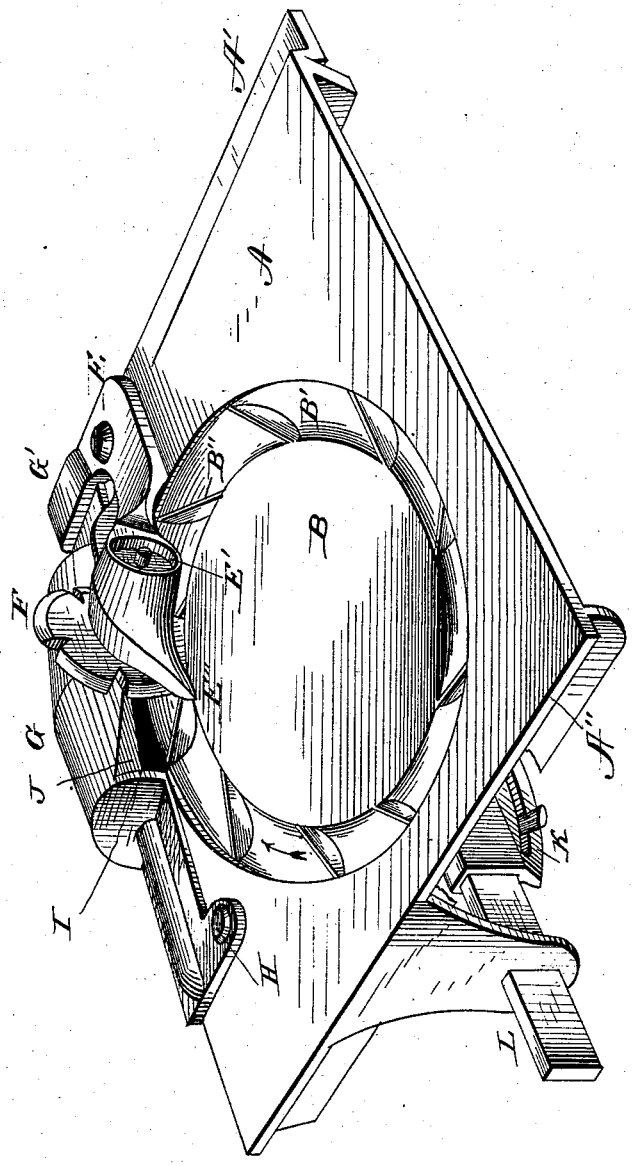
(Model.) 5 Sheets—Sheet 1.

J. W. SPANGLER.

FERTILIZER DISTRIBUTER.

No. 261,569. Patented July 25, 1882.

Fig. 1.



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Wm. N. Finckel

(Model.)

5 Sheets—Sheet 2.

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Fig. 2.

