June 17, 1930. N. W. HARDENBERGH 1,764,019

MACHINE FOR SPREADING ROAD MATERIALS

Filed July 28, 1928 2 Sheets-Sheet 1

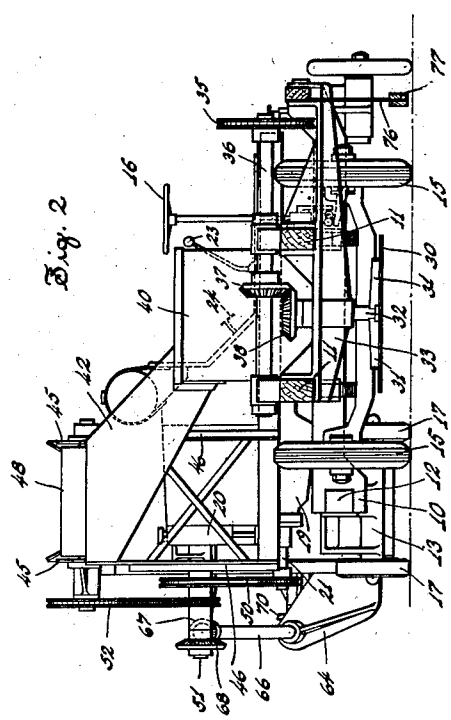

Fig. 2

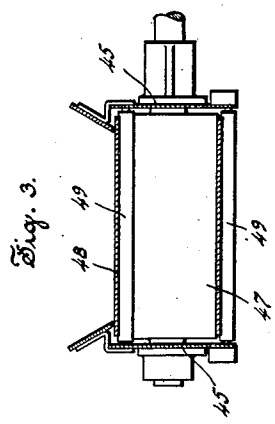

Fig. 3.

