No. 832,449. PATENTED OCT. 2, 1906.

L. D. BENNER.

SEED PLANTING MACHINE.

APPLICATION FILED JAN. 12, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

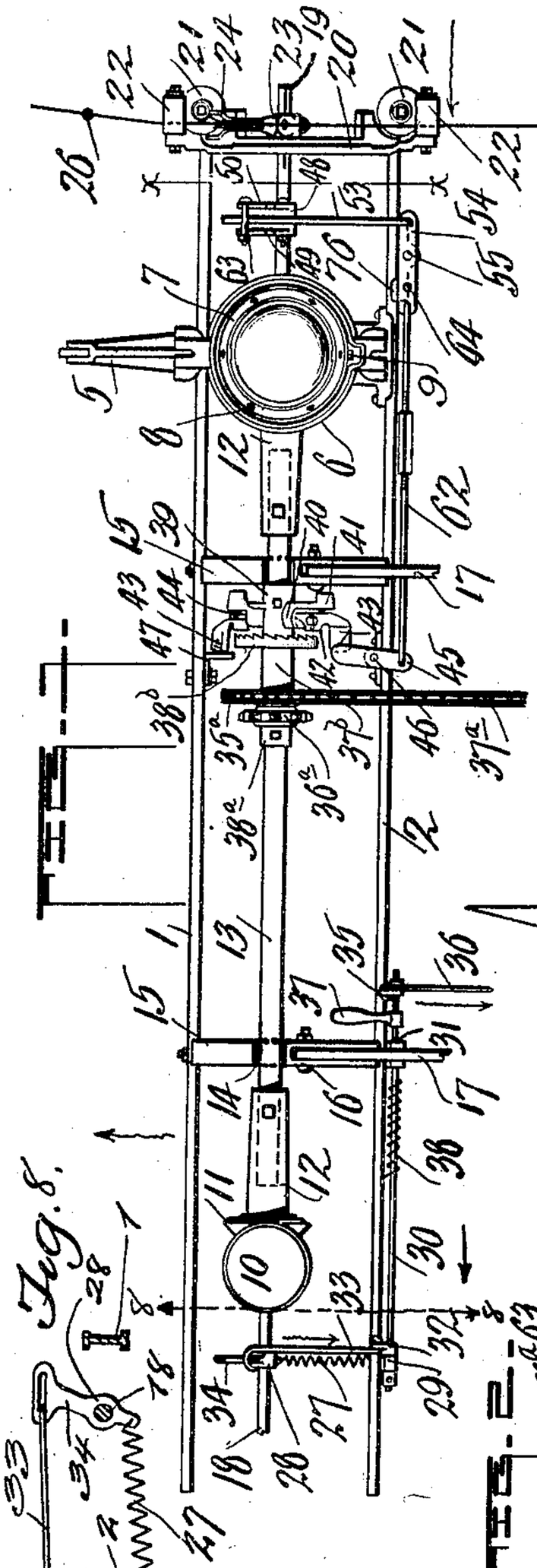


Fig. 2.

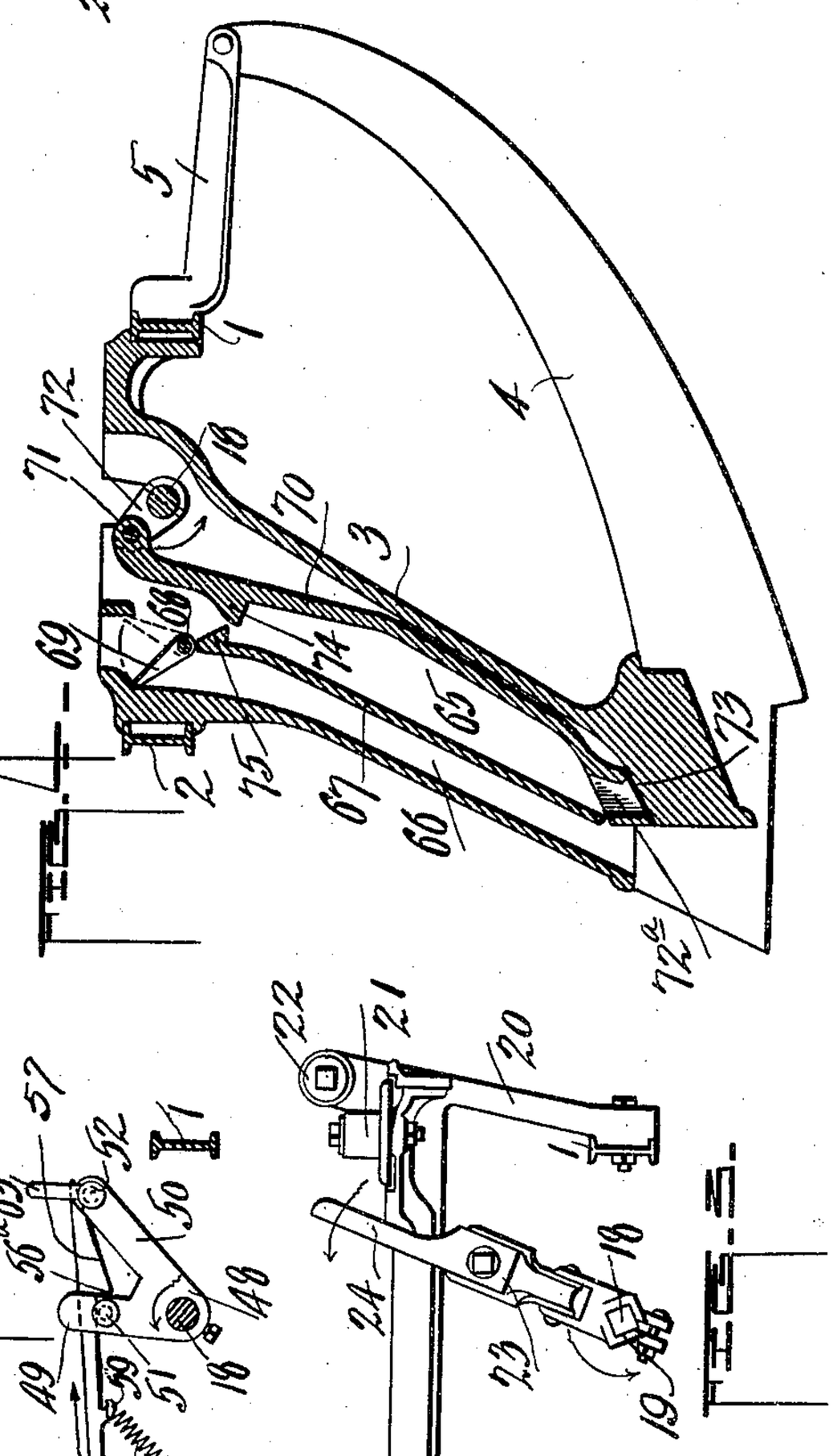


Fig. 3.

