No. 676,076. Patented June 11, 1901.

F. J. NOECHEL.

GRAIN DRILL.

(Application filed May 2, 1900.)

(No Model.) 6 Sheets—Sheet 1.

Fig. 1.

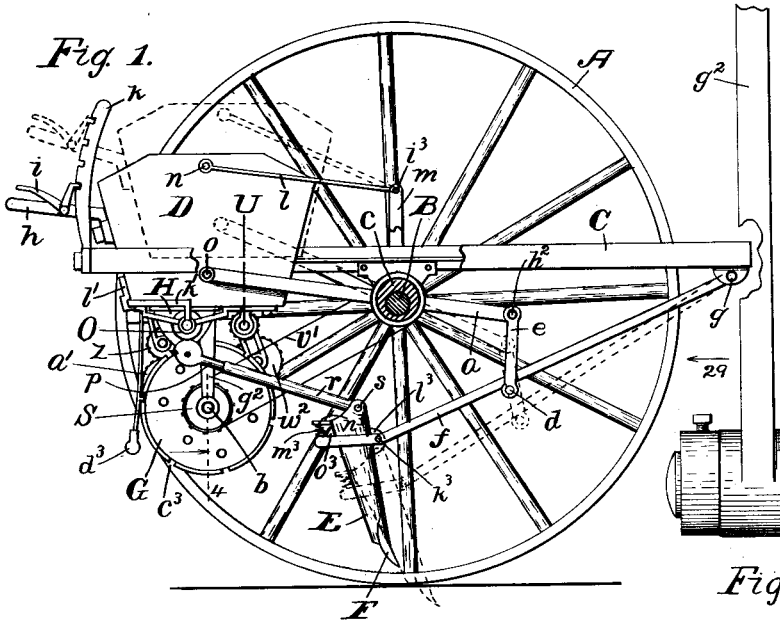


Fig. 3.

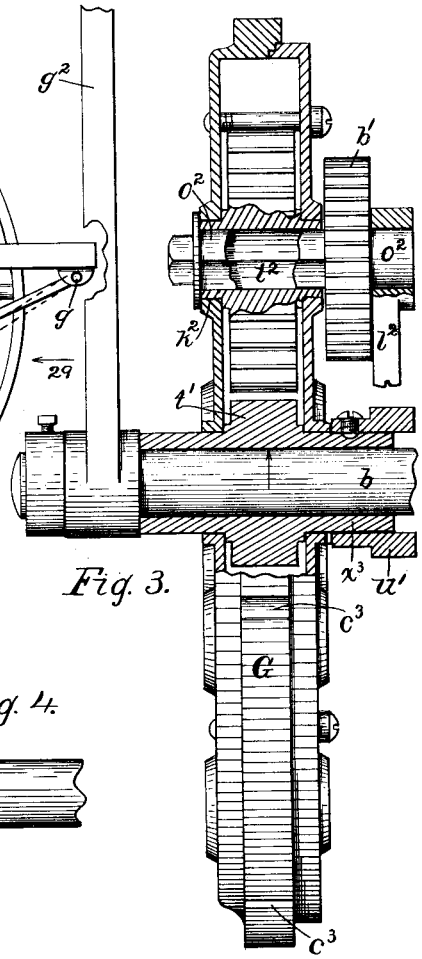


Fig. 4.

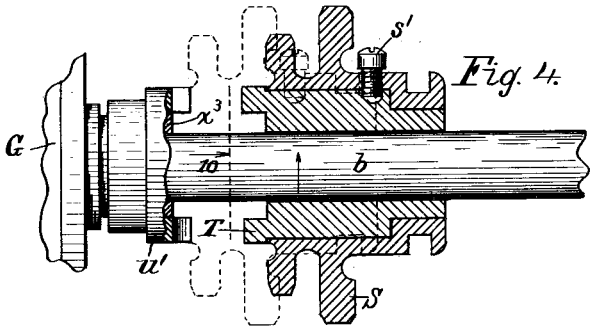
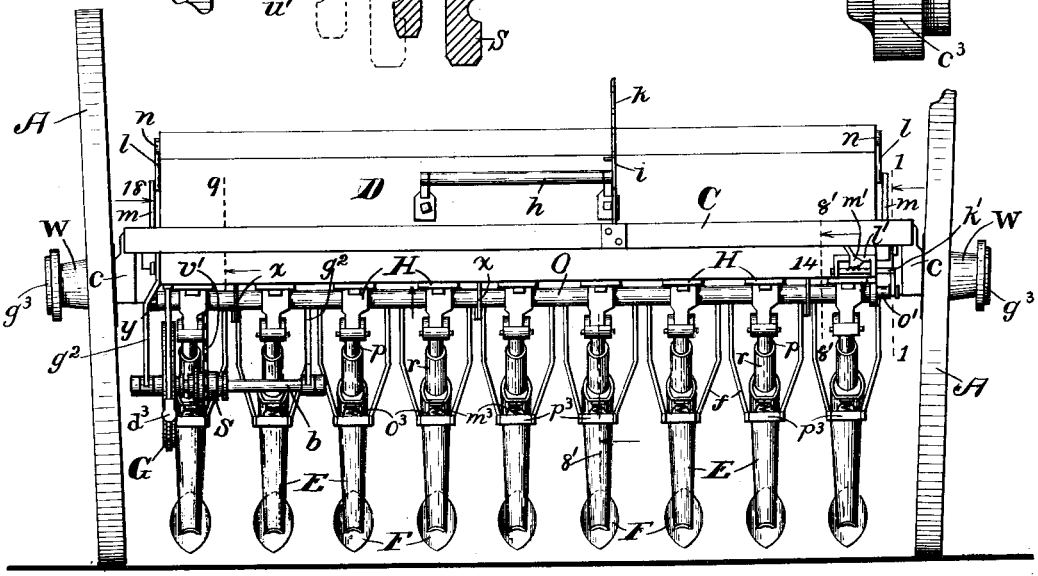


Fig. 2.



Attest:
M. L. Irwinston.
L. M. Shepard.

Inventor:
F. J. Noechel,
By C. B. Whitmore, Atty.

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F. J. NOECHEL.

GRAIN DRILL.

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(No Model.) 6 Sheets—Sheet 2.

