(No Model.)

3 Sheets—Sheet 1.

E. TYDEN.

PLANTER.

No. 385,583. Patented July 3, 1888.

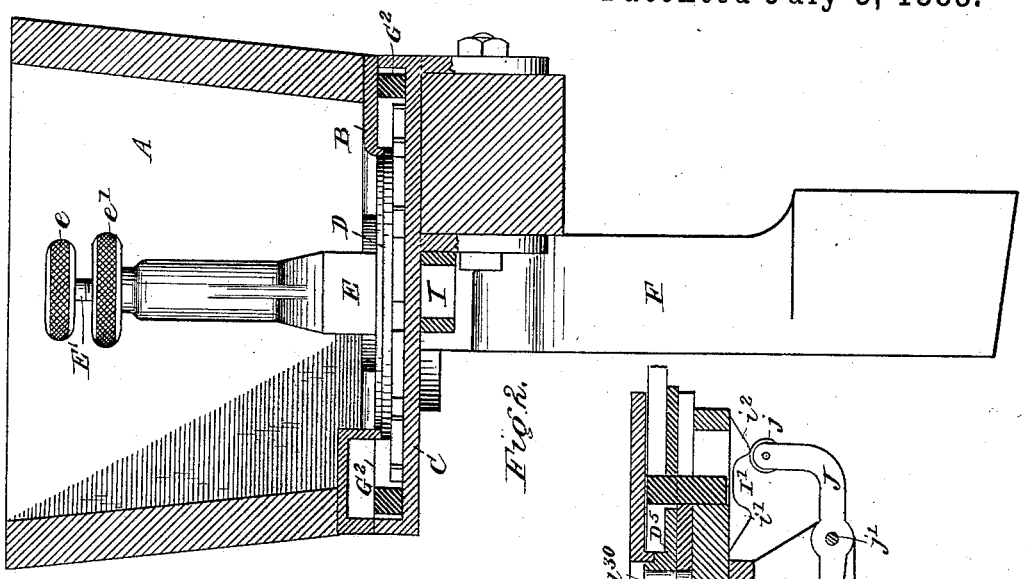

Fig. 2.

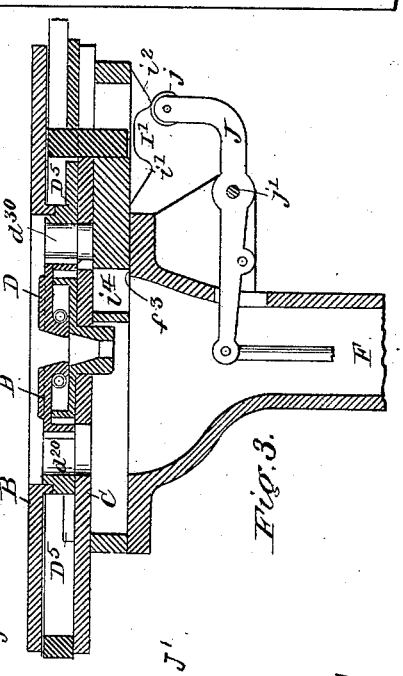

Fig. 3.

Fig. 6.

Fig. 7.

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PLANTER.

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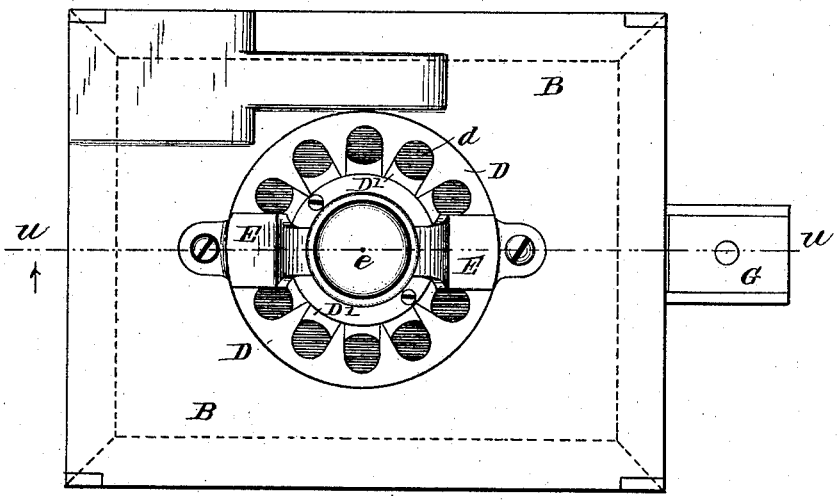
Fig. 4



