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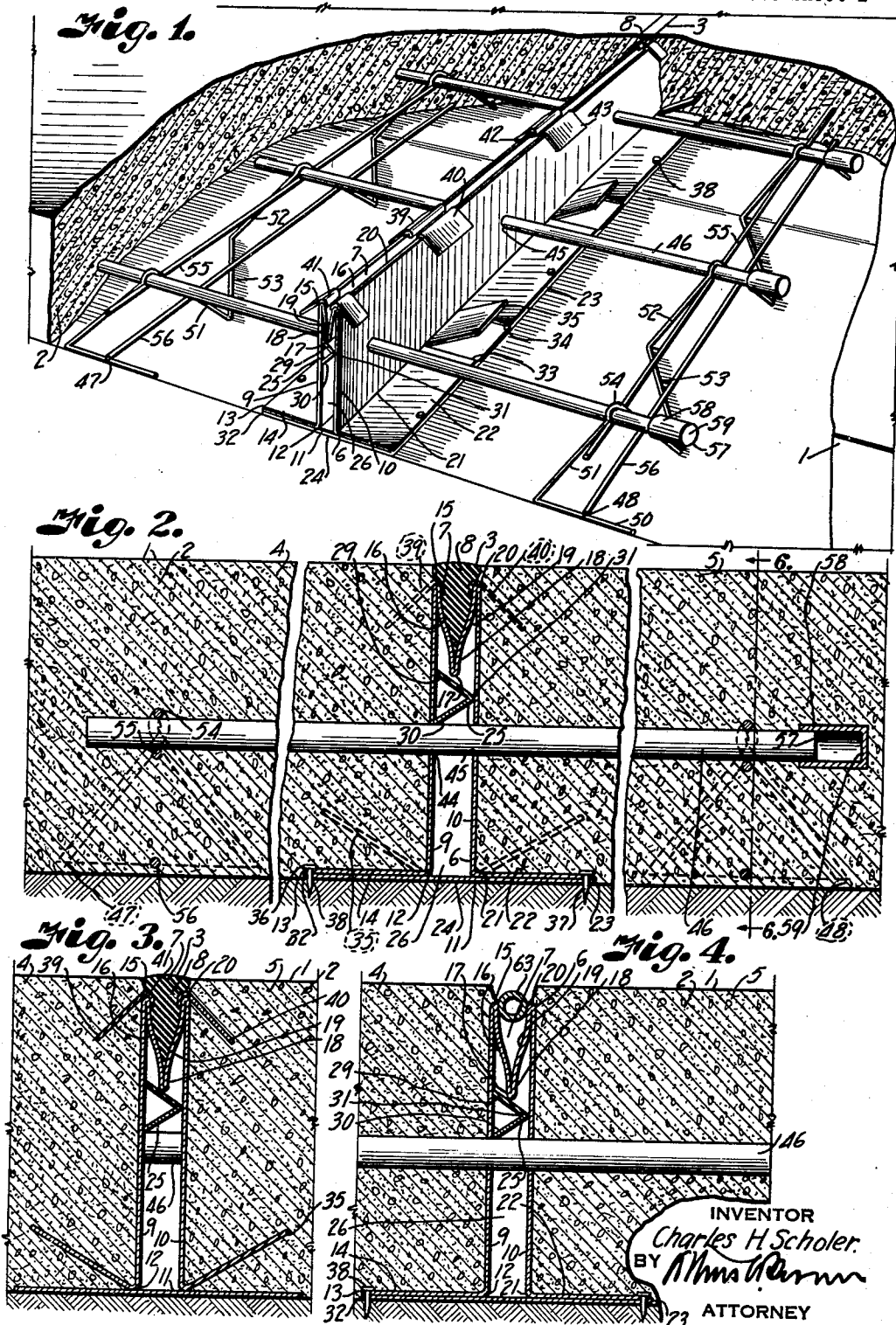
C. H. SCHOLER

