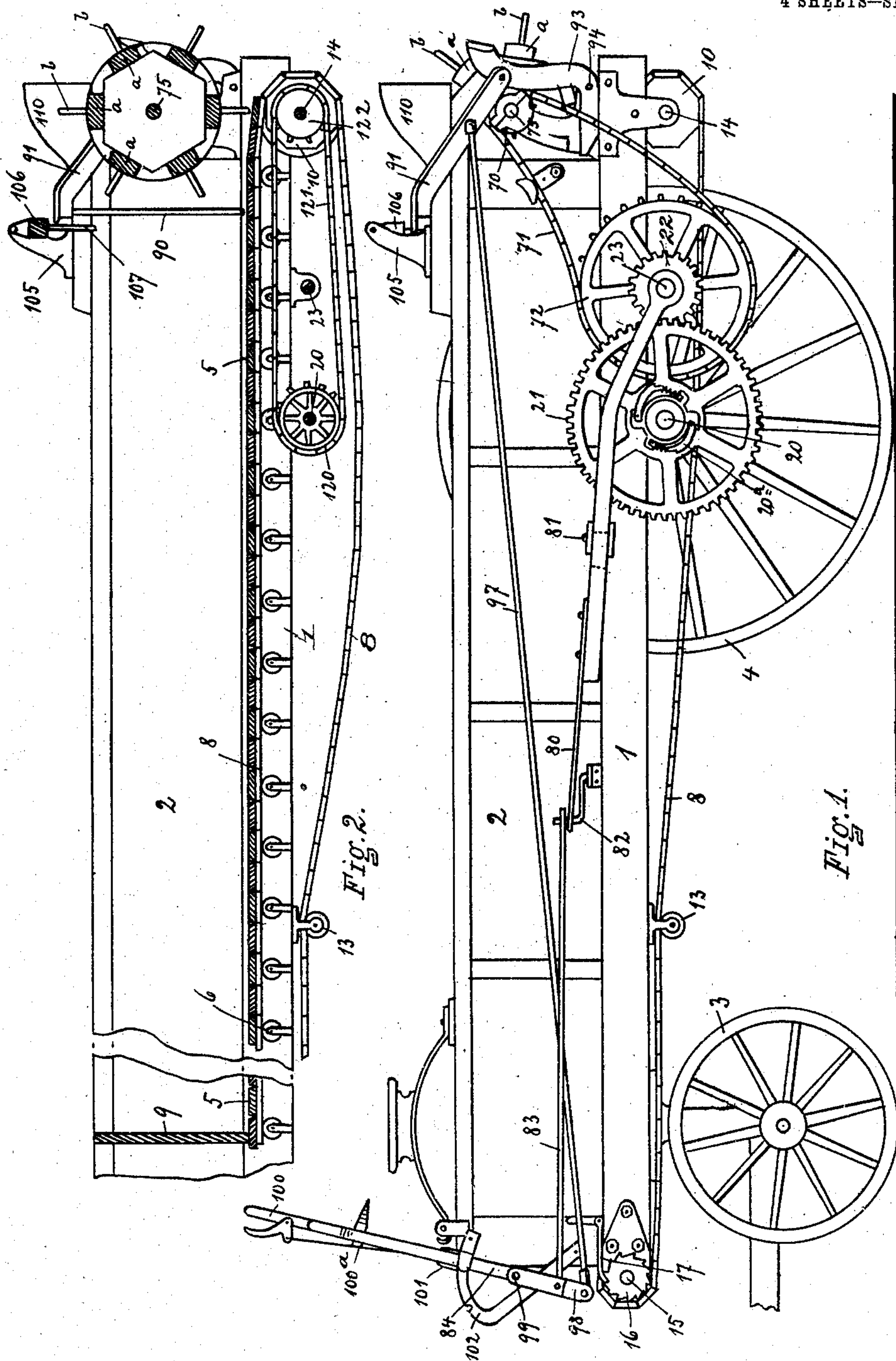


No. 842,172.

