3,393,875
SANDING ATTACHMENTS FOR DUMP TRUCKS
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10 Claims. (Cl. 239--660)

This application is a continuation-in-part of my co-
pending application, Ser. No. 367,424, filed May 14,
1964, and now abandoned.

The present invention relates to road sanders and par-
ticularly to such sanders in the form of attachments for
dump trucks.

Road sanders are herein discussed primarily in connec-
tion with the sanding of snow or ice-covered highways
and the term "sanding" is also meant to include the
spreading of salt-sand mixtures and the spreading of salt
by itself. The problem is, of course, to provide means
for spreading sand on roads with acceptable uniformity
and with maximum efficiency and economy. As a result
of efforts to provide satisfactory sanders, attachments
have been made for use with dump trucks, the attach-
ments being in the form of hoppers, each disposable
transversely of the rear end of a dump truck to receive
sand from the body and provided with a rotor driver to
discharge sand from the hopper along the path of the
truck. Attachments of this type are widely used but they
do not fully meet requirements due, for example, to their
tendency to become clogged by rocks or frozen lumps
that cannot be discharged by the rotor. With any clogging
of the hopper, efficiency is lost and if a workman must be
assigned to correct such trouble, then, the desired degree
of economy is not realized.

The principal object of the present invention is to
provide sanders that will not become clogged and this
objective is attained by providing an attachment that has
an elongated hopper having front and rear walls in-
clined downwardly towards each other with their lower
edges spaced apart to provide a discharge slot. A sand
discharging and spreading rotor extends lengthwise of and
below the slot and has a plurality of circumferentially
spaced rib members. The rotor is driven by a drive in-
cluding at least one ground-engaging supporting wheel.
The lower portion of the front wall is a forwardly open-
ing gate that is spring biased into its closed position but
is yieldable to permit the discharge of objects that would
otherwise not be discharged but would remain in the
hopper to block the flow of sand through the slot and
onto the rotor.

The hinge means have pivoting portions exposed at
each end of the hopper to which arms are secured.
Springs, one at each end of the hopper and anchored
thereon, are connected to the appropriate one of the
arms and each arm may be locked in selected positions
thereby to enable the slot width to be adjusted as desired
or required.

An important objective of the invention is to provide
rotatable cams by which the arms may be swung in a
gate-opening direction against the action of the springs
and means by which the cams may be releasably held in
a range of selected, arm-holding positions.

The front wall includes means by which it is pivotally
connected to the rear end of the truck and each attach-
ment also includes means providing a rearward connec-
tion with the dump truck body to maintain the attachment
out of contact with the ground unless the truck body is
tilted into a dumping position.

Another important objective of the invention is also
concerned with the discharge and distribution of the
sand and, in accordance with it, the lower edge of the
rear wall of the hopper is approximately in vertical aline-
ment with the rotor axis thereby avoiding any material,
upward thrust of the rotor members against the hopper
contents and the rear hopper wall has a rearwardly dis-
posed, arcurate shaped dimensioned relative to the rotor
rib members so that it always overlies one such member.

Another objective of the invention is to provide the
rotor drive with a clutch and a transmission providing
ratio and directional changes so that the sand discharge
can be varied to meet a wide range of operating condi-
tions.

In the accompanying drawings, there is shown an illus-
trative embodiment of the invention from which these
and other of its objectives and novel features and advan-
tages will be readily apparent.

In the drawings:
- FIGURE 1 is a rear perspective view of a sander attach-
ment in accordance with the invention secured to a
truck.
- FIGURE 2 is a similar view but on a reduced scale and
with the truck body tilted and the wheels of the attach-
ment in engagement with the ground.
- FIGURE 3 is a fragmentary perspective view of the
rotor drive on an increased scale.
- FIGURE 4 is a fragmentary perspective view of the
attachment showing its stand and the use of salt plates
in the hopper.
- FIGURE 5 is a vertical cross section of the attachment.
- FIGURE 6 is a fragmentary, side elevation of the
clutch actuator.
- FIGURE 7 is a like view but with the actuator in its
clutch disengaging position.
- FIGURE 8 is a view similar to FIGURE 5 illustrating
another embodiment of the invention, and
- FIGURE 9 is a fragmentary section taken approxi-
mately along the indicated lines 9--9 of FIGURE 8.

A conventional dump truck is generally indicated at
10 and is shown as having a body 11 provided with a
hinged tail gate 12 and mounted on the frame 13 to be
tilted from its position shown in FIGURE 1 into a dump-
position such as is illustrated by FIGURE 2 thereby
to discharge its load of sand indicated at S.

