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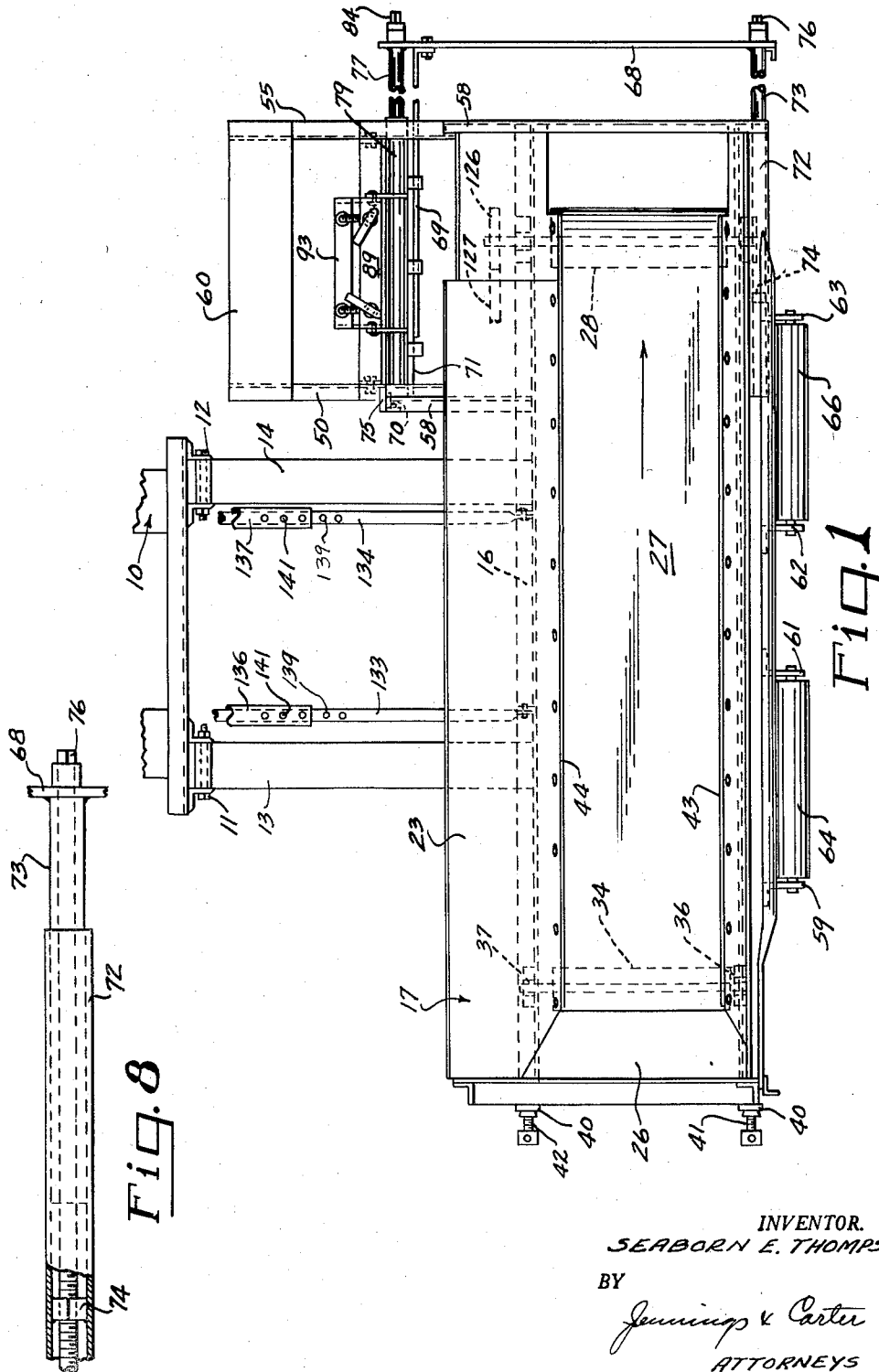
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PAVEMENT WIDENING MACHINE

