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SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

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SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

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This invention relates to improvements in screed assemblies for material laying machines whereby the laid material can be crowned to the desired extent, made perfectly flat, or formed with a depression or basin without interchanging parts of the machine. More specifically, the invention relates to the division of screed assemblies for road finishing machines into two hinged together units which are quickly adjustable. A further object of the invention is to provide a screed crown hinge which is sealed in all positions thereof. A still further object of the invention is to provide a quickly adjustable screed assembly for road finishing machines capable of changing the contour in a road being laid without disassembly of parts of the machine.

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Other objects and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings in which:

Figure 1 is a fragmentary side elevational view of a road finishing machine equipped with a screed assembly according to this invention.

Figure 2 is a broken rear end elevational view of the machine shown in Figure 1.

Figure 3 is a fragmentary broken top plan view, with parts omitted, taken along the line III—III of Figure 1.

Figure 4 is a diagrammatic rear end view illustrating the manner in which the screed assembly is adjusted to crown the same.

Figure 5 is a vertical cross sectional view taken along the line V—V of Figure 6.

Figure 6 is a vertical cross sectional view taken along the line VI—VI of Figure 3.

Figure 7 is an enlarged horizontal cross sectional view taken along the line VII—VII of Figure 5.

Figure 8 is an enlarged, fragmentary vertical cross sectional view similar to Figure 5 but illustrating the tilting of the screw controlled mechanism.

Figure 9 is a broken cross-sectional view, with parts omitted, taken substantially along the line IX—IX of Figure 1.

Figure 10 is a vertical cross-sectional view taken substantially along the line X—X of Figure 2.

As shown on the drawings:

In Figure 1 the reference numeral 10 designates generally a road finishing machine consisting of a self-propelled forward crawler unit A and a tamper and screed assembly B in spaced trailing relation from the crawler unit A. A space C bottomed by the road bed is thus provided between the units A and B.

The crawler unit A comprises a pair of crawler tracks such as 11 and suitable framework defining an engine platform 12 on which an engine 13 is mounted and a road material receiving platform 14 having flight conveyors mounted in the bottom thereof (not shown) to move material dumped therein out of the rear end of the unit into the space C. The front wall 12a of the engine platform 12 can have vertically adjustable
gates thereon (not shown) acting as a strike-off or slice so that an even layer of road material will be fed by the flights to the space C.

Side arms such as 15 are pivotally mounted at their forward ends to the unit A and extend rearwardly of the rear of the unit.

Screw rods 17 are threaded through brackets 18 carried at the rear ends of the side arms 15 and are pivotally connected at their bottom ends to the outer rear ends of a screed assembly 20. The forward outer end of the screed assembly 20 is pivoted as at 21 to brackets such as 22 depending from the arms 15.

A tamper assembly 23 (Fig. 1) is mounted directly in front of the screed assembly 20 and is suspended on eccentric from transverse shafts 24 (Figs. 1 and 3) which are driven through belt or chain connections from the engine 13 encased in housings 25 and 26. The tamper assembly is vibrated vertically to tamp the materials fed to the space C as the finishing unit moves forward. The materials are tamped into a finished mat of road and the screed assembly 20 rides over the mat to smooth and shape the same. Since the screed assembly 20 is suspended from the arms 15 the same will be vibrated by action of the tamper assembly 23 on the road material. A deflector 27 is mounted in front of the tamper assembly 23 and curved forwardly from the tamper assembly to keep the material in the space C rolling over so that it is agitated and again fed to the tamper. Distributing screws such as 28 are suspended in the space C and serve to spread out the road material deposited therein.

Operator’s platforms 29 extend rearwardly from the screed assembly 20.

From the above description it should therefore be understood that the screed assembly 20 is pivoted at its outer forward ends to brackets depending from the side arms 15. The rear outer ends of the screed assemblies are pivotally connected to the screw rods 17 which are in threaded relation with brackets 18 on the rear ends of the side arms 15. Thus the rear end of the screed assembly 20 can be raised and lowered by the screw rods 17 about the pivots 21.

If, for example, the screw rods are raised to raise the rear end of the screed the forward end or toe-end of the screed will converge downwardly toward the road bed to decrease the thickness of the mat being laid by the machine. The inclined position of the screed will be temporary only since as soon as the mat has been thinned down to the desired amount the screed will flatten out about its pivot points and the arms 15 will automatically lower to allow the screed to assume its new lower level.