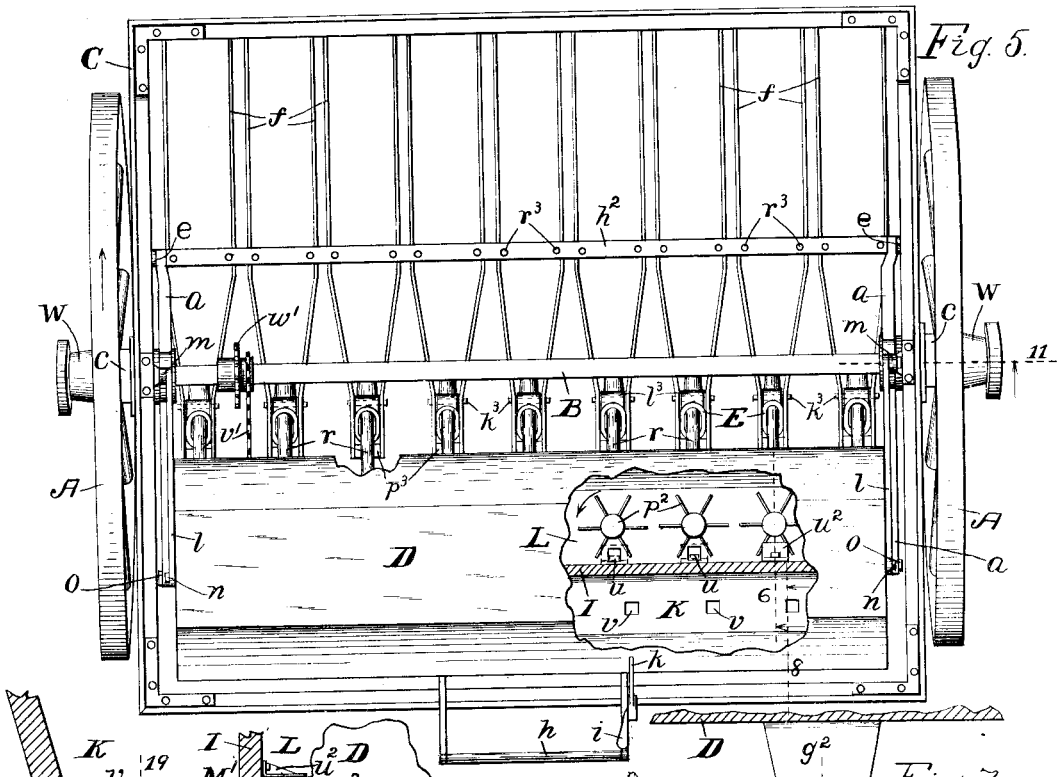

Fig. 5.

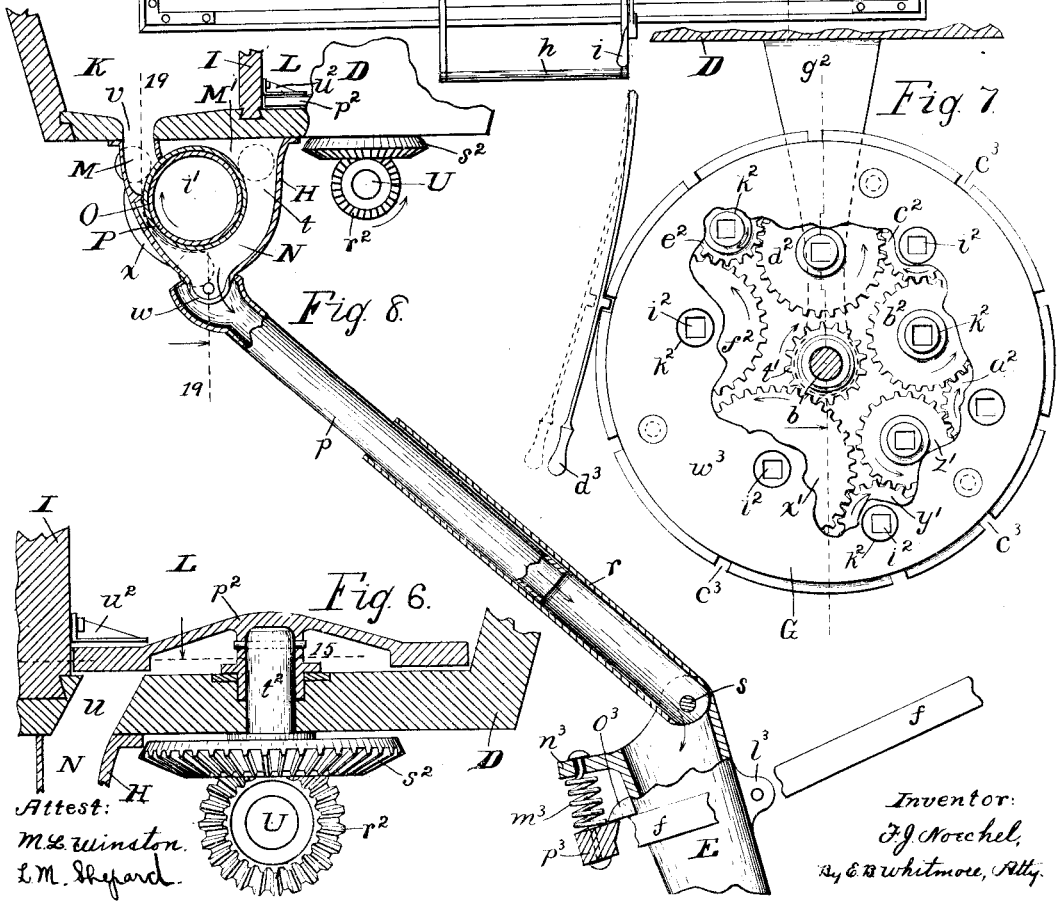

Fig. 7.

Fig. 8.

Fig. 6.

Attest:
M. L. Winston.
L. M. Shepard.

Inventor:
F. J. Noechel,
By E. B. Whitmore, Atty.

No. 676,076. Patented June 11, 1901.

F. J. NOECHEL.

GRAIN DRILL.

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(No Model.) 6 Sheets—Sheet 3.

Fig. 11

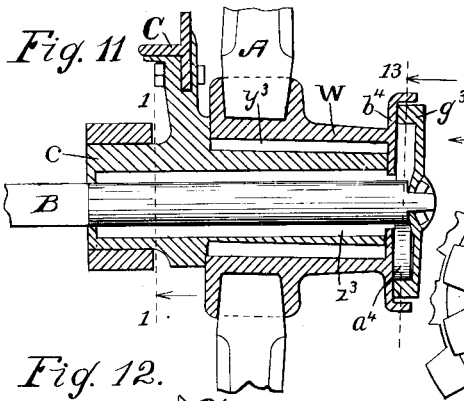


Fig. 9.

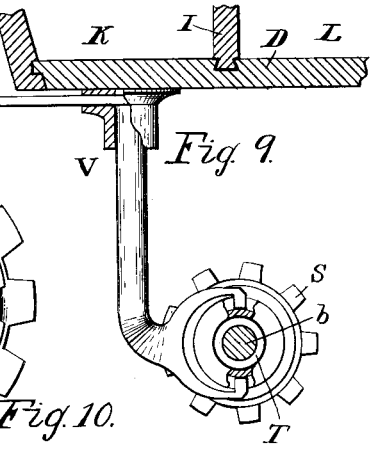
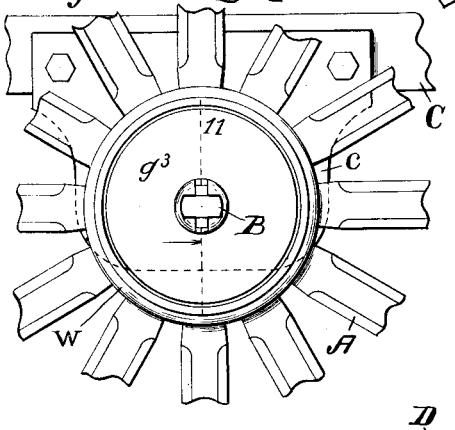


Fig. 12.



