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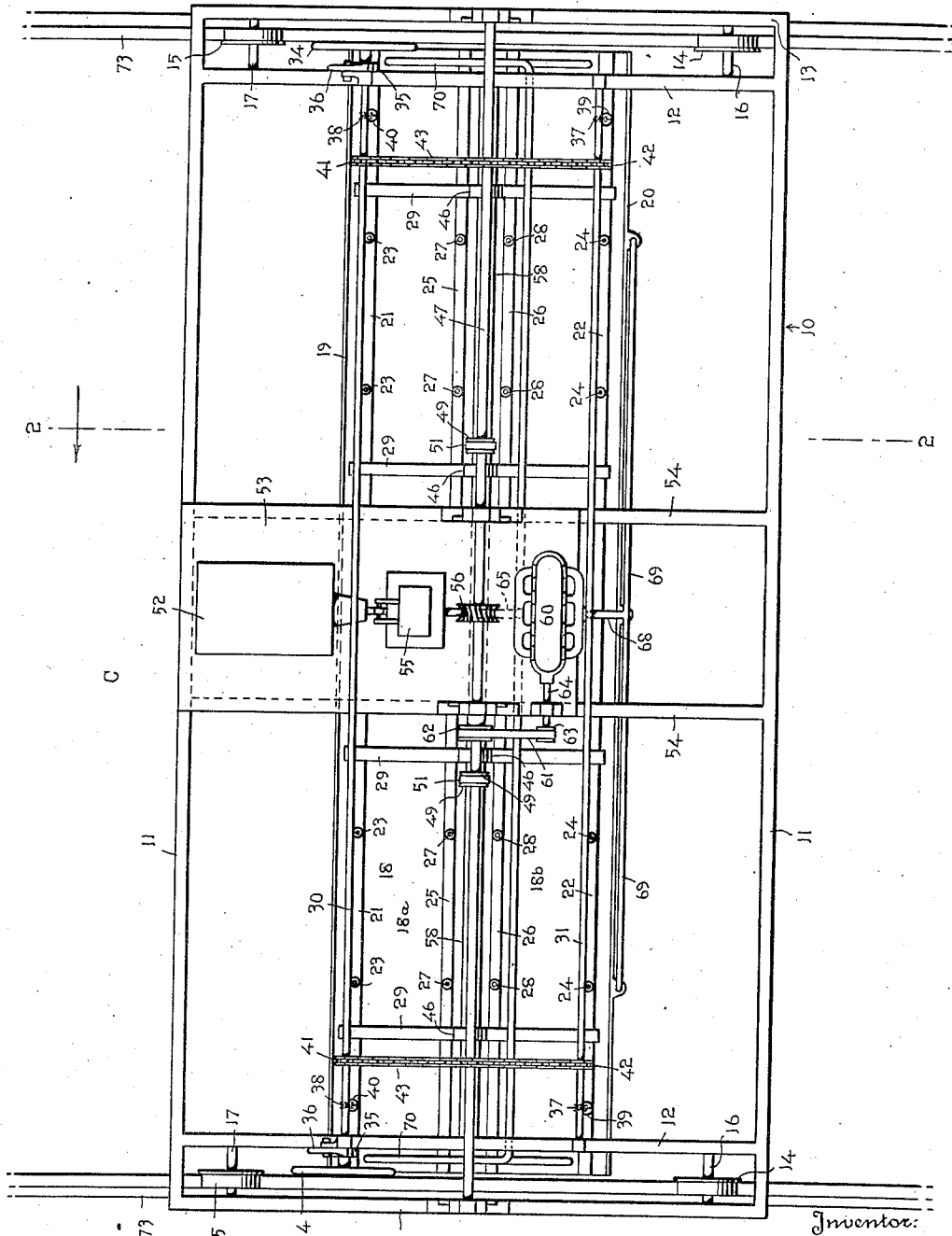
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CONCRETE DEAERATING AND DEHYDRATING MACHINE