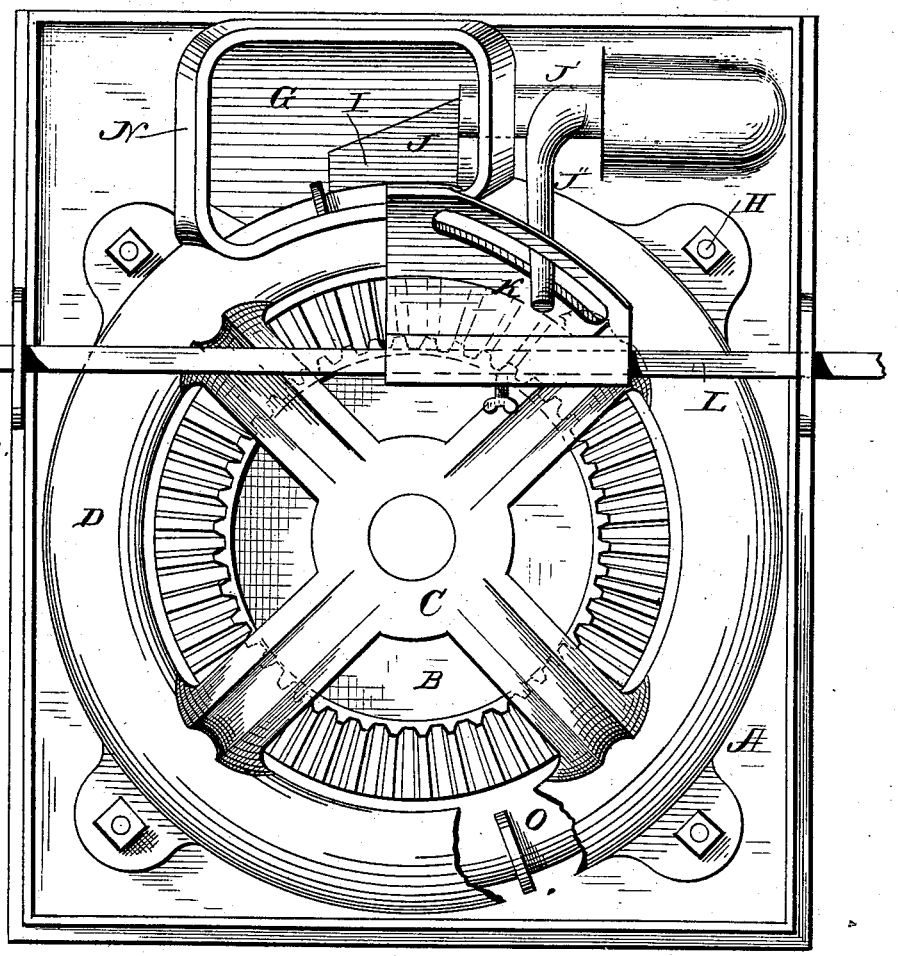
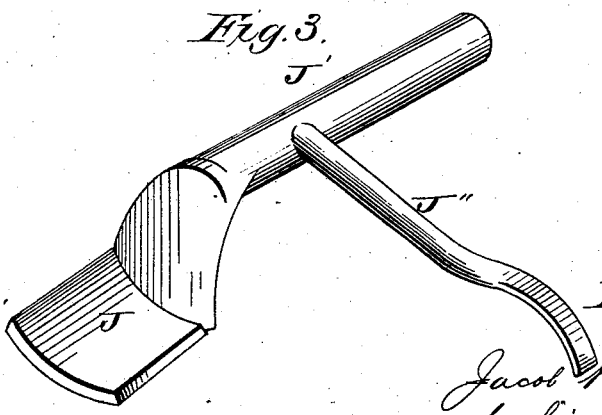


Fig. 3.



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(Model.) 5 Sheets—Sheet 3.

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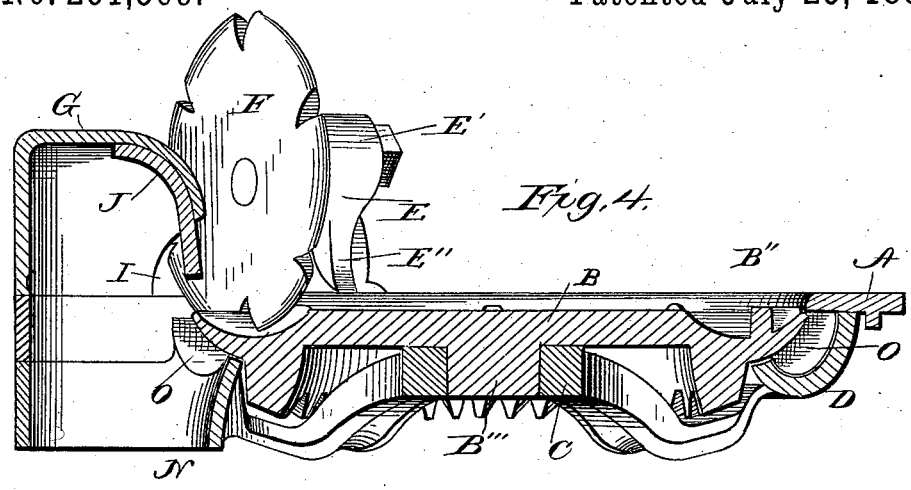

Fig. 4.

Fig. 5.

