MATERIAL-SPREAADING APPARATUS

ABSTRACT: A frame having an endless belt drivably mounted thereon, adapted to be removably mounted in the bed or box of a material-transporting vehicle for removing material from the truck bed and including baffles and augers for spreading the material evenly behind the vehicle as it travels over the ground.
MATERIAL-SPREADING APPARATUS

BACKGROUND OF THE INVENTION

Field of the Invention
The present invention is especially adapted for use with small trucks utilized to transport top dressing material for golf greens and the like. It should be understood, however, that many other uses will be apparent to those skilled in the art.

Description of the Prior Art
In the prior art, top dressing machines and the like are generally constructed so that they are only useful for carrying top dressing materials and distributing the same. In general, these prior art machines carry a relatively small load and are relatively slow and awkward to manipulate. Because these prior art machines are slow and carry a small load, top dressing is a time-consuming and tedious task. Further, because these machines are only useful for top dressing the expense of maintaining such a machine is relatively great.

SUMMARY OF THE INVENTION

The present invention pertains to material-spreading apparatus for use with a material-transporting vehicle including a frame adapted to be removably attached to the vehicle, endless conveying means rotatably mounted on said frame so as to be positioned within the box of the vehicle in substantial overlying relationship to the bottom thereof and extending outwardly from the open end thereof, and power means for rotating said conveying means upon proper energization thereof.

It is an object of the present invention to provide improved material-spreading apparatus.

It is a further object of the present invention to provide material-spreading apparatus adapted to be removably mounted in a material-transporting vehicle to convert the material-transporting vehicle to a material-spreading vehicle.

It is a further object of the present invention to provide material-spreading apparatus capable of spreading various types of materials and adapted to cooperate with various types of material-transporting vehicles.

It is a further object of the present invention to provide material-spreading apparatus which spreads material transversely outwardly in both directions from the material-transporting vehicle to cover wheel tracks when the wheels of the transporting vehicle are mounted transversely outwardly from the box thereof.

These and other objects of this invention will become apparent to those skilled in the art upon consideration of the accompanying specification, claims and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Referring to the drawings, wherein like characters indicate like parts throughout the FIGS.:

FIG. 1 is a view in top plan of the present material-spreading apparatus mounted on a material-transporting vehicle;

FIG. 2 is a view in side elevation of the apparatus and vehicle of FIG. 1;

FIG. 3 is an enlarged view in rear elevation of the apparatus removed from the vehicle, portions thereof broken away and the windshield and cleaning brush removed;

FIG. 4 is an enlarged sectional view as seen generally from a line 4-4 of FIG. 3, portions thereof broken away;

FIG. 5 is an enlarged sectional view as seen generally from a line 5-5 of FIG. 4, portions thereof broken away;

FIG. 6 is an enlarged view in front elevation of a portion of FIG. 1 removed; and

FIG. 7 is a fragmentary view in side elevation of an alternate embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the FIGS., the numeral 10 generally designates a material-transporting vehicle having a seat 11 for an opera-
to the apparatus 15 along the entire length thereof (and the width across the front thereof if desired) so that the apparatus 15 could be utilized in substantially any engagement with the material thereto. Also, if the apparatus 15 has upstanding sides along the length thereof and across the front, the apparatus 15 might be utilized on a vehicle having only a bed with no box thereon.

A first roller 40 is rotatably mounted adjacent the front of the box 13 between the angle irons 21. The diameter of the roller 40 is such that the sheet metal 27 is approximately tangent to the uppermost portion of the periphery while the lowermost portion of the periphery is spaced slightly upwardly from the upper surfaces of the horizontal portions of the angle irons 21. A second roller 41 is rotatably mounted between the angle irons 21, parallel with the first roller 40 at approximately the rear end of the box 13. The second roller 41 has a diameter somewhat smaller than the diameter of the first roller 40. A third roller 42 is rotatably mounted between the pieces of angle iron 23 and spaced rearwardly from the second roller 41 a substantial distance. The first, second and third rollers 40, 41 and 42 are all mounted with their axes approximately in a common plane.

A first endless belt 43 is engaged around the second and third rollers 41 and 42 for rotation therewith. The width of the endless belt 43 is approximately equal to the distance between the upstanding sides 35. A second endless belt 44 is engaged around the first roller 40 and the third roller 42 so as to engage in overlapping relationships portions of the endless belt 43. The width of the second endless belt 44 is approximately equal to the distance between the angle irons 21 and the upper shaft 55 therewith and in overlapping engagement with the sheet metal 27. The horizontal transversely extending portions of the angle irons 24 overlie the edges of the second endless belt 44 and aid in preventing material from moving thereunder. It should be understood that endless belts 43 and 44 are illustrated in this embodiment for simplicity but many other conveying means might be utilized, such as heavy-duty conveyor chain, horizontally spaced-apart flights connected by two parallel endless chains, link-belt-type endless belt, etc.

