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2,766,872

CENTRIFUGAL DEVICE FOR SPREADING FINELY PARTICLED MATERIAL

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2 Sheets-Sheet 1

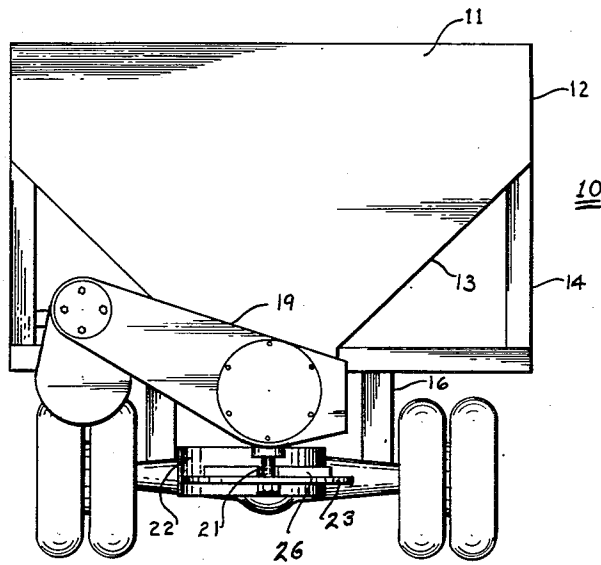


FIG. 1

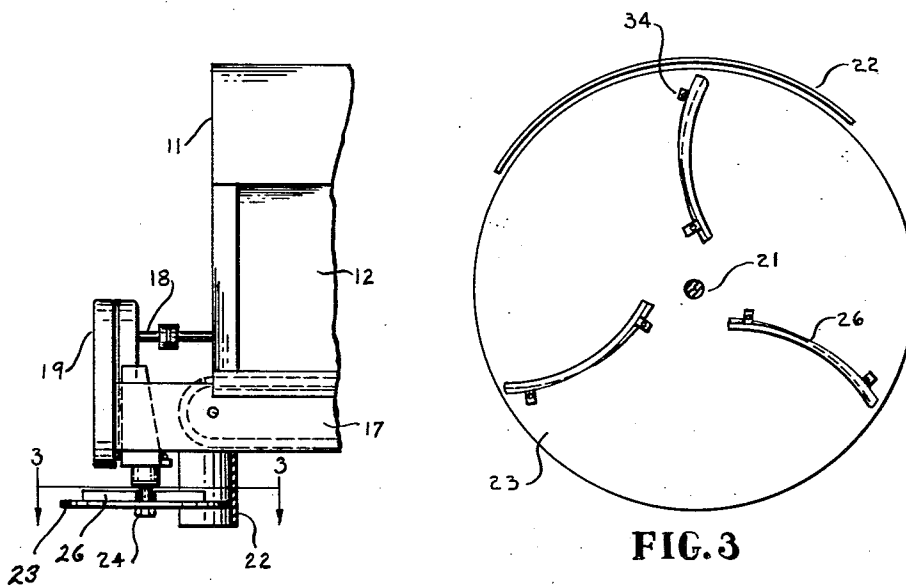


FIG. 2

FIG. 3

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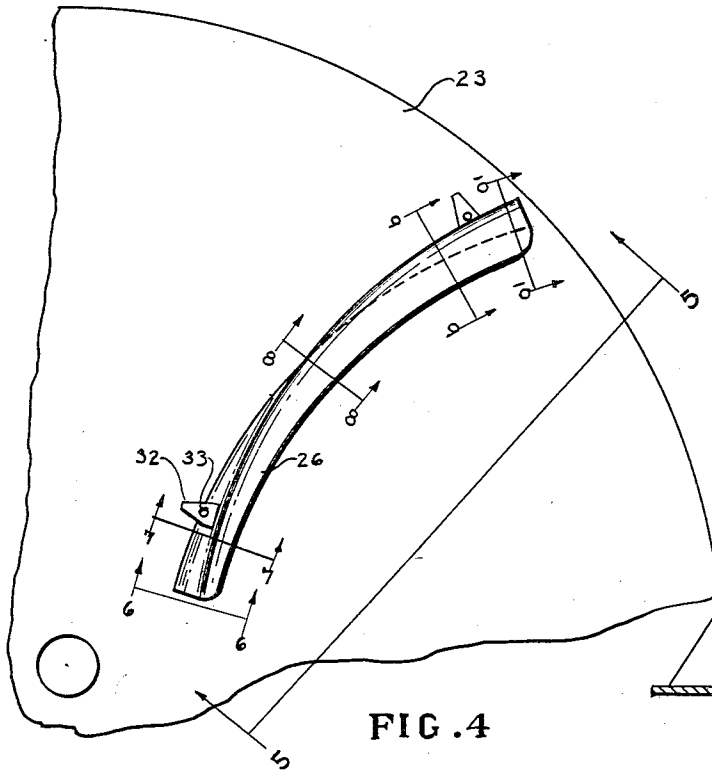
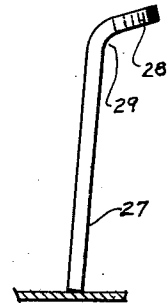
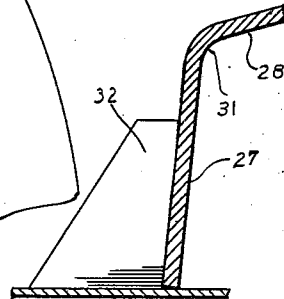
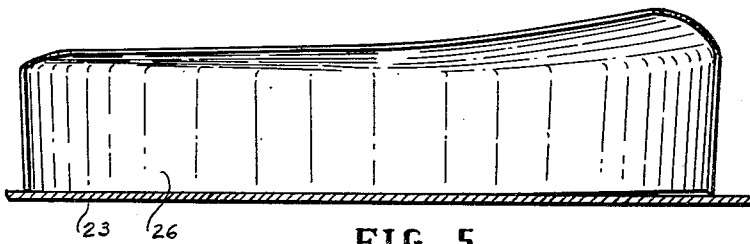
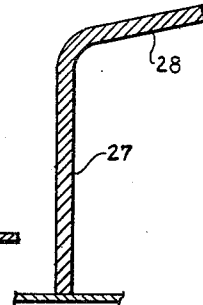
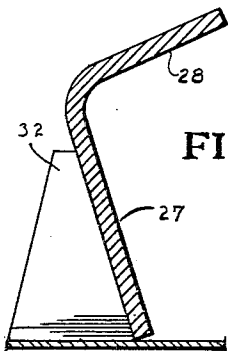
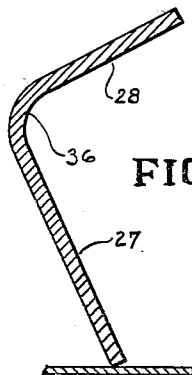
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2 Sheets-Sheet 2



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CENTRIFUGAL DEVICE FOR SPREADING FINELY PARTICLED MATERIAL

Russell Pillsbury, Jamestown, N. Y.

Application September 27, 1951, Serial No. 248,546

7 Claims. (Cl. 198—128)

This invention relates to a device for spreading finely particled material such as fertilizer, and is of the type intended for use with a material carrying vehicle such as disclosed in my co-pending application Serial No. 227,819, filed May 23, 1951, and now Patent No. 2,691,307.

More particularly, it will be understood that the invention relates to structure that is employed to uniformly spread or fling material fed from a continuing source of supply such as the vehicle disclosed in the aforesaid application.

It has been found that regardless of the structure employed to carry and feed finely particled material to a spreading device, the efficiency of the spreading device itself actually determines the success of the operation. Although many spreading devices have been designed and utilized to throw or fling loose material a considerable distance in a generally horizontal direction, they do not effect a uniform distribution of such material. Further, it appears that spreading devices which do effect uniform distribution of the material fail to spread such material over a sufficiently large enough area to keep the operation within reasonable costs. It is apparent that for satisfactory efficiency and inexpensive operation, a spreading device must be capable of rapid distribution covering a large area and effected in a reasonably short period of time.

