Jan. 2, 1940. J. H. MOSEL 2,185,645

ROAD-BUILDING APPARATUS

Filed March 21, 1938 3 Sheets-Sheet 1

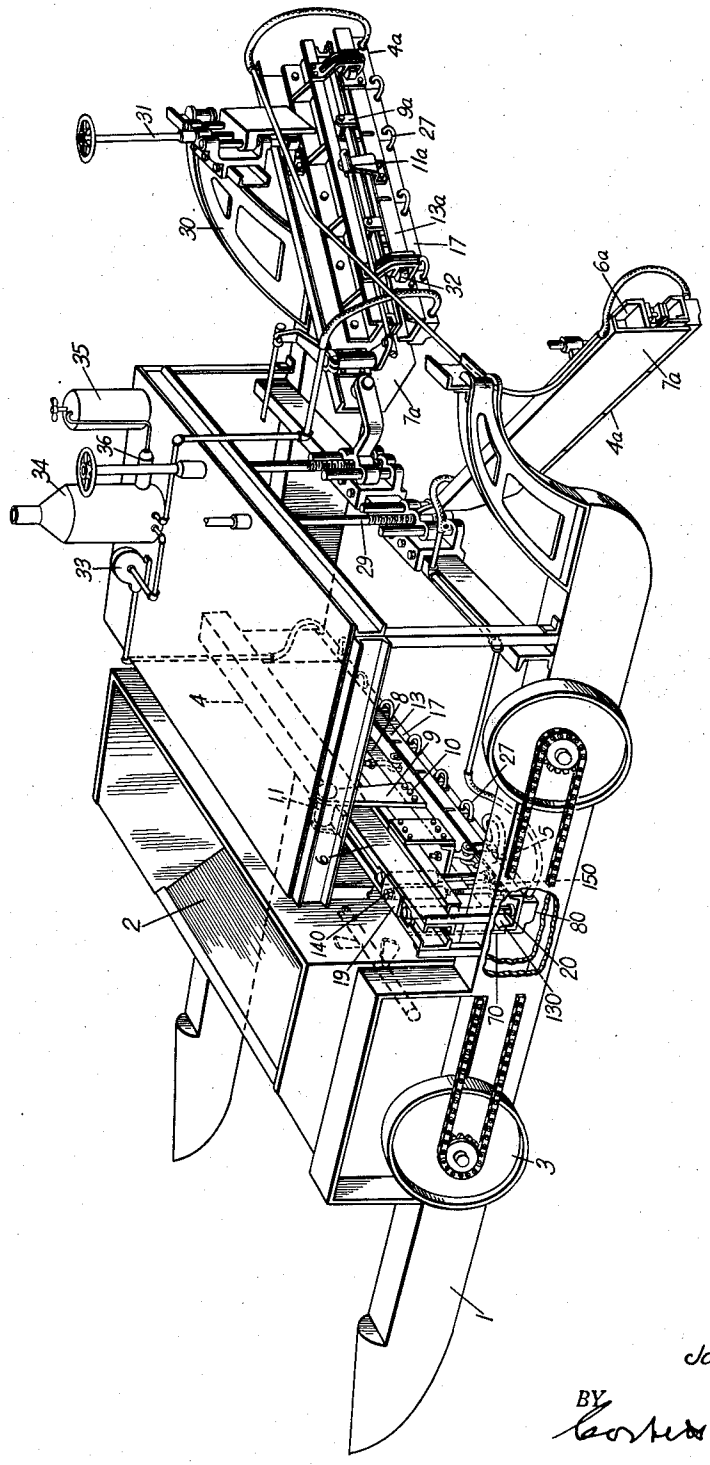


Fig. 1

