

June 2, 1959

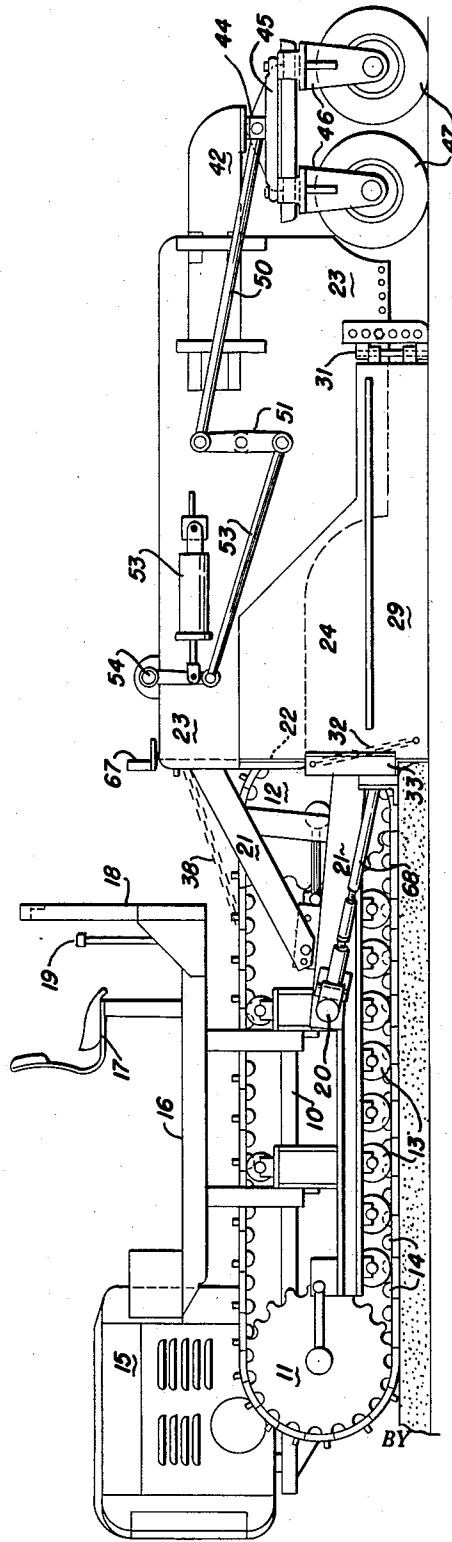
R. J. PLAS
BASE PAVER

2,888,864

Filed Dec. 8, 1953

4 Sheets-Sheet 1

FIG. 1



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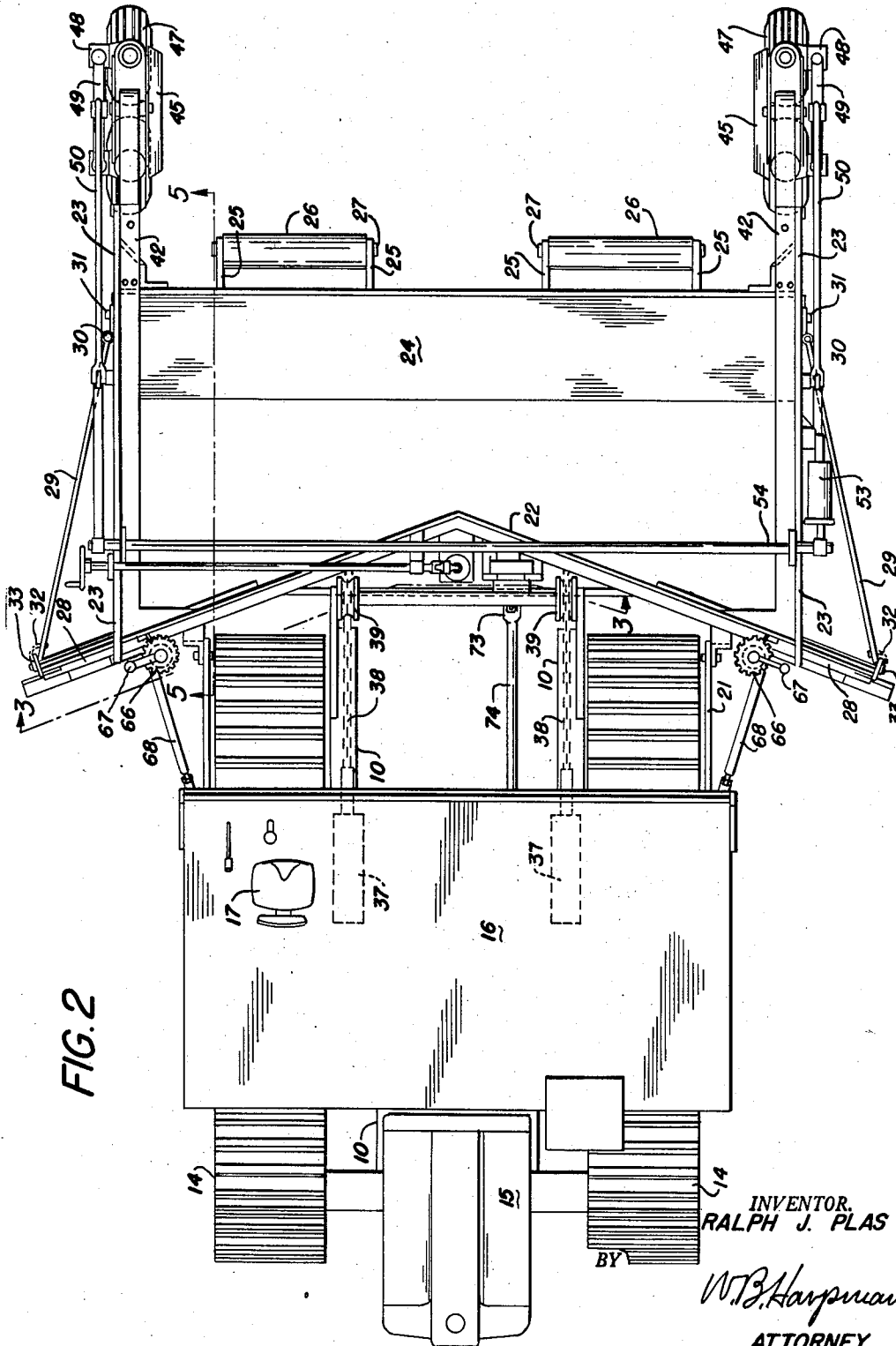
