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E. L. BROWN ET AL
HIGHWAY BARRIER STRUCTURES

3,214,142

Filed Feb. 20, 1963

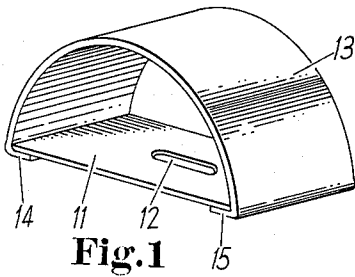


Fig. 1

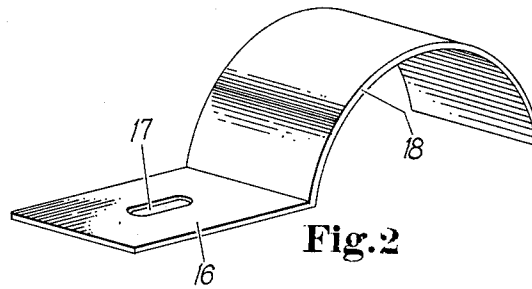


Fig. 2

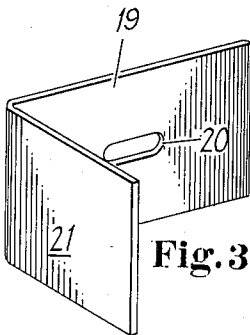


Fig. 3

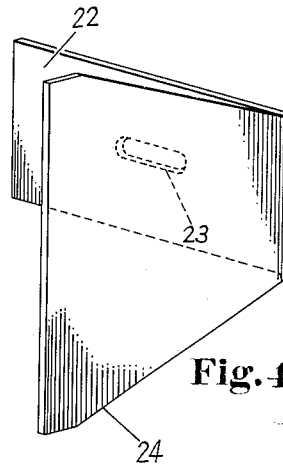


Fig. 4

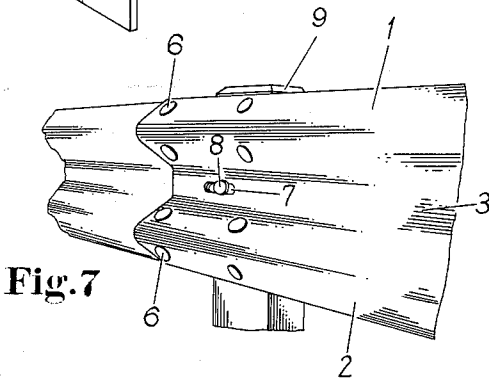


Fig. 7

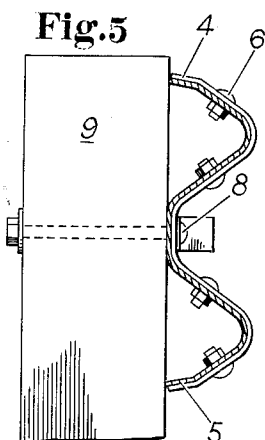


Fig. 5

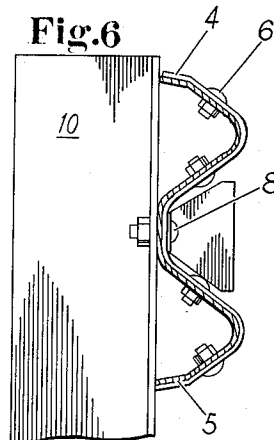


Fig. 6

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HIGHWAY BARRIER STRUCTURES

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5 Claims. (Cl. 256—13.1)

The invention has to do with continuous barrier structures which extend along the edge portions, usually in the shoulder or berm, of highways for automotive traffic. There are a number of kinds of barrier structures; but for the purpose of an exemplary showing, the invention will be described in connection with a structure in common use and made from heavy gauge galvanized iron. Longitudinal stiffness is imparted to such structures by a pair of spaced corrugations joined by a central flat portion. The barrier is made continuous by joining the corrugated pieces together at their ends. This may be done through the use of bolts or rivets with the ends slightly lapped.