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ROAD-BUILDING APPARATUS

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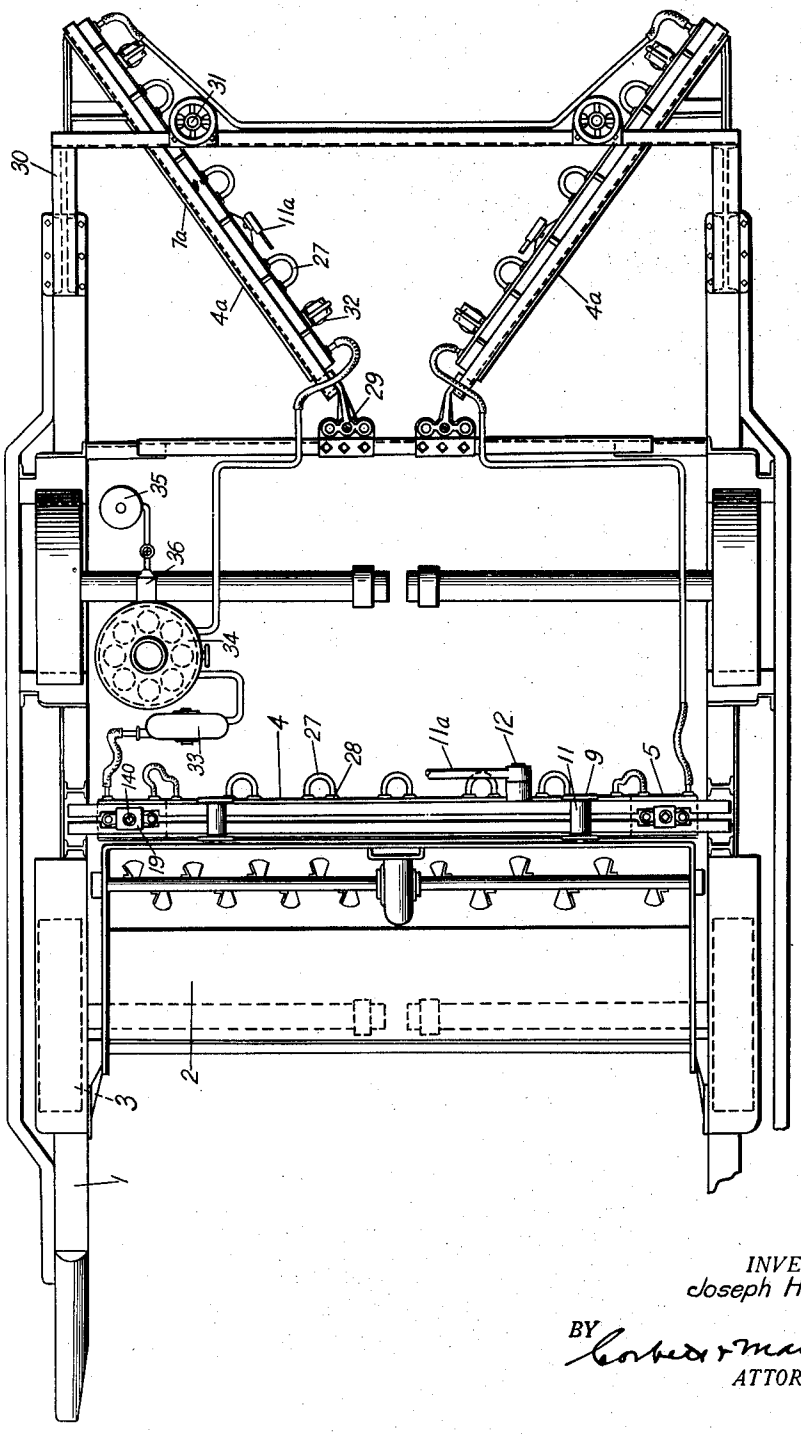