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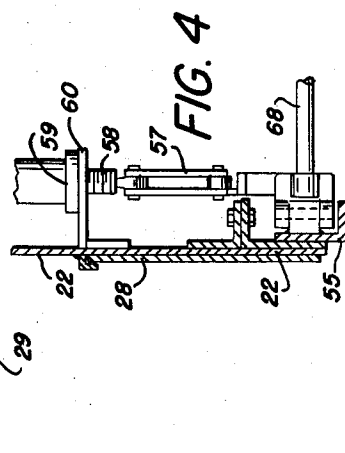
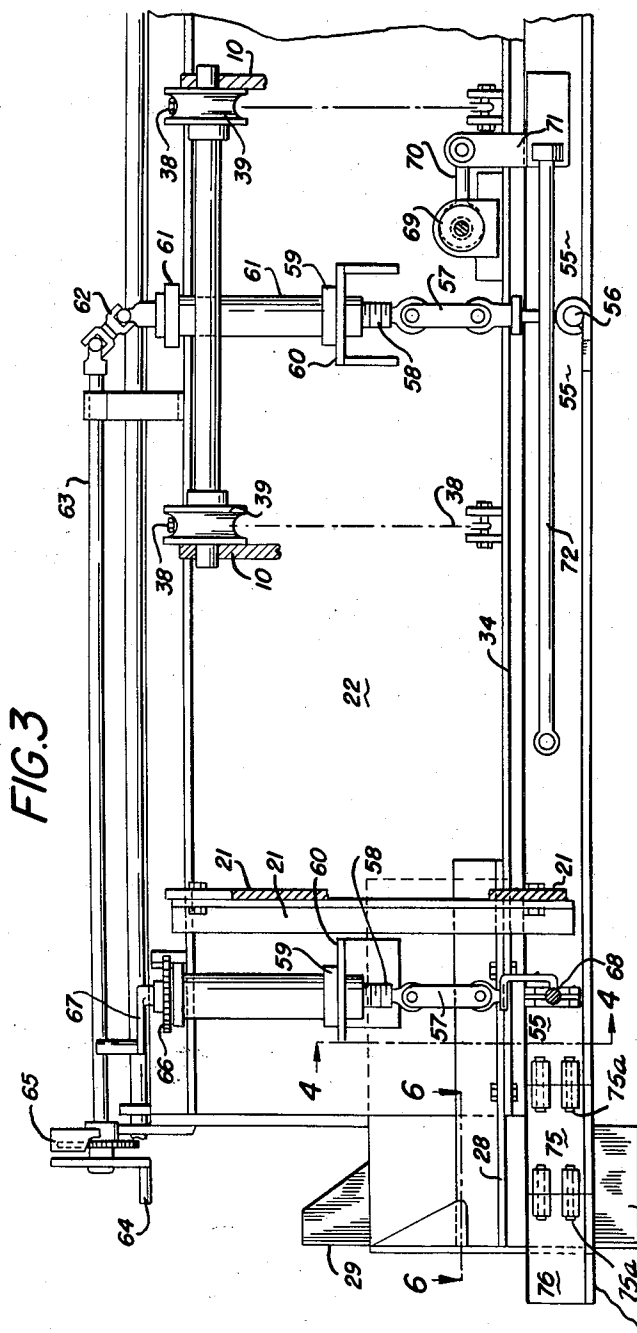
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4 Sheets-Sheet 3