Filed April 28, 1955

4 Sheets-Sheet 1



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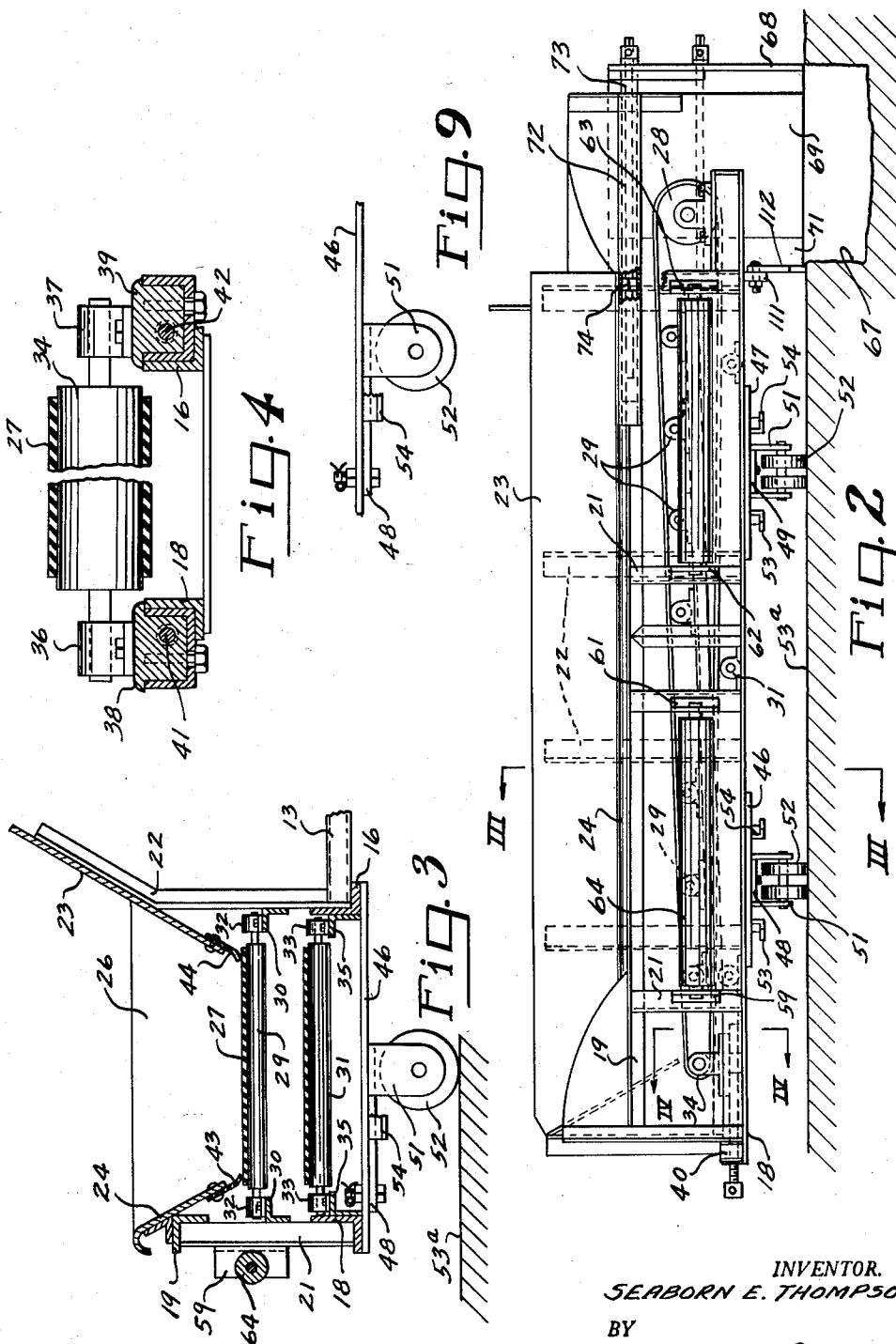
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