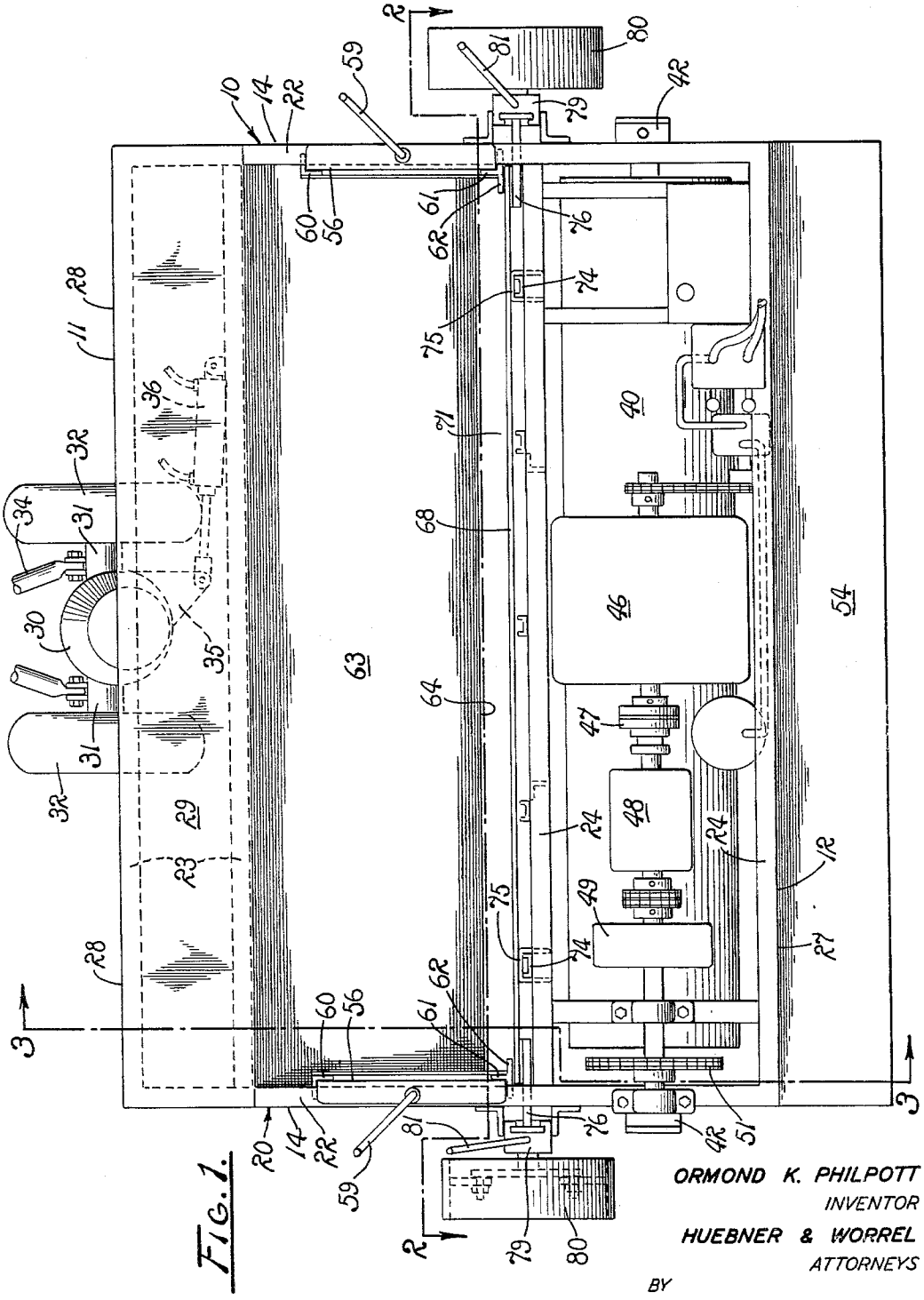
Jan. 18, 1966 O. K. PHILPOTT 3,229,601

METHOD AND APPARATUS FOR LAYING ASPHALT

Original Filed April 24, 1962 3 Sheets-Sheet 1



