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COMPACTING AND SPREADING DEVICE FOR HIGHWAY SURFACING MATERIALS

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FIG. 1

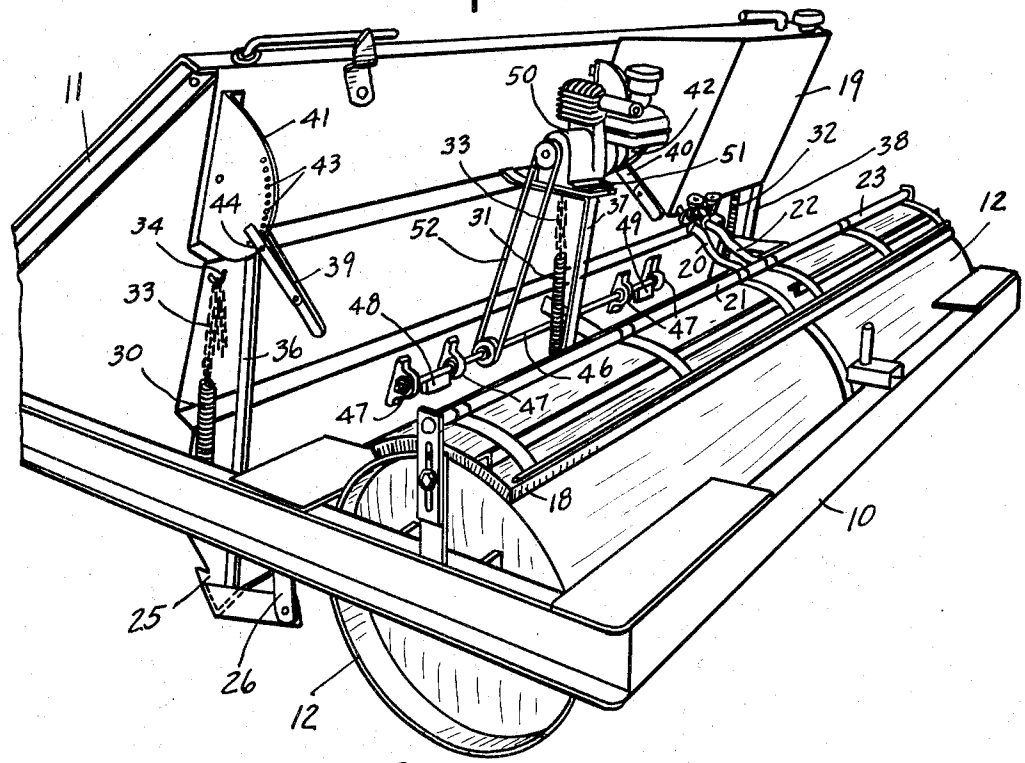
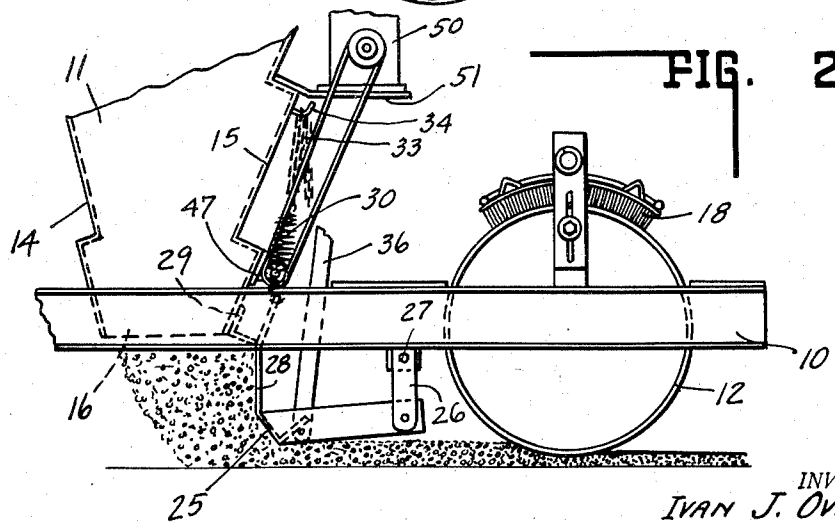


FIG. 2



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COMPACTING AND SPREADING DEVICE FOR HIGHWAY SURFACING MATERIALS

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1 Claim. (Cl. 94—46)

This invention relates generally to apparatus for laying highway surfacing materials, and more particularly it relates to apparatus for vibrating portions of a material spreading and laying machine in order to increase the speed of laying the material and in order to improve the quality of the surface of the material after it is laid.

