June 20, 1944. H. H. BARBER 2,351,593

SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

Filed Aug. 1, 1940 4 Sheets-Sheet 1

Fig-1

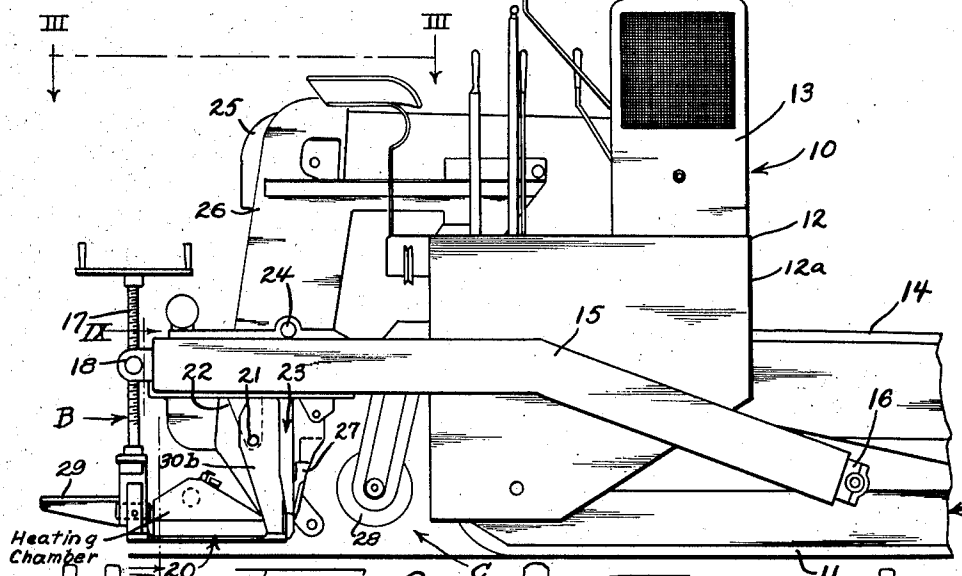
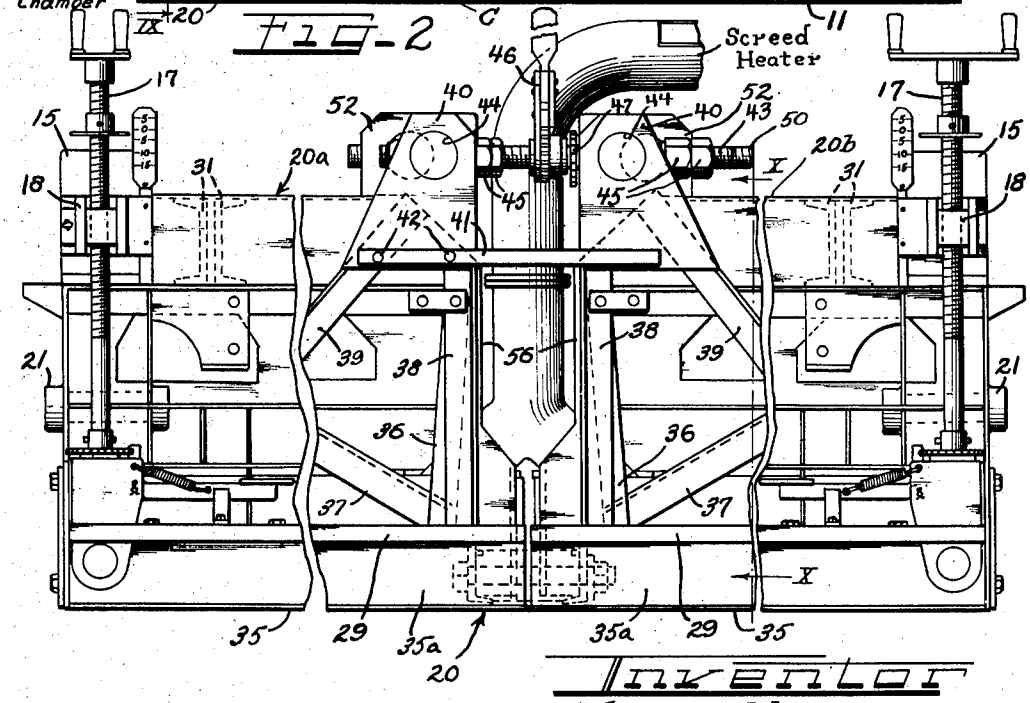


