July 4, 1961 R. J. BEESON 2,990,754

QUICK-CROWN-CHANGE SURFACING UNIT

Filed Sept. 23, 1958 4 Sheets-Sheet 1

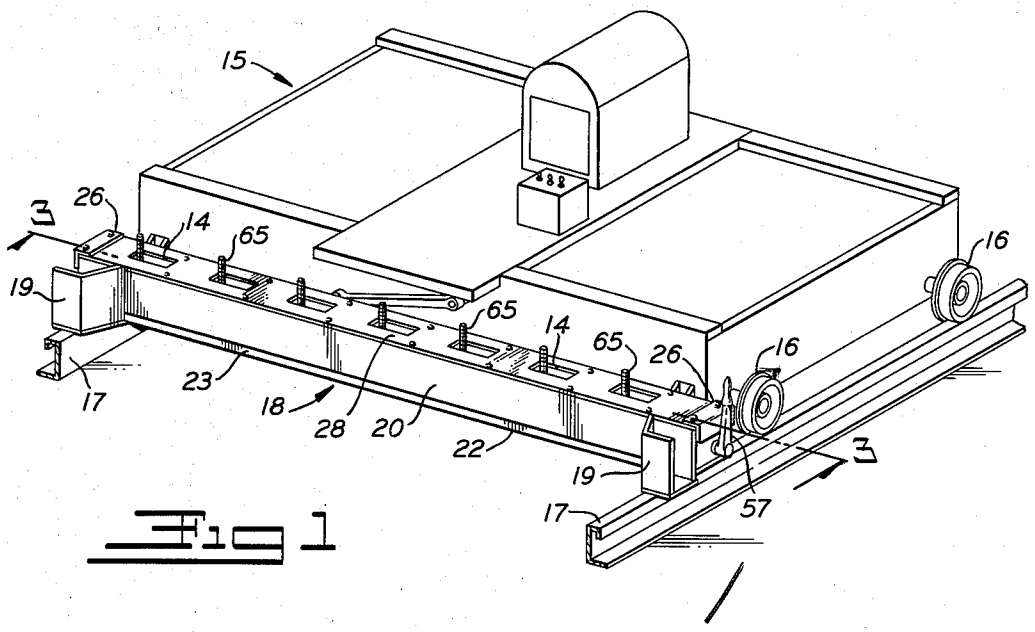



Fig 1

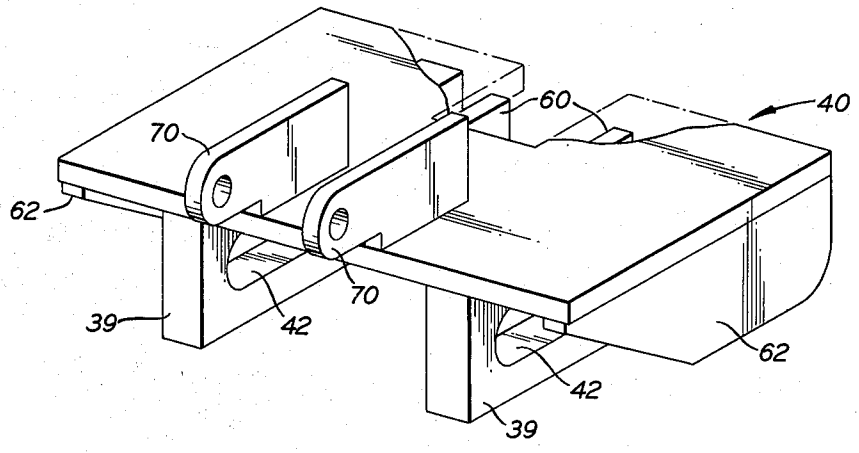



Fig 2

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QUICK-CROWN-CHANGE SURFACING UNIT