Filed Nov. 19, 1937

3 Sheets-Sheet 1



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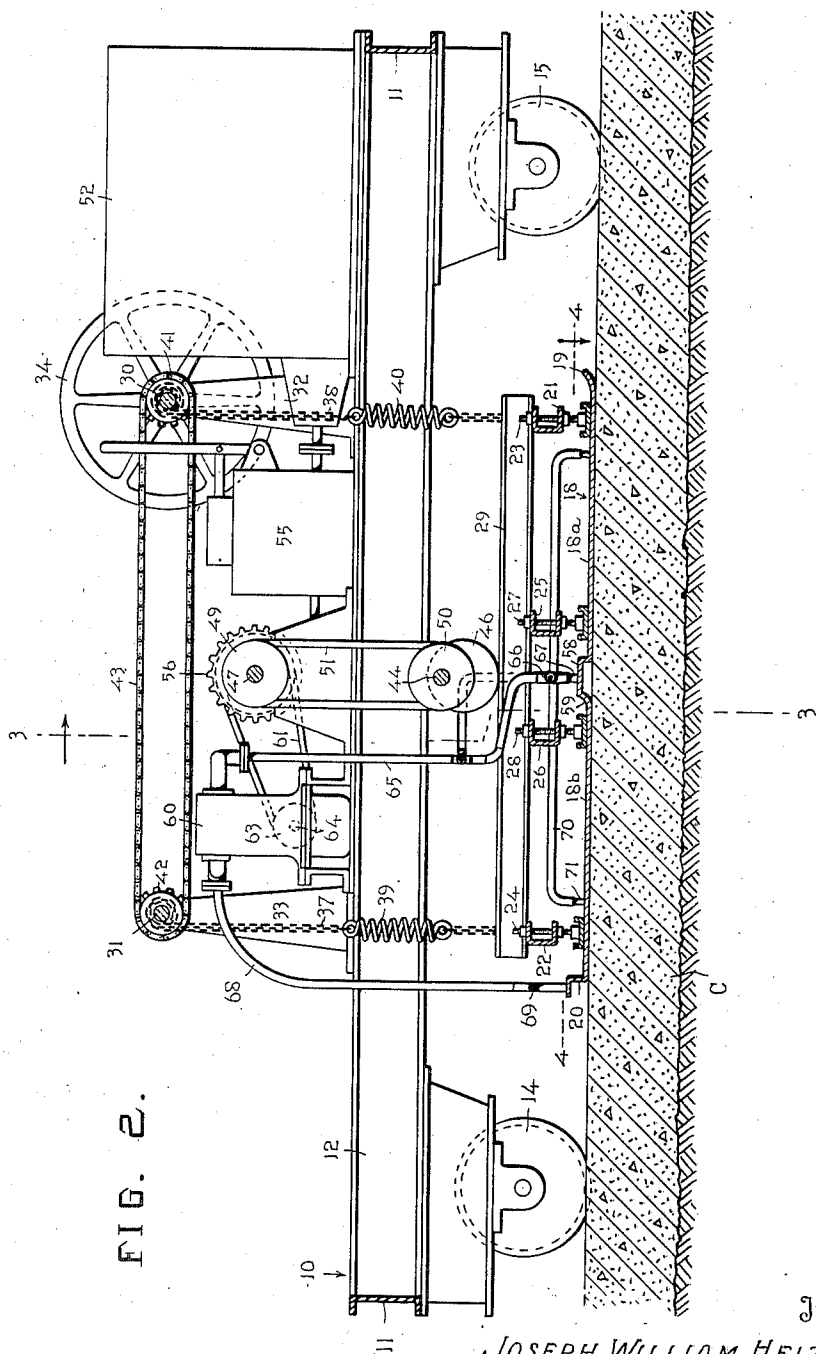
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CONCRETE DEAERATING AND DEHYDRATING MACHINE

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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

