June 25, 1940. J. C. STIMSON 2,205,638

REFLECTING DEVICE

Filed Jan. 3, 1938

Fig. 1.

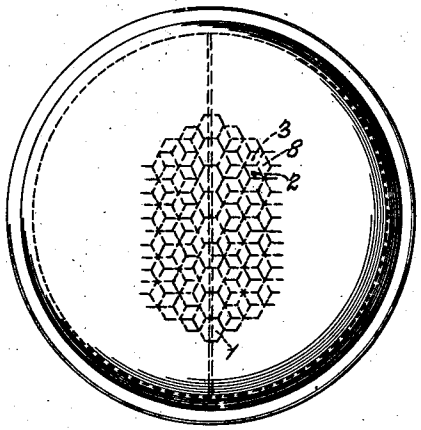


Fig. 2.

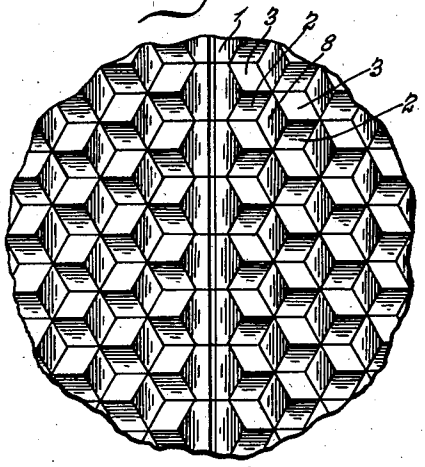
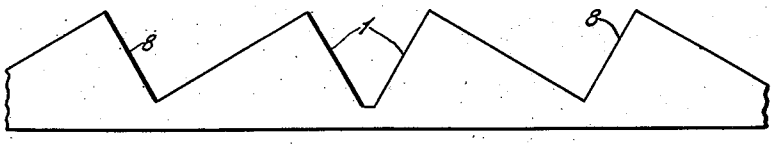


Fig. 3.



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2,205,638

REFLECTING DEVICE

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1 Claim. (Cl. 88—78)

This invention relates to reflecting devices and more particularly to reflecting devices of the retro-directive type, that is reflectors which are constructed to reflect light impinging thereon from a distant source back in the general direction of the light source, irrespective, within limits, of the angle of incidence of the impinging light.

Reflecting devices employing retro-directive units of the triple-reflector type are disclosed in applicant's Patents No. 1,671,086, May 22, 1928, No. 1,743,834, January 14, 1930, No. 1,848,675, March 8, 1932, and No. 2,022,639, November 26, 1935. Processes and apparatus for making such reflectors are also disclosed in applicant's Patents No. 1,591,572, July 6, 1926, No. 2,056,491, October 6, 1936, and No. 2,022,639.

In reflecting devices of the character described the units have different ranges of inclination with respect to the axis of the unit, this being particularly pointed out in applicant's Patent No. 1,848,675. Due to this characteristic the angular range or field from which the reflector will be visible is greater on one side of the axis of the unit than on the other side. This restricts the utility of the reflecting device when used under particular conditions. For example, if the reflecting device is used as a tail light lens on an automobile as disclosed in applicant's Patent No. 1,874,138, August 30, 1932, or as a reflecting device on any vehicle the angular range is limited to one side of the axis thereof, while the angle of approach by an oncoming vehicle may be indiscriminately on one or the other side of the axis of the unit.

One of the objects of this invention, therefore, is to provide a reflecting device whose range of inclination will be substantially the same on both sides of what we may call an axis of the entire reflector.

Further objects will appear from the detail description taken in connection with the accompanying drawing in which

Figure 1 is a face view of a reflecting device embodying this invention;

Figure 2 is an enlarged detail view and

Figure 3 is a still more enlarged transverse section of Figure 2, but with the section lines omitted, and somewhat diagrammatic in form.

Referring to the accompanying drawing, Figure 1 shows a reflecting device in the form of a disk which may either be a tail light lens or a reflector such as used on vehicles generally. It is in the form of a pressed or molded article made of glass or of an artificial resin so as to provide a series of reflecting units arranged in contiguous relation and operating by total reflection. The device may, however, be in the form of a metal reflector formed as described in applicant's patents, above enumerated.