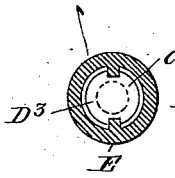


Fig. 7.

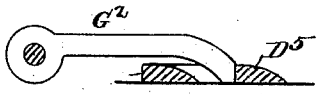


Fig. 8.

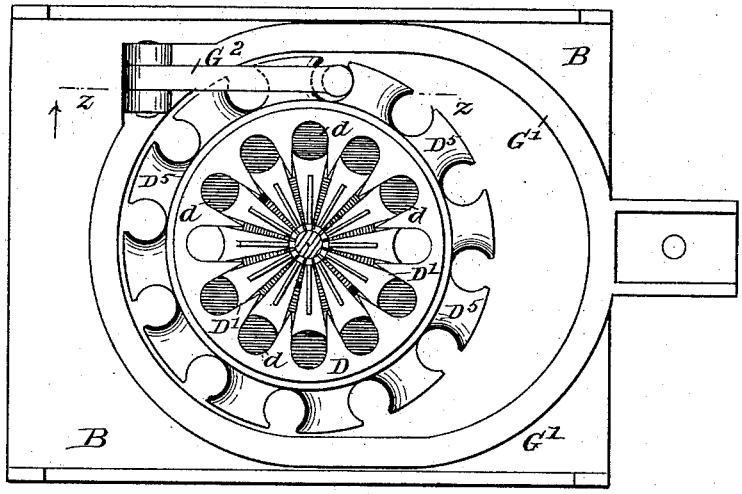


Fig. 5.

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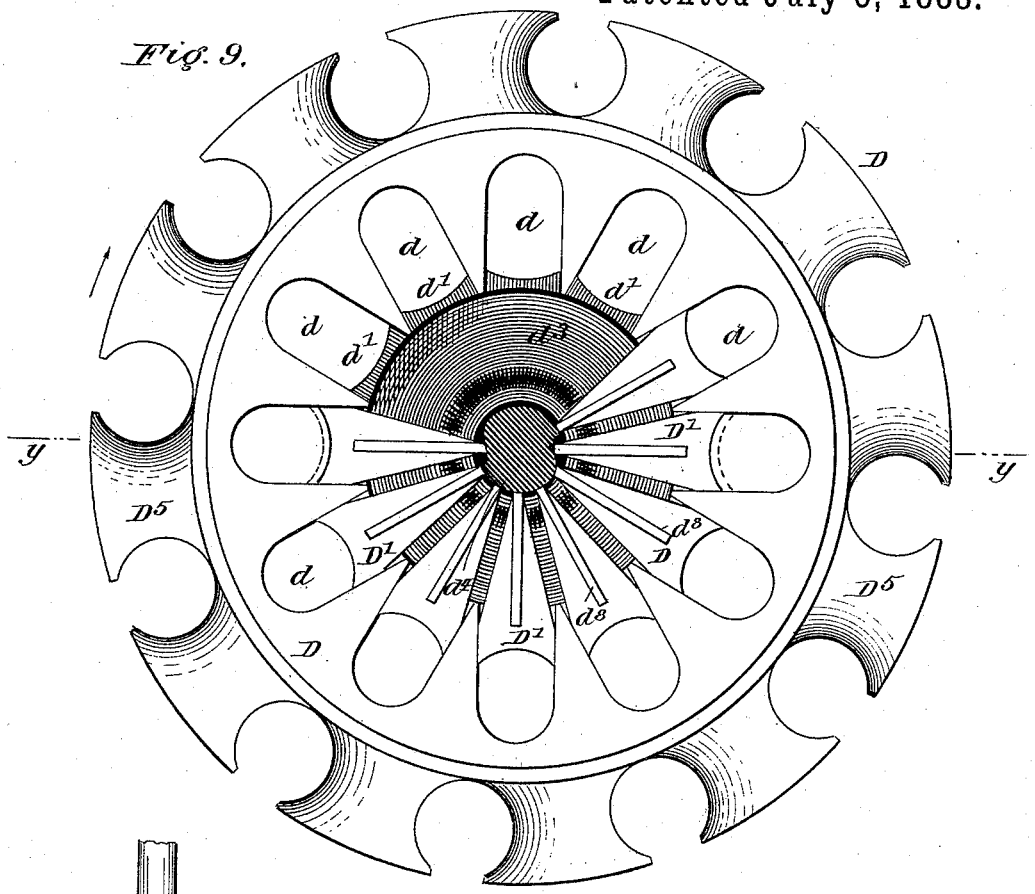
Fig. 9.