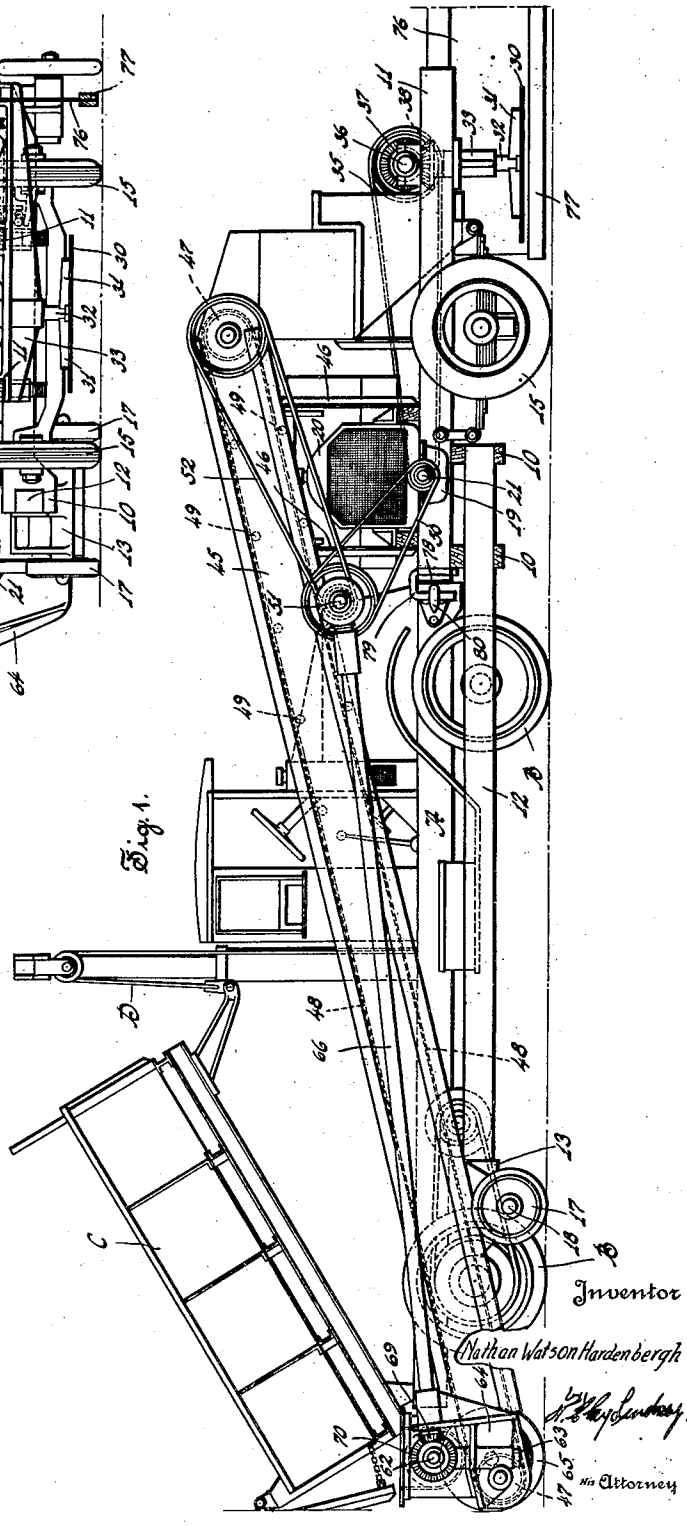

Fig. 1.

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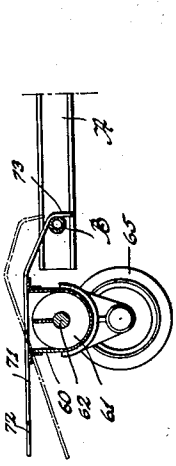

Fig. 5.

