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ROAD MAKING MACHINE

Filed July 24, 1935

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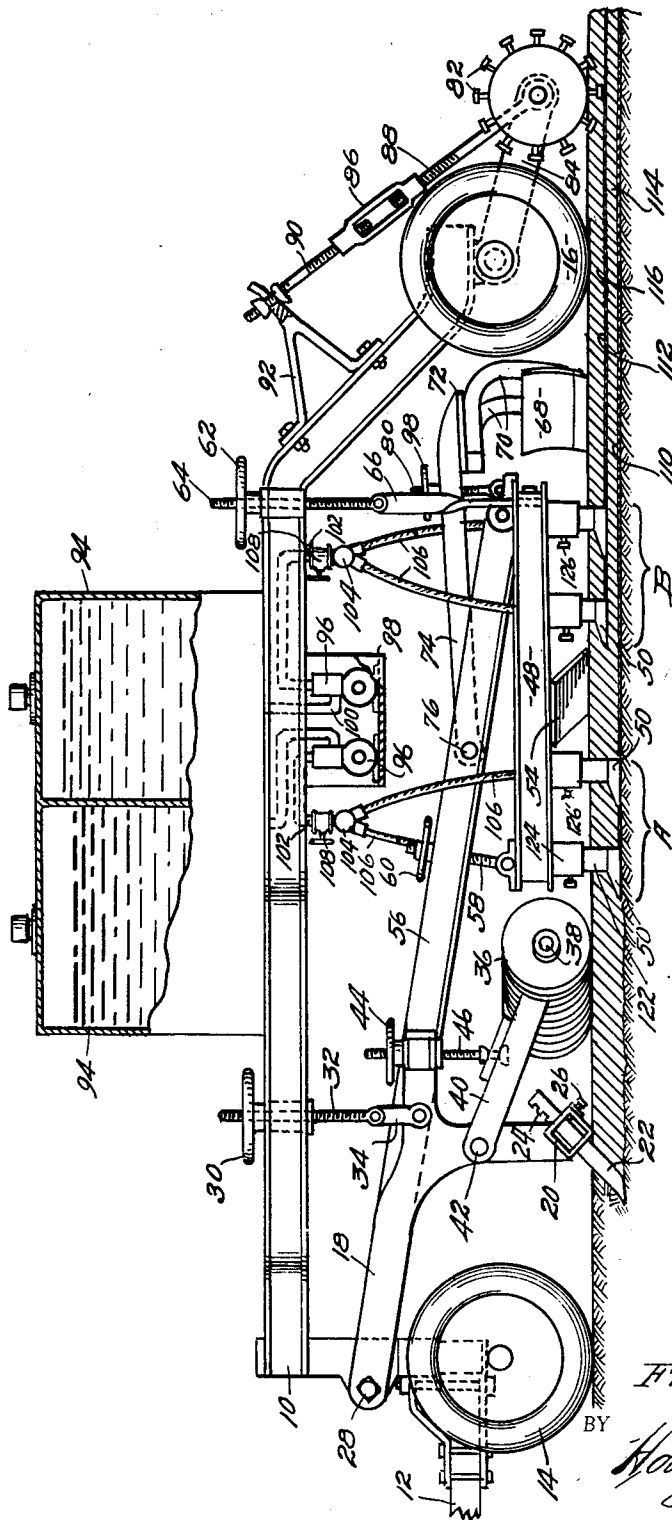