Fig. 2

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ROAD-BUILDING APPARATUS

Filed March 21, 1938 3 Sheets-Sheet 3

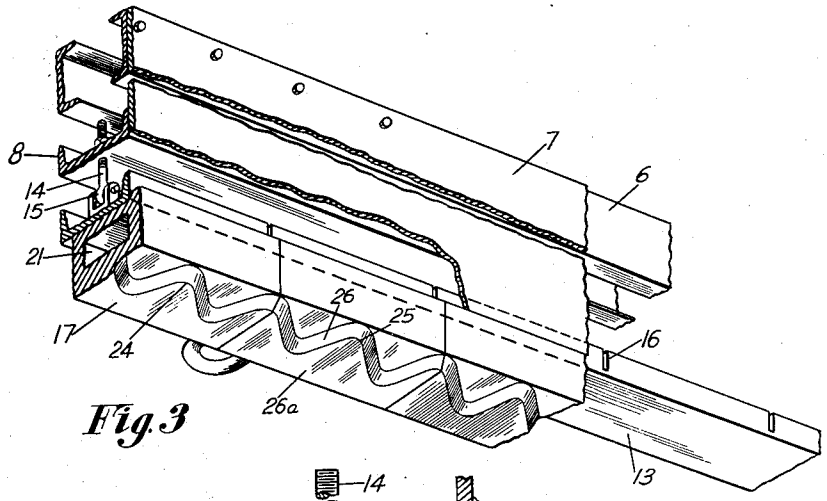


Fig. 3

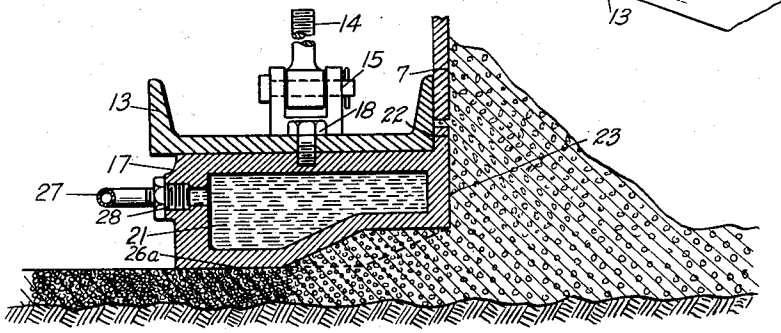


Fig. 4

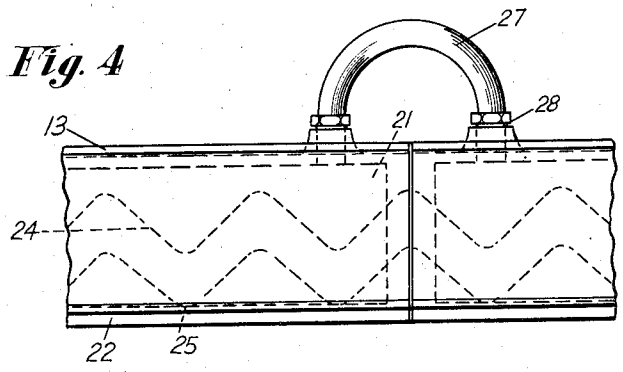


Fig. 5

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Patented Jan. 2, 1940 2,185,645

UNITED STATES PATENT OFFICE

2,185,645

ROAD-BUILDING APPARATUS

Joseph H. Mosel, Columbus, Ohio, assignor to The Jaeger Machine Company, Columbus, Ohio, a corporation of Ohio

Application March 21, 1938, Serial No. 197,067

13 Claims. (Cl. 94—45)

My invention relates to road-building apparatus. It has to do, more particularly, with a machine which is particularly suitable for operating on bituminous mixes or other similar material and is adapted to compact a layer of such material and to produce a smooth finished surface on such material.

The machine embodying this present invention is a machine of the general type illustrated in the patent to Joseph H. Mosel, No. 2,054,437, which issued September 15, 1936. However, it is to be understood that the various features of this invention are not necessarily limited to the particular type of machine disclosed in said patent.

One of the objects of my invention is to provide finishing means adapted to be applied to a machine of the type indicated which is of such a nature that it will compact and finish bituminous mixes, especially hot mixes, in an efficient, economical and accurate manner.

Another object of my invention is to provide finishing means which is particularly useful for operating on bituminous mixes and which embodies a screed that is so constructed that it will shear off and efficiently compact the sticky bituminous material.

Another object of my invention is to provide a screed of the type indicated in the preceding paragraph which is so constructed that it may be readily adjusted to obtain the desired crown on the surface being finished.