Filed Sept. 23, 1958 4 Sheets-Sheet 2

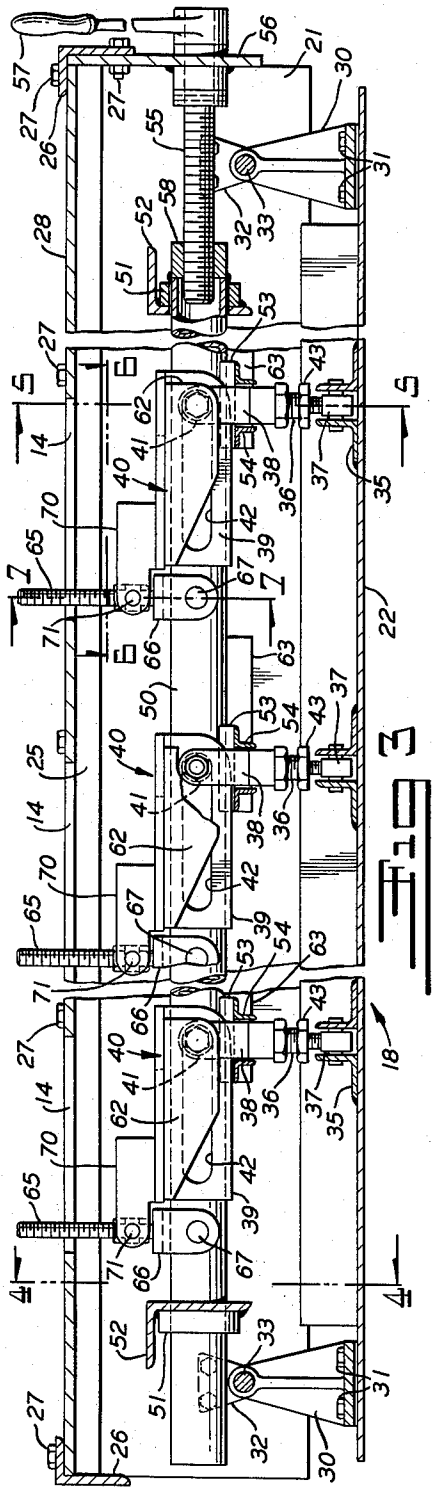


Fig 3

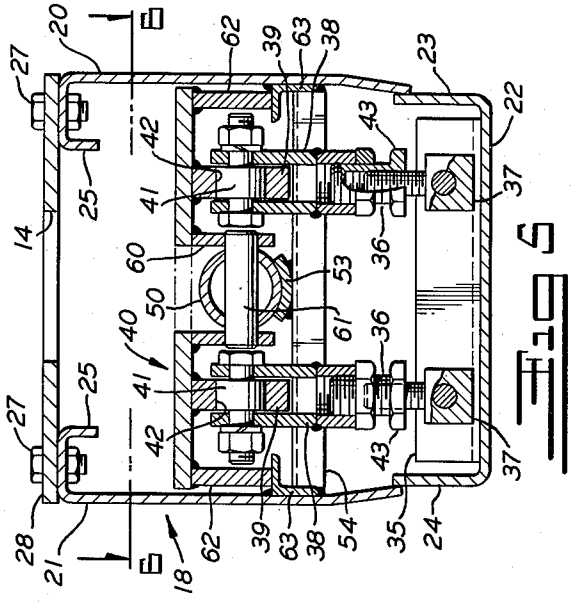


Fig 5

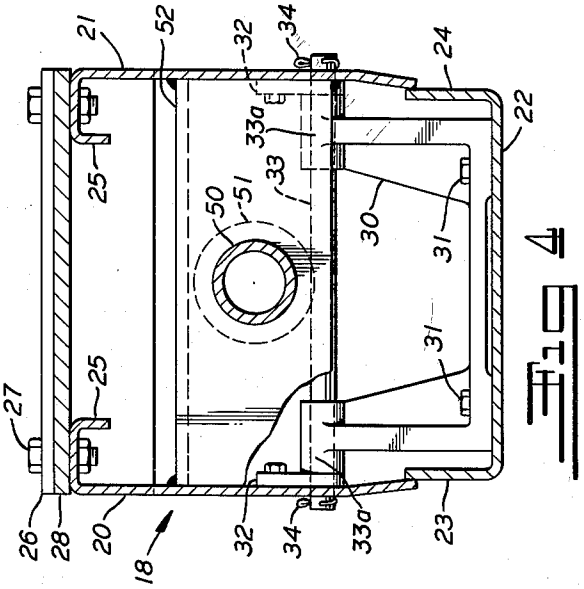


Fig 4

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QUICK-CROWN-CHANGE SURFACING UNIT