Fig. 1

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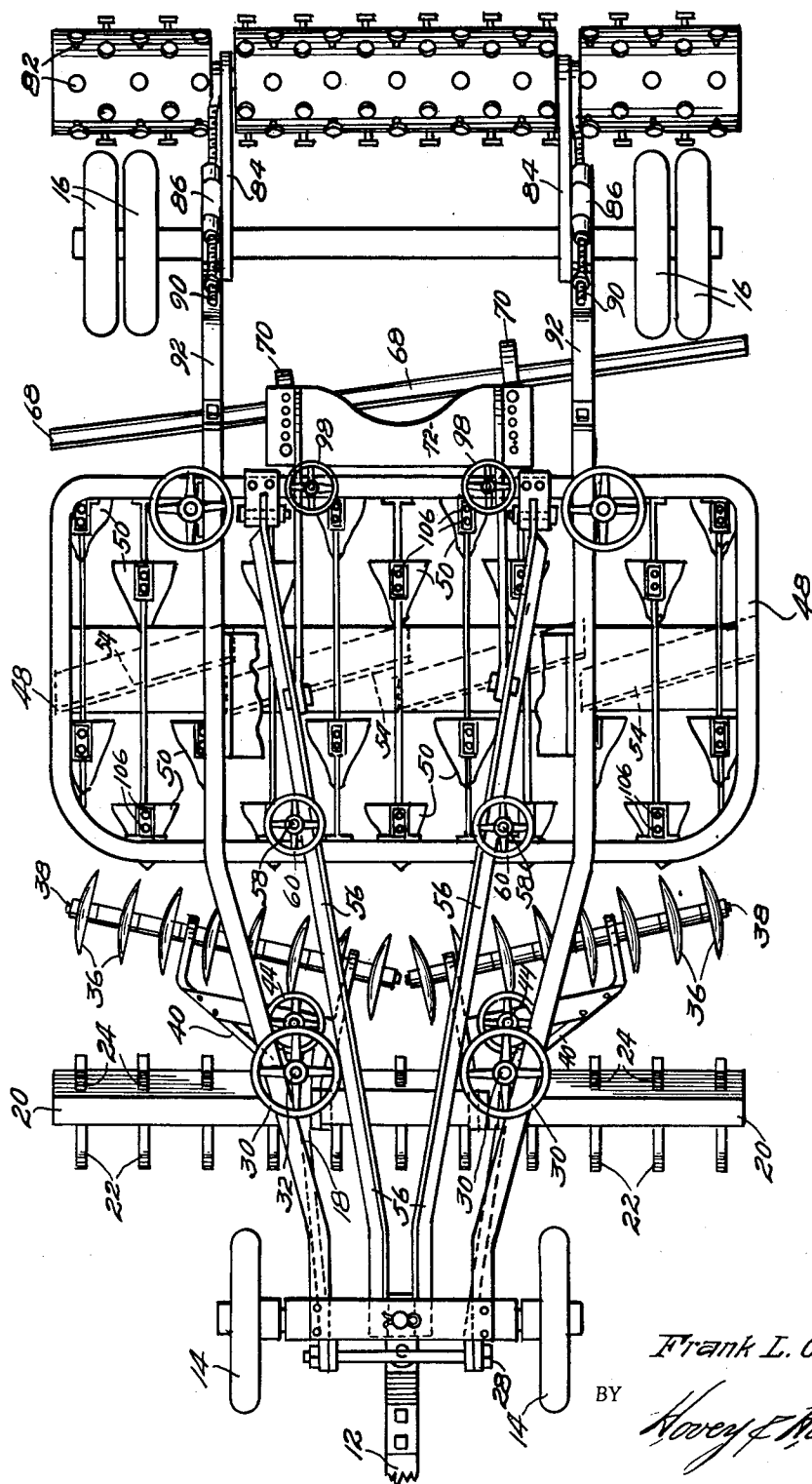
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