T. BROWN.

MANURE SPREADER.

APPLICATION FILED APR. 10, 1911.

1,215,614.

Patented Feb. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

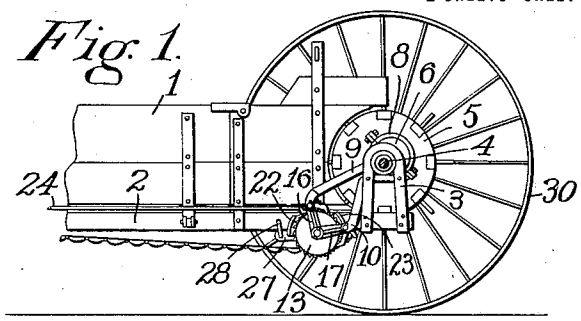


Fig. 3.

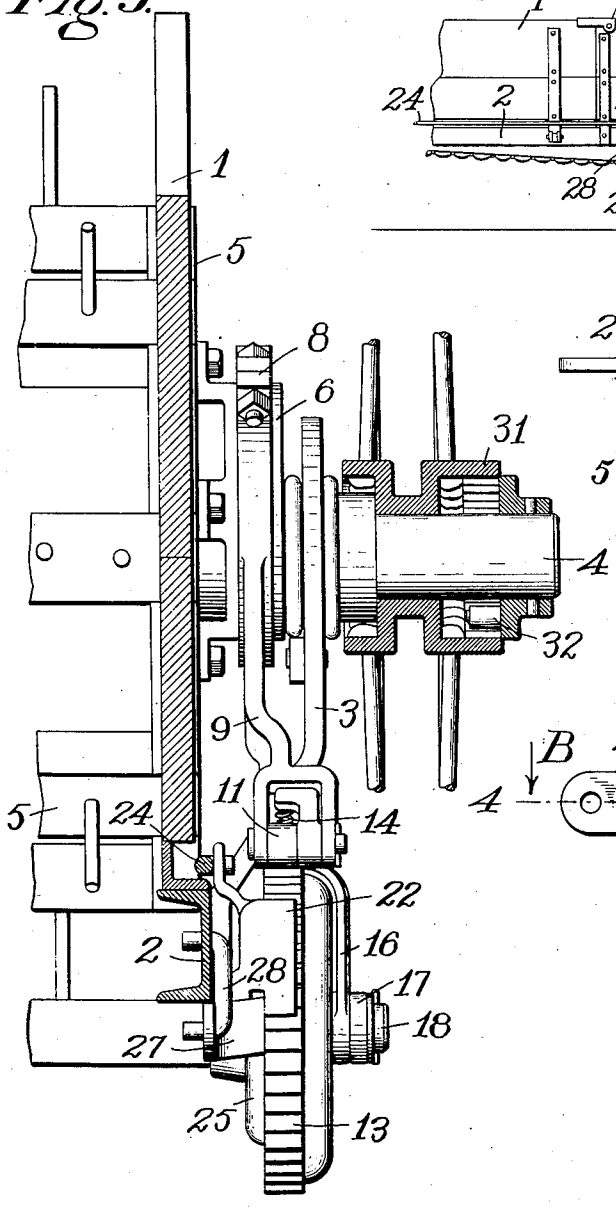


Fig. 4.

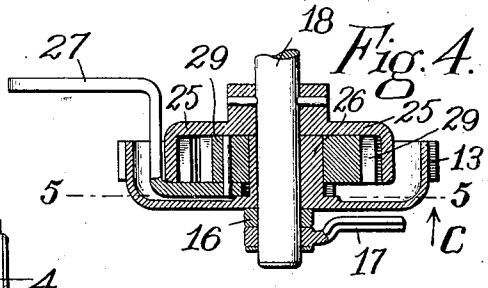
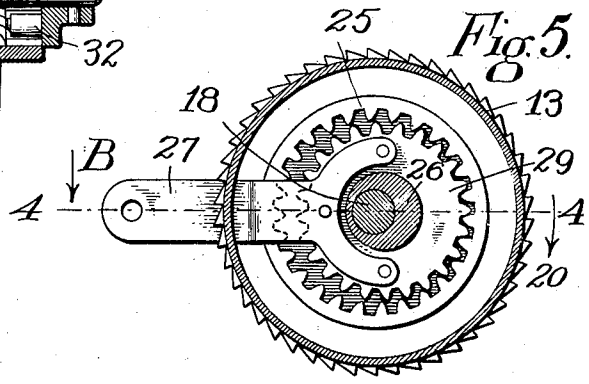


Fig. 5.



Witnesses

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MANURE SPREADER.