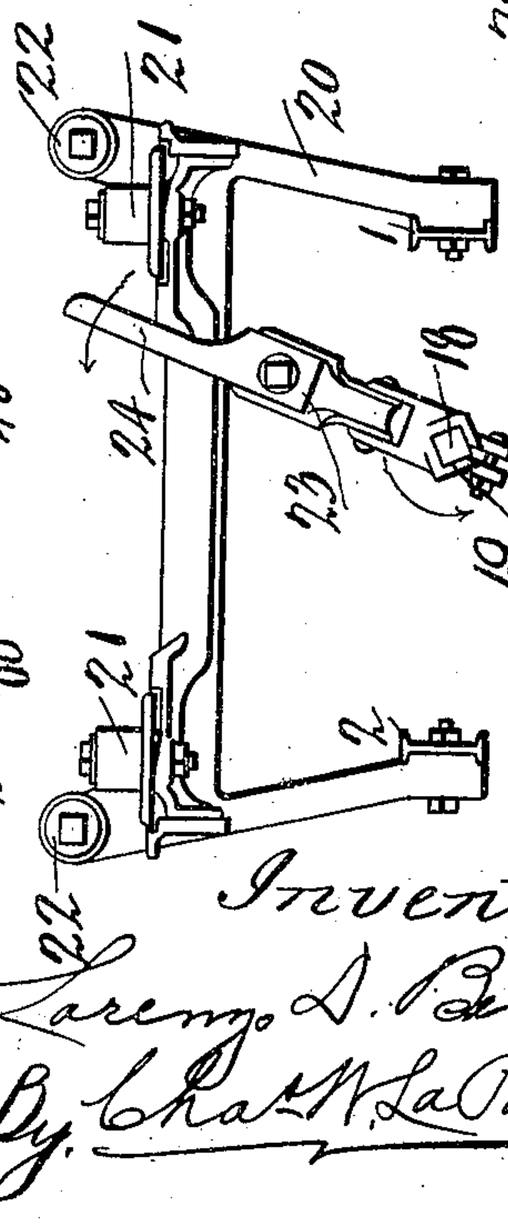


Fig. 4.

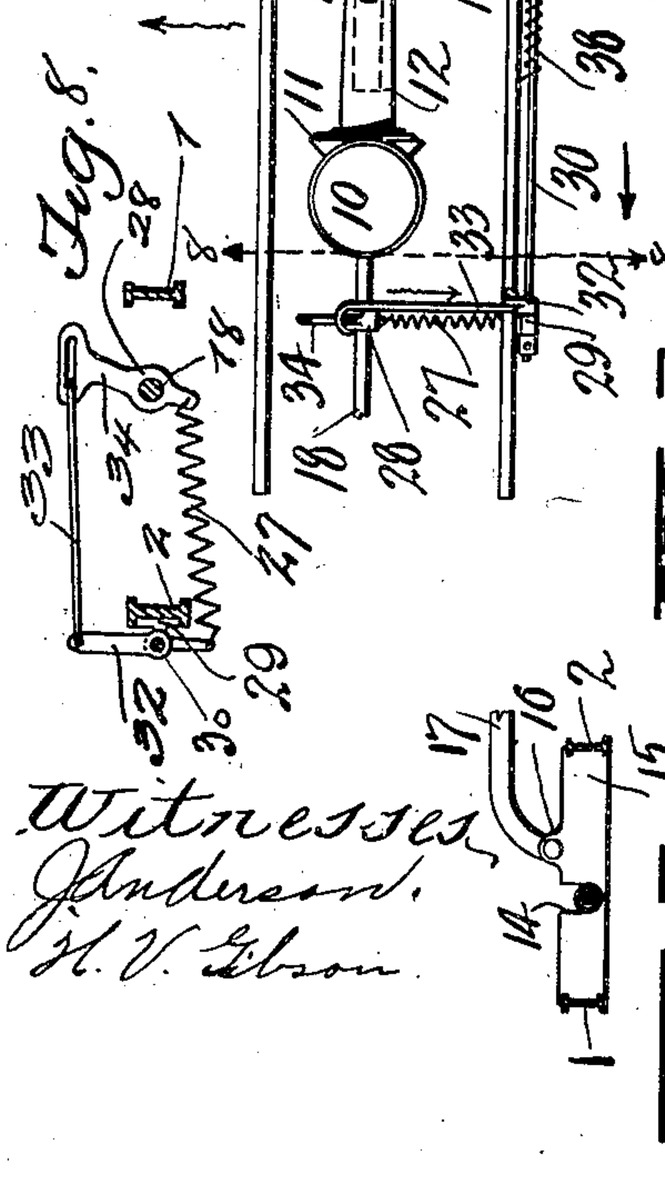
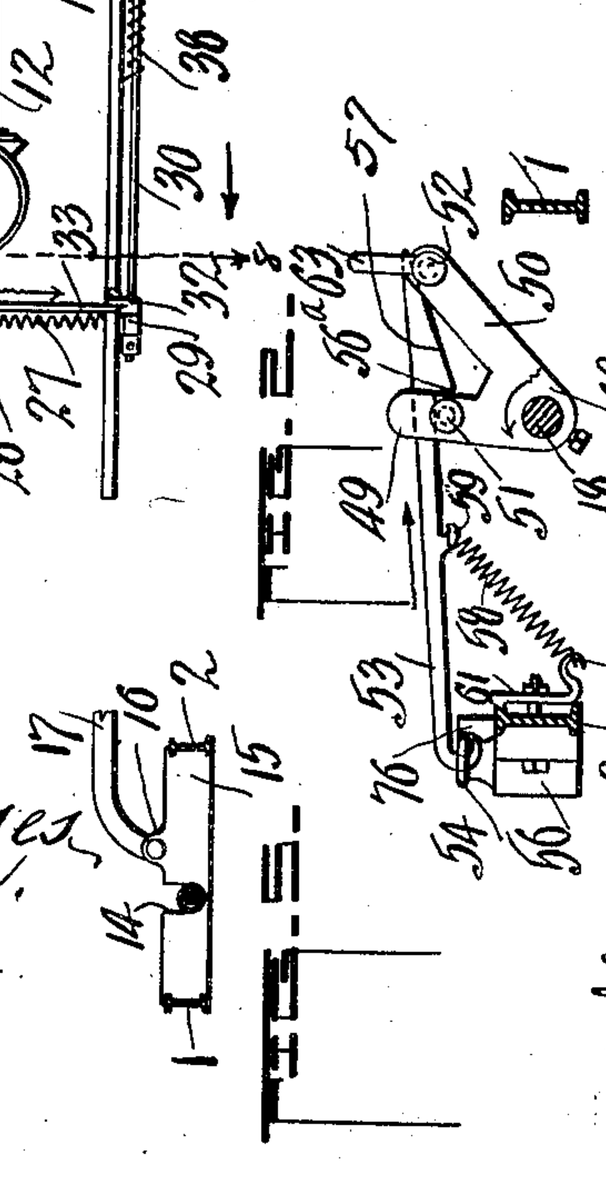


