Dec. 9, 1969 C. E. JENNINGS, JR 3,482,494

ASPHALT PAVER

Filed Jan. 30, 1968 3 Sheets-Sheet 1

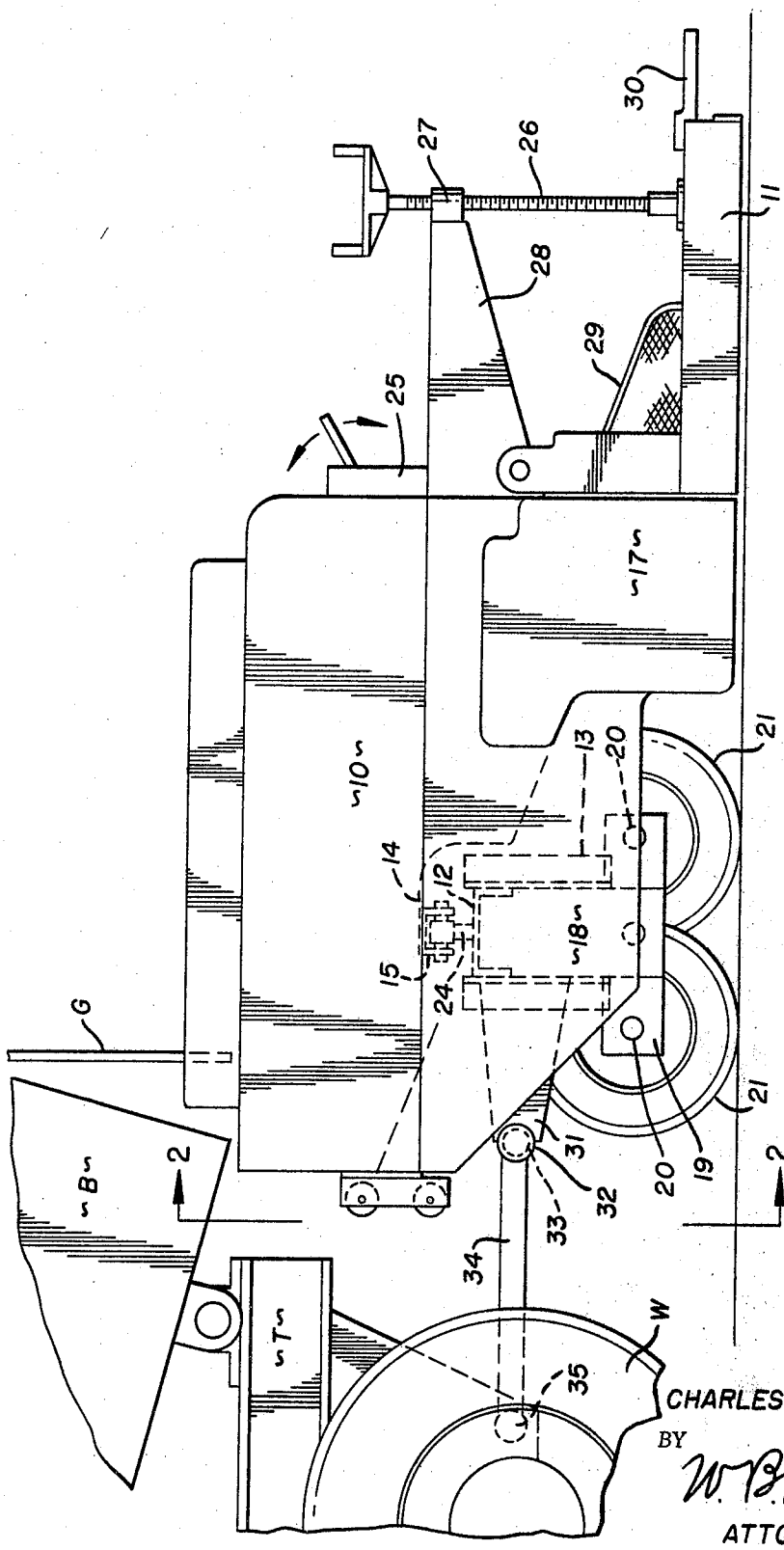