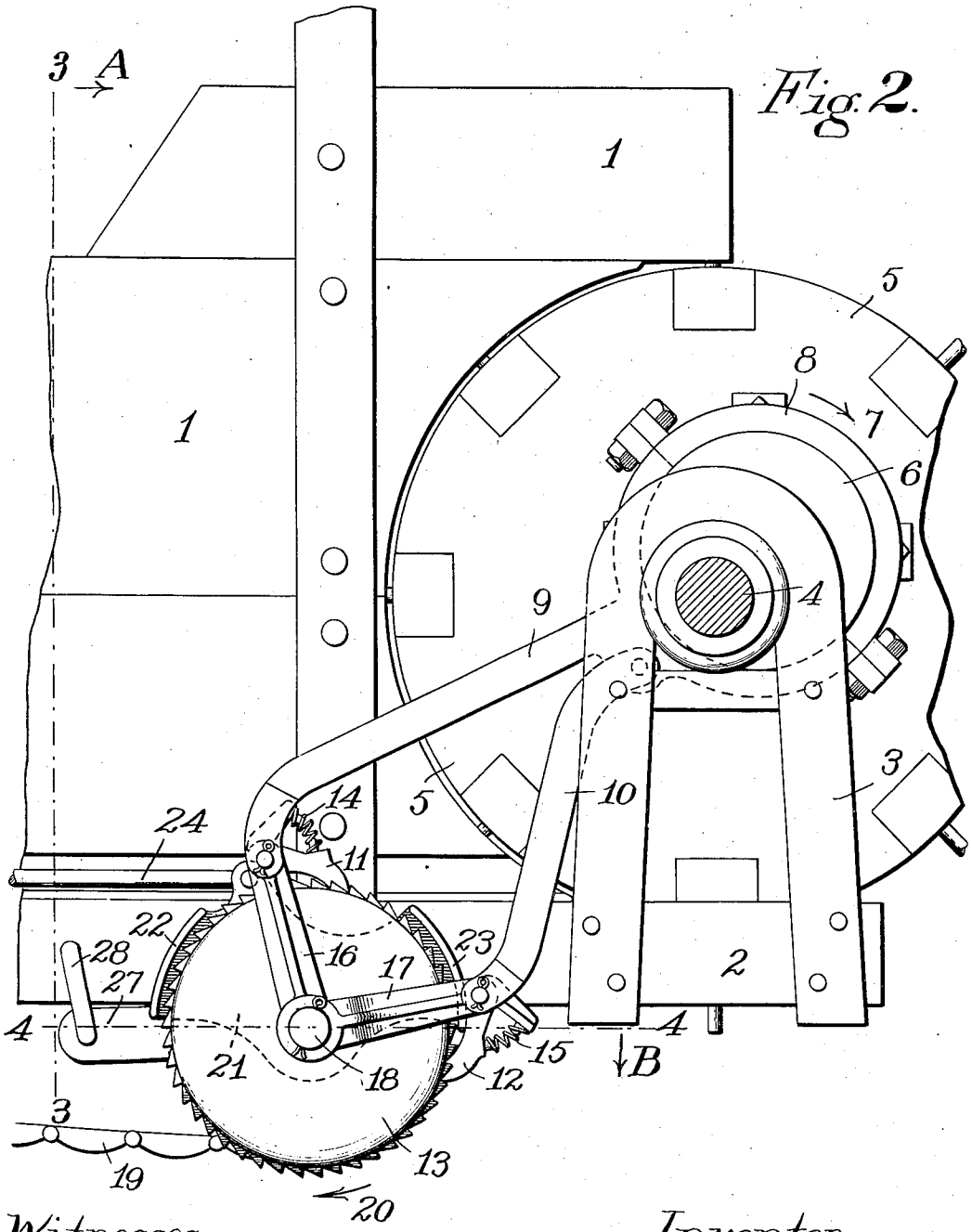
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2 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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MANURE-SPREADER.

1,215,614. Specification of Letters Patent. Patented Feb. 13, 1917.

Application filed April 10, 1911. Serial No. 620,145.

To all whom it may concern:

Be it known that I, THEOPHILUS BROWN, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Manure-Spreaders, of which the following is a specification accompanied by drawings forming a part of the same.

The object of my invention is to provide a mechanism for moving slowly the endless movable bottom of the spreader, by means of mechanism operating from the rapidly revolving beater.

The present improvements relate particularly to manure spreaders having the beater and the rear end of the apron close to the axis of the rear ground wheels, the purpose being to provide a mechanism of the sort above referred to which can be readily employed in the reduced space between the ground wheel and the body.

In the accompanying drawings,

Figure 1 represents a side view of the rear of the spreader, with the rear wheel nearest the observer removed, showing the mechanism embodied in my invention.

Fig. 2 represents an enlarged view of the same.

