

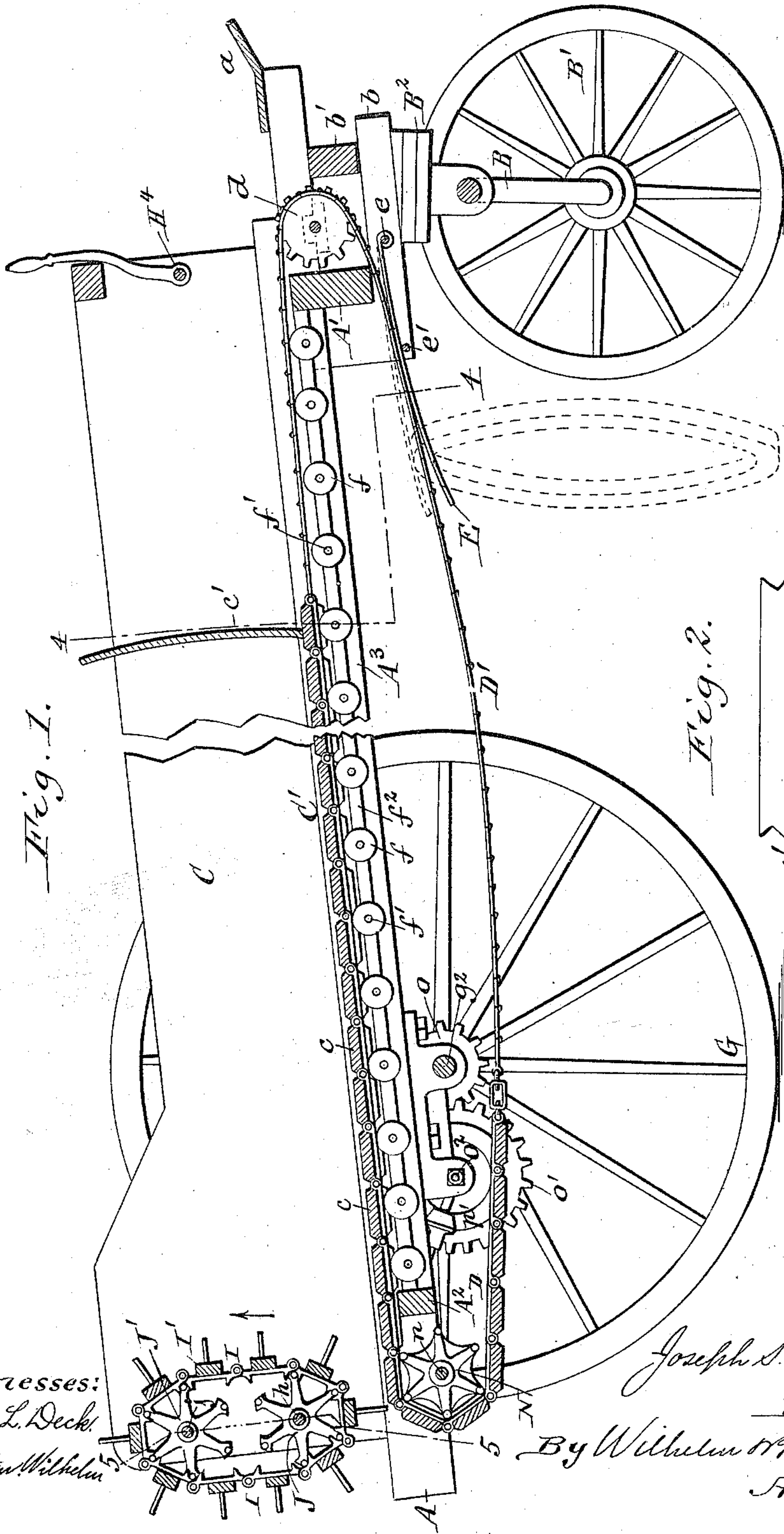
(No Model.)

4 Sheets—Sheet 1.

J. S. KEMP.  
MANURE SPREADER.

No. 584,877.