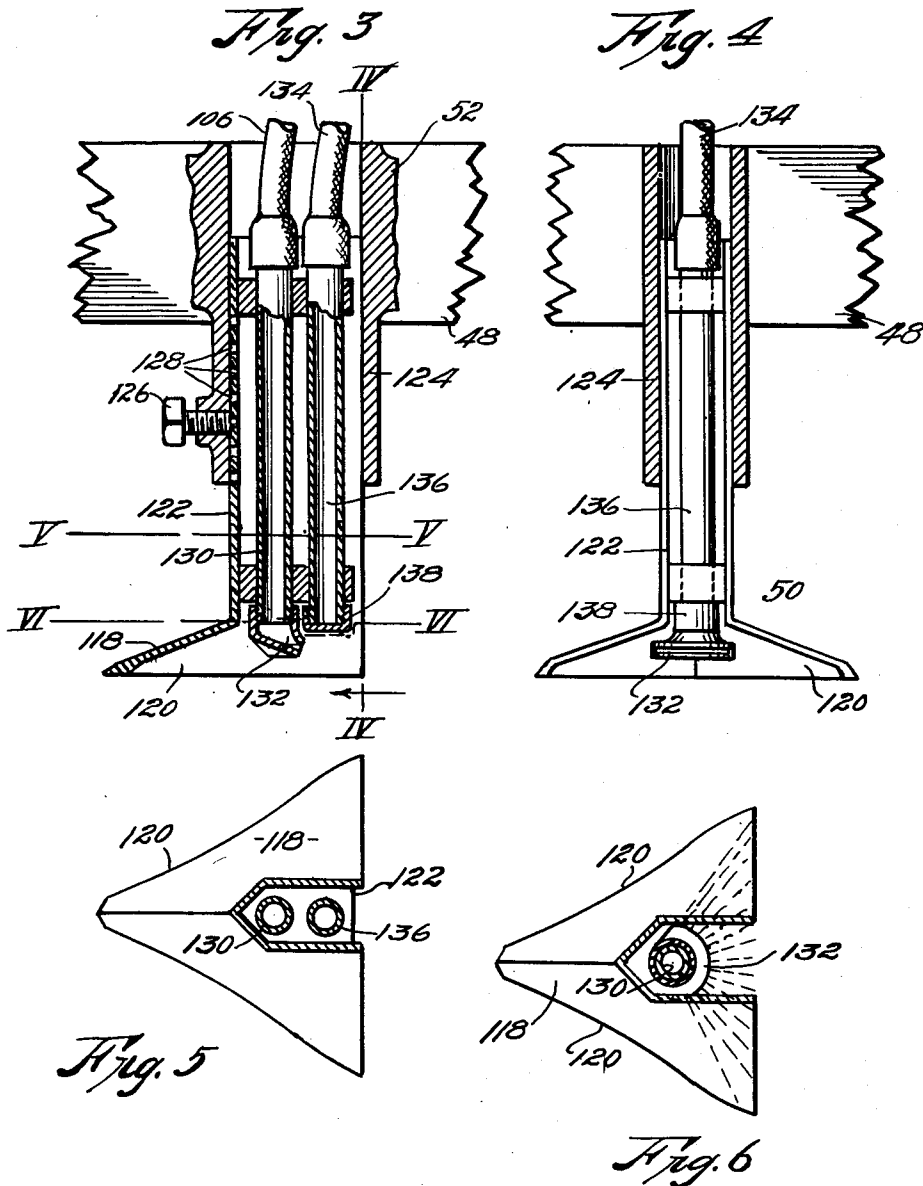
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ROAD MAKING MACHINE

