Jan. 9, 1934. E. A. ROBERTSON 1,942,494

DOWEL BAR CAP AND STOP

Filed July 3, 1931

Fig. 1

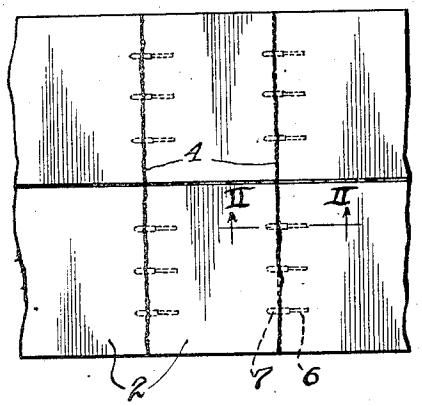


Fig. 5

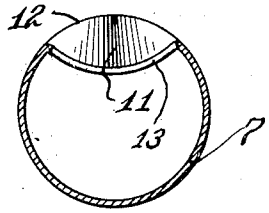


Fig. 2

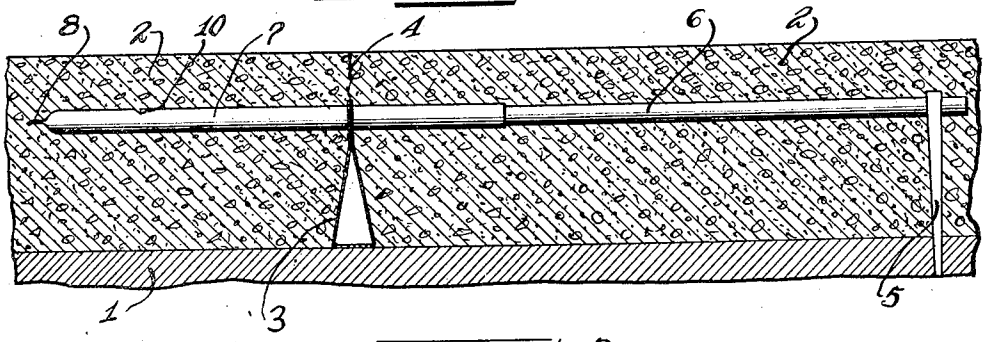


Fig. 3

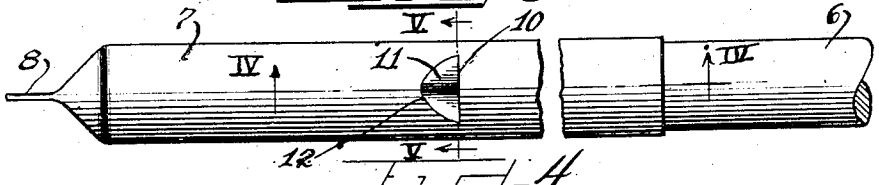
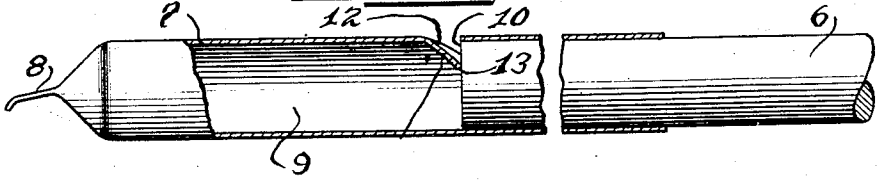


Fig. 4



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DOWEL BAR CAP AND STOP

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5 Claims. (Cl. 94—8)

In concrete road construction work and the like it has been found that due to the expansion of the concrete sections forming the road that the dowel bars which extend between the sections of the road very often are caused to buckle and produce breaking of the pavement. To obviate buckling of dowel bars due to the expansion of road sections it has been the practice to provide dowel caps, sockets or expansion tubes for the reception of the ends of dowel bars or reinforcing bars to allow for expansion of the dowel bars or reinforcing bars without causing buckling of the bars and breaking up of the pavement. Heretofore the movement of bars into sockets or caps has been temporarily limited by lips or lugs struck inwardly from the material of the sockets or caps leaving only a short edge for integrally connecting the tongue or lug with the body portion of the socket or cap so that a very slight movement of a bar in a socket or cap would cause bending over or breaking off of the tongue or lug permitting the bar to slide into the socket or cap so that when additional expansion occurred between sections of a road or the like the bars would buckle and cause breaking of the pavement.

