United States Patent

[11] **3,550,865**

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[33] **Netherlands**
[31] **No. 6813928**

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[54] **TRANSPORTABLE DEVICES FOR SPREADING MATERIAL**
41 Claims, 7 Drawing Figs.

[52] **U.S. Cl.** **239/670,** 222/178, 222/202; 239/683; 280/124, 280/489
[51] **Int. Cl.** **A01c 19/00**
[50] **Field of Search** 222/176, 177, 178, 201, 202, 203; 239/668, 669, 670, 674, 683, 655; 280/490, 489, 124, 124.1

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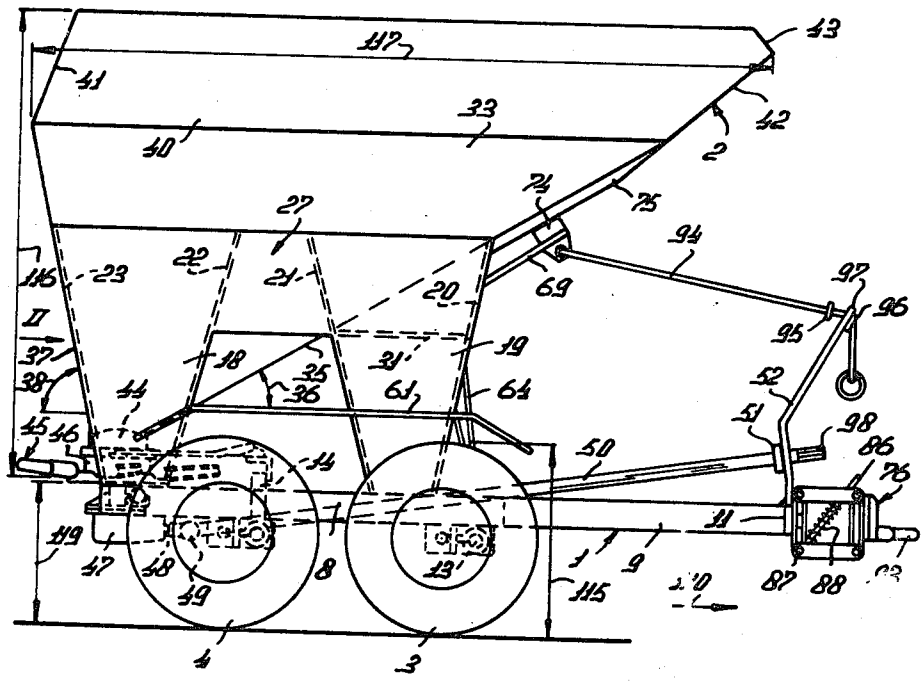
ABSTRACT: A spreading device having a large hopper with sloping walls carried by a wheeled frame. The hopper has a front wall which slopes to the rear to terminate adjacent the rear wheels of the device. A rotatable spreader member is mounted beneath the bottom of the hopper at the rear of the device. The hopper is designed and supported to carry a large amount of fertilizer. The upper rims of the hopper are bent inwardly and reinforcing beams and supports hold the hopper when the device is traveled over rough ground. A resilient towing member is attached to the frame of the device.



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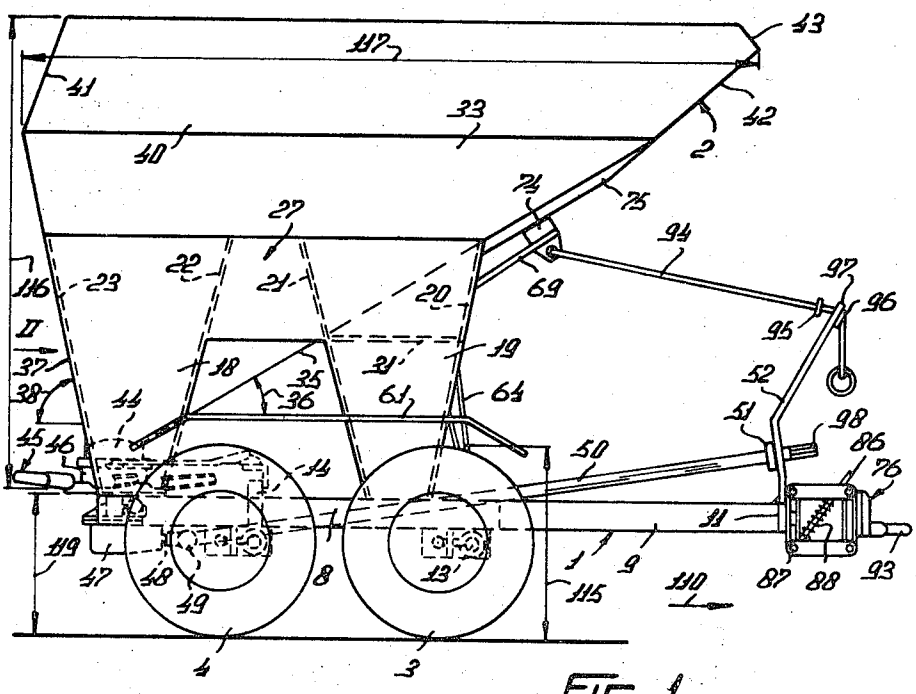