Patented June 22, 1897.



Witnesses:  
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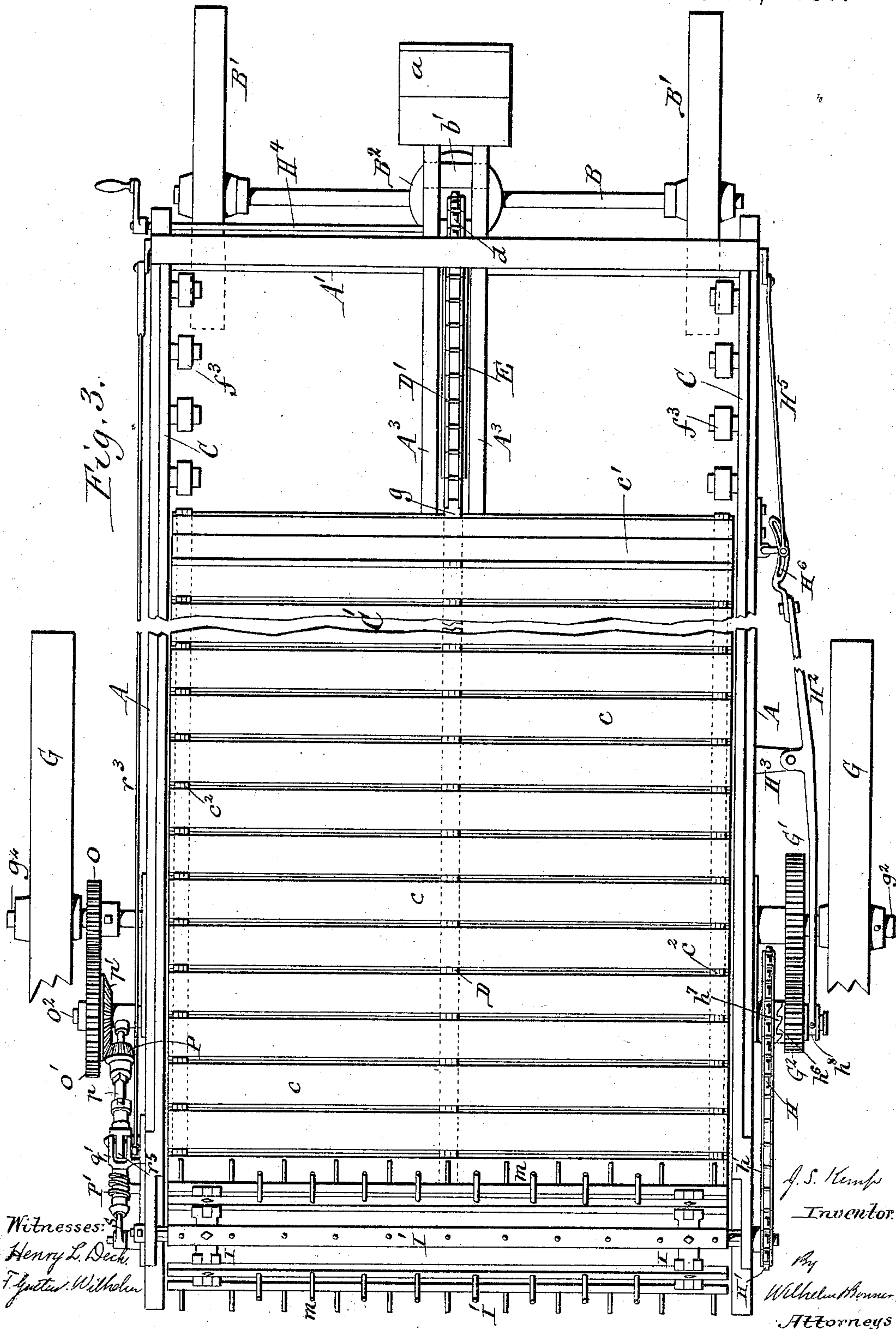