To obviate the above conditions an improved dowel bar receiving socket or cap has been devised with an improved integral inwardly projecting stop for one end of a dowel bar or reinforcing bar with said stop being so constructed that it will afford considerable resistance to the inward movement of a bar due to expansion so that no premature inward sliding movement of a dowel bar or reinforcing bar with respect to its socket or cap will occur until a force is exerted due to the expansion of the bar which will be sufficient to shear off the improved bar stop which is integrally formed in the socket or cap to offer a predetermined amount of resistance to the inward movement of the bar to properly handle the expansion between adjacent sections of a concrete road or the like.

It is an object of this invention to provide an improved type of dowel bar cap having an improved dowel bar stop provided therein and constructed to afford an increased amount of resistance to the inward movement of a dowel bar into the cap caused by the expansion between adjacent concrete road sections.

It is also an object of this invention to provide an improved type of dowel bar cap having a transverse cut therein permitting a portion of the cap to be deflected inwardly to form a conical segment shaped stop which will resist the inward movement of a dowel bar into the cap until an expansive force is exerted which will be sufficient to shear off the stop to permit the dowel bar to slidably enter the cap to obviate buckling of the dowel bar when expansive forces are set up in adjacent sections of the material in which the dowel bar device is imbedded.

It is an important object of this invention to provide a concrete road dowel bar device having an improved dowel bar receiving cap or socket provided with a transverse cut to permit a portion of the body of the cap to be deflected inwardly to provide a conical segment shaped stop having the major portion of the margin thereof integrally connected with the body of the cap to afford a stop which will offer increased resistance to the inward movement of a dowel bar into the cap so that a force equal to the shearing strength afforded by the integral edge of the stop must be exerted by the dowel bar as a result of expansion forces set up in adjacent sections of the material in which the dowel bar device is imbedded before the dowel bar is permitted to project further into the dowel bar cap beyond the position of the dowel bar stop.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawing.

The invention (in a preferred form) is illustrated in the drawing and hereinafter more fully described.

On the drawing:

Figure 1 is a fragmentary top plan view of a portion of a concrete road or the like having imbedded therein a plurality of dowel bar devices including dowel bar caps embodying the principles of this invention.

Figure 2 is an enlarged vertical detail section taken on line II—II of Figure 1 showing an improved dowel bar device imbedded in the road between two concrete sections of the road.

Figure 3 is an enlarged top plan view of a dowel bar device with parts broken away and illustrating the improved stop forming a part of the dowel bar cap.

Figure 4 is a fragmentary longitudinal sectional view of the dowel bar device taken on line IV—IV of Figure 3 with parts shown in elevation.

Figure 5 is an enlarged transverse detail section taken through the dowel bar cap on line V—V of Figure 3.

As shown on the drawing:

The reference numeral 1 indicates a concrete road sub-grade having disposed thereabove a concrete road crown or top comprising a plurality of sections 2. Adjacent sections 2 are separated by means of a transverse road strip device 3 which as is clearly illustrated in Figure 2 rests upon the sub-grade 1 and projects upwardly to within a short distance of the top surface or the crown of the road to cause regular transverse cracking of the crown portion of the road to provide transverse cracks 4 which produce the road sections

2. The upper portion of the transverse road strip 3 is provided with an opening through which a dowel bar device projects to permit the dowel bar device to extend from one section 2 into an adjacent section to hold the sections aligned in position and furthermore preventing the sections from vertical displacement with respect to one another when stresses are set up in the road due to temperature changes. As clearly illustrated in Figure 2 the dowel bar device is supported by means of the transverse road strip 3 and by means of a dowel bar supporting pin or stake 5.

The dowel bar device comprises a dowel bar or reinforcing bar 6 one end of which is adapted to be projected into the open end of a dowel bar cap or socket 7 which serves as an expansion tube for the dowel bar 6. The opposite end of the cap or socket 7 is compressed or pinched to provide a closure lip or flattened head 8 to close one end of the cap to prevent concrete from entering into the cap when the dowel bar device is imbedded in concrete.