Fig-2



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June 20, 1944. H. H. BARBER 2,351,593

SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

Filed Aug. 1, 1940 4 Sheets-Sheet 2

Fig-3

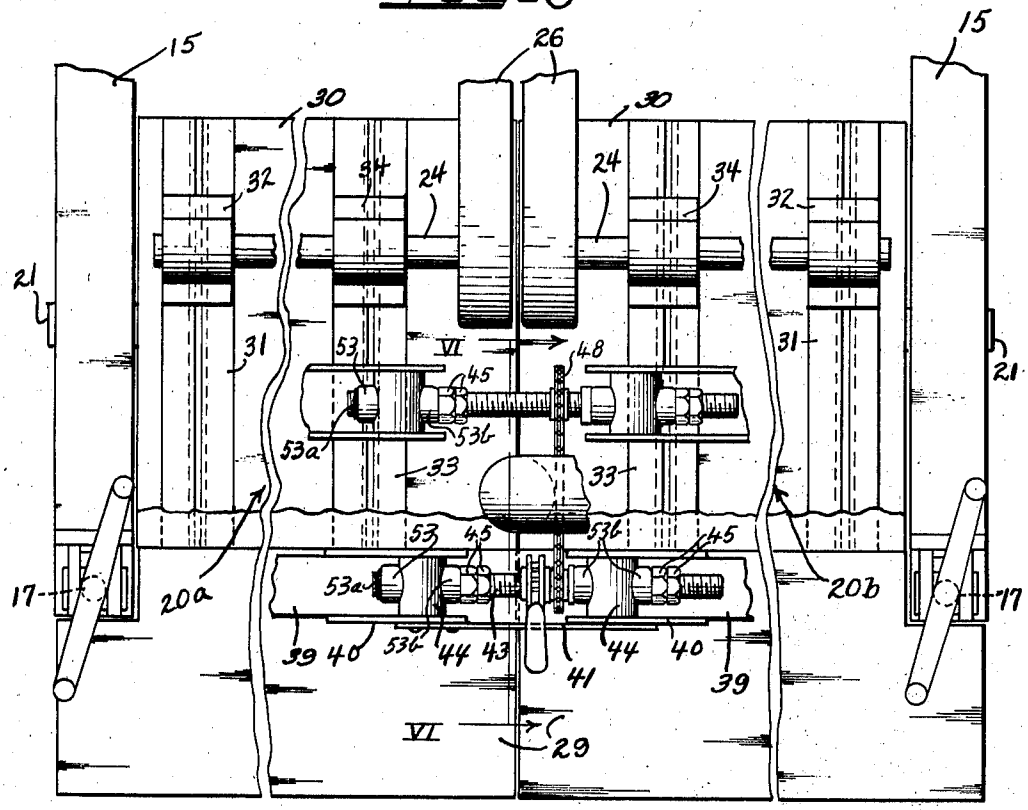
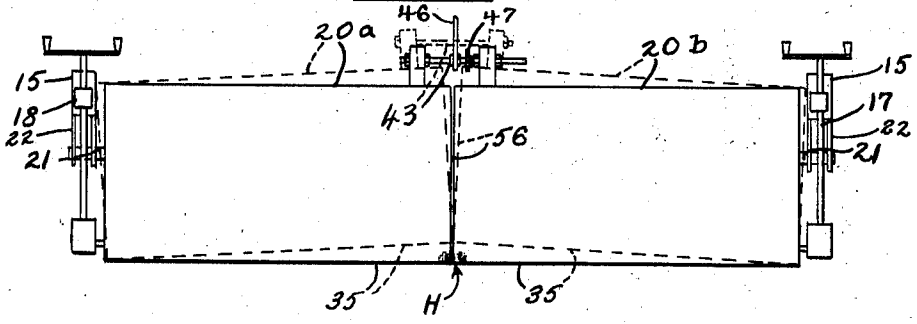