Fig. 5.



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2 SHEETS—SHEET 2.

Fig. 7.

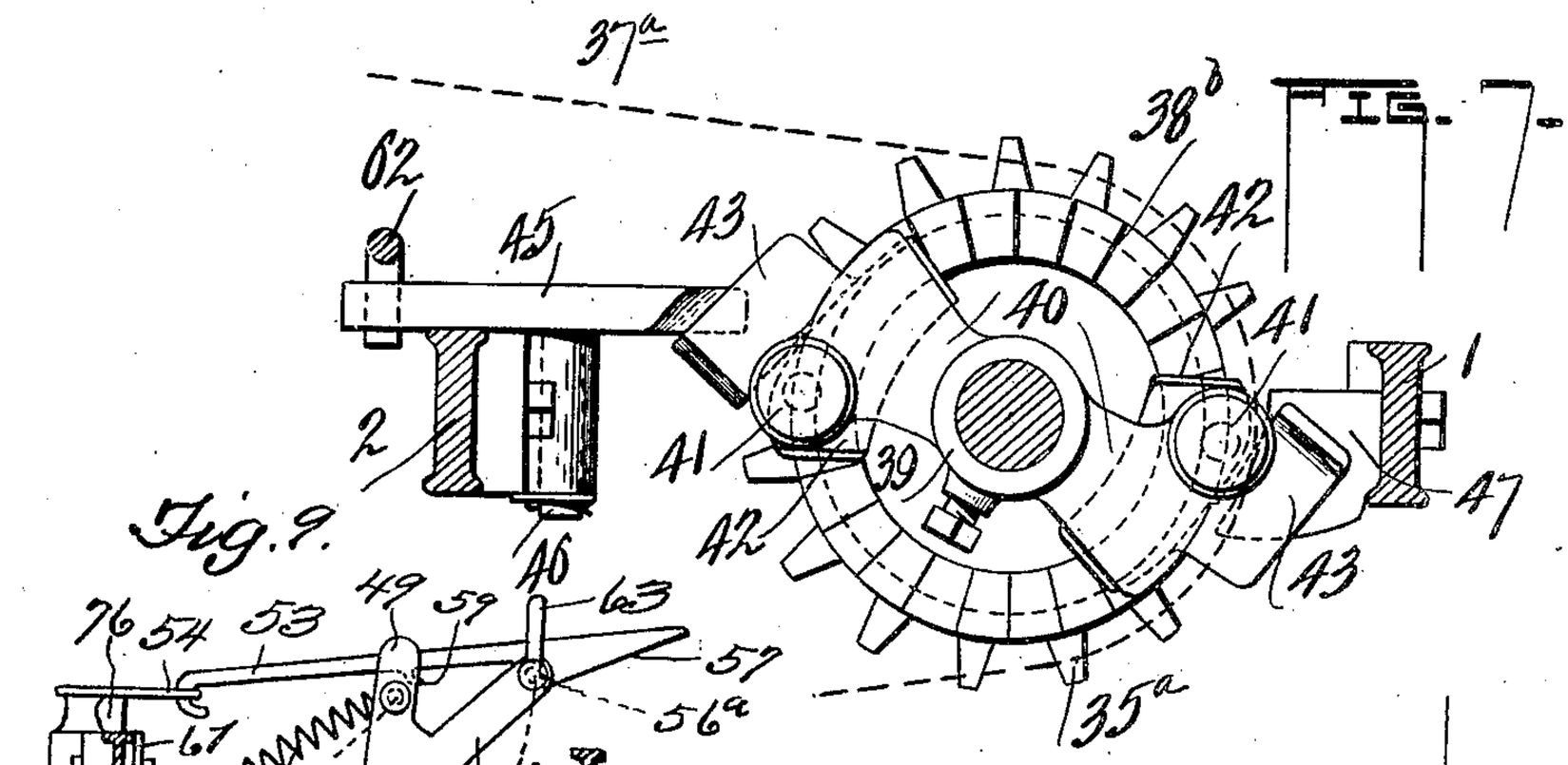
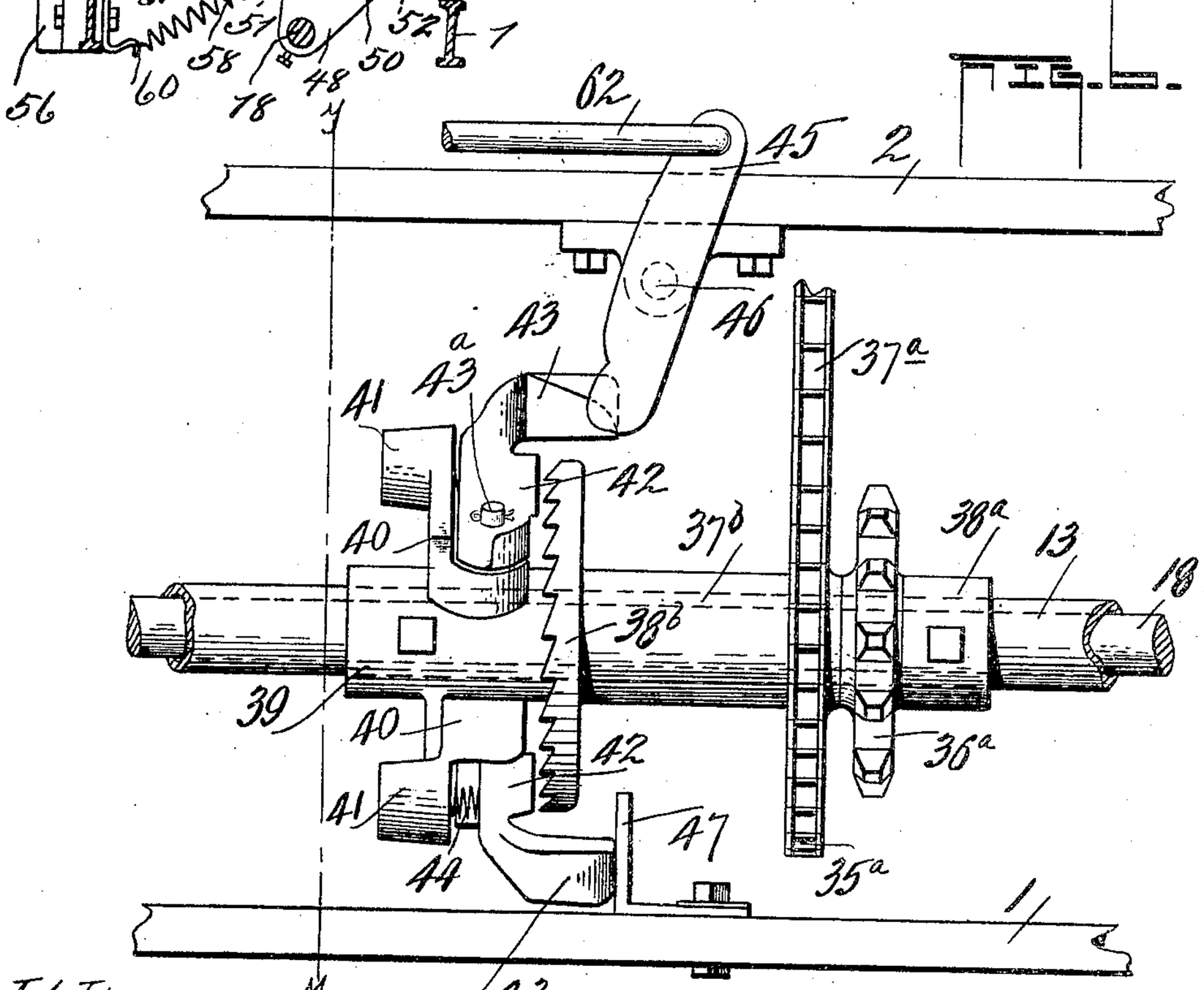


