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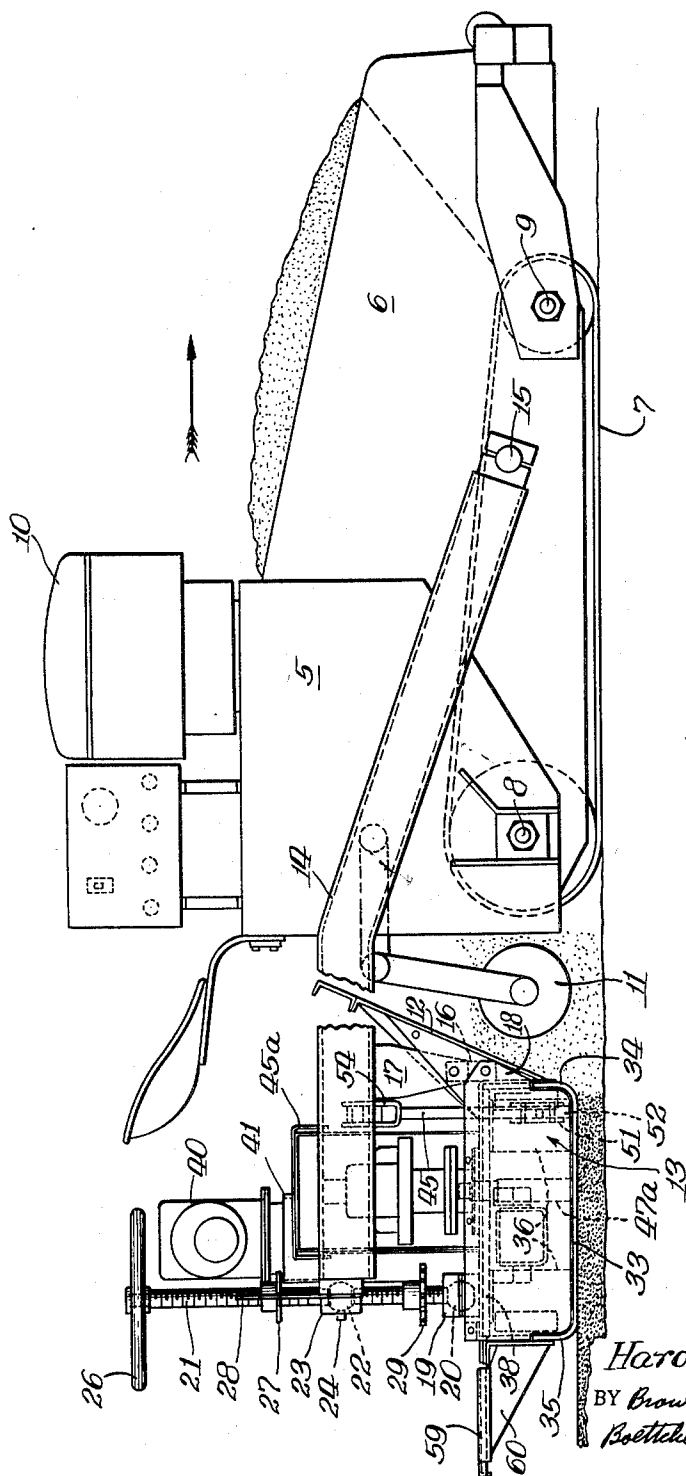
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SCREED COMPENSATING AND ADJUSTING MEANS