FIG. 1

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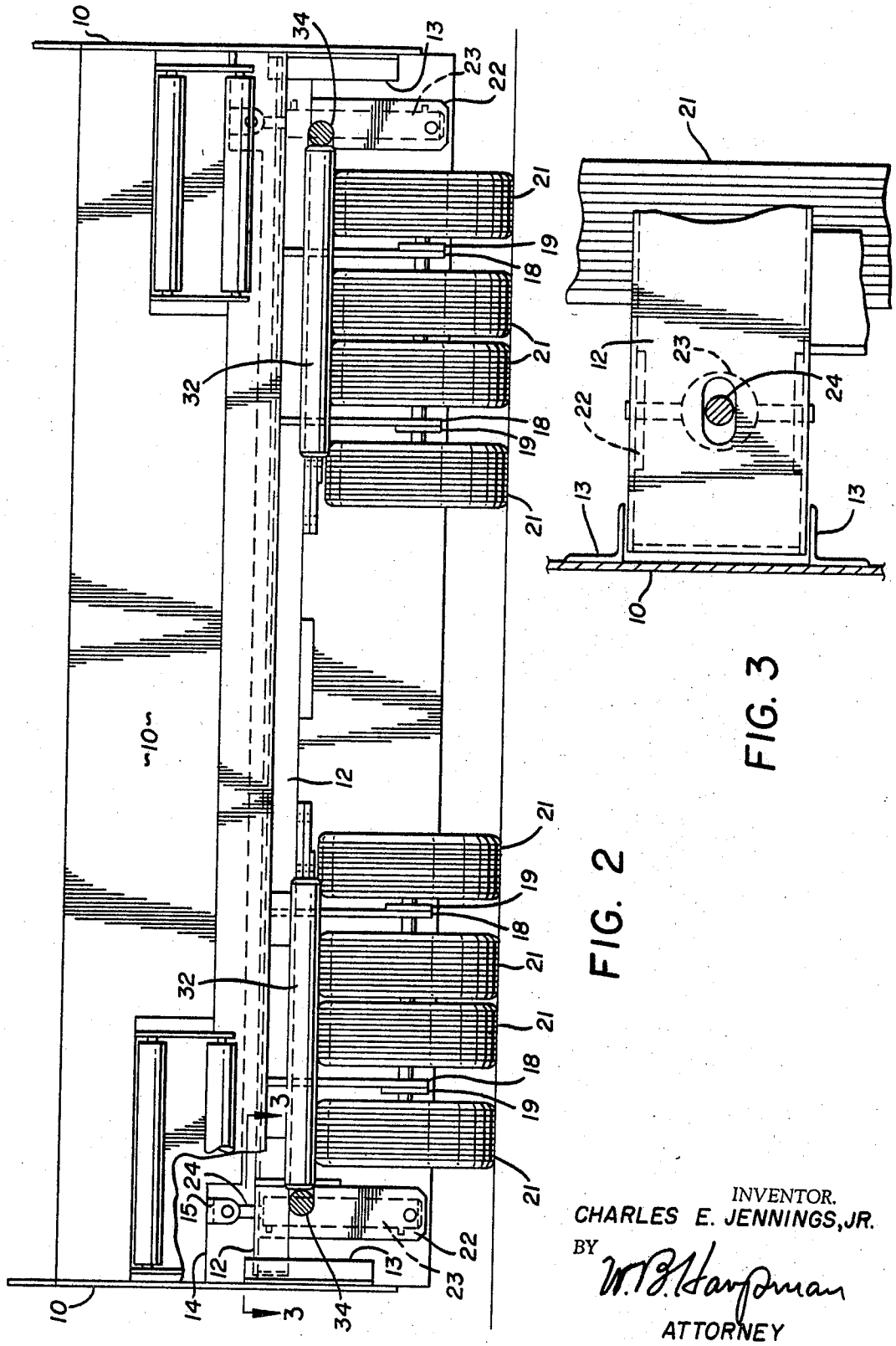