Fig. 9.



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LORENZO D. BENNER, OF PEORIA, ILLINOIS.

SEED-PLANTING MACHINE.

No. 832,449. Specification of Letters Patent. Patented Oct. 2, 1906.

Application filed January 12, 1906. Serial No. 295,704.

To all whom it may concern:

Be it known that I, LORENZO D. BENNER, a citizen of the United States, residing at Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Seed-Planting Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to certain new and useful improvements in seed-planting machines, and relates particularly to the mechanism for actuating the seed-dropping devices of corn-planters.

One of the objects which I have in view in the present invention is to provide a device of the character described wherein the valve mechanisms in the planter-shanks are opened and closed previous to the actuation of the seed-dropping devices for depositing seed into the said shanks.

A further object of the invention is the operation of the rock-shaft in one direction and the return of the said shaft to approximately its normal position before the seed-dropping devices are actuated, to means for operating the rock-shaft, means for operating the seed-dropping devices, and means adapted to be actuated by the rock-shaft for controlling the movements of the seed-dropping devices.

The invention consists, essentially, of seed-dropping devices, continuously-driven mechanism adapted to intermittently actuate said seed-dropping devices, clutch mechanism adapted to control the connection between the seed-dropping devices and continuously-actuated means, to valve mechanism in the planter-shank beneath the seed-dropping devices, a rock-shaft, means for operating said rock-shaft, and mechanism actuated by the rock-shaft and controlling the clutch mechanism adapted during the return movement of the rock-shaft to be actuated to release the clutch mechanism to impart motion to the seed-dropping devices. The arrangement of said rock-shaft, seed-dropping devices, and valve mechanism being such that the rock-shaft will be rocked in one direction to open the valves in the shank and to close said valves in the return of said rock-shaft, and when the rock-shaft has reached approximately its normal position the clutch devices are released for rotating the seed-dropping devices, which is after the opening and closing of the valves in the planter-shanks.

For a further and full description of the invention herein and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the forward portion or runner-frame of a corn-planter and showing my improvements attached thereto. The seed-dropping devices and check-row mechanism being omitted on one end of the figure and on the opposite end thereof a general plan of the seed-plates is shown with the hopper removed. Fig. 2 is an enlarged cross-section in elevation taken on the line X X of Fig. 1. Fig. 3 is an enlarged end view of the forward portion of the planter-frame, showing the arrangement of the check-row devices and looking in the direction of the arrow shown on Fig. 1. Fig. 4 is an enlarged vertical section through the planter-shank to illustrate the arrangement of the valve parts therein. Fig. 5 is a detail in elevation, showing the manner of connecting the parallel frame parts of the runner-frame, also the manner of connecting the reaches between the main frame and the runner-frame, the said connections between the parts of the runner-frame serving as a bearing for the rotating and rock-shafts. Fig. 6 is an enlarged detail in plan of the clutch mechanism controlling the connection between the rotating shaft and seed-dropping devices and a part of the means for controlling such clutch mechanism; and Fig. 7 is a detail in elevation, partly in cross-section, of the clutch parts as the same appear on the line Y Y of Fig. 6. Fig. 8 is a sectional view on the line 8 8 of Fig. 1. Fig. 9 is a view similar to Fig. 2, except that it shows the opposite position of the reach.

Like numerals of reference indicate corresponding parts throughout the figures.