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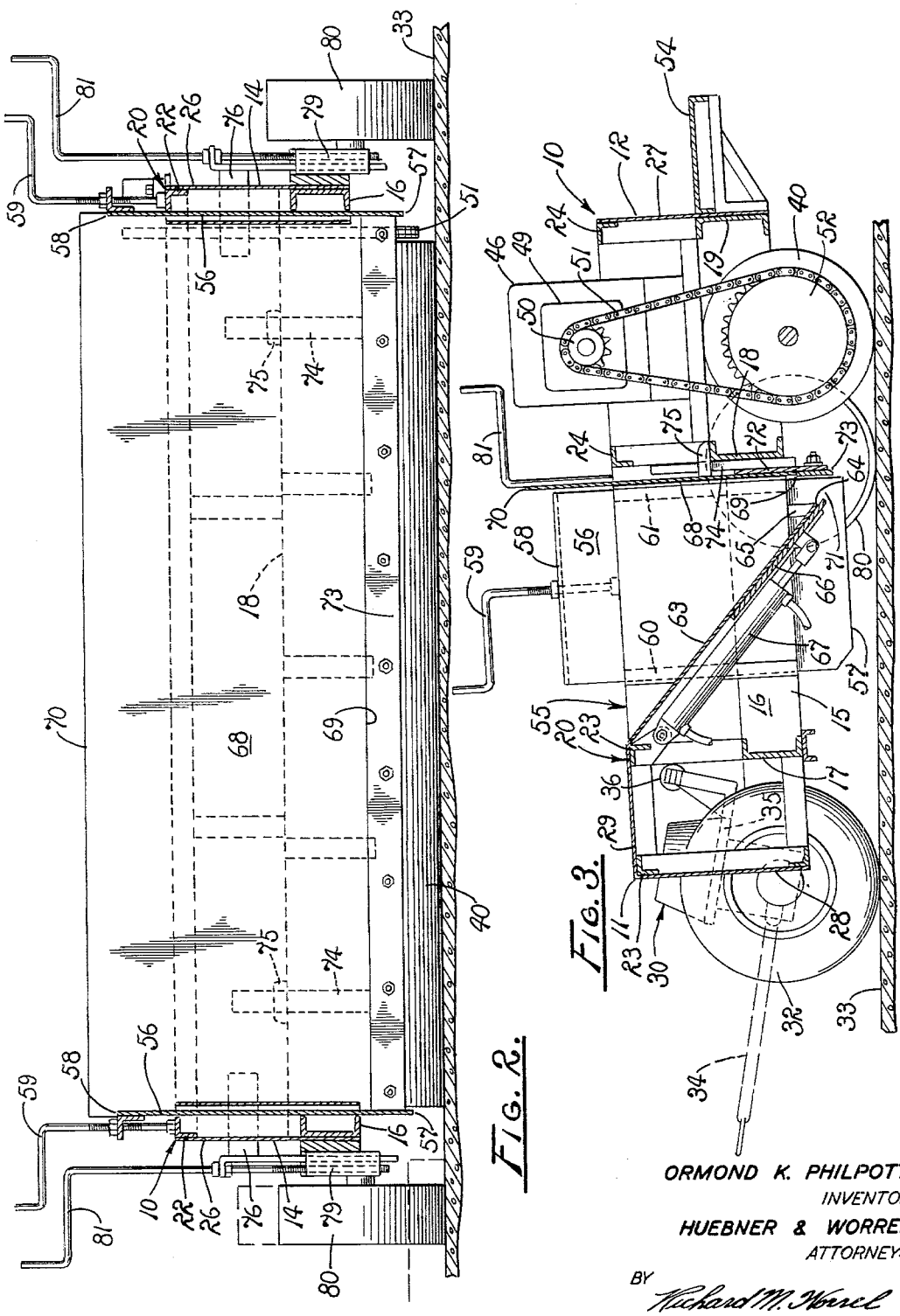


FIG. 2.

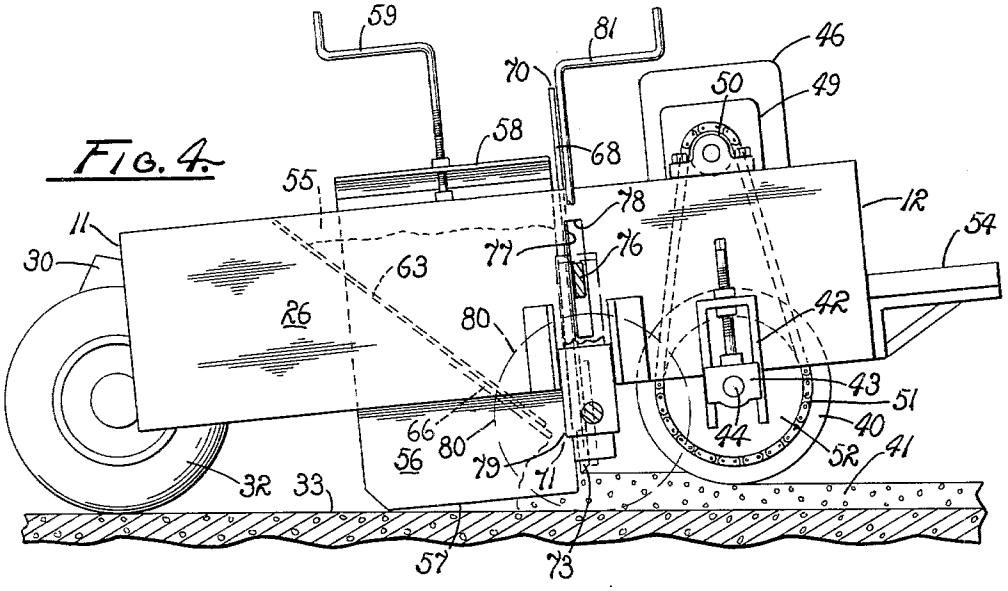
FIG. 3.

