(No Model.) 3 Sheets—Sheet 1.

# A. CUNNINGHAM & H. BICKFORD.

## FERTILIZER DISTRIBUTER.

No. 286,910. Patented Oct. 16, 1883.

*Fig. 1.*

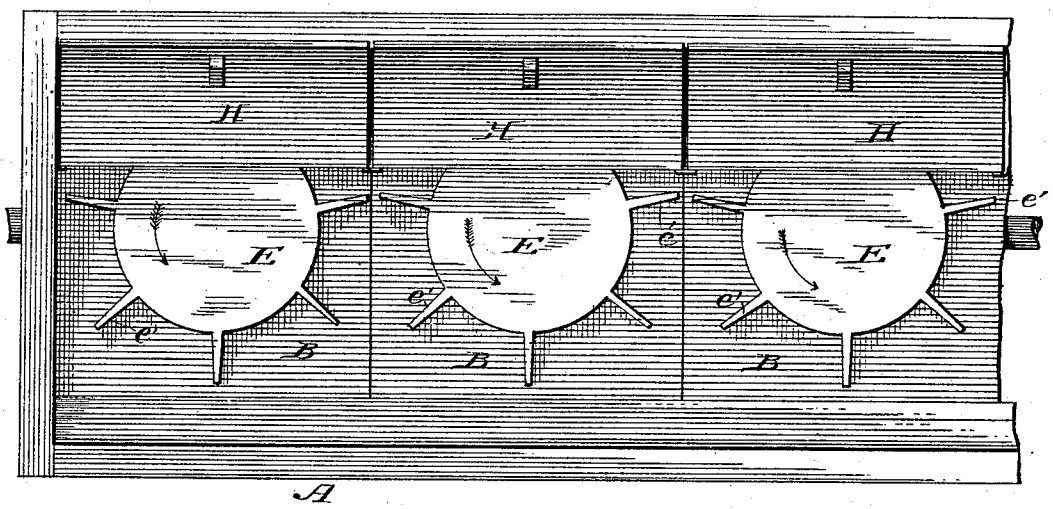
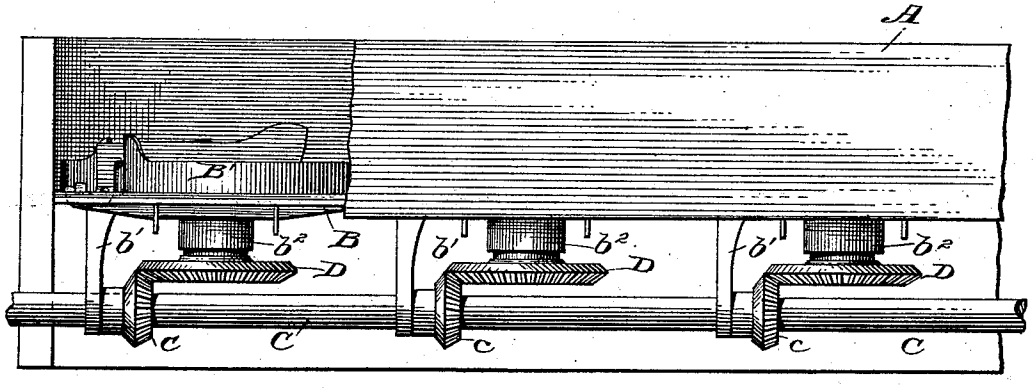



*Fig. 2.*




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## FERTILIZER DISTRIBUTER.

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Fig. 3.