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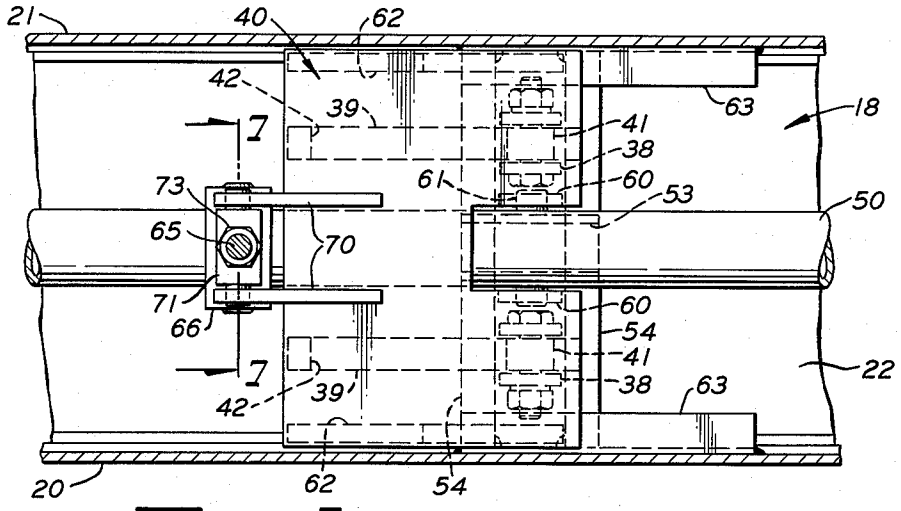



FIG 6

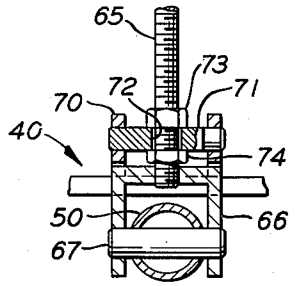



FIG 7

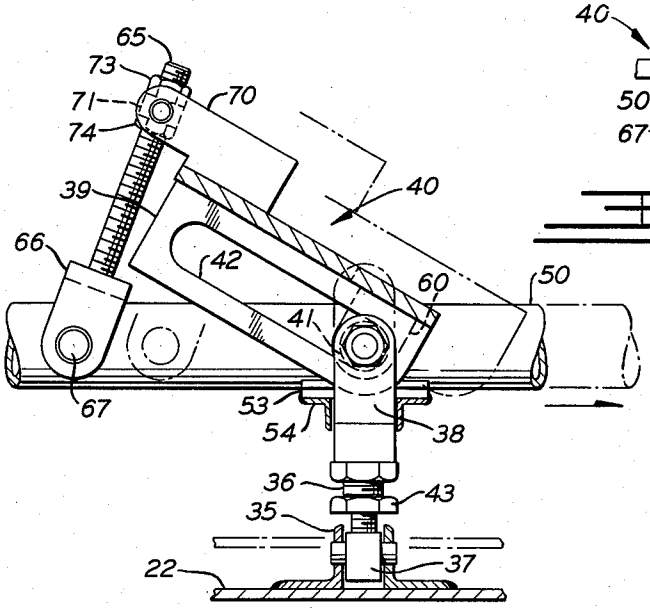



FIG 8

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QUICK-CROWN-CHANGE SURFACING UNIT

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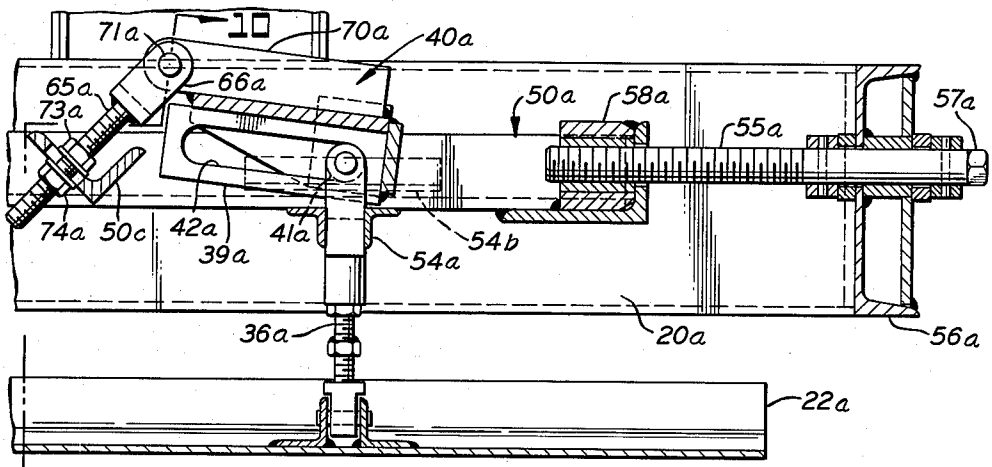