Another object of my invention is to provide a screed of the type indicated having means associated therewith for reciprocating it transversely to the path of movement of the machine, the screed and the reciprocating means being so arranged that a minimum amount of power will be required for producing the reciprocation.

Another object of my invention is to provide a screed of the type indicated having means associated therewith for efficiently and economically heating it so that it will readily operate on bituminous mixes or other similar materials.

My invention takes the form of a screed arrangement and construction applicable to a machine of the general type indicated. A plurality of screeds are provided on the machine and arranged in a novel manner. Each screed unit is mounted in such a manner that it may be vertically adjusted. Each screed unit embodies a supporting structure which carries a vertically disposed forward plate which is adapted to contact with the material as the machine advances. A finishing member is supported on the bottom of the supporting structure and has its forward edge substantially flush with said plate. The finishing member may be reciprocated without reciprocating said plate. Thus, the plate serves to take the thrust of a major portion of the material as the machine advances and prevents the greater portion of this force from being applied to the reciprocating finishing member. Consequently, the finishing member may be reciprocated with a minimum amount of power. The finishing member preferably includes a plurality of separate hollow shoe castings which are suitably secured thereto. These castings project forwardly underneath the stationary forward plate and their forward surfaces are in alignment with the forward surface of said plate. Thus, the forward side of the castings will contact with the material as the machine advances and since they reciprocate with the finishing member of the screed structure, the material will be agitated thereby. However, as previously stated, the greater portion of the thrust of the material will be taken by the stationary vertically disposed plate.

The separate castings are carried by a flexible strip or plate extending the length of the screed structure. Means is provided for flexing this strip so that the lower finishing surface of the screed structure will have the desired crown. Since the castings supported on the lower surface of the screed are in sections, crowning will be facilitated. As previously indicated, each of the castings is of hollow construction. I provide means for connecting these independent castings together and for circulating a hot fluid, such as oil, through the various castings in order to efficiently heat the finishing surface of the screed. Each of the castings has a plurality of teeth formed on the lower surface thereof. These teeth are spaced behind the forward edge of the casting in order to obtain a better compacting action. The teeth are so shaped that, as the screed advances over the material, they will serve to first shear off the material and then compact it.

The preferred embodiment of my invention is illustrated in the accompanying drawings wherein similar characters of reference designate corresponding parts and wherein:

Figure 1 is a perspective view of a road-building machine showing my invention applied thereto.

Figure 2 is a plan view of the machine.

Figure 3 is a detail in perspective, partly broken away, showing the screed structure.

Figure 4 is a transverse section taken through the lower portion of the screed structure show-

ing one of the castings and how it operates on the material over which it passes.

Figure 5 is a bottom view of a portion of the lower surface of the screed showing means for connecting adjacent castings to permit circulation of the heating fluid therethrough.

In the drawings, particularly in Figures 1 and 2, I have illustrated a machine of the general type disclosed in Patent No. 2,054,437, previously referred to. This machine comprises mainly a runner unit 1 and a spreading unit 2, the unit 2 being supported on wheels 3. As will be apparent from said patent, the unit 2 is free to move vertically without causing corresponding vertical movement of the runner unit 1, the runners of the unit 1 merely sliding along the surface. Directly behind the material receiving hopper of the unit 2 is a screed unit 4. This screed unit is carried by the runner unit. At the rear of the machine supported by the runner unit is a pair of auxiliary screeds or blender screeds 4a for operating upon material permitted to bleed back past the main screed 4. Vertically adjustable bleeding gate 5 are provided adjacent the ends of the main screed 4 to permit material to pass rearwardly of the main screed in the same manner described in the above-indicated patent. The screed structures 4 and 4a are of novel construction. Furthermore, they are of practically identical structure.

As illustrated best in Figures 1 and 3, the main screed unit 4 embodies a main supporting beam 6. This beam 6 is mounted on the runner unit for vertical movement and means similar to that described in said patent may be provided for supporting it and adjusting it to any desired position. The beam 6 carries a vertically disposed plate 7 which extends throughout the length of the screed unit. This plate serves to form the lower portion of the rear wall of the material-receiving hopper 2. This plate is disposed at the forward side of the screed structure and is adapted to contact with the material as the machine advances. It is adapted to take the thrust of the greater portion of the material that bears against the screed structure as the machine advances.

