Dec. 29, 1931. R. W. LUCE 1,838,693

TRAFFIC SIGNAL REFLECTOR

Filed May 18, 1927

Fig. 1.

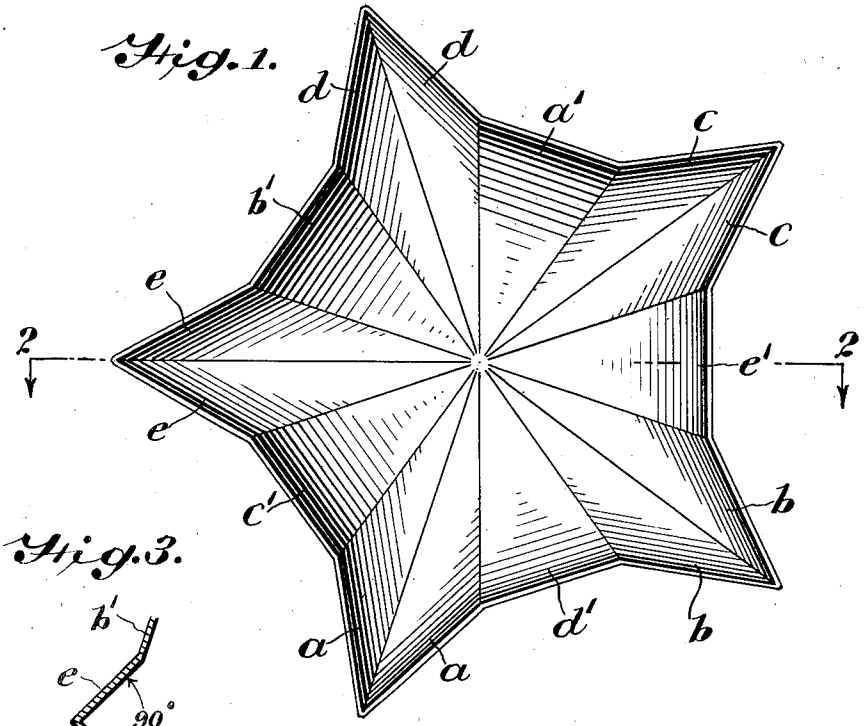


Fig. 3.

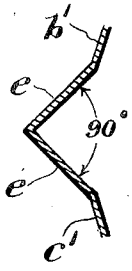


Fig. 2.

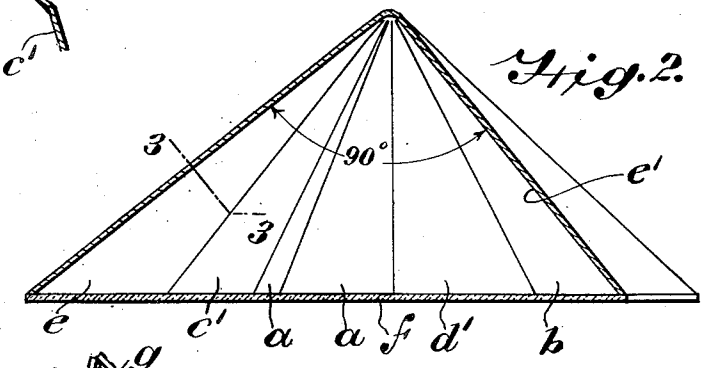
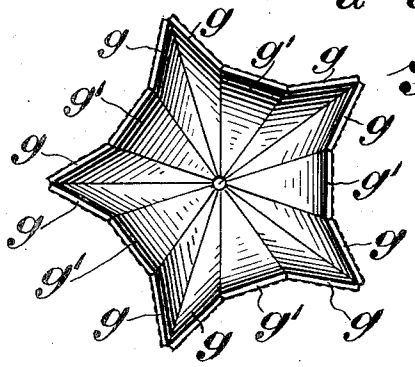


Fig. 4.



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UNITED STATES PATENT OFFICE

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TRAFFIC SIGNAL REFLECTOR

Application filed May 18, 1927. Serial No. 192,173.

My invention relates to reflectors which are adapted for use in connection with traffic control, preferably upon highways and streets, but may be used in connection with traffic of other character and for other purposes for which it may be suited.

Reflectors of this character should be such that they are visible as a result of reflected light to those approaching the same from widely varying angles. It is desirable that the reflecting area of the reflector shall be as large as compatible with economy in construction. Heretofore in the construction of reflectors of the character of that to which my invention relates the practice has been to combine or unite a plurality of reflector units in contiguous relation to each other in a single structure, each unit being complete in itself and performing its functions independently of the other.

The general object of the present invention is to provide a structure of unitary but novel character in which the reflecting surfaces are combined to form a single unit and which surfaces are so related to each other as to effect reflection of the rays of light which may impinge thereon in a return or backward direction parallel or substantially parallel with the incident impinging rays.

A specific object of the invention is to provide a reflector comprising a plurality of couples of tapered sides, the sides of each of the said couples being arranged at right angles to each other and the line of intersection thereof forming a right angle with the opposing surface of a tapered side constituting a portion of the opposing part of the reflector structure.