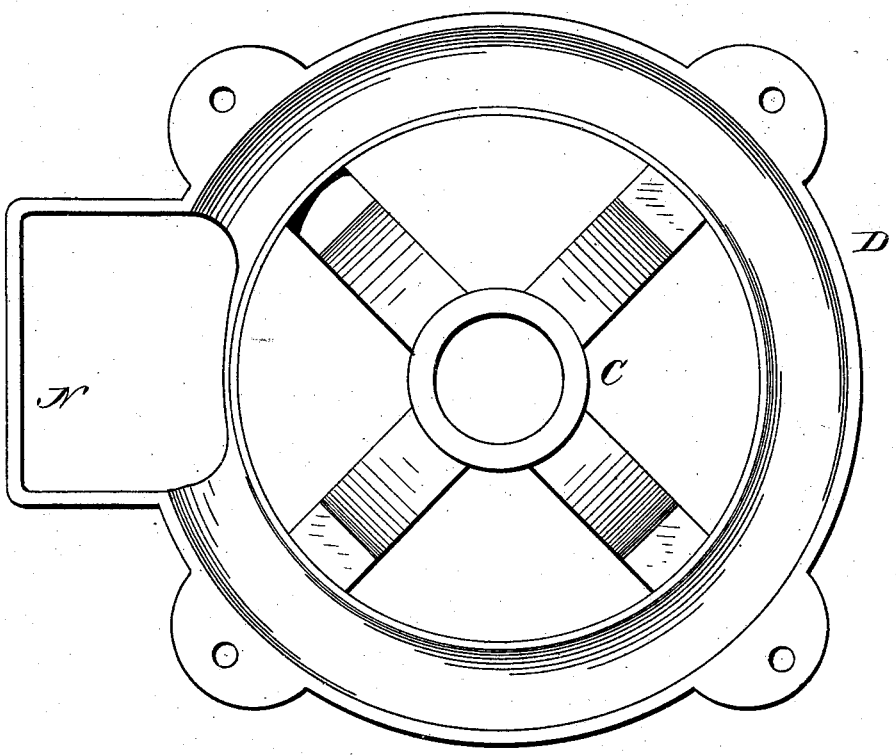

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Fig. 6.

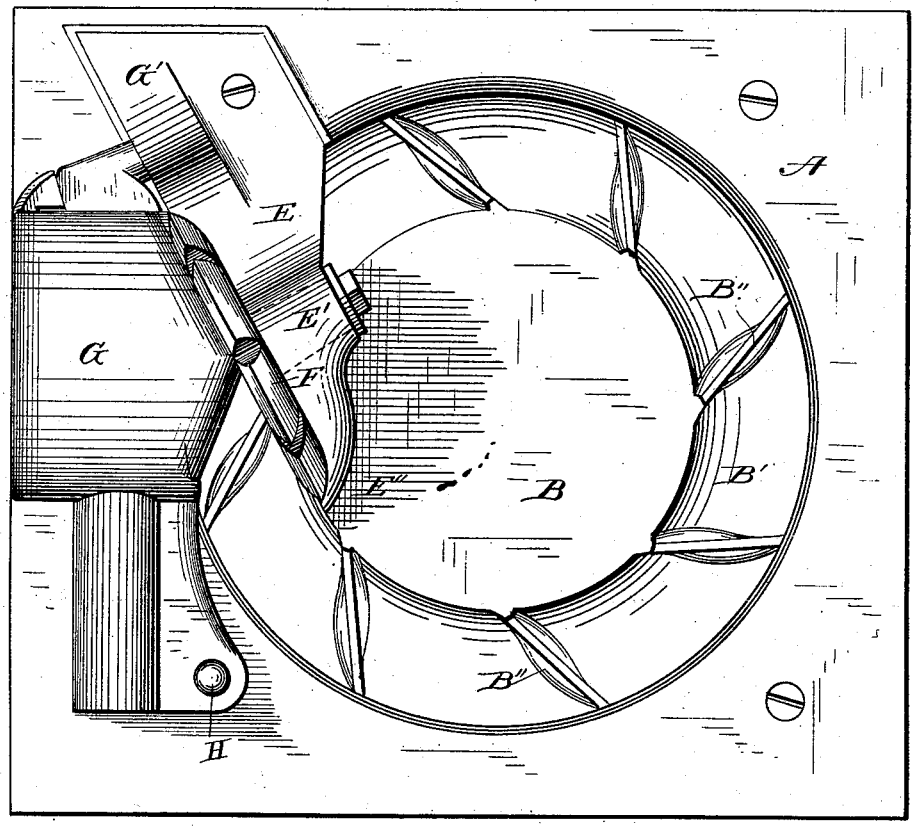

Fig. 7.