Fig 9

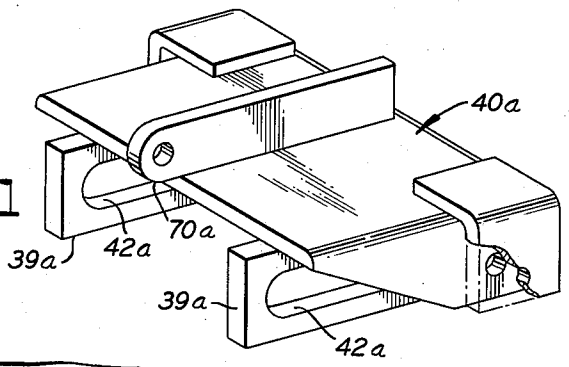



Fig 11

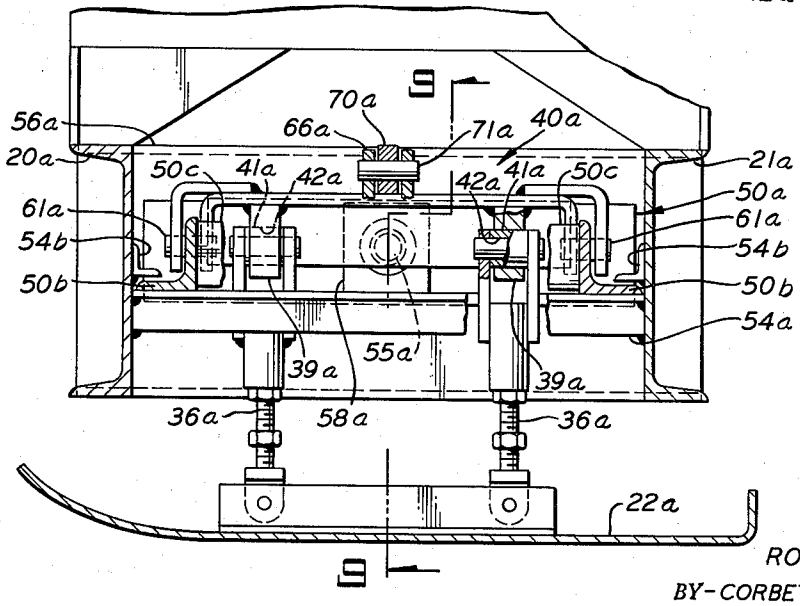



Fig 10

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United States Patent Office 2,990,754 Patented July 4, 1961



2,990,754

# QUICK-CROWN-CHANGE SURFACING UNIT

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Filed Sept. 23, 1958, Ser. No. 762,791
5 Claims. (Cl. 94—45)

My invention relates to a quick-crown-change surfacing unit. It relates, more specifically, to a surfacing unit for surfacing pavements and impacting the desired crown thereto and which has mechanism embodied therein for quickly changing the crown of the surfacing member thereof.

In the patent to Millikin et al. No. 2,299,700 of October 20, 1942, there is disclosed a screed unit which embodies quick-crown-change mechanism and is generally in the form of a box girder or beam. It embodies a forward material-contacting plate and a rearward material-contacting plate which are vertically disposed in spaced relationship and which extend the full length of the screed unit. These forward and rearward plates support a surfacing plate which is disposed therebetween at the lower edges thereof and which extends longitudinally thereof. According to said patent, the surfacing plate is suspended from the front and rear plates by means of a plurality of pairs of independently adjustable suspending rods which are spaced longitudinally of the screed unit. Connected with each of the longitudinally spaced pairs of suspending rods is a wedge member. These wedge members are carried by a single longitudinally reciprocable actuating member mounted on the screed unit so that all the wedge members can be reciprocated simultaneously and will cooperate with the suspending rods to quickly change the crown of such surfacing plate. The wedge members along the screed unit have camming or wedging surfaces at various angles relative to the horizontal so that they produce different camming or wedging effects on the suspending rods along the screed unit and thereby produce the desired crown on the surfacing plate. The surfacing plate, by this arrangement, may be quickly changed to any extent from its maximum crown to a flat surface or vice versa.