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15 Claims. (Cl. 94—44)

This invention relates to road making equipment and particularly machines of the aforementioned character wherein is embodied, in combination, means for scarifying the roadbed to a predetermined depth; means for immediately thereafter discing the roadbed; unique, novel and effective means for depositing road making fluids along a plurality of spaced-apart levels below the normal surface of the road; means for scraping or smoothing the roadbed at the zone of application of said fluids; means for scraping; and lastly, means for tamping the roadbed, all for the purpose of making an oil road having desirable characteristics and structural refinements as will hereinafter be more fully set down.

A further object of this invention is the provision of a road making machine having the aforementioned inter-related units and means associated with all of said units for adjustably maintaining the same in operative relation with respect to each other and with respect to the roadbed upon which the machine is acting.

One of the primary objects of the invention is the provision in such a machine of means for simultaneously depositing road making fluids, such as oil, along a plurality of spaced-apart levels below the normal surface of the road and the method of so preparing a roadway forms one of the salient aims of the invention.

Other objects of the invention include the specific structural embodiments of the foregoing broad objects and the specific structure of the component parts of the above enumerated units, all of which will be set down in a definite manner during the course of the following specification, referring to the accompanying drawings, wherein:

Figure 1 is a side elevation of a road making machine embodying this invention.

Fig. 2 is a top plan view of the same.

Fig. 3 is an enlarged, fragmentary, detailed, vertical, central, sectional view through one of the oil applying shoes of the machine.

Fig. 4 is a vertical, sectional view through one of said shoes, taken on line IV—IV of Fig. 3.

Fig. 5 is a cross sectional view through one of the shoes, taken on line V—V of Fig. 3, and,

Fig. 6 is a cross sectional view through the shoe, taken on line VI—VI of Fig. 3.

The road making machine contemplated by this invention is designed particularly for use in constructing oil roads and it is the purpose of the invention to provide such a machine as will produce a highly satisfactory roadbed after the machine has made one trip along the road for the

purpose of performing all the necessary operations which this method contemplates. Machines of this type may be used in soils of various characteristics and little alteration need take place when the machine is changed for use with clay soils after it has been set for use in treating soils of a lighter nature, such as sand or loam.

It is well known in the art of road making that the surface of the roadbed should be protected from moisture in the sub-grade. A relatively heavy stratum of oil, therefore, is placed well below the normal surface of the road and stratas of light oil are then deposited in spaced-apart relation in the material of the road between the normal surface of the latter and the said first mentioned stratum of heavy oil.

To effectively carry out this method, the machine designed to embody the preferred form of the invention should have a wheeled frame 10 that may be pulled or pushed along the right-of-way by tractors or other suitable means not here shown that may be attached to the machine through the medium of a hitch 12 attached to frame 10 in any desired way. While skids may be employed to hold frame 10 in position for movement along the right-of-way, it is preferred to mount the frame upon front and rear wheels 14 and 16 respectively, and to provide pneumatic tires on said wheels to the end that the roadway will not be rutted or otherwise objectionably channeled out by less efficient wheels.

In practice it is preferred to mount front wheels 14 in such a fashion as to permit guiding of the machine thereby and it is conceivable that the means for moving the machine along the roadway might be mounted directly upon frame 10 and attached to rear wheels 16.

When employing a road making machine of this type, the roadbed should first be prepared by grading, leveling and ditching so that it is ready to receive the oil which will render the surface thereof usable by traffic. Draw bars 18 attached to the forward end of the machine extend rearwardly and depend to a point of attachment with a transverse member 20, which is formed to support a plurality of forwardly and downwardly inclined teeth 22 that are employed to scarify the roadbed to a predetermined depth. These teeth 22 are adjustably carried by member 20 and a series of notches 24 formed along the upper face of each tooth respectively cooperate with a set screw 26 to hold teeth 22 in the set position.

Draw bars 18 are pivotally mounted as at 28 whereby to permit raising and lowering of all of

teeth 22 by the manually operable wheel 30 which is in screw-threaded engagement with shaft 32 joined to each draw bar respectively by link 34.

Discing the material of the roadbed is desirable immediately after scarifier teeth 22 have performed their function. Accordingly, two sets of discs 36 are carried immediately behind the plurality of teeth 22. Discs 36 are mounted upon a common shaft 38 and these shafts are disposed at angles to each other and to a true transverse line through the machine, as illustrated in Fig. 2. Each set of discs 36 is attached to the depending portion of the respective draw bars 18 by an arm 40 which is pivotally joined at its forward end to said respective draw bar 18 as at 42. Each set of discs 36 may be adjusted vertically by hand wheel 44 which is in screw-threaded engagement with threaded shaft 46 joined to arm 40.

After the top material of the roadbed has been acted upon by scarifier teeth 22 and discs 36, the road oil is applied through the unique unit disposed immediately behind the said aforementioned parts. This oil applying unit comprises a frame 48 which carries a plurality of shoes, constructed as shown in the drawings, and particularly Figs. 3 to 6 inclusive thereof. The exact form, function and nature of these shoes 50 will be hereinafter more fully set down.