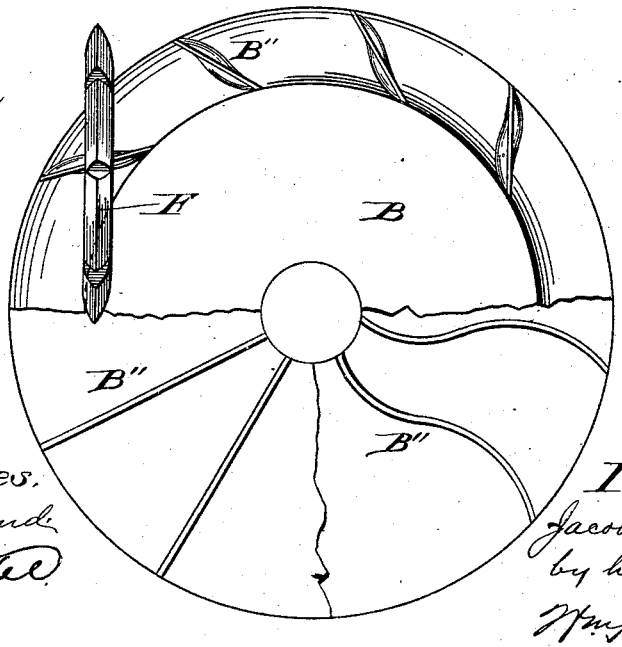

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Fig. 8.

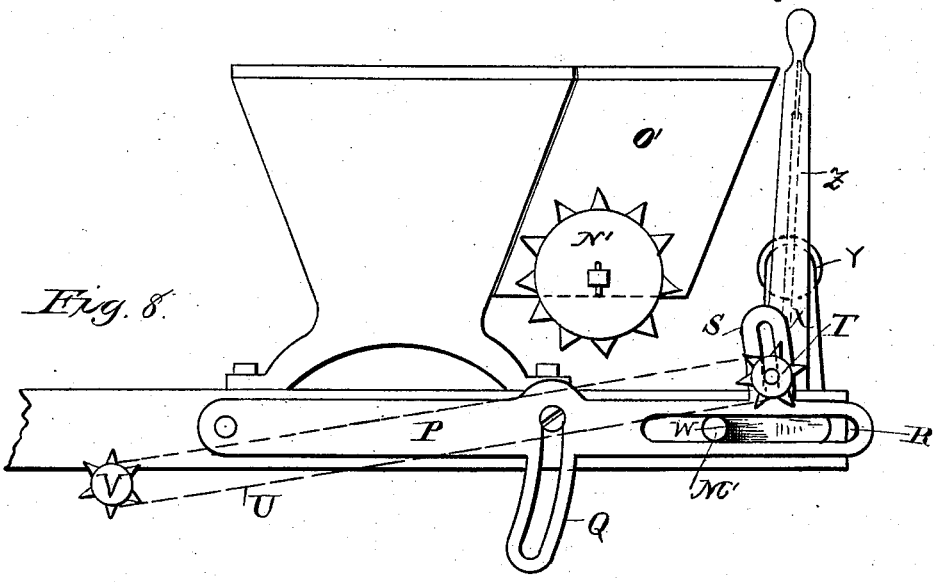


Fig. 9.

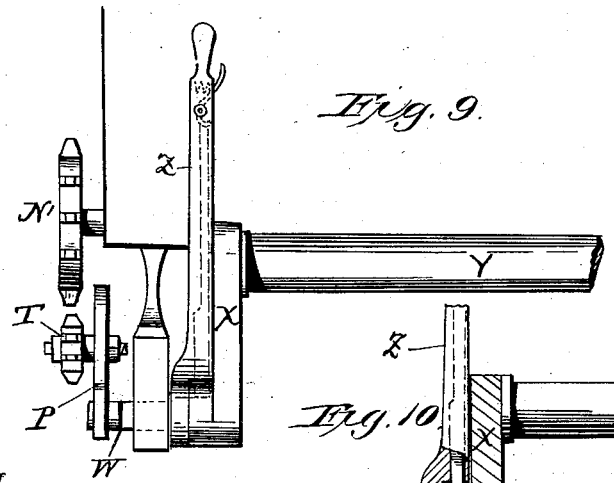


Fig. 11.

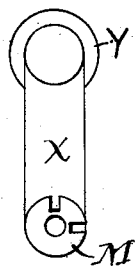


Fig. 10.