PATENTED JAN. 29, 1907.

G. E. CAMP.
MANURE SPREADER.
APPLICATION FILED NOV. 14, 1904.

4 SHEETS—SHEET 1.



WITNESSES
Rich. A. George
Emma S. Hesse

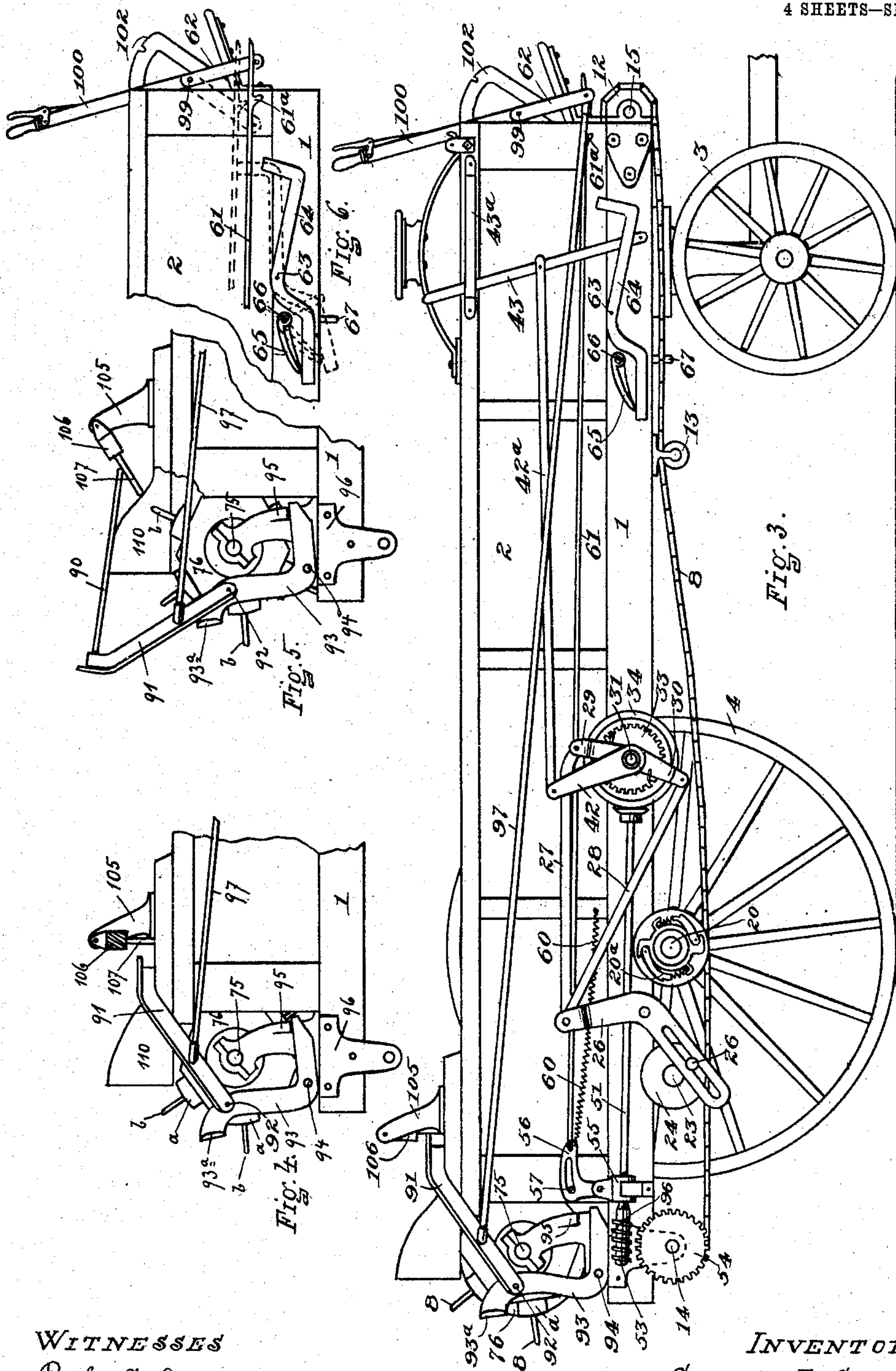
INVENTOR
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By Robinson, Martin & Jones