In the drawings, 1 and 2 denote the parallel frame parts of the forward portion or runner-frame of a planter, the same being the construction usually employed in machines of this type. To the frames and at or near

their opposite ends are connected and depend therefrom the conducting-tubes or planter-shanks 3, connected with the runners or furrow-openers 4, which have connection with the reaches 5, which are secured to the frame part 1. There is nothing unusual about the connection of the conducting tube or shank with the frame parts 1 and 2 nor the connection of the runner 4 with the conducting tubes or shanks or the runner-frame, nor is there anything unusual in the manner of supporting the seed-dropping devices and their hoppers on the conducting-tube or planter-shank and the feeding of seed from the seed-dropping devices to the conducting tube or shank, as any of the well-known forms of seeding devices may be operated in connection with the invention herein. In Fig. 1 the base which supports the seeding devices on the conducting tube or shank is indicated as 6, and in the said base is revolubly carried the seed-plates 7, provided with seed-cells 8, through which in the operation of said plates seed will find its way to an opening 9 in the base 6 and passing through said last-mentioned opening will be deposited in the conducting tube or shank. The seed-plates 7 are adapted to have attached thereto or connected therewith a bevel-pinion 10, (shown at the left-hand end of Fig. 1,) and in mesh with said bevel-pinion is a similar bevel-pinion 11, carried by a sleeve 12, which is adapted to have longitudinal adjustment on a sleeve-shaft 13, it being understood that such adjustment is for the purpose of adapting the planter to different widths when it is desired to adjust the seed devices and conducting-tubes or planter-shanks at different widths. This is a common expedient in machines of this character, and it is understood that no special stress is laid on this arrangement. The sleeve-shaft 13 extends from sleeve to sleeve 12 of the pinion 11, and the same has a bearing in a slotted opening 14 of cross-braces 15, connecting the frame parts 1 and 2, (best seen in Fig. 5,) and the said braces are provided with the ears 16, to which the forward ends of reaches 17 of the wheel-frame are pivotally connected, said reaches serving to connect the runner-frame with the main or wheel frame of planting-machines and are in all respects similar and serving the same functions of connections which are well known in this type of machine.

Extending longitudinally of the runner-frame parallel with the frame parts 1 and 2 and through the sleeve-shaft 13 and the upper ends of the conducting tubes or shanks 3 is a rock-shaft 18, having the squared ends 19. On the outer opposite ends of the runner-frame and supported by the frame parts 1 and 2 thereof is the check-row mechanism. However, the drawings only disclose check-row mechanism on one end of the runner-frame. This mechanism is not unlike that usually employed in this class of machines and consists of the bracket 20 and the check-row wire-guiding wheels 21 and 22. Coöperating with this check-row mechanism is a tappet-arm 23, which is carried on the squared ends 19 of the rock-shaft 18, and the upper end of said arm has the usual bifurcated arms 24, through which a check-row wire 25 is drawn and which is adapted to be engaged by the knots 26 of the said wire, and when so engaged the tappet-arm is thrown in the direction of the arrow seen in Fig. 3 for rocking the rock-shaft 18. For returning the rock-shaft to its initial position, or that position shown in the drawings, after the operation thereof through the engagement of the knots of the tappet-wire with the tappet-arm I employ a coil-spring 27, connected at one end with a collar 28, carried by the rock-shaft 18, and connect the opposite end of the said spring with a bearing or casting 29, attached to the frame part 2. These parts are best seen in Fig. 1 at the left thereof and are substantially such devices as are usually employed for returning the rock-shaft after the operation thereof.

Not only is the rock-shaft adapted to be actuated by means of a tappet-wire and a tappet-arm, but I have also provided a hand-and-foot means whereby the operator may operate the rock-shaft at will or when making the turns at the end of the field. These attachments are usually employed in one form or another in machines of this type; but the mechanism which I employ consists of a short longitudinal rock-shaft 30, journaled at one end in the bearing 29 heretofore referred to and at the opposite end in a bearing 31, both of said bearings being attached to the frame part 2. On one end of said rock-shaft 30 is carried an arm 32, to which is connected a rod 33, which at its opposite end has connection with a slotted arm 34 for purposes to be described. On the opposite end of the rock-shaft 30 is carried an arm 35, to which is attached a rod 36, adapted to extend back and have connection with the usual foot-lever. (Not shown.) Also carried by the rock-shaft 30 is a hand-lever 37. Thus it will be seen that upon the operation of the foot-lever for drawing the rod 36 in the direction opposite to that indicated by the arrow in Fig. 1 or the operation of the hand-lever 37 in the same direction the rock-shaft 30 will be rocked in its bearings and move the rod 33 in a direction indicated by the arrow alongside thereof and it having engagement or connection with the arm 34 of the collar 28 the rock-shaft 18 will be rocked in the same manner heretofore described by the tappet-arm. Upon the release of the foot-lever or the hand-lever the spring 27 will return the rock-shaft to its initial position, and a spring 38 coiled about the rock-shaft 30 and attached at one end to the said shaft and at its opposite end

to the frame, will assist in returning the said shaft, the foot-lever, and the hand-lever to their normal positions.

Carried on the sleeve-shaft 13 is the driving parts and clutch mechanism for imparting movement to the seed-dropping devices. The driving parts consist of the sprocket-wheels 35^a and 36^a, adapted to be connected by a sprocket-chain 37^a with a driving-sprocket (not shown) which may or may not be attached to a planter-axle (also not shown)—that is, the sprocket-wheels are of different sizes—and when it is desired to change the speed the chain which is connected with and driven by a driving-sprocket on the driving-axle of the planter (both of which are not shown) the said chain is placed in engagement with the sprocket on the sleeve-shaft which is desired to be employed for transmitting motion through the sleeve-shaft to the seed-dropping devices. The sprocket 36^a is held in position by the collar 38^a and is loosely carried on the sleeve. The sprocket 35^a is carried by a sleeve 37^b, on the opposite end of which is a ratchet-wheel 38^b, said sleeve, sprockets, and ratchet being loosely carried on the sleeve-shaft 13. Fixedly carried on the sleeve-shaft 13 and positioned in front of the ratchet-wheel 38^b is a collar 39, supporting parts which will be described as adapted to coöperate with the ratchet-wheel 38^b and devices carried by the runner-frame for controlling the connection of such parts with said ratchet-wheel. The collar 39 has projecting therefrom a pair of arms 40, which are provided with the sockets 41. Pivotally connected with the said arms 40 are the ratchet-pawls 42, carried upon the stems or studs 43^a. The ratchet-pawls have projecting therefrom and preferably integral therewith the fingers 43, adapted to have engagement with parts to be described, whereby the ratchet-pawls are rotated on their axis for disconnecting the same from the ratchet-wheel 38^b. To project the pawls 42 for the purpose of causing the same to engage with the teeth of the ratchet-wheel 38^b, I have provided the springs 44, which engage with the ratchet-pawls 42 to one side of the axis thereof and the same are carried in the sockets 41 of the arms 40.