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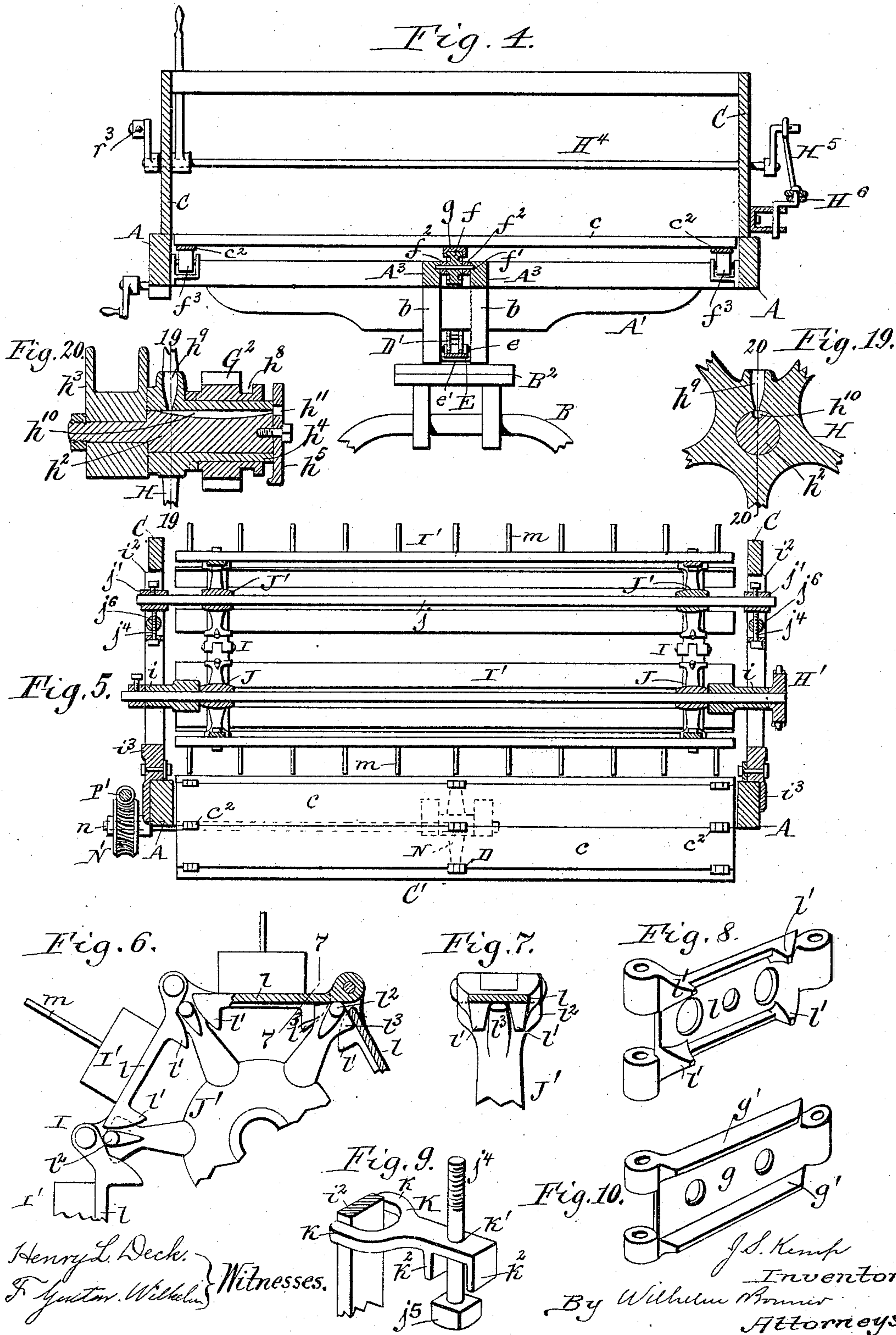