Filed March 18, 1957

2 Sheets-Sheet 1



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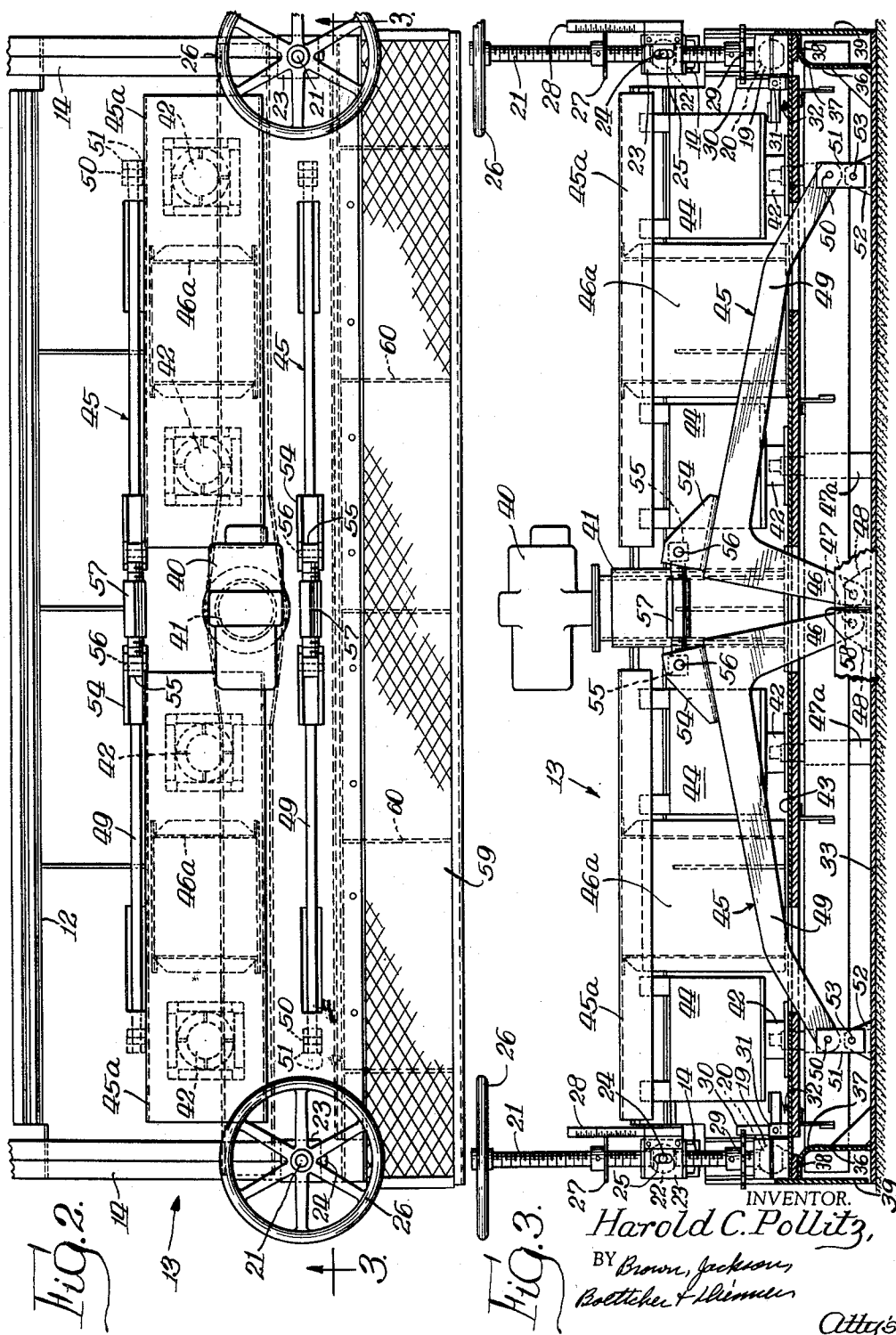
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SCREED COMPENSATING AND ADJUSTING MEANS

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7 Claims. (Cl. 94—45)

This invention relates to road surfacing machines which employ a screed for levelling and finishing the bed of surfacing material, and has to do with compensating means for accommodating expansion and contraction of the screed plate while assuring that it is maintained flat and in contact throughout its area with the surface of the bed of surfacing material, or bowed for crowning, as the case may be.

Road surfacing machines of the above character are well known and rather extensively used. In such machines the screed plate is heated, by known means, to a rather high temperature, which is necessary to impart the proper finish to the top of the bed of surfacing material. When the screed plate is heated it expands and when its temperature is lowered to appreciable extent, in its passage over the surface material, it contracts. The resultant expansion and contraction of the screed plate frequently causes substantial lengthwise warping or buckling thereof such that appreciable areas of the plate do not remain in contact with the surfacing material. That renders it difficult to obtain the proper finish of the surface of the material and necessitates slowing down of the rate of travel of the machine in an endeavor to overcome that difficulty, with resultant slowing down of the road surfacing operation, which is objectionable for obvious reasons.

My invention is directed to means for avoiding the above noted difficulty in respect to screeds as presently used in road surfacing machines. To that end I provide compensating means whereby expansion and contraction of the screed plate, in accordance with variations in temperature thereof, is accommodated and warping or buckling of the plate is prevented. More particularly I provide compensating and adjusting levers attached to the screed plate and adjusting means therefor so arranged that the plate is free to expand and contract lengthwise and is effectively restrained against lengthwise buckling or warping, such levers also providing means for adjusting the screed plate for crowning. Further objects and advantages of my invention will appear from the detail description.