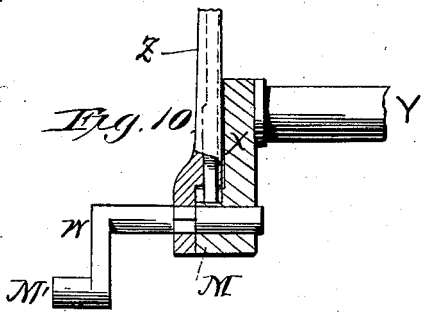
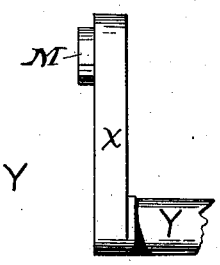


Fig. 12.



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UNITED STATES PATENT OFFICE.

JACOB W. SPANGLER, OF YORK, PENNSYLVANIA.

FERTILIZER-DISTRIBUTER.

SPECIFICATION forming part of Letters Patent No. 261,569, dated July 25, 1882.

Application filed January 4, 1882. (Model.)

To all whom it may concern:

Be it known that I, JACOB W. SPANGLER, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Fertilizer-Distributers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The object of this invention is to provide for the trade a simple and comparatively cheap force-feeding device for use in distributing fertilizers—such as phosphates, guano, &c.—and which is also capable of use in corn-planters, grain-drills, and the like.

The invention consists in a feed-wheel having compartments in its upper surface arranged in a trough, the said feed-wheel being adapted to rotate in a horizontal plane in a bed-plate. Combined with this feed-wheel is a cut-wheel, so arranged as to clear the said compartments as the wheel in its rotation brings such compartments up to the cut-wheel, the partitions between the compartments of the feed-wheel engaging in notches in said cut-wheel to thereby impart rotary motion to it. The discharge-throat is provided with a cap of peculiar construction, and a gate or adjustable gage arranged within it. In order to save the waste of fertilizer through the space between the feed-wheel and its bed-plate, I provide beneath said bed-plate a trough opening into the throat, all as hereinafter specified and claimed.

The invention further consists in the peculiar mechanism combined with but adapted to operate independently of the boot lowering and raising device for governing the feed.

In the accompanying drawings, in the several figures of which like parts are similarly designated, Figure 1 is a perspective view of a fertilizer-distributer for use in connection with grain-drills. Fig. 2 is a bottom plan view thereof. Fig. 3 is a perspective view of the gate for the throat. Fig. 4 is a transverse vertical section of the feeder. Fig. 5 is a top plan view of the trough for catching the siftings. Fig. 6 is a top plan view of my feeder adapted for use in a corn-planter. Fig. 7 is a top plan view of a feed-wheel, showing three different forms of compartments. Fig. 8 is a side elevation of a part of a grain-drill with my feed-regulator and fertilizer attachment in position. Fig. 9 is a rear elevation of a part thereof. Fig. 10 is a sectional diagram of the operating-lever and crank connected, but not in operative position. Fig. 11 is a face view of the boot-roller arm. Fig. 12 is a side view of the same.

A represents the bed-plate, of suitable shape, having a depressed flange, A′, on which the edge A″ of the next adjacent feeder-plate fits when several such feeders are placed in the bottom of a grain-drill hopper or box, the object being to afford a close fit. This bed-plate has a central opening, into which projects from below the feed-wheel B. This wheel has a circumferential trough, B′, which is divided into a number of compartments by means of partitions B″, the said partitions being tangential. This wheel has also a gudgeon, B‴, which has a bearing, as the sole support for said wheel, in a socket, C, connected by arms to the trough D, which is bolted to the under side of the bed-plate. E is a casting which may be held to the top of the bed-plate by one of the bolts used to fasten the trough. This casting has a socket, E′, and is extended into a plow or clearer, E″, the said clearer overlying and in close contact with the feed-wheel on a line with the inner edge of its trough B′. The socket E′ receives the hub of the cut-wheel F, and this socket is so arranged as that the cut-wheel shall stand at an angle to the feed-wheel; or the said socket may be so arranged as that the cut-wheel will stand crosswise of the feed-wheel, as indicated in Fig. 7, either longitudinally with the hopper or transversely thereof; but the preferred arrangement is that shown in Figs. 1, 4, and 6. The cut-wheel is provided with a number of notches so proportioned as that when the feed-wheel is rotating the cut-wheel will enter one of the compartments of the trough of the feed-wheel at its inner edge, and the active edge of such cut-wheel will leave said compartment at the outer edge just as the next notch begins to enter the next adjacent compartment, so that such cut-wheel completely traverses the whole length and width of each compartment during the rotation of the feed-wheel and clears such trough of all

that may be contained therein. This cut-wheel is arranged directly in front of the discharge-throat, and the discharge-throat is covered by a cap, G, which in the case of a grain-drill feeder is held in place by a projection entering the socket G′ in the casting E at one end, and by a bolt, H, at the other end. The object of this construction of the cap is that, should such cap become broken, upon removal of the bolt H the cap can be slid forward out of the socket G′, and thus removed.