A channel beam 8 is suspended from the beam 6 by means of two pairs of brackets 9. Each of these brackets has its lower end bolted to the beam 8 as at 10 and each pair has a roller 11 supported on its upper end which operates on the upper surface of the beam 4. Thus, the beam 8 may be moved longitudinally relative to the beam 6 which supports it. I provide suitable means for reciprocating the beam 8 relative to the beam 6. This means as illustrated in Figure 2 may comprise a rod 11a which is pivotally connected to the beam 8 as at 12. The opposite end of the rod 11a may be connected to a crank or other suitable means for imparting a reciprocating motion thereto.

The beam 8 has suspended therefrom another channel beam 13. This channel beam is suspended from the beam 8 by means of bolts 14 pivoted to the beam 13 as at 15. The channel beam 13 has its flanges slotted at longitudinally spaced points, as indicated at 16, so that by adjusting the bolts 14 it may be curved to any suitable crown. This beam 13 is adapted to carry on its lower surface a plurality of hollow shoes in the form of castings 17 which will be described in detail hereinafter. The castings 17 may be bolted to the beam 13 by means of bolts 18.

As previously indicated, bleeding gates 5 are disposed at the ends of the main screed unit 4. For supporting each of these gates the beam 8 is provided with an extension 80 at each end thereof. The gate embodies a front plate 70 which is flush with the plate 7 and forms a continuation thereof. The lower edge of the plate 70 is secured to a channel 130 which forms a continuation of the channel 13. One of the shoes is secured to the lower surface of this channel 130. The gate is vertically adjusted by means of a screw 140 pivotally secured to the channel 130 as at 150. The upper end of the screw passes through a plate 19 which is adapted to slide on the beam unit 6. Guide rods 20 are also associated with the gate in the manner indicated. These rods 20 and the screw 140 pass upwardly through the beam unit 6, as indicated.

It will be apparent that the unit comprising the channel 8, channel 13 and the shoes carried thereby may be reciprocated relative to the unit consisting of the beam 6 and the plate 7. The plate 7 always remains stationary during the reciprocation.

Each of the castings 17 is of the shape illustrated best in Figures 3 and 4. Each casting is substantially rectangular in cross-section and of a width approximating the width of the channel 13, as illustrated in Figure 4. A chamber 21 for heating fluid is formed within each shoe casting. An upstanding flange or shoulder 22 is formed on the forward edge of each casting and is adapted to bear against the forward edge of the channel 13. The front surface 23 of each casting is flat and is vertically disposed being substantially flush with the plate 7 which projects downwardly into overlapping relationship to the channel member 13. Thus, it will be apparent that when the shoe-carrying portion of the screed unit is reciprocated, the shoes 17 will be reciprocated and the surfaces 23 thereof will move relative to the plate 7. The surfaces 23 of the shoes are adapted to contact with the material as the machine advances. Thus, they will serve to agitate the material adjacent the lower edge of the screed. However, the stationary plate 7 will take the thrust of the greater portion of the material. Thus, the shoe carrying portion of the screed unit may be reciprocated with a minimum of power. As indicated in Figure 3, the joints between the adjacent casting 17 are adapted to align with the slots 16 in the panel 13 to facilitate crowning.

The lower surface of each shoe is preferably provided with a plurality of forwardly projecting teeth or cutting edges 24 formed thereon. These teeth terminate at a point 25 spaced slightly behind the forward surface 23 of the shoe. The edges of the teeth 24 are bevelled as at 26 so that they will serve to compact the material as the machine advances. It will be apparent that the teeth are so arranged that they form a continuous serrated cutting and compacting edge extending throughout the length of the screed. A flat final finishing edge or surface 26a is provided behind the teeth. It will be apparent from Figure 4, that as the machine advances through the material the excess material will begin to pile up in front of the screed unit. The teeth or cutting edges will shear off the material and then by means of the bevelled and serrated surface 26 will key up and compact the material. The final finish is obtained from the flat surface 26a disposed behind the teeth 24. As the machine advances, the shoe-carrying portion thereof will be

reciprocated and this will enhance the shearing and compacting action.