FIG. 1

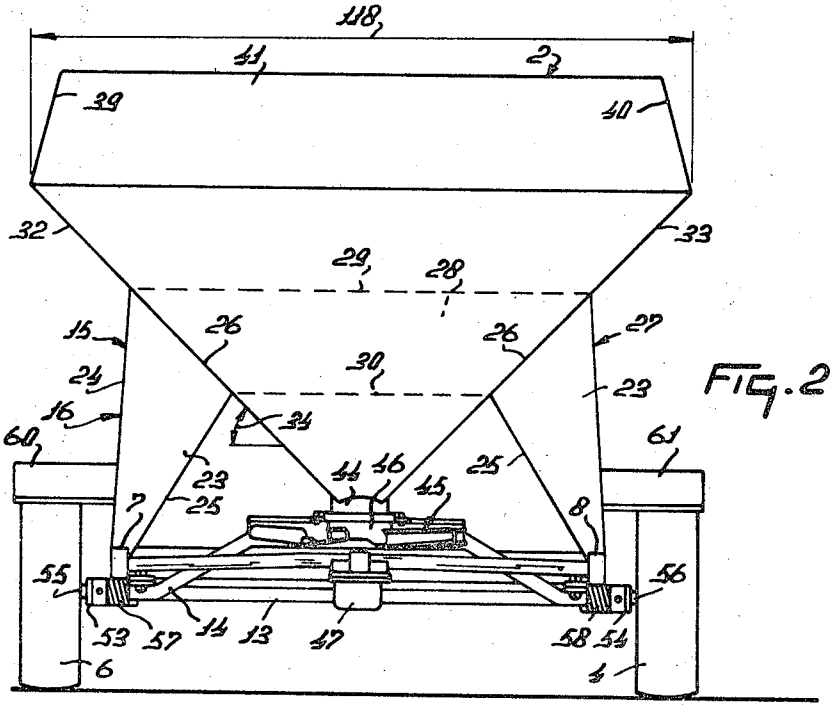

FIG. 2

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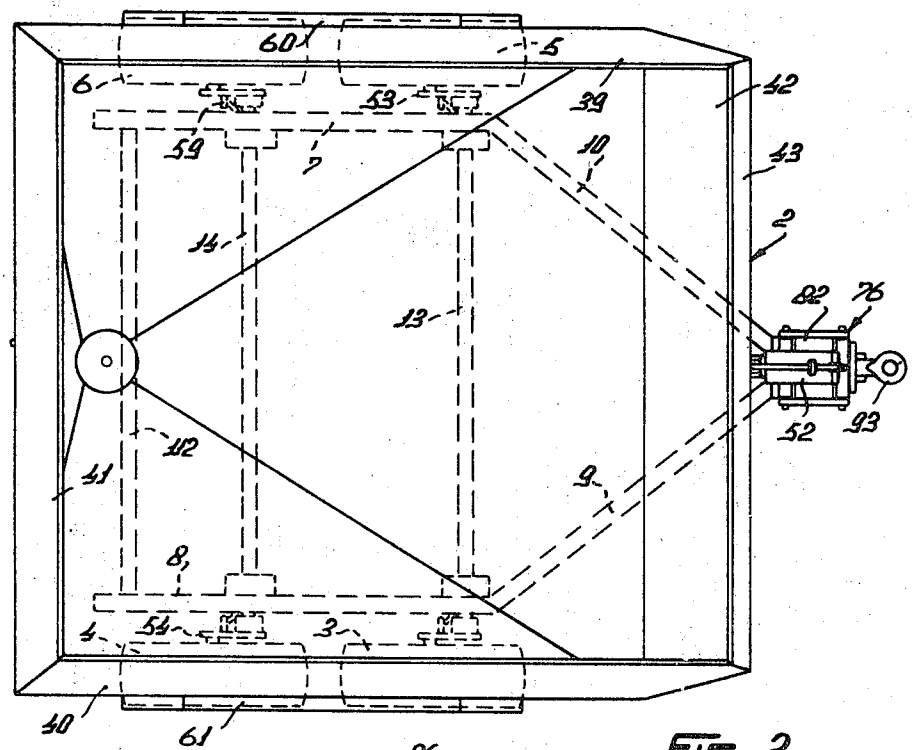