Conventional spreaders or pavers usually consist of a hopper adapted to receive highway surfacing materials. The hopper is mounted on a frame which rides on guide wheels and rollers. The entire apparatus may be hitched to a dump truck whereby the road surfacing material may be continuously fed into the hopper of the spreader, and the truck may tow the spreader at a uniform rate, spreading highway surface material in a continuous stream. Spreaders of this type are usually provided with a screed which is supported from the frame of the spreader immediately behind the hopper for levelling the surfacing material and controlling the thickness of the material laid on the highway. In some cases the screed is not moved in any way during a material levelling operation, while in other cases the screed is oscillated in a horizontal plane. Neither method of operation has been found to be completely satisfactory due to the fact that the levelling action of the screed requires a minimum time period per linear foot of movement, thereby limiting the speed of travel of the spreader. Furthermore, screeds operated in accordance with conventional methods do not create a smooth and level highway surface due to the fact that there is insufficient compacting action whereby some areas of the highway material may be laid with sufficient compaction, whereas other areas are not sufficiently compacted. As a result, what appears to be a smooth surface when the material is laid will subsequently became rough or bumpy after the surfacing material has become compacted by traffic.

Accordingly, the principal object of this invention is to provide highway surfacing apparatus wherein the screed plate thereof is operated to provide positive compacting action with respect to the surfacing material.

A further object of the invention is to provide highway surfacing apparatus having a screed plate which may be operated to level and compact the surfacing materials at a faster rate than possible with prior art apparatus.

In accordance with this invention there is provided apparatus for laying road surfacing material comprising a hopper having a material discharge throat at the bottom thereof, a screed plate cooperating with the hopper for providing a layer of surfacing material of predetermined thickness and including a material guiding plate disposed in over-lapping relationship to the throat portion of said hopper, and a vibrator mounted on one wall of the hopper for vibrating the hopper and the screed plate, thereby to impart compacting action to the screed plate and to increase the rate of levelling and compacting of the highway surfacing material.

The full nature of the invention will be understood from the accompanying drawings and the following description and claim:

Fig. 1 is a rear perspective view of the highway surfacing material spreader provided in accordance with this invention.

Fig. 2 is an end elevation of the apparatus illustrated in Fig. 1.

Referring to the drawings, this invention comprises a highway surfacing material spreader consisting of a rectangular frame **10** on which is mounted a material receiving hopper **11**, together with a rotatable roller **12**. The hopper **11** is triangular in cross section and includes a forward wall **14**, together with a rear wall **15**, the walls converging downwardly toward one another to form a material discharge throat **16**. Hopper **11** may be mounted on frame **10** in any conventional fashion.

The roller **12** is divided into two rolls in accordance with conventional practice, whereby a concave or a convex highway surface may be rolled. The roller is provided with a cocoa mat **18** further in accordance with conventional practice, and the water tank **19** is mounted on the rear wall **15** of the hopper **11** for supplying water to the right and left hand portions of the cocoa mat **18** through pipes **20**, **21**, **22** and **23**, respectively. While the rear end of the spreader is illustrated as being supported on the roller **12**, it will be understood that the forward end of the frame **10** may be supported on wheels or casters (not shown) in accordance with conventional practice. The structure described thus far is conventional in every way and is disclosed in order to clarify the application of this invention to highway surfacing material spreaders.

The screed plate **25** is pivotally mounted below the throat of hopper **11** by means of a set of hangers **26** which may be suitably fastened to frame **10** at **27**. The screed plate **25** is divided into two portions (not shown) in a manner similar to that described in connection with roller **12** and for the same purpose, each half of the screed plate being supported by a pair of hangers **26**. The screed plate includes an upstanding baffle member **28** which extends upwardly beyond the lip member **29**, which is attached to the lower edge of the rear wall **15** of hopper **11**. This relationship of baffle **28** and lip **29** is important in carrying out this invention, as will be described in connection with the functioning of the apparatus.

In order to permit adjustment of the height of the screed plate **25**, a plurality of spring members **30**, **31** and **32** are connected to the upper edge of baffle **28** and suspended by chains such as **33** on hook members **34**, the chain providing means whereby different degrees of tension may be placed on springs **30**.