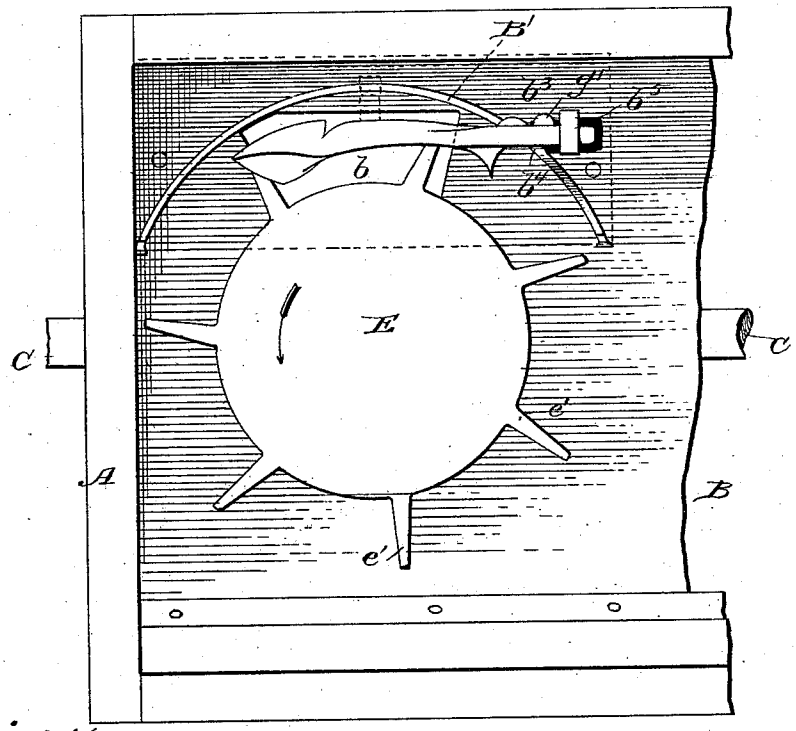



Fig. 4.

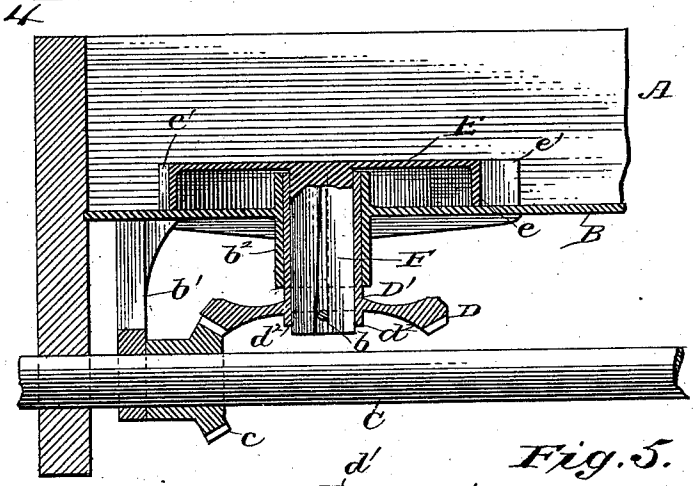
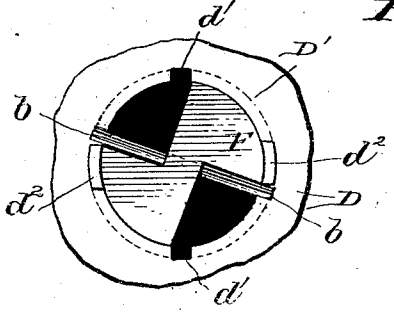



Fig. 5.




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## FERTILIZER DISTRIBUTER.

No. 286,910. Patented Oct. 16, 1883.