FIG. 2

FIG. 3

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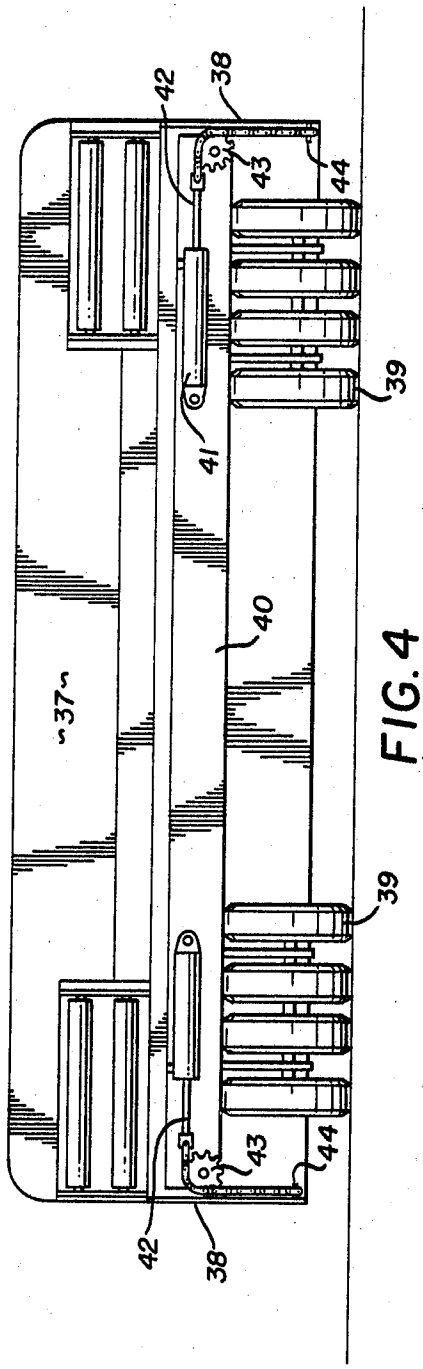


FIG. 4

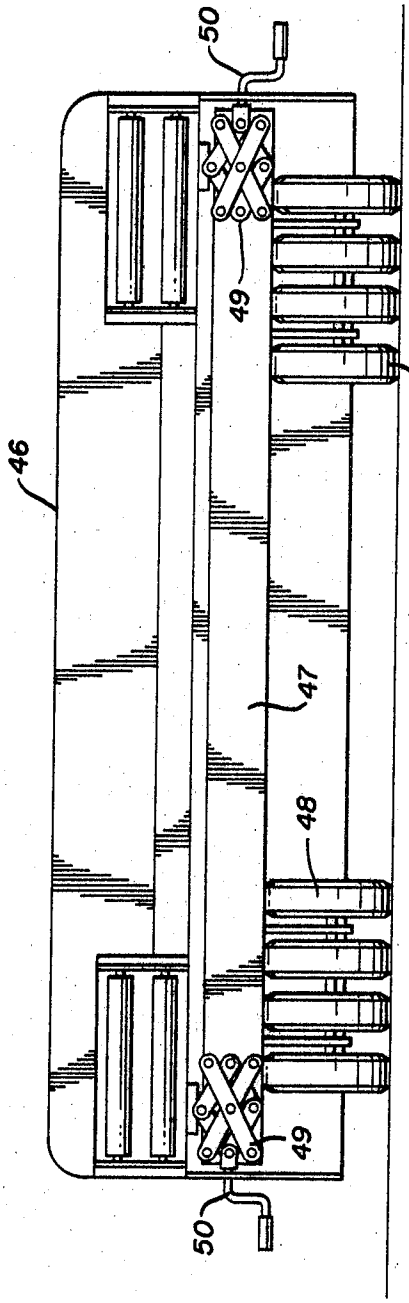


FIG. 5

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3,482,494

ASPHALT PAVER

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Int. Cl. E01c *19/48*
U.S. Cl. 94—46 8 Claims

ABSTRACT OF THE DISCLOSURE

An asphalt paver including a hopper having a screed adjustably mounted thereon and extending transversely with respect to a discharge opening in said hopper, a ground engaging undercarriage for supporting said hopper and devices interconnecting said undercarriage and hopper permitting movement of said undercarriage relative to said hopper and providing for the adjustable positioning of said hopper relative to said undercarriage.