Fig-4



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June 20, 1944. H. H. BARBER 2,351,593

SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

Filed Aug. 1, 1940 4 Sheets-Sheet 3

FIG-5

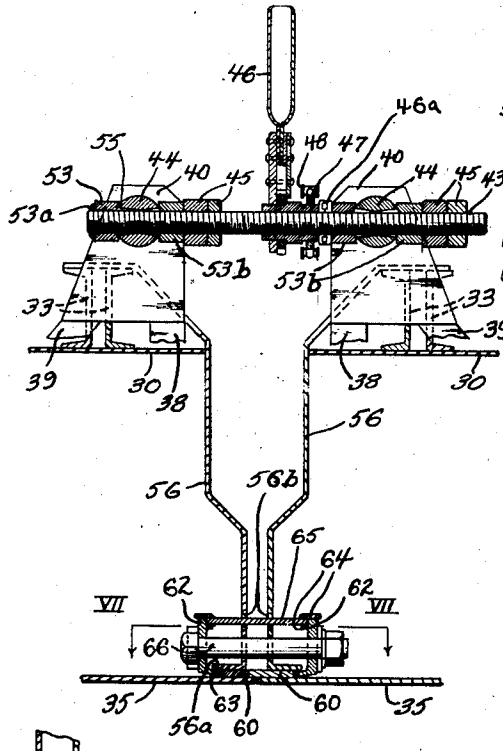


FIG-6

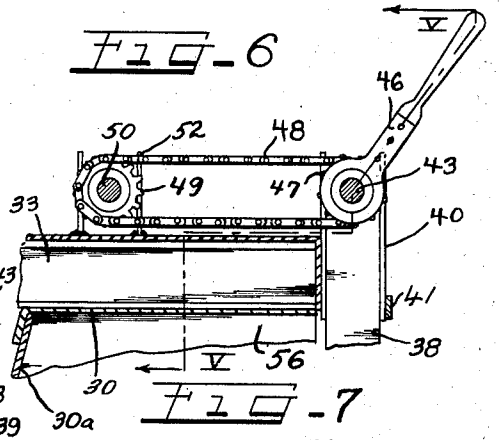


FIG-7

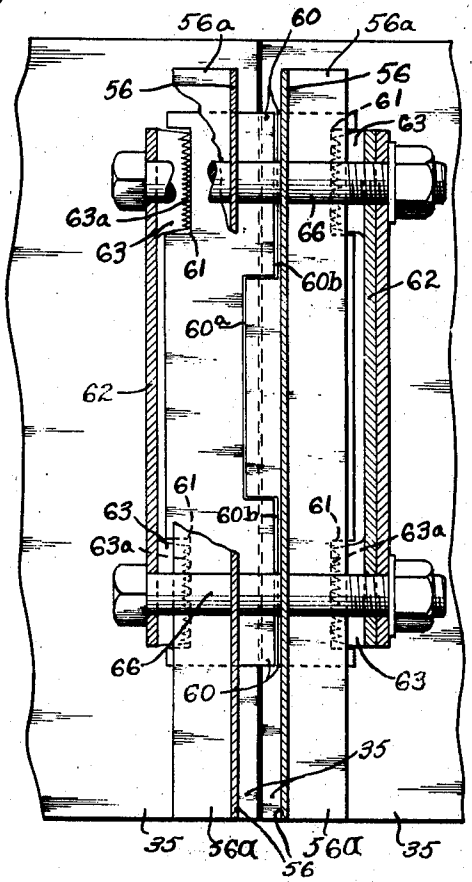
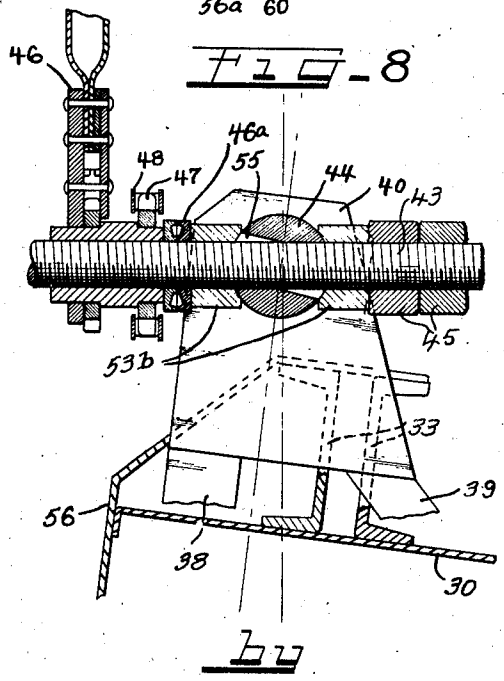