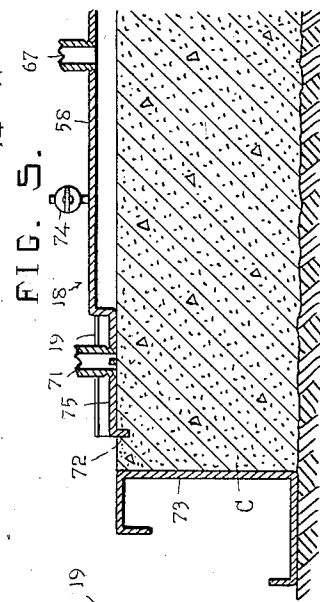
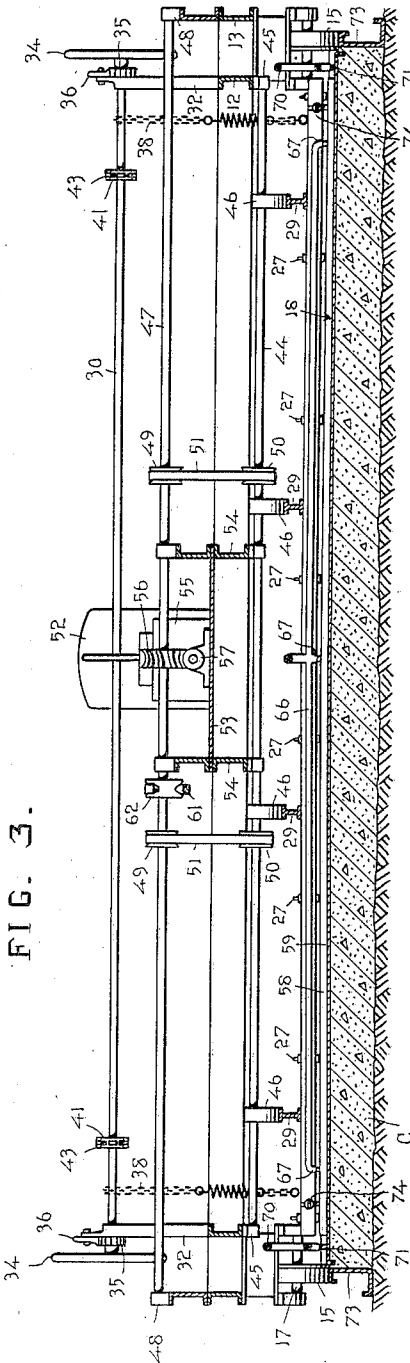
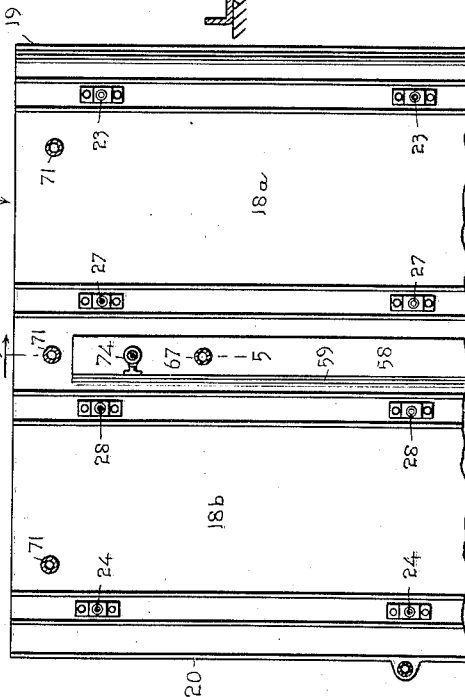


FIG. 4.



UNITED STATES PATENT OFFICE

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CONCRETE DEAERATING AND DEHYDRATING MACHINE

Joseph William Heltzel, Warren, Ohio

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7 Claims. (Cl. 94—45)

This invention relates to road making devices and more particularly to a device for use with a concrete road making machine which is so constructed as to simultaneously smooth and compact the concrete.

An object of this invention is to provide a machine which is adapted to follow the usual screeding machine and which is adapted to smooth the surface of the concrete while, at the same time, removing air and water from the concrete so as to compact the concrete and eliminate voids.