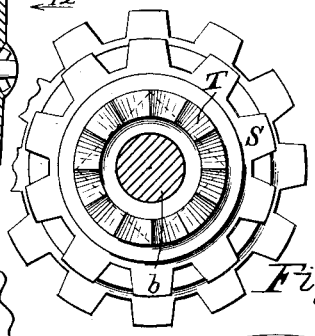


Fig. 10.

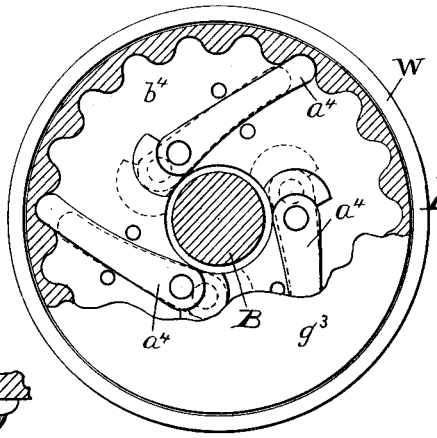


Fig. 13.

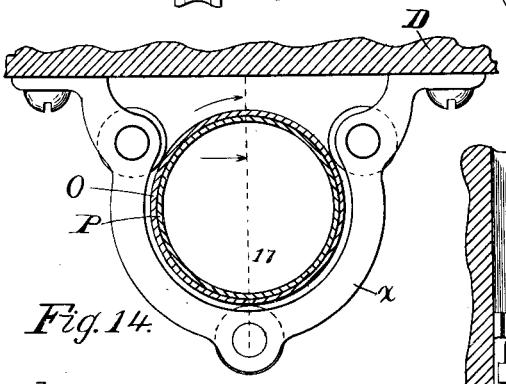


Fig. 14.

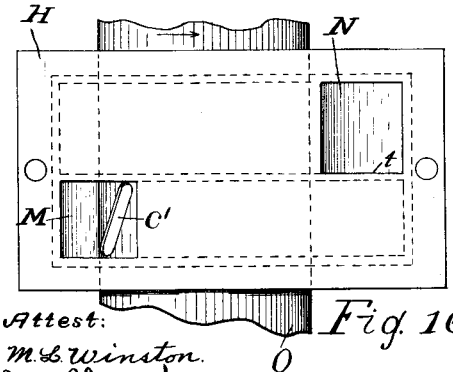


Fig. 16.

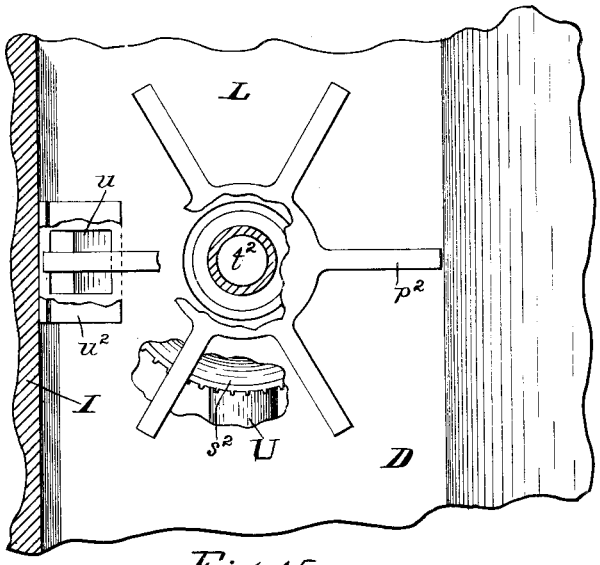


Fig. 15.

Attest:
M. L. Winston.
D. M. Shepard.

Inventor:
F. J. Noechel,
By E. B. Whitmore, Atty.

No. 676,076.

Patented June 11, 1901.

F. J. NOECHEL.

GRAIN DRILL.

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(No Model.)

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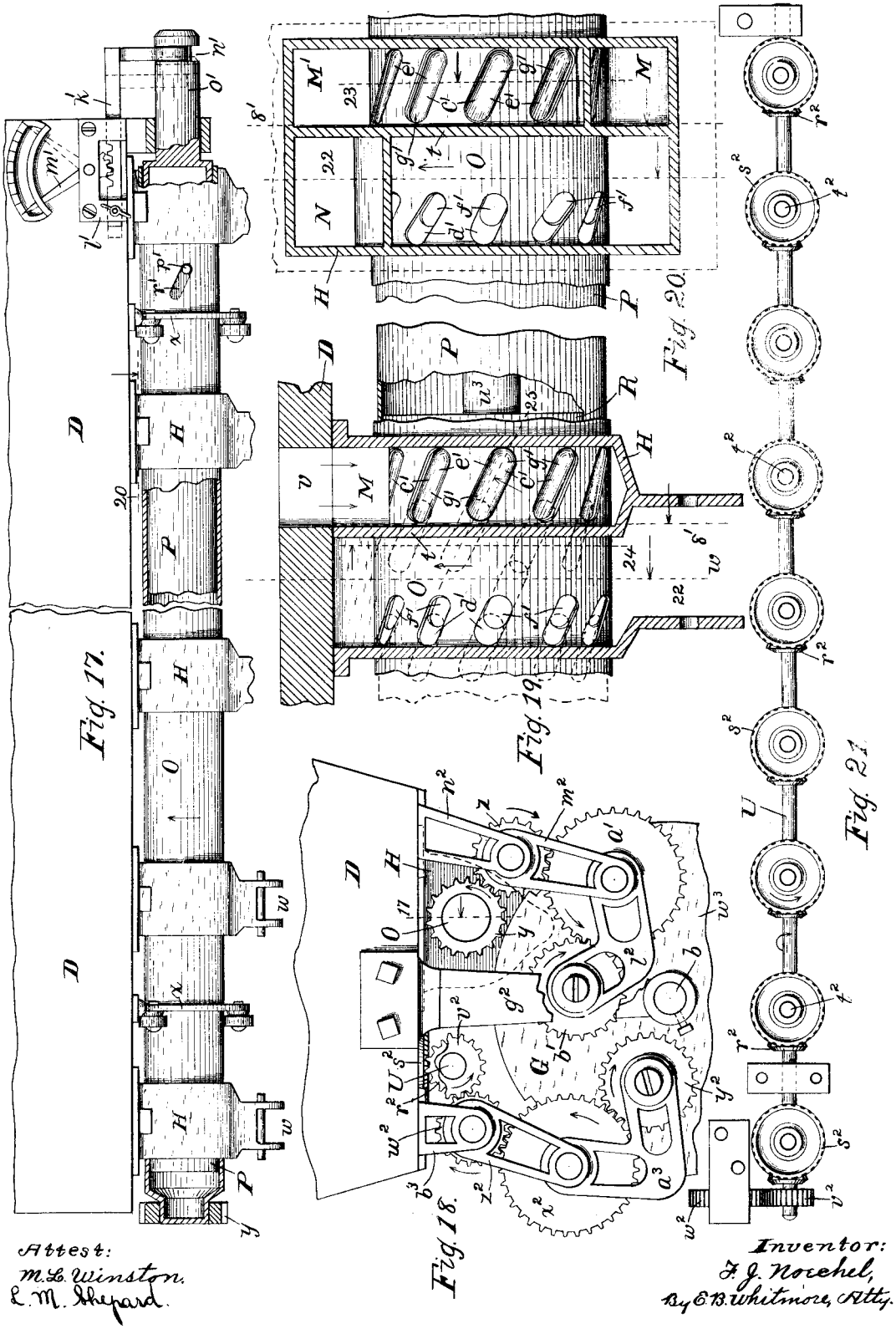