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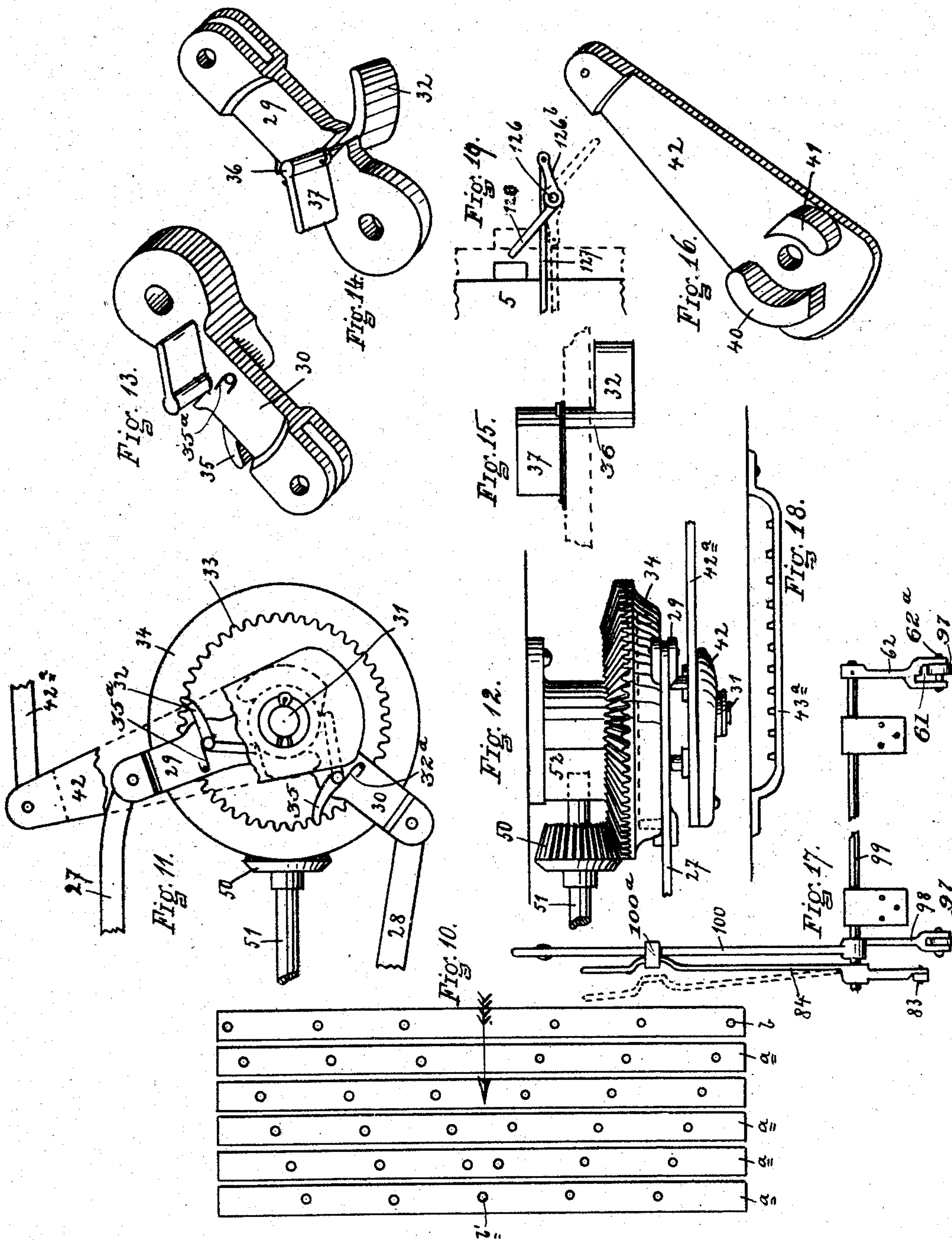
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4 SHEETS—SHEET 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

GEORGE E. CAMP, OF UTICA, NEW YORK, ASSIGNOR TO STANDARD HARROW COMPANY, OF UTICA, NEW YORK.

