

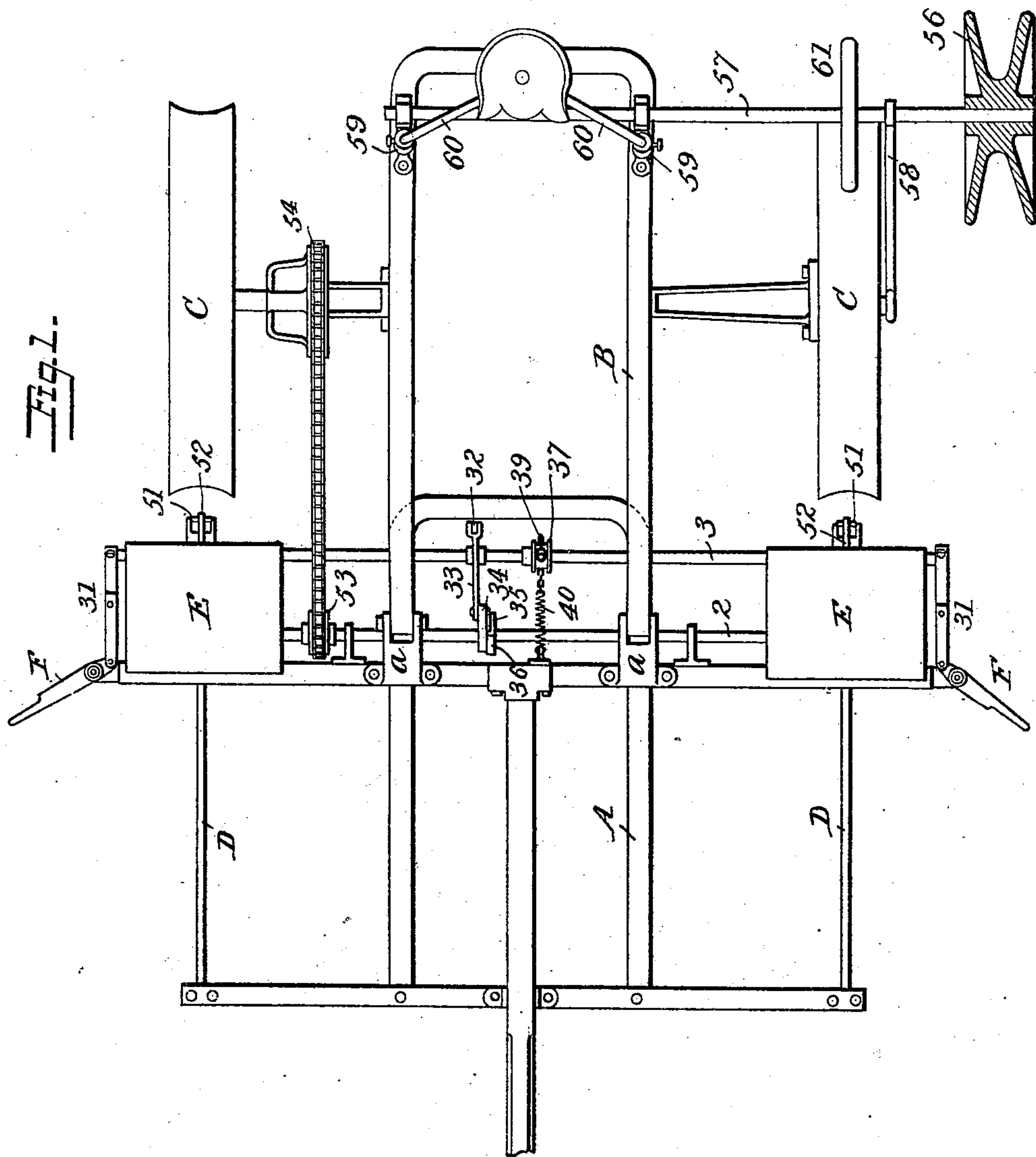
(No Model.)

4 Sheets—Sheet 1.

L. D. BENNER.
CORN PLANTER.

No. 546,482.

Patented Sept. 17, 1895.