It is a purpose and object of the present invention to provide a power operated spreading device for use in distributing finely particled material over given areas.

It is another object of the invention to provide a spreading device that in operation uniformly distributes the material over a given area.

It is a further and important object of the invention to provide a spreading device that, while effecting even and uniform distribution, also causes such material to be so spread over an extremely wide area.

A further and important object of the invention lies in the provision of a spreading device which includes finger blades of such design as to effect a smooth and continuing flow of material and thus avoid serious abrasion of the blades by the material.

Additionally, it is an object of the invention to provide a spreading device which comprises a spreader disk or base, on the upper surface of which is mounted a series of blades which are individually removable and replaceable to accommodate use of the device to the desired distribution of a variety of materials.

Other objects and advantages of the invention will be more fully understood from a consideration of the following specification, taken in conjunction with the accompanying drawings, in which—

Fig. 1 is a rear elevational view of a material carrying vehicle having mechanism for feeding material therefrom onto a spreading device that embodies one form of the invention;

Fig. 2 is a fragmentary side elevational view of the structure shown in Fig. 1;

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Fig. 3 is an enlarged top plan view of the spreading device showing the relationship of disk and blades;

Fig. 4 is a greatly enlarged fragmentary top plan view of a portion of the disk and one blade mounted thereon;

Fig. 5 is a side elevational view of one of the blades, being taken substantially as indicated at 5—5 of Fig. 4;

Fig. 6 is an end view of one of the blades, being taken substantially as indicated at 6—6 of Fig. 4; and

Figs. 7, 8, 9, and 10 are vertical sectional views, taken at different points throughout the length of the blade, being indicated respectively at 7—7, 8—8, 9—9, and 10—10 of Fig. 4.

Referring more particularly to the drawings, the reference numeral 10 is employed to generally designate the rear end of a vehicle that is capable of containing a variety of materials intended to be spread or distributed over a given area, together with suitable mechanism for feeding the material to and from a given outlet. One form of such a vehicle and feeding mechanism is shown in Figs. 1 and 2 of the drawings and is of the type shown and described in the co-pending application referred to above. Although the present invention is susceptible of use with other load carrying vehicles having material feeding mechanisms, a brief description of one such vehicle will enable a clearer understanding. The body of the vehicle includes front and rear walls 11, side walls 12, which extend vertically downwardly a short distance and thence inwardly, as at 13, to provide a sloped wall bin or container for the material it is desired to distribute. Suitable supporting structure, such as indicated at 14, may be employed to rigidify the body as well as provide means by which the body may be conveniently attached to a truck chassis 16.

The bottom of the body, between the sloped walls 13, is open, and set into this opening is a conveyor 17, substantially as suggested in Fig. 2 of the drawings. The conveyor is driven from a suitable power source and this source may also be coupled, through a shaft 18, with a reduction drive mechanism 19.

The mechanism 19 extends slightly rearwardly beyond the vehicle body and terminates in a downwardly extending shaft 21 that is capable of receiving, and having attached thereto, a spreading device constituting the present invention. It will, of course, be understood that a suitable gate (not shown), at the rear of the vehicle body, overlies a part of the spreading device and that a suitable semi-circular guard 22 is carried by the vehicle, slightly forward of the material exit gate, to prevent dissipation of the material between the time it leaves the conveyor and drops onto the spreading device.

The spreading device constituting the subject matter of the invention, as shown in plan view in Fig. 3, consists of a horizontally disposed circular disk 23. Shaft 21 projects through the exact center of this disk and supports the disk in any suitable manner, as by a nut 24. This mounting of the disk enables removal and replacement of the spreading device without the necessity of removing any parts of the drive or feed mechanism. In its present form, the disk 23 is shown to mount three finger blades 26. The blades may be increased or decreased in number, such change being for the purpose of adapting the device to the proper spreading or distributing of material of different density. Successful operation of the device requires that all of the blades 26, regardless of their number, be of identical form and arrangement on the disk and, therefore, only one of the blades will be described in detail.