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FIG. 4.



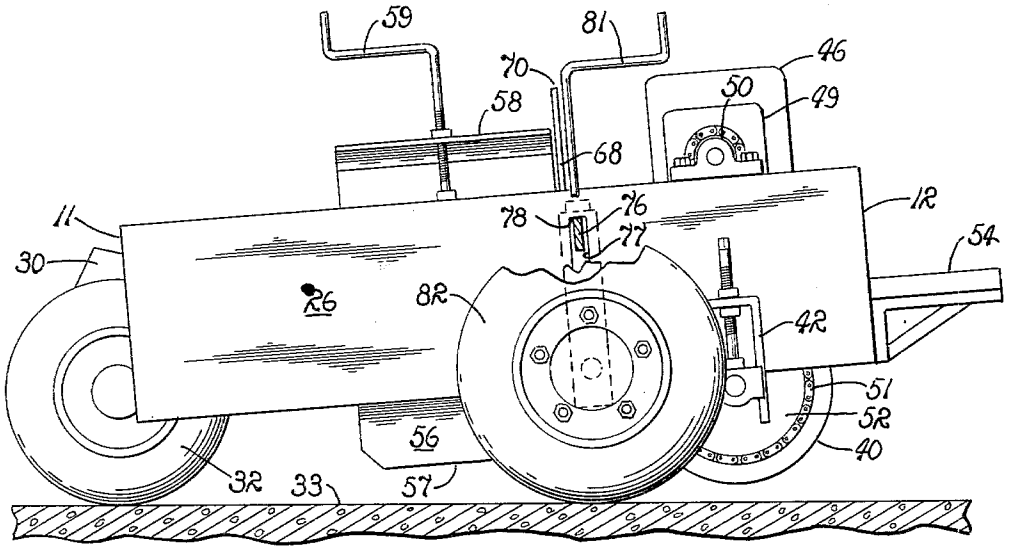


FIG. 5.

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METHOD AND APPARATUS FOR LAYING ASPHALT

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Continuation of application Ser. No. 189,900, Apr. 24, 1962. This application Dec. 24, 1964, Ser. No. 427,529

7 Claims. (Cl. 94—44)

This is a continuation of application Serial No. 189,900, filed April 24, 1962, and now abandoned. The present invention relates to a method and apparatus for laying asphalt and more particularly to such a method and apparatus for the concurrent depositing, leveling, and finish-rolling of asphalt paving and the like.

Much of the inefficiency and expense involved in laying asphalt results from the multiplicity of successive operations involved and the required time-spaced relation of such operations. Hot asphalt is usually transported to the job in trucks and at a temperature of approximately 280° F. It is spread on a pre-established support surface, or bed, while at approximately its transport temperature. It is immediately shaped or levelled in conformity to the ultimate shape and grade desired. If a high quality end product is required, the asphalt is tamped while still hot to achieve a desired density. Finally, and after the lapse of a curing period, the asphalt is rolled to provide the finished surface. Prior to rolling the asphalt, it has been necessary to permit the positioned material to cure for a substantial period depending upon the viscosity of the asphalt utilized and the ambient temperature. Normally, it is necessary to wait for from one to several hours for this curing step to be completed. During the curing the surface of the asphalt is porous and volatile constituents evaporate in substantial quantities. Further, the porosity permits heat to escape more rapidly than desired for optimum curing. While these deficiencies of the curing step have long been recognized, they have been unavoidable prior to the present invention.

If the rolling-finishing operation is performed too soon, it is well known that the asphalt surface rapidly cracks in deterioration known in the art as "raveling." Thus, prior practices have required the toleration of a curing step frequently involving several hours and resulting in the dissipation of valuable volatile constituents in order to avoid or minimize raveling.