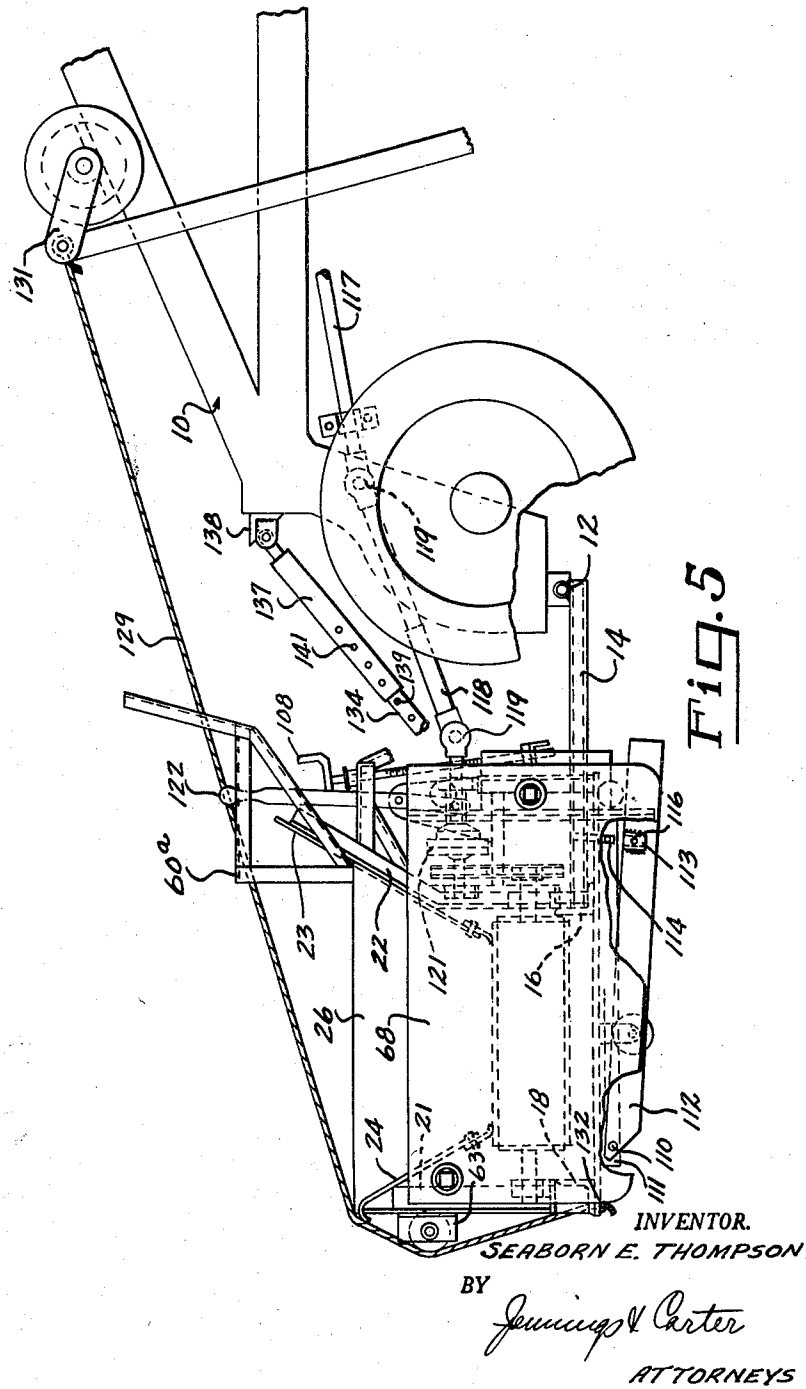
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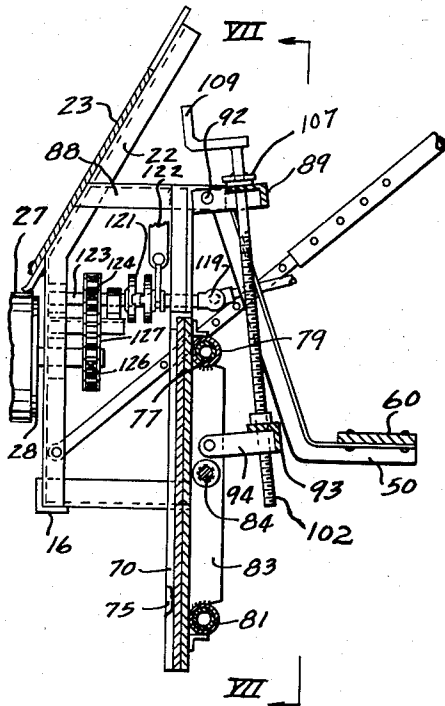