Fig. 3 represents a view in the direction of the arrow A, of Fig. 2, on the broken line 3—3.

Fig. 4 represents a central, horizontal, sectional view in the direction of the arrow B, on the broken line 4—4, Figs. 2 and 5, of the mechanism driving the shaft of the rear sprocket wheel of the spreader.

Fig. 5 represents a view of Fig. 4, in the direction of the arrow C, on the broken line 5—5.

Similar reference figures refer to similar parts in the different views.

Referring to the drawings, 1 denotes the rear end of the body of the spreader, 2 one of the steel sills on which the body is mounted, as is common with vehicles of this class, and 3 is a U-shaped bracket riveted to the sill 2 and supported by the rear axle 4. The axle 4 is coincident with the axle of the beater, which is driven by the mechanism substantially as shown in United States Patent No. 986,903, issued to me March 14, 1911, and the reissue thereof No. 13,318 issued Nov. 21, 1911, and forms no part of my present invention.

Attached to the end of the beater 5 is an eccentric 6, revolving in the direction of the arrow 7 and surrounded by a strap 8. Integral with the strap 8 is a curved forked arm 9, and pivoted loosely to the strap 8 is a curved forked link 10. Pivoted between the forks at the lower and forward ends of the arm 9 and the link 10 are pawls 11 and 12 which engage teeth on the ratchet wheel 13 and are held against the teeth by the springs 14 and 15. At the lower and forward ends of the arm 9 and the link 10, radial arms 16 and 17 are pivoted, which oscillate on the shaft 18 carrying the rear sprocket wheels by which the movable bottom 19 of the spreader is supported. As the eccentric revolves, a reciprocating motion is imparted to the arm 9, the link 10, and the radial arms 16 and 17, causing the pawls 11 and 12 to engage the teeth of the ratchet wheel 13, imparting a slow intermittent rotary motion to the ratchet wheel 13, in the direction of the arrow 20.

Pivoted loosely on the shaft 18, between the ratchet wheel 13 and the sill 2, is a plate 21, having shoes 22 and 23 projecting at right angles, or nearly so, from its periphery over the teeth of the ratchet wheel 13, and operated by means of the lever bar 24 by the driver at the front of the spreader. By this means the shoes 22 and 23 can be moved forward or rearwardly, causing a greater or less number of teeth of the ratchet wheel to become engaged by the pawls. As the shoes are moved rearwardly, a less number of teeth are engaged by the pawls so that the intermittent rotary motion of the ratchet wheel is reduced in extent, and when the shoes are in their farthest rearward position the pawls run over the shoes and do not engage the teeth, so that no motion is imparted to the ratchet wheel.

By moving the shoes forward the movement of the ratchet wheel is increased. Within the ratchet wheel 13 is an internal gear 25, pinned to the shaft 18. The ratchet wheel 13 is provided with a hub 26 eccentric to its axis of rotation and supported by the eccentric hub 26 is a spur gear 29, attached to and held from rotation by a dog 27, which is pivotally connected to one of the sills 2 by a link 28. As the eccentric rotates the spur gear is moved in an eccentric path causing its teeth to be progressively crowded between the teeth of the internal gear 25, and

by the crowding or wedging action of the teeth of the spur gear 29 against the teeth of the internal gear 25, causing a slow rotation of the internal gear and shaft 18, by which the bottom 19 is moved.

The axle 4 on which the beater is mounted is supported on opposite sides of the manure spreader by the supporting wheels 30, one of which is shown in Fig. 1, having the usual pawl and ratchet connection with the axle 4, which is preferably inclosed in the hubs 31 of the supporting wheels, as shown at 32, Fig. 3.

The number of teeth in the internal gear 25 is greater than the number of teeth in the spur gear 29, the excess in the present instance being three teeth. As the spur gear 29 is moved by each complete rotation of the eccentric hub 26, a slow continuous rotation of the internal gear 25 and sprocket wheel shaft 18 is accomplished, the total rotative movement of the internal gear for each rotation of the eccentric hub being determined by the excess of teeth in the internal gear over the spur gear.

It is desirable to have as great a carrying capacity for load in the body part of one of these spreaders as is possible without enlarging the wheel base either laterally or longitudinally. To have such capacity it is necessary to widen the load space between the side walls of the body as far as possible. At the same time it is not desirable to have the distance between the rear ground wheels increased beyond a fixed limit. Positioning the side walls near the ground wheels 30 reduces the space between them wherein can be arranged the power transmitting devices extending from the axle or the beater to the movable bottom or feeding apron 19.