In the structure disclosed in said Patent No. 2,299,700, the angle of the cam surface or wedging surface of each wedge is fixed so that each cam always will produce the same crowning effect on the surfacing plate. According to this invention, this structure is improved by having means for selectively varying the camming or wedging effect of each wedge member. Thus, each wedge member may be adjusted so that it will produce the desired wedging action or crowning effect. This may be varied as desired so that different types of crowns may be obtained with the screed unit. However, the quick-crown-change arrangement is also retained so that all of the wedges may be operated simultaneously to obtain the quick-crown-change in the surfacing plate.

In its main aspect, my invention contemplates the provision of a series of wedge members disposed along a surfacing unit which can be operated simultaneously to quickly change the crown of the surfacing plate thereof from a minimum to a maximum and vice versa, in combination with an arrangement associated with each wedge member so that the wedging or crowning effect of each wedge member may be varied as desired in order that the entire group of wedge members will produce predetermined crown changes in the surfacing plate.

In the accompanying drawings, I have illustrated the preferred embodiment of my invention but it is to be understood that specific details thereof may be varied without departing from the principles involved.



In the drawings:

FIGURE 1 is a perspective view illustrating a pavement finishing machine having a screed unit embodying my invention mounted thereon.

FIGURE 2 is a perspective view of a wedge bracket used in the screed unit.

FIGURE 3 is a longitudinal sectional view taken through the screed unit along line 3—3 of FIGURE 1.

FIGURE 4 is a transverse sectional view taken along line 4—4 of FIGURE 3.

FIGURE 5 is a transverse sectional view taken along line 5—5 of FIGURE 3.

FIGURE 6 is a horizontal sectional view taken along line 6—6 of FIGURES 3 and 5.

FIGURE 7 is a transverse sectional view taken along line 7—7 of FIGURES 3 and 6.

FIGURE 8 is a detail illustrating the adjustment of the wedge bracket.

FIGURE 9 is a longitudinal sectional view through a float unit in which my invention is embodied.

FIGURE 10 is a transverse sectional view taken along line 10—10 of FIGURE 9.

FIGURE 11 is a perspective view of the wedge bracket used in the unit of FIGURES 9 and 10.

With reference to the drawings, I have illustrated in FIGURE 1 a finishing machine 15 which may be of any suitable type and which is supported by wheels 16 for operation upon side forms 17 which are adapted to form the edges of the pavement. A screed unit 18 is mounted at the forward side of the machine and is usually so mounted that it may be reciprocated transversely of the path of movement of the machine. Baffle plates 19 may be provided at the ends of the screed unit for preventing movement of material beyond the ends of the screed unit as it piles up in front of the screed unit. This general arrangement is for the purpose of illustrating one embodiment of my invention, in this instance, the invention being shown as embodied in the screed unit 18 although it can be embodied in other types of surfacing units.

The structure of the screed unit 18, shown in FIGURE 1, is illustrated in detail in FIGURES 3 to 8, inclusive, and the manner in which my invention is embodied in that structure is also illustrated in these figures. The screed unit 18 is constructed in the form of a box girder or beam. It comprises a vertically disposed front plate 20 and a vertically disposed rear plate 21 which extend the full length of the screed unit and which are disposed in spaced parallel relationship. Disposed between the plates 20 and 21, at the lower edges thereof, is the surfacing plate 22 which extends the full length of the plates 20 and 21. This plate 22 is flexible and is provided with a short upturned flange 23 at its forward edge and a short upturned flange 24 at its rear edge. These upturned flanges 23 and 24 will always extend upwardly within the respective plates 20 and 21. The upper edge of each plate 20 and 21 is formed with an inverted channel reinforcement 25 therealong. The plates 20 and 21 are secured together at their upper channel edges by cover plate 28 which extends the full length of the plates 20 and 21. Cover plate 28 has rectangular access and clearance openings 14. At both ends of cover plate 28 are mounted reinforcement angles 26 and bolted thereto by bolts 27.

