Oct. 8, 1946. R. A. McGRATH, SR., ET AL 2,408,989

DOWEL BAR PROTECTOR

Filed April 11, 1945

FIG. 1.

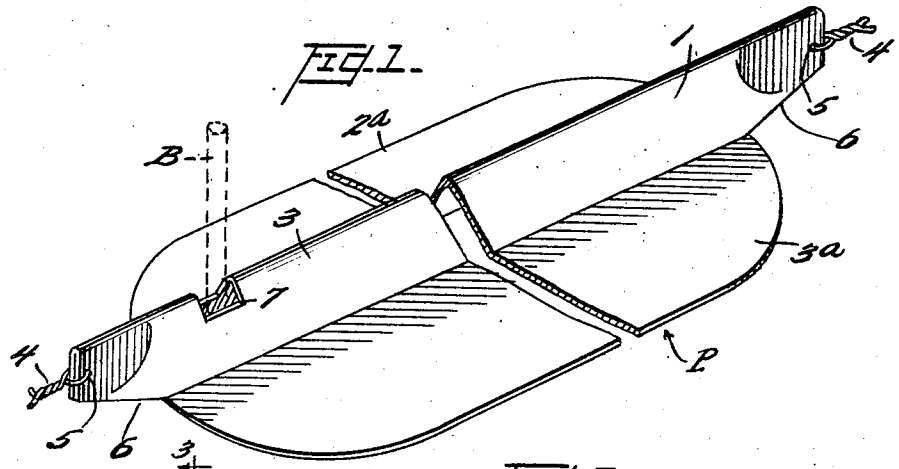



FIG. 2.

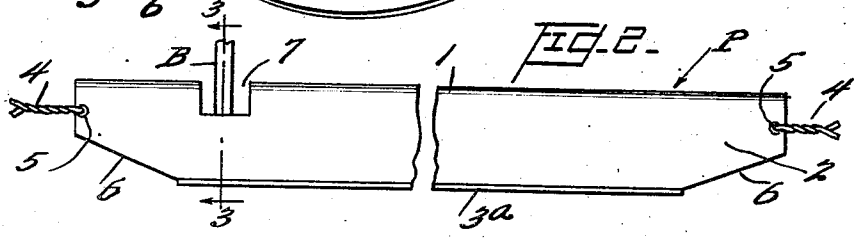



FIG. 3.

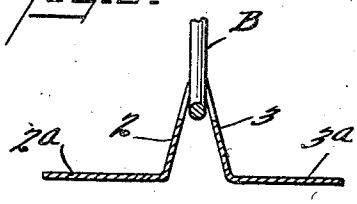



FIG. 4.

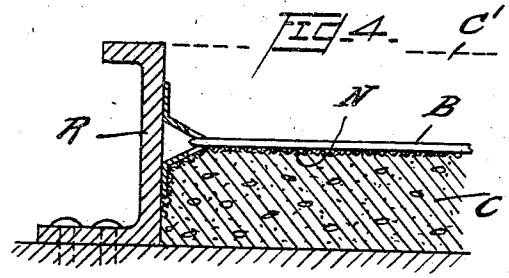
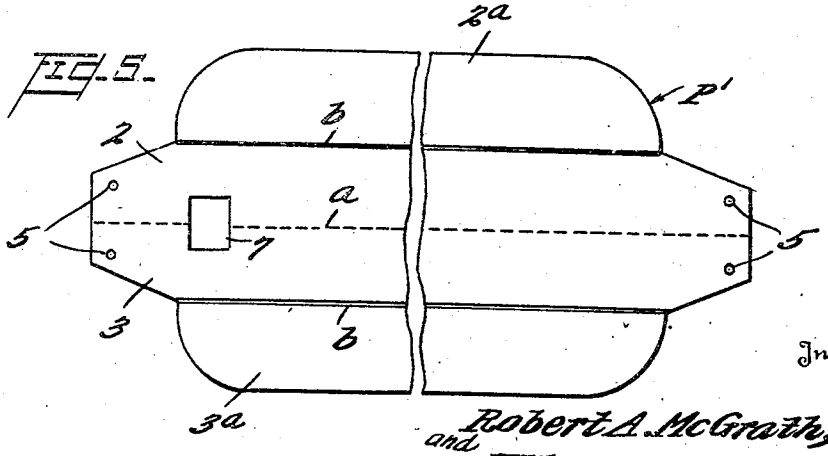



FIG. 5.