Walls 52 extend across frame 48 from side to side thereof and serve to support shoes 50 in spaced-apart relation. The shoes are arranged in series with all of the shoes of one series disposed in substantially the same horizontal plane, while the shoes of another series are disposed in another horizontal plane. Each series of shoes may consist of two rows thereof, each row disposed in a line extending from side to side or transversely of the machine. Shoes 50 are so arranged and positioned in the individual series thereof and are so formed as to be in staggered or offset relation, and to fulfill the important aim of the invention, the staggered, offset shoes should overlap in order to require each series of shoes to deposit a continuous stratum of oil along the line of said series of shoes. Each shoe of each series describes its own path and the paths of oil which are deposited by the individual shoes of each series thereof are in overlapped relation.

As will be observed in Fig. 1, the forward group of shoes making up series A have the bottoms thereof disposed in a horizontal plane below the plane of the group of shoes 50 making up series B. Obviously, any number of series of shoes may be utilized and it has been found desirable to employ smoothers or leveling blades 54 between the series of shoes. These blades 54 are disposed at an angle and in overlapped relation so that piling up of the road material is avoided.

Frame 48 is connected to the forward end of wheeled frame 10 by beams 56 that extend from the rear portion of frame 48 to the forward portion of wheeled frame 30. These beams 56 are pivotally joined to frame 10 and frame 48 at their forward and rear ends respectively and the forward edge of frame 48 may be moved vertically by a pair of adjusting screws 58 having hand wheels 60 mounted thereon. Beams 56 and frame 48, together with all the parts mounted thereon or associated therewith, may be adjusted vertically toward and from the roadbed by a pair of hand wheels 62 mounted upon threaded shafts 64 that are connected to frame 48 by links 66. Obviously, the means for adjusting the parts of the machine with respect to each other and with respect to the roadbed may be remotely con-

trolled from the driver's cab or the like if it is desired to include hydraulic or compressed air means in place of the structures illustrated in the drawings and herein described.

After the application of the oil or road making liquid strata by shoes 50, the normal surface of the road is leveled by scraper 68. This scraper of the conventional type extends transversely across the machine the full width of the finished roadway and is preferably positioned at an angle, as shown in Fig. 2. Brackets 70 which support blades 68 are adjustably connected to a plate 72 that is mounted upon levers 74 which are pivotally mounted as at 76 to beams 56. Means for raising and lowering scraper 68 and the associated parts just mentioned is provided in the form of a hand wheel 78 in screw-threaded engagement with vertical shaft 80.

As a final operation, the roadbed is tamped by a sheep's foot roller 82 rotatably mounted and attached to frame 10 by links 84. This tamping roller 82 may be raised and lowered by rotating turn buckle 86 which will move screw-threaded rods 88 and 90 toward and from each other for said purpose. A bracket 92 rigidly mounted upon frame 10 carried rod 90, while rod 88 is attached at the axis of roller 82.

Large quantities of oil are used in making roads and in some instances it may be desirable to use oils having different specific gravities or characteristics and the supply of oil may be carried in tanks 94 mounted upon frame 10, or, as an alternative, carried in supplementary tank trucks that are moved along the right-of-way with the road making machine. In any event, the oil is fed into shoes 50 so that it may be deposited along the roadbed at different levels. In the embodiment illustrated, tanks 96 which sit upon a platform 98 carried by frame 10. There is a pump for each tank 94 and in the instance illustrated, a pump 96 is employed for each series of shoes 50. One of said pumps 96 is attached to one tank 94 through the lead-in conduit 100 and pipes 102 join the respective pumps 96 with manifolds 104 which extend transversely across the machine so that all of shoes 50 of the series thereof therebelow, may receive oil through the flexible connections 106 which connect each shoe respectively with manifold 105. A valve 108 is interposed in pipe 102 so that oil to any one series may be selectively turned on or shut off.

Heavy oil in tank 94 is fed to series A of shoes 50 and relatively lighter oil is fed from rear tank 94 to series B of shoes 50. This method is effective in precluding moisture from rising to the surface proper of the roadbed and reference to Fig. 1 will readily teach the manner in which lower stratum 110 is placed in parallel, spaced apart relation to and below stratum 112 which may consist of lighter oil. Stratum 114 of the road material lies between stratum 110 and 112 and upper stratum 116 of the roadbed may have a top coating of oil applied thereto if desired.