The continuous length of barrier structure is supported on posts erected at intervals off the edges of the highway. The posts may be of wood or metal, and the method of mounting posts generally involves the use of bolts. The structures just described, which have come into widespread use, have made a substantial contribution to the safety of travel along the highways, not only because they demark the edges of the highways and thus tend to prevent unwitting departures from the paved sections of the highways, but also because they are strong enough to withstand substantial impacts, and in many instances actually stop a motor vehicle upon impact and prevent it from leaving the highway or highway shoulder.

The exemplary type of barrier which has been described, being made of galvanized metal, does not generally require field painting for its protection. It has been realized, however, that improved visibility at night would be a great advantage. Painting with a light colored paint has been widely used but, under some circumstances, does not effect a marked improvement in visibility. Other efforts at a solution of the problem have involved such expedients as the use of reflective buttons on the posts used to support the barrier. This, however, is a matter of considerable expense, and may become ineffective through breakage or loss of the reflective devices.

It is an object of this invention to provide a means which, in combination with a continuous highway barrier, will make for improved night visibility.

It is an object of the invention to attain improved night visibility at a lower cost.

It is an object of the invention to provide a reflector means which can easily be oriented so as to lie substantially perpendicular to the direction of motion of oncoming traffic, whether that traffic be on the straight away or on a curve.

It is an object of the invention to provide a reflective means which is protected in actual use from accidental loss, dislodgement, or maladjustment.

When the reflective means of this invention is employed with the exemplary barrier, new types of coaction occur including an improvement in the security of the mounting of the barrier structure on the supporting posts; and it is an object of this invention to obtain the improved coactions which will be more particularly described hereinafter.

These and other objects of the invention, which will be set forth hereinafter or will be apparent to one skilled in the art upon reading these specifications, are accomplished by that structure and arrangement of parts, and in that combination of which the aforesaid exemplary

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embodiment will now be described. Reference is made to the accompanying drawings wherein:

FIGS. 1, 2, 3 and 4 are respectively perspective views of different forms of reflector elements suitable for use in practicing the invention.

FIG. 5 is a vertical elevation of a wooden post including a sectionalized showing of the barrier and reflector elements, and illustrating the mode of attachment of the barrier to the post.

FIG. 6 is a similar view showing, however, another form of reflector, a metal post and the mode of attachment of the barrier structure to the post.

FIG. 7 is a perspective view showing a typical joint between barrier elements and the mode of joining a continuous barrier structure to a post.

Referring first to FIGS. 5, 6 and 7, it will be seen that the exemplary barrier structure consists of elongated metal elements, each of which is so configured as to form a deep longitudinal corrugation 1 at one edge and a similar deep longitudinal corrugation 2 at the other edge. Between these corrugations there is a flat area indicated at 3. If desired, the extreme edges of the barrier elements may be turned inwardly as indicated at 4 and 5 in FIGS. 5 and 6.

The barrier elements are usually made from 10-gauge or 12-gauge metal, although other thicknesses may be used if desired. The barrier elements in their corrugated conditions are about a foot wide. In exemplary installations, the posts are frequently spaced on 12½ ft. centers, the lengths of the sections of the barrier structure being sufficient to provide a lap at the posts. Here again, however, specific dimensions are not a limitation on the invention.

The individual sections of the barrier structure may be made straight or curved to any desired radius. Their corrugated configuration permits nesting at the overlaps, so that the sections may be firmly affixed together by bolts or rivets such as those indicated at 6 in FIGS. 5, 6 and 7. The end portions of the barrier sections are provided with mating slots, indicated at 7 in FIG. 7, so that the continuous barrier structure may be fastened to suitable posts by means of bolts 8. The posts may be of wood as shown at 9 in FIG. 5 or they may be of metal as shown at 10 in FIG. 6. Concrete posts may also be used.

Those familiar with barrier structures of the type described will understand that various adjunctive elements may be employed with them, such as terminal elements where the barrier stops, and the like. These form no part of the present invention and have not been illustrated herein.