Dowel bar cap devices are provided as a means for allowing reinforcing or dowel bars room for expansion when adjacent road sections 2 are affected by temperature changes causing adjacent sections to move toward one another thereby causing the dowel bar or reinforcing bar 6 to slidably move into the open end of the socket or cap 7. With the telescoping arrangement of the bar 6 into the cap 7 when two adjacent road sections are expanded toward one another buckling of the dowel bar device is obviated thereby preventing breaking up of the pavement as a result of any buckling action of the dowel bars or reinforcing bars. For the purpose of preventing a dowel bar 6 from projecting entirely through a dowel bar cap or socket 7 an improved stop device is provided in the cap 7 to provide an expansion chamber 9 between one end of the bar 6 and the closed end 8 of the cap. In order to prevent premature inward movement of the bar 6 into the expansion chamber 9 of the cap 7 the stop device is of improved form and is so constructed that it will offer increased resistance commensurate with the shearing strength of the material out of which the cap is constructed so that a substantially predetermined expansion force or stress is permitted to be set up between two adjacent concrete road sections 2 before the bar 6 is permitted to telescope further into the expansion cap or socket 7. To form the improved stop device the cap or socket 7 is provided with a transverse cut or slot 10 and a portion of the cap between the transverse cut 10 and the closed end of the cap is deflected downwardly to form a conical segment stop 11 having a major margin or edge 12 which is integral with the body portion of the cap 7 and furthermore having an arcuate or segment shaped stop edge 13 which as clearly illustrated in Figure 4 is positioned within the cap and affords a stop edge for the inner end of the dowel bar or reinforcing bar 6 to provide a normal stop for the inward movement of the bar 6 a predetermined distance into the cap 7 leaving the expansion chamber 9 between the inner end of the bar 6 and the closed end of the cap to permit further advance of the bar into the cap when excessive stresses are set up between adjacent road sections 2. By providing the stop member in the form of a depressed conical segment it will be noted that a stop member is provided wherein the major portion of the edge of the stop member is integral with the body portion of the cap 7 leaving a minor portion of the edge namely the shorter edge 13 as a contact edge for receiving the inner end of a bar 6 seated thereagainst. By providing the major portion of the edge of the stop member 11 in integral contact with the body portion of the cap 7 an increased amount of resistance is provided against the inward movement of the bar 6 with respect to the cap 7 so that the bar 6 normally is held from advancing further into the cap 7 beyond the stop 11 until the stresses set up between adjacent road sections 2 due to temperature changes are sufficient to exceed the shearing strength of the edge 12 of the stop 11. When the stress between adjacent sections is such that additional room for expansion of the bar 6 into the expansion chamber 9 of the cap 7 becomes necessary the stresses set up between the sections will cause the bar 6 to move inwardly in the cap 7 to shear off the stop member 11 along the edge 12 of said stop member thereby permitting the bar 6 to telescope or slide further into the cap 7 beyond the normal position of the stop member 11 and into the expansion chamber 9 of the cap. By merely providing a transverse cut in the cap 7 and depressing a portion of the body of the cap into the cap it will be noted that a bar stop member is provided of increased strength and resistance to obviate premature inward movement of a dowel bar into a cap beyond the stop member when minor stresses or strains are set up between adjacent road sections.

It will of course be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is therefore not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. A dowel bar device comprising a hollow cap closed at one end, a dowel bar projecting into an open end of the cap, and a concave dowel bar stop struck inwardly from the cap, said stop formed with the major portion of the margin thereof integral with the cap leaving a minor portion of the margin of the stop to serve as a stop edge.

2. A dowel bar device comprising a tubular cap closed at one end and open at the opposite end, a bar projecting into the open end of the cap and a depressed tapered bar stop integrally formed in the cap comprising a deflected stop edge and a margin which is longer than the stop edge and integral with the cap.

3. A dowel bar device comprising a pair of telescoping members, and a stop formed in one of said members including a conical segment shaped member having an arcuate stop edge and a longer edge integral with the member and having the ends thereof terminating at the ends of said arcuate stop edge.

4. A dowel bar cap having a single cut therein with a portion of the cap adjacent the cut depressed to form a tapered stop member having the major portion of the margin thereof integral with the cap to form a shearing edge.

5. The combination with a pair of interfitting members, of a stop device struck inwardly from one of said members and comprising a conical segment shaped portion having an arcuate stop edge and a margin integral with said member and longer than the arcuate stop edge.

EDWARD A. ROBERTSON.