Fig. 17.

Fig. 20.

Fig. 19.

Fig. 21.

Fig. 18.

Attest:
M. L. Winston.
L. M. Shepard.

Inventor:
F. J. Noechel,
By E. B. Whitmore, Atty.

No. 676,076.

Patented June 11, 1901.

F. J. NOECHEL.

GRAIN DRILL.

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(No Model.)

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Fig. 22.

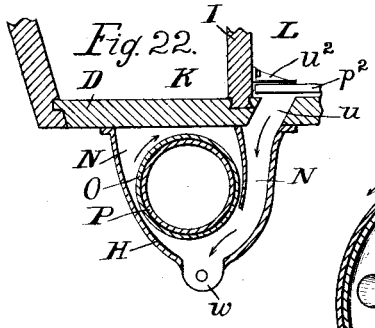


Fig. 24.

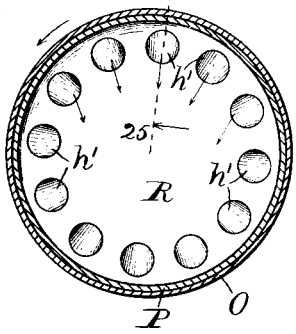


Fig. 23.

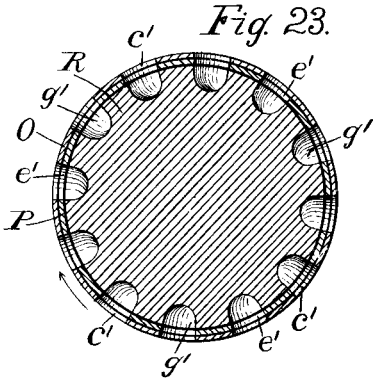


Fig. 25.

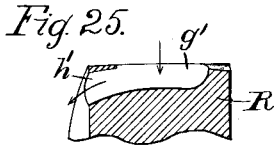


Fig. 26.

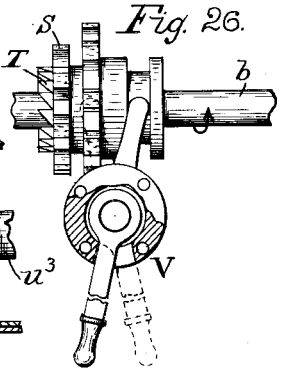


Fig. 27.

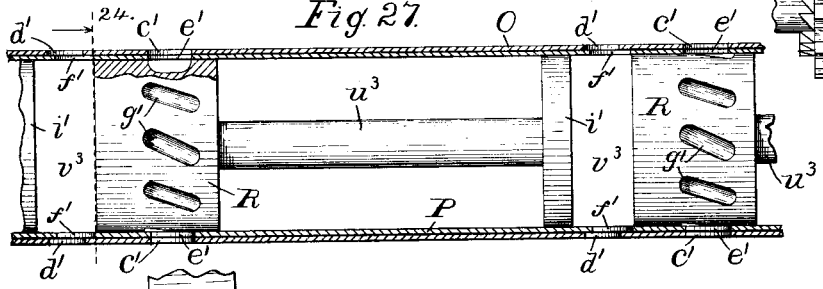
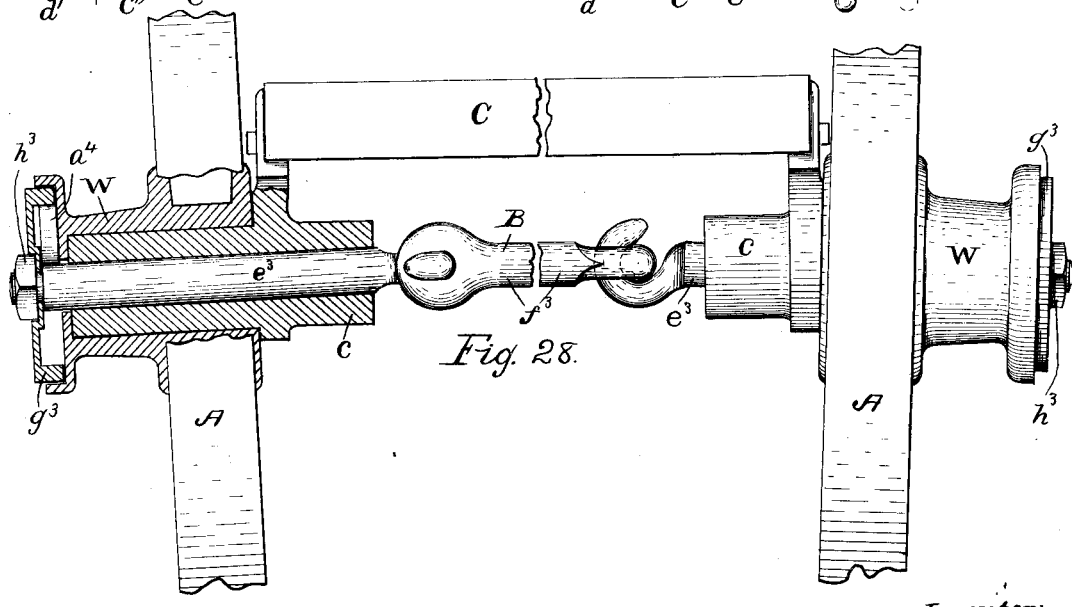


Fig. 28.



Attest:

M. L. Winston.

L. M. Shepard.

Inventor:

F. J. Noechel,

By E. B. Whitmore,

Atty.

No. 676,076. Patented June 11, 1901.