Another object of this invention is to provide a deaerating and a dehydrating machine which follows the screeding machine and is constructed to smooth the surface of the concrete behind the screeding machine so that it will not be necessary to use manual labor in the smoothing operation.

A further object of this invention is to provide a surfacing device which includes means for withdrawing air from the concrete and also withdrawing water while, at the same time, subjecting the plastic material to constant vibrations to assist in the formation of a compact body which upon becoming hardened will have increased strength over bodies which have not been compacted.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

Figure 1 is a top plan of a deaerating and dehydrating machine constructed according to an embodiment of this invention.

Figure 2 is a sectional view partly in detail taken on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary sectional view taken on the line 4—4 of Figure 2.

Figure 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Figure 4.

Figure 6 is a view similar to Fig. 5 but showing the voids in the plastic material before completion of the smoothing operation.

Referring to the drawings, and first to Figure 1, the numeral 10 designates generally a carriage structure comprising transverse beams 11 disposed in parallel relation and connected together at the ends thereof by pairs of end beams 12 and 13. The end beams 12 and 13 are disposed in spaced apart parallel relation and a pair of wheels 14 and 15 are positioned between the end

beams 12 and 13 and are mounted on shafts 16 and 17. The carriage structure 10 is adapted to be connected to a screeding machine and to be pulled along therewith.

A surface smoothing plate member, generally designated as 18, is disposed between the end bars of the frame, and comprises a front section 18a and a rear section 18b. The front section 18a is provided at its forward edge with an upturned edge portion 19 and the rear section 18b is provided at its rear edge with an upwardly offset portion 20. A pair of elongated bars 21 and 22 are disposed adjacent the forward and rear edges respectively, of the plate sections 18a and 18b, respectively, and are secured thereto by means of adjustable bolts 23 and 24, respectively. Intermediate parallel bars 25 and 26 are secured as by bolts 27 and 28, respectively, to the intermediate or substantially central portion of the plate 18, and these adjusting bolts 23, 24, 27 and 28, are adapted to provide a transverse bend in the plate 18 which conforms to the desired crown to be made on the road surface. A plurality of connecting beams 29 connect the beams 21, 22, 25 and 26, together.

A pair of plate supporting and adjusting shafts 30 and 31 are journaled in standards 32 and 33, respectively, and the shaft 31 is provided at each end thereof with a relatively large hand wheel 34. A ratchet 35 is secured to the shaft 31, and a pawl 36 is carried by the standard 33 and engages the ratchet 35 so as to hold the shaft 31 in adjusted position. A pair of chains or flexible members 37 are wound about the shaft 31 adjacent each end thereof and the chains or flexible members 37 have a free end secured to the beam 22. The shaft 30 has a flexible member or chain 38 wound thereabout, there being one chain 38 adjacent each end of the shaft 30 and the free ends of the chains 38 are secured to the front beams 21. Preferably, a spring 39 is interposed in the chain 37 and a spring 40 is interposed in each chain 38 so that the plate structure 18 is yieldably supported from the shafts 30 and 31.

A sprocket 41 is secured to the shaft 30 adjacent one end thereof and a similar sprocket 41 is secured to the shaft 30 adjacent the opposite end thereof. A pair of sprockets 42 are secured to the shaft 31 adjacent each end thereof and an endless chain 43 engages about the sprockets 41 and 42 so that rotation of the shaft 30 by the hand wheel 34 will simultaneously rotate the shaft 31 so as to raise or lower the plate 18 or yieldingly support the plate 18 for desired contact with the surface of the plastic concrete.

A shaft 44 is journaled in bearings 45 carried by the end beam members 12 and a plurality of vibrating members in the form of eccentric discs 46 are secured to the shaft 44. The vibration is caused entirely by the centrifugal eccentric force of the members 46. A drive shaft 47 is rotatably supported above the driven shaft 44, being journaled in bearings 48, and pairs of pulleys 49 are secured to the drive shaft 47. A pair of pulleys 50 are secured to the driven shaft 44 and a belt 51 is trained over aligned pulleys 49 and 50 so that rotation of the driven shaft 44 is effected by rotation of the drive shaft 47. A power member 52 is supported on a platform 53 which is mounted on a pair of intermediate supporting beams 54. The power member 52 is connected to a reduction gear 55 and a worm gear 56 secured to the drive shaft 47 is connected to the reduction gear 55 through a worm 57.