Barrier structures of the type described have given a good account of themselves in actual practice. They demark the edges of the highway and prevent inadvertent departures therefrom. In the event of a vehicle going out of control and striking the barrier structure, they have been found adequate to prevent "pocketing"; and in most instances, they will serve to retain the vehicle on the highway or the shoulder adjacent to it. Further, the individual sections of the barrier are easily replaceable.

The painting of the barrier structures just described, while sometimes desirable for protection from the elements, does not greatly increase the visibility of the structure at night. One reason for this is that the various surfaces of the barrier structure are not configured in such a way as to reflect lights back in the direction of motion of vehicles passing along the highway. It would perhaps be effective to paint the entire barrier structure with some highly reflective coating, but cost considerations usually would not permit this. It has been found, however, that if elements can be located in such a way that their surfaces are substantially normal

to the line of movement of traffic along the highway, and if these members are coated with an efficient reflective substance, they will constitute an inexpensive means which will become easily visible at night in the headlight beams of approaching vehicles. Further, it has been found that the desired visibility is attained when the reflective devices are located at fairly widely spaced intervals. Thus, the location of appropriate reflectors at the posts of the barrier system will be sufficient for safety purposes, and when a vehicle is moving at the fairly rapid speeds currently legal and sometimes enforced on highways, will actually give the visual effect of a line of light following the barrier structure.

In the practice of this invention, reflector elements are located at least at the posts, although the use of reflectors intermediate the lengths of the corrugated sections making up the barrier does not constitute a departure from the spirit of the invention. The reflectors, used in the preferred fashion, include or are employed in connection with a perforated plate portion which serves as a washer for the head of the bolt 8 used to attach the joined sections to the respective posts. This is highly important, because if strain should be imposed on the barrier structure, there is a tendency for the joined sections to tear out or "unbutton" themselves from the heads of the attaching bolts. Even if reflectors were not used, the employment of heavy gauge washers on the bolts would be highly desirable. However, by reason of the expense involved, the precaution of using washers is sometimes neglected. In the practice of the present invention, an adequate washer element forms a part of the reflector structure, so that the use of washer elements is justified by the desirability of the use of reflectors.

In the practice of this invention, also, each reflector includes a portion extending at an angle to the general plane of the corrugated barrier sections. It is this portion which constitutes the reflector, and the structure is so made that a portion at least of the reflective surface can be oriented substantially at right angles to the direction of movement of traffic along the highway. In preferred forms of the reflector structures, tabs or panels extend outwardly from the flat portions 3 of the barrier sections, and can be adjusted by bending so as to lie at the correct reflective angle. This adjustment may be accomplished with a bending tool or with a striking device such as a hammer.

Yet another feature of the invention lies in the fact that, although there is a reflective element which is extending upwardly at a substantial angle to the flat portion 3 of the barrier sections, this extending portion is adequately protected against accidental displacement by the adjacent corrugated portions of the barrier sections. Specifically, the reflector elements have a depth not greater than and generally somewhat less than the depth of the valley between the corrugations 1 and 2 of the barrier sections, as will be apparent from FIGS. 5 and 6.

In one aspect of the invention, a reflective element is employed which is arcuate in configuration and, therefore, does not require angular adjustment since some portion of its arcuate surface will be located substantially at right angles to the direction of motion of the approaching traffic. In FIG. 1 there is illustrated a structure which comprises a heavy gauge washer element 11 having a perforation or slot 12, and an arcuate element 13, the outer edges of which are turned under as shown at 14 and 15, so as to engage under the washer element 11 when the structure is installed.

A somewhat similar, but in this instance, a unitary structure, is illustrated in FIG. 2. Here the washer element 16, with its hole or slot 17, forms a part of an arcuate reflector 18. It will be understood that in the use of these structures the bolt element 8 will be passed through the washer element 11 or 16 before being passed through the flat portions 3 of the joined barrier sections and into or through the supporting post.