While the precise nature of raveling is not understood, it is uniformly recognized that premature rolling of asphalt results in surface cracking. One theory of the cause of raveling aids in the understanding of the present invention. When the hot asphalt is first deposited, its surface loses heat quite rapidly while its interior remains at virtually the same temperature for a protracted period. The decrease in surface temperature causes surface hardening while the support asphalt is still amorphic. Thus, the rolling of the surface compresses an already somewhat hardened layer against an unsubstantial base which during the subsequent cooling is prone to distort by thermocontraction to fracture the surface not already fractured by the rolling action. By waiting several hours, the asphalt attains a more uniform temperature, much closer to environmental temperature, it more uniformly solidifies and thus acceptable paving has resulted from delayed rolling although recognized to be less substantial than the theoretical capabilities of the material.

The broad essence of the present invention resides in the discovery of a method and the provision of an apparatus for concurrently laying, screeding, and finishing asphalt so as to avoid raveling and to retain volatile constituents previously lost to the atmosphere by the asphalt during curing. The invention also permits effective compacting without tamping, the reduction of the laying time to a fraction of that previously required, the attainment of a superior end product and a substantial reduction in cost.

Accordingly, it is an object of the present invention to provide a method and apparatus for concurrently depositing, spreading, levelling and finish-rolling asphalt.

Another object is to provide such a method and apparatus which attains desired compacted density without tamping.

Another object is to increase the speed of asphalt laying and finishing.

Another object is to achieve superior asphalt paving by minimizing the escape of volatile constituents thereof during curing.

Another object is to reduce the labor conventionally required for the laying of asphalt paving.

Another object is to make available improved asphalt paving at reduced cost.

Another object is to provide such an asphalt laying apparatus which is self-propelled but which alternately may be towed during the laying operation or towed for high speed highway transport.

Another object is to provide an asphalt laying apparatus which permanently seals the surface of hot asphalt prior to the escape of volatile constituents thereof.

Another object is to provide such a machine which automatically provides a uniform mat of asphalt without the usual digging-in or climbing-out problems attendant to conventional applying machines.

Another object is to provide an asphalt applying machine capable of laying a successive strip of asphalt while a preceding strip is in a semi-hardened, still heated condition, so that the adjacent strips blend without discernible seams therebetween.

Another object is to provide an asphalt applying machine which can be driven and supported on the surface applied thereby.

Another object is to provide such a machine having a material levelling screed carried for movement therewith which can be supported in free-floating relation to the machine on the pre-established support surface.

Further objects are to provide improved elements and arrangements thereof in a device of the character and for the purposes set forth.

In the drawings:

FIG. 1 is a top plan view of an asphalt applying machine embodying the principles of the present invention.

FIG. 2 is a transverse vertical section of the instant machine, taken on line 2—2 of FIG. 1.

FIG. 3 is a longitudinal vertical section of the machine, taken on line 3—3 of FIG. 1.

FIG. 4 is a side elevation of the instant machine shown in an operating position with the roller thereof supported on the asphalt surface being applied thereby.

FIG. 5 is a side elevation of the instant machine shown modified for high speed transport.

The asphalt applying machine embodying the principles of the present invention shown in the accompanying drawings provides a substantially rectangular box-like frame **10**. The frame includes predetermined forward and rearward ends **11** and **12**, respectively, and opposite sides **14**. The frame has a lower base portion **15** having a pair of opposite side beams **16** which are interconnected by a transversely extended beam **17** rearwardly adjacent to the forward end of the frame, as by welding or the like. A pair of longitudinally spaced transversely extended beams **18** and **19** are similarly disposed and secured adjacent to the rearward end of the frame. The frame also includes an upper rail portion **20** having a pair of opposite side, angle rail members **22**. The rail members are interconnected by a pair of transversely

extended angle rails 23 adjacent to the forward end of the frame and by a pair of longitudinally spaced transversely extended angle rails 24 adjacent to the rearward end of the frame. The frame is enclosed by a pair of opposite side plates 26, a rearward plate 27, and a centrally divided front plate 28, all of which extend between the lower base portion and the upper rail portion of the frame.