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# UNITED STATES PATENT OFFICE.

JOSEPH S. KEMP, OF SYRACUSE, NEW YORK.

## MANURE-SPREADER.

SPECIFICATION forming part of Letters Patent No. 584,877, dated June 22, 1897.

Application filed March 6, 1897. Serial No. 626,289. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH S. KEMP, a citizen of the United States, residing at Syracuse, in the county of Onondaga, in the State of New York, have invented a new and useful Improvement in Manure-Spreaders, of which the following is a specification.

This invention relates to that class of manure-spreaders which embody a box mounted on a wheeled frame and having a movable bottom upon which the manure is slowly carried rearwardly to a toothed beater, which removes the manure from the rear end of the body or pile and throws it rearwardly from the machine.

The invention has the object to improve the construction of such manure-spreaders in various respects.

In the accompanying drawings, consisting of four sheets, Figure 1 is a longitudinal sectional elevation of a manure-spreader containing my improvements. Fig. 2 is a rear view of the chain-guard and its supporting parts. Fig. 3 is a top plan view of the machine. Fig. 4 is a vertical cross-section in line 4 4, Fig. 1, looking forwardly. Fig. 5 is a vertical cross-section in line 5 5, Fig. 1, looking forwardly. Fig. 6 is a fragmentary side elevation of one of the beater-spiders and part of the beater. Fig. 7 is a cross-section in line 7 7, Fig. 6. Fig. 8 is a detached perspective view of one of the beater-links. Fig. 9 is a detached perspective view of the adjusting-screw of one of the upper beater-boxes and its locking-arm. Fig. 10 is a detached perspective view of one of the links of the central bottom chain. Fig. 11 is an elevation of the right-hand side of the rear portion of the machine, showing the mechanism whereby the beater is driven from the rear axle. Fig. 12 is a horizontal section, on an enlarged scale, of the gears and clutch mechanism whereby the beater is driven from the rear axle. Fig. 13 is a horizontal section of one of the bearings in which the lower beater-shaft is journaled. Fig. 14 is a horizontal section of one of the bearings of the upper beater-shaft. Fig. 15 is an elevation of the left-hand side of the rear portion of the machine, showing the mechanism whereby the movable bottom is

driven from the rear axle. Fig. 16 is a detached sectional side elevation of the same mechanism on an enlarged scale. Fig. 17 is a cross-section in line 17 17, Fig. 16. Fig. 18 is a detached perspective view of the frame or housing in which the rear bearing of the worm-shaft is arranged. Fig. 19 is a fragmentary vertical section of the sprocket-wheel which drives the beater, the section being taken in the plane of the wheel in line 19 19, Fig. 20. Fig. 20 is a vertical section of the same wheel and connecting parts in line 20 20, Fig. 19.

Like letters of reference refer to like parts in the several figures.

The bottom frame of the wagon-body is provided with two side sills A, connected at their front ends by a bolster or cross-piece A' and near their rear ends by a cross-piece A<sup>2</sup>. A<sup>3</sup> represents two central sills which are secured to these cross-pieces and arranged side by side at a short distance apart. These central sills project forwardly beyond the bolster A' and carry at their front ends a foot-board a.

B represents the bent front axle, B' the front wheels, and B<sup>2</sup> the fifth-wheel connecting the front axle with the front portion of the frame. The upper part of the fifth-wheel is secured to the under side of two longitudinal timbers b, which are arranged underneath the front portions of the central sills and connected to the under sides of the latter behind the bolster A' and to the under side of the bolster and of a cross-piece b', arranged in front of the bolster.

C represents the side-boards of the wagon-box, which are secured to the side sills, and C' represents the movable bottom, composed of transverse slats c of usual form and provided with the usual follower c'. The bottom slats are connected at the sides by the usual side links c<sup>2</sup> and at the middle by a central chain D. The front and rear ends of the central chain D are connected by a light chain D', forming an endless chain therewith. The chain D runs around a sprocket-wheel d, arranged in front of the bolster A', as usual, the upper part of the chain passing over the bolster and the lower part beneath the bolster.