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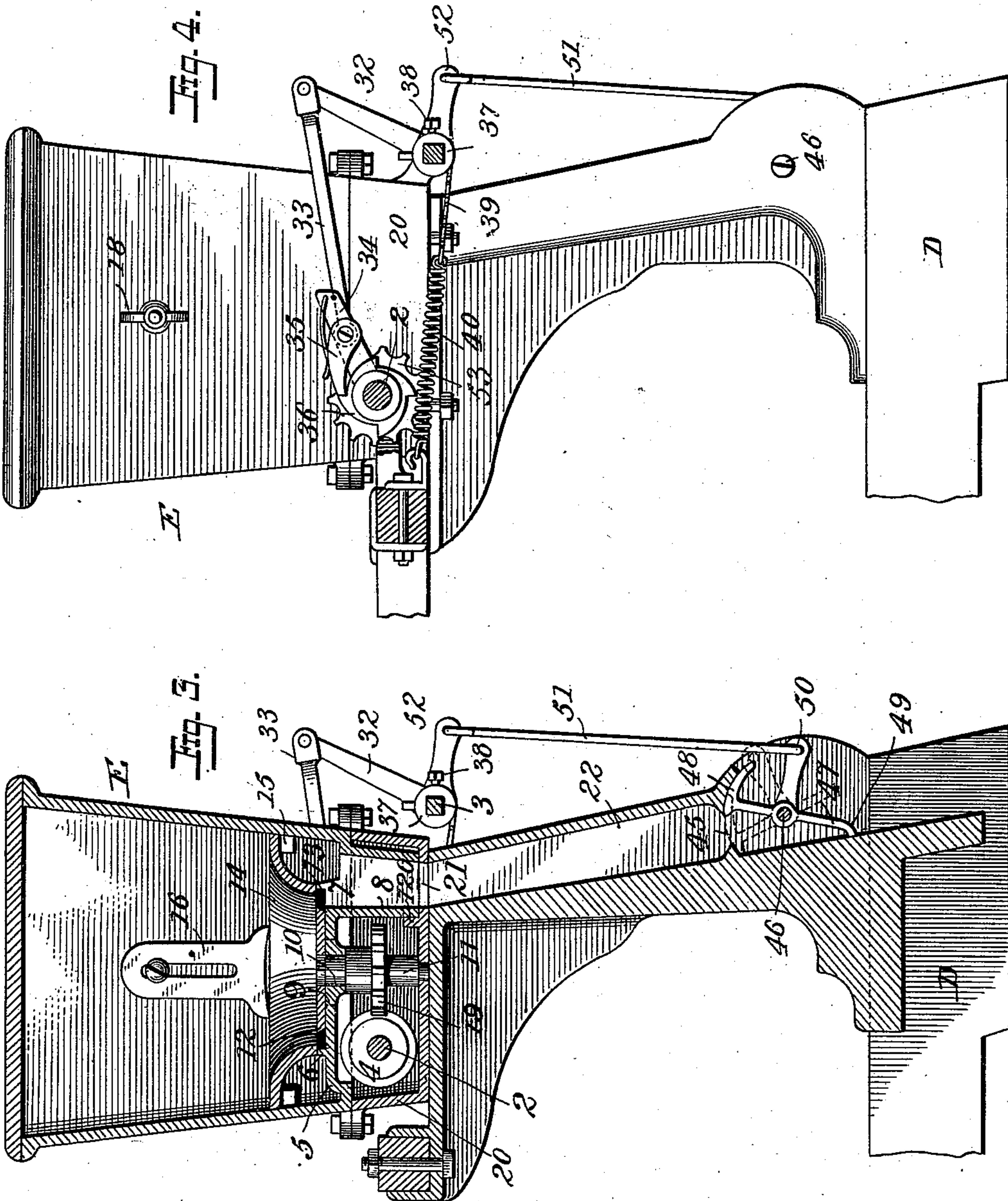
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