A plurality of bridging members 50, each having a generally inverted V-shaped cross section are affixed between the angle irons 24 in upwardly spaced relationship. The bridging members 50 are utilized to aid in, or partially support, a load of material in the box 13. By relieving part of the weight on the endless belts 43 and 44, the load of material is supported more from the surface and less stress thereon. Also, the bridging members 50 are spaced above the endless belt 44 to aid in distributing material evenly thereon during operation. A second type of baffle 51 is illustrated in the FIGS. and may be utilized in addition to or in place of some or all of the bridging members 50. The baffle 51 is a partitionlike member affixed between the angle irons 24 so as to extend angularly upwardly with the lower edge thereof in spaced relation from the upper surface of the endless belt 44.

The baffle 51 is utilized to maintain the major portion of the load of material within the box 13 while a small relatively even portion thereof is allowed to pass under the baffle 51.

A generally V-shaped baffle 52 is positioned between the portions 36 of the upstanding sides 35 adjacent the rear of the box 13, with the apex of the V directed forwardly. The baffle 52 is mounted in upwardly spaced relationship from the endless belt 44 and includes a plurality of downwardly directed teeth 53 (see FIG. 6) in the lower surface thereof. In the present embodiment the teeth 53 are formed by providing a plurality of cuts in the baffle 52 from the lower edge thereof and twisting the material between adjacent cuts. In this fashion, the teeth 53 serve to spread the material along the width of the endless belt 44 as well as limiting the amount of material passing thereunder. The baffle 52 may be utilized in conjunction with or in place of any or all of the bridging members 50 and baffle 51.

A shaft 55, utilized to rotatably mount the third roller 42, extends outwardly on both sides of the box 13 beyond the pieces of angle iron 23. A pulley 56 is mounted on one end of the shaft 55 for rotation therewith and a pulley 57 is mounted on the other end for rotation therewith. In this embodiment the pulley 56 is connected through a belt 58 to the drive pulley on a motor 59. It should be understood, however, that other means than the motor 59 might be utilized for driving the shaft 55 and roller 42, such as a power takeoff from the vehicle 10, a connection directly to the wheels 14, etc.

The pulley 57 at the other end of the shaft 55 is connected by a belt 60 to a pulley 61 at the end of a shaft 62, which shaft 62 is rotatably mounted between the upstanding sides 35 and spaced approximately midway between the rollers 42 and 43. The shaft 62 has an auger 63 affixed thereof, which auger 63 has right and left flights extending outwardly from approximately the center thereof. The auger 63 is mounted above the endless belt 43 and utilized to distribute material from the belt 44, approximately evenly along the width of the belt 43. Because the belt 43 extends transversely outwardly beyond the sides of the box 13, at least as far as the wheels 14, material spread over the width thereof by the auger 63 is spread evenly over the ground beneath vehicle 10, to aid in covering the wheel tracks. It should be understood that apparatus other than the auger 63 might be utilized to distribute the material along the width of the belt 43, for example various types of baffle 52 (with an angle 63' of the box 13, such as the auger 63, if the material being distributed has a tendency to be extremely lumpy, as in the distribution of some top dressing soils and the like, the auger 63 may have spikes, cutting edges, etc. thereon for breaking the lumps.

The pulley 57, in the present embodiment, is a double pulley and is connected through a belt 65 to a pulley 66 fixedly attached to a shaft 67 connected to a motor 68. The pulley 66 is mounted on the lower end of the shaft 67 as supported by the frame 69 and the shaft 67 is affixed thereto a cylindrical shaft 68, which is mounted in engagement with the underside of the belt 43. The brush 68 generally rotates in a direction opposite to the movement of the belt 43 and is utilized to clean any remaining material from the surface of the belt 43. It should be understood that the brush 68 is optional and may be eliminated if desired. Also, the brush 68 may be mounted in a variety of different positions so as to effectively clean the belt 43.

A partition 70, somewhat similar to baffle 51, is mounted between the upstanding sides 35 with the lower end thereof spaced vertically above the rearmost end of the endless belt 43. The lower end of the partition 70 is spaced a substantial distance above the endless belt 44 and prevents wind from diverting, or maximum amount of material, the apparatus 15 can distribute at any given time. An adjustable closure member 71 is engaged in grooves behind the partition 70 as to slide generally parallel with the partition 70 and vary the opening therebelow. Linking members 72 are affixed at one end to a shaft 73 for rotation therewith and at the other end to the closure member 71, so that rotation of the shaft 73 causes the closure member 71 to open or close the space between the endless belt 43 and the upstanding sides 35. The shaft 73 is rotated by means of a handle 74 external of the upstanding sides 35. Thus, manipulation of the handle 74 adjusts the depth of the material spread by the apparatus 15.