The means for supporting the surfacing plate 22 from the front and rear plates 20 and 21 includes a hinge structure at each end of the screed unit. This hinge structure, as illustrated in FIGURES 3 and 4, comprises a hinge bracket 30 which is bolted by the bolts 31 to the plate 22. Each bracket 30 is upstanding from the plate 22, extending transversely thereof, and at its upper end is provided with a pair of transversely disposed pintle-receiving sleeves

33*a*. These sleeves 33*a* receive the pintle or shaft 33 which is rotatable therein and which is disposed in aligning openings spaced above the lower edges of the plates 20 and 21 and in brackets 32 carried on the inner surfaces thereof, being prevented from moving axially of the plates by means of cotter keys 34. Thus, each end of the surfacing plate 22 is attached to the rest of the screed unit by the hinge structures which permit pivoting of the plate about the axes of the pintles 33.

According to the present invention, for quickly changing the crown of the surfacing plate 22 I provide the structure now to be described in detail. This structure comprises shoe members 35 which extend transversely of the surfacing plate 22 and are secured to the upper surfaces thereof as by welding. Each of the shoe members 35 has a pair of turnbuckles 36 secured thereto at the forward and rearward ends thereof by means of the pivots 37. The upper end of each of the turnbuckles is provided with a yoke 38 which straddles a wedge or cam member 39 that is part of a wedge bracket 40. The yoke 38 carries a cam follower roller 41 on its upper end that operates in a cam slot 42 of the cam member 39. It will be apparent that the distance between each roller 41 and the pivot 37 of the associated turnbuckle 36 can be varied easily by rotating the nut 43 of the turnbuckle.

It will also be apparent that the turnbuckles 36 are arranged in two longitudinal rows and in pairs, the members of which comprise transversely aligned forward and rearward members. The cam or wedge members 39 are vertically disposed and are similarly arranged. Each pair of cam plates or wedge members 39 is carried by a single bracket 40 and the members thereof extend longitudinally of the screed unit in parallel relationship, the forward and rearward cam members of each pair being in longitudinal alignment with the corresponding members of all the remaining pairs.

The wedge brackets 40 are carried at longitudinally spaced intervals on a supporting pipe 50, shown in FIGURES 2 to 8, which is mounted for reciprocal movement in collars 51 which may be in any suitable number and which are carried along the center line of the screed by means of the transverse angle brackets 52 which are secured between the front and rear plates 20 and 21. The pipe 50 is further supported by cradles 53 which are attached to transverse angles or guides 54 secured to the front and rear plates 20 and 21. One of these angles 54 is disposed at each side of each pair of turnbuckles 36 to prevent movement of the turnbuckles about the axes of the rollers 41, that is, swinging of these turnbuckles longitudinally of the screed unit. It will be noted that the pivots 37 of the turnbuckles 36 are at right angles to the axes of the roller axes 41 to permit forward and rearward tilting of the surfacing plate 22 by adjustment of the turnbuckles if desired.

In order to reciprocate the pipe 50 longitudinally of the screed unit for quick crown changing, a screw 55 is provided at one end of the screed and is rotatably mounted in a bracket 56. The screw 55 may be rotated by means of a ratchet lever 57. The inner end of the screw is threaded into a cap 58 which is non-rotatably mounted in the end of the pipe 50. It will be apparent that the screw 55 may be rotated by means of the handle 57 to move the pipe 50 longitudinally of the screed unit in the desired direction.

The manner in which the brackets 40 are mounted on the pipe 50 is illustrated best in FIGURES 3, 5, and 6. Each bracket 40 is provided with a pair of pivot lugs 60 which straddle the pipe 50. These lugs 60 carry a transversely extending pivot pin 61 which extends diametrically through aligning openings in the pipe 50. The bracket 40 is further provided with stop flanges 62 depending therefrom at the forward and rearward edges thereof and which rest on stop angles 63, when the bracket 40 is swung about the pivot pin 61 to its lowermost position. These angles 63 are welded to the inner surfaces of the



respective forward and rearward plates 20 and 21. It will be apparent that with the brackets 40 in horizontal position, as shown in FIGURE 3, longitudinal movement of the pipe 50 would produce no crowning action on the plate 22. However, if the brackets 40 are tilted, a crowning action will result. This crowning action will be dependent upon the particular angular adjustment of each bracket 40 away from horizontal and, therefore, the angular relationship of each cam slot 42 relative to the axis of the pipe 50.