In the drawings:

Figure 1 is a side view of a road surfacing machine including a screed comprising screed plate compensating and adjusting means embodying my invention;

Figure 2 is a plan view of the screed assembly and associated parts, certain parts being broken away and certain other parts being omitted for clearness of illustration; and

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 2, certain parts being shown in elevation and certain other parts being shown rather diagrammatically.

My present invention is in the nature of an improvement over the screed disclosed in my Patent No. 2,757,588, granted August 17, 1956, for Vibrating Finishing Machine.

The machine of Figure 1 includes a tractor 5 and a

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hopper 6 carried thereby, both mounted on a track laying carriage 7 extending between axles 8 and 9, and a suitable power source, such as an internal combustion engine 10; the unit as a whole being self-propelled along a road being surfaced. The hopper 6 receives the road surfacing mix, which may be bitumen and an aggregate, or any suitable mix. The mix is delivered by a rearwardly traveling conveyor (not shown) to a two part screw conveyor or distributor 11 which spreads the mix upon the roadway in front of a deflector plate 12. The plate 12 is disposed in front of and deflects the mix downward and rearward to, a screed assembly 13 supported by arms 14 pivoted at their forward ends, at 15, to the tractor unit and extending rearwardly therebeyond. The machine so far described, including the screed assembly 13, is similar to that of my above identified patent.

The screed assembly 13, in general, may be of any suitable construction. It is supported at its front from arms 14 by links 16 pivoted at their upper ends in brackets 17 secured to and depending from arms 14 and pivoted at their lower ends in brackets 18 secured to assembly 13. At its rear the screed assembly 13 is provided with split socket blocks 19 secured to each end thereof. The blocks 19 receive balls 20 at the lower ends of adjusting screws 21 threaded through balls 22 mounted in split socket blocks 23 bolted to the rearward ends of arms 14. Each ball 22 is provided with a rearwardly extending stud 24 projecting through a slot 25 in block 23 effective for restraining ball 22 against turning movement while permitting tilting thereof both lengthwise and transversely of the screed assembly 13. A hand wheel 26 is fixed on the upper end of each screw 21, which also has secured thereon a disc 27 disposed below hand wheel 26 and cooperating with a suitably graduated plate 28, mounted on block 23, to indicate the extent of vertical adjustment of the corresponding end of the screed assembly 13. Each of the adjusting screws 21 is further provided with a ratchet wheel 29 secured thereon a short distance above block 19. A locking pawl 30 is pivoted in a bracket 31 secured to the screed assembly 13, adjacent each ratchet wheel 29 and normally is held in engagement therewith by suitable means, such as a compression spring 32. As will be understood from the above, the screed assembly 13 may be adjusted, by means of the screws 21, so as to dispose the screed plate 33, at the underneath of the assembly either horizontally for contact with the bed of surfacing material, when the bed is to be of uniform thickness, or at an inclination lengthwise for crowning, when the bed is to be of considerable width and of decreasing thickness from the center of the roadway toward the sides thereof, as is known.

The screed plate 33 is formed of comparatively thin resilient plate metal, is flat and of substantially rectangular shape in plan, and may be, by way of example, approximately ten feet long and two feet wide. It is provided with upwardly extending front and rear flanges 34 and 35 and is suspended from screed assembly 13, as shown more clearly in Figure 3, by means of resilient hangers 36 of substantially inverted L shape, the arms of which are connected by an arcuate element 37 curved on a substantial radius. The lower ends of hangers 36 are welded to plate 33 adjacent the ends thereof. The ends of the upper arms of hangers 36, remote from elements 37, are secured, conveniently by welding, to two end frame members 38 of the assembly 33. The hangers 36 suspend the screed plate 33 from the screed assembly 13 for vertical adjustment therewith, and the elements 37 of hangers 36, being resilient, avoid any objectionable interference with vertical vibration of the screed plate 33 independently of screed assembly 13, by means to be described presently. End plates 39 are mounted on the screed assembly 13, free from plate 33 so as not to interfere with

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freedom of vibration or adjustment thereof. The plate 33 may be heated from its upper side by suitable known means, such as an oil burner 40 from which the hot products of combustion are directed downward by a stack 41 and are uniformly distributed, by suitably disposed ducts and baffles, over the upper face of screed plate 33, as is known.

