Sept. 2, 1941. F. L. CARSWELL ET AL 2,254,885

DRAINAGE FOR SLAB ROADWAYS

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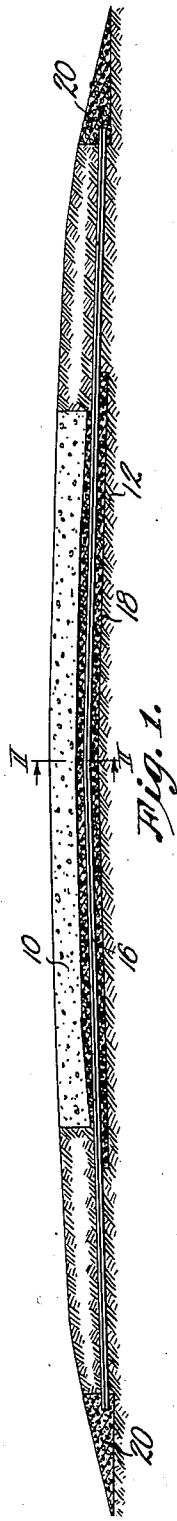


Fig. 1.

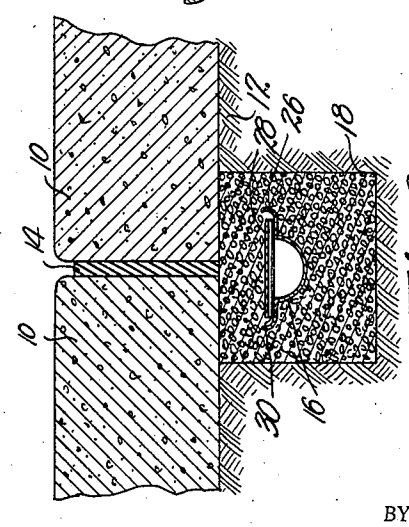


Fig. 2.

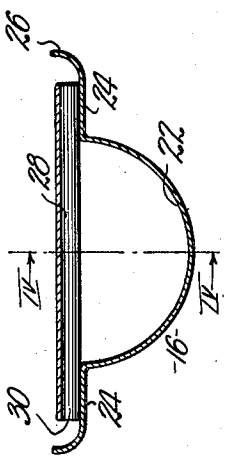


Fig. 3.

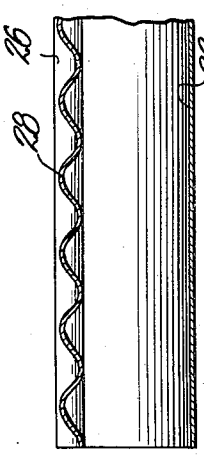


Fig. 4.

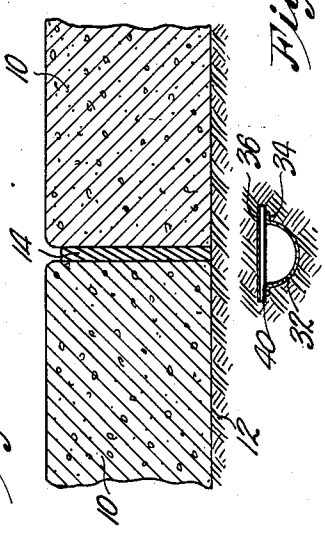


Fig. 5.

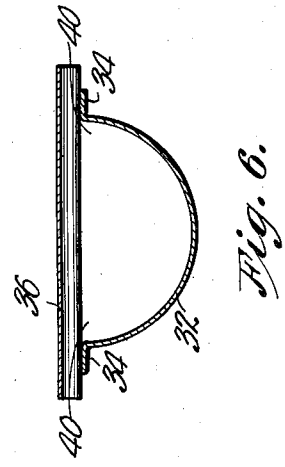


Fig. 6.