45 denotes a short lever or crank-arm which is fulcrumed at 46 to the main frame part 2. The normal position of this lever is such that the forward end thereof lies in the path of the fingers 43, so that in the rotation of the sleeve-shaft 13 and the ratchet-wheel thereon said fingers will engage with the forward end of the lever and through such engagement the ratchet-pawls are oscillated for the purpose of disengaging the same from the ratchet-wheel. This operation refers to the movement of the sleeve-shaft when one of the fingers 43 is moving upwardly in the rotation of the sleeve-shaft, and it is also necessary to provide suitable means whereby the opposite ratchet-pawl is also disengaged from the ratchet-wheel as the same moves downwardly in the rotation of the said sleeve-shaft. To accomplish this, I provide an arm or bracket 47, attached to the frame part 1, with which the fingers 43 engage, substantially as seen in Fig. 6, which said figure clearly shows how both of the fingers 43 of the collar 39 are operated for oscillating the ratchet-pawls 42 to disengage the same from the ratchet-wheel. Means will now be described for oscillating the lever or crank-arm 45 for the purpose of moving the same out of the path or from connection with the fingers 43 when the springs 44 in engagement with the same will automatically act to force the ratchet-pawl 42 into engagement with a tooth of the ratchet-wheel 38^b. This preliminary movement will connect the sleeve 37^b, which carries the ratchet-wheel, and the sprocket-wheels with the sleeve-shaft 13 on which the collar 39 is secured, and through such connection through the continuous operation of the sprocket-wheel 35^a, through the chain 37^a, the sleeve-shaft is clutched to the said sprocket-wheels and motion is thereby imparted to the bevel-gears 11 and 10 for imparting motion to the seed-plates. The continued operation of the sleeve-shaft causes the finger 43 in engagement with the arm or bracket 47 to be disconnected from the same and permit its ratchet-pawl to engage with the ratchet-wheel 38^b. With such engagement of the ratchet-pawl with the ratchet-wheel the sleeve-shaft is permitted to make one-half of a revolution, which in turn imparts a one-half revolution to the seed-dropping devices, when the fingers 43 again move into position to engage with the lever or crank-arm 45 and the arm or bracket 47 for disconnecting the ratchet-pawls from the ratchet-wheel, which operation, as above expained, will disconnect the sleeve-shaft from the driving means.

I have described several different means for operating the rock-shaft, which included the tappet-arm connection to be operated by a tappet-wire and the hand or foot means, all of which it is believed will be understood, and the means in connection with the said rock-shaft and the lever or crank-arm 45 consists of a collar 48, Fig. 2, adapted to be fixedly secured on the said rock-shaft, and the same is provided with the two pairs of upwardly-extended bifurcated fingers 49 and 50, and extending through and connecting each pair of fingers 49 and 50 are shown stems or bolts 51 and 52. The arrangement of the bifurcated extensions of the collar 48 form a channel-way, in which is carried and adapted to be operated a reach 53. This reach at its rear end is connected with one end of a lever or crank-arm 54, fulcrumed at 55 to a bracket 56, attached to the frame part 2, and the said reach at its

forward end is provided with an offset or depending shoulder portion 56ª, which when the reach and the collar 48 are in their normal positions, substantially as shown in the figures, will be adjacent to the stem or bolt 51, and the lower edge of the reach from the shoulder portion to the extreme forward end thereof is beveled or inclined, as at 57, and extends across and slightly above the stem or bolt 52.

The operation of the collar 48 and the reach 53 is somewhat as follows: When the rock-shaft 18 is actuated either through the tappet-wire and tappet-arm connection or by hand or foot power and in the direction indicated by the arrow in Fig. 2, the stem or bolt 52 of the extension 50 of the collar 48 will ride beneath the inclined edge 57 of the reach until the said stem or bolt rides off of the same and engages with the offset 56ª somewhat in the same manner as that shown by the stem or bolt 51 in Fig. 2. If the rock-shaft has been operated by the tappet-wire and the parts have assumed the positions just described, the tappet-wire will release the tappet-arm, and the spring 27 will cause the return of the rock-shaft in a direction just opposite to that indicated by the arrow in Fig. 2, or to its initial position. Such return movement will cause the stem or bolt 52 to project the reach 53 in the direction indicated by the arrow in Fig. 2, and in so doing will oscillate the lever or crank-arm 54, and upon the rock-shaft assuming its normal position or the extension 50, carrying the stem or bolt 52, reaching the limit of its throw the said stem or bolt 52 will disengage itself from the shoulder portion or offset 56ª of the reach 53, when the reach will be returned to its initial position, or that position shown in the drawings, by means of the spring 58, connected at one end to a hook 59, depending from the reach, and at its opposite end to a hook 60 of an arm 61, attached to the frame part 2. Connected with the lever or crank-arm 54 at the end thereof opposite to the connection of the reach 53 therewith is shown a rod 62, which at its opposite end has connection with one end of the lever or crank-arm 45. Thus it will be seen that when the lever or crank-arm 54 is oscillated through the movement of the reach 53 in the direction indicated by the arrow in Fig. 2 the lever or crank-arm 45 will be oscillated, and thereby release the same from the finger 43 of the clutch mechanism then engaging with the same, whereby the ratchet-pawl 42 will engage with the ratchet-wheel 38ᵇ and clutch the driving mechanism with the sleeve-shaft. For the purpose of retaining the forward end of the reach 53 in operative connection with the stem or bolt 52 and in the channel-way formed by the pairs of fingers 49 and 50 of the collar 48 I have provided a yoke 63, which is connected with the outer ends of the fingers or extensions 50 of the collar 48 and overhangs the reach somewhat as shown in Figs. 1 and 2. It will be understood that the stem or bolt 51 serves as a stop in the return movement of the reach after the same has been projected in the manner described and also serves as a rest for the said reach.

In Fig. 1 the connection of the parts between the rock-shaft and the lever or crank-arm 45 shows such parts in a position when it is adapted to impart an intermittent movement to the seed-plates 7, through the connections described, to be made between the sleeve-shaft and the driving mechanism. However, if it is desired to use the planter for drilling wherein a continuous motion is imparted from the driving mechanism to the rotating shaft and from the latter, through the gearing described, to the seed-plates, the connection of the rod 62 between the levers 45 and 54 will be disconnected, particularly with the lever 54, and connection made with the said lever in the perforation indicated as 64, which connection will retain the lever 45 from out of the path of the movement of the fingers 43 of the clutch mechanism, so that there will be a substantial and continuous connection of one or the other ratchet-pawls with the ratchet-wheel 38ᵇ for imparting a continuous rotation from the driving mechanism to the sleeve-shaft.