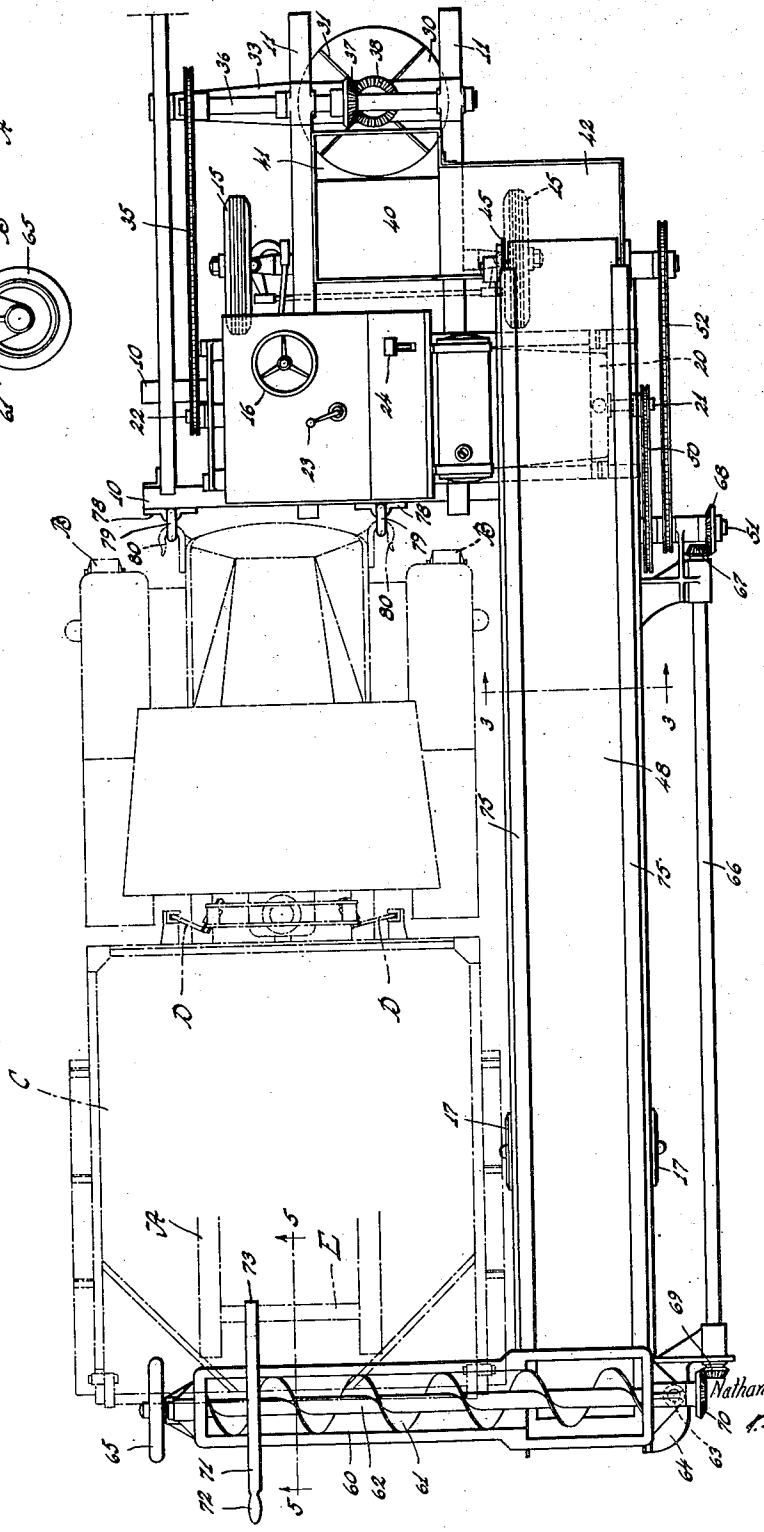

Fig. 4

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UNITED STATES PATENT OFFICE

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MACHINE FOR SPREADING ROAD MATERIALS

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The present invention relates to a machine for spreading or distributing materials over the surfaces of roads. The machine is particularly adapted for use in spreading or scattering sand over road surfaces after they have been oiled or over road surfaces which are coated with ice.

The aim of the invention is to provide a machine of this sort by means of which the sand or other road material may be very quickly distributed and spread over the road surface with a minimum amount of labor and with the most economical and effective use of the trucks which are employed for carrying the sand from the source of supply to the machine.

A further aim of the invention is to provide a machine of this sort which is very simple in construction, which is compact in arrangement, which is strong and durable, and by means of which the sand may be evenly distributed over the road surface to the desired depth.

A further aim of the invention is to provide an improved road machine with a distributor at the forward end thereof so that the sand is spread on the road in front of the wheels of the machine and the wheels of the truck so that these wheels will always be on the sanded surface where they can have a good traction.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings, wherein is shown, for illustrative purposes, one embodiment which the present invention may take:

Figure 1 is a side view of my improved machine with which is associated a truck, the body of the latter of which is shown as tilted;

Fig. 2 is a front view of my improved machine, the truck being omitted;

Fig. 3 is a sectional view through the side conveyer, this view being taken substantially on line 3—3 of Fig. 4;

Fig. 4 is a top plan view of my improved machine, a truck being shown in broken lines with its body in normal or lowered position; and

Fig. 5 is a detail view showing the manner in which the rear transverse conveyer is connected to the truck, this view being taken substantially on line 5—5 of Fig. 4.

Referring to the drawings in detail, my improved machine has a frame with a front or body portion adapted to precede a truck of the usual type, and a rearwardly extending portion or arm projecting from one side of the front portion and alongside of, and beyond the rear end of, the truck. In effect, the frame is generally L-shaped. The frame may be of any suitable construction, but for purposes of illustration, the front portion thereof is shown as comprising a pair of transverse sills or beams 10, 10, and a pair of forwardly extending sills or beams 11, 11. The side portion of the frame includes a longitudinally extending beam 12, the forward end of which is connected to the beams 10, and the rear end of which is connected to a bracket 13. The front portion of the frame is supported by suitable wheels 15 which may be pivoted in the same manner as are the usual front wheels of an automobile so that the machine may be steered. The steering wheel is designated by the numeral 16. The rear end of the frame is supported by one or more wheels, two such supporting wheels 17 being shown. These wheels 17 are carried by an axle 18 supported by the bracket 13.