FIG. 3

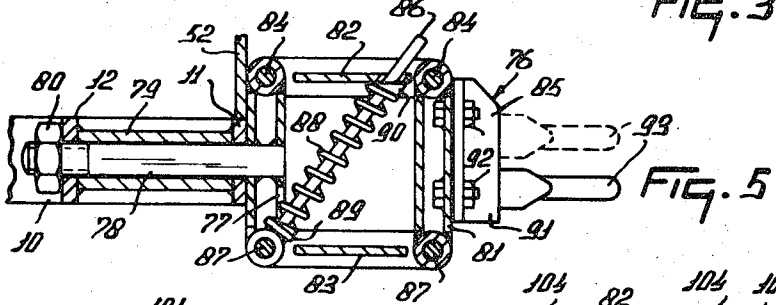

FIG. 5

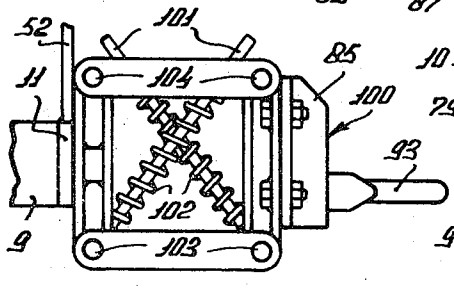

FIG. 6

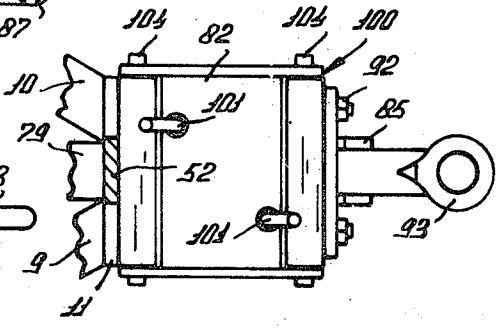

FIG. 7

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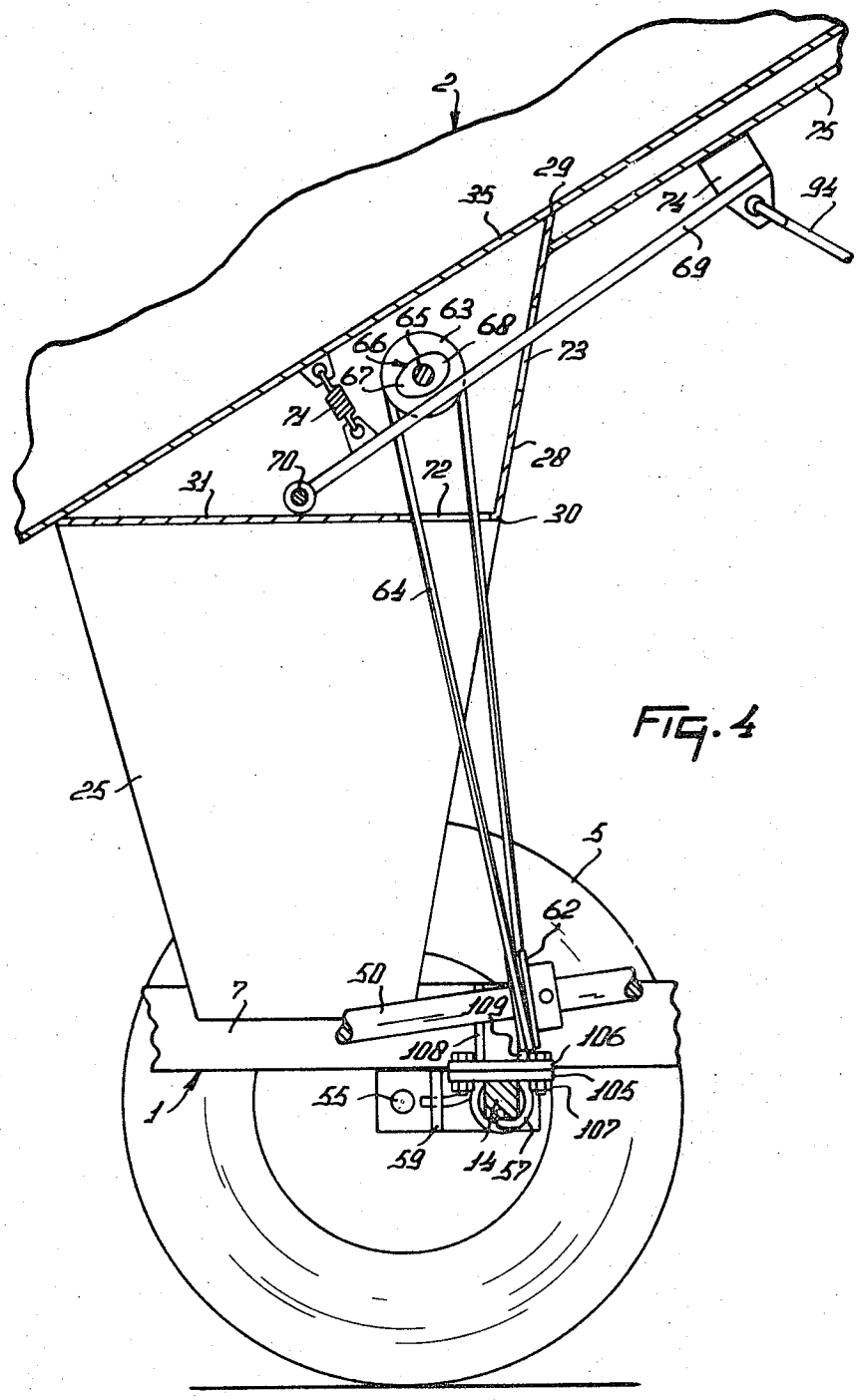

FIG. 4

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TRANSPORTABLE DEVICES FOR SPREADING MATERIAL

In a further construction the device for spreading fertilizer or such material is provided with a hopper and at least two running wheels mounted behind each other at each side of the hopper, the hopper having an outlet to which a spreading disc is mounted, said spreading disc being mounted at the rear of the device and at the lower end of a forward sloping front wall of the hopper.

In a further construction of the device for spreading material the same comprising a frame, a container having an outlet member and a spreading member, the container having at least two downwardly converging walls, one wall being at an angle of more than 25° and less than 50° to the horizontal plane, whereas the other wall is arranged at an angle of more than 50° and less than 85° to the horizontal plane.

By this construction the device comprises a large container, while the material can be effectively conducted from the container towards the spreading member.

An advantageous device embodying the invention is obtained by causing the front wall of the container to be at an angle of about 30° to the horizontal plane, viewed in the direction of movement of the device. The capacity of the container can be enhanced by providing it on the upper side with upwardly extending rims, at least two of which extend obliquely towards the inner side of the container.

The construction of the device may be simple, when the container is held by supports provided on the sidewalls and fastened to horizontal parallel frame beams.

An effective support of the device according to the invention can be achieved by providing the frame with two pairs of ground wheels, the axles of each pair being substantially in line with each other and being arranged one after the other viewed in the direction of movement of the device.

In a further device embodying the invention a knocking member is provided on the outer side of the container for knocking against a wall of the container.

In a further construction of the device embodying the invention a drawbar fixedly connected with the frame of the device is provided with a coupling member, which is adjustable in a direction of height with respect to the drawbar. An advantageous embodiment of the coupling member can be obtained by means of a parallelogram structure so that a connecting hook of the coupling member is adapted to move parallel to itself in a direction of height with respect to the drawbar.