E represents a movable guard-arm which is



arranged underneath the lower front portion of the chain D' to protect the latter against interference with the front wheels when the front axle is turned so as to bring one of the front wheels underneath the wagon-body. The guard-arm is arranged with its front portion between the longitudinal timbers *b* of the frame and hung with its front end to a transverse bolt *e*, secured in said timbers, and is loosely supported near the rear ends of said timbers upon a transverse stop or bolt *e'*, as shown in Figs. 1 and 2. The rear portion of the guard-arm projects rearwardly beyond the timbers *b* underneath the chain and far enough to prevent the front wheels from coming in contact with the chain. When a front wheel is turned under the body, as indicated by the dotted lines in Fig. 1, it lifts the guard-arm and the latter lifts the chain, and the guard-arm prevents contact of the wheel and chain. When the front axle is turned so as to swing the front wheel away from the guard-arm, the latter drops until it again rests upon the supporting stop or bolt *e'*.

*f* represents rollers which are arranged between the central sills at suitable intervals and upon which the central chain D of the movable bottom runs. These rollers are preferably mounted loosely on cross-pins *f'*, which are secured in strips *f''*, fastened to the inner sides of the central sills, as shown in Fig. 4. The links of the central chain D are shown in Fig. 10 and are flat plate-links *g*, provided with longitudinal side flanges *g'*. The latter depend or project downwardly on both sides of each roller *f* in passing over the same, as shown in Fig. 4, whereby the central chain D and the floor-slats secured thereto are centered in the body or box of the machine and prevented from running toward one side and rubbing or binding against the side.

*f''* represents the usual rollers, which are attached to the inner sides of the side sills and whereby the sides of the movable bottom are supported.

G represents the rear wheels, which are connected with the rear axle *g''* in any well-known manner so as to rotate the axle.

G' represents the gear-wheel which is secured to the rear axle on the inner side of the right-hand wheel, and G<sup>2</sup> the pinion which is driven by the wheel G', as shown in Figs. 3, 11, and 12.

H represents the large sprocket-wheel, which is driven by the pinion G<sup>2</sup>, and which drives a smaller sprocket-wheel H' on the lower beater-shaft *h* by a chain *h'*. The large sprocket-wheel H turns loosely upon a horizontal arbor or stud *h''*, which is secured to a bearing-frame *h'''*. The latter is secured to the under side of the right-hand side sill. The hub of the sprocket-wheel H is constructed with an outwardly-projecting cylindrical extension or sleeve *h''''* and is held on the stud by a guard-plate *h'''''*, secured to the end of the stud. The gear-pinion G<sup>2</sup> turns upon this ex-

tension or sleeve *h''''* and is provided at its inner side with a clutch-face *h''''''*, which takes into a clutch-face *h''''''''* on the hub of the sprocket-wheel. The outer end of the pinion is constructed with an annular groove *h''''''''''*, in which the shifting lever H<sup>2</sup> engages. The latter may be of any suitable construction and arrangement. As shown in the drawings, it is pivoted in front of the rear axle to a bracket H<sup>3</sup> and operated from a front cross-shaft H<sup>4</sup> by a rod H<sup>5</sup>, connected at its rear end with a slotted segment H<sup>6</sup> at the front end of the shifting lever. In shifting the pinion for engaging its clutch-face with or disengaging it from that of the sprocket-wheel the pinion moves on the sleeve and not on the stud, and when the pinion has been connected by the clutch-faces with the sprocket-wheel the latter turns by its sleeve on the stud, while the pinion has no movement on the sleeve, whereby the friction and resistance of the parts are greatly reduced.

The hub of the sprocket-wheel H is provided with an oil-cup *h''''''''''*, which opens by a duct into the cavity of the hub, and the stud *h''* is provided on its upper side with a longitudinal oil-groove *h''''''''''''*. This groove receives the oil at its rear end from the oil-cup and distributes the oil along the stud. The front end of this groove is open, so that a wire can be inserted into the groove through an opening *h''''''''''''''* in the guard-plate *h''''''''* for cleaning the groove. The bottom of the groove is slightly raised at the front end to form a dam, which retains the oil in the groove.