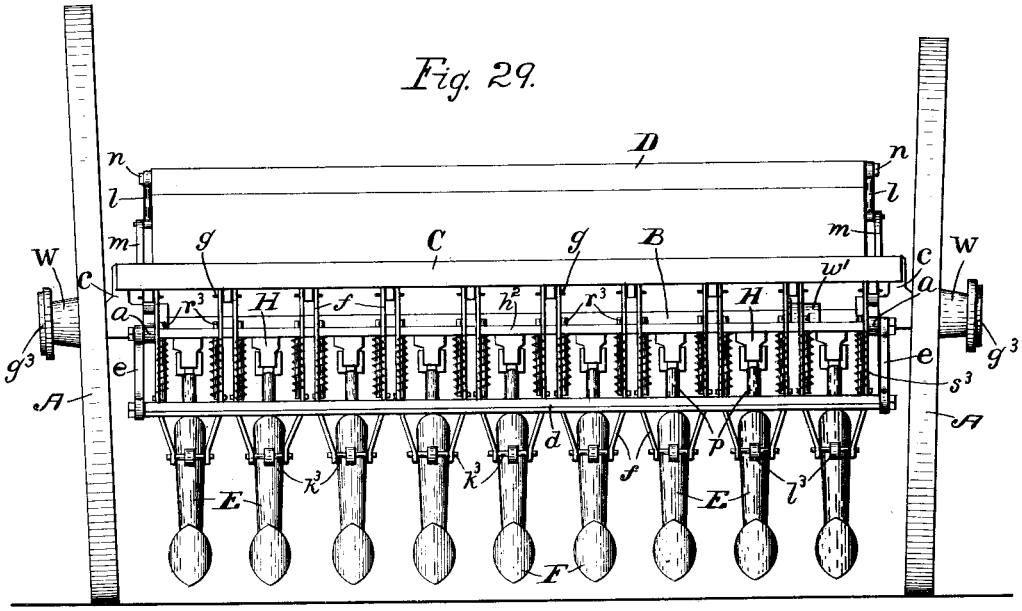
F. J. NOECHEL.

GRAIN DRILL.

(Application filed May 2, 1900.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 29.



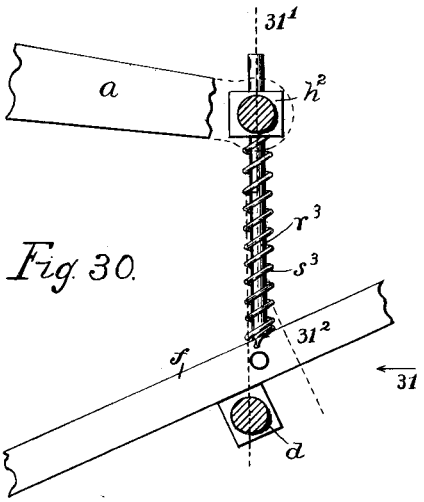


Fig. 30.

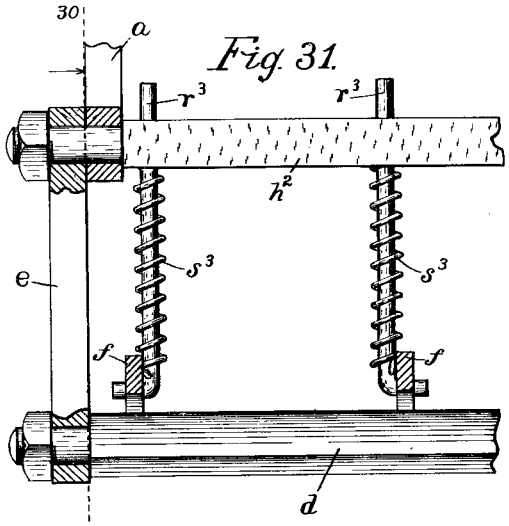


Fig. 31.

Attest:
M. L. Winston.
Le. M. Shepard.

Inventor:
F. J. Noechel,
by E. B. Whitmore, Atty.

UNITED STATES PATENT OFFICE.

FRANK J. NOECHEL, OF ROCHESTER, NEW YORK.

GRAIN-DRILL.

SPECIFICATION forming part of Letters Patent No. 676,076, dated June 11, 1901.

Application filed May 2, 1900. Serial No. 15,218. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. NOECHEL, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Grain-Drills, which improvement is fully set forth in the following specification and shown in the accompanying drawings.

My invention is a grain-drill comprising various improved parts and devices, all hereinafter fully described, and more particularly pointed out in the claims.

The advantages and improvements in the device will be brought out in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is an end elevation of the machine, some parts being omitted and other parts shown in two positions by full and dotted lines, parts at one end of the axle being transversely sectioned, as on the dotted line 1 1 in Figs. 2 and 11. Fig. 2 is a rear elevation of the machine with some minor parts omitted. Fig. 3 is an elevation of the speed device for the feed mechanism, partly in longitudinal section, the section being on the dotted line 4 in Fig. 1. Fig. 4 is a longitudinal section of the sprocket-wheel and clutch of the speed device, taken on the dotted line 4 in Fig. 1, a part being shown in two positions by full and dotted lines. Fig. 5 is a plan of the machine with parts of the grain-box broken away. Fig. 6 is a transverse section of a part of the grain-box and some associated parts, taken on the dotted line 6 in Fig. 5. Fig. 7 is a side elevation of the speed device for the feed mechanism, parts being broken away. Fig. 8 is a transverse section of a part of the grain-box and associated parts, taken on the dotted line 8 in Fig. 5, the conducting-tube and associated parts being longitudinally sectioned, as on the dotted line 8′ in Fig. 2. Fig. 9 is a transverse section of a part of the grain-box and associated parts, taken on the dotted line 9 in Fig. 2, showing the shifter for the clutch, parts being broken away. Fig. 10 is an end view of the sprocket-clutch seen as indicated by arrow 10 in Fig. 4, the counter-shaft being transversely sectioned on the dotted line at the point of the arrow. Fig. 11 is a longitudinal section of a spindle and associated parts, taken on the dotted lines 11 in Figs. 5 and 12. Fig. 12 is an end view of a hub, with associated parts, seen as indicated by arrow 12 in Fig. 11. Fig. 13 is a transverse section of parts at the end of the hub, taken on the dotted line 13 in Fig. 11, parts being shown in two positions by full and dotted lines. Fig. 14 is a transverse section of the feed-cups, taken on the dotted line 14 in Fig. 2, showing a holder for the cups. Fig. 15 is a plan of a part at the bottom of the grain or fertilizer box, showing an agitator and other parts, parts being broken away and other parts horizontally sectioned on the dotted line 15 in Fig. 6. Fig. 16 is a plan of a feed pocket or cup and tubes. Fig. 17 is a rear view of parts of the machine, showing feed-pockets and feed-tubes, with associated parts, parts being longitudinally sectioned, as on the dotted line 17 in Fig. 14, parts being shown in two positions by full and dotted lines. Fig. 18 is an elevation of parts at the left end of the grain-box seen as indicated by arrow in Fig. 2, parts being broken away and omitted. Fig. 19 is a vertical section of a feed pocket or cup, taken on the broken dotted line 19 19 in Fig. 8, with adjacent portions of the feed-tubes, parts being broken away and other parts shown in two positions by full and dotted lines. Fig. 20 is a horizontal section of a feed pocket or cup, taken on the dotted line 20 in Fig. 17, showing the grain and fertilizer passages and parts of the feed-tubes. Fig. 21 is a plan of the series of bevel-gears for operating the fertilizer-agitators beneath the grain-box. Fig. 22 is a cross-section of a part of the grain box and cup beneath, taken on the dotted line 22 in Fig. 19. Fig. 23 is a cross-section of the feed-cups and a core-piece on the dotted line 23 in Fig. 20. Fig. 24 is a cross-section of the feed-cups at the end of a core-piece, taken on the dotted lines 24 in Figs. 19 and 27. Fig. 25 is a longitudinal section of a part of a core-piece on the dotted line 25 in Fig. 24, showing one of the inward passages and cavities for the grain. Fig. 26 is a plan of the clutch-shifter and clutch seen as indicated by arrow 26 in Fig. 9, parts being broken away and other parts shown in two positions by full and dotted lines. Fig. 27 is a longitudinal section of a portion of the feed-cups, showing parts of the core-pieces in place therein. Fig. 28