MANURE-SPREADER.

No. 842,172.

Specification of Letters Patent.

Patented Jan. 29, 1907.

Application filed November 14, 1904. Serial No. 232,642.

To all whom it may concern:

Be it known that I, GEORGE E. CAMP, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Manure-Spreaders; 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, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form part of this specification.

The object of my invention is to provide certain improvements in manure-spreaders whereby the efficiency and utility of the machine are greatly increased and its durability and all-around desirability brought up to a high standard.

Figure 1 of the drawings shows a side elevation of the machine as seen from the left with the rear wheel removed. Fig. 2 is a partial longitudinal section on line A B of Fig. 7. Fig. 3 is a side elevation as seen from the right with the rear wheel removed. Fig. 4 is a detail view of the rear end of the machine. Fig. 5 is the same detail view with the parts in shifted position. Fig. 6 is a detail view showing mechanism at the forward end of the machine for tripping and releasing the feed. Fig. 7 is a broken-out plan view. Figs. 8 and 9 show details of construction hereinafter more fully explained. Fig. 10 shows a plan view of the system of distributing pins provided on the beater. Fig. 11 is an enlarged detail of a portion of the apron feeding mechanism. Fig. 12 is a plan view of the parts shown in Fig. 11. Figs. 13, 14, 15, and 16 are detail views showing portions of the mechanism shown in Figs. 11 and 12 separated from the other parts. Fig. 17 shows other details of construction. Fig. 18 shows in plan view, on a large scale, a holding-rack employed in the construction. Fig. 19 shows in plan view certain details of the construction of the mechanism shown in Fig. 9 relating to the apron-returning mechanism.

Referring to the reference letters and figures in a more particular description, 1 indicates the body-frame, which includes the side-board portions 2 and which is supported on the forward carrying and guiding wheels 3 and on the rear supporting and traction

wheels 4, substantially in the ordinary manner. The body is provided with an open bottom, which is adapted to be closed by the movable apron 5, supported on the side rows of rollers 6 and the central row 7 and consisting of slats attached to chains, as 8. There is a sufficient number of slats provided to complete the bottom of the box when in proper position, and at the front end of the system of slats there is provided an end board 9. At least two chains, as 8, are provided, one at each side of the machine, to which the ends of the slats are attached, and other chains may be supplied, if desired. The chains 8 pass around wheels or rollers 10 at the rear of the machine and around wheels or rollers 12 at the forward end of the machine and so far as the chains are concerned are continuous. The chains 8 may also be passed over idle pulleys, as 13, secured to the frame, whereby the lower runs thereof are better supported and without sagging too far below the general plane of the frame. The apron 5 is mostly handled and operated through the medium of the wheels or rollers 10 at the rear end of the machine, which rollers are secured on the shaft 14, extending transversely of the frame at the rear end and mounted in suitable bearings thereon. The rollers or wheels 12 at the forward end of the machine are mounted on a similar cross-shaft 15, which on the outside of the frame has secured thereto a ratchet-wheel 16, adapted to be engaged by a pawl or dog 17, pivoted to the frame and having a bell-crank end. The rear portion of the box or frame is supported on the cross-shaft or axle-shaft 20, which receives the wheels 4 on either end and is coupled to the wheels to be rotated therewith when turning in a forwardly direction by the pawls or ratchets 20^a, arranged partially in the hub of the wheel, as is common in such a class of construction.