The beater shown in the drawings is an endless belt or apron beater composed of upright endless chains I and transverse toothed slats I', secured thereto. The lower beater-shaft *h* is provided with two spiders J and the upper beater-shaft *j* with two similar spiders J', around which the endless chains run.

The lower beater-shaft *h* is journaled in two bearings *i*, which are each supported by trunnions *i'* in two upright bars *i''*, Figs. 5, 13, and 15. The two uprights *i''* on the same side of the machine are secured with their lower ends to the side sill by a cast foot *i'''*. The bearings of the lower beater-shaft can swivel transversely of the machine on their trunnions in accommodating themselves to the beater-shaft; but the latter is not vertically adjustable. This permits the beater to be so arranged as to run closely to the bottom and prevents the location of the lower portion of the beater with reference to the movable bottom from being disturbed.

The upper beater-shaft *j* is vertically adjustable for the purpose of taking up slack in the beater-chains. This upper shaft does not rotate, but is rigidly secured in bearings *j'*, which are connected by trunnions *j''* to boxes *j'''*, arranged loosely between the upper portions of the uprights *i''*, Figs. 5, 13, and 15. Each box *j'''* is guided on the uprights by side



flanges and is adjusted up and down by a screw  $j^4$ . The latter is provided at its lower end with a head  $j^5$  and works in a cross-piece  $j^6$ , which is secured between each pair of up-  
rights below the box  $j^3$ .

K represents a locking-arm, Figs. 9 and 11, which is applied to the head  $j^5$  of the adjusting-screw for preventing the latter from turning out of its adjusted position by the jarring  
of the machine. This locking-arm has two prongs  $k$ , which straddle one of the uprights  $i^2$ , and an opening  $k'$ , through which the screw passes, and on opposite sides of said opening downwardly-projecting claws  $k^2$ , which are  
adapted to grasp the head of the adjusting-screw. When the locking-arm is raised above the head of the screw, as shown in Fig. 9, the screw can be turned in either direction. When the screw has been adjusted, the lock-  
ing-arm is allowed to drop and then rests on the head of the screw, as shown in Fig. 11, in which position it prevents the screw from turning.

The beater-chains I are composed of plate-  
links  $l$ . (Shown in Fig. 8.) These links are provided with flat outer sides or backs, to which the beater-slats  $l'$  are bolted, and have on their inner sides, near each end, two prongs  $l'$ . The two pairs of prongs of two adjacent  
links engage against the rounded cross-bar  $l^2$ , at the outer end of each arm of the beater-spiders  $J J'$ , as shown in Fig. 6, and the two prongs at the same end of a link straddle a centering-lug  $l^3$  on the spider-arm, as shown  
in Figs. 6 and 7. The outer end of each spider-arm is provided with two of these centering-lugs, one on each side, and the beater-chains are thereby centered on the spiders. The upper spiders  $J'$  turn on the fixed upper  
shaft  $j$  and are also free to move on the shaft lengthwise of the latter, so that the upper spiders can adjust themselves freely to the chains and are held in position simply by the chains.

The links of the beater-chains are made so long that each link receives a beater-slat, as shown in Figs. 1 and 6. This arrangement avoids the loose connecting-links which were heretofore used between those links which  
carry the slats. When such connecting-links, not provided with beater-slats, are present in the beater-chains, the chains are so flexible that the beater-slats can assume a position at a greater or less angle to the direction in  
which the chains and beater-teeth  $m$  move upwardly along the rear face of the body of manure in the box. The resistance which the beater teeth or pins encounter in moving upwardly along the rear face of the body of  
manure tends to tilt the teeth and slats downwardly and the teeth assume such downwardly-inclined position when connecting-links without beater-slats are present in the chains. When the teeth assume this inclined  
position, their capacity to remove the manure is correspondingly impaired. When all the

links carry beater-slats, as shown, the tendency of each slat to tilt downwardly during its upward movement is counteracted by the resistance which the adjoining beater-slats  
encounter and the slats are thereby prevented from tilting and kept in line with their teeth projecting squarely from the ascending portion of the beater, whereby the action of the beater is greatly improved.