Fig. 6

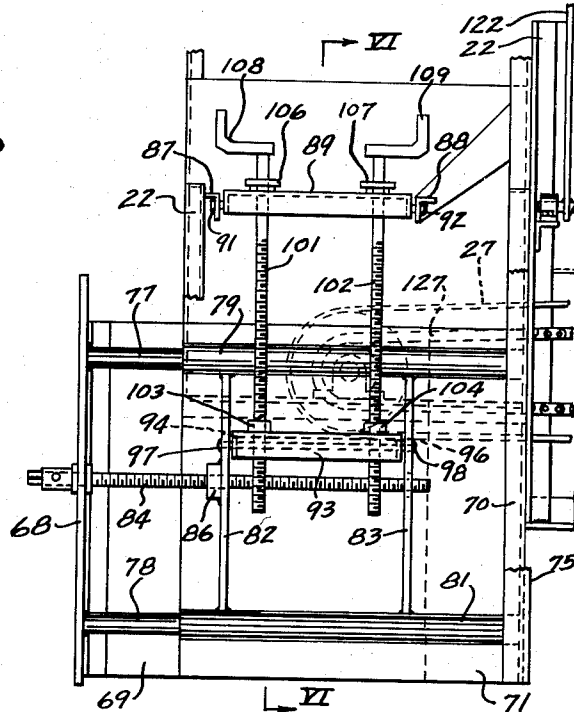


Fig. 7

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PAVEMENT WIDENING MACHINE

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Application April 28, 1955, Serial No. 504,624

7 Claims. (Cl. 94—44)

My invention relates to highway paving machines and has particular reference to such a machine which shall be adapted for widening existing highway pavements.

Wherever it becomes necessary to widen a highway pavement, it is the usual practice to dig a ditch of the required width alongside the existing pavement and of a depth to provide the necessary foundation for the pavement. The ditch is then filled with paving material in the usual way, with stone or other coarse material in the bottom and is finished off either with a bituminous paving mixture or with a concrete mixture. Paving apparatus as heretofore known to me has not been adapted for doing this work and it has accordingly involved considerable labor and expense. The prime object of my invention therefore is the provision of apparatus which shall include means for receiving the necessary paving material and depositing it at the required depth in a widening ditch alongside an existing pavement, and leveling it off to the required depth.

A further object of my invention is to provide highway pavement widening apparatus which shall be of simple design and which shall embody relatively few parts and include means for mounting it on and driving it from a well known form of road grader, thereby avoiding the necessity of providing special motive power for the apparatus.

Briefly, my invention comprises a conveying and discharging apparatus which is mounted on supporting rollers, or wheels, at the front of a road grader and when in use extends transversely of the highway pavement, overhanging the widening ditch at the edge of the pavement. The apparatus is pushed along the pavement, ahead of the grader, and the hopper of the conveyor is adapted to receive paving material from a moving vehicle, in front of the apparatus. Paving material is dumped into the conveyor trough as it is being moved along and is conveyed to the overhanging end thereof where it is delivered through a discharge section into the widening ditch. The discharge section is adjustable as to width in order to adapt the machine for depositing the paving materials in strips of varying widths. An adjustable leveling plate is provided at the rear of the discharge section and smooths the material as it is being discharged.