A substantially flat top plate 29 is rigidly mounted in covering relation between the angle rails 23 at the forward end 11 of the frame 10. A fifth wheel mechanism 30 is mounted on the forward end of the frame centrally of the divided front plate 28. Such mechanism carries an axle 31 for rotation about a substantially upright axis. The axle rotatably mounts a pair of transversely spaced support wheels 32 to support the forward end of the frame upon a pre-established support surface such as a roadbed, as indicated at 33. A removable draft tongue 34 is rigidly mounted on and forwardly extended from the axle of the fifth wheel so that the machine can be towed during operation or during road travel. An arm 35 is rearwardly extended from the fifth wheel 30 and has pivoting connection with the rod end of an hydraulic ram 36. The cylinder end of the ram is pivotally connected to the transverse beam 17 whereby actuation of the ram pivots the wheels 32 about the upright axis of the fifth wheel for steering the machine.

An elongated cylindrical roller 40 is adjustably mounted on the lower base portion of the frame adjacent to the rearward end thereof. The roller supports the rearward end of the frame during operation on a mat 41 of asphalt material being applied thereby in a manner soon to be described. As best shown in FIG. 4, such adjustable mounting is provided by a pair of opposite inverted U-shaped slide brackets 42 which are rigidly individually mounted on the opposite side beams 16 intermediate the transverse beams 18 and 19. The brackets each constrain a bearing block 43 which rotatably receives a mounting shaft 44 concentrically transversely outwardly extended from the roller. An elongated adjusting member is screw-threadably extended through the upper portion of the bracket 42 for connection to the bearing block 43 thereby selectively to raise and to lower the roller 40 relative to the frame.

The roller 40 is driven for rotation by an internal combustion engine 46 which is mounted on the rearward end of the frame intermediate the lower side beams 16. The engine is connected to the roller by way of a conventional drive train including a clutch 47, a transmission 48, a speed-reducing box 49, and a sprocket 50, all coaxially aligned transversely of the engine. The drive sprocket 50 supports an endless chain 51 which is trained about a larger sprocket 52 rigidly carried by the shaft 44 of the roller. As shown schematically to the right of the engine, as viewed in FIG. 1, the rearward end of the frame also mounts a fuel tank and suitable control mechanism for steering and the like. Such control mechanism is conveniently disposed adjacent to an operator's platform 54 carried in rearward extension from the lower frame beam 19.

An asphalt hopper, generally indicated at 55, is carried by the frame intermediate the forward and rearward ends thereof. The hopper provides a pair of transversely opposite vertically adjustable side panels 56 of sheet material each having a lower edge 57 extended below their respective lower side beams 16 adjacent to the roadbed 33 and an opposite outwardly extended right-angularly related upon flanged edge portion 58. The side plates are individually mounted for such movement relative to the frame by a pair of cranks 59 screw-threadably received through an upper flanged edge portion of the side panels with their lower ends rotatably secured to their respective side edges of the frame. The side panels are individually constrained against longitudinal tipping along their opposite side edges by pairs of opposite forwardly and rearwardly disposed, substantially vertically extended, angle rails 60 and 61, respectively. The rearward rails 61 adjacent to the roller 40 provide inwardly extended guide portions 62. The hopper includes an inclined bottom wall 63 which is secured, as by welding or the like, to the rearward edge of the top plate 29 of the frame and downwardly rearwardly declines therefrom to terminate in a lower edge 64 below the side beams 16 and forwardly of the roller 40. The lower edge of the bottom wall 63 is supported in such position by a pair of transversely opposite braces 65 individually secured to their respective frame beams 16 in depending relation therefrom. A metering plate 66 is slidably mounted adjacent to the lower edge of the bottom wall 63 and is adjustably positioned between extended and retracted positions by a double acting hydraulic ram 67.

A substantially flat rectangular screed 68 having upper and lower edges 70 and 69, respectively, is disposed between the opposite side plates of the frame in substantially upright position intermediate the lower end of the bottom wall 63 of the hopper and the forwardly disposed periphery of the roller 40. It is preferably closely adjacent to the roller. The screed, the lower end of the bottom wall, and the opposite side plates form an opening 71 discharging downwardly from the hopper. A backing plate 72 is rigidly mounted along the lower portion of the screed in downwardly extended relation therefrom and provides a replaceable wear plate 73. A plurality of upwardly extended backing plate braces 74 are rigidly secured thereto in transversely spaced relation for extension through corresponding strap members 75 rigidly mounted on the transverse beam 18. As best shown in FIG. 2, a pair of opposite support arms 76 is rigidly mounted intermediate the upper and lower edges of the screed in transversely outwardly extended relation therefrom through elongated substantially vertically extended openings 77 in the opposite side plates 26 of the frame. The portion of the side plates defining the upper end of the openings provides a support arm stop surface 78. The support arms individually mount a depending slide bar which is received within a channeled axle block 79. The axle blocks individually mount ground engaging wheels 80 which, through crank handles 81, may be elevationally adjusted relative to the screed. The wheels 80 are preferably of the hard tire, all steel type to permit precise control of the screed 68. Each crank handle provides a lower end which is rotatably secured to its respective axle block 79 and has a screw-threaded portion screw-threadably received through the upper end of the slide bar 74 for positioning the axle block toward and from the support arm 76. As best shown in FIG. 5, the wheels 80 can be replaced by pneumatic tired wheels 82 for high speed transport of the machine. The diameter of the wheels 82 is sufficiently greater than the wheels 80 to raise the roller 40 in elevationally spaced relation from the support surface. Also, the support arms 76 of the screed 68 abut the upper stop surfaces 78 of the openings 77 in the side plates 26 to support the frame 10 and the roller 40 in such transporting position.