N represents the spider, which is arranged at the rear end of the machine underneath the central chain D of the movable bottom and which engages with the links thereof for propelling the bottom rearwardly. This spi-  
der is secured to a transverse shaft  $n$ , which carries at the left-hand side of the machine a worm-wheel  $N'$ , by which the shaft is actuated.

O represents a gear-pinion secured to the rear axle  $g^2$  on the inner side of the left-hand rear wheel G, Figs. 3, 15, and 16. O' is a gear-wheel which meshes with said pinion and turns loosely upon an arbor  $O^2$ , secured to the frame of the machine in rear of the rear axle.

$p$  represents a rearwardly-ascending shaft which carries at its front end a pinion P and at its rear end a worm  $P'$ . The pinion P meshes with one of several concentric gear-rims  $p'$ , formed on the rear side of the gear-wheel O',  
so as to be driven by the latter. One of these gear-rims is indicated by dotted lines in Fig. 15. The front end of the shaft is journaled in a bearing  $p^2$ , which is hung upon the arbor  $O^2$ , so that the rear end of the shaft can be  
lowered and raised for throwing the worm into and out of gear with the worm-wheel. The rear portion of the worm-shaft  $p$  is journaled in a bearing  $q$ , which is vertically movable in a frame or housing  $q'$ , affixed to the  
side of the machine, Figs. 15, 16, 17, and 18. In this frame is mounted a transverse rock-shaft  $r$ , which carries an elbow-lever  $r'$  and an actuating-arm  $r^2$ . The latter is connected to an actuating-rod  $r^3$ , leading to the front  
end of the machine and by which the shaft  $r$  can be rocked in its bearings, which are formed by recesses  $r^4$  in two of the walls of the frame  $q'$ . The movable bearing  $q$  is provided with an upwardly and rearwardly extending head  $r^5$ , which overhangs the upper arm of the elbow-lever  $r'$ , while the lower arm of the lever bears upon the bearing. Upon swinging the actuating-arm  $r^2$  of the rock-shaft forwardly the upper arm of the elbow-lever raises the head  $r^5$  and the bearing  $q$ , connected therewith, and raises the worm out of engagement, while by swinging the actuating-arm backwardly the lower arm of the elbow-lever depresses the bearing and throws  
the worm into gear. This mechanism for raising and lowering the worm-shaft is old and well known.

S represents a detent-pawl which is pivoted to the left-hand side of the machine in rear of the worm-shaft. This pawl has a depending stop-arm  $s$ , which is adapted to engage



with the worm-wheel  $N'$  and locks the same, and an actuating-arm  $s'$ , which projects forwardly and engages in a hollow head or collar  $s^2$ , secured to the rear end of the worm-shaft.

5 Upon raising the worm-shaft the stop-arm  $s$  of the pawl is thrown into gear with the worm-wheel, and so locks the latter when the worm is out of gear, while upon lowering the rear end of the worm-shaft and throwing the  
10 worm into gear the lock-arm of the detent-pawl is thrown out of engagement with the worm-wheel.

I claim as my invention—

1. The combination with the wheeled frame  
15 of the machine, the movable bottom and the chain connecting the ends of the movable bottom, of a movable guard-arm mounted in the frame underneath the chain and over the front wheels and preventing contact of the  
20 front wheels with the chain when turning the front axle, substantially as set forth.

2. The combination with the wheeled frame of the machine, the movable bottom, and the chain connecting the ends of the movable  
25 bottom, of a guard-arm arranged underneath the chain and above the front wheels and pivoted at its front end to the frame, and a stop supporting the guard-arm in rear of its pivot, substantially as set forth.

30 3. The combination with the body-frame and the movable slat bottom, of a longitudinal series of supporting-rollers arranged centrally in the frame, and a central series of links secured to the under sides of the bottom  
35 slats and provided with depending side flanges which embrace said rollers, substantially as set forth.