Apparatus embodying features of my invention is illustrated in the accompanying drawings forming a part of this application in which:

Fig. 1 is a plan view;

Fig. 2 is a front elevational view drawn to larger scale;

Fig. 3 is a sectional view taken along the line III—III of Fig. 2;

Fig. 4 is a sectional view taken along the line IV—IV of Fig. 2;

Fig. 5 is an end view showing the apparatus connected to a grader;

Fig. 6 is a fragmentary sectional view taken along the line VI—VI of Fig. 7;

Fig. 7 is a rear elevational view of the discharge section with parts broken away and looking in the direction of the arrows VII—VII in Fig. 6;

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Fig. 8 is a detail view showing the adjusting means for the front of the end shield; and,

Fig. 9 is a detail view of one of the supporting rollers for the conveyer assembly.

Referring to the drawings I show in Fig. 1, at 10, a fragment of a road grader of a well known design, which is pivotally connected at 11 and 12 to forwardly extending beams 13 and 14. The beams 13 and 14 are rigidly connected at their forward ends to the rear, lower frame member 16. See Fig. 3, of an elongated conveyor indicated generally by the numeral 17 and which, in use, extends transversely of the pavement to be widened.

The conveyer 17 also includes a lower front frame member 18, an upper front frame member 19, forward vertical frame members 21, and rear vertical frame members 22. See Fig. 3. Mounted on the rear vertical frame members 22 and extending the length of the conveyer is a plate 23 which forms the rear wall of the conveyer hopper as well as the rear frame member and extends the full length of the conveyer. The front wall of the hopper is formed by a plate 24 which is welded to the upper frame member 19 and which extends the full length of the conveyer. The end of the conveyer hopper, remote from the discharge end of the conveyer is formed by a plate 26 which is joined at the ends to the plates 23 and 24. Mounted in the bottom of the hopper just described, is a belt conveyer 27, which is driven from a driving roller 28 at its discharge end, in a manner to be described more particularly hereafter and is supported on upper idler rollers 29 and lower idler rollers 31 mounted in the frame, as shown in Figs. 2 and 3. Bearings for the rollers 29 and 31 are shown at 32 and 33, respectively and are supported by longitudinally extending angles 30 and 35. The tail end of the conveyer 27 passes around a roller 34 mounted in bearings 36 and 37 which are supported on sliding blocks 38 and 39 in the frame members 18 and 16, respectively, see Fig. 4. The blocks 38 and 39 are tapped to receive adjusting screws 41 and 42, which pass through retaining collars 40 at the end of the frame, whereby the tension of the belt 27 may be adjusted. Secured to the lower edges of the plates 23 and 24 forming the sides of the hopper are rubber strips 43 and 44 which bear against the belt 27 and form seals against the loss of paving material from the hopper.

Extending transversely of the frame and welded to the underside of the lower frame members 16 and 18 are plates 46 and 47. The plates 46 and 47 thus form the lower transverse members of the conveyer frame. Mounted on each of the plates 46 and 47 are wheel or roller supports comprising plates 48 and 49, each of which is pivotally connected at its forward end to its associated plate, by means of cap screws so that it is movable angularly a limited distance on its respective plate. Each of the plates 48 and 49 is provided with brackets 51 in which are journaled supporting rollers 52 for the conveyer frame. When the apparatus is in use, these supporting rollers rest on the pavement, indicated at 53^a in Fig. 2. In order to limit angular movement of the plates 48 and 49, I provide stops 53 and 54 on each of the plates 46 and 47.

Mounted on the front of the conveyer frame are angles 59, 61, 62 and 63 which are welded to the front frame members and which support a pair of forwardly projecting rollers 64 and 66, mounted in suitable bearings and so disposed as to engage the rear wheels of a truck (not shown) hauling paving material to be unloaded into the conveyer hopper. In operation, the truck, is pushed by reason of engagement of the rollers 64 and 66 with its rear tires, ahead of the apparatus as the paving material is being unloaded.