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FIG. 5

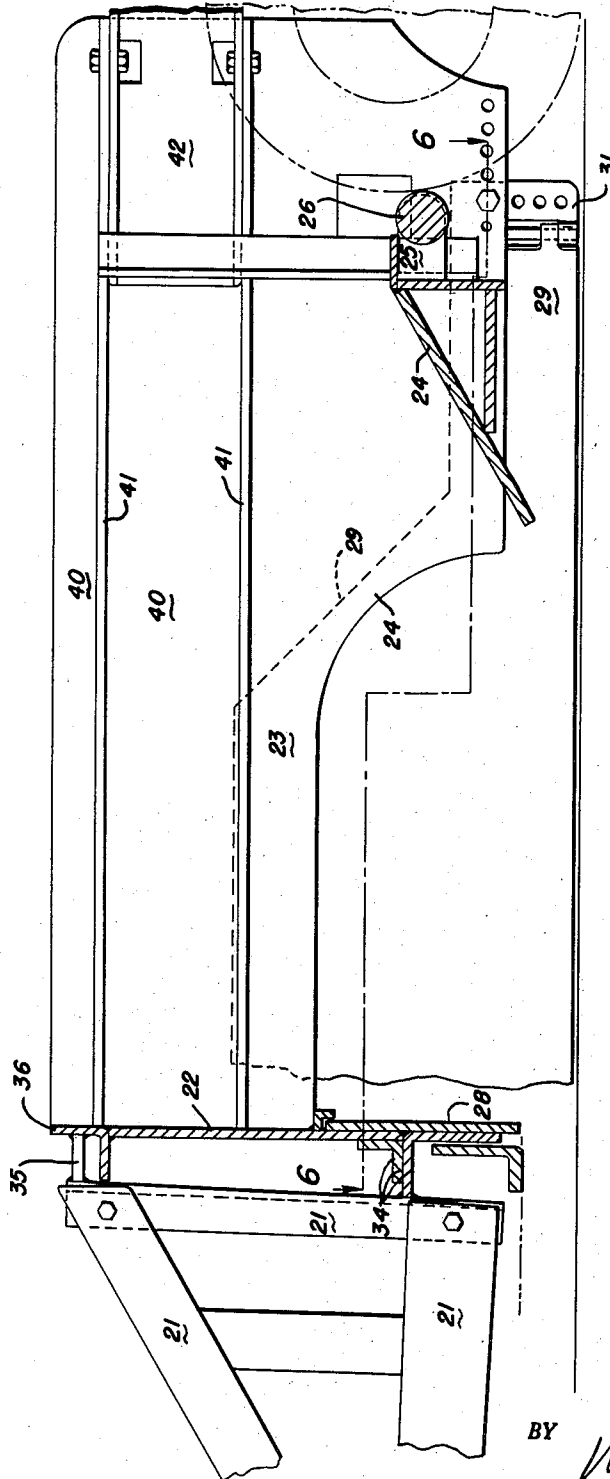
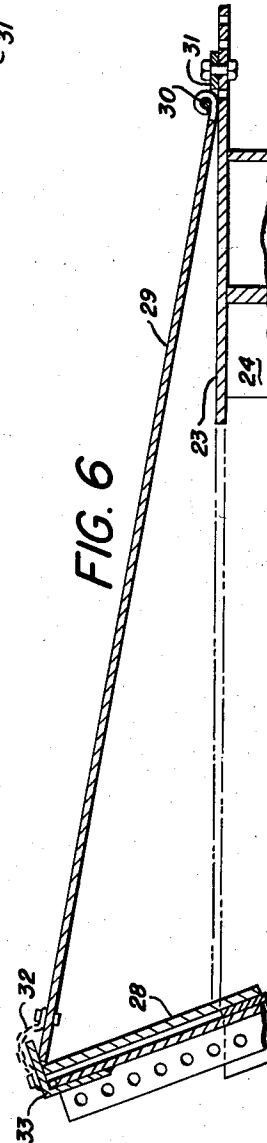