FIG-8



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June 20, 1944. H. H. BARBER 2,351,593

SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

Filed Aug. 1, 1940 4 Sheets-Sheet 4

Fig. 9

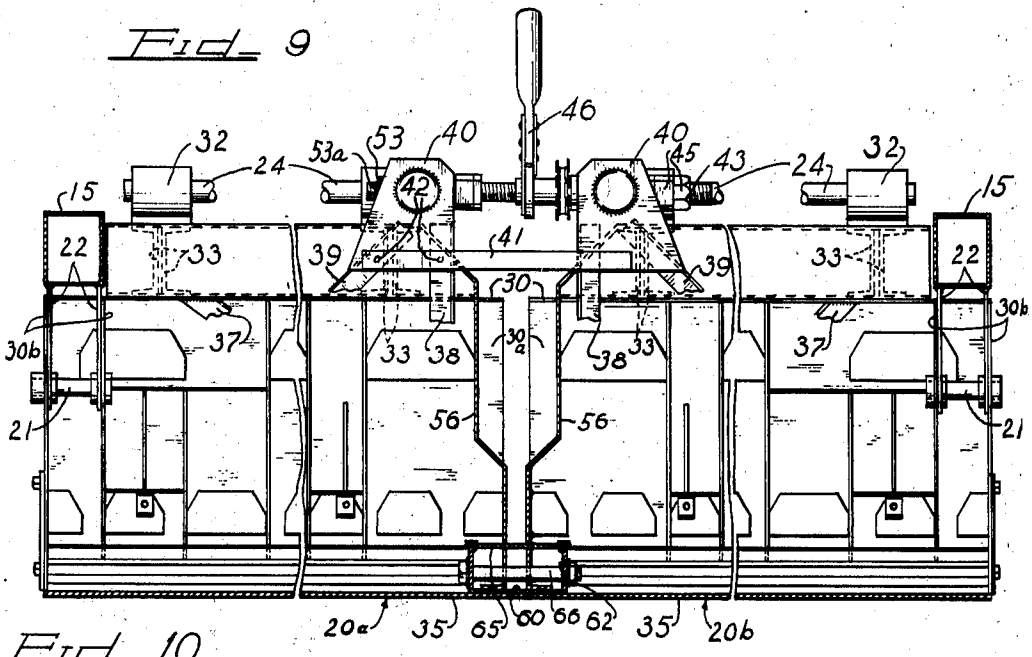
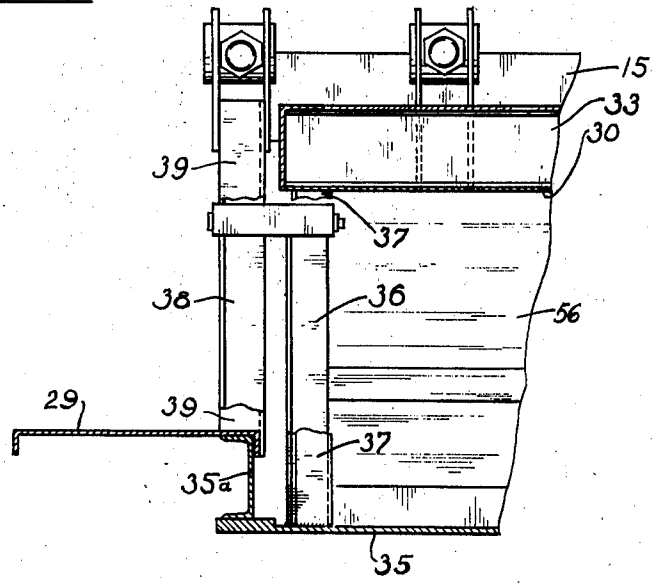