shows a modification of the form of the driving-axle, parts being longitudinally and axially sectioned and other parts broken away. Fig. 29 is a front view of the machine seen as indicated by arrow 29 in Fig. 1, parts being omitted. Fig. 30 is a side elevation of a portion of a balance-lever, carrying-rod, and some associated parts, parts being broken away and other parts vertically sectioned, as on the dotted line 30 in Fig. 31. Fig. 31 is a front elevation of parts of the lifting mechanism for the hoes or drill-teeth seen as indicated by arrow 31 in Fig. 30, parts being sectioned, as on the dotted lines 31′ and 31^2, respectively, in Fig. 30. Figs. 1, 2, 5, and 29 are drawn to a scale about one-twelfth size; Fig. 21, to a scale one-sixth size; Figs. 7, 8, 9, 11, 12, 17, 22, 26, and 28, to a scale one-fourth size; Figs. 30 and 31, to a scale one-third size; Figs. 3, 4, 6, 10, 13 to 16, and 27, to a scale one-half size, and Figs. 19, 20, and 23 to 25 to a scale three-fourths size.

Referring to the parts shown, A A, Figs. 1, 5, and 11, are the carrying-wheels for the device, and B the axle or main shaft.

C is the frame of the machine, and D the grain-box.

c c are a pair of spindles rigid with and projecting from the frame C for holding the carrying-wheels A A.

E, Figs. 1, 2, 5, and 8, is a series of hoes or drill-teeth for engaging the ground, each being provided at its lower end with a shoe F.

G, Figs. 1, 2, 3, 7, and 18, is a speed device for the feed mechanism held beneath the grain-box upon a counter-shaft *b*, supported by hangers g^2 g^2.

H, Figs. 1, 2, 8, 16 to 20, and 22, represents a series of funnels or feed pockets or cups secured beneath the grain-box, pierced by a horizontal cylinder O to control the outward flow of grain from the grain-box.

The grain box or hopper D is mounted upon carrying arms or levers *a a*, Figs. 1, 5, and 11, one pivotally connected at either end, said levers crossing the axle and having fulcrum-bearings upon the spindles *c c*. These levers extend forward of the axle, holding at their forward ends a horizontal bar h^2, from which depends a second horizontal bar *d*, Figs. 29 to 31, by means of pendent connectors *e e*.

The hoes or drill-teeth E are each provided with a pair of carrying-rods *f f*, Figs. 1 and 5, pivoted to the frame at *g*. A drill-tooth is between the two rods of a pair, and each pair, with its hoe or drill-tooth, is at liberty to swing upward or downward independently of the others. These rods *f* cross and rest upon the bar *d*, which when the hoes or drill-teeth are lifted out of use supports their weight. Thus the grain-box at one end of the tilting levers *a a* acts to balance the series of hoes held at the opposite ends of the levers, either moving upward as the other moves downward. The grain-box is operated by means of a handle *h*, Figs. 1, 2, and 5, provided with a catch-dog *i*, engaging a ratchet *k*, rigid with the frame C, to hold the grain-box in different positions of elevation. At each end of the box is pivotally connected at *n* a carrying-arm *l*, the two reaching forward and held at their front ends at i^3 i^3 pivotally on studs *m m*, rising from the frame C. The arms *l l* are vertically over the respective tilting levers *a a* and parallel therewith, the connections *n n* being vertically over the connections *o o*. The connections i^3 i^3 are vertically over the axle B, so that the connections *k n* i^3 at either end of the box and the adjacent axial point of a tilting lever *a* are respectively at the four angles of a parallelogram. This causes the grain-box to be maintained horizontally in all of its positions of elevation. The grain-box in its lowest position, Fig. 1, corresponds with the hoes or drill-teeth lifted completely away from the ground and is at its upper position when the hoes or drill-teeth engage the ground.

The hoes or drill-teeth E are connected with the various pairs of carrying-rods *f* by pins k^3, Figs. 1 and 29, passing horizontally through lugs l^3 of the hoes, the latter being adapted to tilt or turn on the pins. From a pin k^3 each pair of rods *f* extends horizontally backward past the hoe or drill-tooth, being provided in rear of the hoe or drill-tooth with a tie-piece p^3, holding a spring m^3, Figs. 1 and 2, joined to a ledge n^3 of the hoe or drill-tooth. The action of each spring is a pull, and it tends to hold the point of the hoe or drill-tooth forward, with the lug o^3 bearing down against said tie-piece. If the point of a hoe or drill-tooth should at any time be unduly pressed by encountering an obstacle, as a stone, the spring permits the hoe or drill-tooth to temporarily yield backward at the point until the obstruction is passed.

As shown in Figs. 29 to 31, the carrying-rods *f* for the hoes or drill-teeth are provided with stems r^3, extending upward freely through openings in the bar h^2, each rod being provided with a spring s^3 pressing said bar. By means of these stems and springs either hoe or drill-tooth may be lifted or pushed upward by a pressure against the point independent of the other hoes or drill-teeth, the actions of the springs being to hold the hoes or drill-teeth downward to their work, with the rods *f* normally pressing the upper side of the bar *d*, as shown. Thus while the smaller springs m^3 permit the hoes or drill-teeth to pass over small obstructions, as above described, the yielding of the larger springs s^3 allows the hoes or drill-teeth to be each bodily lifted out of and far above the surface of the ground, if need be, to enable them to pass over greater obstacles.