2,093,697

EXPANSION JOINT

Filed Aug. 20, 1934

2 Sheets-Sheet 1



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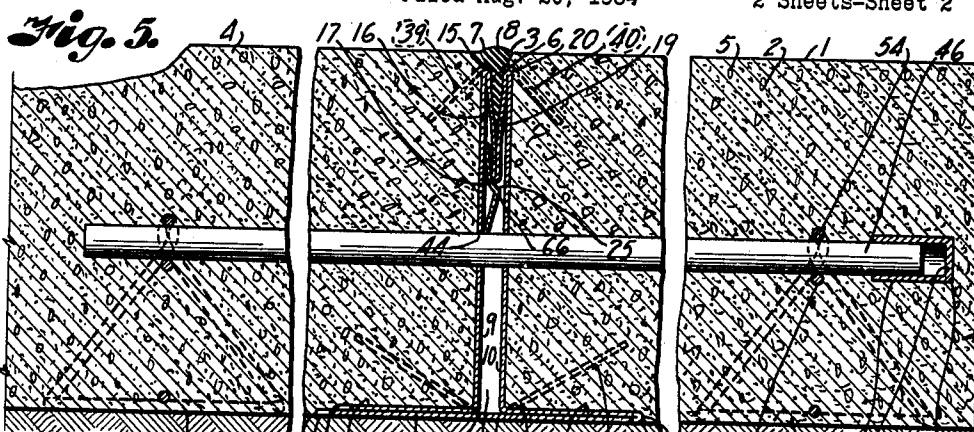
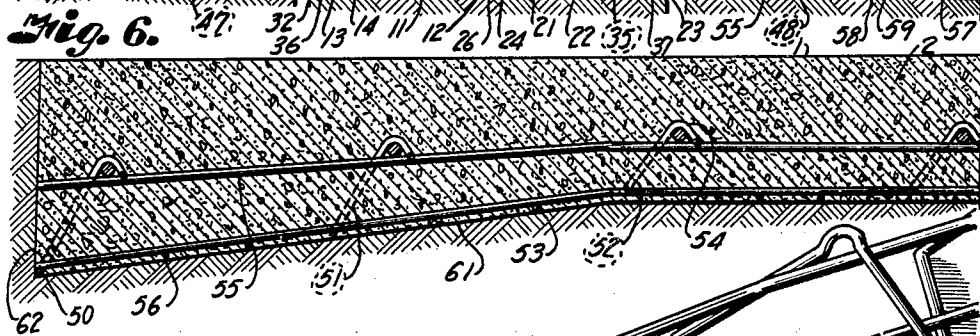
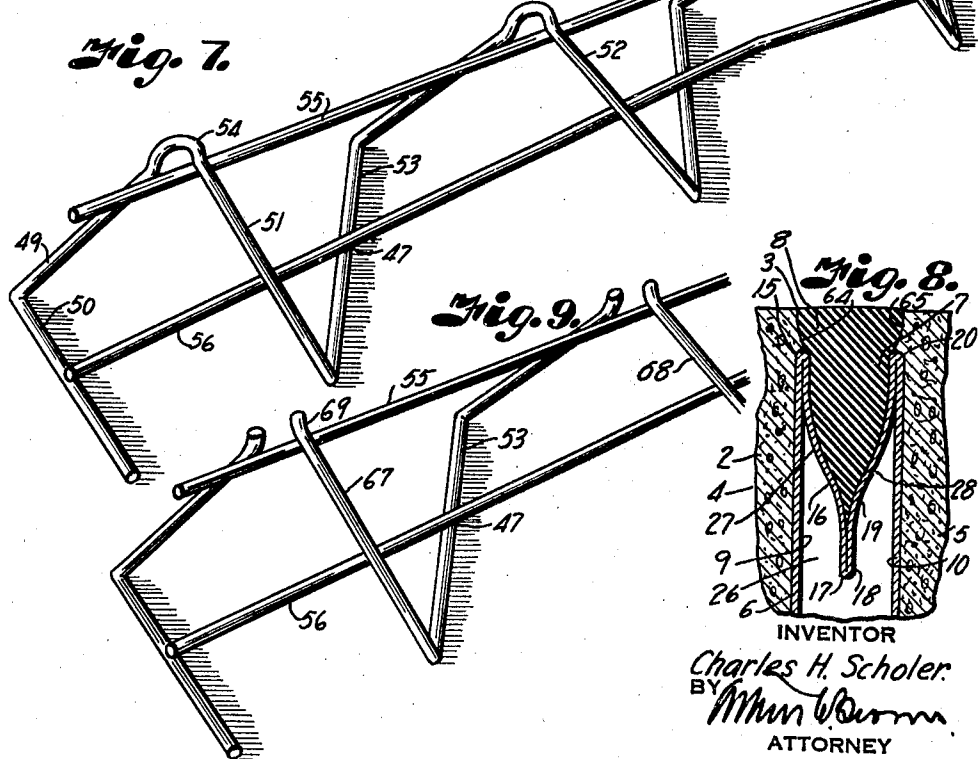
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EXPANSION JOINT

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2 Sheets-Sheet 2



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2,093,697

EXPANSION JOINT

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4 Claims. (Cl. 94-18)

This invention relates to expansion joints and more particularly to those of the character used in compensating for expansion in highway pavements and has for its principal objects to provide a water tight joint wherein the entire joint space is available for expansion, to provide a minimum amount of joint sealing material thereby reducing the amount displaced from the joint upon expansion of the pavement, to provide the joint with dowel rods for maintaining surface alignment of the pavement during expansion, and to provide free relative movement of the dowel rods and pavement in the direction of the expansion.