Difficulties in this respect are particularly incident to manure spreaders of the class here typified, that is those having the beater and the shaft of the feeder apron both so placed that their axes pass through the ground wheels. In constructions where the axes of these two rotary parts are on transverse lines outside of the peripheries of the ground wheels this difficulty is not met with. But for numerous fundamental reasons I arrange the beater so that its axis is at or near the axis of the ground wheels. As shown, the beater is mounted concentrically with the axle; and the rear shaft of the feeding apron is close to the beater. The ground wheels, respectively, being close to the side walls of the body I have found it necessary to design an apron-driving mechanism which can be used in the reduced space between the wheels and the body.

The wheels 25 and 29 it will be seen move in substantially the same planes, these being, as shown, vertical planes parallel to those of the ground wheel. The step-by-step moving wheel 13 is also in these planes, and, consequently, the driving mechanism for the apron shaft is made very compact in respect to lines transverse to the machine. I provide a strong durable mechanism which not only transmits power from the axle to the apron, but reduces the high speed at the power receiving end of the train to a very low speed at the apron, and I also provide a constant lock for the apron so that under all circumstances it is locked against movement in either direction.

The body support, or bracket, 3 is suspended from or rests on the axle at points immediately inside of the ground wheel; and the eccentric 6, which may be regarded as the prime power device, is positioned inside of this body support. In this construction this power device 6 is secured to and carried by the beater, the narrow space which is available for such a power device being utilized to the greatest advantage in this way.

It will be further seen that both the parts 25 and 29 move in fixed or orbital paths around the axis of the shaft 18 that axis being a line which is common to them in their orbital movements in relation thereto, this line being transverse to the aforesaid planes of these movements; and this relative arrangement of parts assists in securing the compactness above described.

I claim,

1. In a manure spreader the combination of the body, the rotary beater, the movable bottom on which the load is supported and which tends to move therewith forward or backward according to the direction of its inclination, and means for positively feeding the body forward comprising two permanently interengaged elements which move in orbital paths around a common line transverse to the planes of their movements the first of which is connected to the bottom and the second of which is adapted to drive the first element through its orbital movements and is also adapted to lock it against movement in either direction.

2. In a manure spreader the combination of the body, the rotary beater, the movable bottom on which the load is supported and which tends to move therewith under the action of gravity toward or from the beater, means comprising a rotary shaft engaging with and actuating the bottom, shaft-driving devices which comprise two interlocking elements both mounted to move in orbital paths around a common line transverse to the planes of their movements the first of which elements is operatively connected to the aforesaid bottom, and a prime driving device, the second of said elements transmitting power from the driving device to the first said element and adapted to rotate it when the driving

device is in action and to lock it against motion in either direction when the driving device is inactive.

3. In a manure spreader the combination of the body, the rotary beater, the movable bottom on which the load is supported and which tends to move therewith under the action of gravity and is adapted to be driven by power, and means for positively feeding the body forward comprising a rotary wheel connected to the bottom, a prime driving device and a power transmitter between the driving device and said wheel and adapted to rotate the wheel when the driving device is in action and to lock the wheel against motion in either direction when the driving device is inactive.

4. In a manure spreader, the combination of the ground wheels, the axle, the load-carrying body, the body support resting on the axle inside of the ground wheel, a prime power device driven by the axle and arranged inside of the said body support, the feeding apron, the apron shaft, the speed-reducing driving mechanism for the apron shaft comprising two intermeshing gear wheels, and power transmitting devices between said prime power device and the said gear wheels, the said prime power device, the said two intermeshing gear wheels and the said power transmitting devices being all located in substantially the same vertical planes.

5. In a manure spreader, the combination of the ground wheel, the axle, the body, the body support resting on the axle inside of the ground wheel, the beater on an axis passing through the ground wheel, the feeding apron, the apron shaft on an axis passing through the ground wheel, the step-by-step moving speed-reducing driving mechanism for the apron shaft between the ground wheel and the body and comprising two intermeshing gear wheels moving in the same plane, a prime power device driven by the axle and positioned between the said body support and the body, and power transmitting means between the prime power device and the said gear wheels, the said two intermeshing gear wheels the said prime power device and the said power transmitting means being all located in substantially the same vertical planes.

6. In a manure spreader, the combination of the ground wheel, the axle, the load-carrying body, the body support resting on the axle inside of the ground wheel, the prime power device driven by the axle and arranged inside of the said body support, the feeding apron, the apron shaft, the speed-reducing driving mechanism for the apron shaft comprising a step-by-step moving wheel and two intermeshing gear wheels, and power transmitting devices between said prime power device and the step-by-step moving wheel, the said prime power device the said step-by-step moving wheel the said two intermeshing gear wheels and the said power transmitting devices being all located in substantially the same vertical planes intermediate the plane of the said body support and the outer plane of the said body.

Dated this eighth day of April, 1911.

THEOPHILUS BROWN.

Witnesses:
PENELOPE COMBERBACH,
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