Referring to Fig. 6, it will be noticed that the cut-wheel lies between the casting E and the cap G, and that there is a close joint between them. By this means the cap and casting serve to clear the cut-wheel and at all times keep it clean. At the same time the cut-wheel prevents the loss of fertilizer through the joint between the two. An opening, I, is made in the cap-plate in advance of the cut-wheel, and in this opening, within the cap, is arranged a gate, J, which gate has a stem, J′, received in a bearing therefor in the bed-plate, whereby said gate is supported within the cap-plate. In the case of a grain-drill the gate has an arm, J″, projecting beneath the bed-plate, and adapted to engage a cam-slotted plate, K, secured adjustably, as by a set-screw or bolt, or by a rivet, upon a bar, L. By means of the engagement of the arm J″ with this cam-plate the gate can be partly rotated upon its stem J′, so as to cover more or less the opening in the cap. This movement of the gate is effected by a longitudinally-sliding motion of the bar L, acting through its cam-plates upon the gate-arms J″. The arrangement of the gate within the cap with respect to the opening therein is such that the edge of the opening will serve to clear the cap of any material adhering thereto. This opening is directly over the discharge-throat, and the gate therein serves to regulate the quantity of material discharged. Hence it becomes a feed-gage.

In a corn-planter, inasmuch as only one feeder is employed, the cam-plate and bar for operating the gage will be dispensed with, and the arm J″ may be connected to any suitable push-piece or pull as a substitute; but where, as in grain-drills, a number of feeders are used, all of the gates should be opened to the same extent, and hence a rod with a cam applied for each feeder and all the cam-plates adjusted alike is necessary.

The connection of the throat-cap with the cut-wheel casting in a corn-planter feeder, Fig. 6, differs slightly from that above described, in that the throat-cap has a lateral projection which fits in a lateral socket in the casting, so that such throat-plate can be turned up, as upon a hinge, when it is desired to remove or take out a gate that may have been damaged, these differences of construction being occasioned by the difference in construction of a corn-planter hopper and a grain-drill hopper.

The support for the feed-wheel comprises in one casting the trough D and the throat N. The trough D underlies the feed-wheel in a line with the periphery of the opening in the feed-plate, so that any siftings of phosphate which may occur, and which do frequently occur, to the damage of the machinery and the waste of material, will fall into this trough; and in order to clear this trough of these siftings and to save them, I provide the under side of the feed-wheel with sweeps or ears O, which fit snugly into the trough D, and as said feed-wheel rotates these sweeps traverse the trough and carry the contents of the trough around into the throat N, where they are utilized with the rest of the fertilizer discharged into such throat.

The feed-wheel is driven in any suitable manner—as, for instance, by a pinion meshing into gears on the under side.

The shaft bearing the pinions of a grain-drill for operating all the devices therein may be supported beneath the feeders in any suitable hangers.

The compartments of the feed-wheel may be made in a trough, as in Figs. 1, 4, and 6; or they may extend radially from about the center of the wheel or spirally therefrom, as indicated in Fig. 7. In either case the cut-wheel or its equivalent will be arranged to clear the compartments and to discharge their contents through the opening in the cap over the discharge-throat.

The plow or point E″ extends slightly in advance of the cut-wheel, and also upwardly, so as to divert from injuring the cut-wheel any nails or hard substances contained in the fertilizer, it acting to throw aside such matter. It also serves to direct the fertilizer into the compartments or pockets of the feed-wheel.

The face of the cut-wheel opposite the cap G stands nearly vertical, or is flat, and the rear face has its edge curved or beveled, thus presenting a comparatively sharp edge, and this edge is preferably substantially of the contour of the bottom of the trough in the feed-wheel, so that it acts somewhat as a scoop in discharging the contents of such wheel. The notches in the cut-wheel are arranged at regular intervals of distances equal to the length of the compartments or pockets in the feed-wheel, and as one notch leaves the pocket the next following notch begins its entry into the next pocket, so that the feed from these pockets, by means of this cut-wheel, is continuous. It will be understood that the feed-wheel projects more or less within the opening of the throat-cap, so that the cut-wheel discharges the whole contents of each pocket or compartment into the throat. If the pockets contain more material than can be discharged through the opening set by the gate in the throat-cap, the excess will be forced over the gate and cap, their contour permitting of this movement of the material. A cut-wheel whose rear face—that is to say, the face next adjacent to casting E—is substantially convex, especially on the active edge, will usually produce the best feeding or clearing results.