For a better understanding of the invention and to show how the same may be carried into effect, reference is made by way of example to the accompanying drawings.

FIG. 1 is a side elevation of a device embodying the invention.

FIG. 2 is a rear view of the device of FIG. 1 in the direction of the arrow 11 in FIG. 1.

FIG. 3 is a plan view of the device of FIGS. 1 and 2.

FIG. 4 shows on an enlarged scale a vertical sectional view of part of the device comprising a knocking member for the container.

FIG. 5 shows an enlarged vertical sectional view of the coupling member provided at the front of the drawbar of the device.

FIG. 6 is a side elevation of a further embodiment of a coupling member, and

FIG. 7 is a plan view of the coupling member of FIG. 6.

The device shown in the FIGS. comprises a frame 1, supporting a container 2. The frame 1 is supported from four ground wheels 3, 4, 5 and 6, each having a diameter 115 of about 66 cm. Hereby the wheels 3 and 4 are situated at one side of the frame and the wheels 5 and 6 are situated at the other side of the frame. The wheels 4 and 6 are mounted behind the wheels 3 and 5 respectively relative to the intended direction of travel 110. The frame 1 comprises two parallel, horizontal beams 7 and 8. At the front the beams 7 and 8 have fixedly secured to them horizontal beams 9 and 10, which converge towards the front and are located near one another by

their front ends and are interconnected by plates 11 and 12. The beams 7 and 8 are interconnected by two square-section shafts 13 and 14. The shafts 13 and 14 are rigidly secured to the beams 7 and 8, which is shown in detail in FIG. 4 for one end of the shaft 13. A connecting plate 105 is rigidly secured to the shaft 13 and a connecting plate 106 is provided on the beam 7, with which it is rigidly connected by means of side plates 108. The plates 105 and 106 are intercoupled by means of bolts 107 for fastening the shaft 13 to the beam 7.

For holding the container 2 the horizontal beams 7 and 8 are provided with supporting portals 15 and 27, each forming an inverted U when viewed from a side. The supporting portal 15 comprises an outer plate having a horizontal portion 16 and two vertical portions 17 and 18. Alongside the portions 17 and 18 stiffening plates 20, 21, 22 and 23 are arranged at right angles to the outer plate and have each a triangular shape (see FIG. 2) having a side 24, a side 25 and a side 26. The supporting portal 27 has the same shape as the supporting portal 15, so that it need not be described further. Corresponding parts are designated by the same reference numerals. The plate 20 is connected with the corresponding plate 20 of the portal 27 by a plate 28, located at the front of the container and having horizontal sides 29 and 30. A horizontal plate 31 joins the lower side 30 of the plate 28 and extends between the supporting portals 15 and 27.

The container 2 is rigidly secured to the supporting portals 15 and 27 and comprises opposite sidewalls 32 and 33, which join the supporting portals 15 and 27. The walls 32 and 33 are each at an angle 34 of 45° to the horizontal plane. At the front the container has a wall 35, which is at an angle 36 of more than 25° and less than 50° to the horizontal plane. This angle is preferably about 30°. This front wall 35 is situated with its upper forward end forward of the front wheels 3 and 5 as seen in side view and relative to the intended direction of travel 110. The lower end of the wall 35 is situated rearwardly of the axis of rotation of the rear wheels 4 and 6 as seen in side view and relative to the direction 110. The container 2 has a rear side 37, viewed in the direction of movement 110, which side is at an angle 38 of more than 50° and less than 85° to the horizontal plane. The latter angle is preferably about 75°. The lower part of the container 2, formed inside the sidewalls 32, 33 the front wall 35 and the rear wall 37, is provided with the upper part comprising rims 39 and 40 joining the sidewalls 32 and 33 and extending in upward direction toward each other, said rims joining rim 41 extending in upward direction towards the interior of the container and fastened to the upper side of the rear wall 37. Hereby the upper side of rear wall of the hopper 2 is situated above the outlet spout 44 as seen in side view. The front side of this upper container part comprises a side 42, which is only at a small angle to the front wall 35, whereas the upper portion of said side 42 is bent over inwardly by a portion 43. On the lower side the container is provided with an outlet member formed by an outlet spout 44, which is open at its lower end and through which the material can be delivered from the container. The overall height 116 of the container from the delivery spout is about 160 cm. The length 117 is about 270 cm. and the width 118 is about 235 cm.

Beneath the delivery spout 44 a rotatable spreading member 45 is arranged, while between the delivery spout 44 and the spreading member 45 a dosing member (not shown in detail) 47 is provided with one or more outlet ports which can be closed to a greater or lesser extent for regulating the delivery from the container to the spreading member per unit of time. The dosing member includes an annulus surrounding with its open upper end the spout 44 and with its open lower end resting against the spreading member 45 in such a way that the spreading member 45 constitutes a bottom part for the container 2. The spreading member is located at a distance 119 of about 50 cm. above the ground. The spreading member 45 is located near the rear side of the device and connected with a vertical shaft (not shown), journaled in a gearbox 47. The gearbox 47 is connected with a beam 112, which is arranged between the rear ends of the beams 7 and 8. The gear-

box 47 is provided at the front with a horizontal shaft 48, which is coupled by a universal joint 49 with a coupling shaft 50. The intermediate shaft 50 extends to the front of the device and is journaled in a bearing 51 on a support 52, which is secured to the plate 11. The connecting shaft 13 extends below the coupling shaft 50 and is straight. The ends of the shaft 13 are provided with supporting arms 53 and 54, adapted to turn about the shaft 13, while the axles 55 and 56 of the ground wheels 3 and 5 are located in the ends of the supporting arms 53 and 54. The ends of the shaft 13 are surrounded by helical springs 57 and 58, one end of each of which is secured to the shaft 13, which is stationary relative to the frame, whereas the other end is secured to tags provided on the supporting arms 53 and 54 respectively. These tags are designated in FIG. 4 for the supporting arm 54 by 59. The shaft 14 is slightly curved upwards and extends over the coupling shaft 50. In the same way as it is described for the shaft 13, the shaft 14 is provided with supporting arms holding the ground wheels 4 and 6. These supporting arms are not shown in detail here. Above the ground wheels 5 and 6 a mud board 60 is connected with the supporting portal 15 and above the wheels 3 and 4 a mud board 61 is secured to the supporting portal 27.