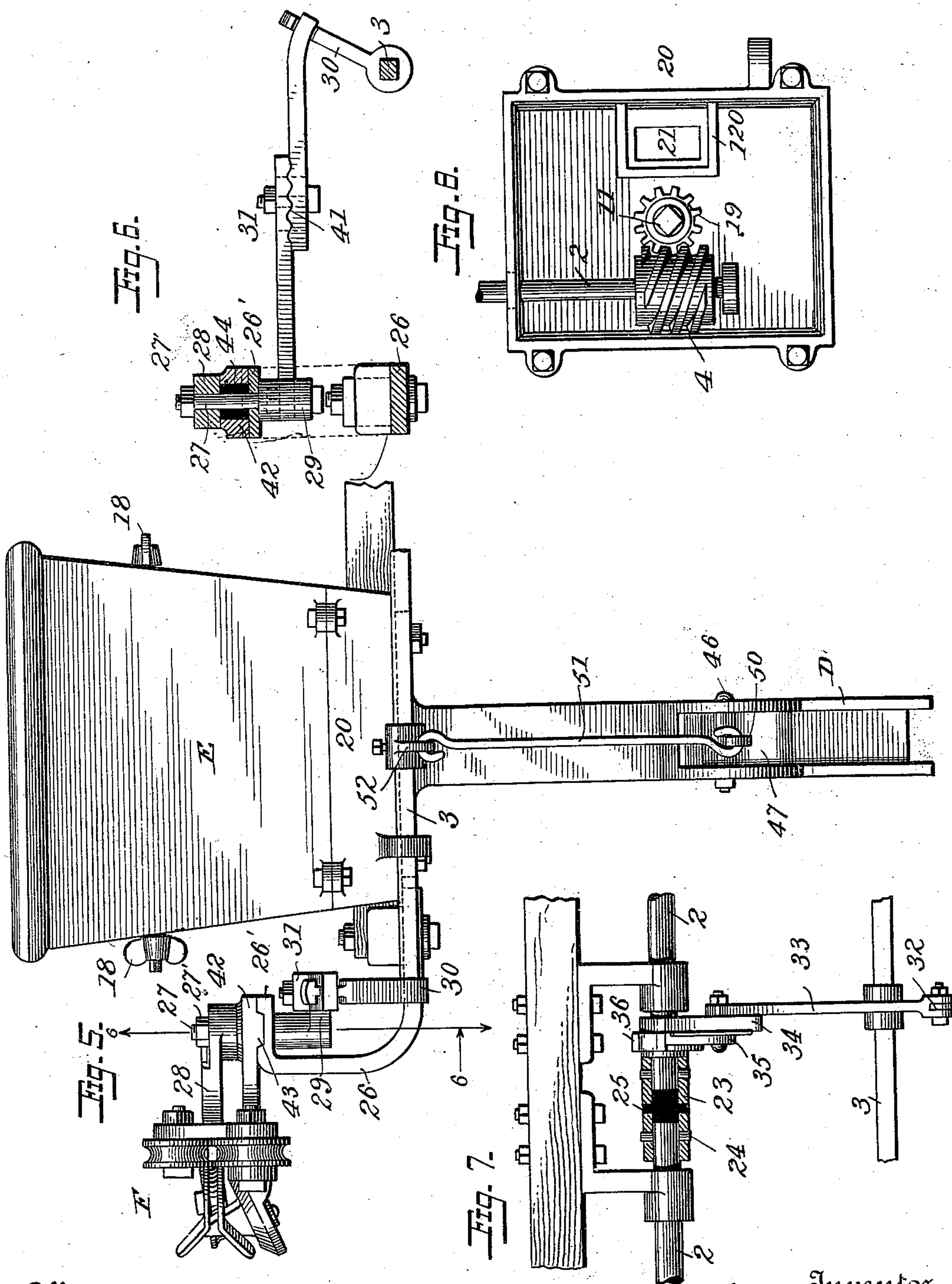
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UNITED STATES PATENT OFFICE.