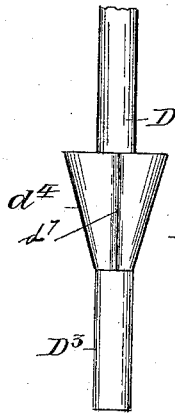


Fig. 12.

Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE.

EMIL TYDEN, OF CHICAGO, ILLINOIS.

PLANTER.

SPECIFICATION forming part of Letters Patent No. 385,583, dated July 3, 1888.

Application filed December 9, 1887. Serial No. 257,456. (No model.)

To all whom it may concern:

Be it known that I, EMIL TYDEN, a subject of the King of Sweden, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Planters, of which the following is a full, clear, and exact specification.

My invention relates particularly to the dropping mechanism of corn-planters; and it consists, first, in improved means whereby seed is dropped at every reciprocation of the actuating-bar; second, means for regulating conveniently the number of grains dropped into each hill at a reciprocation; third, means for expanding the walls of the seed-cup at the moment of the dropping of the seed, so as to effectually free it and prevent the cup passing on with the grain choked therein; fourth, improved drop-valve mechanism having reliable action.

Minor improvements will be mentioned as they occur hereinafter.

In the accompanying drawings, Figure 1 is a vertical section of the complete dropping mechanism of a corn-planter which embodies my invention, taken on line *u u* of Fig. 4. Fig. 2 is a similar view with the pawl-carrying frame at the reverse end of its stroke. Fig. 3 is a transverse vertical section of the same mechanism, taken on line *v v* of Fig. 1. Fig. 4 is a plan view of the top plate at the bottom of the grain-hopper, the hopper being shown in dotted outline and the grain cut-off in position. Fig. 5 is a plan view of the dropper-disk and the pawl-carrying frame, the top plate and the cut-off being removed. Fig. 6 is a detail plan view of the cut-off slide-valve, which operates below the dropper-disk. Fig. 7 is a transverse section of the chambered cylinder and the cone-spindle, taken on line *w w* of Fig. 1. Fig. 8 is a section on line *z z* of Fig. 5, showing the pawl actuating the dropper-disk and its relation to the lugs thereof. Fig. 9 is a plan view of the dropper-disk with the capacity-regulating blocks of four of the cups removed. Fig. 10 is a sectional view of the dropper-disk, taken on line *y y* of Fig. 9. Fig. 11 is a detail perspective view of an adjustment-block. Fig. 12 is a detail view of the cone-spindle regulating the position of the adjustment-blocks.

Like letters indicate similar parts throughout the several views.