The space formed between the plate 31, the plate 28 and the front wall 35 of the container accommodates a driving mechanism for a knocker. This driving gear comprises a pulley 63 and a pulley 62 on the coupling shaft 50, a rope 64 being passed around the pulleys 62 and 63. The pulley 63 is fixed to a shaft 65, journaled in said space and having a cam disc 66 fastened to it. The cam disc 66 has two cams 67 and 68, which cooperate with a knocking bar 69, which is adapted to pivot about a shaft 70. The knocking bar 69 is engaged by a draw spring 71, which is secured to the front wall 35 of the container. The rope 64 passes through an opening 72 in the wall 31 and the knocking bar 69 passes through an opening 73 in the plate 28. The end of the knocking bar 69 projecting beyond the plate 28 is provided with a thrusting member 74, which cooperates with a thrust plate 75, which is located at a short distance from the front wall 35. The thrust plate 75 is rigidly connected with the front wall 35 and fastened by one side to the plate 28.

The plate 11 is provided with a coupling member 76, by means of which the device can be coupled with a vehicle moving the device. The coupling member 76 comprises two vertical plates 77, which are provided with a horizontal shaft 78. The shaft 78 is fastened to the plates 11 and 12 and between these plates a sleeve 79 surrounds the shaft 78, while the shaft 78 is fastened by means of a nut 80.

The coupling member 76 comprises two plates 81, extending parallel to the plates 77. A connecting member 82 is arranged between the upper ends of the plates 77 and the upper ends of the plates 81 and a connecting member 83 is arranged between the lower ends of the plates 77 and 81. The connecting members 82 and 83 are pivoted to the plates 77 and 81 by means of shafts 84 and 87. The coupling member 76 thus comprises a parallelogram structure and the plates 81 are furthermore provided with a fastening hook 85. A bar 86 is arranged diagonally in the parallelogram and connected by one end with said structure near the pivotal shaft 87 of the same. The bar 86 is surrounded by a pressure spring 88, which bears on a ring 89, fastened to the shaft 86, and on a ring 90 on the connecting member 82. The bar 86 extends through a hole 113 in the connecting member 82 so as to be movable in a direction of length. The fastening hook 85 comprises a plate 91, which is secured by bolts 92 to the plates 81. The plate 91 is provided with a connecting eyelet 93. This connecting eyelet 93 is eccentrically secured to the plate 91. The plate 81 has a plurality of holes for receiving the bolts 92 so that the fastening hook 85 is adjustable in a direction of height on the plates 81. The plate 91 may be turned over so that the connecting eyelet 93 is further adjustable in a direction of height with respect to the plate 81.

With the knocking bar 69 is connected a wire 94, which is provided with two stops 95 and 96. These stops 95 and 96 cooperate with the upper end 97 of the supports 52. The end 97 has an elongated hole through which the wire 94 can be taken but through which the stops 95 and 96 cannot pass.

Before operation the container 2 is filled with the material to be spread. The quantity of material delivered from the spout per unit time can be regulated by the adjustment of the dosing mechanism 46. By means of the coupling member 85 the device is hitched to a prime mover, for example a tractor. The front end 98 of the coupling shaft 50 can be coupled with the aid of an intermediate shaft with the power takeoff shaft of the tractor. By the power takeoff shaft the rotatable spreading or ejecting member 45 is caused to rotate so that the material fed through the outlet ports of the dosing mechanism 46 to the spreading member can be distributed. Owing to the form of the container adequate supply of material to the spreading member is ensured without the need for conveying means inside the container for the delivery of material to the spout. When it is required to distribute material tending to stick to the wall of the container, the thrust member 74 can knock against the front wall 35. For this purpose the stop 96 is disposed as is shown in FIG. 1. In this position of the stop and the wire 94 the knocking bar 69 can be drawn by the spring 71 against the wall 35. The cam disc 66 will cooperate with the bar 69 so that the cams 67 and 68 alternately move the bar 69 away from the thrust plate 75, the thrust member 74 knocking twice against the thrust plate 75 during each revolution of the cam disc 66. Thus the container and particularly the front wall 35 is caused to vibrate so that the material will always flow in sufficient quantities along the walls towards the delivery spout 44.

The shape of the frame and its support from the four ground wheels permit of using such a large container that a great quantity of material can be carried by the device. This is particularly advantageous when distributing fertilizer on larger areas. In order to satisfactorily absorb the movements between the tractor and the device on uneven ground the coupling member 76 is provided with the parallelogram pivot so that the coupling hook 85 is movable with respect to the drawbar formed by the beams 9 and 10, said drawbar being stationary with respect to the frame. The spring 88 counteracts a downward movement of the coupling hook 85.