Secured on the axle-shaft 20 is a comparatively large gear-wheel 21, which meshes with the gear-pinion 22, provided on the outer end of the transverse crank-shaft 23, which crank-shaft also has bearings in the frame. On the opposite end of the shaft 23 from that which carries the pinion 22 there is provided a crank-disk 24, having a crank-pin 25 secured therein. This crank-pin operates in a slotted opening in the bell-crank lever 26,

pivoted in its middle portion to the frame. To the upper end of the bell-crank lever 26 there are attached two connecting-rods 27 and 28, the former connecting the bell-crank lever 26 with an upwardly-extending ratchet-lever 29 and the latter connecting the bell-crank lever 26 with the downwardly-extending ratchet-lever 30, both levers 29 and 30 being mounted on a fixed pivot 31 from the frame. The ratchet-lever 29 carries a pawl or dog 32, adapted to engage with the internal ratchet-teeth 33 of the combination ratchet and bevel gear-wheel 34. The ratchet or bevel gear-wheel 34 is mounted to rotate freely upon the same fixed pin or pivot 31 before mentioned. The ratchet-lever 30 is provided with a pawl 35, adapted to engage with the same internal teeth 33 of the combination ratchet and bevel-gear pinion 34, and both of the pawls 32 and 35 are provided with springs 32^a and 35^a, as shown, for throwing them into engaging positions. These two pawls 32 and 35 are similar, and one of them is shown in Fig. 15 in detail. They each have a shaft or pintle portion 36, which finds bearing in the ratchet-levers, and are also provided with an oppositely-extending tailpiece 37. These tailpieces 37 of the respective pawls 32 and 35 are adapted to engage with the tripping and throwing-out projections 40 and 41 of the regulating-lever 42, also pivotally mounted on the same pivot-stud 31 heretofore mentioned. The bevel-gear-tooth portion of the combination ratchet and gear wheel 34 engages with the gear-pinion 50, secured on the feed-shaft 51. At its forward end the feed-shaft 51 has a fixed bearing at 52 in the boss or base portion of the supporting-pivot projection 31 and extends rearwardly and is provided at its rearward end with the feed-worm 53, adapted to engage with the worm-wheel 54 on one end of the shaft 14 heretofore mentioned. The rear end of the shaft 51 is supported in a vertical movable or adjustable box 55, which box is connected with a swinging lever-piece 56, having a slotted opening, by means of which it engages on a fixed pin 57 in the frame of the machine. To the movable piece 56 is attached one end of a spring 60, the other end of which is attached to the frame, and the spring serves to move the parts 55 and 56 into the position shown in Fig. 3. For operating the said parts to throw the worm 56 into mesh with the gear 54 there is provided an operating-rod 61, connected to the piece 56 and extending to the forward end of the machine, where it is provided adjacent to its front end with a projection 61^a, adapted to engage on a pin in the swinging end of the crank-arm 62, while an extension of the rod 61 beyond the projection 61^a is adapted to ride on the pin in the crank-arm.

Pivoted at 63 on the frame is a tripping-lever 64 for the rod 61, which lever is adapted

to be actuated by an arm 65 on the rock-shaft 66, extending transversely of the frame and provided, preferably in about the middle of the machine, with a projection 67, adapted to be struck by the rearmost slat of the bottom 5 when it is moved to suitable position to engage therewith. This occurs at the same time that the end board 9 reaches the beater. When the tripping-lever 64 is operated from the position shown in full lines in Fig. 6 to that shown in dotted lines, it throws up the forward end of the rod 61, freeing the projection 61^a from the pin 62^a in crank-arm 62.

To the swinging end of the regulating-arm 42 there is attached a connecting-rod 42^a, extending to the forward end of the machine in convenient reach of the operator, where it is connected to the lever-handle 43 and set in engagement with a rack 43^a.