Upon the frame, and preferably upon the front portion thereof, is located a power plant which may be of any suitable construction but is here shown as being an internal combustion engine of the type with which automobiles are usually provided. The power plant may have an engine 19 (diagrammatically shown) with a radiator 20. The engine has a crank shaft 21 and the usual drive shaft 22. The drive shaft 22 may be driven from the engine through the usual transmission mechanism (not shown) controlled by the usual shift lever 23. Also, there may be a

throw-out clutch controlled by the usual foot lever 24. Preferably, the engine extends cross-wise of the frame.

The distributor is located on the frame forwardly of the front supporting wheels 15. In the present illustrative disclosure, this distributor is shown as comprising a rotary disk 30 disposed in a horizontal plane and having, on its upper surface, a plurality of radiating vanes or fins 31. As will be clear to those familiar with the art, this disk is rotated so that the sand, which drops thereonto, will be thrown outwardly by centrifugal force and thus spread more or less evenly over the road surface. The distributor is fixed to the lower end of a vertical shaft 32 journalled in a cross sill 33 carried by the sills 11 adjacent their forward ends. The shaft 32, together with the distributor carried thereby, may be rotated from the power plant through any desired connection, the driving connection, in the present instance, being shown as comprising a sprocket chain 35 passing about sprocket wheels on the drive shaft 22 and a shaft 36, and bevel gears 37, 38, respectively fixed to the shaft 36 and the upper end of the shaft 33. It will be noted that the distributor is rotated by the drive shaft 22 which may be driven at different speeds so that the speed of the distributor may be controlled in accordance with conditions to be met in distributing the sand.

On the body portion of the frame is a hopper 40 having an opening 41 through which the sand is discharged onto the rear portion of the distributor, as will be seen most clearly from Figs. 1 and 4. Leading to this hopper is a laterally extending inclined chute 42 to the upper end of which the sand is delivered by a longitudinally extending or side conveyor. This side conveyor, in effect, forms part of the rearwardly extending portion or arm of the main frame. It comprises a frame or beam having a pair of side plates 45 suitably connected together and supported adjacent their forward ends by standards 46.

The rear end of the side conveyor is connected to and supported by the wheeled bracket 13. The conveyor, as will be seen most clearly from Figs. 1 and 4, is adapted to extend rearwardly beyond the rear end of the truck. The conveyor frame has, at its opposite ends, suitable drums 47 about which passes an endless belt 48. The runs of this belt, between the drums 47, may be supported against sagging by suitable rollers 49. The belt 48 may be driven from the power plant or engine 19 in any suitable manner, but for the purpose of illustration, the driving connection is shown as comprising a sprocket chain 50 passing about sprockets fixed to the crank shaft 21 and a jack shaft 51; and a sprocket chain 52 passing about sprockets fixed to the shaft 51 and to the gudgeon of the foremost drum 47.

Pivoted to the rear end of the rearwardly extending arm or portion of the frame of the machine for swinging movement in a horizontal plane is a transverse conveyor adapted to receive the sand or other material from the rear end of the truck body and deliver the same to the rear end of the longitudinally extending conveyor 48. In the present illustrative disclosure, this transverse conveyor is shown as being of the screw type. It has a trough 60 in which is located a spiral screw 61 provided with a shaft 62. One end of the trough 60 is suitably pivoted to the rear end of the frame of the longitudinally extending conveyor so that the transverse conveyor may be swung to one side in order to permit the truck to be driven up to the rear end of the front portion of the frame of the machine. In the present illustrative disclosure, this pivotal connection is shown as including a depending stud 63 fixed to one end of the trough 60 and engaging in a bearing provided in a bracket 64 fixed to one of the side members 45 of the longitudinally extending conveyor. The other or free end of the trough is supported by a roller or wheel 65. The rear transverse conveyor is driven from the engine 19.

The driving connection, in the present instance, comprises a shaft 66, the forward end of which is provided with a bevel gear 67 meshing with a gear 68 fixed to the jack shaft 51 which, as previously stated, is driven through the sprocket chain 50. On the rear end of the shaft 66 is a bevel gear 69 meshing with a gear 70 fixed to the end of the screw shaft 62.