The improvements herein described are intended particularly for use on corn-planters having two hoppers, each provided with a dropper-disk having an intermittingly-rotative motion and actuated by pawls pivoted to a reciprocating bar or to a frame attached thereto, one at each end thereof.

It has been deemed unnecessary in the drawings to show more than the one hopper and its simple dropping mechanism, since the parts are equally applicable to a planter having but one hopper.

In the various figures, A indicates a grain-hopper of the usual form.

B indicates the top plate, and C the bottom plate, of the false bottom, within which the dropper-disk D rotates.

E is a double cut-off having the customary chisels—one in each compartment—to clear off the surplus grain from the seed-cups.

F is the seed-tube through which the grain is dropped to earth.

The mechanism will now be described by which the number of grains of seed dropped into a hill can be conveniently regulated and by which the seed-cup is enlarged at the movement of the dropping of the grain, whereby the charge contained therein is freely discharged, thus preventing the clogging to which seed-cups having fixed walls are liable. The disk D is provided with the enlarged cup-apertures *d d*, placed in the usual manner about the center. I have shown twelve such cups. The center of the disk is chambered, leaving a narrow wall, *d'*, between the cups and the chamber. Downwardly into each of the seed-cups projects from the adjustment-block D' a lug, d^2, preferably having a concave face. This lug in size is equal to the rectangular section of the seed-cup *d*, in which it is adapted to form a movable end wall, capable of adjustment inwardly or outwardly to increase or decrease the capacity of the cup, as may be desired. The dividing-wall *d'* of the disk D is cut down sufficiently between the central chamber, d^3, and the cup-apertures *d d* to allow the body of the adjoining block D' to lie within the recess thus formed, with its surface flush with the face of the disk, thus obtaining an

unobstructed path for the cut-off chisels to operate in and providing a slideway for the blocks to move on. The bodies of the several adjustment-blocks are tapered to a common center to allow them to lie within the space allotted them in the chamber of the disk. The tapered end is provided with a downwardly-projecting lug, d^9, having a concave saddle, in which is seated an endless spiral spring or other retractile element common to all, by which the adjusting-blocks are drawn inwardly, the whole lying within and acting in the chamber d^3. The cone-spindle D^3 is journaled at its lower end in the extended hub of the dropper-disk, which is chambered to allow of the limited downward longitudinal movement of the cone-enlargement d^1. At the upper end the cone-spindle is supported in the hub of the cover-plate D^4, which is likewise chambered to permit of the motion of the cone d^4. This cover-plate is also provided with splineways equal in number to the number of the adjusting-blocks. These blocks have corresponding splines on their surface, which fit into the splineways of the cover-plate, maintaining the adjustment-blocks in their proper path and preventing their interference one with the other. The cover-plate serves, also, to protect the interior from dust or other extraneous substances.

If it now be desired to reduce the number of grains of seed dropped into each hill, the capacity of each of the seed-cups may, obviously, be decreased simultaneously and equally by forcing the cone downward, and thereby the adjusting-blocks D′ D′ outwardly, the lugs d^2, forming the end walls of the seed-cups, moving inwardly, diminishing the capacity of the cups in exact proportion to the amount of depression given the cone-spindle. If, on the other hand, it be desired to increase the number of grains of seed dropped into each hill, it may be accomplished by raising the cone-spindle, the adjusting-blocks being retracted inwardly by the spring D^2 and the capacities of the seed-cups correspondingly increased. The amount of grain to a charge, it will thus be seen, may be determined to exactness.

The mechanism by which the adjustment of the cone-spindle is made is shown most clearly in Fig. 1.