The construction of each one of shoes 50 that have heretofore been mentioned is unique in that it is individually vertically adjustable and includes an unique inclined face 118 that is formed on the base of the shoe for the purpose of elevating and then depositing the material of the roadbed immediately prior and immediately subsequent to depositing the road oil. Base 120 of shoe 50 extends forwardly and laterally to each side of the hollow shank 122 thereof and this shank is in slidable engagement with a bearing 124 formed integrally with walls 52. A set screw

126, in screw-threaded engagement with bearing 124, has a reduced inner end which enters one of holes 128 formed in vertical alignment along the adjacent wall of shank 122. Thus each shoe 50 may be set to the desired position and flexible connection 106 thereto will give sufficiently to allow any adjustment.

Flexible connection 106 to each shoe 50 respectively is joined to a pipe 130 which has a special nozzle 132 at the lowermost end thereof. This nozzle is detailed in Fig. 6 and formed so that oil passing therefrom is projected radially the full width of base 120 of shoe 50. The exact positioning of this nozzle 132 may be altered to suit conditions, but the open port thereof should be directed rearwardly or in some direction so that the lifted road material will not clog the same.

In some cases it may be desired to admix other fluids with the oil being placed, and if so, a supplementary flexible hose connection 134 is connected to a second pipe 136 within shank 122 for that purpose. In the illustrated embodiment of the invention, this pipe is shown plugged at one end by a cap 138.

The desirable manner of employing a machine of the character contemplated by this invention has been made clear during the course of the foregoing specification, and while specific structural details have been specified, it is desired to be limited only by the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A road making machine comprising a wheeled frame; means carried by the frame for simultaneously depositing uninterrupted sheets of fluids along a plurality of definitely determinable spaced-apart levels below the normal surface of the road and between layers of road material; and structure for maintaining said means in predetermined adjusted positions whereby to vary the distance apart of said levels.

2. A road making machine comprising a frame; and means carried by the frame for simultaneously depositing a plurality of uninterrupted liquid strata in spaced-apart relation below the normal surface of the roadbed, and structure for maintaining said means in a predetermined position to maintain a definite thickness of intermediate strata of roadbed material between said liquid strata during the deposition of the latter.

3. A road making machine comprising a frame; and means carried by the frame for simultaneously depositing a plurality of liquid strata in predetermined spaced-apart parallel relation below the normal surface of the roadbed, said means comprising a plurality of series of shoes, each series having the shoes thereof in the same horizontal plane and formed to elevate the entire roadbed material thereabove as the liquid is being deposited in a continuous sheet and to drop said material on the stratum of liquid placed by said series of shoes.

4. A road making machine comprising a frame; and means carried by the frame for simultaneously depositing a plurality of liquid strata in spaced-apart parallel relation below the normal surface of the roadbed, said means comprising a frame carrying a plurality of series of shoes, each series having the shoes thereof in the same horizontal plane and formed to elevate the roadbed material thereabove as the liquid is being de-

posited and to drop said material on the stratum of liquid placed by said series of shoes, each series of shoes having the shoes thereof disposed in offset, overlapped relation whereby one series deposits a continuous stratum of liquid the full width of the said series.

5. A road making machine comprising a frame; and means carried by the frame for simultaneously depositing a plurality of liquid strata in predetermined spaced-apart parallel relation below the normal surface of the roadbed, said means comprising an adjustable frame carrying a plurality of series of shoes, each series having the shoes thereof in the same horizontal plane, each shoe of each of said series having an inclined face adapted to elevate the roadbed material in the path thereof as the machine is advanced and to drop said material into said path upon the stratum of liquid placed by said series of shoes, said shoes each being appreciably narrower than the width of the series thereof, and the shoes of each of said series being in overlapped relation to work the roadbed the entire width of the series.