For this reason, each of the brackets 40 has means associated therewith for rocking it vertically about the pivot 61 to any desired angular position and holding it in such position. This means comprises an upstanding screw 65 which is rigidly connected at its lower end to a yoke 66. This yoke 66 also straddles the pipe 50 and carries a pivot pin 67 which extends diametrically through aligning openings in the pipe. The bracket 40, at its upper side and at the edge opposite its pivoted edge, is provided with a pair of upstanding outwardly projecting pivot lugs 70. These lugs 70 have a transversely extending pivot bar 71 rotatably mounted therein. The pivot bar 71 has the screw 65 (FIGURE 7) loosely passing through an opening 72 therein. Above and below the bar 71 clamping nuts 73 and 74 are threaded on the screw 65. It will be apparent that by adjusting these nuts 73 and 74 on the screw 65 the angular position of the bracket 40 will be determined. Furthermore, it will be apparent that the angular position of each of the wedge or cam brackets 40 can be adjusted independently of the other one.

With this arrangement, if it is desired that the screed function merely as a flat surfacing member, all of the brackets 40 will be adjustable into horizontal positions. However, if it is desired that the surfacing plate 22 have a predetermined crown in it to properly crown the pavement, the brackets 40 will be adjusted into various angular positions to obtain any desired maximum crown. Thereafter, if the wedge-actuating pipe 50 is moved to the right, as indicated by the arrow in FIGURE 8, which is accomplished by threading the screw 55 into the cap 58, the rollers 41 will be moved upwardly in the cam slots 42 to exert a pull on the associated turnbuckles 36 and thereby properly crown the plate 22. By the extent of movement of the pipe 50, the plate 22 can be crowned from a flat position to a maximum. By threading the screw 55 out of the cap 58 to move the pipe 50 to the left, the rollers 41 will be moved down the inclined cam slots 42 so that the plate 22 will return to flat condition. Thus, the surfacing plate may be quickly adjusted from a flat position to a maximum crown and, vice versa, merely by operation of the lever 57. Furthermore, the type of crown produced by this operation is selected by predetermined adjustments of the various brackets 40 about their pivot axes 61.

As previously indicated, this invention is not limited to any particular type of surfacing unit and the screed unit shown and described is by way of example of an embodiment of my invention. Another arrangement, by way of example, is illustrated in FIGURES 9 to 11, inclusive, which show a surfacing unit of the float finisher type.

In this unit the surfacing plate 22*a* is supported by pairs of turnbuckles 36*a* which are arranged longitudinally of the plate 22*a*. The upper ends of the turnbuckles carry rollers 41*a* which operate in wedge or cam members 39*a* that are part of and depend from a wedge bracket 40*a*. Each of the wedge or cam members 39*a* has a slot 42*a* for receiving the roller 41*a*. Each pair of turnbuckles 36*a* is disposed between the transversely extending angle braces 54*a* which are secured to a front beam 20*a* and a rear beam 21*a* of the float-supporting frame. The brackets 40*a* are pivoted by pivot pins 61*a* to a reciprocal crown-changing frame 50*a* which includes the angle members 50*b* at each side thereof that are slidably mounted on the transverse supports 54*a*. Upward movement of the frame 50*a* is precluded by pairs of

angle clips 54*b* in transverse alignment with the turnbuckles 36*a* and welded to the frame beams 20*a* and 21*a* and projecting over the associated angle members 50*b*.

To adjust each of the wedge brackets 40*a* about its pivot axis 61*a*, a screw 65*a* is connected to each bracket. Each screw is provided with a yoke 66*a* on its upper end which straddles a lug 70*a* on the bracket 40*a* and is pivoted thereto by means of a pivot pin 71*a*. The screw 65*a* passes through an angle brace 50*c* which is attached to the frame 50*a*. Clamping nuts 73*a* and 74*a* clamp against opposite sides of the member 50*c* and are threaded on the screw 65*a*. Thus, by adjusting the bolts or nuts 73*a* and 74*a*, the brackets 40*a* may be adjusted angularly about the pivot axis 61*a*.