Referring to Fig. 2 of the drawing, I show diagrammatically at 67 a widening ditch which is provided along-

side the pavement 53^a and in which the paving material is being discharged from my improved apparatus. It will be seen by reference to Fig. 2 that the apparatus overhangs the ditch 67 so that the conveyer 27 discharges its material into the ditch.

The portion of my improved apparatus overhanging the widening ditch 67 constitutes a discharge section for the conveyer 27. The discharge section, as shown in Fig. 2, is open at the front and is defined by an outer end shield 68 which extends parallel with and along the outer edge of the ditch 67. At the rear is a levelling means comprising two overlapping relatively movable leveling plate sections 69 and 71. The front end of the end shield 68 is pivotally mounted on the main frame of the conveyer by means of a pipe section 72 which is welded to the main frame and a smaller diameter pipe section 73 which telescopes in the pipe section 72 and which is welded to the end shield 68. Mounted in the pipe section 72 is a nut 74 and an adjusting screw 76 extends through the end shield, the pipe sections 73 and 72, and into the nut 74 to provide means whereby the end shield 68 may be moved inwardly or outwardly to adjust for the width of the ditch 67.

The support for the rear of the discharge section is best shown in Figs. 6 and 7. The leveling plate section 69 is rigidly joined to the end shield 68 and welded to the end shield 68 are two horizontally extending pipe sections 77 and 78. Welded to the leveling plate section 71 are two larger pipe sections 79 and 81 into which the pipe sections 77 and 78 telescope, respectively. Also, welded to the plate section 71 are two vertically extending bars 82 and 83. An adjusting screw 84 is rotatably mounted in the end shield 68 and extends horizontally through the bars 82 and 83, suitable holes being provided therein. A nut 86 is welded to the bar 82 so that when the screw 84 is turned, the plate 69 is caused to move inwardly or outwardly with respect to the plate 71 to adjust that end of the discharge section to the width of the ditch 67.

A pair of angle bars 87 and 88 are secured to vertical frame members 22 and extend rearwardly as shown in Fig. 6. Pivotaly mounted between the bars 87 and 88 by means of bolts 91 and 92 is a short bar section 89. Pivotaly mounted between the bars 82 and 83, which are secured to the leveling plate section 71, is a second angle section 93 which is secured to the bars 82 and 83 by means of bracket members 94 and 96 and bolts 97 and 98. Extending downwardly through the angle section 89 are two adjusting screws 101 and 102 which pass downwardly through nuts 103 and 104 mounted on the bar section 93. The screws 101 and 102 are provided with thrust collars 106 and 107 and with operating cranks 108 and 109 on their upper ends, whereby as they are rotated, the leveling plate sections 69 and 71 are raised and lowered in unison. Means are thus provided whereby material being delivered into the discharge section and into the ditch 67 is leveled off as the apparatus is propelled forward.

Secured to the leveling plate section 71 adjacent the main frame is an angle member 70 which bears against an angle member 75 mounted on the frame and serves to guide and brace the leveling plate in its operation.

At the rear of the discharge section, I provide a supporting bracket comprised of angle bars 50 and 55 which are secured by members 58 to the main frame shield and mount an operator's step 60 thereon. Also, as is well understood, a seat 60^a (see Fig. 5) may be provided, preferably adjacent the discharge section, for the convenience of an operator.

Extending across the conveyer frame, adjacent the discharge section, and secured to the lower frame members 16 and 18 is a narrow plate 111. Pivotaly mounted at 110 to the forward end of the plate 111 is a plate 112 which acts as an inner shield to prevent paving material being discharged into the ditch 67 from spilling over onto

the pavement 53^a. The rear end of the plate 112, when the machine is in operation, slides on the pavement. Welded to the plate 112 is a short sleeve 113 into which a rod 114, secured to the main frame, is adapted to enter. A hole 116 is provided in the sleeve 113, and corresponding holes are provided in the rod 114 whereby, when the apparatus is being moved from place to place, the plate 112 may be raised and secured in its raised position by inserting a pin through the hole 116, to prevent damage.