*Fig. 6.*

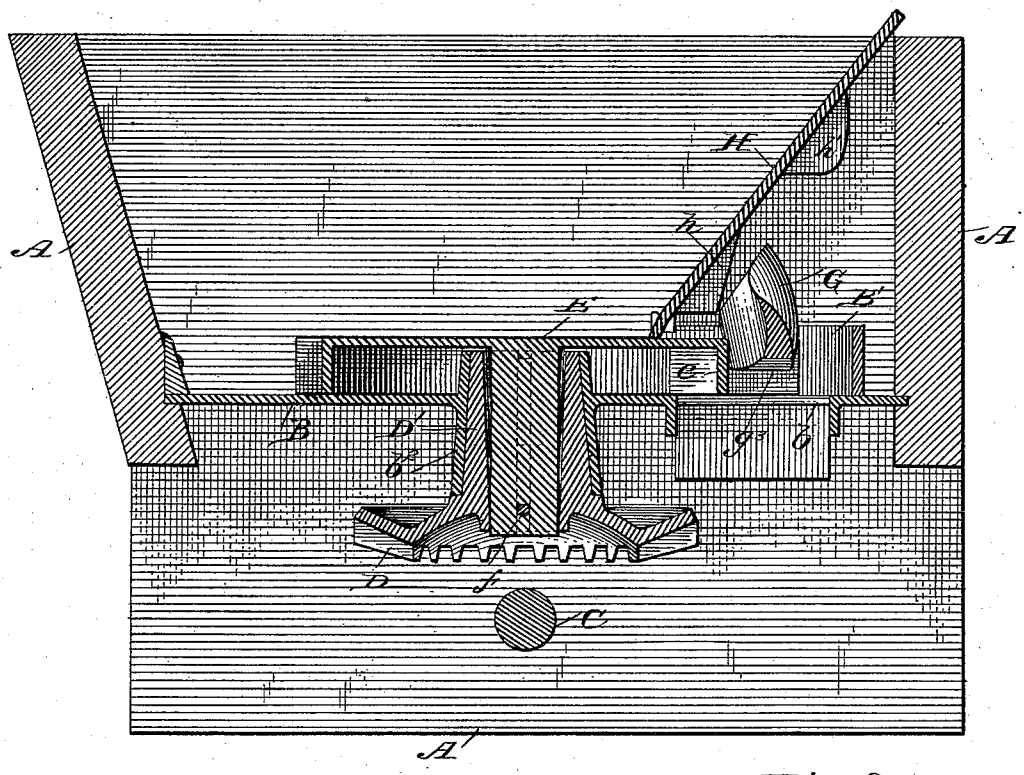



*Fig. 7.*

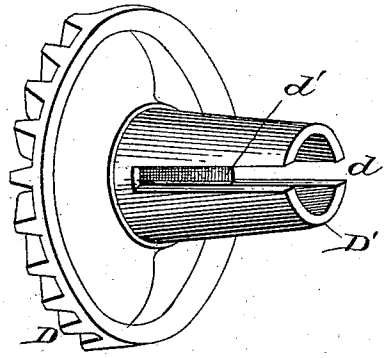



*Fig. 8.*

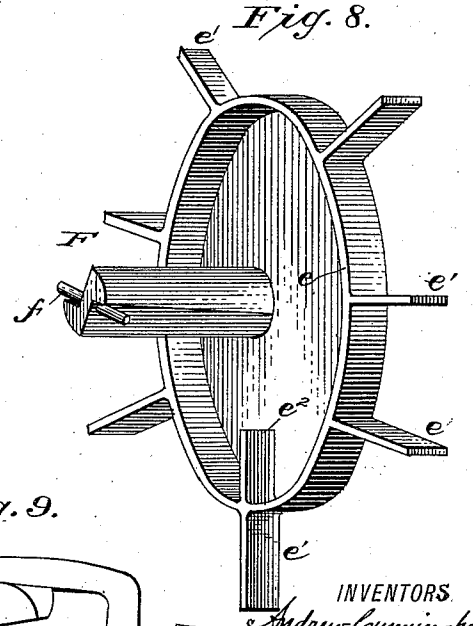
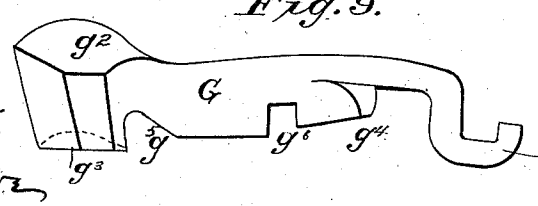



*Fig. 9.*




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# UNITED STATES PATENT OFFICE.

ANDREW CUNNINGHAM, OF TROY, AND HOMER BICKFORD, OF MACEDON, ASSIGNORS TO BICKFORD & HUFFMAN, OF MACEDON, NEW YORK.

## FERTILIZER-DISTRIBUTER.

SPECIFICATION forming part of Letters Patent No. 286,910, dated October 16, 1883.