The reflecting unit may be of any retro-directive type having different ranges of inclination with respect to its axis. In the particular embodiment shown these units are of the triple-reflector type and more particularly of the square-face triple-reflector type shown in applicant's Patent No. 1,848,675. Such a unit is made up of square-faces 2, 3 and 8 with the corresponding faces of adjacent units lying in the same plane and having the same orientation. At the margin of the reflector the corresponding faces 8 can be extended to form a border 1. It will be noted that the same reference numerals are employed as applied to corresponding parts as in Figure 1 of applicant's Patent No. 1,848,675. In that reflector all of the units in a row, as along the border 1 and rows parallel thereto, have the same orientation. As further shown in that patent and particularly by Figure 5, the maximum range of inclination of all units lie towards the same side, namely, towards the faces 8 and the border 1 with the minimum inclination on the other side of the axis.

In accordance with this invention the units are arranged in adjacent groups, with the units of each group having the same orientation and with the units of adjacent groups having opposed orientations. This is accomplished as shown more particularly in Figures 2 and 3, by dividing the reflector comprising a plate into two parts or groups to provide adjacent reflector areas on opposite sides of a division line, with the units of one part or group so positioned that the borders 1 will face one another. We can conceive this as being accomplished by building up a group, which is revolved 180° with respect to the other group. This places say one-half of the units with their maximum range of inclination towards the right and with the other half towards the left, assuming the borders 1 to be vertical, as shown in Figure 2. All of the units will, however, have their axes parallel.

It will be seen that a reflector constructed as described will have the entire area effective on both sides of the axis of each and every one of the units to a point where the minimum range of inclination is reached. Therebeyond only one-half of the reflector will become effective but up to the maximum range of inclination. Accordingly, the reflector will always be visible to an

observer up to the maximum range of inclination.

Where the units are constructed and arranged as in the Patent No. 1,848,675 but with the units arranged in adjacent groups, the units of each group are arranged with corresponding surfaces of adjacent units similarly oriented and with the unit apertures formed by the intersection of the reflecting surfaces of adjacent units. More specifically stated, a series of square reflecting surfaces are arranged relatively at right angles and in a circuit around its axis, the units being arranged in adjacent groups and the units of each group being arranged in contiguous relation with the square surfaces of a unit intersecting with square surfaces of the surrounding units so as to form an hexagonal aperture therefor. In accordance with this invention, however, the units of adjacent groups have opposed orientations. This is accomplished in the manner shown in the drawing. The plate which has the units formed thereon is divided to provide adjacent reflector areas on opposite sides of a division line; the units of each area are arranged in contiguous relation with the corresponding surfaces, such as 1 and 8, lying in parallel planes; the surfaces 1 and 8 of one area are, however, located at acute angles to the corresponding surfaces of the adjacent area as shown in Fig. 3. This results in the units of one group having orientations opposed to those of the other group even though all of the units have their axes parallel.

It will be understood, of course, that the front face of the reflector may be either plane or convex as, for instance, shown in applicant's Patent No. 1,807,350, May 26, 1931, and the units may conform to the front face as disclosed in said patent. It is further to be understood that various changes may be made in details within the scope of the appended claim without departing from the spirit of this invention. It is, therefore, to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention, what is claimed is:

A reflecting device of the character described, comprising, a plate divided to provide adjacent reflector areas on opposite sides of a bisecting division line each reflector area being composed of a series of contiguous successive rows of reflecting units of the type in which a series of square reflecting surfaces are arranged relatively at right angles and in a circuit around its axis, all of said units being arranged with their axes parallel, and the units of each area being arranged in contiguous relation with the square surfaces of the several units intersecting so as to form merging hexagonal apertures therefor, the corresponding surfaces of each area lying in parallel planes, the surfaces of one area which are in planes parallel to the division line being located at acute angles to corresponding surfaces of the adjacent area, whereby the units of the adjacent areas have opposed orientations.

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