The frame of the cut-off E is rigidly secured to the top plate, B, at the bottom of the hopper by suitable lugs. It extends at the center in line with the axis of the dropper-disk upwardly in the form of a chambered cylinder. Within this chambered cylinder the spindle D^3 has a limited longitudinal motion. A spiral spring, d^6, is coiled upon the spindle and maintains it in an upward position by its opposing action exerted between a washer resting upon the cover-plate D^4 and a fixed cap at the end of the spindle. The use of this washer is simply to reduce friction between the fixed and moving parts and to prevent dust entering the spring-chamber and clogging the motion of the spring. The upper end of the cylinder of the cut-off E is threaded and fitted to receive a screw-bolt, E′, having a suitable hand-wheel, e, by which it can be rotated.

A jam-nut wheel, e', is arranged to coact with the end of the cut-off cylinder and fix the screw-bolt E′ in any set position.

It is obvious that by the manipulation of the screw E′ upwardly or downwardly the cone-spindle will be given a corresponding motion and the adjusting-blocks moved inwardly and outwardly, thereby adjusting with facility the capacity of the seed-cups. The cap d^5 of the cone-spindle D^3 is notched with one or more splineways, which engage with splines projecting from the inner wall of the cylinder-chamber, in which it is located. The cone d^4 is thus prevented from rotation, for reasons which will appear hereinafter. The enlargement d^1 of the spindle D^3 has heretofore been considered as if it were a perfect cone. If it were such, the universal adjustment only of the blocks D′ D′ would be attained. It is desired, however, further, to open the cup or cups slightly at the moment of their arriving at the dropper-ports to release with certainty the grain confined therein and secure its dropping. To accomplish this, it is necessary to withdraw the adjustment-blocks of these particular cups without altering the position of the other blocks. To do this, the cone d^1 is altered to a conical cam, a section of which is shown in Fig. 9 and an elevation in Fig. 12. The surface of the cone is maintained intact, with the exception of those elements of the cone immediately opposite the ports, of which two have been shown, here used for reasons which will be made plain in the following. In case seed is dropped from but one cup and through but one port, it will be necessary to provide but one offset to the cone.

The operation of the mechanism described in the foregoing is as follows, to summarize: The hopper A is supplied with seed-corn. The number of grains to be dropped into a hill is determined by the adjustment of the screw E′. Motion is given the reciprocating bar G by the forward movement of the planter, and in turn communicated through the frame G′ and the pawl G^2 to the dropper-disk D. This is rotated, carrying with it the adjustment-blocks forming a part thereof, the cone-cam d^4 being held at rest, as previously described. The inner ends of the adjustment-blocks D′ being maintained, by virtue of the retractile spring D^2, in contact with the periphery of the cam, the uniform size of the seed-cups is thus maintained while they are passing through the open grain and below the cut-off chisels, a uniform quantity of grain being thus collected in each cup. Upon passing beneath the cut-off E the end of each adjustment-block in turn descends into the groove d^7 of the periphery of the cone d^4, being drawn therein by the spring D^2. The grain in the cup is loosened by the withdrawal of the lug d^2 and falls into the seed-tube below.

Heretofore, so far as to me known, there has

been made no horizontally-rotating dropper-disk having seed-cups adjustable in size, the adjustment being universal and simultaneous, and made from a point above the surface of the grain within the hopper; nor has there ever been constructed a horizontally-rotating dropper-disk having a cup which enlarges at the moment of dropping its charge.

It has been necessary in planters using a horizontally-rotating dropper-disk when in the field and a change of feed was wanted to allow the corn already in the hopper to run out, or else empty the hopper by hand, in order to replace the disk by one having the proper capacity, since the disks are at the bottom beneath the grain. This has been very unsatisfactory, causing waste of time, and rather than suffer the inconveniences changes have frequently been left unmade which were advisable.

By the mechanism herein described the adjusting-wheel is at the surface of the contents of the hopper and regulation to the nicety of a single seed of corn can be obtained in a moment. If found desirable, an index can be readily adapted to the regulating-screw, by which the amount of feed may be accurately indicated. The loss and breakage of change-disks is also avoided. It not infrequently happens that in disks having fixed cups a cup becomes clogged by the grain being jammed together by the cut-off chisel, and the disk in its continued rotation regularly fails to drop the seed as the clogged cup registers with the dropping-port, and an irregular planting is the result.