Referring now to Figs. 5 and 6, I show in more detail the manner of supporting and driving the mechanism of my improved apparatus. At 117, I show the usual power take-off shaft that is provided on road graders of the kind which I contemplate using. Power take-off shaft 117 extends slidingly into a sleeve 118 carried by the paving apparatus and transmits its power through the usual universal couplings 119. A clutch is shown at 121 which is controlled by means of a lever 122 mounted adjacent the discharge section of the apparatus. Power is transmitted through the clutch 121 to a shaft 123 carrying a sprocket 124 which drives a sprocket 126 through a chain 127, the sprocket 126 being on the shaft of the driving roller 28 for the conveyer belt 27. When the conveyer is being driven, the upper reach of the belt 27 moves in the direction indicated by the arrow in Fig. 1 to deliver paving material into the discharge section of the apparatus.

At 129 I show a cable which is secured to a power actuated lifting arm 131 on the grader. The cable 129 extends forwardly over the front of the conveyer frame and may be secured at 132 to the lower frame member 18 of the conveyer frame. It will be seen that if the lifting arm 131 be rotated to the right, as shown in Fig. 5 of the drawing, the apparatus will be raised clear of the pavement and can be transported without engagement with the ground. In order to relieve the cable 129 of strain during such transportation, I pivotally connect two pipe sections 133 and 134 to the lower end of rear frame member 22 and connect them to telescoping pipe sections 136 and 137 which, in turn are pivotally connected to a bar section 138 mounted on the front of the grader 10. Holes 139 and 141 are provided through the telescoping pipe sections whereby, when the apparatus is raised by means of the cable 129, pins may be inserted in the holes to hold the conveyer in its raised position, and the cable 129 may then be slacked off.

From the foregoing description, the operation of my improved apparatus will be readily understood. When an existing pavement 53^a is to be widened, a ditch 67 of the required width is dug alongside the pavement and the apparatus is placed on the pavement with the discharge section overhanging the ditch as shown in Fig. 2 of the drawing. The apparatus is propelled forwardly by the grader 10 and as it is being propelled, paving material is delivered into the hopper 17 of the conveyer onto the conveyer belt 27. This is usually accomplished by backing a truck against the rollers 64 and 66 and pushing the truck ahead of the apparatus as the paving material is being unloaded into the conveyer hopper.

With paving material in the hopper, the conveyer 27 is operated by means of the power take-off from the grader, as previously described, and the material is conveyed to the discharge section and discharged into the ditch 67. The end shield 68 of the discharge section is adjusted to the width of the ditch 67 and prevents paving material from being spilled over outside the ditch. The inner shield 112 prevents the paving material from being spilled over onto the pavement 53^a. As the apparatus is propelled forwardly, the leveling plate 69, 71, levels the material off to the proper level.

As the apparatus is being propelled forwardly, it may be guided from the usual steering apparatus on the grader, the supporting wheels 52 being so mounted as to pivot about their pivot screws to accommodate changes in direction.

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Whenever it becomes necessary to move the apparatus from place to place, the cable 129, connected to the lifting arm 131, is extending forwardly and placed over the apparatus as shown in Fig. 5 to engage the frame member 13 and the apparatus is raised up off the ground, the inner shield plate 112 being secured in its raised position so that it will not drag. When the apparatus is raised, pins are placed through the holes 139 and 141 in the telescoping pipe sections 133, 136 and 134, 137 to secure the apparatus in its raised position. The cable 129 may then be slacked off and the apparatus is ready to move in its raised position.