LORENZO D. BENNER, OF PEORIA, ILLINOIS, ASSIGNOR OF ONE-HALF TO
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CORN-PLANTER.

SPECIFICATION forming part of Letters Patent No. 546,482, dated September 17, 1895.

Application filed May 28, 1894. Serial No. 512,705. (No model.)

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 Corn-Planters, of which the following is a specification.

My invention relates to seed-planters, it being particularly applicable to that class of such machines known as "check-row" planters; and it consists of the several improvements which will be hereinafter pointed out, some of which improvements are applicable to other kinds of planters than that shown.

In order that my invention may be more clearly understood, I have illustrated the same in the accompanying drawings, in which—

Figure 1 is a top plan view of a seed-planting machine having my invention applied thereto. Fig. 2 is a rear elevation of the machine. Fig. 3 is a vertical sectional view through one of the seed-boxes and the runner connected therewith. Fig. 4 is a sectional elevation taken on the line 4 4 of Fig. 2. Fig. 5 is a rear elevation of one end of the forward or runner frame. Fig. 6 is a sectional view taken on the line 6 6 of Fig. 5. Fig. 7 is a plan view, partly in section, illustrating the connections between the rocking and the revolving shafts and also the connection between the two parts of the latter shaft. Fig. 8 is a detail plan view of the box or casing which surrounds the driving-gearing of the seed-dropping devices. Fig. 9 is a top plan view of one of the seed-boxes with the hopper 14 removed. Fig. 10 is a detail view showing one of the bearings of the reel-shaft.

The framework upon which those portions of the machine which embody my invention are mounted may be of any usual or approved construction; but in the accompanying drawings, wherein I have shown my invention applied to a well-known form of check-row corn-planter, A designates the forward or runner frame, and B the rear or wheel frame, these two frames being pivotally connected, as represented at a.

C C designate the main supporting-wheels; D D, the runners; E E, the seed-boxes; and F F the check-row mechanism, which parts need not be herein described in detail.

Two shafts are mounted upon and extend across the forward or runner frame, one of these shafts 2 being termed in this specification the "revolving" shaft or the "seed-dropping" shaft and the other 3 being called the "rock-shaft" or the "check-row" shaft. These shafts are preferably arranged as shown, being parallel and with the shaft 2 forward of and slightly above the shaft 3.

The revolving shaft 2 operates the seed-dropping devices and extends into or below the seed-boxes E and is provided near each end with a worm 4.

The seed-box E is provided with a bottom 5, which, when the seed-box is of metal, may be integral therewith and which is provided with a centrally-arranged circular and upward-projecting flange 6. There is an opening 7 through the bottom plate 5, through which the seed is dropped, and from this opening there leads a short spout or conduit 8, which may be integral with the bottom of the box, if desired. There are also openings 9 9 through the bottom of the box, which serve to permit the escape of dirt and seed, as will be presently pointed out, and there is another opening 10, arranged centrally of the flange 6, and through which extends the shaft 11, carrying the seed-dropping plate 12. This latter plate is circular in outline and fits closely within the space inclosed by the flange 6, its edge being notched to form the seed-pockets 13, the flange 6 serving to close the outer ends of these seed cells or pockets. The seed cells or pockets 13 preferably flare downward in order to insure an easy and free escape of the seed. The opening 7 is so placed that the notched portion of the seed-wheel passes over it, so that the charges of seed held in several cells are successively delivered through this opening. I have found that the seeds more readily clear themselves from the cells in the plate 12 when such cells are formed by notches at the edges of the plate than when they are formed, as is usual, by perforations arranged within the periphery of the plate.

14 is a sort of hopper or false bottom arranged in the lower part of the seed-box, with its lower contracted end resting upon the flange 6, so that it serves to direct the seed to the plate 12. As shown in Fig. 3, the lower

edge of this hopper extends slightly over the inner edge of the flange 6, so that it is directly above the notched edge of the seed-plate, thus holding the latter close down upon the bottom plate 5. The hopper 14 closes the space intermediate of the walls of the seed-box and the annular flange 6 of the bottom 5 and preferably rests upon the supports 15 on the inner walls of the seed-box and is held down in place by slotted plates 16 and bolts and thumb-nuts 18.

Any dirt or seed which escapes outside of the hopper collects on the bottom plate 5 and may be removed through the openings 9, heretofore referred to.