According to this invention the screed assembly 20 is divided centrally into right and left hand individual units 20a and 20b.

As best shown in Figures 5 and 9 the right and left hand screed units 20a and 20b are each built up from top plates 30 supported through front walls such as 30a secured to the front ends of the screed plates 35. These front walls 30a have outer side flanges 390 receiving the pivots 21 (Figure 9). Outer longitudinal stiffening beams 31 are carried at the outer ends of the plates 30 and the forward ends of these beams 31 carry bearings 32 in which the tamper shafts 24 are rotatably mounted as shown in Figure 3.

The plates 30 also carry inner longitudinal stiffening beams 35 spaced inwardly from the beams 31. These beams 33 likewise have bearings 34 thereon for the tamper shafts 24.

The screed units 20a and 20b each include a flat screed plate 35 adapted to ride on the pavement being laid. Each plate 35 has a vertical rear wall 35a secured thereto. Uprights 38 (Figures 2 and 10) extend between the rear inner ends of the top plates 30 and the rear inner ends of the screed plates 35. Likewise diagonal reinforcing struts 37 extend between the rear ends of the plates 30 and the rear ends of the screed plates 35. As shown in Figure 9, the upper ends of the struts 37 are secured toward the outer rear ends of the plates 30 while, as shown in Figure 2, the lower ends of these struts 31 are secured near the inner rear ends of the screed plates.

The platforms 29 are secured to the vertical rear walls 35a of the screed plates.

The rear ends of the plates 30 are thus supported from the screed plates 35 through the uprights 38 and the diagonal struts 37. The front ends of the plates 30 are supported by the front walls 38a secured to the fronts of the screed plates 35 and pivoted to the side arm brackets 22.

Posts 39 and diagonal struts 35 (Figures 2, 9 and 10) likewise extend upwardly from the rear walls 35a of the screed plates to support brackets 40 independently of the plates 30. These brackets 40 are mounted immediately in rear of the plates 30 and are held in alignment by means of a brace 41 secured as at 42 to one of the brackets only and extending across the rear face of the other bracket. The brackets each have screwed pivot pins 44 extending thereacross and a screw rod 43 is slidable through the pins. A bushing 45 with a concaved seat portion is welded as at 53a to one end of the screw rod and its seat portion engages the adjacent pin 44. This prevents rotation of the screw rod. Additional bushings 53b are slidably mounted on the screw rod to engage the other side of the one pin 44 and both sides of the other pin 44 as shown in Figure 5.

Locknuts such as 45 are threaded on the screw rod 43 to hold the adjacent bushings 53b in position. A ratchet device 46 threaded on the screw rod between the brackets 40 acts on a thrust bearing 46a abutting a slidable bushing 56 for forcing the brackets 40 apart. Since these brackets 40 each rigidly connected to a rear wall 35a of a screed plate 35 movement of the brackets toward and away from each other raises and lowers the inner rear ends of the screed plates.

The screw rod ratchet device 46 carries a sprocket 47 which is connected through a chain 43 to a second sprocket 48 threaded on a second screw rod 50, as best shown in Figure 6 to act against the adjacent pins carried by brackets 52 which are supported by the beams 33.

In Figures 5 and 8 the pins 44 carried by the brackets 40 have transverse apertures 55 through which flare outwardly from the axis of the pins for a purpose to be hereinafter described.

Plates 56 disposed over the beams 33 extend downwardly in spaced opposed relation as shown in Figure 5 to the screed plates 35. As indicated in Figure 6 these plates 56 extend rearwardly from the brackets 52 to the brackets 40 and to the rear end of the screed plates 35.

When the sprockets 47 and 48 are operated on
the screw rods 43 and 50 the plates 56 are forced apart and the plates together with the beams 33 and the brackets 40 may assume the angular positions shown in Figure 8. This angular position is readily permitted by the flaring bores 55 in the pins 44 as shown in Figure 8 without interfering with the binding against the screw rods.

The screwed plates 35 are hinged together as best shown in Figures 5 and 7. Finger plates 60 are welded to the tops of the screwed plates 35 adjacent their abutting inner ends. These plates 60 have alternating fingers 62a and 60b projecting through over the opposite screwed plate as shown in Figure 7. This arrangement prevents one plate 35 from rising above the other plate 35.

The outer ends of the finger plates 60 are recessed as at 61. Bars 62 have bottom flanges 63 adapted to fit in the recesses 61. These flanges 63 have teeth 63a on their inner ends to bite into and grip the finger plates 60.