The mechanism by which the adjustment of the blocks D′ D′ is made, as well as the shape of the blocks themselves, and means for their retraction may be variously modified—as, for instance, each adjustment-block may have its individual spring for retractile purposes; the spring d^5 may be dispensed with and the cone-spindle D^3 produced and threaded to be operated by the present jam-wheel e', arranged to rotate and maintain its seat on the chambered cylinder of the frame of the cut-off E.

Attention will now be called to the peculiarities of the teeth or lugs D^5 of the disk D, on which the pawl G^2 operates, by which slipping and consequent wear are prevented and more reliable action of the pawl is secured. These lugs D^5 are constructed with a semi-cylindrical face. The pawl centering upon this face maintains itself in a straight line with its thrust. No side strain is produced by angling faces, looser fitting is practicable, and the wear is much reduced. In its return-stroke the pawl mounts the opposite lug or tooth upon a similar semi-cylindrical face, made on an incline, however, to facilitate its motion. The tendency is for it to maintain its proper path and be guided to its position behind the next tooth, owing to the curvature of the path over which it travels.

It has been found in practice that a very smooth and reliable pawl movement is obtained by this combination of parts. The mechanism by which a charge of grain may be dropped at every reciprocation of the bar G may now be described. The object in view is to avoid extra wear of the various parts and to secure better service by decreasing the speed at which the parts must travel, if a charge were dropped at every alternate reciprocation of the bar G, or by the usual disk-actuating mechanism, which consists of two pawls placed on opposite sides of the frame G′, one a pushing and the other a pulling pawl, acting at alternate reciprocations of the bar G. It has been found, further, that owing to the limited gripping-surface possible to give these pawls on the lugs of the dropper-disk, because of the compactness of all parts necessary in this class of machinery, that on the surfaces of the pulling-pawl and dropper-disk lug which come into contact the wear is material, oblique rounded faces are soon formed, allowing the pawl to slip off of the face of the lug, and a failure to drop the charge is the result. A pushing-pawl is not liable to this objection for obvious reasons, being practically indestructible, and consequently reliable.

In the usual form of dropper-disks grain is dropped from one seed-cup at a reciprocation of the bar G. In the construction shown, embodying the principles of my invention, two opposite seed-cups are made to register with corresponding parts in the bottom plate, C, and to drop their charges simultaneously. The grain in cup d^{20}, as shown in Fig. 1, drops freely into the seed-tube F and down to the top of the valve, H, where it lies until by the reciprocation of the bar G, which carries the lug g, located in a slot, i, the supplemental cut-off slide valve I, sliding in guides beneath the parts of the bottom plate, C, the valve H is dropped from its normal position in which it is held in opposition to the spring J′, through the lever, J, pivoted at j', by the lug i' of the cam I′, situated on and moving with the cut-off valve I. It will be supposed that the disk D has been rotated into position shown in Fig. 1, with its charged seed-cups d^{20} and d^{20} so registering. The valve I does not reciprocate as a part of or with the bar G, but owing to the comparative length of the slot i and the lug g the bar G has completed about one-half of its reciprocation before it comes into motion. The cam I′ is of such contour as to operate the lever J, through the friction rollers j, with rapidity, when the valve I is finally moved in completion of a reciprocation of the bar G.