Other important objects of the invention are to facilitate setting of the joint form prior to pouring of the paving material, to provide chair supports for accurately holding the dowel rods in position during pouring, and to provide for accurately maintaining the width of the joint space and exclusion of the paving material therefrom during pouring and prior to insertion of the sealing material.

In accomplishing these and other objects of the invention, hereinafter pointed out, I have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of a portion of a highway pavement equipped with an expansion joint embodying the features of the present invention, a portion of the paving being broken away to better illustrate the construction of the joint.

Fig. 2 is a longitudinal section through the joint taken at the point of one of the dowel rods.

Fig. 3 is a similar section through the joint taken at a point intermediate the dowel rods.

Fig. 4 is a longitudinal sectional view through the joint, particularly illustrating the spacer for maintaining the width of the joint space during pouring of the paving material.

Fig. 5 is a sectional view similar to Fig. 2 showing a joint after expansion of the paving material.

Fig. 6 is a cross sectional view through one side of the paving on the line 6-6, Fig. 2.

Fig. 7 is a detail perspective view of an end of one of the chairs which support the dowel rods.

Fig. 8 is an enlarged fragmentary section through the joint particularly illustrating the sealing material for closing the joint space.

Fig. 9 is a detail perspective view of a modified form of chair for the dowel rods.

Referring more in detail to the drawings:

1 designates a portion of a highway paved with an expansible paving material such as concrete

2 and which is divided at regularly spaced intervals by transverse expansion joints 3 to allow for longitudinal expansion of the pavement as in conventional highway construction, the expansion joints 3 being usually provided by dividing the paving into a series of sections 4 and 5, each spaced apart a sufficient distance to allow for the maximum expansion of the material comprising each individual section and the joint space is ordinarily filled with a plastic sealing material which is extruded therefrom onto the upper surface of the highway during expansion of the sections.

This sealing material, therefore, not only interferes with free expansion of the paving sections, but the material is extruded to such an extent that the transverse ridges formed thereby are plainly perceptible to traffic moving along the highway. The sealing material also interferes with free expansion of the paving sections and causes the sections to move out of surface alignment, thereby increasing perceptibility of the joint to the traffic. The paving is, therefore, subject to rapid deterioration by the pounding action of the traffic moving over the joints. This deterioration of the joint and paving material allows entrance of moisture under the paving which is instrumental in hastening the destruction of the highway.

In the present invention, these defects are overcome by providing a joint form 6 which becomes a permanent part of the highway and is provided with a relatively shallow contractible trough shaped pocket 7 for containing a minimum amount of sealing material 8, the portion of the joint below the sealing material being entirely open to allow free expansion of the adjacent paving sections 4 and 5.

The joint form 6 is preferably produced from a single strip of metal of sufficient length to extend across the width of the roadway and is shaped to provide spaced vertically positioned plate portions 9 and 10 that are supported on a horizontal base portion 11.

In bending the metal to form, a right angular bend 12 is provided in spaced relation with a side edge 13 thereof to form a lateral flange portion 14 and the vertical spaced plate portion 9. The plate is then bent retractively as at 15 to form the upper edge of the plate portion 9 and one side 16 of the trough shaped pocket 7. The metal is again bent retractively as at 17 to form the bottom 18 and the opposite side 19 of the pocket, after which the metal is again retractively bent as at 20 to form the upper edge of the plate por-

tion 10. The metal is then provided with a right angular bend 21 in horizontal alignment with the bend 12 to provide a right angular flange portion 22 corresponding to the flange portion 14 previously described. The next bend is made by bending the metal reversely on itself as at 23 to form a bottom portion 24 underlying the flanged portions 14 and 22.