The cut-wheel may have its hub simply inserted in the socket E′ without any fastening, and depending upon the adjacent face of the throat-cap to hold it in place; but it will usually be found desirable to employ a washer and nut, as in Fig. 6, to hold the cut-wheel in place.

Referring to Fig. 6, it will be seen that the plow or point of the casting E also hugs the edge of the cut-wheel, and thus prevents any substance getting between the two.

The throat-cap is made readily detachable in order to obtain access to the gate, for this gate is the one member of the feeder most exposed to damage. Any hard substance coming in contact therewith and finding it immovable will break it, thereby saving the other parts of the feeder at the expense of the one most readily and cheaply replaced.

It is proposed also to supply the parts of this feeder separately, so that they may be readily duplicated, and any part of the feeder that may be worn or damaged can be readily removed or replaced.

In my improved feed-regulator I employ a lever, P, pivoted to the framing, and having a slotted segmental arm, Q, to guide it in its vertical movement, and provided with a longitudinal slot, R, and an upwardly-extended slotted segment, S. In this slotted segment S is adjustably arranged a sprocket-wheel, T, which is connected by a chain, U, with a sprocket-wheel, V, on, for instance, the driving-shaft or main axle.

W is a crank loosely fitted to an arm, X, placed on the end of the boot-roller Y. The crank W has a round end fitted in a round hole in the arm X, and has a square shoulder next to said round end, upon which is fitted a lever, Z. This lever has a spring-pawl normally in engagement with one of several notches in a hub M on the arm X, this spring-pawl having a thumb-piece arranged in connection with the handle of the lever Z. The crank W has a pin, M′, which fits in the longitudinal slot R of the lever P, and the lever Z being suitably moved, the lever P will be elevated and carry up the chain U, so as to put said chain into mesh with a sprocket-wheel, N′, on the feeder-shaft of the fertilizer attachment O′, and thereby communicate motion from the main axle to the series of feeders in the fertilizer-box. It will be understood that the fertilizer-box is preferably removable, to thereby form an attachment for any of the well-known grain-drills.

It will be understood that the sprocket-wheel T may be removed from the slotted segment S and a larger or smaller one substituted for it, in accordance with the speed it is desired to give the feeders, and to this end it is customary to supply fertilizer-distributers with a set of wheels, so as to obtain more readily the desired speed.

It will be understood that I do not limit the application of my invention in feeders to the feed-regulator herein described, nor the feed-regulator to the special form of feeder; nor do I limit myself either to a fertilizer-distributer made as an attachment to a grain-drill, since it may be desirable to construct an entirely new distributer or grain-drill.

By my feed-regulator it is possible for the user of the attachment to sow and stop sowing fertilizer, just as desired, without in the least affecting the operation of the seeder. In other words, the operation of the fertilizer-distributer is wholly independent of the seeder, so that the operator can distribute the fertilizer only as required while the seed is being sown uninterruptedly, and this is achieved by having the crank W arranged to turn in the boot-roller arm independently of said roller; but said crank may move with the roller by allowing the lever Z to remain locked thereto, the locking or unlocking of this lever serving respectively to connect or disconnect the two. This lever may thus serve to operate the boots also; or it may be attached elsewhere and perform its special function, while a separate lever may be used for the boots. By arranging the feed-wheel beneath the bed-plate, so that such wheel is supported by the hub of the spider and its weight taken from the bed-plate, the minimum of friction is obtained, and the feeder thereby operates much more easily and with less wear and tear.

I am well aware that it is not new to arrange the feed-wheel below the bed-plate; and I am further aware that it is old to provide a bearing for the wheel in a spider beneath such wheel; but such spider-bearing has been supplemented by a bearing in the bed-plate also. I am not aware, however, that the feed-wheel has been supported beneath the bed-plate out of contact therewith solely by the spider.

What I claim is—

1. In a force-feed, a horizontal feed-wheel provided with a circumferential trough, B, which is subdivided into comparments or pockets, substantially as described.