A sander attachment in accordance with the
invention has a hopper generally indicated at 14. The hopper
14, as may be seen in FIGURE 4 has front and rear walls
13 and 16, respectively, and end walls 17, the walls 15
and 16 being inclined downwardly towards each other
with their lower edges spaced apart to provide a dis-
charge slot 18. The front wall 15 of the hopper is pro-
vided with lugs 19, connected to ears 20 at the rear end
of the frame 13 by pivot pins 21. Chains 22 are con-
ected to the upper edge of the rear hopper wall 16 and
these are detachably connected to the body 11, con-
veniently to the pivots 12A of its tail gate 12. The front
and rear walls are also interconnected by a brace 23.
Bearings 24 are secured to the end walls 17 and these
support the stub axles 25 of a rotor 26 provided with
circumferentially spaced ribs 27 which extend from end
to end thereof.

As may be seen from FIGURE 5, the rotor 26 is below
the slot 18 in a position wherein there is a close clearance
between the ribs 27 and the bottom edge of the front wall
15. The rear wall 16 carries a removable flexible shield
28, which may conveniently be formed from belling,
whose forward edge is spaced in or close to a vertical
plane inclusive of the axis of the rotor 26 and provides
a suitably close clearance with the ribs 27. A metal shield
28A overlies the attached end of the shield 28 and the
rear wall 16 includes an extension 29 arcuate with respect
to the rotor 26 and of an extent such that it always over-
lies a rib 27. With such a hopper-rotor arrangement,
steady flow of the sand to the rotor 26 is assured with
sand spreading being determined by the rate of its rotation.
in relation to the speed of the truck. Because of the disposition of the flexible shield 28 relative to the rotor 26, the sand in the throat of the hopper is not subjected to any appreciable upward force by the rotor.

To prevent any interference with the effective distribution of sand due to rocks or frozen lumps, the lower part 15A of the front wall 15 is in the form of a gate having a hinge 30. At each end of this gate 15A there are rearwardly disposed arms 31. Each end wall 17 has an outwardly disposed flange 17A adjacently supporting a rod 32. Each rod 32 is connected to the proximate arm 31 by a spring 33 maintaining the gate 15A closed but yielding to permit the discharge of rocks or frozen lumps.

The rear wall 16 is secured to generally indicated framework 34 to which is welded a tubular housing 35 for a shaft 36 provided with a pair of wheels 37. The framework 34 also supports a transmission 38, see FIGURE 3, whose drive shaft 39 is connected to the shaft 36 by a universal joint 40. The driven shaft 41 is provided with a sprocket 42 connected to a sprocket 43 on a shaft 44 by a chain 45. The transmission is desirable of the type providing a plurality of forward speeds and a reverse with its shifter being indicated at 38A. The shaft 44 has a clutch 46 having a shifter arm 47 by which its sprocket 43 may be disengaged therefrom. The sprocket 48 is connected to a sprocket 49 on one end of the rotor 26 by a chain 50.

The arm 47 has a flexible cable 51 connected thereto which passes through a tubular protective conduit 52 extending transversely of the hopper 14 and detachably connected to a cable 53 extending forwardly of the frame 13 and into the cab of the truck 10, the floor of the cab being indicated at 54 in FIGURE 6 and FIGURE 7. The floor 54 has a slot 55 in which there is mounted a support 56. A link 57 is pivoted to the support 56 and its lower end is connected to the cable 53 and with its upper end movable by the lower end of the control lever 58, which is also pivoted to the support 56, when the control lever 58 is pushed forwardly thereby to pivot the link 56 thereby pulling the cable 53 to disengage the clutch. The control lever 58 prevents releasing movement of the link 57 until the control lever 58 is manually moved in the opposite direction.

From the foregoing, it will be appreciated that not only is the sander attachment in accordance with the invention capable of operating reliably under a wide range of conditions as to sand but is also adapted to provide maximum convenience of use since until the truck body is tilted, the wheels of the attachment are not in contact with the ground. When the truck body is tilted to discharge sand, the wheels 57 engage the ground and the rate of rotation of the rotor in forward speeds may be varied thereby to vary the quantity of sand distributed for a given distance.

By reversing the drive, sand may be distributed rearwardly of the truck while it is being backed and, at any time, the operator may interrupt said distribution by disengaging the clutch.

When it is desired to use less than the full length of the discharge slot 18, as is usually the case in the application of salt, plates are placed in either or both ends of the hopper 14, one such plate being indicated at 59 in FIGURE 4. Such plates may be stored in the compartment generally indicated at 60 established by the upper part of the framework 34.