The grain-box D is formed with the usual longitudinal partition I, Figs. 5, 6, 8, 15, and 22, dividing its interior into apartments K L, one for holding the seed-grain and the other for holding a fertilizer. Openings *u* are

formed through the floor of the apartment L for the fertilizer to pass out and other openings v, Figs. 5, 8, and 19, through the floor of the apartment K for the grain to escape, the escaping fertilizer and grain dropping into feed cups or funnels H. These funnels are arranged and equally spaced beneath the grain-box, there being one over and associated with each of the hoes E. Each funnel is reduced at its lower end, where it is formed with an outlet-opening w and pivotally connected with a tube p, Figs. 1 and 8, down through which the grain and the fertilizer flow, through the hoes or drill-teeth, to the ground. The tubes p telescope within larger tubes r, the lower ends of the latter being pivotally connected at s with the respective hoes E. Now as the grain-box is raised or lowered, as above described, varying the distance between the funnels and the hoes, the tubes slide upon each other, maintaining at all times continuous passages for the grain and fertilizer from the funnels to the hoes. Fig. 8 shows the parts when the grain-box is elevated and the telescoping tubes partially drawn apart.

The outflow-orifices u v in the floor of the grain-box are formed in parallel longitudinal rows, as shown in Figs. 5 and 6, one orifice of each row being covered or inclosed beneath the floor by a funnel H. Each funnel is formed internally with a short channel or passage M, Figs. 8, 16, 19, and 20, communicating between an opening v and the perforated surface of the cylinder O, said passage being partitioned off from the main interior M′ of the funnel. A passage N, Figs. 6, 16, 20, and 22, is also formed in each funnel for the fertilizer, communicating between an opening u and the lower part of the funnel. The funnels are further preferably formed with transverse partitions t to prevent the fertilizer from passing into and clogging up the openings in the feed-tube O. This tube, Figs. 1, 2, 8, 14, 16 to 20, and 22 to 24, which is revolved by means described farther on, passing through the line of cups H, is supported by roller-hangers x, secured to the grain-box. It is pierced by numerous semispiral openings c', Figs. 16, 23, and 27, extending around the tube in rows, a row of these openings being opposite each passage M of the funnels, on account of which grain flowing into the passages M from the grain-box may pass into the interior of the tube. The tube O is further formed with other rows of semispiral openings d' within the funnels H.

Within the tube O is fitted a smaller tube P, Figs. 8, 14, 17, 19, 20, and 22 to 24, formed with rows of openings e' and f', corresponding, respectively, with the openings c' and d' in the tube O. On account of this, grain passing through the openings c' may also pass through the opposing openings e' into the interior of the inner tube and so pass out of the latter through the openings d' and f'—that is to say, seed-grain falling from the grain-box into the funnels may pass through the feed-tubes O P, thence into the conducting-tubes p r, and to the ground. Within the tube P is placed a series of closely-fitting cylindrical blocks or core-pieces R, Figs. 19, 23 to 25, and 27, formed with semispiral openings or pockets g', corresponding with and adjacent to the inflow-openings e' in said tube. These pockets terminate in passages h' in a manner to direct the flowing grain toward the outlet-openings d' f'. The core-pieces are rigid with the tube P, each being formed with a partition or diaphragm i' at the end of a connecting-stem u^3. Each core-piece R has its perforated end adjacent to a row or series of outflow-openings f' d', as shown, and a diaphragm i' is adjacent to said row of openings on the opposite side, inclosing between them a space v^3, in which to receive the outflowing grain and hold it adjacent to said openings. As the pockets g' of each series in the respective core-pieces successively pass the respective passages M in the funnels they take up the grain held in said passages and deliver it in jets into the spaces v^3 as the tubes O P are rotated.

The inner tube P is adapted to be adjusted endwise in the tube O for the purpose of varying the size of the inflow-openings c' for the grain to adapt them to different kinds or sizes of grain and for the purpose of controlling the amount of seed sowed to the acre. This adjustment of the inner tube is effected by means of a bent arm k', Figs. 1, 2, and 17, held movably in a rest l', secured to the grain-box. The upper side of the arm is formed with teeth engaged by a toothed lever m', by means of which the arm is moved endwise, its outer end engaging with the sides of a groove n' in an extended part O′ of said tube. By moving the tube P to the left, as appears in Figs. 17, 19, and 20, the openings c' are reduced, thus lessening the amount of grain passed through them, and by moving the tube sufficiently to the left the openings may be closed altogether—as, for instance, when moving the machine from place to place about the farm. When the inner tube P is moved in the outer tube, it slightly turns on its axis, having a semispiral motion to correspond with the semispiral form of the openings through the tubes. This motion of the inner tube is effected by means of a pin p', Fig. 17, rigid with the tube P, traversing an inclined slot r' in the outer tube O.

The feed tube or cylinder O is provided with a pinion y, Figs. 17 and 18, at one end and revolved by means including a train of gears z a' b', associated with the speed device G. Upon the counter-shaft b, Figs. 1 to 4, 7, 9, and 10, is placed a sprocket S, secured by a fastener s' to a sliding clutch-section T. Within the drum w^3 of the speed-regulator G is placed a pinion t' upon the shaft b, having a hub x', extending outward from the drum, upon one end of which is secured a clutch-section u', adapted to be engaged by the sec-

tion T. Upon the sprocket S is placed a chain v', Figs. 1 and 5, leading from a corresponding driving-sprocket w' on the axle B, by means of which the clutch S is caused to rotate.

V, Figs. 9 and 26, is a shifter, of ordinary construction, for the clutch T, secured to the grain-box D. When the clutch-sections T and u' are brought into engagement by the shifter V, the pinion t' is caused to turn by the action of the axle B. Within the drum w^3 of the speed device is a train of internal gears x', y', z', a^2, b^2, c^2, d^2, e^2, and f^2, Fig. 7, turned in the order named by the central pinion t' engaging the first gear x'. These gears, except as to the driving-pinion t', are formed with central square openings i^2, Figs. 3 and 7, the gears turning on end bearings k^2 in the sides of the drum.

The train of gears b', a', and z, Fig. 18, engaging the pinion y of the feed-tube, is controlled by links l^2 and m^2, connected with a hanger n^2, rigid with the seedbox D, the links being pivotally connected at their ends. The link l^2 holds the shaft o^2, Fig. 3, of the gear b', said shaft at one side of the gear being made square and adapted to occupy a square opening in a gear in the inclosed train, as d^2, Figs. 3 and 7. By this means the feed-tube O is rotated from the counter-shaft b, or primarily from the axle B. Similarly the agitators p^2, Figs. 5, 6, and 15, for the fertilizer are made to rotate from the axle B. A shaft U, Figs. 1, 6, 8, 18, and 21, is secured longitudinally beneath the grain-box and provided with a series of bevel-pinions r^2, engaging gears s^2, having short shafts t^2, extending upward through the bottom of the grain-box, as shown. At the upper ends of the shafts t^2 and within the box the agitators p^2 are secured in positions to revolve in a horizontal plane, just clearing the floor of the grain-box. The arms of the agitators pass across covered openings u, each passing arm serving to sweep a charge of the fertilizing material down the opening into the funnel H below, the arms passing under ledges u^2, covering the respective openings. The shaft U is provided with a pinion v^2, Figs. 18 and 21, engaged by a gear w^2, which in turn is engaged by a gear x^2, driven by a gear y^2. The latter gear is provided with a square shaft, like the shaft o^2 of the gear b', already described, which, occupying a driving-gear, as f^2, Fig. 7, in the drum w^3, is caused to turn by said driving-gear, and thus rotate the agitators. The gears x^2 y^2 are controlled by jointed links z^2 and a^3, connected with a rigid hanger b^3 of the grain-box.