Application filed June 25, 1883. (No model.)

*To all whom it may concern:*

Be it known that we, ANDREW CUNNINGHAM, of Troy, Rensselaer county, New York, and HOMER BICKFORD, of Macedon, county of Wayne, and State of New York, have invented a new and useful Improvement in Fertilizer-Distributers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

Our invention relates to devices for feeding fertilizing materials from the containing-hopper into the dropping-tubes; and the object of the invention is to provide a self-clearing feeding mechanism, the several parts of which shall be readily removable, and which shall be separately connected with the actuating mechanism.

To these ends our invention consists in the provision of a feeder-foot secured removably upon a detachable plate constituting the bottom of the hopper, and separately connected with suitable actuating mechanism, a knocker removably secured to the bottom plate and operating in connection with the feeder-foot, by which it is actuated, and a shield for the knocker provided with attachments for acting upon said knocker to prevent displacement of the latter.

In order that the invention may be fully understood, we will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a plan view of a series of our improved feeders in operative position within a hopper. Fig. 2 is a side elevation of the same, showing the connections with the actuating mechanism, one end of the wall of the hopper being broken away to expose the interior mechanism, from which the feeder-foot is removed. Fig. 3 is a plan view, on an enlarged scale, of the feeder-foot and its knocker. Fig. 4 is a vertical cross-section of the same. Fig. 5 is a plan view of the lower extremity of the feeder-foot shaft, showing its manner of attachment with the operating gear-wheel. Fig. 6 is a transverse vertical section of the mechanism in operative position. Figs. 7 and 8 are perspective views of the feeder-foot and its operating gear-wheel. Fig. 9 is a side elevation of the knocker, showing the formation of its under side.

In the said drawings, A designates the hopper, which may be of any suitable or preferred form, designed to be properly mounted upon the vehicle-frame.

B B B designate a series of plates set removably in the lower portion of the hopper, and constituting the bottom thereof, each of said plates being formed with a discharge-aperture, *b*, through which the fertilizing material is delivered.

C designates the driving-shaft of the actuating mechanism, which is supported by the hangers *b'*, one of which is formed upon the under side of each plate B; and *c* designates the beveled-gear pinions, each of which is mounted upon the shaft C in such position as to engage with the teeth of one of the beveled-gear wheels D, to be presently described.

E designates the feeding-disk or feeder-foot, formed with a downwardly-extending peripheral flange, *e*, and also with radial arms *e'* upon the outer side of said flange. A scraper-blade, $e^2$, may be formed upon the inner side of the flange *e*, to clear away any of the fertilizing material which may get under the feeder-foot, and throw it out through the aperture *b*.

F designates the feeder-foot shaft, which is approximately Z-shaped in cross-section, and extends downward from the center of the said feeder-foot. At its lower end this shaft is provided with a pin, *f*, passing horizontally through it. The shaft F extends through an aperture in the center of the plate B, and within a collar, $b^2$, set in said aperture. The beveled-gear wheel D is provided on its upper side with a vertical conical sleeve, D', the sides of which are formed with two oppositely-disposed elongated recesses, *d*, opening at the upper extremity of the sleeve, and extending downward to about midway of its length, where they each join one end of a groove, *d'*, extending in alignment with the recess, through to the lower extremity of the sleeve. The lower end of the sleeve D' enters the eye of the wheel D, which is formed on its under side with two oppositely-disposed lugs or stops, $d^2$, interposed between the grooves *d'*. Thus it will be seen that the feeder-foot is placed in connec-

tion with the gear-wheel D, by inserting the shaft F through the sleeve D′, the extremities of the pin *f* being carried through the recesses *d* and grooves *d′* of the sleeve D′, and then, when the pin *f* passes through the eye of the wheel D, giving the feeder-foot a quarter-turn, so as to bring the extremities of the pin over the solid portions of the wheel-face, between the ends of the grooves *d′* and lugs $d^2$ and against the sides of said lugs.