It will be noted that each blade, although formed through a curve between its inner and outer ends, extends substantially radially from the center of the disk and is located with its inner end somewhat removed from the shaft 21 and its outer end closely approaching the disk

rim. Referring particularly to Figs. 6 and 7 of the drawings, it is to be observed that the inner end of the blade consists of a wall 27 that is in a plane nearly perpendicular to the plane of the disk 23. From the wall 27, a short top wall 28 extends, the meeting of these walls being through a small arc or bend 29. As viewed in the drawings, the wall 27 inclines to the right which, with the disk 23, forms a slight pocket. Further outwardly, the wall 27 of the blade is slightly more inclined from the vertical to slightly increase the pocket effect at this point, and wall 28 is of slightly greater width and connected with wall 27 through a greater diameter arc 31. Although the blade may be attached to the disk at other points than those shown, it is found preferable to secure a mounting block 32 to the outer face of the wall 27 at approximately the point disclosed in Figs. 4 and 7 of the drawings. The block 32 is formed with an aperture 33, through which a bolt 34 projects into engagement with the disk 23.

Approximately midway of the length of the blade (Fig. 8), it is to be noted that a progressive change in the proportions has taken place. At this point the wall 27 is vertical and the top wall 28 is of increased width and more nearly approaches the plane of the disk 23 than it does nearer its inner end. A comparison of Figs. 6, 7, and 8 will clearly illustrate this. Further outwardly of the length of the blade, the wall 27 inclines backwardly or in the opposite direction from the incline thereof at its inner end. This is clearly suggested in Fig. 9, wherein it also shows that the top wall 28 is now of greater width and more removed from a horizontal plane. At its outer end, the wall 27 is still further rearwardly inclined and the top wall 28 is not only of increased width but is connected with the wall 27 through an arc 36 that is of greater radius than any of the previously shown arcs of connection between these walls. As suggested in Fig. 4 of the drawings, a further mounting block 32 is attached to the outer or rearmost face of wall 27, being secured to the disk by a further bolt 34.

A comparison of Figs. 6 to 10, inclusive, is suggested for the purpose of understanding the developed contour of the blade. At the blade's inner end, which is on that area of the disk located beneath the material exit of the vehicle, somewhat of a pocket is formed. The centrifugal force at this radius on the disk, and by reason of the pocketing effect, is only such that the material flowing thereon will be moved along the blade wall 27. Little or none of such material, at this point, will reach the top wall 28 unless there is a rapid feed from the exit gate of the vehicle. As the material is centrifugally crowded outwardly along the walls 27, it will be observed that this wall straightens (Fig. 8). The radius at this point in the blade being greater, centrifugal force is stronger and the material tends to crowd outwardly of the wall 27 and in part would be lost in undesired upward spread were it not for the increased width of the top wall 28. Thus, substantially midway of the blade's length, none of the material reaching the device has been dissipated but is rather being crowded preparatory to being flung or thrown when it reaches the blade's outer end. As suggested in Fig. 9, the material can now move up the now rearwardly inclined wall 27, and due to greater centrifugal force, will move upwardly of the top wall 28 until such time as it reaches the outer end of the blade, where the centrifugal force is so great as to virtually fling the material off the upper portion of the wall 27 and upwardly and beyond the rounded end of wall 28.

From the foregoing it should be evident that the blade shown and described is so designed that it will first pick up material dropped onto the disk, hold such material against vertical loss or distribution, and guide such material along the walls of the blade under increasing centrifugal force until the point is reached where the blade walls permit the centrifugal action to fling the material. It is also to be particularly noted that not only the walls

27 and 28 serve to confine movement of the material to a radial horizontal direction, but that the wall 28, from inner to outer end, is curved sufficiently to produce a pocketing effect on the material. This serves to slightly retard the radial movement of the material by reason of slightly counteracting the centrifugal force effected by the rotation of the disk and blade. As the material gets beyond the center of this pocket, the wall 27 of the blade curves forwardly to provide a continuing counteraction to the centrifugal force on the material and this curve continues to the end of the blade. The purpose of this is to prevent such low distribution of the material that the full effect and flinging force of the blade will not be dissipated or impaired by material simply sliding from off the edge of the disk. It is evident that this would not only produce poor distribution but would fail to spread or fling the material over a wide area. Thus, the rearward inclination of walls 27 and 28 of the blade guide the material upwardly so that when the material reaches the blade end it is flung not horizontally but upwardly at an angle from the horizontal and can thus travel a greater distance and effect a greatly increased width of spread.