Referring again to the planter-shank 3, the same is provided with two longitudinal channels 65 and 66, divided by the partition 67, which is cut away for a portion of its length at or near the upper end thereof to form a communicating way between the said channels 65 and 66. At 68 is pivotally connected in the shank a flip-valve 69. This valve is not unlike valves of this character provided in planter-shanks except in its arrangement, and the mode of operating the valve is from the outside of the shank by a suitable connection with an arm connected with the pivot of the valve. This connection has not been shown, as no claim is made upon the same, and any well-known attachments upon the valve may be applied. The location of the valve is at the head of the partition 67, and when the valve is shifted into the position shown in the dotted line in Fig. 4 the upper end engages with the lower end of the upper extension of the said partition, and any seed dropped into the shank through the opening 9 in the base which supports the seed-plate will pass down and through the channel-way 66 and into the ground or furrow cut by the runner of the shank. The adjustment as described for the valve for directing the seed into the channel-way 66 is made when the planter is used for drilling, and the rod 62, which controls the movement of the lever 45, has been adjusted and connection made with the lever 54 at 64. Operating in the channel 65 of the shank is a valve consisting of the

arm or extension 70, which is of considerable length and pivotally connected at 71 with the crank-arm 72, carried by the rock-shaft 18. On the lower end of this arm or extension 70 is provided a pocket 72[a], which is slidable on a seat portion 73 of the shank. The arm or extension of the valve just referred to has the offset or rest 74 projecting laterally therefrom, and projecting in an opposite direction from the partition 67 is a rest or seat portion 75, projecting slightly over the lower end of the rest or seat portion 74 of the valve. In check-rowing or when an intermittent movement is imparted to the seed-dropping devices the valve 69 is in the position shown in full lines in Fig. 4, whereby when seed or kernels of corn are deposited in the upper end of the channel 65 it will fall on the flip-valve 69 and pass through the open way formed by the partition 67 and into the channel-way 65 and on the combined rest formed by the offsets 75 of the partition 67 and 74 of the extension 70 of the valve. When the rock-shaft is rocked in the direction indicated by the arrow in Fig. 4, the crank-arm 72, carried by the said shaft, will project the extension 70 of the valve downwardly and cause the pocket 72[a] to ride off of the seat 73 of the shank. Any seed or kernels of corn which are in the pocket 72[a] will be deposited in the furrow formed by the runner, and any seed held by the offsets or rests of the partition and valve of the shank will be dropped to the lower end of the shank; but the movement of the valve and the arrangement of its rest 74 is such that the seed in the pocket 72[a] will be discharged from the shank and the pocket returned to its normal position approximately by the time the seed dropped from the rest 74 of the valve reaches the pocket 72[a] thereof. However, the lower end of the partition 67 will prevent the discharge of any seed from the shank dropped from the rest 74 of the valve with the discharge of seed from the pocket 72[a], as the lower end of the partition is in close proximity to the upper face of the pocket and will retard the discharge of any seed until the pocket has been moved to a position to receive the seed dropped into the lower end of the said shank.

It was stated in the fore part of the specification that the rock-shaft would be moved in one direction and returned approximately to the end of its return movement before the seed-plates or seed-dropping devices would be set in motion and that the motion of the seed-dropping devices would not occur until the valves in the planter-shank had been opened and closed. To substantiate this statement, it will be seen from an examination of the drawings that the devices which control the clutching of the driving mechanism and the rotating shaft are in such a position that the rock-shaft may be moved in one direction, or that direction indicated by the arrows in Figs. 2, 3, and 4, and returned approximately to its initial position before the reach 53 would be moved sufficiently to release the lever or crank-arm 45 from one or the other of the fingers 43 of the clutch devices to permit the connection of the driving mechanism with the rotating shaft in the manner described. It will also be seen that with the preliminary movement of the rock-shaft in the direction indicated by the arrow in Fig. 4 the valve-arm 70 will be depressed and raised for discharging seed from the pocket 72[a] thereof and the return of said pocket to its normal position by the time the reach 53 is actuated for imparting motion to the lever 45 through the connections described with the said reach 53 and for the purposes above explained, when the said plates will be rotated for depositing seed into the planter-shanks.

I am aware that it is not new to provide for an intermittent clutch engagement between the driving mechanism and the rotating shaft and that the same is controlled by the operation of the rock-shaft and that such movement of the rock-shaft through suitable connections is capable of operating the valves in the planter-shanks; but heretofore the operation of such valves in the planter-shanks and also the movement of the seed-plates or seed-dropping devices have occurred during the preliminary movement of the rock-shaft, such as have been indicated by the arrows in Figs. 2, 3, and 4, or when the tappet-arm has been thrown rearwardly, which is the description for the first throw of the tappet-arm when engaged by the tappet-wire; but in my device the only operation which takes place during the preliminary movement of the rock-shaft or in the rearward movement of the tappet-arm is the moving of the valve-arm 70 and the pocket 72[a] thereof through the connection of the crank-arm 72 with the rock-shaft, which will open the same, and when the rock-shaft has reached approximately its initial position or the tappet-arm its limit of movement in the forward throw the pocket 72[a] of the valve in the shank will be closed, and simultaneous with such parts assuming the positions just described the lever 45, through the operation of the reach 53 and the connections thereof, will be in a position whereby the finger 43 of the clutch devices then engaging with the lever 45 will be permitted to be oscillated through the pressure of the spring 44 to cause an engagement of the ratchet-pawl 42 with the ratchet-wheel 38[b] for connecting the driving mechanism with the rotating shaft. Thus it will be seen that in the operation of the seed-plates or seed-dropping devices all seed deposited in the planter-shank, if the valve 69 is in the position shown in the drawings, will fall onto the offsets or shelf portions 74 and 75 of the

valve extension and the partition, respectively.

The within improvements are not only well adapted to planters using a single-kernel drop mechanism, but are also adapted for use in connection with seed-dropping devices where one or more kernels of corn are dropped at a time. The said devices have a special advantage if the seed devices are caused to be operated by hand or foot power—that is, if the clutching of the rotating shaft with the driving mechanism should be regulated by hand or foot power. It will be noted in this connection that if the rock-shaft is moved in one direction, being the preliminary movement, and held in that position the only operation of devices would be to depress or open the valve in the planter-shank and that there is no possibility of the seed-dropping devices being actuated, and it is not until the rock-shaft returns approximately to its initial position that the seed-dropping devices can be actuated at all, so that in the use of hand or foot power for operating the rock-shaft through the connection of the rock-shaft 30 and the rod 33 it will be necessary to release the hand or foot from such devices before the spring 27 can act to cause the stem or bolt 52 of the collar 48 to project the reach 53 in the manner and for the purposes above described.