The screed plate 33 is vibrated in a suitable manner, preferably by a plurality of electro-magnetic vibrators 42 mounted on a cross member 43 of the assembly and enclosed in housings 44 suspended from a channel member 45a supported above cross member 43 by boxings 46a. Each of the vibrators 42 has a tubular rod or armature 47a attached thereto at its upper end and secured at its lower end, conveniently by welding, to the upper face of screed plate 33. The vibrators 42 are spaced uniformly along the screed assembly 13 lengthwise thereof and are suitably energized, preferably in the manner disclosed in my above identified patent, for vibrating the screed plate 33 vertically in the manner and for the purposes stated in that patent. Within the broader aspects of my invention, the screed plate 33 may be vibrated in any suitable manner.

The screed plate 33 is provided adjacent the front and the back thereof with a pair of substantially L-shaped temperature compensating and adjusting levers 45. The shorter arm 46 of each lever 45 is pivoted at 47 to a bracket 48 suitably secured, conveniently by welding, to the upper face of screed plate 33 adjacent the midlength thereof. The longer arm 49 of each lever 45 is pivoted at 50 between the upper ends of two links 51 disposed at opposite sides thereof and at opposite sides of a bracket 52 suitably secured, conveniently by welding, to the upper face of screed plate 33 a short distance from the end thereof, to which bracket 52 the lower end of the links 51 are pivoted at 53. A substantially U-shaped bracket 54 is secured, conveniently by welding, to the upper face of arm 49 of each of the levers 45, adjacent the inner end thereof. A suitably bored and threaded block 55 is disposed between the sides of bracket 54 and is pivoted by studs 56, at its opposite sides, in bracket 54 for turning movement about a horizontal axis extending transversely of screed plate 33. The blocks 55 of each pair of levers 45 receive the threaded end portions of a turn-buckle 57.

The levers 45 of each pair are tied together at their inner ends by the turnbuckles 57 and associated parts and may be adjusted thereby to assure that the screed plate 33 is flat and level lengthwise as well as transversely. The linkage connections between the outer ends of the levers 45 and the screed plate 33 accommodate expansion and contraction of the latter, due to temperature variations, and, in conjunction with levers 45, effectively restrain the end portions of plate 33 against vertical movement relative to the midportion thereof. That prevents any objectionable lengthwise warping or buckling of screed plate 33. When the bed of surfacing material being laid is of substantial width, approximately twice the length of screed plate 33, for example, crowning may be effected by disposing the screed plate 33 at an appropriate inclination lengthwise, by means of the adjusting screws 21, as above described. If the bed of surfacing material being laid is of a width within the length of the screed plate 33 the latter may be bowed lengthwise to give the desired crown. That is accomplished by turning the turn-buckle 57 in such direction as to force the inner ends of the levers 45 of each pair thereof away from each other, it being noted that each of the flanges 34 and 35 is provided at its midlength with a vertical slot 58 extending for the full height thereof and thus comprises two sections. Forcing the inner ends of levers 45 apart causes them to swing in opposite directions about pivots 47. That swings the outer ends of levers 45 downward depressing the ends of screed plate 33 and imparting thereto a lengthwise bow, determined by the extent of adjustment of the turnbuckles 57, for imparting the desired

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crown to the bed of surfacing material being laid. When the screed plate 33 is thus bowed, the levers 45 remain effective for preventing objectionable warping or buckling thereof as before. The rear turnbuckle 57 and the hand wheels 26 of the adjusting screw 21, and the locking pawls 30 are readily accessible from an operator's platform 59 mounted at the back of the screed assembly 13 on brackets 60, and a suitably disposed platform (not shown) may be provided giving ready access to the front turnbuckle 57.

It will be understood that changes in detail may be resorted to without departing from the field and scope of my invention, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been disclosed.

I claim:

1. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular normally flat continuous and flexible screed plate suspended from said assembly for relative vertical vibration, means attached to said plate for vibrating it vertically and independently of said assembly, means for heating said plate, a pair of vertically and oppositely disposed rigid levers of substantially L-shape extending lengthwise of said plate and pivoted thereto at their inner ends adjacent the midlength of said plate, substantially vertically disposed rigid links respectively having one end pivoted at a fixed point lengthwise thereof to said levers and their other end pivoted at a fixed point lengthwise thereof to said plate adjacent the ends of the latter, and means rigidly securing the inner ends of said levers in spaced relation above the pivots thereof, said links accommodating expansion and contraction of said plate and in cooperation with said levers restraining said plate against buckling incident to heating thereof.

2. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular normally flat continuous and flexible screed plate suspended from said assembly for relative vertical vibration, means attached to said plate for vibrating it vertically and independently of said assembly, means for heating said plate, a pair of vertically and oppositely disposed rigid levers of substantially L-shape extending lengthwise of said plate with the lower ends of their shorter arms pivoted to said plate adjacent the midlength thereof, substantially vertically disposed rigid links respectively having one end pivoted at a fixed point lengthwise thereof to said levers adjacent the outer ends of the longer arms of said levers and their other end pivoted at a fixed point lengthwise of said links to said plate adjacent the ends of the latter, and means rigidly securing the shorter arms of said levers in spaced relation above the pivots thereof, said links accommodating expansion and contraction of said plate and in cooperation with said levers restraining said plate against buckling incident to heating thereof.

3. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular normally flat continuous and flexible screed plate suspended from said assembly for relative vertical vibration, means attached to said plate for vibrating it vertically and independently of said assembly, means for heating said plate, a pair of vertically and oppositely disposed rigid levers of substantially L-shape extending lengthwise of said plate with the lower ends of their shorter arms pivoted to said plate adjacent the midlength thereof, substantially vertically disposed rigid links respectively having one end pivoted at a fixed point lengthwise thereof to said levers adjacent the outer ends of the longer arms of said levers and their other end pivoted at a fixed point lengthwise of said links to said plate adjacent the ends of the latter, and means rigidly and adjustably securing the shorter arms of said levers in spaced relation above the pivots thereof, said links

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accommodating expansion and contraction of said plate and in cooperation with said levers restraining said plate against buckling incident to heating thereof, said securing means being effective for moving the inner arms of said levers apart and depressing the outer ends of said levers for optionally bowing said plate lengthwise.

4. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular normally flat and flexible screed plate suspended from said assembly for relative vertical vibration, means for vibrating said plate vertically and independently of said assembly, means for heating said plate, a pair of substantially vertically and oppositely disposed substantially L-shaped rigid levers extending lengthwise of said plate with the lower ends of their shorter arms pivoted to said plate adjacent the midlength thereof, substantially vertically disposed rigid connectors pivoted at fixed points lengthwise thereof to the longer arms of said levers adjacent the outer ends of said longer arms and to said plate adjacent the ends thereof respectively, and means rigidly and adjustably securing the upper ends of the shorter arms of said levers in spaced relation, said connectors accommodating expansion and contraction of said plate and in cooperation with said levers restraining said plate against buckling incident to heating thereof, said securing means being effective for moving the inner arms of said levers apart and depressing the outer ends of said levers for optionally bowing said plate lengthwise.

5. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular normally flat and flexible screed plate suspended from said assembly for relative vertical vibration, means for vibrating said plate vertically and independently of said assembly, means for heating said plate, a pair of substantially vertically and oppositely disposed substantially L-shaped rigid levers extending lengthwise of said plate adjacent each lengthwise edge thereof with the lower ends of their shorter arms pivoted to said plate adjacent the midlength thereof, substantially vertically disposed rigid connectors pivoted at fixed points lengthwise thereof to the longer arms of said levers adjacent the outer ends of said longer arms and to said plate adjacent the ends thereof respectively, and screw means rigidly and adjustably securing the upper ends of the shorter arms of said levers in spaced relation, said connectors accommodating expansion and contraction of said plate and in cooperation with said levers restraining said plate against buckling incident to heating thereof, said securing means being effective for moving the inner arms of said levers apart and depressing the outer

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ends of said levers for optionally bowing said plate lengthwise.

6. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular and normally flat one piece screed plate suspended from said assembly, means for heating said plate, a pair of rigid substantially vertically and oppositely disposed substantially L-shaped levers extending lengthwise of said plate and pivoted thereto at their inner ends, substantially vertically disposed rigid connectors pivoted at fixed points lengthwise thereof to said levers and to said plate adjacent the ends thereof respectively, and adjustable means rigidly securing the inner ends of said levers in spaced relation above the pivots thereof and effective for adjusting them toward and away from each other about their pivot connections to said plate, said levers and connectors restraining said plate against buckling incident to heating thereof and said connectors accommodating expansion and contraction of said plate.

7. In a road surfacing machine, a support, a screed assembly mounted on said support, a substantially rectangular and normally flat screed plate suspended from said assembly, means for heating said plate, a pair of substantially vertically and oppositely disposed rigid levers of approximately L-shape extending lengthwise of said plate with the lower ends of their shorter arms pivoted to said plate, substantially vertically disposed rigid connectors pivoted at fixed points lengthwise thereof to said levers adjacent the outer ends of the longer arms of said levers and to said plate adjacent the ends of the latter respectively, and means rigidly securing the inner ends of said levers in spaced relation above the pivots thereof, said levers and connectors restraining said plate against buckling incident to heating thereof and said connectors accommodating expansion and contraction of said plate.

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