The plate 18 is provided at a point substantially midway between the front and rear edges thereof with an elongated vacuum chamber 58 which is open on the underside of the plate 18. This vacuum chamber 58 at the ends thereof terminates inwardly of the opposite ends of the plate 18 as shown in Figures 4 and 5. Preferably, the rear wall of the vacuum chamber 58 is curved, as at 59, so that no plastic material will be collected in the chamber 58 as the plate 18 is moved forwardly along the plastic concrete.

A vacuum pump 60 is mounted on the platform 53 and is operated by the power member 52 through a belt or flexible drive member 61 which engages over a pulley 62 mounted on the drive shaft 47 and a pulley 63 mounted on a shaft 64 which forms a part of the pump 60. The intake side of the pump 60 is connected by means of a suction pipe 65 to a suction manifold 66 extending longitudinally of the vacuum chamber 58 and connected thereto by a plurality of connections 67 or the like. The discharge side of the pump 60 is connected to a discharge pipe 68 which extends downwardly from the pump 60 and is connected to a discharge manifold 69 which discharges through the upwardly offset portion 20 at the rear of the plate 18. In this manner, the water which is drawn up from the vacuum chamber 58 will pass through the pump 60 and then be discharged at the rear edge of the plate 18 where it will form a seal at the rear edge of the plate 18. The vacuum chamber 58 terminates inwardly of the opposite ends of the plate 18 for the purpose of preventing any voids or pockets adjacent the marginal edges of the concrete from breaking the vacuum and thus impairing the effectiveness of the suction or vacuum chamber. In order to remove the air and water in the plastic concrete outwardly of the ends of the vacuum chamber 18, I have provided a pair of end manifolds 70 which are connected to the plate 18 by means of connecting members 71 which are connected to relatively small holes in the plate 18 beyond the ends of the suction chamber 58. The holes in the plate 18 to which the nipples or connecting members 71 are connected are of such a size that none of the material of which the roadway is constructed will be drawn into the manifold 70. The ends of the plate 18 are also provided with dependent flanges 72 which act to prevent any air from passing beneath the ends of the plate 18 to break the suction force in either the suction chamber 18 or the outer suction manifolds 70.

In the use and operation of this device, the frame 10 is adapted to be connected by any suit-

able connections to the screeding machine and the wheels 14 are adapted to ride over the side form members 73 which are disposed along the opposite edges of the roadway. The tension of the plate 18 upon the plastic concrete C is adjusted through the hand wheel 34 and the flexible members 37 and 38. The power member 52 will operate the pump 60 at the desired speed and at the same time will rotate the vibrating shaft 44 so as to effect vibration of the plate 18 simultaneous with the movement of the plate 18 along the surface of the plastic material. As the plate 18 is vibrated by means of the vibrating members 46 and, at the same time, is moved longitudinally of the roadway along the side forms 73, the water in the plastic material will be drawn to the surface and will be drawn up into the suction chamber 58. The vibration of the plate 18 will tend to pack the plastic material and any air existing in the form of voids will also be eliminated by being drawn up into the vacuum chamber 58 and the suction manifold 70. During the movement of the plate 18 over the surface of the plastic concrete, the water drawn to the surface of the material will be disposed in the chamber 58 and will act as a sealing means for the lower open side thereof.

In Figure 6 there are shown a number of voids V which appear in the upper surface of the concrete C. These voids V are gradually smoothed out by the plate 18 as the plate 18 moves along the plastic concrete. The vacuum chamber 58 is terminated short of the adjacent edges of the plate 18 so that the extension or bridging portion 75 thereof will bridge over any voids at the ends of the chamber 58 and prevent breaking of the suction in the chamber 58. The downturned flange 72 will also assist the bridging portion 75 in preventing breaking of the vacuum in chamber 58.