The plates 56 depending from the screw rod controlled brackets 52 have feet or flanges 56a at their bottom ends welded on top of the finger plates 60 and as shown in Figures 5 and 7 these feet 56a project beyond the recesses in the finger plates 60 so that the flanges 63 on the bars 62 cannot be pulled upwardly out of the recesses. As shown in Figure 5 the upper ends of the bars 62 have inwardly projecting ribs 64 welded to the inner faces thereof to form seats therebetween for a horizontal plate 55 bridging the space between the bars. The plates 56 are apertured as at 56b to receive the plate 55 therethrough.

Draw bolts 66 extend through the bars 62 and through additional apertures in the plates 56 to draw the bars 62 together. Since these bars have flanges which act against the finger plates 60 and since the finger plates 60 are welded to the screwed plates 35 tightening of the draw bolts will bring the screws plates into tight butting relation with each other along their entire inner adjacent edges.

From the above description of the hinged joint between the screw plates, it should be understood that the plates are held in position by means of interlocking fingers. The screw plates are held in tight abutting relation by draw bolts mounted very close to the screw surfaces. When the adjusting sprockets on the screw side are operated to bring the plates 56 and the brackets 40 toward or away from each other the inner ends of the screw plates are raised or lowered while at the same time the abutting edges of the screw plates must rock in tight engagement with each other. A tight sealed joint between the plates is thus obtained under all conditions.

The crowning operation of the screwed units 26a and 26b is illustrated diagrammatically in Figure 4 which shows in solid lines the position of the screwed units when uncrowned or flat relation and showing in dotted lines the position of the screwed units when in crowned relation.

It will be noted from Figure 4 that the screw units are pivoted at their outer ends from supports carried by the side arms 16 of the machine. The units are hinged together at the center through the standard hinge designated generally at H and this hinge is raised and lowered by means of the plates 56 which are urged toward and away from each other through the adjusting screw 50. The rear screw rod 43 operated by the ratchet 46 thereon likewise moves the brackets 49 toward and away from each other to control the tilting of the rear ends of the screw plates. If the chain 48 is disconnected and the sprockets 47 and 49 independently operated the screw plates can be warped from front to rear as well as from outer end to inner end. Thus with the plates in initial flat position the rear sprocket 47 can be operated alone to force the brackets 49 apart thereby producing a crown in the rear edge of the screw with no crown in the forward edge. This will throw the corners of the screw down so that it exerts more pressure at the edges. Adjustment of the front and rear brackets independently make for positive pressure control at any point in the screw. Tearing or dragging tendencies can thus be eliminated at any point of the screw.

It is thus a simple matter to merely operate the ratchet handle 46 on one of the adjusting screw rods and automatically obtain any desired amount of uniform crowning of the screw assemblies across their entire width or to vary the front to rear crown by independent operation of the screw rods.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted herein otherwise than as suggested by the scope of the appended claims.

I claim as my invention:

1. A screw assembly for a material laying machine comprising side arms, pivots connecting the forward outer ends of the screw assembly with the side arms, screw rods depending from said side arms, pivots connecting said screw rods with the rear outer ends of the screw assembly, said screw assembly being divided centrally of said outer pivot connection into two units including abutting screw plates, stiff rigid means secured to the screw plates and extending upwardly therefrom, adjustable spreading means extending between the stiff rigid means for moving said stiff rigid means toward and away from each other to raise and lower the inner ends of the units relative to their outer pivots, and a hinged joint between the screw units maintaining the screw plates in abutting relation.

2. A screw assembly for a road finishing machine comprising a pair of screw plates in end to end abutting relation, a finger plate secured to the top of each screw plate adjacent the inner end thereof and having fingers extending over the other screw plate for holding the abutting ends in alignment, bars engaging the outer edges of the screw plate, bolts drawing said bars toward each other to hold the screw plate in abutting relation, hanger plates secured to each finger plate and an adjusting spreading screw between the hanger plates for moving the same toward and away from each other to tilt the screw plates about their abutting ends.

3. The improvements in a screw assembly for a road finishing machine which comprise a pair of abutting screw plates, pivot supports for the outer ends of the screw plates, a hinge connection between the inner ends of the screw plates, means for raising and lowering said hinge connection relative to said outer pivots for tilting the screw plates, independent bracket means connected to the rear ends of the screw plates, and means for moving said independent brackets means toward and away from each other to control the tilting of the rear ends of the screw plates relative to the tilted positions of the
plates controlled by said means for raising and lowering the hinge connection.