2. In a force-feed, the horizontal feed-wheel having a circumferential pocketed trough, combined with a cut-wheel arranged above said pockets and operating in connection therewith, substantially as described, to empty them of their contents.

3. A force-feed wheel rotated in a horizontal plane and having a circumferential trough provided with pockets or compartments, combined with a cut-wheel deriving motion from such feed-wheel and arranged relatively thereto, so as to begin to enter one pocket simultaneously with its leaving the other pocket, to thereby effect a continuous feed, substantially as described.

4. A force-feed wheel provided with a circumferential-trough having pockets or compartments and adapted to receive a rotary motion, combined with a cut-wheel having an active edge of substantially the same contour as the bottom of the pockets, to enter said pock-

ets at their innermost edge, and thence traverse them throughout their length and width to clear them of their contents, substantially as specified.

5. A force-feed wheel provided with pockets, combined with a cut-wheel to clear such pockets of their contents, and a plow extended forward of the cut-wheel relatively to the direction of its rotation, to divert from such cut-wheel any injurious matter, substantially as specified.

6. The casting E, provided with a socket forming a bearing for the cut-wheel of the force-feed, and terminating in a plow or point, substantially as and for the purpose described.

7. A throat-cap, G, held in place at one end by the casting E, combined with a throated bed-plate and means to attach it thereto, whereby the cap may be turned aside or removed at pleasure.

8. The throat-cap and the casting E, arranged substantially as described, and adapted to receive the cut-wheel between them, substantially as and for the purpose set forth.

9. The bed-plate having a discharge-throat and the cap G therefor, combined with the gate J, arranged therein to regulate the extent of opening in said cap, the bearing for said gate in the bed-plate, and an arm projecting from said gate and adapted to be moved to raise or lower the gate within the opening of the cap, substantially as specified.

10. A bed-plate having a throat and a cap therefor provided with an opening, a gate arranged within said cap to govern the extent of the opening, an arm projecting from said gate, and a cam-slotted plate in which said arm is arranged, and whereby the gate is raised or lowered, substantially as and for the purpose specified.

11. A bed-plate having a throat and a cap therefor provided with an opening, and a gate arranged within the same, combined with a cam-slotted plate arranged upon a projecting bar, and adapted to be adjusted upon said bar and held in any adjustment to govern the extent of the throw of the gate, substantially as specified.

12. In a feeder for fertilizer-distributers, a feed-wheel and a bed-plate with which it is connected, combined with a trough arranged beneath the wheel and bed-plate in line with the periphery of the feed-wheel, and opening in the discharge-throat to catch and utilize siftings, substantially as specified.

13. In a feeder for fertilizer-distributers, a bed-plate having an opening to receive a feed-wheel, combined with such feed-wheel, a trough arranged beneath the two in line with their meeting edges, and sweeps on said feed-wheel, fitting in said trough, to move the contents thereof into the discharge-throat, substantially as described.

14. In a feeder for fertilizer-distributers, the bed-plate provided with a casting comprising an imperforate trough to catch the siftings, a socket to receive the feed-wheel, and a throat into which said trough opens, substantially as shown and described.

15. The combination of the feeders with the pivoted lever P, the adjustable sprocket-wheel T, chain U, driving-wheel, crank W, and operating-lever Z, substantially as and for the purpose specified.

16. A feed-wheel having a trough, combined with a cut-wheel, arranged with its active edge or edges above said wheel and in operative proximity to its trough, to scoop the material from said trough into the discharge-opening, substantially as shown and described.

17. A boot-elevating roller and a feed-regulating mechanism for fertilizer-distributers, combined with an operating-lever adapted to be disconnected from the boot-roller to operate the fertilizer-feeder independently of the position of the boots, substantially as shown and described.

18. The boot-roller Y and its supporting-arm X, combined with a crank, W, and a lever, Z, connected therewith, and adapted to lock the crank in any given position, and with a lever, P, with which said crank is in connection for raising and lowering it, and a driving-chain carried by said lever P, whereby the feeders of a fertilizer may be operated at pleasure independently of the position of the boots, substantially as specified.

19. The bed-plate A, having a central opening, and the spider having the hub C, and arranged beneath said bed-plate, combined with the feed-wheel, supported wholly by said spider, and arranged beneath the bed-plate so as to revolve free of frictional contact therewith, substantially as shown and described.

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

J. W. SPANGLER.

Witnesses:
GEORGE M. SHETTER,
CHARLES A. SHETTER.