The knocking effect of the thrust member 74 can be put out of operation by pulling the wire 94 towards the end 97 so that the stop 95 can be arranged on the front side of the support 52, viewed in the direction of movement. The knocking bar 69 is then held at a larger distance from the front wall 35 against the tension of the spring 71 so that the cam disc 66 is no longer in contact with the bar 69. The rope 94 can be actuated from the driver's seat of the prime mover of the device for bringing the stop 95 or 96 in contact with the end 97. By its construction and superstructure the device is particularly suitable for use as a fertilizer distributor, which is especially capable of effectively spreading granular or powdery material.

With these devices the ground wheels 3, 4, 5 and 6 are arranged so that the point of gravity of the device with a filled container is located substantially centrally between the supporting wheels 3, 5 and 4, 6 respectively. By the connection of the ground wheels 3, 4, 5 and 6 with the frame through the supporting arms, for example, the arm 54, adapted to turn about the stationary shafts and by the provision of coupled helical springs between these supporting arms and the stationary shafts, for example, the helical springs 57, the wheels are resiliently held with respect to the frame 1 so that during travel the device is resiliently supported relatively to the ground. The helical springs 57 hereby will act on the arms, such as the arms 53 and 54, in such a way that the supporting arms will be pushed downwardly relative to the frame by the said springs. Owing to the fact that the wheels, for example the pair of wheels 3 and 4, are resiliently movable to the frame the axis of rotation of each of the pairs of wheels 3 and 5 respectively 4 and 6 will not always be exactly in alignment but

mostly only nearly in alignment. Shocks from travelling over uneven ground will thus not be transferred to the device.

FIGS. 6 and 7 show a coupling member 100, which is constructed in the same manner as the coupling member 76. However, in the coupling member 100 the parallelogram pivot includes two bars 101, each of which is surrounded by a helical spring 102. The bars 101 extend between the pivots 103 and the pivots 104 and the bars 101 are pivoted to the coupling members near the pivots 103, while its upper ends are adapted to pass through a hole as is described from the bar 86. The components of the coupling member 100 corresponding with those of the coupling member 76 are not shown in FIGS. 6 and 7 and they are designated by the same reference numerals as in FIGS. 1 to 5.

In the construction shown in FIGS. 6 and 7 the pivotal movements of the coupling hook 85 both in upward direction and in downward direction with respect to the drawbar formed by the beams 9 and 10 are resilient movements owing to the springs 102. In the embodiment shown in FIG. 5 only the downward movement of the hook 85 with respect to the drawbar is a resilient movement. The front side of the drawbar is owing to the fact that the beams 9 and 10 are horizontal and on the same level as the beams 7 and 8 lying on a distance above the ground approximately half the height of the diameter of the wheels 3—6.

I claim:

1. A spreading device comprising a frame, a hopper mounted on the frame and a plurality of pairs of wheels positioned one behind the other, supporting said frame, said hopper having a sloping front wall extending down towards the rear of the implement, the lower end of said front wall terminating to the rear of the axis about which the rearmost pair of wheels turn, the upper end of said front wall terminating in front of said foremost pair of wheels, an outlet in said hopper at the rear thereof and a rotatable spreading disc mounted on a vertical axis being positioned beneath said outlet, said hopper having walls which terminate adjacent said outlet whereby material flows to said outlet by gravity.

2. A device as claimed in claim 1, wherein said hopper has at least two downwardly converging walls, one of said walls being at an angle of more than 25° and less than 50° to the horizontal plane, and the other of said walls being at an angle of more than 50° and less than 85° to the horizontal plane.

3. A device as claimed in claim 2, wherein said two walls comprise two opposite sides of said hopper and said hopper has a four-sided horizontal sectional area.

4. A device as claimed in claim 3, wherein the front wall of said hopper is sloped at an angle of about 30° to the horizontal plane.

5. A device as claimed in claim 4, wherein said two opposite sides are sloped at equal angles to the horizontal plane.

6. A device as claimed in claim 5, wherein the angle between said opposite sides and the horizontal plane is about 45°.

7. A device as claimed in claim 3 wherein the sides of said hopper have upwardly extending rims, at least two of said rims extending obliquely towards the center of said hopper.

8. A device as claimed in claim 7, wherein the rear side and the opposite sides of said hopper have upright rims extending obliquely upwards towards the interior of said hopper, the front side of said hopper having a rim extending forwardly approximately in line with the front side for a distance and then terminating with an inwardly bent over portion.

9. A device as claimed in claim 2, wherein side supports hold said hopper and said supports are secured to horizontal, parallel frame beams of said frame.

10. A device as claimed in claim 9, wherein each of said side supports has the shape of a U, the limbs of said supports pointing downwards and being secured to said horizontal frame beams.

11. A device as claimed in claim 10, wherein each of said supports is a plate having a horizontal portion and two vertical, downwardly extending portions, said plate having stiffening plates secured at right angles thereto.

12. A device as claimed in claim 11, wherein said stiffening plates are parallel to said vertical portions of said support.

13. A device as claimed in claim 9, wherein the bottom of said hopper has a delivery spout, a rotatable spreading member being mounted below said spout and a dosing mechanism being positioned between said spout and said spreading member.

14. A device as claimed in claim 13, wherein the interior of said hopper is unobstructed.

15. A device as claimed in claim 9, wherein said frame is mounted on two pairs of ground wheels, axles of each pair of ground wheels being substantially in line with each other, said pairs of wheels being positioned one after the other viewed in the direction of travel.

16. A device as claimed in claim 15, wherein said axles are connected by supporting arms having shafts, said shafts being rigidly secured to said frame, said shafts being surrounded by helical springs which resiliently secure same to said supporting arms whereby said springs exert a force on said supporting arms in downward direction with respect to said frame.

17. A device as claimed in claim 16, wherein said shafts are stationary and extend between said two parallel frame beams of said frame, said shafts being secured to said frame beams.