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DRAINAGE FOR SLAB ROADWAYS

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5 Claims. (Cl. 94—33)

This invention relates to drainage for slab roadways and has particular reference to the drainage of water from the roadway, which seeps through the expansion joint between roadway slabs.

Concrete highways are made of slabs spaced apart and provided with expansion joints, which are filled with a rather soft material, such as asphalt, which will permit expansion of the slab without setting up excessive stress and strain therein, whereby they are caused to crack. After a period of time many of these joints become defective and water seeps through to the road bed to form a soft spot. The support for the slabs is thus impaired and they are subject to breakage and warping. Also, water collected beneath the slabs may freeze, thereby causing an expansion of the road bed at that point, which may work to the detriment of the slabs.

It is for the purpose of overcoming the above roadway defects that the present drainage system for the expansion joint of slab roadways is provided. The principal object of the present invention is the provision of a drainage tube positioned in a road bed directly beneath the expansion joint, between adjacent slabs forming the road surface, whereby substantially all the water passing through said joint will be directed from beneath said slabs.

A further object of this invention is the provision of drainage for slab roadways, including a drainage tube provided with an upper trough whereby substantially all the water passing through the expansion joint will be directed to the drainage tube for delivery from beneath the slabs.

Other objects are simplicity and economy of construction, efficiency in load carrying, and adaptability to effectually withstand the expansion and contraction due to weather conditions. With these, as well as other objects, which will appear during the course of the specification, in view, reference will now be had to the drawing wherein:

Figure 1 is a cross sectional view of a slab roadway showing a drainage means for that portion of the roadway adjacent the expansion joints between said slabs and embodying this invention.

Fig. 2 is a fragmentary, enlarged sectional view taken on line II—II of Fig. 1.

Fig. 3 is an enlarged sectional view of the drainage tube, detached.

Fig. 4 is a fragmentary, horizontal section of the drainage tube, taken on line IV—IV of Fig. 2.

Fig. 5 is a sectional view of a roadway showing a modified form of the drainage tube; and,

Fig. 6 is an enlarged cross sectional view of the modified form of drainage tube.

In the construction of concrete highways, it is now common practice to construct the road surface of concrete slabs laid on a suitable road bed 12, in spaced apart relation. The road bed is usually constructed on the earth structure, but may be of any other built in material.

The slabs 10 are arranged to form an elongated road surface of uniform width, having transverse expansion joints 14. The joints are formed by placing the slabs a short distance apart and then filling the space therebetween with a semi-plastic material, such as bituminous material which will allow for variations in the distance between the adjacent slabs without exerting too much pressure against the slabs. These joints after long use usually become defective and will permit water to seep therethrough and into the base of the road. The seepage not only softens the road base at the joints of the slabs, but in many instances, the water collected beneath the slab will freeze and cause a cracking or distortion of the slab.

The roadway is shown crowned, with the edges of the slabs made thicker than the center portion, thus producing a good surface drain for the roadway, and also making it possible to position the drainage tubes 16 on an inclination from the center of the roadway without materially varying the distance of the drainage tubes from the lower surfaces of the slabs.

While it is possible to position the drainage tube 16 in the road bed material, regardless of its structure, yet it has been found good practice to form a trench 18 in the road bed, just below the expansion joint, and fill it with a gravel, crushed stone, or similar substance, that will permit rather free filtration of the water, and at the same time, will serve as a good and sufficient support for the road structure and loads thereabove.

The free flow drainage tube is positioned as shown. It is preferably positioned adjacent the expansion joint and directly therebelow so as to collect substantially all the water as it seeps through the joint, thus insuring its rapid transfer to a point from beneath the roadway.

It will be noted that the drain tube extends beyond the edges of the slabs 10 and into gravel back-fill 20, which is adapted to receive the water and direct it to the road drainage ditch. Many other means might be provided for the

disposal of the water after it has been carried from beneath the slabs, also additional longitudinally disposed tubes might be provided to drain the water from the road bed, longitudinally of the roadway, however, such longitudinal drainage tubes have not been shown.

