as this structure forms the subject-matter of a divisional application, filed on or about February 26, 1906, Serial No. 303,069.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine of the class described, the combination of a main frame, hoppers arranged at an angle, feed mechanism, flexible spouts or tubes, drag bars or beams having drilling devices and connected with the drag bars or tubes, and means for moving the drag bars or beams backward and forward for arranging them either in a straight line or in angular relation.

2. In a machine of the class described, the combination of opposite hoppers having feed mechanism provided with slides, operating-rods connected with the slides, and means for connecting the operating-rods for simultaneously actuating the same.

3. In a machine of the class described, the combination of opposite hoppers having feed mechanism provided with slides, operating-rods connected with the slides, and an adjusting-screw having right and left hand threaded portions connected with the operating-rods for simultaneously moving the same in opposite directions.

4. In a machine of the class described, the combination with a hopper, and a movable furrow-opener, of a flexible spout or tube composed of a plurality of short telescopic sections having a limited longitudinal movement, and means rigid with the sections for limiting the longitudinal movement to prevent the sections from becoming disconnected.

5. In a machine of the class described, the combination with a hopper, and a movable furrow-opener, of a flexible spout or tube composed of a plurality of telescopic sections having a limited longitudinal movement, and rigid connecting means for the sections to prevent their separation, said connecting means being arranged in spaced relation to permit a limited rotary movement of the sections.

6. In a machine of the class described, the combination with a hopper, and a movable furrow-opener, of a flexible spout or tube composed of a plurality of telescopic sec-

tions having an annular series of exterior connecting devices spaced apart to permit the sections to have a limited rotary movement.

7. In a machine of the class described, the combination of a hopper, a movable furrow-opener, a flexible spout or tube composed of a plurality of sections capable of a limited rotary and longitudinal movement on each other, and means for positively limiting the rotary and longitudinal movements of the sections.

8. In a machine of the class described, the combination of a hopper, a movable furrow-opener, a flexible spout or tube composed of a plurality of sections capable of a limited and longitudinal movement on each other, said sections also having a rocking movement, and means rigid with the sections for limiting the said movements.

9. In a machine of the class described, the combination of a hopper, a movable furrow-opener, and a flexible spout or tube composed of a plurality of tapering telescopic sections circular in cross-section, and separate means rigid with the upper ends of the sections and overlapping the contiguous sections, and engaging the same, for positively limiting the movement of the sections on each other.

10. In a machine of the class described, the combination of a hopper, a movable furrow-opener and a flexible spout or tube composed of a plurality of telescopic sections, each provided with a projecting flange and having substantially hook-shaped tongues engaging the flange of the adjacent section.

11. In a machine of the class described, the combination of a hopper, a movable furrow-opener, and a flexible spout or tube composed of a plurality of telescopic sections, each provided with a projecting flange and having substantially hook-shaped tongues engaging the flange of the adjacent section and having a limited lateral movement between the tongues thereof.

12. In a machine of the class described, the combination with a hopper, and a furrow-opener, of a flexible spout or tube composed of tapering telescopic sections circular in cross-section, each section being provided at the top with an annular flange and having depending substantially hook-shaped tongues arranged at intervals, the tongues of one section receiving the flange of the adjacent section and having a limited rotary movement between the tongues thereof.

13. In a machine of the class described, the combination of opposite hoppers arranged at an angle, feed mechanism having shafts arranged at an angle and provided with spaced gears, an intermediate gear meshing with the said gears, and gearing for communicating motion from the intermediate gear.

14. In a machine of the class described, the

- combination of a wheeled frame having a rotary axle, a plurality of hoppers arranged at an angle and provided with feed-shafts arranged at an angle, spaced gears mounted on the feed-shafts, intermediate gears meshing with the said gears, lower transverse shafts, and gearing for connecting the lower transverse shafts with the intermediate gears and with the axle.
15. In a machine of the class described, the combination of a wheeled frame having a rotary element, a plurality of hoppers, feed mechanism having feed-shafts, spaced gears mounted on the feed-shafts, intermediate gears meshing with the said gears, lower transverse shafts, separate gearing connecting the transverse shafts with the intermediate gears, and other gearing for connecting the transverse shafts with the axle.
16. In a machine of the class described, the combination of front, rear and intermediate hoppers having cups, the cups of the front hoppers being provided at the front with discharge-openings, and the cups of the other hoppers having discharge-openings at the back, feed mechanism provided with feed-shafts, lower front, intermediate and rear transverse shafts, gearing connecting the transverse shafts with the feed-shafts, sprocket-gears mounted on the axle and on

the intermediate and rear transverse shafts, a sprocket-chain arranged on the said sprocket-gears, and spur-gearing connecting the front and intermediate transverse shafts.

17. In a machine of the class described, the combination of front, rear and intermediate hoppers having cups, the cups of the front hoppers being provided at the front with discharge-openings, and the cups of the other hoppers having discharge-openings at the back, feed mechanism provided with feed-shafts, lower front, intermediate and rear transverse shafts, gearing connecting the transverse shafts with the feed-shafts, sprocket-wheels having gears of different diameters and arranged on the axle and on the intermediate and rear transverse shafts, and a sprocket-chain arranged on the sprocket-wheels and adapted to be changed from one set of gears to another, and spur-gearing connecting the front and intermediate transverse shafts.

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

JACOB HENRY ULLRICK.

Witnesses:

THOS. E. HUGHES,
ERNEST C. HARLAN.