The attachment may be quickly and easily connected to or detached from the truck and, for convenience, it is provided with means operable as a stand to hold the attachment in position for reattachment. For this purpose, each end wall 18 has a mount 61 to which an arm 62 is pivoted. A link 63 is also pivoted to the mount 61 and the link and arm are pivoted to a stand 64. After attachment to the truck, each arm 62 is freed from the holding chain, conveniently one of the holding chains 22, and is then depressed to raise its stand 64 into its inoperative position.

The embodiment of the invention illustrated by FIGURES 8 and 9 is shown as similar to the embodiment of FIGURES 1 and 7 and its corresponding parts are distinguished by the prefix "1" added to the appropriate numerals and only the changed or added structure will be described.

In FIGURE 8, the gate-pivoting arms 131 are substantially longer than the arms 31. Each arm 131 is held by a spring 133 in engagement with a cam 59, one for each hopper end wall 117 and slightly and rotatably supported thereon by pin 60. Each cam 59, as may best be seen in FIGURE 9, is urged towards the end wall on which it is mounted by a spring 61 backed by a keeper 62 on the outer end of the pin 60.

Each end wall 117 has a pin 63 disposed to be entered in any one of the arcuate series of cam holes 64 thus to provide means to hold the cams from turning accidentally. Each cam 59 has a handle 65 disposed diametrically of its axis by which it may be pulled outwardly against the action of the associated spring 61 to disengage it from its holding pin 63 and turned to bring another hole 64 into registry with that pin 63 thus to disengage the slot 118 as desired or required and to hold that adjustment positively when the cam 59 is again seated with the pin 63 entrant of said other hole 64.

1. In a sander attachment for a vehicle, an elongated hopper having front, rear, and end walls with its front and rear walls inclined towards each other, a gate extending lengthwise of the lower edge of the front wall, hinge means providing a pivot axis and connecting said gate to the lower edge of the front wall, an arm fixedly connected to said gate at the pivot axis thereby forming a pivoting portion, said arm being fast on said pivoting portion and extending upwardly part way across the proximate end wall, the lower edges of the gate and the rear wall being spaced apart to provide a discharge slot, a rotor extending lengthwise of and below said slot and including a plurality of circumferentially spaced ribs, a spring connected to said arm and extending part way across said proximate end wall and anchored thereto, said sander yieldably holding said arm and said gate in a first position in which the slot is substantially closed by said rotor and its ribs but permitting sand to escape from the hopper as it rotates, said spring yieldingly to permit discharge of objects so dimensioned that they would not otherwise be discharged from said hopper, supporting structure attached to and extending rearwardly of said hopper and including a shaft parallel to the rotor axis and provided with at least one ground engaging wheel, a drive interconnecting said rotor and said shaft and including a clutch, and connecting means for attaching said attachment to said vehicle.

2. The attachment of claim 1 and adjustable means at the end wall of the hopper at which the arm and spring are located, for holding the arm in selected other positions against the action of the spring thereby to move the gate relative to the lower edge of the rear wall to increase the slot width.

3. The attachment of claim 1 and a rotatable cam on the wall of the hopper at which the arm and spring are located, the cam being engaged by the arm and under the influence of the spring and operable, as the cam is turned in one direction, to swing the arm in a gate-opening direction.

4. The attachment of claim 3 and means to lock the cam in a plurality of different arcuately spaced positions.

5. The attachment of claim 1 and a cam at the end wall of the hopper at which the arms and springs are located, a pivot rotatably and slidably supporting each cam on said wall, a spring on said pivot yieldingly urging the cam towards the proximate hopper end wall, the cam having a series of arcuately spaced holes and the
hopper end on which the cam is mounted having a pin entrance of a selected one of the holes when the cam is under the control of the spring, and a handle fixed on the cam for use in withdrawing it from a position in which it is held by the pin.

6. The attachment of claim 3 in which the cams are in engagement with the end of the arm.

7. The attachment of claim 1 in which the ribs are spaced apart a distance less than the width of the slot and the rear wall of the hopper has a shield concentric with the rotor and of an arcuate extent spacing the free edge of the shield from the lower edge of the front wall a distance greater than the spacing between the ribs.

8. The attachment of claim 1 and a stand for the device including a ground-engaging stand, an operating arm pivotally connected to a hopper end and to the stand, and a link pivotally connected to that hopper end and to the stand parallel to the stand operating arm.

9. The attachment of claim 1 and a rigid tubular member extending transversely of the hopper through its front and rear walls, and a clutch operating cable extends through the tubular member and is connected to the clutch.

10. The attachment of claim 1 and clutch operating means including a connection with the clutch and a connection attached to the truck including a mount, first and second levers pivotally connected thereto, the first lever being connected at one end to the clutch and the second lever being manually operated and when so operated moving the first lever and then holding the first lever against movement.

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