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## DOWEL BAR PROTECTOR

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2 Claims. (Cl. 25—118)

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This invention relates to dowel bar protectors of the general type used in construction of concrete roadways.

In the building of concrete roads it is common practice to lay the road in lateral half sections in order to allow traffic to move over one lane of the roadway while the other lane is under construction. For tying together the two sections of the completed roadway, dowel bars are frequently embedded in the first laid section leaving a portion of their length projecting which is later incorporated in the subsequently completed section. In order that the projecting ends of the dowel bars will not extend over onto and interfere with traffic on the uncompleted lane of the roadway, it has become common practice to bend the protruding portions of these dowel bars at right angles so as to extend parallel and close to the retaining rail which confines the concrete along the inner side of the first-completed road section. Then, when the concrete hardens, the rail is removed and the dowel bars are straightened out and covered by the concrete forming the second or final section of the roadway.

Unless the bent portions of the dowel bars which lie adjacent the retaining rail are suitably protected during the pouring of the first section of the roadway, they become more or less embedded in the concrete and difficulty is encountered in prying them away from the hardened concrete without injuring the edge of the roadway. It, therefore, has been proposed to associate protectors with the bent portions of the dowel bars to prevent them from becoming covered with concrete. One such form of protector is disclosed in Patent No. 1,987,392 of Charles H. Dill. Heretofore, such protectors have generally required special supporting means, such as clips or stakes, for retaining them in place preliminary to the pouring of the concrete, which condition has added to the cost of the protectors (which are used in large quantities in road building) and has interfered with their compact stowage and convenient handling on the job. Another disadvantage to this type of protector is that such protectors usually present only a smooth face to the concrete, so that after the concrete has hardened and the side rail is removed the protectors do not adhere tightly to the concrete and hence it is usual to pry or strip them loose with the likelihood chipping or otherwise injuring the edge of the roadway.

It is an important object of our invention to provide a protector for dowel bars used in concrete road construction which is adapted to be associated with the projecting bent portions of the dowel bars, the protector serving to prevent the concrete from coming into contact with the dowel bars but which at the same time is so constructed and arranged as to provide interlocking engagement with the concrete after the latter has set. By virtue of this construction the protector becomes firmly embedded in the concrete and does not require removal therefrom.

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Another object of our invention is to provide a protector of the above character which includes laterally disposed wings adapted to be held by the plastic concrete in tight contact with the inner face of the side rail so as not to require supplementary means, such as clips or stakes, for retaining the protector in position preparatory to pouring the concrete.

Still another object of our invention is to provide a flat blank of sheet material, for example metal, from which our protector can be fashioned on the job with the simplest tools and by relatively unskilled workmen. Thus, a supply of protectors can be shipped and stowed in the form of blanks so as to occupy a minimum amount of space, and effecting a reduction in transportation costs, and the blanks can be bent to shape at the time and in the quantity that they are required for use.

Other objects and advantages will be apparent from the following detailed description of a preferred embodiment of the invention, reference being had to the annexed drawing in which:

Figure 1 is a perspective view of a protector for dowel bars;

Figure 2 is a side view of the protector;

Figure 3 is a cross-section of the protector taken on the line 3—3 of Fig. 2;

Figure 4 is a cross-section through a portion of a concrete roadway during its construction, showing the position occupied by the protector with respect to the side rail; and

Figure 5 is a plan view of a blank from which the protector is formed.

Referring to the drawing, in Figs. 1 and 2 is shown a dowel bar protector P. The protector comprises an elongated strip of metal folded along a line extending medially throughout its length so as to provide a casing 1 of triangular shape, as illustrated in Fig. 3, including the two sides 2 and 3. Contiguous with the casing and extending laterally outwardly from its two lower edges are wings 2*a* and 3*a*, respectively, both lying in a common plane.