The corn lying on the top of the valve H and against the valve-slot f of the seed-tube F is precipitated into the lower chamber, F′, of the tube, where it is met by the descending valve H, which enters the lower valve-seat, f', as shown in dotted lines, and is there held in restraint until the roller j rises on the lug i^2, when it is dropped instantly to earth, and the valve H is returned to its normal upper position. In the meanwhile the contents of the

cup d^{30}, which have fallen to the bottom of the aperture i^4 of the slide I and rests on the upper surface, f^3, of the seed-tube which forms this bottom, is carried forward by the slide I off of its bottom f^3, on which it rested, and drops to the top of the valve H, arriving at that point the instant after it has reached its normal position, after dropping the charge of seed from the cup d^{20} to earth. The bar G now makes its return reciprocation, carrying with it on a frame connected thereto the pawl G^2. This operates to carry the dropper-disk one cup forward to repeat the operation described in the foregoing. As before, the lever J is operated by the cam I, and the charge from the cup d^{30} first descends into the lower chamber, F′, of the seed-tube F and is then dropped to earth in a similar manner to the dropping of the charge of cup d^{20}, all the parts being so proportioned that the time of dropping of each charge is accurately determined relative to each other. The object of this double-seated valve is to secure increased accuracy. The upper valve serves to collect all the grain dropped from the seed-cups above in the long interval at which the valve H rests in its normal up position. Having so collected a charge, it is dropped instantaneously into the lower chamber, there having been no chance in the interval elapsed for this charge to mix with the next succeeding charge, or for seed from the cups to fall direct to earth, by the valve H remaining open owing to any accident, to which dropping mechanism is liable, since it is impossible for seed to reach the earth except when the valve is performing its regular movements. Many other forms of dropper-valves may be substituted for this double-seated valve H to work in conjunction with the cut-off valve I with equally good results, the feature of this part of my invention being the dropping of the contents of the seed-cups d^{20} and d^{30} at alternate reciprocations of the bar G while the dropper-disk is at rest.

I have described this valve as operated by a cam movement. It is obvious that it can be operated in many ways. It is deemed unnecessary to describe others.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a dropper-disk, seed-cups, each provided with a movable wall, in combination with a cone or cam common to all, by which the blocks may be adjusted inwardly or outwardly, as specified.

2. In a dropper-disk, a seed-cup having one or more of its walls movable, in combination with means of adjustment extending to a point above or without the body of seed within the hopper, whereby the capacity of the cup may be varied without removing the grain from the hopper.

3. In a dropper-disk, seed-cups, each provided with a movable wall, in combination with means of adjustment extending to a point above or without the body of seed within the hopper, whereby the capacity of the cup may be varied without removing the grain from the hopper.

4. A dropper-disk having seed-cups, each provided with a movable block which forms the inner end wall thereof, in combination with means of adjustment extending to a point above or without the body of grain within the hopper, whereby the capacity of the cup may be varied without removing the grain therefrom, as specified.

5. A dropper-disk having seed-cups, each cup provided with a movable block which forms one of the walls thereof, and means for the retraction of the blocks toward a common center, in combination with a cone capable of longitudinal axial motion, whereby the blocks may be adjusted inwardly or outwardly, for the purpose specified.

6. In a dropper-disk having seed-cups, the movable blocks forming each respectively one of the walls of a cup, in combination with a cam about or within which the dropper-disk revolves, the cam being adapted to withdraw the block and enlarge the seed cup, thereby freeing the grain therein, as specified.

7. A dropper-disk having enlarged seed-cups, each cup being provided with an adjustment-block, which forms the inner end wall thereof, each of the said blocks having downwardly-projecting lugs, in combination with a retracting-spring or other resilient element embracing all of the said lugs, whereby the adjustment-blocks are drawn toward the common center, substantially as shown.

8. A dropper-disk having the cups d d, a chamber, d^5, and the lowered division-wall d', and the cover-plate D^4, rigidly secured to the disk and provided with splineways, in combination with the adjusting-blocks D′ D′, having a downwardly-projecting lug, d^9, in which lies the retracting-spring D^2, all in combination, substantially as specified.

9. A dropper-disk having the seed cups d d, the adjustment-blocks D′ D′, and the retracting-spring D^2, in combination with the cone d^4, whereby the blocks D′ D′ may be adjusted outwardly and inwardly, substantially as specified.