Each of the separate shoe castings 17 is provided with a chamber 21 for receiving the fluid adapted to heat the shoe. In order to connect adjacent shoe castings, I provide a number of U-shaped tubes 27 of the type indicated in Figure 5. One end of this tube is threaded into a boss 28 formed adjacent the end of one of the shoes while the opposite end thereof is threaded into a similar boss formed on the adjacent end of the adjacent shoe. It will be apparent that the shoe sections may be caused to assume the proper crown without disturbing the connection between the adjacent shoes.

Each of the screed units 4*a* is substantially identical with the screed unit 4. Each unit has a stationary plate 7*a* which has one end supported on screws 29 mounted on the runner unit and provided for vertically adjusting the end of the screed unit 4*a*. The opposite end of each of these units is supported on a support 30 extending rearwardly from each runner and is adapted to be vertically adjusted by means of a screw 31. The stationary plate 7*a* carries a beam 6*a*. Reciprocably suspended from this beam 6*a* by means of brackets and roller units 9*a* is a channel 13*a*. This channel carries shoes 17. The reciprocating portion of this screed unit is substantially identical with that of the unit 4 and further description is not deemed necessary. Any suitable means such as that indicated generally by the numeral 11*a* may be provided for reciprocating the shoe-carrying portion of the screed. Thrust-receiving rollers 32 supported on brackets depending from the beam 6*a* and bearing against the rear surface of the channel 13*a* may be provided.

The means for supplying and circulating the heating fluid through the various shoe castings may be of any suitable type. It preferably comprises a pump 33, a heating chamber 34 and a tank 35 for air under pressure. The tank 35 is adapted to supply a burner unit 36 with air for combustion. These units are connected to the various screed units by suitable flexible conduits.

It will be apparent from the above description that I have provided finishing means adapted to be applied to a machine of the type indicated having many advantageous features. The auxiliary screeds as well as the main screed are reciprocated in order to enhance the finishing action. Each screed is of such a nature that it will contact and finish bituminous mixes, especially hot mixes, in an efficient, economical and accurate manner. Each screed which I have provided has a comparatively flat lower finishing surface which is provided with a serrated and bevelled continuous edge for shearing and compacting the material as the machine advances and the screed reciprocates. The screed is of such structure that its crown may be readily changed. Furthermore, the screed is so arranged that the shoe-carrying portion may be reciprocated with a minimum amount of power.

Having thus described my invention, what I claim is:

1. In apparatus for finishing a road surface, a reciprocating finishing member having a substantially flat finishing surface, said finishing surface having a serrated edge formed on the bottom thereof for contacting with the material as the apparatus advances, said serrated edge being disposed behind the forward edge of said finishing member.

2. In apparatus for finishing a road surface, a finishing member having a substantially flat finishing surface and disposed transversely of the path of movement of the apparatus, said finishing surface having a substantially continuous serrated edge formed thereon for contacting with the material as the apparatus advances, means for reciprocating said finishing surface transversely of the path of movement of the apparatus as the apparatus advances, said edge being bevelled so as to compact the material as the apparatus advances and the finishing surface reciprocates, said serrated edge being disposed behind the forward edge of said finishing member.

3. In apparatus for finishing a road surface, a screed unit having a substantially flat finishing member disposed at the bottom thereof, a stationary vertically disposed plate supported on said screed unit and adapted to take the thrust of the greater portion of the material bearing against said screed unit as the apparatus advances, said finishing member having a serrated edge formed thereon at a point behind the forward edge of said finishing member, the forward edge of said finishing member being disposed below the edge of said plate and substantially flush therewith, and means for reciprocating said finishing member without reciprocating said plate.