It also is an object of the invention to provide a reflector consisting of a plurality of fragmentary portions of central triple reflectors, one of the said fragmentary portions including a corner formed by the intersection of two adjoining or contiguous sides and a flat or plane portion opposed thereto upon the opposite side of the reflector structure, the inner surface of the latter forming a right angle with the line of intersection of the surfaces of the said two intersecting sides, the intersecting and flat sides alternating with each other and being arranged around a central axis and converging toward a point on said axis.

Another object of the invention is to provide a light reflector comprising a plurality of couples of reflector surfaces, the surfaces of each couple being arranged at right angles to each other, and a plurality of plane reflector surfaces arranged about a single point in alternate relation to the said plurality of couples of reflector surfaces.

A still further object of the invention is to provide a reflector consisting of sheet metal having a plurality of flat tapered sides so related as to form a structure of general cone shape, the said sides converging toward an apex and including a plurality of couples of sides arranged in right angular relation to each other to provide right angularly related reflecting surfaces and a plurality of single tapered sides to provide a plurality of flat reflecting surfaces arranged in alternate relation to the said couples of angularly related sides.

Other objects and advantages of the invention will be pointed out in the detailed description thereof which follows or will become apparent from such description. In order that the invention may be readily understood and its practical advantages fully appreciated reference should be had to the accompanying drawings in which I have illustrated certain forms of embodiment thereof. However, it is to be understood that changes in the details of construction may be made within the scope of the claims without departing from the principle of the invention.

In the drawings,

Fig. 1 is a view in front elevation of a reflector embodying the invention, the light diffusing sheet employed in practice being omitted;

Fig. 2 is a vertical sectional view taken on the line 2—2 of Fig. 1 with the light diffusing sheet in place;

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2; and

Fig. 4 is a view similar to that of Fig. 1 but showing a modified structural embodi-

ment of the invention in which the sides consist of glass mirrors.

In the drawings I have shown a reflector comprising, as hereinbefore suggested, a plurality of fragmentary portions of central triple reflectors combined in a manner to produce a single reflector which may be defined generally as of cone shape; that is to say, the respective reflector elements embodied in the structure are tapered and arranged around a central axis and extend convergently toward an apex. This relationship is clearly indicated in Fig. 2 of the drawings.

In the reflector a plurality of groups of three reflecting surfaces are arranged to cooperate with each other in the reflection of impinging rays of light. Each group may be regarded as consisting of a couple of cooperating elements. In order to more readily and effectually indicate the relation of the reflecting surfaces with respect to each other I shall designate the elements of the respective groups by similar reference characters. The said reflector comprises the reflecting elements *a* and *a*, *b* and *b*, *c* and *c*, *d* and *d*, and *e* and *e*. The reference letters *a* and *a*, *b* and *b*, *c* and *c*, etc., designate respectively adjoining reflecting sides or means, the reflecting surfaces of which are arranged in right angular relation to each other. Flat sides or reflecting surfaces *a'*, *b'*, *c'*, *d'*, and *e'* are arranged alternately with respect to the plurality of couples of right angularly related sides or reflecting surfaces. For instance, the side *a'* is located between the couple of right angularly related sides *c*—*c* and the couple of right angularly related sides *d*—*d*, while the side *c'* is located between the couple of right angularly related sides *b*—*b* and the couple of right angularly related sides *c*—*c*, and so on to include all of the flat sides embodied in the structure.

The line of intersection of the reflecting surfaces of the sides *a*—*a* extends at right angles to the reflecting surface of the side *a'*, while the line of intersection of the reflecting surfaces of the sides *e*—*e* extends at right angles to the reflecting surface of the side *e'*. The said relation holds between the corresponding line and surface of each of the remaining groups of fragmentary portions of the central triple reflectors embodied in the structure; that is, between the cooperating elements of each group.

Regarding the two reflecting surfaces of each couple of right angularly related reflecting surfaces of the structure as a single reflecting element, it will be noted that the reflector as illustrated comprises ten reflecting elements; that is to say, there are five couples of right angularly related reflecting surfaces and five plane or flat reflecting surfaces cooperating respectively with the said couples, making a total of ten (10) reflecting elements in the structure. This number may be increased or diminished within reasonable limits, but in every structure there will be in practice an even number of cooperating reflecting elements. If an uneven number of reflecting elements were employed the shape of the completed reflector structure would not be desirable.

In the construction as illustrated in Figs. 1 to 3 inclusive of the drawings the reflector consists of metal, preferably sheet metal shaped as shown to provide tapered sides related to each other as shown. The inner surfaces of said sides are light reflecting.

In the manufacture of a reflector as shown in Figs. 1 to 3 of the drawings a sheet metal plate is spun to cone shape. The inner surface is then polished to render it light reflecting. Thereafter the cone shaped member is subjected to pressure in a mold, the cooperating faces of which are shaped to produce the structure as shown in said Figs. 1 to 3. Such pressing and shaping do not detract from or destroy the reflecting surface of the said member provided thereon by the previous polishing operation.

Instead of polishing the inner surface of said member to render it light reflecting it may be rendered reflecting by depositing thereon a coating of silver or other suitable metal.