Fig. 10



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Patented June 20, 1944 2,351,593

UNITED STATES PATENT OFFICE

2,351,593

SCREED CONSTRUCTION FOR ROAD FINISHING MACHINES

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Application August 1, 1940, Serial No. 349,038

13 Claims. (Cl. 94—46)

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 and yet rigid in their adjustment for controlling the contour of a road being laid.

While the invention is adapted for screed or ironing and smoothing devices of material laying machines generally, it will be hereinafter described specifically as applied to road finishing machines of the type disclosed and claimed in my U. S. Letters Patent Nos. 2,138,828 and 2,168,507.

Road finishing machines are generally constructed so as to lay a mat of finished road about ten feet in width. It is desirable to be able to crown this ten foot wide mat in order to conform with the surface contour of the pavement. According to this invention the crowning is obtained by dividing the screed assembly into two five foot sections and by hinging the sections together through a sealed joint hinge which will not open up to leave a ridge in the road surface and which will not close up on the road material.

According to the invention two screed plates are butted together in end to end relation and are maintained in this butting relation at all times. The inner abutting ends of the screed plates are suspended from hangers which are capable of being drawn together or urged apart for raising and lowering the inner ends of the plates without however permitting any separation of the plates. In this manner the contour defined by the abutted plates can be varied at will to control the surface contour of the pavement.

It is then an object of this invention to divide the screed assembly of road finishing machines into two units and to hinge these units together through a sealed joint which always maintains the screed plates in abutting relation.

A further object of the invention is to provide a screed assembly pivoted at its outer ends to a road finishing machine and divided into individual units between the outer pivot connections with the machine for raising and lowering the inner ends of the units relative to their outer pivots to change the contour of the screed plates.

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.

Other 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 16 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 eccentrics 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 assembly 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 20*a* and 20*b*.

As best shown in Figures 5 and 9 the right and left hand screed units 20*a* and 20*b* are each built up from top plates 30 supported through front walls such as 30*a* secured to the front ends of the screed plates 35. These front walls 30*a* have outer side flanges 30*b* 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 33 spaced inwardly from the beams 31. These beams 33 likewise have bearings 34 thereon for the tamper shafts 24.

The screed units 20*a* and 20*b* each include a flat screed plate 35 adapted to ride on the pavement being laid. Each screed plate 35 has a vertical rear wall 35*a* secured thereto. Uprights 36 (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 37 are secured near the inner rear ends of the screed plates.

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

The rear ends of the plates 30 are thus supported from the screed plates 35 through the uprights 36 and the diagonal struts 37. The front ends of the plates 30 are supported by the front walls 30*a* secured to the fronts of the screed plates 35 and pivoted to the side arm brackets 22.

Posts 38 and diagonals 39 (Figures 2, 9 and 10) likewise extend upwardly from the rear walls 35*a* 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 apertured pivot pins 44 extending thereacross and a screw rod 43 is slidable through the pins. A bushing 53 with a concaved seat portion is welded as at 53*a* 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 53*b* 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.