This invention relates to an asphalt paver and more particularly to a paver of the towed type wherein a truck comprising a supply source of bituminous paving material, for example, serves as a prime mover for the paver and tows the same in a continuous paving operation.

The principal object of the invention is the provision of an asphalt paver having a cushioning adjustable mechanism incorporated in its support means whereby the hopper of the paver may be adjusted relative to the support means and the support means may move relative to the hopper.

A further object of the invention is a provision of an asphalt paver with an adjustable floating hopper and screed and wherein the mechanism providing such adjustability may be remotely controlled.

A still further object of the invention is the provision of an asphalt paver that may be towed over a relatively uneven surface to be paved and deposit and smooth and partially compact bituminous concrete or the like in an even surface configuration.

Towed pavers have been heretofore known in the art and the arrangements for towing the same from a material supplying truck are well known. These include devices directly engaging the axles of the towing truck, brackets on the axles or more recently, engaging arms having roller ends in the rims of the wheels of the truck so that the paver is towed by such engagement. Such a device is shown, for example, in U.S. Patent No. 3,304,-101. Towed pavers heretofore known in the art have provided various means of controlling the screed which levels, smooths and partially compacts the bituminous cement material being laid. Among the prior art devices are floating screeds carried on the ends of elongated arms which themselves are pivoted to the hopper at a sufficient distance to allow the screed to float evenly with respect to possible uneven movement of the hopper and its support means. Still other towed pavers mount the hopper directly on support means which include wheels or the like and adjustably position the screed relative to the hopper in an effort to provide an even finished course when the surface being paved is uneven. These several prior art devices work reasonably well and have been widely used. The present invention relates to a towed paver incorporating a novel and greatly improved construction with respect to the ground engaging hopper supporting undercarriage and the hopper carried thereby. More particularly the improvement resides in the arrangement of devices between the hopper and the undercarriage which act to float the hopper relative to the undercarriage and at the same time permit vertical adjustment of the hopper relative to the undercarriage so that tapered courses of

bituminous concrete may be laid and relatively rough surfaces to be paved may be traversed by the paver with the hopper following a flat even plane while the supporting undercarriage wheels or the like follow the contour of the surface being paved.

In the present disclosure the screed is adjustably positioned with respect to hopper but primarily attached thereto and thus spreads smooth and partially compacts the bituminous concrete in a smooth flat surface plane.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being the intention to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

The invention is illustrated in the accompanying drawing, wherein:

FIGURE 1 is a side elevation of the asphalt paver with parts broken away and parts in cross section.

FIGURE 2 is a front view of the paver with parts broken away and parts in cross section.

FIGURE 3 is a horizontal cross section on line 3—3 of FIGURE 2.

FIGURE 4 is a front elevation of a modified paver construction.

FIGURE 5 is a front elevation of still another modified paver construction.

By referring to the drawings and FIGURES 1, 2 and 3 in particular, it will be seen that an asphalt paver has been disclosed which includes a hopper **10** having a screed **11** adjustably mounted on the rear side thereof. The hopper **10** is supported on an undrecarriage including a transverse beam **12**, the ends of which are slidably engaged in vertical channels **13** formed on the depending side portions of the hopper **10**. The bottom wall of the hopper **10** is angularly disposed throughout a majority of its length with exceptions at either end where raised flattened areas **14** carry downwardly extending bifurcated brackets **15**. The angular bottom wall of the hopper extends downwardly from the front to the rear of the asphalt paver as seen in FIGURE 1 of the drawings, the front being the left side. The bottom wall terminates in spaced relation to a back wall **16**, thus defining a transversely extending material discharge orifice. Adjustable gates, not shown, are disposed on the back wall **16** of the hopper so that desirable areas of the discharge opening may be used or closed. Side plates **17** affixed on either side of the hopper **10** of the asphalt paver define closures with respect to the discharge opening and as known in the art, these may be replaced by extensions to permit a wider course of paving material to be spread.

By referring now to FIGURES 1 and 2 of the drawings, it will be seen that the beam **12** of the undercarriage has a plurality of depending structural members **18**, the upper ends of which are securely fastened to the beam **12** and the lower ends of which pivotally mount tandem wheel carrying arms **19**, the opposite ends of which support axles **20** and on which axles two pairs of wheels **21** are engaged.