FIG. 6



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2,888,864

BASE PAVER

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5 Claims. (Cl. 94—46)

This invention relates to a base paver of the type employed for continuous receiving, spreading and leveling coarse paving materials and particularly base materials.

The principal object of the invention is the provision of a base paver for continuously receiving, spreading and leveling base paving materials without segregating the materials handled.

A further object of the invention is the provision of a base paver which is self-contained and self-powered and which is capable of traveling through soft, spongy subgrades pushing a truck of paving material from which it is being supplied and placing and leveling the material to form a continuously smooth surface.

A still further object of the invention is the provision of a base paver capable of handling various paving materials including pugmill mixed materials without segregating the fine from the coarse material during the even distribution of the material by the paver.

A still further object of the invention is the provision of a base paver of relatively high capacity and specifically capable of handling materials at the rate of four hundred tons an hour so that an efficient and rapid base paving operation is realized from the use of the machine.

A still further object of the invention is the provision of a base paver having an oscillating V-type material engaging screed enabling the paver to perform accurate straight edge spreading and leveling of various base paving materials.

A still further object of the invention is the provision of a base paver having a receiving hopper capable of receiving materials from practically any dump truck regardless of the size and shape thereof.

A still further object of the invention is the provision of a base paver, the track portion of which operates on the base paving laid by the machine and the hopper and steering and spreading portions of the device operate on the unpaved areas immediately forward of the paved area so that trucks supplying paving material may be pushed along ahead of the paver while depositing material in the hopper thereof while the paver continuously spreads and levels the material as it advances.

The base paver disclosed herein comprises an improvement in the art relating to such devices and more particularly in the art relating to the handling of loose, dry base paving materials such as crushed stone, slag, gravel and the like. Those skilled in the art will recognize that it has recently been determined that concrete or asphaltic concrete pavement laid upon a suitable base structure is far superior in resistance to breakage, deflection or cracking than a similar concrete or asphaltic concrete pavement laid directly on the ground.

As a result of these findings, a relatively large portion of the new pavement constructions, and particularly those of highways and toll roads, are being constructed with an appropriate base structure for supporting the actual pavement as well as providing drainage with respect thereto. Such constructions require the use of efficient base pavers capable of handling a large volume of the

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base paving materials efficiently and quickly, depositing the same on the highway and simultaneously spreading and partially compacting the base structure so that it is ready to receive the finished pavement.

Such base paving constructions as have heretofore been formed have been generally laid with a spreader box either attached to a truck or independently moved, and which boxes comprised relatively small devices serving only to spread material deposited therein sidewardly and leaving the spread material in such condition that it required subsequent leveling by other equipment before a pavement could be formed thereon.

The present invention considerably improves the art with respect to such spreader boxes and practices in that it combines the advantages of simultaneously depositing, spreading, partially compacting and longitudinal leveling of the base paving materials with a fast high tonnage operation.

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 base paver.

Figure 2 is a top plan view of the base paver.

Figure 3 is a cross sectional elevation taken on line 3—3 of Figure 2.

Figure 4 is a vertical section taken on line 4—4 of Figure 3.

Figure 5 is a cross section on line 5—5 of Figure 2.

Figure 6 is a cross section taken on line 6—6 of Figure 5.

By referring to the drawings and Figures 1 and 2 in particular it will be seen that the base paver comprises a traction unit comprising a frame 10 incorporating spaced pairs of ratchet wheels 11 and 12 and a plurality of roller wheels 13—13. Endless treads 14—14 of an interconnected nature, as known in the art, are trained over the ratchet wheels 11 and 12 and provide spaced parallel tracks upon which the rollers 13 movably support the frame 10. An engine enclosed in a housing 15 and provided with conventional gearing drives the ratchet wheels 11 in a manner known in the art and the frame 10 supports an operator's platform 16 including an operator's chair 17 which faces toward the front of the machine—the right portion thereof as shown in Figures 1 and 2 of the drawings.