4. In apparatus for finishing a road surface, a screed structure comprising a supporting structure, said supporting structure being mounted on the apparatus in such a manner that it may be vertically adjusted, said supporting structure carrying a vertically disposed plate adapted to receive the thrust of the greater portion of the material which bears against the screed structure as the apparatus advances, a finishing member supported on said supporting structure for reciprocating movement relative thereto, said finishing member having a flat forward edge adapted to engage the material as the apparatus advances, said flat edge being disposed below the edge of said stationary plate and substantially flush therewith, and means for reciprocating said finishing member relative to said plate.

5. A screed unit comprising a support adapted to be reciprocated, a finishing shoe secured to said support, said shoe comprising a substantially flat lower surface having a continuous serrated and bevelled edge formed thereon which is spaced from the forward edge of said shoe, said shoe also having a substantially flat surface formed thereon behind the serrated edge.

6. A screed unit comprising a longitudinally extending support, means for bowing said support to produce a predetermined crown, a plurality of finishing shoes secured to said support, said shoes being mounted on said support adjacent each other but being independent of each other to permit crowning of said support, each of said shoes comprising a substantially flat lower surface having a continuous serrated and bevelled edge formed thereon which is spaced from the forward edge of said shoe.

7. A screed unit comprising a longitudinally extending support, means for bowing said support to produce a predetermined crown, a plurality of finishing shoes secured to said support, said shoes being mounted on said support adjacent each other but being independent of each other to permit crowning of said support, each of said shoes having a chamber formed therein

for receiving heating fluid, and means for connecting the adjacent shoes together so that the fluid will circulate from one shoe to the other, said means being of such a nature that it will not interfere with crowning of said support.

8. In a machine of the type described, a plurality of longitudinally extending runners, a main screed carried by the runners and extending transversely of the path of movement of the machine, means for reciprocating said screed transversely of the path of movement of the machine, means for permitting material to bleed back past said screed, an auxiliary screed disposed behind said main screed, said auxiliary screed being carried by the runner and being disposed at an angle thereto, and means for reciprocating said auxiliary screed longitudinally of its own axis.

9. In a machine of the type described, a plurality of longitudinally extending runners, a main screed carried by the runners and extending transversely of the path of movement of the machine, means for reciprocating said screed longitudinally of its own axis, an auxiliary screed disposed behind said main screed transversely of the path of movement of the machine, and means for reciprocating said auxiliary screed longitudinally of its own axis.

10. In a machine of the type described, a plurality of longitudinally extending runners, a main screed carried by the runners and extending transversely of the path of movement of the machine, an auxiliary screed disposed behind said main screed and extending transversely of the path of movement of the machine, and means for reciprocating said auxiliary screed longitudinally of its own axis.

11. In a machine of the type described a plurality of longitudinally extending runners, a main screed carried by said runners and extending transversely of the path of movement of the machine, means for permitting material to bleed back past said screed, an auxiliary screed disposed behind said main screed for operating upon the material that bleeds back past the main screed, said auxiliary screed being disposed at an angle to said runners, and means for reciprocating said auxiliary screed longitudinally of its own axis.

12. In apparatus for finishing a road surface, a hopper having a rear wall, a screed unit disposed directly behind said rear wall, said screed unit embodying a supporting structure which is vertically adjustable relative to said rear wall, said screed unit including a vertically disposed plate secured to said supporting structure and being vertically movable therewith, said screed unit also including a substantially flat finishing member disposed at the bottom thereof, said finishing member being mounted on said supporting structure in such a manner that it may be reciprocated thereon longitudinally of itself, said finishing member having its forward edge disposed below the edge of said plate and substantially flush therewith, and means for reciprocating said finishing member without reciprocating said plate.

13. In apparatus for finishing a road surface, a screed unit, said screed unit embodying a main supporting structure, a vertically disposed plate secured to the front side of said supporting structure, a support carried by said first support in such a manner that it may be reciprocated relative thereto, a substantially flat finishing member adjustably carried by said last-named support, said finishing member having its forward edge disposed below the edge of said plate and substantially flush therewith, said plate being adapted to take the thrust of the greater portion of the material bearing against said screed unit.

JOSEPH H. MOSEL.