At the rear end of the machine and mounted in fixed bearings on a shaft 75 there is provided a rotary circular beater 76. This beater, as shown, consists of six slats or bars *a*, the six being shown in plan view in Fig. 10 and provided with a series of pins or projections, as *b*, arranged as shown in Fig. 10—that is to say, starting with what may be termed a “center” pin *b'* and diverging in each direction as the lines extend across the several slats, then starting new lines parallel to these diverging lines on each side, whereby when the slats are applied in the circular form a right-and-left-screw formation of pins is secured. On one end of the shaft 75 there is provided a sprocket-wheel 70, secured firmly thereto, which receives the sprocket-chain 71, passing around the larger sprocket-wheel 72, secured on the shaft 23 before mentioned. Between the gear-pinion 22 and the sprocket-wheel 72, secured on the shaft 23, there is introduced a clutch 73, whereby a driving connection can be established at this point or the driving connection broke. For operating this clutch there is provided a lever 80, pivoted on a stand 81, from one side of the frame and connected with the gear-pinion 22, so as to slide it along the shaft to engage and disengage the clutch. For operating the lever 80 there is provided in its end an elongated eye or opening 80^a, which receives one portion of the crank 82, pivoted in a bracket on the frame, and the swinging end of which, being the end passing through the eye 80^a, is engaged by the operating-rod 83, extending to the forward end of the machine and connected to a hand-lever 84. The tail-board 90 of the machine is adapted to occupy when closed a position in the rear end of the box and in front of the beater and when open a position as a guard over the top of the beater, as shown particularly in Fig. 5. The tail-board 90 is mounted on a frame engaging the same at its upper edge and having particularly the arms 91 rigidly connected there-

to. These are pivoted at 92 to the upper end of one of the arms of bell-crank lever 93, one on each side, which levers are pivoted adjacent to their angles at 94 to the frame. The opposite arm of the bell-crank lever 93 from that to which the arms 91 are attached has a limited movement between the stop 95 on the upper side and a shoulder at 96, which operates as a stop on the lower side. For operating the tail-board to open and closed position, as well as holding it in its forward position when closed, there is provided a pair of connecting-rods 97 on each side of the machine connecting to about the middle of the arms 91 at the rear end and extending to the front end of the machine, where they are connected on the right hand of the machine to the crank-arm 62 and on the left hand of the machine to the crank-arm 98, both of which crank-arms are rigidly secured on the rock-shaft 99, supported in suitable bearings on the front end of the machine. For operating the rock-shaft 99, together with the parts mentioned, there is provided an operator's lever 100, which will be provided with a catch or lock 101, engaging with a suitable segmental rack 102, whereby the lever 100 can be secured in its positions of adjustment.

The lever-handle 84 for controlling the beater and apron-feeding mechanism is loosely mounted on the end of shaft 99 and is adapted ordinarily to be coupled to the lever 100 by a catch 100^a on the lever 100. For separate operation the lever-handle 84 may be sprung into the position shown in dotted lines in Fig. 17, freeing it from the catch 100^a.

The swinging end of the arm 98 is adapted to strike on the bell-crank end of the pawl 17 and throw it out of engaging position with the ratchet-wheel 16.

Pivotaly mounted in brackets 105 on the rear end of the machine is a comb-bar 106, having suspended pins or teeth 107, which are arranged to be swung by the load, particularly an over-full load, to the inclined position shown in Fig. 5, where they are stopped by coming in contact with the rear edge of the tail-board 90 when in open position. The comb serves to hold the fertilizer to some extent against the operation of the beater, whereby a better pulverizing effect is secured, and the contents of the box must all pass under the tail-board, acting as a shield or cover to the beater.

For returning the bottom 5 to its normal position for loading after having discharged a load there is provided on the main shaft or axle 20 a sprocket-wheel 120, which is connected by a sprocket-chain 121 with a sprocket-wheel 122, provided on the shaft 14, which carries the rear end of the bottom or apron and heretofore mentioned. The sprocket-wheel 120 is provided with a clutch member adapted to engage with the fixed clutch

member 123 on the shaft 20, and the sprocket-wheel 120 with its clutch member is adapted to be moved into and out of engagement with 123 by means of the angular lever 124. A spring 125 is provided for the purpose of moving this clutch out of engaging position. For moving the clutch into engaging position there is provided on the front of the machine a short upright shaft 126, having a handle 126^a and a crank 126^b, which crank is connected by a rod 127 with the angular lever 124.