The bends 15, 17 and 20 are preferably made so that the side plate portions 9 and 10 lie flatly against the portions 16 and 19 forming the sides of the pocket, then when the plate portions 9 and 10 are spread apart, by an angle shaped insert strip 25 to form an expansion space 26 therebetween, the side portions of the pocket flex on reverse curves 27 and 28 in forming the pocket as shown in Fig. 8.

This is an important feature of the present invention for the reason that when the plates 9 and 10 are moved to and from each other incidental to expansion and contraction of the paving material, the wing portions will flex on the reverse curves rather than the bends 15, 17 and 20.

The strip 25 is preferably inserted between the plate portions 9 and 10 so that the legs 29 and 30 will engage against the plate portion 9 and the vertex 31 of the angle against the plate portion 10 at a point below the bottom of the trough shaped pocket. When in this position, the edge 13 of the flange portion 14 aligns with the edge 32 of the plate portion 24.

In order to form anchors for securing the form member to the respective paving sections 4 and 5, the flange portions 14 and 22 are slit as at 33 and 34 at spaced points throughout their length to provide wings 35 which are bent upwardly preferably at an acute angle relative to the base, as best shown in Fig. 3.

The flange portions 13 and 22 and the underlying plate portion 24 are also provided along their longitudinal edges intermediate the wings with apertures 36 and 37 through which nails 38 or the like are projected to retain the form in transverse alignment with the road bed prior to pouring of the paving material as later described.

The upper edges of the trough shaped pocket may be provided with anchor clips 39 and 40 having hooked portions 41 and 42 welded or otherwise secured to the upper edges 15 and 20 of the plate portions 9 and 10 so that the body portions 43 thereof extend outwardly and downwardly in inclined relation to the plate portions 9 and 10.

Extending through series of aligned openings 44 and 45 in the plate portions 9 and 10, at spaced intervals throughout the length of the form member, are dowel rods 46 having their ends supported in horizontal alignment relatively to the base of the form member by means of chairs 47 and 48. The chairs are best illustrated in Fig. 7 and include a rod 49 bent to form end foot portions 50 for engaging the road bed and triangular shaped portions 51 and 52 connected at their lower ends by angularly arranged foot portions cooperating with the foot portions 50 on the end of the rods. The apex of the leg portions 51 and 52 are preferably provided with loop portions 54 wherethrough the ends of the dowel rods are projected to rest upon a transverse rod 55 which is preferably welded to the leg portions 51 and 52 of the rod 49. The foot portions 50 and 53 are likewise interconnected by a similar rod 56 which serves as a transverse reinforcing bar for the bottom of the paving material.

The upper rod 55 likewise forms a transverse reinforcing bar to prevent cracking of the paving

material due to the settlement of the shoulders or the bed of the roadway.

In order to provide for longitudinal movement of the dowel rods, one end thereof carries sockets 57 including sleeve portions 58 freely slidable over the ends of the rods and having their outer ends closed by walls 59 to prevent the paving material from filling the interior of the sleeves.

The sleeves are preferably of sufficient length to provide bearing on the ends of the dowel rods and to provide clearance between the end of the rod and the wall 59 greater than the width of the spacing afforded between the plate portions 9 and 10 of the form member.

The form member as well as the chairs are shaped to conform to the road bed. For example, the center portion of the road bed may be substantially level; however, the sides of the road bed slope downwardly as at 61 to form shoulders of substantially greater thickness than the center of the roadway.

The upper edges 15 and 20 of the plate portions as well as the trough shaped pocket are preferably crowned to conform to the crown of the road so that the edges thereof will be spaced a uniform distance below the top surface of the paving material throughout the width of the paving strip.

In constructing a road way employing expansion joints as above described, the road bed is prepared in conventional manner, after which, the form members comprising the expansion joint and chairs 47 and 48 are located transversely at suitably spaced intervals along the length of the road bed. When the form members are aligned transversely with the roadway, they are anchored in position by the nails 38 which are driven through the apertures in the flange portions 14 and 15 and the plate portion 24.

The chairs 47 and 48 are likewise aligned with the form member and staked in position to prevent their displacement.

The dowel rods are then inserted through the loop portions 54 and through the openings 44 and 45 in the plate portions 9 and 10. The sockets 57 are then slipped over one end of the dowel rods to leave sufficient clearance at the ends of the rod to provide expansion of the rod.

A round bar or tube as illustrated at 63, Fig. 4, is then inserted between the edges 15 and 20 to close the open upper end of the trough shaped pocket to retain the edges in uniformly spaced relation and to prevent entrance of road paving material into the pocket. The dowel rods are then greased to prevent the paving material from sticking thereon. The road pavement material is then poured about the form members and dowel rods to form the sections 4 and 5 of the highway.