The water drawn up by the pump 60 will be discharged at the rear edge of the plate 18 by the discharge pipe 68 so that an effective seal is provided at the rear edge of the smoothing plate 18. The weight of the plate 18 and the parts secured thereto are such as to thoroughly compact the plastic concrete, and the vibration of the plate 18 will tend to bring the air in the voids to the upper surface of the material and will also cause the excess water in the plastic material to rise to the upper surface.

When it is desired to lift the plate 18 from the plastic material, the vacuum in the chamber 58 may be broken by means of valve members 74 which are connected to the vacuum chamber 58 adjacent the ends thereof and are manually operated.

A device constructed according to this invention will thoroughly compact the plastic material immediately following the screeding machine, so that it will not be necessary to provide any means in the form of straight edging devices or surface smoothing devices, to either smooth or compact the plastic material. The surface configuration of the plastic material is determined by the transverse bend of the plate 18 effected by means of the adjusting bolts 23, 24, 27 and 28, and as the flanges 72 at the ends of the plate 18 are relatively short, the grooves formed thereby need not be filled in; because in hand belting the grooves will be filled in automatically through such operation. If desired the plate 18 may have a width equal to the distance between the side forms 73 so that the flanges 72 will contact with the forms 73.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. A device for the treatment of plastic roads under construction comprising a carriage, a double smoothing plate disposed below the carriage and having a grooved chamber between the two portions of the double smoothing plate, means to exhaust air from said grooved chamber, and supporting means for supporting said plate from said carriage, said supporting means including a plurality of flexible members, and a spring interposed in the length of each member whereby to yieldably support said plate in adjusted position relative to said carriage.

2. A device as described comprising a weighted plate portion for resting upon the surface of a plastic road under construction and for compacting and smoothing the same and driving the water and air upwardly from the plastic mass, means behind said plate portion for withdrawing the liberated air and water from the plastic road surface, a second rear plate portion following said means and subjecting the plastic mass to weight and pressure to break down the cell walls and to compact the mass, means for drawing said plate portions and said means along the surface of the roadway in a continuous operation, and means for subjecting both plate portions to a substantially continuous vibration.

3. A device as described comprising a wide and long heavy plate portion resting directly on the surface of the plastic roadway under construction for smoothing and compacting the plastic material and driving the water and air to the surface, vacuum means for withdrawing the air and water at the rear edge of said plate portion, a second plate portion wide and long following said vacuum means and being of substantial weight and resting directly on the surface of the plastic

material to break down the cell walls and to compact and smooth the plastic mass, means for subjecting both plate portions substantially continuously to vibratory action, and means for drawing both plate portions and said vacuum means along the surface of the plastic material in a continuous operation.

4. A device as described comprising a smoothing and compacting plate portion lying along and movable along the surface of a plastic road under construction, a second smoothing and compacting plate portion resting directly on the surface of the plastic road behind the first plate portion and separated therefrom, vacuum means between the plate portions for withdrawing the air and water from the plastic material, and means for depositing water at the rear portion of the rear plate to seal the same.

5. In a device of the kind described, a weighted smoothing plate resting directly upon the wet concrete, a vacuum chamber at an intermediate part of the plate, means for creating vacuum in said chamber, means for drawing the plate along slowly in a substantially rectilinear direction, and means for introducing water downwardly upon the concrete immediately in rear of said plate and in seal forming relation thereto across the width of the plate.

6. In a device for making plastic roads, a carriage movable along the road, a plate member being freely suspended from said carriage and adapted to be directly supported on the plastic road, and vacuum means carried by an intermediate portion of the plate for withdrawing air and water from the plastic concrete.

7. In a device for making roads of plastic material, a carriage movable along the road, a plate member wholly supported from the carriage and adjustable therewith adapted to rest directly on the plastic material, and a vacuum chamber carried by an intermediate part of the plate for withdrawing air and water from the plastic material of the road.

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