For automatically throwing out the clutch there is provided on the upright shaft 126 an arm 128, adapted to be struck and operated by the front end of the movable bottom 5.

In Fig. 19 there is shown in full lines certain of the parts mentioned in a position which they assume when the clutch is in engaging position and in dotted lines the position of the same parts when they have been tripped and operated to a position which corresponds with the disengaged position of the clutch.

The operation of manure-spreaders is too well understood to warrant a lengthy description herein. Some of the more particular features may be mentioned, however. When the apron 5 is in its normal position, with the end-board 9 at the front, as shown in Fig. 2 and in part in Fig. 7, and the tail-gate 90 is closed, as shown in Fig. 2, the machine can be loaded with the fertilizer. The arrangement is such that at this time substantially all of the movable parts of the mechanism are out of gear, and in this condition the load can be conveyed for any suitable distance and until the point is reached where it is desired to discharge or spread the load.

By means of the regulating-lever 43 controlling the position of the pawl-tripping projections 40 and 41 the feed of the movable bottom is readily regulated, whereby the quantity of fertilizer distributed per acre is under control. Further than that, the feed of the bottom may be instantly stopped by the regulating-lever by the operator moving the lever to its farthest position toward the front. Resort will not be ordinarily necessary to this method of stopping the feed, but it is advisable to do so, and in so doing the pawl-tripping projections 40 and 41 are brought into position where they engage the tailpieces of the pawls 32 and 35 and hold the pawls out of engagement with the ratchet-teeth 33 of the ratchet-gear mechanism continually.

When the regulating-lever is properly adjusted, the machine is thrown into operation by operating the common controlling-lever 100. In operating this lever the first effect is to move the tail-gate 90 bodily to the rear about two inches or sufficient to free it from the load. This is accomplished through the

medium of a thrust on the connecting-rods 97, and the movement is permitted by a swinging of the bell-crank levers 93 from the position in which they are shown in full lines in Figs. 1 and 3 to the positions in which they are shown in full lines in Figs. 4 and 5. When the bell-crank levers 93 come to their limit of movement toward the rear, a further thrust movement on the rods 97 causes the arms 91, carrying the tail-gate, to swing upwardly and over from the position shown in Fig. 4 to that shown in Fig. 5, carrying the tail-gate 90 laterally out of the way of the rear end of the load and into a substantially horizontal position above the beater. At the same time that the tail-gate is moved into open position the beater is thrown into operation through the medium of the rod 85, the lever 80, and the clutch 73. Not only is the beater thrown into operation, but the crank-shaft 23 is thrown into operation, and through the medium of the bell-crank 26 the pawl-and-ratchet mechanism for operating the worm feed-shaft 51 is also thrown into operation. The final part of the movement of the lever 100 brings the pin 62^a in the crank 62 into engagement with the projection 61^a on the rod 61. A thrust movement through the medium of this rod throws over the hanger 56, moving the worm 53 downward into mesh with the gear 54 on the shaft 14, which controls the movement of the apron 5. The final movement of the lever 100 also throws out the holding-pawl 17 on the front end of the machine, releasing the apron, so that it is free to be moved by the mechanism just mentioned. When the mechanism is all in gear, as before described, and which can be accomplished either when the machine is at rest or under motion, the apron feeds the load toward the beater, which, revolving rapidly in an overshot direction, pulverizes and distributes the fertilizer behind the machine as it moves forward. In its open position the tail-gate 90 serves as a shield to the beater, preventing the fertilizer from being thrown upwardly and causing it to be thrown rearwardly from the machine. In case of the box of the spreader being full or overloaded with fertilizer the top of the load will come in contact with the pins or teeth 107 in the comb-bar 106 and swing this bar from the position shown in Figs. 2 and 4, for instance, to that shown in Fig. 5. This comb serves to rake down the top of the load and cause it to all pass under the tail-gate 90, acting as a shield.