The platform 16 includes a rail construction 18 and a plurality of operating levers 19 for controlling the operation of the base paver. The frame 10 is provided with a pair of outwardly extending stub shafts 20—20 which serve as fulcrum points for a bracing frame 21, the inner ends of which are pivoted to the stub shafts 20 and the outer ends of which are engaged upon a transversely positioned blade 22 which is V-shaped in top plan view, as shown in Figure 2 of the drawings, with the apex of the V-shaped blade forwardly of the sides thereof and on the center line of the machine.

The blade 22 is formed integrally with a pair of forwardly extending sides 23—23 which with the blade 22 define the side and back walls of a hopper, the frontal portion of the hopper being defined by a transversely positioned rearwardly inclined bottom member 24. The forward vertical edge of the bottom member 24 has spaced pairs of brackets 25—25 which rotatably support a pair of rollers positioned therethrough and engaged in the brackets 25—25. The bottom member 24 is spaced

approximately midway between the front and back portions of the sides 23—23, as best shown in Figure 2 of the drawings.

By referring now to Figures 1 and 5 of the drawings it will be seen that portions of the sides 23 are cut away so that the material deposited within the area between the sides 23 and in front of the V-shaped blade 22 can, in addition to flowing downwardly through the open bottom area thereof, also flow outwardly through the openings to effectively increase the width of the material being spread.

Horizontal extensions 28—28 are detachably secured to the outermost ends of the blade 22 so that, in effect, the outer ends of the blade 22 are extended a substantial distance beyond the sides 23—23 and shields 29—29 are pivotally secured as at 30—30 to vertically adjustable brackets 31—31 which are in turn mounted on the sides 23—23. The shields 29—29 are of relatively lesser height at their forward ends than at their rearward ends, as best shown in Figures 1 and 3 of the drawings, and they are attached at their rearward ends to the extensions 28—28 of the blade 22 by means of flexible members 32—32.

In this connection it will be observed that the end extensions 28—28 on the blade 22 have forwardly extending flanges 33—33 which overlie the sides of the shields 29 and thereby prevent the outward movement of the same beyond those points.

The blade 22 is provided with a rigid cross member 34 through which some of the connections to the bracing frame 21 are established. Other connections are established between the blade 22 and the bracing frame 21 through studs 34 and secondary frame members 35 and 36 as best shown in Figure 5 of the drawings.

The entire hopper defined by the blade 22, sides 23 and the transverse bottom member 24 is thus carried on the forward ends of the bracing frame 21 which in turn is pivoted to the shafts 20 on the carriage 10 of the paver.

Means for elevating the hopper assembly is provided and comprises a pair of hydraulic piston and cylinder assemblies 37—37 which are mounted on the frame 10 beneath the operator's platform 16 and actuate flexible members 38—38 in the form of chains which are trained over idlers 39—39 carried on forward extensions of the frame 10 and attached to the horizontal framing member 34 on the blade 22, as best shown in Figures 2 and 3 of the drawings. It is thus possible for the operator to raise and lower the entire hopper assembly at will.

By referring to Figure 1 of the drawings it will be observed that when the treads 14—14 are running on a newly laid base, the lower portions of the hopper part of the machine are engaged upon the surface on which the base paving is being positioned.

By again referring to Figures 1 and 2 of the drawings it will be seen that each of the sides 23—23 is provided with a pair of vertically spaced angles 40—40, the flanges of which are intumed, as best shown in Figure 5 of the drawings and wherein the intumed flanges are indicated by the numerals 41—41. The flanges 41—41 provide longitudinally extending means by which wheel supporting arms 42—42 may be positioned, as also best shown in Figure 5. The wheel supporting arms extend forwardly of the frontal edges of the sides 23—23, as shown in Figures 1 and 2 of the drawings, and have vertical pivot structures 43—43 located on their outermost ends.

A tandem wheel assembly incorporating a tandem frame 45 and a pair of pivoted wheel yokes 46—46 are mounted on the pivot assemblies 43—43 and each of the tandem wheel assemblies includes tandem wheels 47—47. The tandem wheels 47—47 may be simultaneously turned in like direction by means of the pivotal mounting of the yokes 46—46 on the tandem wheel frames 45 and means for imparting such steering motion is provided and includes sidewardly extending lever arms 48—48 which are interconnected by links 49—49 and which links 49—49 are in turn movable longitudinally by secondary links

50—50 which extend rearwardly along the sides 23—23 through the levers 51—51 pivoted intermediate their ends and third links 52—52 which are in turn actuated by a steering piston and cylinder assembly 53 by way of a rock shaft 54. Controls for the steering piston and cylinder assemblies are carried on the operator's platform 16 and the base paver is thus steerable both by means of the tandem wheel assemblies 47—47 and the treads 14—14 through the usual clutch arrangements as provided on track-type tractor constructions.