The transverse conveyor may be detachably secured or locked in operative position in any suitable manner. In the present illustrative disclosure, the conveyor is shown as having a strip or bar 71 secured to the upper edge of the trough 60. One end of this strip has a handle 72 and the other end has a hook or down bent portion 73 adapted to hook over a part on the truck as hereinafter described more in detail. There is sufficient "give" in the trough 60 to permit the strip to be moved from locking position shown by full lines in Fig. 5, to raised position shown by broken lines in that figure.

The longitudinally extending conveyor may be provided with inclined guards 75 (see Fig. 3) for the purpose of maintaining the sand upon the upper run of the belt 48. In some instances, it is desirable to limit the lateral spread of the sand which is thrown off by the distributing disk. For this purpose, the machine may be provided with a baffle 76 which, in the present illustrative disclosure, is in the form of a curtain, the lower end of which is weighted by strips 77. This baffle may be employed, for instance, when it

is desired to sand only half of the road or when it is desired to prevent the sand from being distributed along the roadside. As previously stated, the front end of the truck is adapted to abut against, or be connected to, the rear end of the body portion of the frame of the machine.

The rear transverse sill 10 may, if desired, be provided with straps or guideways 78 each adapted to receive, for sliding movement, one arm of a staple or hook 79. The truck may be provided, at its forward end, with hooks 80 which are adapted to be engaged with the staples 79.

The machine is adapted to be used with trucks of the type which are adapted to deliver from the rear end. Any suitable truck may be employed, that shown in the drawings being illustrated by way of exemplification only. The truck is shown as having the usual frame or chassis A mounted on wheels B. The truck has a body C pivoted at its rear end and connected, at its forward end, to suitable lifting mechanism which may include a chain or rope D. It will be understood that the body may be raised and lowered through the usual mechanism with which trucks of this type are provided. The letter E designates the usual rod or bar extending transversely of the truck frame at the rear end thereof.

The machine is adapted to be used in connection with a number or fleet of trucks which are despatched from a source of supply at suitable intervals. To bring a truck into proper position with respect to the machine, the rear conveyor is swung out of the way, that is, into substantial longitudinal alignment with the side conveyor 48. The truck is driven into the space immediately behind the front portion of the frame, and then the rear conveyor is swung laterally and forwardly so that it is immediately beneath the rear end of the truck body. The rear conveyor is locked in this position by hooking the down bent portion 73 of the strips 71 over the rod E of the truck as shown in Fig. 5. The truck now abuts against the rear end of the body portion of the frame, and may be connected thereto by the staples 79 and the hooks 80.

The body portion of the truck is raised, and power is thrown onto the truck so that the truck will move forwardly and will push the machine forwardly over the road surface. As the truck and the machine move forwardly as a unit, the sand flows out of the rear end of the body portion of the truck into the rear or screw conveyor which delivers the sand to the rear end of the side conveyor 48. This side conveyor delivers, at its forward end, to the inclined chute 42 and the hopper 40. The sand flows through the opening 41 of the hopper onto the distributor which spreads the sand in front of the machine, as previously described. When the truck body is emptied, which requires but a very short space of time, the handle 72 is depressed to raise the hook 73 (to the dotted line position of Fig. 5) out of engagement with the rod E; the rear screw conveyor is swung out of the way, the truck is disconnected from the machine and then backed up. Another truck, which has just been brought to the scene of operations, is then moved behind the front portion of the frame of the machine, the screw conveyor is thrown into and locked in the operative position illustrated in Fig. 4, and the operations are repeated. It has been found, in actual use of machines constructed in accordance with the present invention, that the contents of a fleet of trucks may be spread over a road surface with considerable rapidity and in a very effective manner without requiring any appreciable idleness of the trucks or the machine.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of and propelled by a truck, a distributor at the forward end of said frame, and conveying means adapted to extend rearwardly along side of the truck and transversely at the rear of the truck for receiving the material from the rear end of the truck and delivering the same to said distributor, said conveying means rearwardly of the truck being arranged to be moved into and out of position to permit the truck to be moved into and out of position with respect to said portion of said frame.

2. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of a truck, a distributor at the forward end of said frame and adapted to spread the material in front of the wheels of the frame, a rearwardly extending conveyor adapted to extend along side of the truck and to deliver to said distributor, and a transversely extending conveyor adapted to extend across the rear end of the truck and to deliver to said first conveyor.

3. A machine for spreading road mate-

rials having a wheeled frame with a portion adapted to be placed in front of a truck, a distributor at the forward end of said frame and adapted to spread the material in front of the wheels of the frame, a rearwardly extending conveyor adapted to extend along side of the truck and to deliver to said distributor, and a transversely extending conveyor adapted to extend across the rear end of the truck and to deliver to said first conveyor, said transverse conveyor being movable into and out of operative position to permit the truck to be moved into and out of position.

4. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of a truck, a distributor at the forward end of said frame, a longitudinally extending conveyor adapted to extend rearwardly along side of the truck, a transverse conveyor adapted to extend across the rear end of the truck and to deliver to said first conveyor, means for supporting said transverse conveyor for swinging movement into and out of operative position, and means for securing said transverse conveyor in operative position.

5. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of a truck, a distributor at the forward end of said frame, a longitudinally extending conveyor adapted to extend rearwardly along side of the truck and to deliver to said distributor, a transverse conveyor adapted to extend across the rear of the truck and to deliver to said first conveyor, said transverse conveyor including a trough and a screw therein, and means for securing said transverse conveyor to said wheeled frame for swinging movement into and out of operative position.

6. A machine for spreading road materials having a wheeled frame provided with a body portion adapted to be placed in front of a truck and a rearwardly extending side portion, a distributor at the forward end of said frame, a belt conveyor on said rearwardly extending portion and delivering to said distributor, and a transverse screw conveyor adapted to extend across the rear end of the truck and deliver to the rear end of said belt conveyor.

7. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of a truck and a rearwardly extending side portion, a distributing disk at the forward end of the frame, a belt conveyor on said side portion delivering to said disk, and a transverse screw conveyor delivering to the rear end of said belt conveyor.

8. A machine for spreading road materials having a frame with a body portion adapted to be placed in front of a truck and a rearwardly extending side portion, a pair of wheels supporting said body portion, a wheel supporting the rear end of said side portion, a distributor disk at the forward end of said frame, a hopper delivering to said disk a conveyor on said side portion of said frame, delivering to said hopper a transverse conveyor adapted to extend across the rear end of the truck and deliver to the rear end of said side conveyor, and means for supporting said transverse conveyor for swinging movement into and out of operative position.

9. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of and propelled by a truck, a distributor at the forward end of said frame, and conveying means adapted to extend rearwardly along side of the truck and transversely at the rear of the truck for receiving the material from the rear end of the truck and delivering the same to said distributor, said conveying means rearwardly of the truck being arranged to be moved into and out of position to permit the truck to be moved into and out of position with respect to said portion of said frame, and power means on said frame for driving said distributor and conveying means.

10. A machine for spreading road materials having a wheeled frame with a portion adapted to be placed in front of a truck, a distributing disk at the forward end of said frame, a longitudinally extending conveyor adapted to extend rearwardly along side of the truck, a transverse conveyor adapted to extend across the rear end of the truck and to deliver to said first conveyor, means for supporting said transverse conveyor for swinging movement into and out of operative position, means for securing said transverse conveyor in operative position, and power means on frame for driving said distributor and said conveyors.

11. A machine for spreading road materials having a wheeled frame provided with a body portion adapted to be placed in front of a truck and a rearwardly extending side portion, a distributor at the forward end of said frame, a belt conveyor on said rearwardly extending portion and delivering to said distributor, a transverse screw conveyor adapted to extend across the rear end of the truck and deliver to the rear end of said belt conveyor, an internal combustion engine on said frame having a drive shaft and a crank shaft; a driving connection between said drive shaft and distributor, and a driving connection between said crank shaft and said conveyors.

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