It will be observed by viewing Fig. 7 that the gears of the train within the speed device have different diameters, so that by shifting the shaft o^2 of the gear b' and the corresponding shaft of the gear y^2 from one gear to another the speed at which the feed-tube O and the shaft U rotate may be varied to control the amount of grain and fertilizer delivered to the ground per acre. The faster the feed-tube and the agitators p^2 revolve the greater will be the delivery of the seed and the fertilizer to the ground. The speed device G is adapted to be turned upon its bearings upon the pinion t', Figs. 3 and 7. It is formed with peripheral notches c^3, there being a detent-lever d^3 secured to the grain-box D in position to engage with said notches to hold the speed device in different positions of adjustment. By turning it to different positions different internal gears are brought into positions to engage the shafts of the external driving-gears b' and y^2 for the purpose of giving the feed-tube and the agitators the required rates of speed.

As shown in Figs. 5, 11, and 29, the axle B is straight and in a single piece, the hubs W of the wheels having inclined bearings upon the spindles c, which may be supplied with rollers in the spaces y^3. The axle and the spindles are horizontal, with their axes coinciding, and the bearings of the spindles and axle may involve rollers in the spaces z^3. The heads b^4 of the hubs of the wheels are provided with dogs a^4, Fig. 13, which engage corrugations of the circular plates g^3, secured to the ends of the axle in a manner to move thereon, but to turn with the axle. As the machine moves forward, the dogs, acting by gravity, engage the plates g^3, and so revolve the axle. A backward movement of the machine causes the dogs to release the plates and the axle does not turn. On account of the heads b^4 of the hubs being inclined to the axle the plates g^3 have universal rocking motions upon their seats upon the axle as the machine moves along. I prefer, however, to make the axle B in sections, as shown in Fig. 28, and join the parts so as to have universal motions upon each other—that is to say, I make the sections e^3 e^3 of the axle, occupying the spindles c c, separate and join them to the middle section f^3 near the inner ends of the spindles. In this construction the spindles are inclined, their axes coinciding with the axes of the hubs and the axle-sections e^3 e^3, the section f^3 being always horizontal. In this form of the parts there is no motion of the plates g^3 g^3 upon the axle, said plates being secured rigidly to the axle by screw-nuts h^3, as shown.

The features herein shown and described but not claimed are made the basis of separate applications filed by me March 1, 1901, Serial No. 49,482, and April 6, 1901, Serial No. 54,617.

What I claim as my invention is—

1. A grain-drill having an axle, a seedbox and a series of hoes or teeth, in combination with a pair of balance-levers crossing the axle, the seedbox and the hoes being supported respectively at the opposite ends of said levers, substantially as shown and described.

2. A grain-drill having a seedbox and a series of hoes or teeth, and mechanism comprising a pair of balance-levers, for connecting said seedbox and the hoes, whereby the weight

of the seedbox acts to balance the combined weight of the hoes, substantially as described.

3. A grain-drill having a seedbox, and a series of hoes or teeth, and mechanism comprising a pair of levers of the first order, for connecting the seedbox and the hoes, said seedbox and hoes being adapted to occupy various positions of elevation, and to move simultaneously in contrary directions, and means to hold the seedbox in its different positions of elevation, substantially as shown and described.

4. A grain-drill having an axle, a seedbox and a series of hoes or teeth, in combination with a series of carrying-rods for the hoes, and tilting balance-levers crossing the axle, the seedbox being connected with one end each of said levers, and the carrying-rods connected with the opposite ends of the levers, substantially as shown and described.

5. A grain-drill having a frame, a seedbox and a series of hoes or teeth, and a pair of spindles held by the frame, in combination with a series of carrying-rods for the hoes, and levers fulcrumed on said spindles, the seedbox and the hoes being connected with said levers on opposite sides of said spindles, substantially as specified.

6. A grain-drill comprising a seedbox, an axle and a series of hoes or teeth, in combination with a pair of levers connected with the seedbox and crossing the axle, a bar h^2 held by said levers opposite the seedbox, a bar suspended from said bar h^2 and a series of carrying-rods for the hoes, resting upon said suspended bar, substantially as shown and set forth.

7. A grain-drill comprising a seedbox, an axle and a series of hoes or teeth, in combination with a pair of levers connected with the seedbox and crossing the axle, a bar held by said levers opposite the seedbox, and a series of carrying-rods for the hoes, and a supporting-bar beneath the carrying-rods, the latter being held against said supporting-bar by spring action, substantially as described.

8. A grain-drill comprising a seedbox, an axle and a series of hoes or teeth, in combination with a pair of levers joined to the seedbox and crossing the axle, a bar held by said levers, and a series of pivotal carrying-rods, in pairs, for the hoes, adapted to swing independently in vertical directions, and a support for the carrying-rods, substantially as shown and described.

9. A device such as described, comprising a seedbox, a pair of levers, and a series of hoes or teeth, in combination with a series of carrying-rods in pairs, for the hoes, the seedbox and the hoes being supported from the opposite ends of said levers, substantially as and for the purpose specified.

10. A device such as described, comprising an axle, a seedbox and a series of hoes or teeth, a pair of tilting levers crossing the axle, joined at one end of each to the seedbox, a bar h^2 held at the opposite ends of said levers, suspenders on said bar, a second bar carried by the suspenders, a series of carrying-rods for the hoes resting upon said suspended bar, a series of vertical stems one connected with each of said carrying-rods, and occupying an opening in said bar h^2 and adapted to move therein, and springs on said stems, as and for the purpose specified.

11. In a device such as described, a frame, a series of tiltable hoes or teeth, and a series of carrying-rods, in pairs, for the hoes, pivotally connected with the frame, and a spring acting between each of said hoes and its pair of carrying-rods, substantially as described.

12. In a machine such as described, a frame, a seedbox and an axle, in combination with a pair of carrying-arms at each end of the seedbox and pivotally connected therewith, the arms of each pair being one over the other, the two lower arms being pivoted about the axle and the upper arms pivoted in rests over the axle, the four bearings of the two arms at either end of the seedbox being at the angles of a parallelogram, substantially as shown and described.

13. A grain-drill having a frame, a seedbox and an axle, in combination with four carrying-arms forming two pairs one at either end of the seedbox and pivotally connected therewith, the arms of each pair being one over the other, the two lower arms being adapted to turn about the axle as centers of motion, and pivotal rests for the free ends of the upper arms, the four bearings for the arms corresponding with the angles of a parallelogram, and the lower arms extending beyond the axle, substantially as shown and described.

In witness whereof I have hereunto set my hand, this 30th day of April, 1900, in the presence of two subscribing witnesses.

FRANK J. NOECHEL.

Witnesses:
ENOS B. WHITMORE,
M. L. WINSTON.