In order that material deposited in the hopper defined by the transverse bottom member 24, sides 23 and blade 22 of the device will be suitably spread by the blade, an oscillating screed construction is incorporated in the blade construction of the hopper and is best illustrated in Figures 3 and 4 of the drawings.

By referring to Figures 3 and 4 of the drawings it will be seen that a main screed 55 formed in right and left half units pivoted to one another at their innermost adjacent ends at a point 56 are suspended on the back of the blade 22 by flexible linkage 57, each of the flexible linkage assemblies 57 being supported on exteriorly threaded members 58—58 which are in turn engaged in threaded bosses 59—59 carried on brackets 60—60 on the blade 22. The centermost one of the flexible linkage assemblies 57 which engages the screed 55 at its center point 56, as shown in Figure 3 of the drawings, is arranged so that the exteriorly threaded members 58 extend outward of the top of a tubular extension 61 of the bracket 60 and engages a universal joint 62 which in turn is connected with a horizontally positioned shaft 63 which extends to one side of the machine and is provided with a hand wheel 64 and associated ratchet 65.

Rotation of the hand wheel 64 will accordingly raise or lower the innermost ends of the half sections of the main screed 55 so that a crown may be imparted to the base material, the level of which is determined by the action of the screed 55. The opposite outermost ends of the screed 55 are supported by the flexible linkage 57 located adjacent the outermost ends of the blade 22, one of which is illustrated in Figure 3 of the drawings and both of which are illustrated in Figure 2 of the drawings.

The exteriorly threaded rotatable members 58 are each provided with ratchet wheels 66 and hand cranks 67 so that the outer ends of the screed may be accordingly vertically adjusted as desired. The outer ends of the main screed 55 are also supported with respect to the bracing frame 21 by means of support arms 68—68 which are longitudinally adjustable as to length and which extend from pivotal engagement with the screed 55 near the ends thereof to pivotal engagement with the bracing frames 21 near the stub shafts 20—20 to which the bracing frames 21 are attached.

It will thus be seen that the two-part screed 55 is positioned immediately adjacent the back of the blade 22 in such manner that it may be moved with respect to the blade 22 for vertical adjustment as well as horizontally in a desired oscillating motion. Means to impart such oscillating motion to the two-part screed 55 is provided and comprises an eccentric 69 such as known in the art and which eccentric is mounted on the blade 22 with a driving arm 70 thereof pivotally engaging an upward extension 71 of the screed 55. A horizontal extension 72 connects the two parts of the screed 55, as best shown in Figure 3 of the drawings, so that the oscillating movement imparted to the one part of the screed 55 is automatically imparted to the other. The eccentric 69 is flexibly connected by means a universal joint 73 to a shaft 74 which extends to a power take-off on the engine 15 as heretofore referred to.

Still referring to Figure 3 of the drawings it will be observed that screed extensions 75 and 76 are secured to the ends of the two-part screed 55 by bolts 75a, the extensions increasing the effective width of the screed so that it extends in back of the shields 29 and the hori-

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zontal extensions 28 of the blade 22 which are themselves adjustable transversely of the blade 22 as has heretofore been explained.

It will thus be seen that the effective width of the base material laid by the base paver may be altered as desired from that comprising the distance between the sides 23—23 to that comprising the total effective distance between the shields 29—29 and/or the total effective width of the screed 55 of the screed extensions 75—75 as may be secured to the ends thereof.

Operation

In operating the base paver herein disclosed, the machine is run onto the area on which the base paving is to be laid. Trucks carrying the particular base paving material such as gravel, slag, crushed stone and the like are backed into the area between the tandem wheels 47—47 of the machine so that the rear wheels of the truck or trailer, as the case may be, are engaged against the rollers 26. The dump body of the truck is then elevated so that a portion of the load flows into the area defined by the blade 22, the sides 23 and the bottom member 24. The base paver is then energized by the necessary mechanical connection between the engine 15 and the sprocket wheels 11 and 12 and movement thereby imparted to the entire device.