18. A device as claimed in claim 1, wherein the forward end of said frame has a draw device located at about the same height above the ground as the axis of said pairs of wheels, said forward end being positioned in fixed relation relative to said frame.

19. A device as claimed in claim 18, wherein said pairs of wheels are spring mounted on said frame.

20. A device as claimed in claim 1, wherein said outlet is formed at the lowest part of the bottom of said hopper and said spreading disc is mounted below said outlet.

21. A device as claimed in claim 20, wherein the upper end of the rear wall of said hopper terminates above the outlet of said hopper.

22. A device as claimed in claim 1, wherein a knocking member is mounted adjacent one side of said hopper, said member being mounted to periodically knock against said side from the outside.

23. A spreading device comprising a frame, a hopper mounted on said frame and a plurality of pairs of ground wheels positioned, one behind the other, supporting said frame, said hopper having a sloping front wall extending downwardly towards an outlet spout at the lower end of said hopper located rearwardly of the axis of rotation of the rearmost pair of wheels, said sloping front wall extending upwardly and forwardly to terminate in front of the foremost pair of wheels and said front wall having a top part which extends at a different angle than the remainder of said front wall, the upper side of said top part extending obliquely upwardly and rearwardly with reference to the direction of travel of said device, said hopper having a rear wall extending obliquely upwardly from said outlet spout and having at its upper side a rim part extending obliquely upwardly and forwardly, said rear and front walls being connected to sidewalls which extend from said outlet spout obliquely upward to diverge upwardly relative to each other, the upper ends of said sidewalls having a rim portion which extend upwardly and obliquely towards each other, said sidewalls being connected to supports connected to horizontal beams of said frame and said wheels being resiliently connected to said beams, a rotatable spreading member mounted on said beams below said outlet and a drawbar attached to said beams to couple said device to a prime mover.

24. A spreading device comprising a frame including a horizontal frame part connected to a plurality of pairs of wheels positioned one behind the other, a hopper supported on said frame and said frame part being connected to a U-shaped support at each side of said hopper, upper end of each support being connected a sidewall of said hopper, the sidewalls extending obliquely upwardly so as to diverge towards their upper ends relative to each other, the lower ends of said side walls extending to an outlet spout of said hopper

adjacent the longitudinal axis of said device, said hopper having a front wall sloping upwardly from said spout to terminate with its upper end in front of the foremost pair of wheels, said spout being located near the rearmost wheels of said spreading device and a generally vertical rear wall extending upwardly from said outlet, said sidewalls, front and rear walls each having an upper rim extending at an angle to the remainder of their respective walls, a single rotatable spreading member rotatable about a vertical axis being positioned beneath said spout and a closing mechanism being mounted between said spout and said spreading member, said horizontal frame part having a drawbar attached to its forward end for connection to a prime mover.

25. A spreading device comprising a hopper and a frame having a horizontal frame part, two running wheels being connected to said frame part at each side of the longitudinal axis of said device, said horizontal frame part being connected to each side of said device with an inverted U-shaped support, the limbs of each U-shaped support extending downwardly and secured to said frame part, the upper end of each support being connected a sidewall of said hopper, each sidewall extending obliquely upwardly so as to diverge at their upper ends relative to each other, the lower end of each sidewall extending to an outlet spout of said hopper which is located adjacent the longitudinal axis of said device, said hopper having a front wall sloping upwardly from said spout to terminate with its upper end in front of said wheels, said spout being located near the rearmost end of the device and the rear wall of said hopper extending upwardly from said spout at an angle to the horizontal of more than 50°, said sidewalls, front and rear walls each having an upper rim extending inwardly, a single spreading member rotatable about a vertical axis positioned beneath said spout with a dosing mechanism mounted between said spout and said spreading member, said horizontal frame part having a drawbar at its forward end for connection to a prime mover.

26. A spreading device comprising a frame and a hopper supported on said frame, said hopper having an outlet spout at its lower end and a spreading member positioned below said end, said hopper being four sided with two sidewalls extending downwardly and obliquely so as to converge to said spout, a front wall connecting said side walls and said front wall extending at an angle of less than 50° to the horizontal from said spout upwardly and forwardly to terminate substantially in line with the forward side of said frame, a rear wall extending upwardly from said spout at an angle of more than 50° to the horizontal, said frame including a horizontal frame part to which is connected a plurality of pairs of wheels positioned one behind the other, said spout being positioned rearwardly of the axis about which the rearmost pair of wheels turns, said frame having two parallel frame beams positioned one at each side of said device, a substantially vertical support on each of said frame beams to bear said hopper, each support being U-shaped in side view with its limbs extending downwards to be secured to said parallel frame beams, said horizontal frame part having a drawbar.

27. A spreading device comprising a frame and a hopper supported on said frame, said hopper having an outlet spout at its lower end, said device having a single spreading member rotatable about a substantially vertical axis, said spout having a center line coinciding with the said vertical axis, said center line and vertical axis being located in a vertical plane and in line with the longitudinal axis of said device, said hopper being four sided with two sidewalls extending downwardly and obliquely at an angle of about 45° to the horizontal so as to converge towards said spout, a front wall extending at an angle of about 30° to the horizontal and extending from said spout upwardly and forwardly so as to terminate substantially in line with the forward part of said frame, a rear wall extending upwardly from said spout at an angle of about 75° to the horizontal plane, said frame having a horizontal frame part to which is connected a plurality of pairs of wheels positioned one behind the other, said spout being located adjacent the rear side of the rearmost of said pair of wheels, said frame having two parallel frame beams, one situated at each side of said device, a substantially vertical support bearing said hopper, each of the supports being U-shaped in side view with its limbs extending downwards and secured to one of said parallel frame beams, said horizontal frame part being provided at its front end with a drawbar comprised of forwardly converging beams terminating with a coupling member.