Reflectors of the character disclosed herein are used mostly for the purpose of imparting information to automobilists, the head lights of automobiles supplying the source for the rays of light which impinge upon the reflectors. The presence of the diffusing glass *f* in front of the reflector enables the chauffeurs or drivers of automobiles to observe the presence of the reflector more readily than if it were not present. Furthermore its presence increases very materially the critical angle within which the reflector is visible to an approaching automobilist due to reflected light.

Instead of constructing the reflector of sheet metal as shown in Figs. 1 to 3 it may be constructed of tapered segmental sections *g* and *g'* of glass mirrors. These sections are of the same shape as the sides of the metal reflectors shown in Figs. 1 to 3 and are supported by any suitable means in the same relation to each other as the said sides. Although not shown, a light diffusing sheet should in commercial practice be employed in front of a reflector consisting of segments of glass mirrors as shown in Fig. 4.

The principle of reflection is the same whether a reflector as illustrated in Figs. 1 to 3 or in Fig. 4 is employed. Explaining the principle of reflection as effected by the reflectors by reference to Figs. 1 to 3 it may be noted that if a ray of light impinges for example upon one of the reflecting surfaces of one of the sides *a*, it is reflected to the other of the sides *a* and from the latter to the re-

flecting surface of the side a' from which latter side it is reflected or projected back along a line parallel or substantially parallel with the impinging ray. If the ray should impinge upon the reflecting surface of the side a' it is reflected forward to the reflecting surface of one of the sides a, thence to the reflecting surface of the other side a and from the latter is reflected or projected back along a line parallel or substantially parallel with the impinging ray. The same operation of reflection is effected or takes place in connection with each couple of cooperating elements; that is, with each group of reflecting surfaces formed by the fragmentary portions of central triple reflectors of which the reflector as a whole is composed, as previously stated.

In the present construction the fragmentary portions of five (5) central triple reflectors are embodied. As has been indicated, the number of fragmentary portions may be increased or diminished within reasonable limits.

By the employment of my invention I am enabled to provide a reflector of general cone shape in which all of the reflecting surfaces taper and converge toward a common point on its axis as a result of which it is practical to produce an efficient reflector of unitary structure of larger area than heretofore has been feasible.

Having thus described my invention, what I claim and desire to secure by Letters Patent is,

1. A reflector of general cone shape comprising a plurality of couples of reflector elements arranged around a central axis and converging toward a point on said axis, each couple consisting of two sides the reflecting surfaces of which intersect and are at right angles to each other, and a plurality of reflector elements having plane reflecting surfaces alternating with the said couples of reflector elements and arranged around said axis and converging toward the same point thereon as that to which the said couples of elements converge, each of said second named elements being located in opposed relation to one of said couples of elements with the reflecting surface thereof at right angles to the line of intersection of the reflecting surfaces of said opposed couple.

2. A reflector comprising a plurality of couples of sides, the sides of each couple being tapered and arranged in planes at right angles or approximately at right angles to each other, and a plurality of single flat tapered sides, the said couples of sides and the said flat sides being located alternately with respect to each other and arranged about an axis and converging toward a point on said axis and the lines of intersection of said couples of sides extending at right angles or approximately at right angles to the planes of oppositely disposed flat sides.

3. A reflector of the character described, consisting of sheet metal, said reflector comprising a plurality of tapered sides arranged around a central axis and converging toward a point upon said axis, the inner surfaces of said sides being light reflecting, a plurality of couples of said sides being arranged in planes at right angles to each other and intersecting, and said tapered sides including a plurality of flat sides equal in number to the plurality of couples of said sides and which are arranged in alternate relation to the said couples of sides, the lines of intersection of the sides of said couples of sides extending at right angles to the planes of oppositely disposed flat sides.

4. A reflector consisting of a single sheet of metal, said reflector comprising a plurality of sides, certain of said sides being arranged in couples with the sides of each couple approximately at right angles to each other and intersecting and others of said sides being positioned approximately at right angles to the lines of intersection of the sides of said respective couples and in alternating relation to said couples of sides.

5. A reflector comprising a plurality of light reflecting sides, couples of said sides being arranged aproximately at right angles to each other, others of said sides being disposed at approximately right angles to the lines of intersection of the sides of said couples and in opposed relation thereto, the said couples of sides and the others of said sides being located alternately about a common axis.

6. A reflector of general cone shape consisting of sheet metal, said reflector comprising a plurality of light reflecting sides, couples of said sides being disposed approximately at right angles to each other, others of said sides being located opposite said couples of sides and disposed approximately at right angles to the lines of intersection of the sides of said couples, the said couples of sides and the others of said sides being located alternately with respect to each other about a common axis.

7. A reflector in which portions of a plurality of triple reflectors are located in contiguous relation to each other about a central axis, said reflector including a plurality of members each having a plane reflecting surface, and a plurality of couples of members the reflecting surfaces of the members of each couple intersecting and being in right angular or approximately right angular relation to each other, the said first named members and said couples of members being arranged alternately with relation to each other.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 14th day of April, 1927.

RICHARD W. LUCE.