By still referring to FIGURES 1 and 2 of the drawings, it will be seen that these two pairs of wheels **21** are arranged with the foremost pair in outwardly spaced relation from the rearmost pair and that their front to back spacing is such that an area of overlap occurs when the wheels are seen in the side elevation.

The opposite end portions of the beam **12** are provided with depending cylinder carrying arms **22** and hydraulic cylinders **23** are pivoted adjacent the lower ends of the arms **22** and extend vertically thereabove with their pistons **24** pivoted to the bifurcated brackets **15**. The cylinders **23** are double acting cylinders with fluid passageways ad-

jacent their opposite ends and these are placed in communication with a suitable pump and release valve mechanism **25** which is preferably mounted on the back wall of the hopper **10** of the asphalt paver.

Those skilled in the art will observe that actuation of the pump **25**, which is supplied by a suitable reservoir, will move hydraulic fluid to the desired port of one or both of the cylinders **23** and which action will move the piston and piston rod **24** thereof and thus change the relative positioning of the hopper **10** with respect to the beam **12** of the undercarriage which includes the wheels **21**. It will thus be seen that the cylinders **23** provide means of raising either one or both sides of the hopper **10** relative to the beam **12** and the undercarriage. One side being raised will result in the asphalt paver laying a course tapered transversely while elevation of both sides introduces a hydraulic cushion floatation action of the hopper with respect to the undercarriage and at the same time, controls the thickness of the course being laid as the forward end of the screen **11** is pivoted to the hopper **10** and thus moves vertically with the same. The rearward end of the screed **11** is adjustable vertically by means of a pair of vertically positioned adjustment screws **26** which are positioned through threaded fittings **27** on the rear ends of extension arms **28** mounted on the hopper **10**. Means for heating the screed **11** is preferably provided and an enclosure **29** is provided therefore. A walkway **30** is pivotally mounted on the screed **11** and extends rearwardly therefrom.

Still referring to FIGURES 1 and 2 of the drawings, it will be seen that the forward side of the beam **12** of the undercarriage of the asphalt paver is provided with the plurality of forward extensions **31**, the outer ends of which mount transversely extending tubular guides **32** in which longitudinally movable members **33** are located. The outer ends of the members **33** are joined with and form part of a pair of opposed connecting arms **34** which extend forwardly adjacent either side of the asphalt paver and at right angles to the members **33**. Each of the opposed connecting arms **34** has a roller **35** positioned at right angles thereto and journalled thereon, as best seen in FIGURE 1 of the drawings, these rollers **35** are adapted to engage the rims of the wheels of a truck, the wheels being indicated by the letter W and the truck by the letter T. The dump body B of the truck is shown pivoted thereto with the tailgate G thereof partly open so that the bituminous concrete mixture may be delivered therefrom directly into the hopper **10** as the truck moves along towing the paver with it by reason of the coupling mechanism just described.

The prior art and particularly Patent 3,304,101 discloses a similar coupling mechanism wherein the parts comparable to the members **33** and the tubular guides **32** in which they are slidably engaged are mounted directly on the hopper. In the present invention, they are carried on the forward extensions **31** which are part of the vertically movable undercarriage principally defined by the beam **12** hereinbefore described and in no way connected directly with the hopper **10**. Thus motion which may be imparted through the oppositely disposed connecting arms **34** to the paver is transmitted to the undercarriage and the undercarriage is separated from the hopper and the rest of the paver by the hydraulic cylinder arrangement hereinbefore described so that the hopper floats freely with respect to any such motion.

In order that the oppositely disposed connecting arms **34** may be moved suitable actuating means is connected between the inner ends of the members **33** for moving the same individually and/or simultaneously. Such means may obviously comprise a double acting hydraulic cylinder and piston assembly or it may comprise a rack and pinion mechanism, both of which are known in the art.