6. A road making machine comprising a frame; and means carried by the frame for simultaneously depositing a plurality of liquid strata in predetermined spaced-apart parallel relation below the normal surface of the roadbed, said means comprising a frame carrying a plurality of series of shoes, each series having the shoes thereof in the same horizontal plane, each shoe of said series having an inclined face adapted to elevate the roadbed material in the path of travel thereof as the machine is advanced and to drop said material into said path, and a spray nozzle positioned to deposit liquid beneath the material so elevated, said shoes each being appreciably narrower than the width of the series thereof, and overlapping the adjacent shoes to work all the roadbed the entire length of said series.

7. A road making machine comprising a frame mounted for movement along the roadbed; and means carried by the frame for simultaneously depositing a plurality of liquid strata in spaced-apart, substantially parallel relation below the normal surface of the roadbed, said means comprising a plurality of shoes, means supporting all of said shoes, structure for holding the individual shoes in predetermined adjusted positions relative to each other, and devices for vertically independently adjusting different portions of said supporting means whereby the distances apart of the said liquid strata may be varied and the distances of said strata below the normal surface of the roadbed may be altered.

8. A road making machine comprising a frame mounted for movement along the roadbed; means carried by the forward part of the frame for scarifying the roadbed to a predetermined depth; vertically adjustable means supported by the frame for subsequently and simultaneously depositing a plurality of continuous liquid strata at different levels within and entirely across the scarified portion of the roadbed; and means mounted on the frame at the rear portion for thereafter compressing the liquid strata and intermediate layers of the roadbed.

9. In a road making machine of the character described, a plurality of series shoes each of said series being arranged in different horizontal planes; and means incorporated in the shoes for releasing liquid along said planes during the operation of the machine, each of said shoes formed to create a relatively narrow path in the roadbed,

the paths of the shoes of each series overlapping for the purpose specified.

10. In a road making machine of the character described, a plurality of shoes arranged in different horizontal planes; and means incorporated in the shoes for releasing liquid along said planes during the operation of the machine, said shoes being arranged in series each of a plurality of shoes, arranged in rows extending transversely of the machine, the shoes in each row being in spaced-apart relation and staggered to overlap with respect to the shoes in the other rows of the series, whereby the roadbed is worked the entire length of said series.

11. In a road making machine of the character described, a plurality of shoes arranged in different horizontal planes; and means incorporated in the shoes for releasing liquid along said planes during the operation of the machine, said shoes being arranged in series each of a plurality of shoes, arranged in rows extending transversely of the machine, the shoes in each row being in spaced-apart relation and staggered with respect to the shoes in the other rows of the series, the shoes of each series being overlapped in the same horizontal plane whereby a continuous stratum of liquid the full width of the said series of shoes may be placed in the roadbed material and means for separately and collectively adjusting said shoes toward and from the road surface being worked.

12. The method of preparing a roadway which comprises simultaneously forming a plurality of uninterrupted strata of road building liquids within the roadbed in situ at different spaced apart levels below the normal surface of said roadway; and subsequently compressing the roadway to

bond the laminations of roadbed material and road building liquids.

13. The method of preparing a roadway which comprises forming a plurality of parallel spaced apart strata of oil within the roadbed in situ at different levels below the surface of the roadway, the lowermost stratum being formed in advance of the strata thereabove and of relatively heavy oil.

14. A road making machine comprising a wheel mounted frame; a secondary frame positioned below said wheeled frame and intermediate its ends; pivoted bars interconnecting the front end of said wheeled frame with the secondary frame whereby it is moved forwardly as the machine is moved; devices for independently adjusting said secondary frame vertically; a plurality of series of shoes, each series being arranged in rows extending transversely of the machine, the shoes of each row being in spaced-apart relation and staggered and overlapping with respect to the shoes in the other rows of the series, the shoes of each series being in the same plane, whereby a continuous uninterrupted stratum of the roadbed is worked the full width of the said series of shoes; means carried by said bars whereby the road surface to the rear of said shoes is leveled; and means mounted on said wheeled frame for compressing said worked road material.

15. A road building machine comprising a wheeled frame; means carried by the frame for simultaneously depositing liquid in continuous sheets along a plurality of predetermined spaced apart levels below the surface of the road; and mechanism whereby layers of road material are deposited above each layer of liquid.

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