The seed-plate is driven by the worm 4 on the revolving shaft 2, which gears with a pinion 19 on the shaft 11. I prefer that the worm and wheel should be inclosed, and to this end I mount them within a box 20, which is open-topped and upon the upper edge of which rests the seed-box E, which is bolted or otherwise secured thereto. The box 20 is mounted upon the runner-frame and has an opening 21 through its bottom, with which registers the spout 8, leading from the seed-box, and the conduit 22, leading down to the runner. A flange 120 surrounds the opening 21, and inside of this fits the end of the spout 8. This arrangement insures a continuous smooth seed-conduit from the seed-box to the runner and at the same time holds the parts securely in proper relation to each other.

It is desirable that the opposite seed-boxes and runners should be capable of adjustment toward and from each other within certain limits, and to this end I make the shaft 2 in two parts and connect these parts by a sleeve 23, as shown in Fig. 7, which sleeve is permanently secured to one part of the shaft, and is secured to the other part by a removable pin or key 24. In the said figure the ends of the two parts of the shaft are shown as separated, and hence the seed-dropping devices are at the greatest distance apart; but it will be understood that if the key 24 be removed and the ends of the two parts of the shaft 2 brought together and the key passed through the hole 25 the seed-dropping devices will be brought closer together. An adjustment of about two inches is what is ordinarily required.

The shaft 2 under all circumstances drives the seed-plates 12, and I will now describe the connections between this shaft and the check-row mechanism F.

The check-row devices F are each supported in a bracket 26, which constitutes a part of the runner-frame A, in the upper part 26' of each of which brackets is mounted the shaft 27, to which the tappet arm or lever 28 of the check-row mechanism F is secured. The shaft 27 has secured to it an arm 29, which is connected with an arm 30, extending from the rock-shaft 3, by means of the link 31. It will be observed, particularly by reference to Figs. 1, 5, and 6, that whenever the tappet-arm is

vibrated the shaft 3 is rocked. The shaft 3 is provided, preferably about midway of its length, with another arm 32, which is connected by a link 33 with an arm 34, loosely supported upon the shaft 2. This latter arm carries a pawl 35, which engages with a ratchet-wheel 36, fixed upon the shaft 2. The mechanism which I have just described is that which I prefer to use for transmitting the motions imparted to the check-row mechanism to the seed-dropping shaft 2; but it will be understood that equivalent means may be employed in lieu of those shown and described.

It is desirable that the parts connected with the shaft 3 should normally assume the positions indicated in Figs. 3 and 4—that is to say, with the pawl 35 retracted—and in order to automatically bring the parts to this position I make use of an adjustable tension device, which I will now describe.

37 indicates a spool mounted upon the shaft 3, to which it is secured by a set-screw 38 or other means which permit of its being adjusted around such shaft. To this spool is connected one end of a flexible band, cord, or chain 39, to the opposite end of which is secured a spring 40. This spring tends to restore the parts to the positions above referred to, and the tension of the spring can be varied to suit the requirements put upon it by adjusting the spool 37.

The various conditions under which the machine operates make it desirable to adjust the relations between the tappet-arm 28 and the pawl 35 or other part which is operated by the shaft 3, and to this end I make the link 31 in two parts, which are capable of being adjusted relative to each other in the direction of their length and after such adjustment held together, as at 41, Fig. 6, so that the link operates as a single part. The link 31 being thus adjustable as to its length, the angle which the tappet-arm 28 assumes relative to the other parts of the apparatus, when the devices operated by the shaft 3 are in the positions shown in Figs. 3 and 4, may be varied.

It is also desirable that the stationary portions of the check-row device F should be adjustable forward or back relative to the tappet-arm, and I have shown means whereby this adjustment may be effected. As shown, the plate or arm 42, which carries the stationary parts of the check-row device, is mounted between the hub of the tappet-arm 28 and the upper plate 26' of the bracket 26, and there is a groove or channel in the upper face of this part of the bracket, into which fits a rib 43 on the plate or arm 42. The channel and the rib 43 are substantially parallel with the line of travel of the machine, and the arm 42 is provided with a slot 44, parallel with the said rib, and through which the shaft 27 passes. By loosening the nut 27' upon the shaft 27 the arm 42 and the parts carried thereby can be adjusted forward or back without changing the position of the tappet-arm 28 or of any of the other parts of the apparatus, after

which the parts can be again secured by tightening the nut 27'.