After the top surface of the sections has been shaped to conform with the required crown of the road way, a suitable tool can be run along the top of the spacing rod 63 to form concave shoulders 64 and 65 extending over the upper edges 15 and 20 of the form member so that when the concrete is set, the shoulders will form overhanging shedlike projections to prevent entrance of moisture between the concrete and the plate portions 9 and 10.

The concrete after being placed around the chairs and about the anchor wings 55 and the anchor clips 43 securely embeds the joint assembly in position so that it becomes a permanent part of the paving when the material has set.

After the material has set, the rod 63 is re-

moved and the trough shaped pocket including the space between the curved shoulders is filled with a plastic sealing material which maintains its plasticity throughout the life of the highway.

When the sections of the highway expand, the ends thereof move the plate portions 9 and 10 toward each other crushing the angle shaped spacing strip 25 as shown at 66, Fig. 5.

When the plate portions are moved toward each other, the pocket is closed and the sealing material is extruded therefrom; however, the amount extruded is relatively small and will not be perceptible to the traffic moving along the highway.

After the paving has once expanded, the expansion space is free of obstruction so that there is nothing to limit the full expansion of the sections and substantially all of the space between the plate portions 9 and 10 is made available to compensate for maximum expansion of the paving.

Upon movement of the plates to and from each other, the flange portion 14 will slide freely over the base portion 24 since upon the first expanding movement of the section the nails will have pulled through the metal thereof, Fig. 5.

It is obvious that the sealing material prevents seepage of moisture into the space between the ends of the paving sections and that due to the inclined nature of the base on which the road way is laid, it is impossible for water to run into the ends of the joint.

From the foregoing, it is apparent that I have provided an expansion joint which is readily and accurately set in position preparatory to pouring of the paving material and that after the paving material is set and the sealing material applied, the joint is water tight and provides ample expansion of the sections without extruding any great amount of sealing material onto the surface of the road way.

It is also obvious that due to the pocket, the sealing material is retained in place to seal the joint and that it is not necessary to seal the entire space between the sections as is the present practice in road building construction.

Also, because of the pocket, I am enabled to effect a saving on the amount of sealing material required and that due to the adhesion of the sealing material to the sides of the pocket any of the material extruded will be drawn back into the pocket upon contraction of the pavement aided by the movement of the traffic over the joints which tends to compress the material and refill the trough shaped pocket.

The dowel rods while allowing free expansion of the paving sections, retain the upper surfaces

thereof in perfect alignment and provide for smooth movement of the traffic over the joint.

The modified form of chair member shown in Fig. 9 is similar to that shown in Fig. 7, except that the dowel supports are formed by separate rod sections 67 and 68 having finger portions 69 extending above the rod 55 to engage the sides of the dowel rods.

What I claim and desire to secure by Letters Patent is:

1. In an expansion joint of the character described, a form member comprising spaced plate portions, a trough-shaped pocket connecting upper edges of the plate portions for containing a sealing material, flange portions extending laterally from the lower edges of the plate portions, a plate portion underlying the flange portions, anchoring wings extending from the spaced plate portions, and anchor clips having hook portions engaging over the upper edges of the spaced plate portions.

2. In an expansion joint of the character described, a form member comprising spaced plate portions, a trough-shaped pocket connecting upper edges of the plate portions for containing a sealing material, flange portions extending laterally from the lower edges of the plate portions, a coextensive plate portion integrally connected with one of the flange portions and having relative sliding engagement with the other flange portion, and anchoring wings for securing the plate portions in facing relation with a pair of adjoining slab sections between which the form member is inserted.

3. In an expansion joint of the character described, a form member comprising spaced plate portions, a pocket connecting upper edges of the plate portions for containing a sealing material, flange portions extending laterally from the lower edges of the plate portions, a plate portion underlying the flange portions, anchoring wings extending from the spaced plate portions, and anchor clips having hook portions engaging over the upper edges of the spaced plate portions.

4. In an expansion joint of the character described, a form member comprising spaced plate portions, a pocket connecting upper edges of the plate portions for containing a sealing material, flange portions extending laterally from the lower edges of the plate portions, a plate portion fixed to one of the flange portions and having relative sliding engagement with the other flange portion, and anchoring wings for securing the plate portions in facing relation with a pair of adjoining slab sections between which the form member is inserted.

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