Operation

The operation of the described embodiment of the subject invention is believed to be readily apparent and is briefly summarized at this point. The apparatus of the present invention is positioned on the roadbed 33 with the wheels 80 supporting the screed 68 thereon. The roller 40 engages the roadbed in supporting relation to the rearward end 12 of the frame 10. The crank handles 81 are manipulated elevationally to adjust the screed 68 relative to the roadbed so as to pre-level asphalt subsequently applied by the machine to the desired thickness. Also, the crank handles 59 are similarly manipulated to position the lower edges 57 of the hopper side panels 56 closely adjacent to the roadbed to constrain such deposited asphalt transversely of the apparatus. The hy-

draulic ram 67 is actuated to extend the closure plate 66 of the bottom wall 63 of the hopper 55 to a position abutting the wear plate 73 of the screed 68 thereby to close the hopper opening 71. The hopper is then filled with hot asphalt having a temperature of approximately 280° F. from a dump truck in the conventional manner. Upon engagement of the drive train clutch 47 to transmit torque to the roller 40, the jack 67 is actuated to retract the closure plate 66 to open the hopper opening immediately ahead of the screed 68. The hot asphalt gravitationally flows from the hopper and is deposited on the roadbed 33.

With forward movement of the machine, the lower wear plate 73 of the screed 68 engages such deposited asphalt in edgeward scraping relation and levels the same ahead of the roller 40. With continued forward movement, the roller rolls over the upper substantially flat surface of the mat 41 of deposited asphalt. The roller is quite heavy, as is known in the art.

As soon as the roller 40 is supported on the deposited asphalt, the cranks 59 are manipulated properly to adjust the heights of the side panels 56. Since the screed 68 is supported on the gauge wheels 80, the cranks 81 need not be adjusted to accommodate any elevational movement of the roller 40.

It will be apparent that the roller 40 engages the asphalt immediately after it has been levelled by the screed 68. The asphalt has thus not had an opportunity to cool to any significant extent even on its surface. Since the entire mat of asphalt is still hot, the roller compacts it as effectively as conventional tamping operations. In fact, the roller readily compacts the asphalt to a density of 90% which is frequently superior to the densities achieved by tamping. The roller also seals the surface of the asphalt by forming a substantially nonporous layer. Not only is such sealing superior to that previously attainable but it precludes or minimizes the escape of volatile constituents. Still further, the sealing retards heat loss so that the asphalt cures more gradually. Since the surface does not have an opportunity to chill prior to the action of the roller, conventional raveling is totally avoided even though regarded as an unavoidable consequence of rolling prior to or during curing.

An operator supported on the platform 54 is in an ideal position to observe the job being performed and to direct the apparatus along the area to be paved. In actual practice, the described apparatus has been found capable of depositing, screeding, compacting and surfacing to completion a mat eight feet wide at the rate of sixty linear feet per minute.

When laying successive mats of asphalt or when laying asphalt closely adjacent to an elevated curb, the screed support wheels 80 can be individually elevationally positioned to be supported on the curb or preceding mat of asphalt thereby to maintain absolute surface conformity. Inasmuch as the instant apparatus provides for immediate rolling while the asphalt is still in a heated condition, adjacent mats can be laid without any discernible seam therebetween. In fact, if a succeeding mat is laid before a preceding adjacent mat has cooled, actual bonding therebetween can be achieved. It is believed apparent that when working next to a previously laid mat of asphalt, the elevationally adjustable hopper side panel 56 adjacent thereto is raised to permit the two mats to blend.

The free-floating screed 68 and gauge wheels 80 insure that the thickness of the asphalt being screeded thereby is not influenced by irregularities encountered by the frame. With this arrangement, the instant structure precludes any digging-in or climbing-out of the screed. These difficulties are unavoidable if the screed is carried by the roller or by wheels or rollers supported on the applied asphalt. After use, the apparatus may be quickly and easily adapted for high speed transport by replacing the screed support wheels 80 with the pneumatic tired wheels 82. Further, the tongue 34 can be returned to position for towed transport.