The treads 14 move upwardly onto the spread base material and as this occurs the respective height of the frame 10 and the vertical blade 22 are adjusted as hereinbefore described so that the screed 55 is positioned the desired height with respect to the surface on which the base paving material is being spread. The height adjustment controls the effective height of the spread material and as the machine continues to move forward pushing the truck ahead of it, the load flows from the truck into the hopper where it is continually spread by the forward motion of the machine plus gravity flow and smoothed and partially tamped by the oscillating action of the screed 55.

Those skilled in the art will observe that the relatively long distance between the tandem wheels 47 and the stub shafts 20 on the frame 10 serves to float the blade 22 and the screed 55 across such irregularities as may exist in the surface on which the base paving is being laid and without imparting waviness longitudinally of the base material. This is occasioned by the fact that the tandem wheels 47 are pivotally connected to the forward ends of the arms 42 and that they may accordingly rise and fall over irregularities without imparting noticeable vertical movement to the device. Additionally, relatively soft pneumatic tires are employed on the tandem wheels 47 which can pass over raised portions in the surface being paved without noticeably changing the elevation of the front portion of the device. The elevation of the entire device is continually under the control of the operator through his actuation of the hydraulic cylinders 37 and their vertical control of the entire hopper assembly including the blade 22, the sides 23, etc.

In actual practice, it has been determined that the base paver may move forward rapidly and deposit various types of base materials in substantial tonnages up to and including four hundred tons per hour.

The thickness of the base may obviously be varied at will. It may be made relatively thicker at one side as in banking a curve or it may be crowned in the center by the adjustments provided. Alternately, it may be perfectly flat transversely and the machine insures the longitudinal flatness of the base paving laid without the heretofore believed necessary waviness resulting from vertical motion imparted the base lying apparatus. The width of the base material being laid is readily adjusted by adding to or subtracting from the extensions of the screed 55 and the sideward movement of the horizontal extensions 28 and the corresponding sideward adjustment of

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the shields 29 rendering the device highly flexible in operation and enabling it to handle surprisingly wide areas very effectively.

It will thus be seen that the several objects of the invention are met by the base paver disclosed herein.

Having thus described my invention, what I claim is:

1. The improvement in a base paver comprising in combination a tread traction unit having a source of motive power and a frame, a pair of bracing frames pivotally engaged on said frame and extending forwardly longitudinally of said tread traction unit, a blade positioned transversely across the ends of the bracing frames and secured thereto, the middle section of the said blade being spaced forwardly of the end sections thereof, said blade incorporating structural members rendering the same rigid, forwardly extending transversely spaced sides secured to said blade, said sides each including a pair of vertically spaced parallel longitudinally extending members having inturned oppositely disposed flanges, a transversely positioned cross sectionally triangular bottom member secured between the said sides in spaced relation to said blade and with the said blade and sides defining an open bottom hopper, arms positioned on each of said sides and extending forwardly therebeyond and fitting between and secured to the said pairs of inturned flanges, pivot assemblies on the lower forward ends of said arms and steerable tandem wheel assemblies secured to said pivot assemblies, the back lower sections in each of said sides having cut away areas and removable extensions on said blade extending outwardly beyond said sides, shields vertically pivoted at their forward ends to said sides and connected at their rearmost ends to said removable extensions, and a screed adjacent said blade and partially behind and below the same, means supporting said screed for transverse horizontal reciprocatory movement, and extensions removably secured to the outermost ends of said screed and extending outwardly beyond the sides of the hopper.

2. A base paver including in combination a tread traction unit having a frame and a source of motive power, a bracing frame extending forwardly of the tread traction unit and pivotally connected at its rear portion thereto for vertical movement, a hopper unit at the forward end of the bracing frame fixedly secured thereto, said hopper unit including a transversely disposed vertically extending blade, oppositely disposed transversely spaced sides extending forwardly from said blade and rigidly secured thereto, and a forward plate member extending transversely between the sides and joined at its ends to the same, said forward transverse plate member extending rearwardly at a downward inclination and being spaced from said blade to provide a bottom opening, a screed adjacent said blade at the rear side thereof extending from side to side of the hopper, means supporting said screed for transverse horizontal reciprocatory movement, frame means on each side of the hopper rigidly connected thereto and extending forwardly beyond said forward transverse inclined plate member, steerable tandem supporting wheel assemblies on said frame means, each of said wheel assemblies including a beam extending substantially horizontally longitudinally of the tread traction unit and pivoted horizontally intermediate its ends to the frame means for free rocking movement in a vertical plane, a vertically pivoted yoke member on each end portion of the beam, and a wheel rotatably mounted in said yoke.