Although applicant has shown and described only one form of a device for spreading finely particled material over a considerable area, it will be apparent that the diameter of the disk may be altered and the number of blades mounted thereon may also be changed without in any way altering the effectiveness of said blades, and that these modifications are considered as being within the spirit and scope of the invention insofar as they are contained in the annexed claims.

Having thus set forth my invention, what I claim as new and for which I desire protection by Letters Patent is:

1. A device for horizontally spreading finely particled material over a wide area comprising a circular disk, operative means mounting said disk for rotation about a vertical axis, blades mounted on the top surface of said disk, said blades being generally radially disposed and extending from approximately the disk perimeter inwardly toward the disk mounting means, each of said blades being formed with a curved recess that is of greatest depth midway of the blade's length and which extends in a direction opposite to the direction of travel of the blade.

2. A device for horizontally spreading finely particled material over a wide area comprising a circular disk, operative means mounting said disk for rotation about a vertical axis, blades mounted on the top surface of said disk, said blades being generally radially disposed and extending from approximately the disk perimeter inwardly toward the disk mounting means, each of said blades including angularly related wall portions, one of said portions progressively developing from a slightly forwardly inclined position with respect to said disk at its inner end to an inclination away from the direction of disk rotation at its outer end.

3. A device for horizontally spreading finely particled material over a wide area comprising a circular disk, operative means mounting said disk for rotation about a vertical axis, blades mounted on the top surface of said disk, said blades being generally radially disposed and extending from approximately the disk perimeter inwardly toward the disk mounting means, each of said blades including a material engaging wall portion and a material confining wall portion, the portions progressively changing their angular relationship with said disk throughout their length and cooperating with said disk to provide pockets extending from the inner to the outer ends of said blades.

4. In a device for horizontally spreading finely particled material over a wide area, the device including a circular disk rotatable about a vertical axis, a flinger blade mounted on the top surface of said disk and extending generally radially thereof, said blade comprising a pair of connected angularly disposed portions, one of said portions providing a material engaging surface, the other

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of said portions with said disk providing a partial closure to confine the material to the one portion, said portions together, from the inner to the outer end of said blade, progressively changing their inclination with respect to said disk to enable flinging material at an upward incline from the plane of and at the perimeter of said disk.

5. In a device for horizontally spreading finely particled material over a wide area, the device including a circular disk rotatable about a vertical axis, a finger blade mounted on the top surface of said disk, said blade comprising a pair of angularly disposed wall portions joined along their common lengthwise edge, said portions cooperating with the top surface of said disk to form a pocket open along the leading side of the blade, at least one of said portions being progressively inclined away from the leading side of the blade from the inner to the outer end thereof.

6. A flinger blade for use in horizontally spreading finely particled material, a disk mounting said blade, said blade comprising a pair of wall portions integral along their common sides, said portions being secured to said disk and cooperating therewith to form a pocket open along the entire leading edge of said blade, said portions, through a considerable portion of their length, being progressively inclined away from said leading side of said blade to form a material flinger at that end of the blade adjacent the periphery of said disk.

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7. A flinger blade for use in horizontally spreading finely particled material, a disk mounting said blade, said blade comprising a pair of angularly related wall portions, said blade being secured to said disk and co-operating therewith to form a pocket open along the entire leading side of said blade, said portions, through a considerable portion of their length, being progressively inclined away from said leading side of the blade to form a material flinger at one end of the blade, one of said portions being further formed to provide a curved recess that is of greatest depth substantially midway of the blade's length.

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