From the foregoing, it is readily apparent that the asphalt laying method and apparatus of the present invention is operative to deposit, level, and finish-roll an asphalt surface in one operation. Such single operation not only provides a markedly better surface than that obtainable with conventional machines or practices, but does so at a reduced cost and at an increased profit to owners of such equipment. Further, the resultant pavement is harder and more durable. Large areas, such as playgrounds and the like, can be covered by successive passes with the machine with no discernible seams between the individual mats applied thereby to provide a smooth unbroken surface throughout the area. By being able to finish roll the surface immediately after screeding, substantially all the volatile constituents of the asphalt are sealed within the mat for optimum curing of the asphalt.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices and apparatus.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame; asphalt containing means mounted on the frame, said containing means providing an asphalt discharge opening elongated transversely of the direction of travel of the apparatus; a cylindrical roller axially coextensive with said opening and in rearwardly spaced relation thereto; means connecting the roller to the frame rearwardly adjacently of the discharge opening in supporting relation to said frame, said roller being adapted to be disposed on asphalt discharged from said containing means; asphalt levelling means positioned in the frame between said opening and said roller means mounted in the frame mounting the levelling means for travel with the frame for elevational movement independently of said frame and with the levelling means adapted to be disposed in engagement with asphalt discharged from said opening; means mounted in the frame for floating elevational movement independently thereof and oppositely outwardly spaced from the levelling means, opposite ends of the opening and opposite ends of the roller, said floating means being operably associated with the levelling means and being adapted to support said levelling means on said support surface in predetermined spaced relation thereto on opposite sides of the opening; and powered means connected to the roller for rotating the same to motivate the apparatus for travel over the support surface.

2. An asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame; asphalt containing means mounted on the frame, said containing means providing an asphalt discharge opening adapted to be disposed adjacent to said support surface and elongated transversely of the direction of said travel and having opposite ends; a cylindrical roller axially coextensive with the opening and rearwardly spaced therefrom, said roller having opposite ends individually substantially aligned with said opposite ends of the opening; means connecting the roller to said frame rearwardly adjacently of said opening in supporting relation to the frame, said roller being adapted to be disposed on asphalt discharged from said containing means; said containing means providing asphalt levelling means contiguous with the opening and between said opening and said roller, said levelling means being adapted for free-floating elevational movement independently of the frame and the containing means, said levelling means having a lower edge adapted to be disposed in scraping engagement with asphalt discharged from said opening; gauge means operably associated with the levelling means and disposed in outwardly spaced relation from said opposite ends of the opening

and from said opposite ends of the roller, said gauge means being adapted to support said levelling means on a support surface in said free-floating relation to said frame and to said roller on opposite sides of asphalt discharged through the opening, said gauge means being adapted to support said levelling means and maintain the same in predetermined spaced relation to the support surface whereby asphalt discharged through the opening is pre-conditioned for the roller at a predetermined uniform thickness; and powered means having driving connection to the roller for rotating the same to motivate the apparatus for travel over a support surface.

3. A mobile asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame having predetermined forward and rearward ends and opposite sides, steerable wheels mounted on said forward end of the frame in supporting relation thereto, an elongated cylindrical roller mounted on the frame in transversely extended relation between said sides thereof in supporting relation to the rearward end of the frame, powered means mounted on the frame having driving conenction to said roller, a hopper borne by the frame intermediate the ends thereof forwardly of the roller having a downwardly directed opening transversely coextensive with the roller for depositing such asphalt on the support surface immediately ahead of the roller, a screed, means mounting the screed in said frame for travel therewith and for elevational movement independently thereof rearwardly adjacent to said opening in the hopper having a lower edge adapted to be disposed in scraping engagement with asphalt discharged from the hopper opening and opposite ends transversely outwardly extended beyond said lower edge thereof and beyond said sides of the frame, and gauge means adapted to support said screed in free-floating engagement on said support surface on opposite sides of asphalt discharged through said opening from the hopper in predetermined spaced relation to said support surface so as precisely to maintain said lower edge of the screed in said spaced relation to insure uniform deposit of asphalt on the support surface irrespective of elevational movements of the frame.