When the apron-bottom 5 has passed to the rearward until the end-board 9 has reached the position of the tail-gate 90, in discharging the load it is necessary to bring the apron to a standstill. The arrangement is such that at the time that the end-board 9 has reached said position the rearmost slat of the apron will have passed forward under the bottom

of the body until it comes in contact with the tripping-lever 67. This operates to rock the shaft 60 and by means of the lever 65 operate the lever 64 to throw up the forward end of the rod 61. When it is so thrown up, and as shown in dotted lines in Fig. 6, (see, also, Fig. 17,) the projection 61^a is freed from the pin 62^a and the rod 61, with its attached parts, is freed and is immediately moved to its forward position by means of the spring 60. This operates through the mechanism heretofore described to lift the feed-worm 53 out from the worm-gear 54, which of course instantly stops the feed of the apron. In order to conveniently return the apron to its proper position in the bottom of the box, the operator turns the handle 126^a at the forward end of the machine from the position in which it is shown in Fig. 7 to that in which it is shown in Fig. 9. The result of this is to throw into gear the clutch 123, and as the spreader moves forward the rotation of the shaft 20, through the intervening mechanism, serves to move the apron back into normal position. When it has reached its normal position, the forward end of the apron strikes the projection 128 at the forward end of the machine, tripping the mechanism before referred to and allowing the clutch 123 to become disengaged. At the same time or any suitable time the operator will change the position of the lever 100 from its forward position, as heretofore described, to the rear position, as shown in Figs. 1, 3, and 6. In so doing the tail-gate is returned to its normal closed position and the movable parts of the mechanism are entirely thrown out of gear. At the same time also the pawl 17, Fig. 1, is dropped into engagement with the ratchet-wheel 16, thereby securing the apron against any tendency to shift from its normal position in the bottom of the box.

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

1. In a spreader, the combination with the box and movable apron-bottom thereof, of a feeding mechanism consisting of a gear-wheel having internal ratchet-teeth, a pair of pawls operating on said teeth, ratchet-levers carrying said pawls respectively, means for operating the ratchet-levers, and adjustable means for holding the pawls out of engagement with the internal ratchet gear-teeth during more or less of the movement of the ratchet-levers, substantially as set forth.

2. In a spreader and in combination with the box and the movable apron, of a feeding mechanism for the apron, consisting of a wheel having internal ratchet-teeth mounted to turn on a fixed pivot, a pair of swinging levers mounted on the same pivot, means for vibrating the swinging ends of the levers, pawls on the levers respectively for engaging the ratchet-wheel, and adjustable means for throwing out and holding out of engagement

with the ratchet-wheel the said pawls, substantially as set forth.

3. The combination in a spreader of a load-holding box, having a movable bottom, a
5 tail-gate for the rear end of the box arranged to present a plain flat face to the load when in closed position, means for mounting the said tail-gate to permit it, first, to be retired laterally away from the load, and then turn
10 circularly into a position above the plane of the load, and means for operating said tail-gate, substantially as set forth.

4. The combination in a manure-spreader of a load-holding box, a movable bottom
15 therefor, means for moving the bottom toward the rear in discharging the load, a rotary beater mounted at the rear end of the box, means for driving the beater, a flat, plain tail-gate adapted to present a flat face to the
20 load when in closed position, mounted to move from a vertical position in the rear end of the box to a substantially horizontal position over the beater, and a comb supported

over the rear end of the box and adapted to swing into engagement with the edge of the
25 tail-gate when in open position, substantially as and for the purposes set forth.

5. The combination in a manure-spreader of a load-holding box, having a movable bottom, a rotary beater at the rear of the box, a
30 tail-gate for the rear end of the box formed and arranged to present a plain flat face to the load when in closed position, and mounted to be retired laterally away from the load and toward the beater, and then
35 turned circularly into position above the plane of the load and over the beater, and means for holding and operating the tail-gate, substantially as set forth.

In witness whereof I have affixed my sig-
40 nature, in presence of two witnesses, this 8th day of November, 1904.

GEORGE E. CAMP.

Witnesses:

S. I. DE VINE,
EMMA S. HESSE