The ends of the casing are pressed together

and held by tie wires 4 passing through registering holes 5. These ends project longitudinally beyond the corresponding ends of the wings 2a and 3a and are undercut, as indicated at 6, so as to overhang the plane defined by the wings. An opening 7 is provided in the ridge of the casing adjacent but spaced from one end but located at such a distance therefrom, measured lengthwise of the protector, as to lie rearwardly of the termination of the undercut 6.

In laying a section of roadway a concrete retaining rail R (Fig. 4) is secured in place so as to extend longitudinally along the middle of the road under construction, it being understood that a similar rail (not shown) is secured to the outer edge of the road. An initial layer of concrete C (approximately one-half the final proposed thickness of the roadbed) is poured between the rails, after which dowel bars B are laid horizontally upon this bed, usually over a wire reenforcing netting N, with the ends of the dowel bars bent so as to extend closely adjacent and parallel to the rail R.

A protector is associated with each dowel bar by introducing the bent end of the bar through the opening 7 so that the bar lies within the apex of the triangular casing, as shown in Fig. 4. One wing of the protector is pushed down into the soft concrete and in contact with the rail R so as to retain the protector in place while the other wing, also flatly abutting the rail, extends above the level of the concrete. Following this, another layer of concrete C' is deposited between the rails on top of the first layer C completely embedding the dowel bars and protectors and raising the level of the roadway to the top of the rails. During the pouring of this final layer, the plastic concrete flows into the space between the undercut 6 and the inner face of the rail, thus locking the protector in the concrete. Since the ends of the casing 1 are secured together by the tie wires 4 and because the wings 2a and 3a are pressed tightly into contact with the face of the rail by the pressure of the concrete, the bent portions of the dowel bars are effectively shielded from the concrete, such little concrete as may flow into the casing through the open bottom of the undercut 6 being negligible.

After the concrete bed has set, the rail R is removed and the bent dowel bars B are straightened so as to extend over onto the other half-section of the roadway and are embedded in the concrete composing that section when the roadway is completed. The protector remains in the concrete when the roadway is finished. Thus, in the event frost, earth disturbances or other action causes the raising of one lane of the roadway above the other to an extent sufficient to break or loosen the dowel bars, the smooth faces of the wings 2a and 3a allow relative slippage between the vertical faces of the road sections and reduces to a large extent the danger of cracking of the cement.



The blank B shown in Fig. 5 from which the protector is made is composed of relatively light gage sheet metal, this metal being of sufficient rigidity to withstand the pressure of the concrete without deforming but being readily bendable by hand or by means of a pair of hand pliers. The blank is grooved or otherwise weakened along the bend line a forming the ridge of the casing 1 and also along the two bend lines b where the wings 2a and 3a join the sides of the casing, forming of the protector to proper shape without calling for any special skill on the part of the workman.

Instead of being made of sheet metal as described above, the casing may be made of any other suitable sheet material, such as paper, plastic or wood. Also, instead of the wires 4, other means—such as pins, screws, bolts, or rivets—may be used to hold the ends of the casing together. Manifestly various other changes in construction and design within the skill of the art may be made in the protector described above without departing from the spirit of our invention as defined by the following claims.

We claim:

1. A protector for dowel bars comprising an elongated casing made of sheet material adapted to receive a dowel bar, the ends of said casing being closed, wings extending laterally from the lower ends of both sides of the casing but of less length than the casing, said casing being undercut adjacent its ends, and a relatively small opening in the top of the casing in the vicinity of one of its ends through which the dowel bar may be slid endwise into the casing.

2. A protector for dowel bars comprising an elongated casing made of sheet material and of generally triangular shape in transverse cross-section, means closing the ends of said casing, wings contiguous with and extending laterally from the lower ends of both sides of the casing, said wings terminating a spaced distance from the ends of the casing, a relatively small opening in the top of the casing in the vicinity of one of its ends through which the dowel bar may be slid endwise into the casing, said casing being undercut from its ends to a point adjacent the wings, and said opening being located beyond the undercut area.

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