On the upper side of the bottom plate, B, is formed a curved flange, B′, concentric with the periphery of the feeder-foot, and extending from one end of the plate to the other outside of the feed-opening *b*. On its upper edge this flange is formed, near one of its extremities, with two projections, $b^3$ $b^4$, between which is a depression to receive the knocker G. This knocker G is formed with a hooked extremity, *g*, which is inserted beneath a bridge, $b^5$, overlying an aperture formed in one corner of the bottom plate, B, and rests in the depression between the projections $b^2$ $b^3$ in such manner as to bring its free end into engagement with the arms *e′* of the feeder-foot E. A stud, *g′*, may be formed upon the side of the confined end of the knocker G, to engage with the upper face of the bottom plate, B, near the bridge $b^5$, for preventing the hooked end of the knocker from descending too far within the aperture. At its free end the knocker G is provided with an enlarged portion having a laterally-inclined upper face, $g^2$, and a downwardly-inclined lower face, $g^3$, for purposes presently to be described. The knocker G is formed with a convex lower side terminating in a laterally-projecting portion, $g^4$, and having two notches, $g^5$ $g^6$, as shown.

H designates a shield-plate, which rests in suitable notches in the ends of the flange B′, and extends obliquely upward over the knocker G. On its under side the shield H is formed with two projections, *h h′*, the former of which engages with the oblique face $g^2$ of the knocker G, and thereby prevents said knocker from being carried sidewise by the arms *e′* as they successively pass beneath the convex side of said knocker, and the projection *h′* limits the upward movement of said knocker caused by the passage of the arms *e′* just mentioned.

The operation of the above-described apparatus is as follows: The hopper having received any desired quantity of the fertilizing material, and the machine having been set in motion, the actuating mechanism C *c* D will cause the feeder-foot E to rotate in the direction indicated by the arrows in Figs. 1 and 3, and the first pair of arms *e′*, carrying between them a mass of the fertilizing material, will approach the discharge-aperture *b*. At the instant when the forward arm of this pair is about engaging with the free end of the knocker G, the arm preceding said forward arm will be moving out of the notch $g^6$ and along beneath the under side of the portion $g^4$, raising the free end of the hammer and allowing the forward arm of the pair to move partly over the aperture *b*. The preceding arm will then pass out from under the portion $g^4$, allowing the knocker G to fall (the forward arm entering the notch $g^5$) and loosen the mass of material between the two arms. The forward arm of the pair will then pass out of the notch $g^5$, along the convex under side of the knocker, raising it, and, entering the notch $g^6$, will cause the knocker to fall again, forcing the mass out from between the arms *e′*, and out through the discharge-aperture *b*. As the feeder-foot continues to revolve, the several movements will be successively repeated, the projection *h* guiding the free end of the knocker as it ascends and descends, and the projection *h′* preventing the said free end of the knocker from being tossed too high by the forcible action of the arms on the knocker.

Having now described our invention, what we claim as new is—

1. In a feeding apparatus for fertilizers, the combination of the feeder-foot, and the pivoted vibrating knocker operating therewith and actuated thereby, substantially as and for the purposes described.

2. The combination of the rotary feeder foot or wheel provided with the pendent shank having radial pins or spurs fast thereon, and the gear-wheel provided with the grooved sleeve or hub detachably connected with said feeder-foot, substantially as described.

3. The combination of the feeder-foot, the removable bottom plate provided with the curved flange, and the knocker, with the shield placed removably upon the said flange, and provided with attachments for controlling the direction and extent of movement of the knocker, substantially as set forth.

4. The combination of the removable sections forming the hopper-bottom, the rotary feeder feet or wheels having pendent shafts provided with fixed radial spurs or pins, and the gears actuating said feed-wheels provided with grooved sleeves or hubs, for permitting the ready application and removal of said feed-wheels and of the bottom sections interposed between said feed-wheels and their actuating-gear, all substantially as described.

5. The removable bottom plate, the feeder-foot, the knocker, the shield, and the gear-wheel detachably connected to said feeder-foot, in combination with suitable actuating mechanism, substantially as shown and described.

In testimony whereof we have hereunto set our hands this 23d day of June, A. D. 1883.

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MARTIN DEAN.