3. A base paver, including in combination, a tread traction unit having a frame and a source of motive power, a bracing frame extending forwardly of the tread traction unit and pivotally connected at its rear portion thereto for vertical movement, a hopper unit at the forward end of the bracing frame fixedly secured thereto, said hopper unit including a vertically disposed transversely extending blade, oppositely disposed transversely spaced sides extending forwardly from the outer ends

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of said blade and rigidly secured thereto, and a forward plate member extending transversely between the sides and joined at its ends to the same, said forward transverse plate member extending rearwardly at a downward inclination and being spaced from said blade to provide a bottom opening, a screed adjacent the blade at the rear side thereof extending from side to side of the hopper, said screed being substantially V-shaped in top plan with the apex of the screed facing forwardly, the sides of the hopper having cut away areas in their lower rearmost portions to provide for flow of material laterally from the hopper in addition to downward flow through the bottom opening, said blade having plate extensions at each end of the same extending outwardly beyond the sides of the hopper, vertically disposed shield plates extending opposite the cut away areas in the lower rear portions of the sides of the hopper, said shield plates being vertically pivoted at their forward ends to the sides of the hopper forwardly of said cut away areas for adjustment horizontally, and means limiting outward movement of the shield plates beyond the ends of said blade extensions.

4. A base paver, including in combination a tread traction unit having a frame and a source of motive power, a bracing frame extending forwardly of the tread traction unit and pivotally connected at its rear portion thereto for vertical movement, a hopper unit at the forward end of the bracing frame fixedly secured thereto, said hopper unit including a vertically disposed transversely extending blade being substantially V-shaped in top plan with the apex of the blade facing forwardly, oppositely disposed transversely spaced sides extending forwardly from the outer ends of said blade and rigidly secured thereto, and a forward plate member extending transversely between the sides and joined at its ends to the same, said forward transverse plate member extending rearwardly at a downward inclination and being spaced from said blade to provide a bottom opening, the sides of the hopper having cut away areas in their lower rearmost portions to provide for flow of material laterally from the hopper in addition to downward flow through the bottom opening, a screed adjacent the blade at the lower rear side thereof and being substantially V-shaped in top plan with the apex of the screed facing forwardly, means supporting the screed for transverse horizontal reciprocatory movement, plate extensions on the outer end portions of the screed extending outwardly beyond the sides of the hopper, frame means on the sides of the hopper extending forwardly thereof, and supporting wheels on said frame means.

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5. A base paver, including in combination, a tread traction unit having a frame and a source of motive power, a bracing frame extending forwardly of the tread traction unit and pivotally connected at its rear portion thereto for vertical movement, a hopper unit at the forward end of the bracing frame fixedly secured thereto, said hopper unit including a vertically disposed transversely extending blade, oppositely disposed transversely spaced sides extending forwardly from the outer ends of said blade and rigidly secured thereto, and a forward plate member extending transversely between the sides and joined at its ends to the same, said forward transverse plate member extending rearwardly at a downward inclination and being spaced from said blade to provide a bottom opening, the sides of the hopper having cut away areas in their lower rearmost portions to provide for flow of material laterally from the hopper in addition to downward flow through the bottom opening, said blade being V-shaped in top plan with the apex of the blade facing forwardly and lying on the longitudinal center line of the hopper unit and extending between rear portions of the sides of the hopper, frame means on the sides of the hopper extending forwardly thereof, and supporting wheels on said frame means.

References Cited in the file of this patent

UNITED STATES PATENTS

1,393,341	Bower	Oct. 11, 1921
1,833,387	Briggs	Nov. 24, 1931
1,979,619	Hemstreet et al.	Nov. 6, 1934
1,994,082	Abernathy	Mar. 12, 1935
2,003,186	Glassner	May 28, 1935
2,092,458	Krout	Sept. 7, 1937
2,109,020	Abernathy	Feb. 22, 1938
2,245,426	Baker	June 10, 1941
2,351,593	Barber	June 20, 1944
2,393,954	Baker	Feb. 5, 1946
2,572,776	Smith	Oct. 23, 1951
2,589,257	Horning	Mar. 18, 1952
2,590,443	Miller	Mar. 25, 1952
2,725,799	Day et al.	Dec. 6, 1955
2,755,713	Harrison	July 24, 1956
2,757,587	Mentes	Aug. 7, 1956

FOREIGN PATENTS

569,977	Great Britain	Oct. 18, 1945
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OTHER REFERENCES

"Roads and Streets," May 1950, pages 49 and 50.