28. A spreading device comprising a frame, a hopper mounted on said frame and a plurality of pairs of wheels mounted on a horizontal frame part, said pairs of wheels positioned one behind the other supporting said frame, said hopper being four sided with at least some of said sides converging downwardly to terminate in an outlet spout located adjacent the rear side of the device, a rotatable spreading member positioned below said spout, said spreading member being connected to a substantially vertical axle mounted in a gearbox and said gearbox being mounted on said horizontal frame part, inverted U-shaped supports being connected at their lower ends to said horizontal frame part and their upper ends supporting said hopper, the front end of said horizontal frame part having a drawbar comprising two frame beams converging towards each other to terminate in coupling means, said gearbox being mounted on said frame part to the rear of the axis about which the rearmost pair of wheels turns, a coupling shaft affixed to the front side of said gearbox and said shaft having its front end lodged in a support member on said horizontal frame part, the front end of said coupling shaft being connectable through an intermediate shaft to a power takeoff shaft of a prime mover.

29. A spreading device comprising a frame, a hopper mounted on the frame and a plurality of pairs of wheels positioned one behind the other supporting said frame, said hopper having a sloping front wall extending downwardly towards the rear of said implement, the lower end of said front wall terminating to the rear of the axis about which the rearmost pair of wheels turns the upper end of said front wall terminating in front of the axis about which the foremost pair of wheels revolves, said hopper terminating in its lower end with an outlet spout located to the rear end of the said device, a spreading member being positioned beneath said spout, said spreading member being connected to a substantially vertical shaft mounted in bearing means connected to a transverse frame beam of said frame, said transverse frame beam being connected between two substantially parallel horizontal frame beams extending in the direction of travel of the device, a further transverse frame beam having its center bowed upwardly adjacent said spreading member, front ends of said parallel beams being fixed to converging drawbars and a coupling member secured to said drawbars for coupling the device to a prime mover.

30. A spreading device comprising a frame and a hopper mounted on said frame, said hopper having an outlet and a spreading member positioned adjacent said outlet, said frame being supported on at least two pairs of ground wheels, the axles of each of said pairs of ground wheels being approximately in line with each other, said hopper having four walls which converge downwardly towards one another to terminate at said outlet, a spreading member beneath said outlet, and a dosing mechanism positioned between said spreading member and said outlet, said spreading member being mounted on a substantially vertical axle mounted in a gearbox, said gearbox being supported on said frame, a coupling shaft extending from said gearbox forwardly to a supporting member mounted on said frame, coupling means connected to said shaft for coupling through the intermediary of an intermediate shaft, to the power takeoff shaft of a prime mover, the front end of said frame having hitching means to be connected to said prime mover, said coupling shaft having driving means connected with a knocking device which is positioned adjacent the outside of the front wall of said hopper.

31. A device for spreading material comprising a wheeled frame and a hopper mounted on said frame, said hopper hav-

ing four sloping sides with an outlet at the lowest portion of said hopper and a spreading member rotatably mounted on a substantially vertical shaft below said outlet, said hopper having a knocking member mounted adjacent the outside of the front wall, said front wall sloping downwardly towards said outlet at an angle of about 50° or less, driving means connected to said spreading member and extending forwardly, said knocking member being mounted adjacent said front wall and driven by said driving means to periodically knock against said front wall during operation of said device.

32. A device as claimed in claim **31**, wherein said knocking member comprises a spring-biased pivotal knocking arm pivotally mounted on said device whereby a spring biases said arm towards a wall and means is associated with said knocking member for periodically moving said knocking arm away from said hopper.

33. A device as claimed in claim **32**, wherein an end of said knocking arm has a thrust member in contact with said one wall, a rotatable cam disc being mounted between the pivot point of said arm and said thrust member to cooperate with the pivotal arm whereby at least one cam moves said knocking arm against the spring bias periodically from said one wall.

34. A device as claimed in claim **33**, wherein said spreading member has a driving shaft and said shaft rotates said cam disc.

35. A device as claimed in claim **34**, wherein a thrust plate is secured to said one wall against which said thrust member knocks.

36. A device as claimed in claim **34**, wherein said driving shaft extends to said spreading member at the rear of said device, said driving shaft being supported at the front of said frame, coupling means at the front of said shaft for coupling it with a power takeoff.

37. A device as claimed in claim **36**, wherein an endless belt is mounted between the driving shaft and a second shaft for driving said cam disc.

38. A device as claimed in claim **34**, wherein said knocking member is connected to a switchoff mechanism and said mechanism is remote controllable.

39. A device as claimed in claim **38**, wherein said switchoff mechanism is a wire having two stops, a support secured at the front of said device with an elongated hole, said wire extending through said hole with one of said stops positioned on either side of said hole.

40. A device as claimed in claim **31**, wherein said frame has a stationary drawbar with a coupling member, said coupling member being vertically movable relative to said drawbar.

41. A spreading device comprising a frame with a horizontal frame part and a four-sided hopper supported on said frame, said hopper having sloping walls converging downwardly so as to terminate in an outlet spout in the bottom of said hopper, a rotatable spreading member mounted on said frame below said outlet, said hopper being connected to inverted U-shaped supports and the arms of said supports being connected to said horizontal frame part, said horizontal frame part being connected to at least two wheels supporting said frame, said wheels being rotatably secured to axles which are mounted on supporting arms, said arms being hingeably connected to said frame with resilient members associated with said supporting arms whereby said wheels can move resiliently relative to said horizontal frame part.