Lock nuts such as 45 are threaded on the screw rod 43 to hold the adjacent bushings 53*b* in position. A ratchet device 46 threaded on the screw rod between the brackets 40 acts on a thrust bearing 46*a* abutting a slidable bushing 53*b* for forcing the brackets 40 apart. Since these brackets 40 are each rigidly connected to a rear wall 35*a* of a secreed 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 48 to a second sprocket 49 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 therethrough 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 49 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 or binding against the screw rods.

The screed plates **35** are hinged together as best shown in Figures 5 and 7. Finger plates **60** are welded to the tops of the screed plates **35** adjacent their abutting inner ends. These plates **60** have alternating fingers **60***a* and **60***b* projecting therefrom over the opposite screed 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 **63***a* 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 **56***a* at their bottom ends welded on top of the finger plates **60** and as shown in Figures 5 and 7 these feet **56***a* 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 **65** bridging the space between the bars. The plates **56** are apertured as at **56***b* to receive the plate **65** 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 screed plates **35** tightening of the draw bolts will bring the screed plates into tight butting relation with each other along their entire inner adjacent edges.

From the above description of the hinged joint between the screed plates it should be understood that the plates are held in proper vertical relation by means of interlocking fingers. The screed plates are held in tight abutting relation by draw bolts mounted very close to the screed surfaces. When the adjusting sprockets on the screw rods are operated to bring the plates **56** and the brackets **40** toward or away from each other the inner ends of the screed plates are raised or lowered while at the same time the abutting edges of the screed 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 screed units **20***a* and **20***b* is illustrated diagrammatically in Figure 4 which shows in solid lines the position of the screed units when in uncrowned or flat relation and showing in dotted lines the position of the screed units when in crowned relation.

It will be noted from Figure 4 that the screed units are pivoted at their outer ends from supports carried by the side arms **15** of the machine. The units are hinged together at the center through the stiff 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 **40** toward and away from each other to control the tilting of the rear ends of the screed plates. If the chain **48** is disconnected and the sprockets **47** and **49** independently operated the screed plates can be warped from front to rear as well as from outer end ot inner end. Thus with the plates in initial flat position the rear sprocket **47** can be operated alone to force the brackets **40** apart thereby producing a crown in the rear edge of the screed with no crown in the forward edge. This will throw the corners of the screed 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 screed. Tearing or dragging tendencies can thus be eliminated at any point of the screed.

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 screed 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 hereon otherwise then necessitated by the scope of the appended claims.

I claim as my invention:

1. A screed assembly for a material laying machine comprising side arms, pivots connecting the forward outer ends of the screed assembly with the side arms, screw rods depending from said side arms, pivots connecting said screw rods with the rear outer ends of the screed assembly, said screed assembly being divided centrally of said outer pivot connections into two units including abutting screed plates, stiff rigid means secured to the screed 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 screed units maintaining the screeds in abutting relation.

2. A screed assembly for a road finishing machine comprising a pair of screed plates in end to end abutting relation, a finger plate secured to the top of each screed plate adjacent the inner end thereof and having fingers extending over the other screed plate for holding the abutting ends in alignment, bars engaging the outer ends of the finger plates, bolts drawing said bars toward each other to hold the screed plates 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 screed plates about their abutting ends.

3. The improvements in a screed assembly for a road finishing machine which comprise a pair of abutting screed plates, pivot supports for the outer ends of the screed plates, a hinge connection between the inner ends of the screed plates, means for raising and lowering said hinge connection relative to said outer pivots for tilting the screed plates, independent bracket means connected to the rear ends of the screed plates, and means for moving said independent bracket means toward and away from each other to control the tilting of the rear ends of the screed 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 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 walls secured to the forward edges of said screed plates, pivot connections between the outer ends of said front walls 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 crown 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, drawbolts holding the inner edges of the screed plates in tight abutment, and means for raising and lowering said drawbolts 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 spacer plate 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 abutted 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 crowning the screed plates.

12. In a road finishing machine including a screed assembly having a pair of abutted 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 crowning 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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