4. A road finishing machine including side arms, screw rods extending from said side arms, a pair of abutting screed plates in end to end relation, pivot connections between the outer rear ends of said screed plates and said screw rods, brackets depending from said side arms in spaced forward relation from said screw rods, front wall secured to the forward ends of said screed plates, pivot connections between the outer ends of said front wall and said brackets, a hinged joint between the inner ends of said screed plates, means for raising and lowering said hinged joint to tilt the screed plates from their outer to their inner ends, brackets secured to the rear ends of the screed plates, and independent means for moving said brackets toward and away from each other to warp the screed plates in a front to rear direction.

5. A road finishing machine including a pair of spaced arms, a pair of abutting screed plates in end to end relation pivotally supported at their outer ends from said arms, a hinge joint connecting the inner abutting ends of said screed plates, means for raising and lowering said hinge joint to tilt the screed plates from their outer to their inner ends, a bracket carried by the rear end of each screed plate, a spreading screw rod extending between and connecting each of said brackets, and means for operating said screw rod to move said brackets toward and away from each other for tilting the rear ends of said screed plates for crowning the same independently of the amount of tilt obtained by raising and lowering said hinge.

6. In a crowning device for a screed assembly of a road finishing machine, the improvement which comprises individual screed plates, a hinge between said screed plates, a pair of opposed crow control brackets, hangers depending from said brackets and secured to said hinge, and a spreading screw rod extending between the brackets for moving said brackets toward and away from each other to tilt the hangers for raising and lowering the hinge.

7. A material laying machine comprising a pair of flat screed plates each extending inwardly from opposite sides of the machine into abutting relation with each other, drawing bolts holding the inner edges of the screed plates in tight abutment, and means for raising and lowering said drawing bolts to rock the screed plates about their abutting edges for varying the contour of a surface being laid by said machine.

8. In a road finishing machine including a pair of abutting screed plates, the improvement which comprises a hinge between the abutting edges of said plates adapted for allowing rocking of the plates about their abutting edges, said hinge including plates secured to the top of each respective screed plate and overlapping the opposite screed plate, and means urging said overlapping plates toward each other.

9. A screed crown hinge for a screed assembly including a pair of abutting screed plates, which comprises a finger plate welded to the top of each screed plate adjacent the abutted ends thereof, fingers projecting from said finger plates into overlapping relation with the opposite screed plate, bars disposed in angular relation to the screed plates having flanges engaging the outer ends of the finger plates, a screw rod between said bars in spaced relation above the screed plates, and drawbolts engaging said bars between the finger plates and said spacer plate for urging the bars together to act on the finger plates for holding the edges of the screed plates in tight abutting relation.

10. In a screed assembly for a road finishing machine having two screed plates in abutted end to end relation, the improvement which comprises a bracket carried by the rear end of each screed plate, a screw rod extending between and operatively connecting each bracket, and means for operating said screw rod to force the brackets apart for crowning the rear ends of the screed plates.

11. In a road finishing machine including a screed assembly having a pair of abutting screed plates in end to end relation, the improvement which comprises a hinge including complementary parts fixed to each screed plate connecting the inner abutting ends of said plates, a hanger plate secured to each fixed hinge part, brackets for cooperating with said hanger plates, a spreading screw rod between said brackets, and means for operating said screw rod to move the hanger plates away from each other for crowing the screed plates.

12. In a road finishing machine including a screed assembly having a pair of abutting screed plates in end to end relation, a hinged connection between the abutting ends of the screed plates, a pair of opposed brackets, hanger plates depending from said brackets secured to said hinge, a second pair of opposed brackets carried by the rear ends of the screed plates, screw rods connecting the brackets of each pair, and means connected to both screw rods for operating the screw rods in unison to move the brackets apart for crowing the screed plates.

13. A road finishing machine including spaced side arms, a pair of screed plates in end-to-end abutting relation pivotally supported at their outer ends from said side arms, a hinged joint construction between the inner ends of said screed plates including complementary hinge parts fixed to each screed plate, laterally spaced brackets above said hinged joint construction, a hanger extending from each bracket to a complementary hinge part, a spreading screw rod between the brackets, means for operating the screw rod to move the brackets toward and away from each other for raising and lowering the hangers to move the hinged joint construction relative to the pivot supports at the outer ends of the screed plates for thereby tilting the screed plates from the outer to the inner ends thereof.

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