Additionally, for adjusting the height of the screed plate **25** with respect to the highway surface, the screed plate is suspended adjustably by means of hangers **36**, **37** and **38** which in turn are pivotally connected to adjusting levers such as **39** and **40**. Hangers **36** and **38** support the outer ends of the screed plate while hanger **37** supports the inner ends thereof. Levers **39**, **40** are pivotally connected at their ends to semicircular plate members **41** and **42** mounted on wall **15** of the hopper, these plate members having a series of holes **43** adjacent their outer edges for receiving stop pins, whereby the levers may be lifted or lowered until the screed plate is positioned at the desired height, after which the pins such as pin **44** may be passed through the levers and the holes **43** to lock the levers in adjusted position. It will be understood that the lever at the right hand end of hopper **11** is obscured by tank **19** and that its structure is identical with that of the lever and mounting structure **39**, **41**, **43** and **44**. In order to permit the springs **30**, **31** and **32** to carry a certain portion of the weight of screed plate **25**, and in order to permit vibratory motion of screed plate **25**, the holes **43** are oversized with respect to pins **44**, whereby one-quarter inch to one-half inch of up-

ward and downward play of the screed plate may occur, even though the levers **39** and **40** are pinned to the plates **41** and **42**.

For imparting vibratory motion to the rear wall **15** of the hopper **11**, and also to the screed plate **25** and its baffle **28**, there is provided a vibrator consisting of a shaft **46** mounted in pillow blocks **47** on wall **15**, the shaft being provided with off center weights **48** and **49**. For rotating the shaft **46** and therewith the weights **48** and **49**, there is provided an engine **50** mounted on a shelf **51** projecting outwardly and horizontally from the wall **15**, the engine **50** driving shaft **46** through the pulley and belt connection **52**.

In operation the spreader may be pulled in a forward direction behind the dump truck with the hopper **11** receiving surfacing materials; such as stone, gravel and hot or cold asphalt mix. The height of the screed plate **25** above the surface of the highway may be adjusted by means of the levers **39** and **40**, whereby the screed plate is adjusted within one-quarter to one-half inch of the desired thickness of the surfacing material. Thus, the screed plate hangs on springs **30**, **31** and **32**. With the engine running and the vibrator shaft **46** rotating, the rear wall **15** of hopper **11** is set into vibration. Shaft **46** may be rotated at any speed between three hundred R. P. M. and twelve hundred R. P. M., depending upon the nature of the material being spread. As the material falls through the throat **16**, and as the screed plate **25** pushes the material forward, there is a tendency for material to be forced between baffle **28** and the outer edge of the lip **29**, thereby providing a connection between these two elements. In this manner, the vibration of wall **15** is transmitted to baffle **28** and screed plate **25**, and because of the one-quarter inch to one-half inch play provided in the adjustable supporting structure **39**, **41**, **43** and **44**, together with springs **30**, **31**, **32**, the screed plate **25** receives vibratory motion from wall **15**. The effect of this vibratory motion is to cause the surfacing material to be compacted by the screed plate and to be settled into any cracks or cavities in the highway surface. Thus, after the screed plate **25** has passed over an area, the newly laid layer of surfacing material has uniform density or compaction, regardless of irregularities in the original highway surface. Furthermore, this compaction occurs at a higher rate of speed than is possible using conventional apparatus.

Consequently, the material spreading apparatus provided in accordance with this invention has increased capacity to the extent that it can be moved in a forward direction at a higher rate of speed, laying a greater volume of surfacing material.

The invention claimed is:

Apparatus for laying highway surfacing material comprising a frame, rotatable means for supporting said frame, a hopper mounted on said frame and having front and rear walls converging downwardly to form a material discharging throat at the bottom thereof, a screed plate positioned behind and below the rear wall of said hopper and including a baffle member extending upwardly into overlapping relationship with the lower edge of the rear hopper wall, whereby highway surfacing material pushed in front of said baffle may form a vibration transmitting connection between the rear of said hopper and the upper portion of said baffle, means for adjustably mounting said screed plate on said frame with a predetermined degree of play in a vertical direction, said means including members pivotally suspending the rear edge of the screed plate from the frame, spaced brackets mounted on the rear hopper wall, spaced pivotal links for suspending the forward edge of said screed plate from the brackets, said brackets each having a plurality of enlarged openings therein receiving a pin of reduced diameter at the upper end of the links permitting movement within the limits of clearance thereby provided, and tension springs connecting the forward edge of said screed plate to the rear hopper wall, thereby resiliently supporting said plate for vibratory movement, and means supported on the rear wall of said hopper for vibrating said wall and therewith said screed plate.

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