The construction of the drainage tube is but shown in Figs. 3 and 4, wherein 22 is a channel having longitudinally extending flanges 24 with upturned edges 26, positioned across the open face of the channel 22 and on flanges 24, in spaced apart relation between upturned edges 26, is a transversely corrugated cover 28 which serves to present openings 30 through which water passes to the channel 22. It will be noted that the upturned edges 26 serve to form side barriers to prevent the escape of water to the road bed and direct it to the openings 30. When properly positioned the upturned edges 26 are at opposite sides of the expansion joint 14, and water passing through said joint will naturally have a downward flow to the drainage tube. It can be readily understood that in certain road construction, the drainage tube might be positioned a relatively long distance from the expansion joint and still function to eliminate the water from the road bed.

A further type of drainage tube that might be utilized under certain conditions, is shown in Figs. 5 and 6. This type of tube comprises a channel 32 having longitudinal flanges 34 and a transversely corrugated cover member 36 which extends beyond flanges 33 and serves as a canopy to protect the openings 40 formed between the cover 36 and flanges 34. This type of tube is very suitable for use when the natural earth material is used as a road bed and there is considerable fine material that might tend to fill the openings leading to the channel.

It will be noted that the drainage tube extends outwardly and downwardly from the center of the road and that the water will be directed to both sides of the roadway at a sufficient inclination to insure a free flow and to prevent any material accumulation of sediment.

By this efficient means of elimination of seepage water from the road bed, it is apparent that much trouble now encountered, due to breaking and buckling of the road slab, will be eliminated and the life of the roadway will be materially increased.

It is apparent that many changes might be made in the structure of the drainage tubes and in their position relative to the slab joint, however, 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. The combination with a road structure having a base and a series of spaced apart surface slabs, with a transversely disposed expansion joint between adjacent slabs, a bed of coarse pervious material positioned directly below said expansion joint, of a drainage tube comprising a channel having out-turned longitudinal flanges with upturned edges, a transversely corrugated cover strip resting on said flanges in spaced relation to said upturned edges whereby openings are formed between the cover strip and flanges, said drainage tube being positioned directly below said expansion joint in said bed of pervious material whereby water passing through said joint will move between said upturned edges and be directed through said openings to said channel.

2. The combination with a road structure having a pervious base and a series of spaced apart surface slabs with a transversely disposed expansion joint between adjacent slabs, of a substantially flat-top drainage tube comprising a channel having out-turned side flanges with upturned edges, and a cover strip resting on said out-turned flanges with openings formed therebetween, positioned in said base vertically below said expansion joint whereby substantially all the water passing through said expansion joint will pass downwardly between said upturned edges and be directed through said openings into said channel.

3. The combination with a road structure having a pervious base and a series of spaced apart surface slabs with a transversely disposed expansion joint between adjacent slabs positioned thereon, of a substantially semicircular sheet metal drainage tube having offset upturned edges, positioned in said base with its curved portion extended downwardly and its horizontal top portion spaced below said slabs and intersected by a vertical plane determined by said expansion joint, said tube having a transversely corrugated cover strip positioned on said flanges in spaced relation to said up-turned edges to form a series of openings below the upper edges of said upturned edges to said channel to receive water passing through said pervious base from said joints.

4. The combination with a road structure having a base and a series of spaced apart surface slabs with transversely disposed expansion joints between adjacent slabs, of an open top channel having upwardly diverging side walls and a cover strip positioned in said channel below the upper edges of said side walls with openings formed between said side walls and said cover strip whereby water passing through said expansion joint will pass downwardly between said side walls and be directed through said openings into said channel.

5. The combination with a road structure having a base and a series of spaced apart surface slabs with vertically disposed expansion joints between adjacent slabs of a substantially flat top drainage tube with longitudinal edge flanges extending above said flat top and having openings formed through the top of said tube whereby water deposited on said flat top will be directed through said openings into said drainage tube.

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