From the foregoing it will be apparent that I have devised an improved paving machine which is especially adapted for widening existing pavements which is simple of design, economical of manufacture and which is reliable in operation.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. In apparatus for widening a highway pavement, in combination, a propelling vehicle, a conveyer frame pivotally connected to the propelling vehicle and adapted for extending transversely of the pavement, a hopper mounted on the conveyer frame, a horizontally disposed belt conveyer mounted in the bottom of the hopper for conveying paving material, supporting rollers for the conveyer frame, an outwardly extending discharge section mounted on said conveyer frame and adapted for overhanging the highway alongside the pavement for discharging paving material thereon, said discharge section comprising a vertical outer end shield pivotally connected at its forward end to said conveyer frame and a vertical leveling plate secured to the rear of said outer end shield and extending transversely thereof, said end shield extending transversely of said frame and having horizontal adjusting means thereon operatively connected to said frame whereby the shield may be moved inwardly and outwardly of the conveyer frame and thereby vary the width of the area over which paving material is being discharged, and adjustable supporting means connecting the rear end of the discharge section to the conveyer frame.

2. Apparatus as defined in claim 1 in which said adjustable supporting means comprises vertical adjusting screws on said leveling plate operatively connected to said conveyer frame whereby the rear of said discharge section is suspended from the conveyer frame by said vertical adjusting screws.

3. In apparatus for widening a highway pavement, an elongated conveyer frame adapted to be propelled forwardly while extending transversely of the pavement with one end overhanging the highway alongside the pavement, a hopper on the frame extending substantially the length thereof, a belt conveyer mounted in the bottom of the hopper with its delivery end at the overhanging end of the conveyer frame, an outwardly extending discharge section pivotally mounted at its forward end to the overhanging end of said conveyer frame and extending transversely thereof, and means adjustably supporting the rear of said discharge section for pivotal movement on said conveyer frame, said discharge section comprising a leveling plate assembly extending across the rear thereof and operatively connected to said supporting means whereby the lower edge of said leveling plate assembly may be vertically adjusted to a predetermined height.

4. Apparatus as defined in claim 3 in which the leveling plate assembly is comprised of overlapping plates, horizontally extending telescoping pipe sections mounted on the respective plates, and an adjusting screw cooperat-

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ing between the plates to vary their relative positions and thereby vary the width of the leveling plate assembly.

5. In apparatus for widening an existing highway pavement, the combination of a power driven automotive road machine, a conveyer assembly pivotally connected in front of the machine and adapted for extending transversely of the pavement for receiving and discharging paving material, supporting rollers for the conveyer assembly, said conveyer assembly including a conveyer frame adapted for extending transversely of the pavement and a discharge section connected to the conveyer frame and adapted for overhanging the roadway adjacent the pavement, said discharge section comprising an end shield pivotally connected at its forward end to said conveyer frame and a vertical leveling plate secured to the rear of said outer end shield and extending transversely thereof, adjusting means operatively connected between the end shield and said conveyer frame whereby the shield may be moved inwardly and outwardly of the conveyer frame and thereby vary the width of the area over which paving material is being discharged, additional adjusting means operatively connected between said leveling plate and said conveyer frame for supporting the rear of said discharge section and for adjusting the lower edge of said leveling plate to a predetermined height.

6. Apparatus as defined in claim 5 in which lift means are arranged on the power driven machine and operatively connected to the conveyer assembly to raise it off the ground and hold it in raised position while being transported.

7. In apparatus for widening an existing highway pavement, an elongated conveyer frame adapted to be propelled forwardly while extending transversely of the pavement with one end overhanging the highway adjacent the pavement, a hopper on said conveyer frame, a belt mounted in the bottom of the hopper with its delivery end at the overhanging end of said frame, an inner shield pivotally mounted on said frame and adapted for riding on the existing pavement, a discharge section mounted on the overhanging end, said discharge section comprising an outer end shield pivotally connected at its forward end to said conveyer frame and a vertical leveling plate secured to the rear of said outer end shield and extending transversely thereof, adjusting means operatively connected between the end shield and said conveyer frame whereby the shield may be moved inwardly and outwardly of the conveyer frame and thereby vary the width of the area over which paving material is being discharged, additional adjusting means connected between said leveling plate and said conveyer frame for supporting the rear of said discharge section and for adjusting the lower edge of said leveling plate to a predetermined height.

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