In FIG. 3 there is shown a unitary structure of angular configuration consisting of a base or washer element 19 with a hole or slot 20 and an arm 21 which is the reflector proper. A somewhat similar structure is shown in FIG. 4 where the base or washer element is indicated at 22, the bolt receiving hole or slot at 23, and the angular arm or vane at 24. The difference between the structures of FIGS. 3 and 4 lies in the fact that the arm or vane of the latter structure is configured more nearly to conform to the space between the opposed sides of the corrugations 1 and 2 of the barrier sections. This has the advantage of providing a somewhat larger reflective surface, although the cost is somewhat increased. The structures of FIGS. 3 and 4 have the further advantage that after installation the vanes or arms 21 or 24 can be adjusted as to their angularities to the washer portions of the structure. An angularity generally suitable for traffic on a straight away portion of the highway can be achieved in factory production, but adjustment is desirable on curved sections of the barrier structure, as will readily be appreciated.

The portions of the reflector structures hereinabove described which are intended to reflect back to the driver of an automotive vehicle the light of his own head lamps will be "reflectorized." This term is used herein to cover any suitable type of reflecting coating. A substantial improvement in night visibility is attained even if the reflective portions of the devices are painted in a light color such as white or yellow, or are coated with so-called aluminum paint. But there are many types of reflective coatings or reflective substances on the market which will give very much better results. Fluorescent paint-like material may be employed, as well as coating materials containing instead or in addition reflective beads of glass or plastic. It is also possible to employ reflective coatings imposed upon flexible backings coated with pressure sensitive adhesives. The use of such "tapes" has a certain advantage in that the reflective coating, if it becomes damaged or otherwise loses its reflective power, may be more readily replaced. However, it is readily possible for highway crews to recoat the reflector elements with paint-like substances from time to time.

Among the reflective materials which have been used with success are a paint-like substance containing reflective beads and sold under the trade name "Codit." This material has been employed both in yellow and in silver-gray colors. A type of highly reflective tape coated with pressure sensitive adhesive is obtainable under the trade name "Scotch lite." The Firestone Tire & Rubber Company also manufactures a plastic coating containing a reflective plastic beads. These and many other means for "reflectorizing" the means forming part of this invention may be employed to good effect.

Modifications may be made in the invention without departing from the spirit of it. The invention having been described in certain exemplary embodiments, what is claimed as new and desired to be secured by Letters Patent is:

1. A highway barrier structure made up of sections each of which is of elongated form, having outer longitudinal corrugations along its longitudinal edges, and a center, flat, depressed portion therebetween, said barrier sections being fastened to each other and to posts along a highway by headed means passing through said depressed portion, in combination with a reflector element, said reflector element having a base attached to the said flat portion of said barrier structure by one of said headed means, said base being perforated and configured to act as a washer for said one of said headed means, said reflector element having another portion extending at an angle from said base, said last mentioned portion being reflectorized, said reflector element lying wholly within the space between the said corrugations.

2. The structure claimed in claim 1 wherein the por-

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tion of said reflector element extending at an angle to said base is semi-cylindrical in configuration.

3. The structure claimed in claim 1 wherein said reflector element extending at an angle from the said base is a semi-cylindrical element with intumed ends engaged beneath said base. 5

4. The structure claimed in claim 1 wherein said reflector element is a unitary piece of metal having a portion serving as said base and another portion of semi-cylindrical configuration laterally offset from said base. 10

5. The structure claimed in claim 1 in which said reflector element is a unitary metal piece having a portion serving as said base, the said other portion extending at an angle thereto being configured fanwise to conform generally to the space between the said corrugations.

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References Cited by the Examiner

UNITED STATES PATENTS

1,802,940	4/31	Cornelius	88—79
1,878,691	9/32	Foster	88—79 X
1,974,232	9/34	Brown	88—78
2,050,027	8/36	Waterman	256—13.1
2,109,011	2/38	Joyce	88—79
2,536,760	1/51	Martin et al.	256—13.1
2,979,307	4/61	Crone	256—13.1

HARRISON R. MOSELEY, *Primary Examiner.*

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,214,142

October 26, 1965

Edward L. Brown

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the drawing, line 1, for "E. L. BROWN ETAL" read -- E. L. BROWN --.

Signed and sealed this 26th day of July 1966.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents