July 23, 1968 J. H. BRYANT, JR 3,393,875

SANDING ATTACHMENTS FOR DUMP TRUCKS

Filed April 18, 1966 3 Sheets-Sheet 1

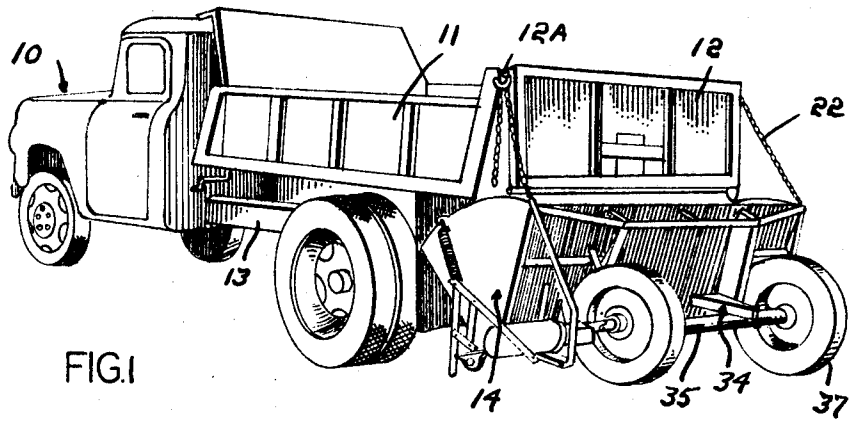


FIG. 1

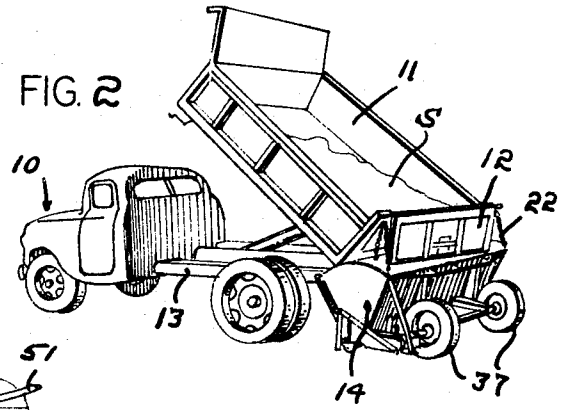


FIG. 2

FIG. 3

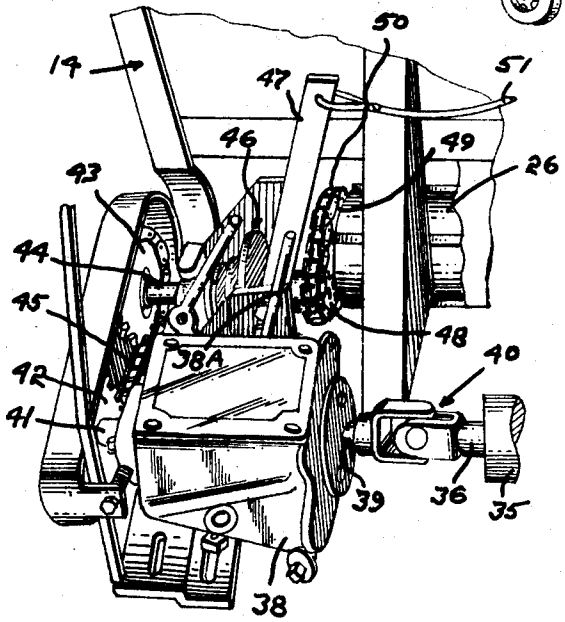
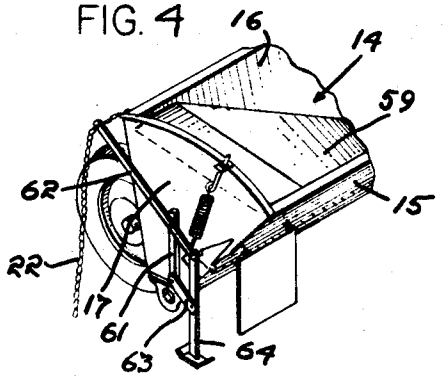


FIG. 4



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July 23, 1968 J. H. BRYANT, JR 3,393,875

SANDING ATTACHMENTS FOR DUMP TRUCKS

Filed April 18, 1966 3 Sheets-Sheet 2

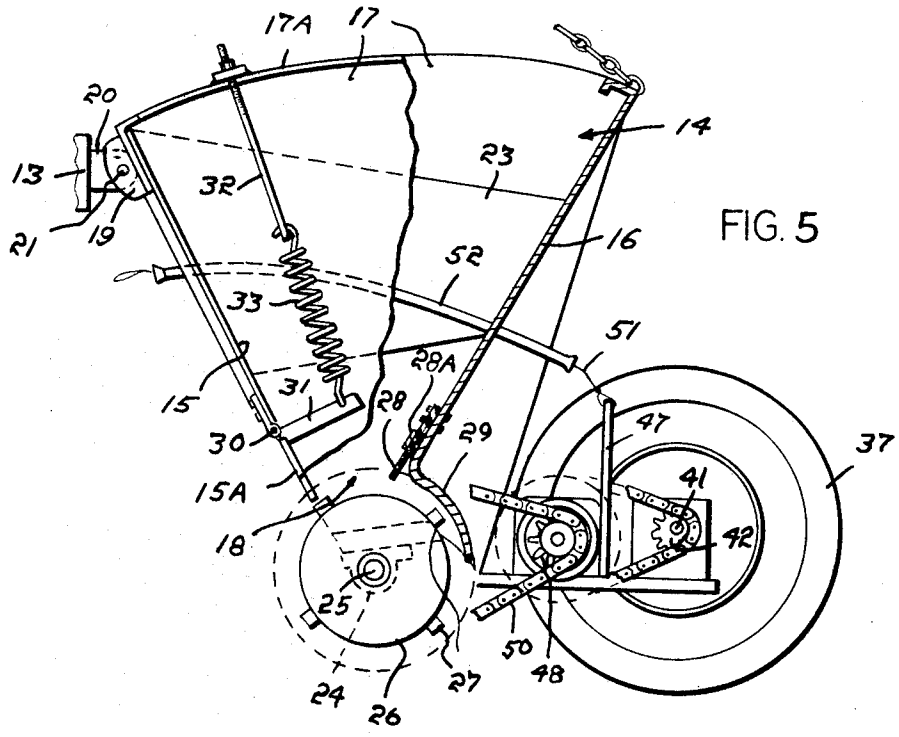


FIG. 5

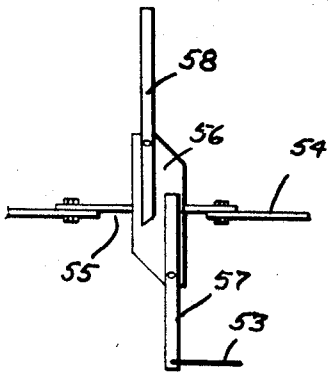


FIG. 6

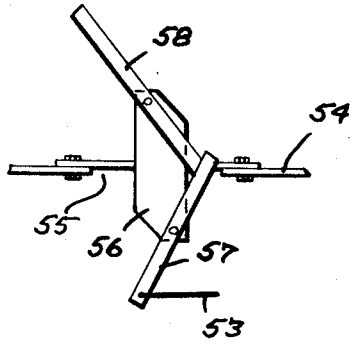


FIG. 7

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July 23, 1968 J. H. BRYANT, JR 3,393,875

SANDING ATTACHMENTS FOR DUMP TRUCKS

Filed April 18, 1966 3 Sheets-Sheet 3

FIG. 8

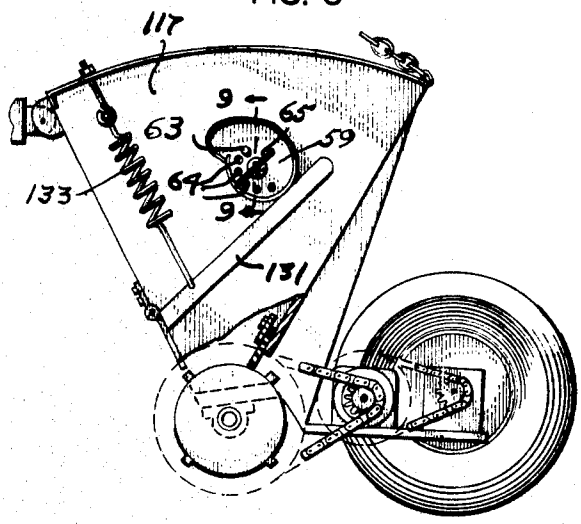
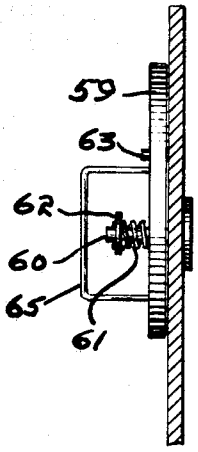


FIG. 9



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United States Patent Office 3,393,875 Patented July 23, 1968

3,393,875

SANDING ATTACHMENTS FOR DUMP TRUCKS

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Continuation-in-part of application Ser. No. 367,424, May 14, 1964. This application Apr. 18, 1966, Ser. No. 549,113

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 particularly to such sanders in the form of attachments for dump trucks.

Road sanders are herein discussed primarily in connection 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 attachments 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 objective 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 inclined 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 including at least one ground-engaging supporting wheel. The lower portion of the front wall is a forwardly opening 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 thereto, 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 attachment also includes means providing a rearward connection 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 alinement 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 disposed, arcuate shield 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 conditions.

In the accompanying drawings, there is shown an illustrative embodiment of the invention from which these and other of its objectives and novel features and advantages will be readily apparent.

In the drawings:

FIGURE 1 is a rear perspective view of a sander attachment 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 attachment in engagement with the ground,

FIGURE 3 is a fragmentary, rear 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 approximately 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 dumping 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 15 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 discharge slot 18. The front wall 15 of the hopper is provided with lugs 19, connected to ears 20 at the rear end of the frame 13 by pivot pins 21. Chains 22 are connected to the upper edge of the rear hopper wall 16 and these are detachably connected to the body 11, conveniently 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 belting, 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 overlies 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 the gate **15A** there are rearwardly disposed arms **31**. Each end wall **17** has an outwardly disposed flange **17A** adjustably 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 desirably 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 **48** 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 engageable 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 **37** 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 slidably and rotatably supported thereon by a 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** to adjust the width of 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**.

I claim:

1. In a sanding 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 attached 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 spring 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 yielding 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 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 yieldably 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 entrant 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 pivotably connected to a hopper end and to the stand, and a link pivotably 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 pivotably 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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