10. A dropper-disk having the seed-cups d d d, the adjustment-blocks D′ D′, the spring D^2, all substantially as described, in combination with the spindle D^3, carrying the cone d^4, the spring d^6, by which the cone is maintained in its highest position, and the adjusting-screw E′, by which the position of the cone-spindle is regulated, and thereby the position of the adjustment-blocks in the seed-cups, substantially as specified.

11. A dropper-disk having seed-cups, each provided with an adjustment-block, which forms the inner wall thereof, the said blocks being retracted toward the common center against a cam, as that upon rotation of the dropper-disk about the cam the adjustment-blocks of the seed-cups which register with

the dropping-ports are withdrawn, enlarging the said cup, and thereby freeing the grain therein, substantially as shown.

12. In a dropper-disk, the cups *d d d*, the adjustment-blocks D′ D′ D′, the retracting-spring D^2, in combination with a conical cam, d^4, upon a spindle, D^3, having a longitudinal motion but non-rotary, whereby the adjustment-blocks D′ D′ D′ may be accurately adjusted inwardly and outwardly, and thus the capacity of the seed-cups determined, and whereby the adjustment-blocks of the seed-cups registering with the dropping-port may be slightly withdrawn and the grain therein freed, substantially as described.

13. An intermittingly-rotating dropper-disk actuated by a pawl having the lugs D^5, with face of semi-cylindrical contour, to prevent slippage of the pawl, substantially as described.

14. An intermittingly-rotating dropper-disk actuated by a pawl and having the lugs D^5, with face of semi-cylindrical contour, to prevent slippage of the pawl, substantially as described, the opposite face of the lug being of similar semi-cylindrical contour, inclined, however, so that the pawl may ascend it upon the return reciprocation of the frame G′, the contour of the lug being such that the pawl will maintain its proper path with accuracy and be guided into position for further action, substantially as specified.

15. An intermittingly-rotating dropper-disk actuated by a pawl carried on a reciprocating frame or bar, which acts at every alternate stroke to produce a partial rotation of the disk D, the said disk being at rest during the return reciprocation of the frame, in combination with a cut-off valve, I, having an aperture, i^4, having a fixed surface, the return reciprocation of the frame acting to carry the cut-off valve I forward, and with it the charge of grain in the aperture I^4, off from the fixed bottom and drop it to the seed-tube below, substantially as specified.

16. An intermittingly-rotating dropper-disk actuated by a pawl carried on a reciprocating bar, which acts at every alternate stroke to produce a partial rotation of the disk, the said disk being at rest during the return reciprocation of the frame, the said frame having a downwardly-projecting lug, *g*, in combination with a cut-off valve, I, having an aperture, i^4, bottomed on a fixed surface, and a slot, *i*, in which the lug *g* engages, the slot *i* being of such length that the valve I does not come into operation until the close of the reciprocation of the frame G′, when it is carried forward, and with it the charge of grain in the aperture i^4, and the grain upon being carried off from the fixed bottom drops to the bottom of the seed-tube, substantially as described.

17. A dropper-disk, D, an actuating-frame, G′, a pawl, G^2, and a cut-off valve, I, carrying the cam I′, and actuated by the reciprocating frame G′ or bar G, in combination with the lever J, the drop-valve H, and the seed-tube F, provided with the valve-seat projections *f* and *f′* and the chamber F′, all for the purpose and substantially as described.

18. In a corn-planter, the combination of suitable mechanism, which drops charges of grain at regular intervals into the seed-tube, with the valve H, operated at proper intervals, and the valve-seat projections *f* and *f′* and the chamber F′, substantially as shown and described.

In witness whereof I hereunto subscribe my name this 5th day of December, A. D. 1887.

EMIL TYDEN.

Witnesses:
CHAS. L. BARTLETT,
C. W. DAVENPORT.