4. A mobile asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame having predetermined forward and rearward ends and opposite sides, said opposite sides each having an elongated substantially upright opening therethrough; steerable wheels mounted on said forward end of the frame in supporting relation thereto; an elongated cylindrical roller having opposite ends; means mounting said ends of the roller in said sides of the frame with the roller disposed in continuously extended relation therebetween in supporting relation to the rearward end of the frame, said roller mounting means being adapted to allow elevational adjustment of the frame relative to the roller; powered means mounted on the frame having driving connection to said roller; an asphalt hopper borne by the frame intermediate the ends thereof including an inclined bottom wall having a rearwardly disposed lower extremity, and opposite side panels; a screed; means mounting the screed in said frame for travel therewith and for free elevational movement independently thereof rearwardly contiguous to the hopper, said screed having a lower extremity, said hopper and screed in combination providing a downwardly directed opening therebetween forwardly of said roller and coextensive therewith for depositing such asphalt on the support surface, said opening being disposed between said lower extremities and having opposite ends closed by said side panels and individually aligned with said opposite ends of the roller, said lower extremity of the screed being adapted to be disposed in scraping engagement with asphalt discharged from the hopper opening; an adjustable closure plate mounted on said bottom wall of the hopper; powered means mounted on the frame having manipulatory connection to said closure plate to motivate the same between a position closing said hopper opening and a position retracted therefrom; a pair of opposite transversely outwardly extended support arms carried by the screed extended through said upright openings in the sides of the frame for elevational sliding movement relative to the frame; and a pair of gauge members individually mounted on said support arms for engagement with a support surface, said gauge members being adapted to support the screed on said support surface on opposite slides of asphalt discharged through said opening from the hopper to permit elevational floating movement of the screed relative to the frame through said upright openings therein to maintain said lower edge of the screed in predetermined precisely spaced relation to said support surface to insure uniform deposit of asphalt thereon irrespective of elevational movements of the frame.

5. The apparatus of claim 4 wherein the gauge members are wheels and including means for mounting the wheels on the support arms for rolling engagement with a support surface.

6. An asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame having predetermined forward and rearward ends and opposite sides, said opposite sides each having an elongated substantially upright opening therethrough; steerable wheels mounted on said forward end of the frame in supporting relation thereto; an asphalt hopper borne by the frame intermediate the ends thereof, said hopper having an inclined bottom wall, opposite side panels and an elongated downwardly directed opening extended transversely of the direction of travel of the apparatus between said side walls of the frame for depositing asphalt on the support surface, said side panels having lower edges adjustably disposed adjacent to said support surface for constraining such deposit of asphalt between the sides of the frame; an elongated cylindrical roller having opposite ends rotatably mounted in said sides of the frame disposing the roller in axially coextensive relation with said opening from the hopper and in rearwardly spaced relation thereto, said roller being adapted to support the frame on asphalt discharge from said hopper; powered means mounted on the frame having driving connection to the roller so as to compact such deposited asphalt with a minimum of scuffing; a screed supported in said frame for travel therewith and for free elevational movement independently thereof, said screed being disposed intermediate said discharge opening from the hopper and said roller and having a lower edge adapted to be disposed in scraping engagement with asphalt discharged from the hopper; a pair of opposite transversely outwardly extended support arms mounted on the screed extended through said upright openings in the sides of the frame for free elevational sliding movement of the arms and screed relative to the frame and to said roller; a pair of screed support wheels; and an elevationally adjustable wheel support member individually mounting the wheels on the support arms to support the screed on said support surface with the wheels adapted to engage said support surface on opposite sides of asphalt discharged through said opening from the hopper and for permitting elevational floating movement of the screed independently of the frame to maintain said lower edge of the screed in predetermined precisely spaced relation to the support surface to insure a uniform deposit of asphalt thereon irrespective of elevational movements of the frame.

7. A mobile asphalt applying apparatus adapted for travel on a pre-established support surface comprising a mobile frame having predetermined forward and rearward ends; an elongated screed; means mounting the screed transversely in the frame for travel with the frame and elevational movement independently thereof; means carried by the frame adapted to deposit asphalt in front of the screed through an elongated opening having oppo-

site ends and disposed transversely of the frame; a roller; means mounting the roller transversely in the frame rearwardly adjacent to the screed and in supporting relation to the frame; powered means borne by the frame having driving connection to the roller to motivate the frame; and screed support means connected to opposite ends of the screed in supporting relation thereto and disposed for engagement with the support surface outwardly spaced from the ends of said opening.

References Cited by the Examiner

UNITED STATES PATENTS

1,641,703	9/1927	Stanton	94—46 X
2,271,333	1/1942	Farrell	94—46
2,779,258	1/1957	Johnson	94—46
2,842,036	7/1958	Overman	94—46

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