A windshield 75, having a generally arcuate cross section, is mounted between the upstanding sides 35 so as to shield the rear end of the endless belt 43 and prevent wind from diverting material falling therefrom. The windshield 75 is optional and may be constructed in a variety of forms so as to protect the falling material from wind and aid in directing the material onto the desired location.

In FIG. 7 a somewhat modified embodiment of the apparatus 15 is illustrated. In this embodiment similar parts are designated with like numerals having a prime added to indicate a modified embodiment. In the embodiment of FIG. 7 the endless belt 43 and rollers 41 and 42 have been replaced with an enlarged roller 43' having a circumference approximately equal to the length of the endless belt 43. The roller 43' functions similar to the previously described apparatus which it replaces and some means, such as the auger 63', are utilized to distribute material evenly therealong so that the ap-
apparatus 15' can spread the material evenly on the ground to
the desired width. It should be understood that other forms of
spreading the material to the desired width might be designed
by those skilled in the art and the two forms illustrated are
simply two possible embodiments.

Thus, material-spraying apparatus is disclosed which can
be conveniently installed in substantially any material trans-
porting vehicle, with no modifications to the vehicle, and will
convert the vehicle into a material-spraying device. Further,
the present material-spraying apparatus is simple and
economical to construct and highly efficient in the operation
thereof. In addition to the above, the present material-spraying
apparatus can be easily stored and the associated material-
transporting vehicle can be utilized for other purposes.

We claim:

1. Material-spraying apparatus for use in combination with
a material-transporting vehicle having a box thereon with one
def. open, comprising:
a. a frame adapted to be removably attached to the vehicle;
b. endless conveying means mounted on said frame to be
operated within the box adjacent the bottom thereof and
having a width substantially equal to the inner width of
the box and extending from adjacent the closed end of
the box to somewhat beyond the open end thereof;
c. baffle means attached to the frame in spaced relation
generally above the conveying means for limiting the
amount of material conveyed through the open end of the
box at any one time; and

d. power means for rotating said conveying means upon
energization thereof to convey material outwardly
through the open end of the box.

2. Material-spraying apparatus as set forth in claim 1
wherein the portion of the conveying means extending beyond
the open end of the box is substantially wider than the box and
including in addition dispersing means for causing the material
to be conveyed substantially equally along the width of the
conveying means.

3. Material-spraying apparatus as set forth in claim 2
wherein the dispersing means includes an auger having right
and left flights for distributing material in both directions.

4. Material-spraying apparatus as set forth in claim 1
wherein the vehicle has a trailer hitch attached thereto and the
frame has a mating member for removably attaching the frame
to the vehicle.

5. Material-spraying apparatus as set forth in claim 1 hav-
ing in addition a windshield affixed to the frame adjacent the
end of the conveying means extending beyond the box and
partially enclosing said end to aid in directing material
downwardly.

6. Material-spraying apparatus as set forth in claim 2
wherein the endless conveying means includes a first endless
belt having a width substantially equal to the inner width of
the box and a second endless belt having a width substantially
wider than the box and being mounted in underlying relation-
ship to the rearmost portion of said first endless belt for sim-
ultaneous rotation.

7. Material-spraying apparatus for use in combination with
a vehicle having a generally elongated bed thereon, compris-
ing:
a. a frame adapted to be removably attached to the vehicle
in a generally longitudinal manner along the vehicle bed
between front and rear ends thereof;
b. conveying means mounted on said frame and extending
generally from adjacent the front end of the vehicle bed
to the rear end thereof;
c. power means for rotating said conveying means upon
ergonization thereof to transport material outwardly
beyond said rear end; and

d. dispersing means positioned above said frame adjacent
said rear end and operatively associated with said conveying
means for causing generally equal transverse distribu-
tion of the material conveyed outwardly beyond the rear
end.

8. Material-spraying apparatus as set forth in claim 7 in-
cluding in addition means defining upstanding sides having op-
positely disposed open and closed ends positioned generally
above the rear and front ends, respectively, of the vehicle bed
wherein said material is distributed outwardly through said
open end.

9. Material-spraying apparatus as set forth in claim 8 hav-
ing in addition baffle means attached to said frame in spaced
relation above said conveying means and dispersing means for
limiting the amount of material transported outward through
said open end at any one time.

10. Material-spraying apparatus as set forth in claim 8
wherein said dispersing means includes an auger having right
and left flights for distributing material in both directions.