The frame 50*a* may be reciprocted by means of a screw 55*a* having its inner end threaded into a fixed member 58*a* on the end of the frame 50*a*. This screw has its outer end rotatably mounted in a transverse frame portion 56*a* which is rigidly attached to the front and rear beams 20*a* and 21*a*. The outer end of the screw 55*a* is provided with an angular nut portion 57*a* by means of which it may be rotated.

It will be understood that this structure will function substantially as the previously described structure. The brackets 40*a* are adjusted initially to selected angular positions to obtain the predetermined crown in the float plate 22*a*. Longitudinal movement of the frame 50*a* by means of the screw 55*a* will produce the desired quick-crown-change in the float plate 22*a*.

It will be apparent from the above description that I have provided a surfacing unit having quick-crown-change mechanism whereby any desired crown between flat and a predetermined maximum can be obtained quickly on the relatively flexible surfacing plate which can be bowed. Furthermore, the nature of the resulting crown can be varied selectively as desired merely by adjusting the different wedge or cam members, these members being independently adjustable as desired. Thus, I provide quick-crown-change mechanism which includes a plurality of cam members which can be termed inclined plane or wedge members disposed along the finishing plate and engaging cam followers or rollers carried on the upper ends of supporting members connected to the plate, all of said wedge members or inclined members being moved longitudinally of the plate simultaneously by a single actuating member which carries them and which is mounted for longitudinal sliding movement on the supporting structure of the surfacing unit, and all of said wedge members or inclined plane members being carried by the actuating member in such a manner that they may be independently adjusted to vary the crowning effect produced by each inclined plane member or wedge member.

According to the provisions of the patent statutes, the principles of this invention have been explained and have been illustrated and described in what is now considered to represent the best embodiment. However, it is to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

Having thus described my invention, what I claim is:

1. A surfacing unit comprising a supporting structure, a longitudinally extending surfacing member which is flexible so that it may be bowed, a plurality of supporting members for supporting said surfacing member from said supporting structure, said supporting members being disposed at intervals spaced longitudinally of said surfacing member and being connected thereto in angular relationship thereto, a cam member cooperating with each of said supporting members and having a cam surface extending angularly relative to the cooperating supporting member, each of said supporting members having a cam follower portion engaging the cam surface of the cam member cooperating therewith, a single actuating member extending longitudinally of said supporting structure and having said cam members secured thereto at intervals spaced longitudinally thereof, means for movably mounting each of said cam members on said actuating member for angular adjustment relative thereto, adjustable means interconnecting each of said cam members and said actuating member for independently changing the angular position of the surface of each cam member relative to said actuating member to vary the effect thereof, said actuating member being mounted on said supporting structure for reciprocation longitudinally relative to said surfacing member, guides on said supporting structure for preventing movement of said supporting members in the direction of reciprocation of said actuating member but guiding movement relative thereto angularly of said actuating member and said surfacing member, and means carried by said supporting structure for reciprocating said actuating member.

2. A surfacing unit according to claim 1 in which said mounting means for each of said cams comprises a pivotal connection between said cam and said actuating member and said adjustable means interconnecting said cam and said actuating member comprises means for swinging the cam about said pivot.

3. A surfacing unit according to claim 2 in which each cam member is in the form of a cam bracket pivoted to said actuating member, said bracket having a cam slot for receiving the cam follower of the associated supporting member which supports said surfacing member, said cam follower being in the form of a roller operating in said cam slot, and said adjustable means comprises means connected to the bracket and to said actuating member for swinging said bracket about its pivot.

4. A surfacing unit according to claim 3 in which said adjustable means comprises an adjusting screw connected between the free end of each bracket and said actuating member.

5. A surfacing unit according to claim 4 in which each cam bracket has a plurality of cam portions with the cam slots formed therein, and a supporting member is provided in cooperation with each of said cam slots and has a roller on its upper end for cooperating with the adjacent cam slot, said supporting member having its lower end connected to said surfacing member.

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