The valve by means of which the passage of the seed from the dropping-plate to the ground is intercepted is operated from the shaft 3. This valve is mounted in the heel of the runner and extends across the seed channel or conduit 22, which latter is contracted at a point 45 above the valve. This valve consists of a plate 47, mounted upon a transverse axis 46, and extending across the seed-channel 22 from side to side, and having at its upper end a curved guard-piece 48, which is adapted to be moved across the contracted portion 45 of the channel to close the same at this point when the valve is moved into one position, (see dotted lines in Fig. 3;) but when the valve is moved into its opposite position (see full lines, Fig. 3) the guard-piece is moved from across the channel, at which time the lower end 49 of the valve is brought against the forward face or wall of the channel, which is then closed at this point.

50 is an arm projecting from the rear face of the valve and connected by a link 51 with an arm 52, secured to the shaft 3.

While I have shown and described both the seed-dropping devices within the seed-box and the seed-valve in the channel of the runner as being connected with the shaft 3 and operated by means of a check-row wire or cord, it will be evident, if it be found that this produces too much draft upon the wire, that either one of these devices may be uncoupled from the shaft 3 and driven by other mechanism operated from the driving-wheels or otherwise. Thus I have shown the shaft 2 as being provided with a sprocket-wheel 53, which can be connected with and driven by a sprocket-wheel 54, connected with one of the driving-wheels. When this driving arrangement is used for operating the shaft 2, the pawl 35 is thrown out of engagement with the ratchet-wheel 36, and a different seed-plate 12, having a less number of notches, is substituted for the seed-plate used when the shaft 2 is driven intermittently from the shaft 3.

When the machine is used for drilling, the check-row devices are thrown out of engagement, the valves in the runner-channels are removed, and the seed-plates are operated by means of the connections with one of the driving-wheels, as just described.

I have shown a novel means for mounting the reel 56, upon which the check-row wire or cord is wound, whereby such reel may be arranged outside of one of the drive-wheels C and so that it may be driven therefrom. To this end the shaft 57, upon which the reel is mounted, is supported in bearings 58 59, the bearing 58 being supported by the axis of the drive-wheel C, preferably outside thereof, and the bearings 59 59 being carried by the supporting legs or standards 60 of the driver's seat.

61 is a friction-wheel mounted upon the

shaft 57 and adapted to bear against the periphery of the drive-wheel C, by which means the reel is operated when it is desired to automatically wind up the check-row wire. One or more of the bearings in which the shaft 57 is mounted is made of two parts, as shown in Fig. 10, and between one of these parts and the shaft there is arranged a spring 62. By adjusting the force with which this spring bears upon the shaft the proper tension may be given to the check-row wire while it is being unwound.

The devices which I have described are simple in construction and tend to a more certain and accurate working of the machine.

I find that the worm wheel and gear is an especially advantageous means for driving the seed-plate, as it tends to accuracy in the dropping operations, the movements given to the plate being positive, while at the same time the plate is always locked against unnecessary or accidental forward as well as backward movements.

So far as this part of my invention is concerned—that is to say, the intermittently-driven rotary shafts provided with worm-gearing by which the seed-plates are directly and intermittently operated—the invention may be variously modified without departing from the spirit of my invention. Thus instead of placing the ratchet-wheel 36 near the center of the shaft 2 it could be placed at one end thereof and driven by a pawl carried by the link 31, or two ratchet-wheels could be provided, one at either end, and driven by pawls carried by the said links 31.

The arrangement of the parts within the seed-box whereby the seed is directed and dropped is likewise of a special advantage, as the parts fit together accurately and are easily operated.

What I claim is—

1. In a seed planting machine, the combination of the seed dropping devices, the check row devices, a rock shaft connected to be operated by the check row devices, a revolving shaft which operates the seed dropping devices, and connecting mechanism between the rock shaft and seed dropping shaft, whereby the latter is intermittently operated from the former, substantially as described.

2. In a seed planter, the combination of the seed dropping devices, a rotary shaft which operates said devices, the shaft carrying a ratchet wheel, a rock shaft carrying an arm 32, an arm loosely mounted on the said rotary shaft and carrying a pawl adapted to engage with the said ratchet wheel, and a link connecting the two said arms, substantially as described.