4. The combination with the rear axle and the beater-shaft, of a wheel whereby the  
40 beater-shaft is driven and which is provided with a clutch-face and a sleeve projecting beyond the clutch-face, a fixed arbor on which said wheel and sleeve turn, and a driving-pinion mounted to slide on said sleeve and  
45 provided with a clutch-face adapted to engage the clutch-face of said wheel, substantially as set forth.

5. The combination with the rear axle and the driving-wheel secured thereto, of a fixed  
50 arbor arranged in rear of said axle, a sprocket-wheel mounted to turn on said arbor and having a clutch-face and a sleeve projecting beyond said face, a pinion mounted to slide on said sleeve and meshing with said driving-  
55 wheel and having a clutch-face engaging with that of said sprocket-wheel, and a beater driven from said sprocket-wheel, substantially as set forth.

6. The combination with the rear axle and  
60 the driving-wheel secured thereto, of a fixed arbor arranged in rear of said axle and provided in its upper side with a longitudinal oil-groove which opens at the outer end of said arbor, a sprocket-wheel which is pro-  
65 vided with a sleeve mounted to turn on said arbor and with a clutch-face at the inner end

of said sleeve, and with an oil-cup opening into the oil-groove of the arbor, a pinion mounted to slide on said sleeve and provided with a corresponding clutch-face, and a beater  
70 driven from said sprocket-wheel, substantially as set forth.

7. The combination with the rear axle and the driving-wheel secured to the same, of a lower beater-shaft which is driven from said  
75 driving-wheel and supported in bearings which are held against vertical movement, an upper beater-shaft which is supported in vertically-adjustable bearings, and an endless apron-beater mounted on said shafts, sub-  
80 stantially as set forth.

8. The combination with the lower beater-shaft, driving mechanism whereby said shaft is rotated, and spiders secured to said shaft, of a non-rotative upper beater-shaft, spiders  
85 which are capable of rotative movement and longitudinal movement on said non-rotative shaft, endless chains applied to said spiders, and toothed beater-slats secured to said chains, substantially as set forth.

9. In a manure-spreader, the combination with the box and its movable bottom, and the transverse beater-shafts and their spiders arranged at the rear end of said box, of an  
95 endless, apron-beater consisting of endless chains and transverse toothed slats, each chain-link being secured to one of the slats, whereby the slats are held against tilting, substantially as set forth.

10. The combination with the beater-spi-  
100 ders having their arms provided with end cross-bars and having centering-lugs on both sides of each cross-bar, of beater-chains composed of flat links having at each end a pair of prongs which straddle said centering-lugs,  
105 substantially as set forth.

11. The combination with the uprights and the adjustable bearing of the beater-shaft arranged between the same, of a vertical ad-  
110 justing-screw whereby said bearing is adjusted, and a locking-arm which straddles one of said uprights and which grasps the head of the adjusting-screw, substantially as set forth.

12. The combination with the uprights, and a cross-bar secured between the same and pro-  
115 vided with a screw-threaded opening, of a vertical adjusting-screw passing through said opening and having a head at its lower end, a locking-arm having an opening through which said screw passes and provided with  
120 claws which embrace the screw-head and at its opposite end with prongs which straddle one of said uprights, and a bearing which rests upon said screw, substantially as set forth.

13. The combination with the movable bot-  
125 tom and the worm-wheel by which the bottom is driven, of a worm-shaft which is movable toward and from said worm-wheel, and a detent-pawl which is adapted to engage with  
130 said worm-wheel and connected with said worm-shaft, so as to be engaged and disen-



gaged by the movement of the worm-shaft, substantially as set forth.

14. The combination with the movable bottom and the worm-wheel by which the bottom is driven, of a worm-shaft which is movable toward and from said worm-wheel, a hollow head secured to the end of said shaft, and a detent-pawl adapted to engage with said worm-wheel and provided with an actuating-

arm engaging in said hollow head, substantially as set forth.

Witness my hand this 25th day of February, 1897.

JOSEPH S. KEMP.

Witnesses:

A. A. SCHENCK,  
EDWARD WILHELM.