With the usual construction of corn-planters and the arrangement of the mechanism to be operated by the rock-shaft for connecting the rotating shaft with the driving mechanism if an operator in operating by hand or foot power should fail to release the parts engaged by the hand or foot the seed-dropping devices would continue to be actuated; but, as above stated, it is impossible for the seed-dropping devices to be actuated at all until the hand or foot is released, and then the parts can only move a predetermined distance, when they will have to be again engaged and set into a position for a second operation.

Attention is directed to the slotted extension 34 of the collar 28, with which the rod 33 is connected, which is also connected with the rock-shaft 30, adapted to be actuated by hand or foot power. The slotting of the extension 34 guards against any motion being imparted to the foot or hand power devices when the rock-shaft 18 is operated through the tappet-arm connection and prevents any interference with the movement of the rock-shaft by the hand or foot power mechanism during the operation of said rock-shaft through the tappet-arm connection. When the rock-shaft is moved in the direction indicated by the arrow in Fig. 3, it will be seen that the slotted extension of the collar 28 may be projected without disturbing the rod 33, which moves loosely in the said slotted extension, and yet if the parts are in the position seen in the drawings they are such that when it is desired to actuate the rock-shaft motion being imparted to the rock-shaft 30 will, through its connection with the collar 28, impart a corresponding movement to the rock-shaft 18.

For the purpose of controlling the limit of movement of the lever or crank-arm 54, being one of the parts for controlling the operation of the clutch devices during the actuation of the reach 53, I have provided the lug 76, which projects up from the bearing 56, attached to the frame part 2, with which the lever or crank-arm 54 is adapted to engage when the same assumes the position shown in Fig. 1.

While I have shown the rotating shaft as a sleeve-shaft through which the rock-shaft extends, it is to be understood that this is the preferred application of my invention, although the ordinary arrangement of rock-shaft and rotating shaft where the same are spaced apart could be used equally as well as that arrangement shown in the drawings with slight modification in the connection of the operating parts with such rock-shaft and rotating shaft.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, mechanism for opening and closing the valves prior to the operation of the seeding devices, and means adapted to be actuated by the mechanism aforesaid for controlling the movement of the seeding devices.

2. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, intermittently-actuated mechanism for opening and closing the valves prior to the operation of the seeding devices, and means adapted to be actuated by the mechanism aforesaid for controlling the movement of the seeding devices.

3. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, a rock-shaft, connection between the rock-shaft and valve mechanism, means for actuating the rock-shaft to open and close the valves prior to the operation of the seeding devices and means adapted to be actuated by the rock-shaft for controlling the movement of the seeding devices.

4. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, a rock-shaft, connection between the rock-shaft and valve mechanism, means for actuating the rock-shaft to open and close the valves prior to the operation of the seeding devices, continuously-driven means for actuating the seeding devices, and clutch mechanism adapted to be released through the movement of the rock-shaft for clutching the continuously-driven means with the seed-

ing devices after the opening and closing of said valves.

5. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, a rock-shaft for actuating the valve mechanism, a rotating shaft for actuating the seeding devices, means for actuating the rock-shaft to open and close the valve mechanism in advance of the operation of the seeding devices, clutch mechanism for controlling the connection of the rotating shaft with the seeding devices, and means adapted to be actuated by the rock-shaft for releasing the clutch parts and thereby connect the rotating shaft with the seeding devices.

6. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, a rock-shaft for actuating the valve mechanism, a rotating shaft for actuating the seeding devices, means for moving the rock-shaft in one direction and returning the same and during such movement open and close the valves, and mechanism controlling the connection of the rotating shaft with the seeding devices, said mechanism adapted to be actuated by the rock-shaft during its return movement whereby the seeding devices are not actuated until the rock-shaft has reached approximately its initial position.

7. In a corn-planter, the combination with the seeding devices and valve mechanism thereof, clutch devices for controlling the operation of the seeding devices, a rock-shaft, connection between the rock-shaft and valve mechanism, a member carried on the rock-shaft, connection between the said member and the clutch devices, means for actuating the rock-shaft in one direction and returning the same and during such movement open and close the valves, the member on the rock-shaft during the return movement thereof adapted to operate the connection with the clutch mechanism for releasing the same and thereby impart movement to the seeding devices, the actuation of the seeding devices occurring approximately at the time the rock-shaft reaches its initial position in the return movement thereof.

8. In a corn-planter the combination with the seeding devices and valve mechanism thereof, a rock-shaft for actuating the valve mechanism, means for moving the rock-shaft in one direction for opening the valves, means for returning the rock-shaft and closing the valves, and means operating when the rock-shaft has reached approximately its initial position for actuating the seeding devices and means for stopping the seeding devices after a predetermined movement thereof.

9. In a corn-planter the combination with the seeding devices and valve mechanism thereof, means for opening and closing the valves, means for actuating the seeding devices subsequent to the actuation of the said valves, and means for stopping the said seeding devices after a predetermined movement thereof.

10. In a corn-planter the combination with the seeding devices and valve mechanism thereof, mechanism for opening and closing the valves, and means governed by the actuation of the mechanism aforesaid for controlling the movement of the seeding devices, whereby motion is not imparted to the seeding devices until after the opening and closing of said valves.

11. In a corn-planter the combination with the seeding devices and valve mechanism thereof, a rock-shaft for actuating the valve mechanism, a rotating shaft for actuating the seeding devices, clutch mechanism for controlling the connection of the rotating shaft with the seeding devices, a member carried on the rock-shaft, a reach in connection with the said member, mechanism adapted to be operated by the reach for controlling the engagement and disengagement of the clutch mechanism, means for moving the rock-shaft in one direction to open the valves, means for returning the rock-shaft and closing the valves, and during such movement operating the reach aforesaid and thereby permitting the engagement of the clutch mechanism for connecting the rotating shaft with the seeding devices subsequent to the opening and closing of the said valves.

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

LORENZO D. BENNER.

Witnesses:

CHAS. W. LA PORTE,

J. ANDERSON.