3. In a seed planter, the combination of the seed box having a bottom provided with an annular flange, the circular seed dropping plate having its edge notched to form seed cells and arranged within the said flange, the hopper or false bottom closing the space between

the flange and walls of the box and mechanism for rotating the plate, substantially as described.

4. In a planter, the combination of the seed box having its bottom provided with an annular flange 6, the rotary seed dropping plate arranged within the said flange, and a false bottom or hopper arranged within the seed box above the seed plate, and arranged to direct the seed to the seed plate, substantially as described.

5. In a planter, the combination of the seed box having its bottom provided with an annular flange, the rotary seed dropping plate arranged within the said flange, a false bottom or hopper, arranged within the seed box above the seed plate and with its lower edge extending over the edge of the seed plate, whereby the seed is directed to the seed plate, and the latter is held in place and means for holding the said hopper in position, substantially as described.

6. In a planter the combination of the seed box having a bottom provided with the annular flange 6, the opening 7, and the spout 8, leading away from the said opening, the circular seed dropping plate having its edge notched to form the open-ended cells, the said flange serving to close the open ends of the said cells, and the false bottom or hopper 14, extending from the walls of the seed-box to the annular flange and which directs the seed to the seed plate, substantially as described.

7. In a planter, the combination of the runner, having the seed channel 22, the box 20, mounted on the runner frame and having the opening 21, which registers with the channel 22, and is surrounded by a flange 120, the seed box, provided with the spout 8, the end of which fits inside the said flange, and means for securing the said boxes together and to the runner frame, substantially as described.

8. In a planter, the combination with the check row devices, of a rock shaft, connecting mechanism between the check row devices and the rock shaft, mechanism driven by the rock shaft, and an adjustable tension device for restoring the parts to a desired initial position, consisting of a spool adjustable around the shaft, a spring and a flexible connection between the spring and the spool, and means for securing the spool in different positions substantially as described.

9. In a planter, the check row device consisting of a vibrating tappet arm and a stationary part, the latter being adjustable forward and backward relative to the tappet arm, substantially as described.

10. In a planter, the combination of the tappet arm, the shaft upon which it is mounted, supported in a bracket carried by the frame of the machine, the plate or arm 42, carrying

the stationary part of the check row device, the said plate or arm being slotted as at 44, and means for securing the said plate or arm in the various positions to which it may be adjusted relative to the tappet arm, substantially as described.

11. In a planter, the combination of the seed box, the runner having the channel 22, the valve mounted in the said channel and consisting of the plate 47, extending transversely across the channel, mounted upon the transverse axis 46, and having the guard plate 48, at one end, and the rearward extending arm 50, and means for intermittently moving the valve, substantially as described.

12. The combination with the planter, of the reel, its supporting shaft, a support or bearing for the shaft arranged outside of one of the main supporting wheels and carried by the axle thereof, and another bearing on the main frame arranged inside the said wheel, and a friction wheel on the said shaft bearing upon the said supporting wheel, substantially as described.

13. The combination with the check row device and the seed box, of an intermittently operated rotary seed plate, a worm gearing for driving the same, an intermittently rotated shaft for operating the said worm gearing, and the connections between the said shaft and the check row devices for imparting an intermittent rotary motion to the said shaft, substantially as set forth.

14. In a seed planter, the combination with the check row device and the seed box, of the intermittently rotated seed dropping plate, a shaft provided with a worm, and with a ratchet wheel, a worm wheel mounted upon the shaft of the seed dropping plate and gearing with the said worm, and a pawl operating upon the said ratchet wheel and receiving its motion from the check row devices, for imparting an intermittent rotary motion to the said shaft, substantially as set forth.

15. In a planter, the combination of check row devices, a rock shaft, seed-dropping devices, and intermediate mechanism or connections whereby said seed-dropping devices are operated intermittently from said rock shaft, substantially as described.

16. In a planter, the combination of check-row and seeding devices, a rock-shaft, an intermittently rotating shaft, and connections to operate the shafts from said check-row devices, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LORENZO D. BENNER.

Witnesses:

R. N. McCORMICK,
WILL R. BERRY.