Modifications in the means for separating the undercarriage and the hopper of the paver will occur to those skilled in the art and two such modifications are illustrated herein. In FIGURE 4 of the drawings a portion of a paver, including a hopper **37**, may be seen in front plan view. Like the preferred form of the invention hereinbefore described, the hopper **37** has a sloping bottom wall, the forward edge of which defines the transverse discharge opening. The hopper **37** has depending side walls **38** and it is supported in elevated relation to the ground or other supporting surface by an undercarriage which includes wheels **39** and a beam **40**. One or more hydraulic cylinders **41** are mounted on the beam **40** and their pistons **42** are connected to flexible members which are trained over sprockets **43** and connected at their outermost ends with brackets **44**, which in turn are mounted on the opposite side walls **38** of the hopper. Means (not shown) for supplying hydraulic fluid under pressure to the cylinders **41** will move the pistons inwardly thereof and result in raising the hopper **37**. This action may be at either side by the individual operation of the cylinders **41** or the hopper **37** may be elevated uniformly with respect to the beam **40** and its undercarriage including the wheels **39** by the simultaneous actuation of the cylinders **41**. All of the advantages of the preferred form of the invention hereinbefore described may be realized by the modification as will occur to those skilled in the art.

A still further modification may be seen in FIGURE 5 of the drawing wherein a hopper **46** is supported on a beam **47**, which in turn is supported by ground engaging wheels **48**. The hopper **46** is separated from the beam **47** by mechanical devices, including lever jacks **49**, which are of the type that are actuated by a continuous screw which is revolved by a crank **50**, as will occur to those skilled in the art; operation of the cranks **50** will move the parts of the lever jack threadably engaging the screw extension of the crank **50** so that they expand or contract thereby raising or lowering the hopper **46** relative to the beam **47**.

It will thus be seen that an asphalt paver has been disclosed which incorporates a novel construction capable of effectively floating the hopper and screed portions of the paver with respect to the undercarriage which is traveling over the supporting surface to be paved. The construction disclosed herein meets the several objects of the invention and having thus described my invention, what I claim is:

1. An asphalt paver including a hopper having a screed adjustably mounted thereon and movable therewith and extending transversely with respect to a discharge opening in said hopper, a ground engaging undercarriage for supporting said hopper, means mounted to said undercarriage interconnecting said hopper and said undercarriage and providing for cushioning movement of the undercarriage relative to said hopper and screed, said means further providing for selectively adjustably vertically positioning either side of said hopper and screed relative to said undercarriage to tilt said hopper and screed from side to side.

2. The asphalt paver set forth in claim **1** and wherein said means mounted to and interconnecting said undercarriage and said hopper comprise hydraulic piston and cylinder assemblies and means including a hydraulic pump, a reservoir for hydraulic fluid in communication therewith and with said hydraulic cylinders for actuating the same.

3. The asphalt paver set forth in claim **1** and wherein said means mounted to and interconnecting said undercarriage and said hopper comprise lifting devices mounted on said undercarriage and engaging said hopper so as to be able to lift said hopper relative to said undercarriage.

4. The asphalt paver set forth in claim **1** and wherein outwardly extending connecting arms arranged for movement in horizontal and vertical planes are attached to said undercarriage and have configurations engageable with a towing vehicle for towing said paver.

5. The asphalt paver set forth in claim **1** and wherein said ground engaging undercarriage consists of a transversely positioned beam with depending structural mem-

bers and wheel carrying axles on said depending structural members.

6. The asphalt paver set forth in claim 1 and wherein said ground engaging undercarriage consists of a transversely positioned beam with depending structural members having wheel carrying axles attached thereto, outwardly extending members on said beam with connecting arms movably attached thereto and fastening configurations on said extending arms for engaging a towing vehicle for towing for towing said paver.

7. The asphalt paver set forth in claim 1 and wherein said means mounted to said undercarriage interconnecting said hopper and said undercarriage is remotely controlled.

8. The asphalt paver set forth in claim 1 and wherein said means mounted to said undercarriage interconnecting said hopper and said undercarriage comprises mechanical devices including lever jacks actuated by a continuous screw revolved by a crank.

References Cited

UNITED STATES PATENTS

2,251,095	7/1941	Wood	94—46
3,029,714	4/1962	Creswell	94—46 X
3,088,383	5/1963	Ekstrom	94—46
3,229,601	1/1966	Philpott	94—46 X
3,237,539	3/1966	Layton	94—46 X
3,338,143	8/1967	Layton	94—46

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