

[54] **COLOR SPLITTING PRISM ASSEMBLY**

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Related U.S. Patent Documents

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[58] Field of Search 358/43, 50, 52, 55; 350/173; 354/103, 104, 118, 119; 352/67

[56] **References Cited**

FOREIGN PATENT DOCUMENTS

1206461 9/1970 United Kingdom 358/55

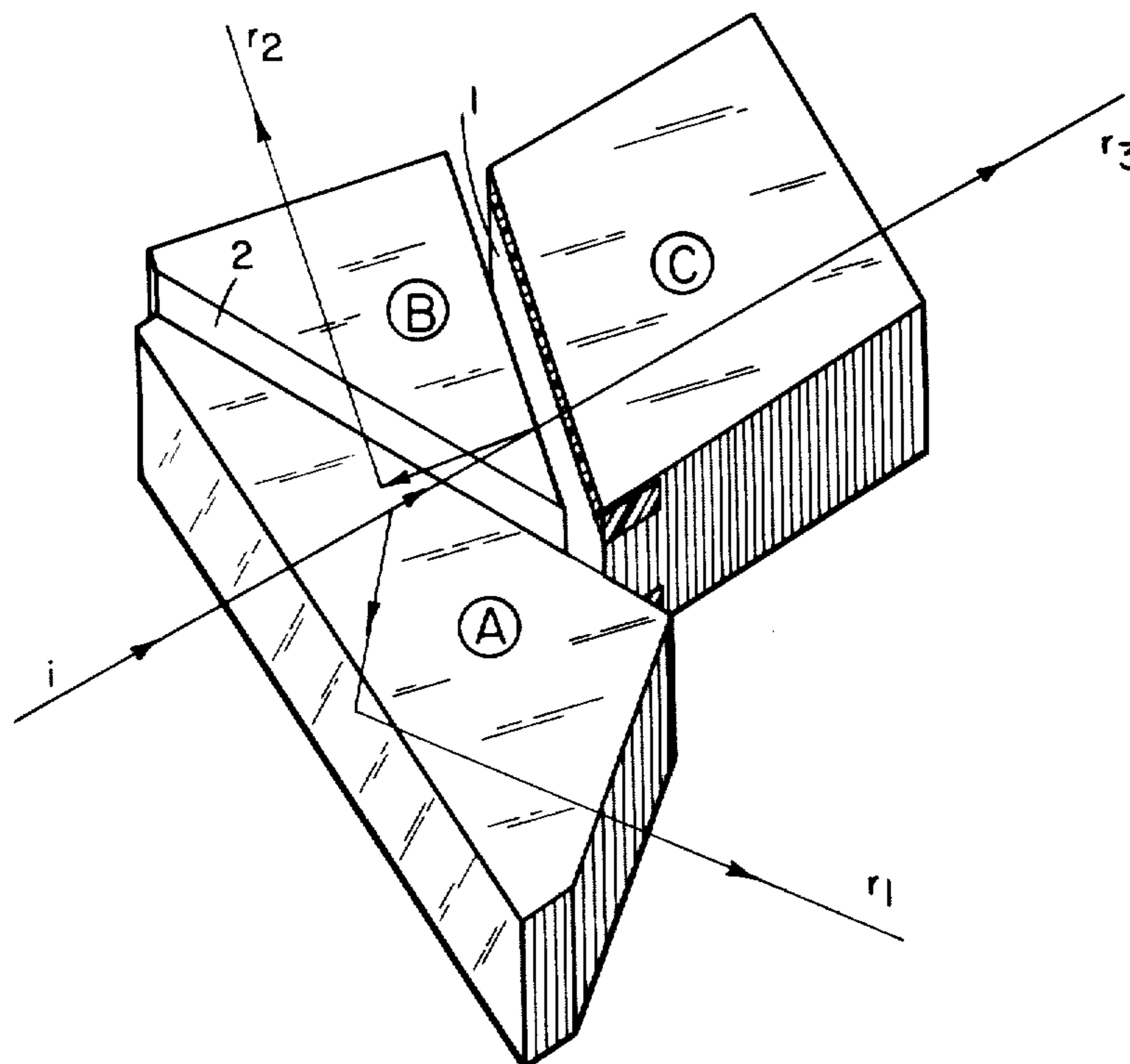
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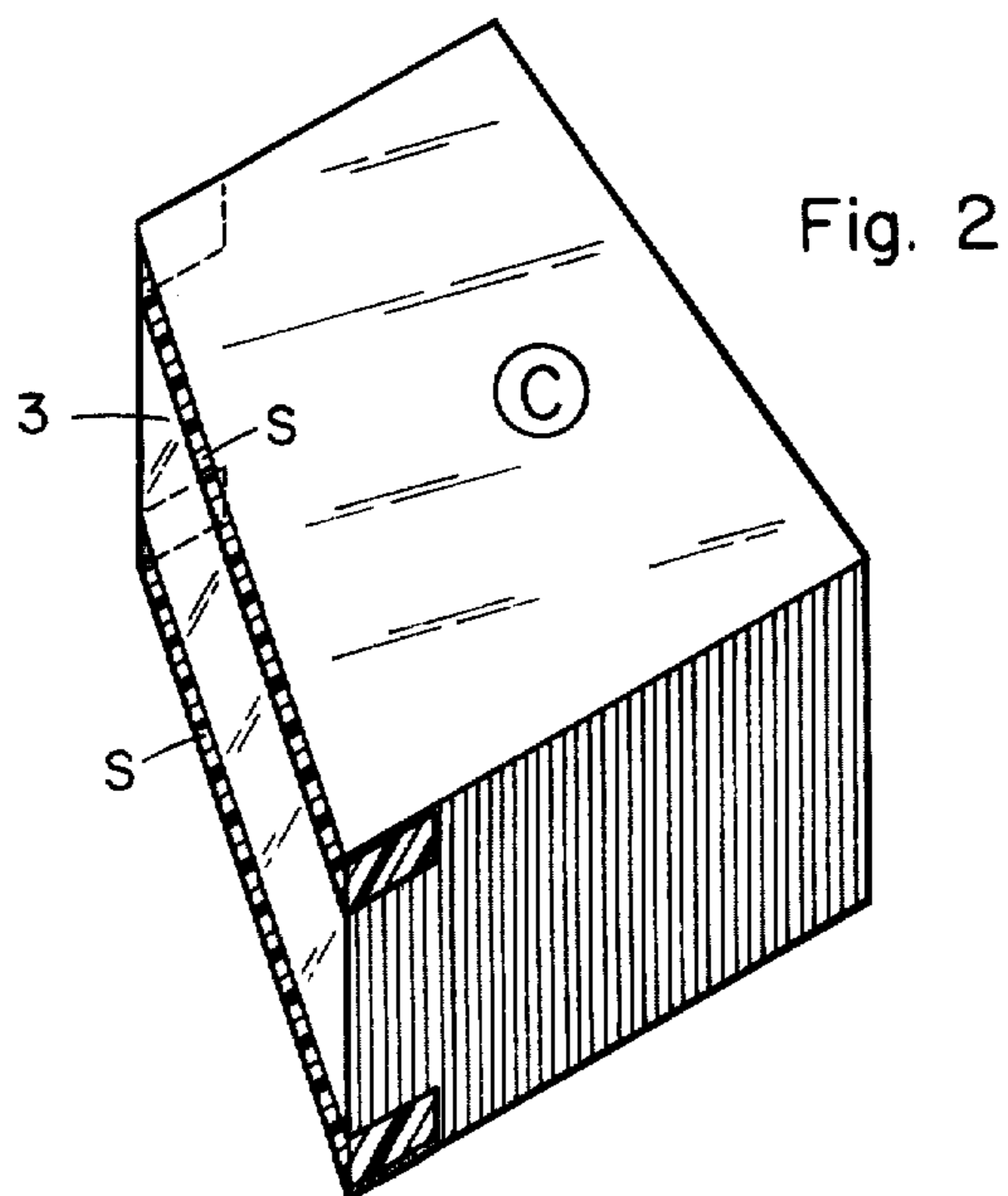
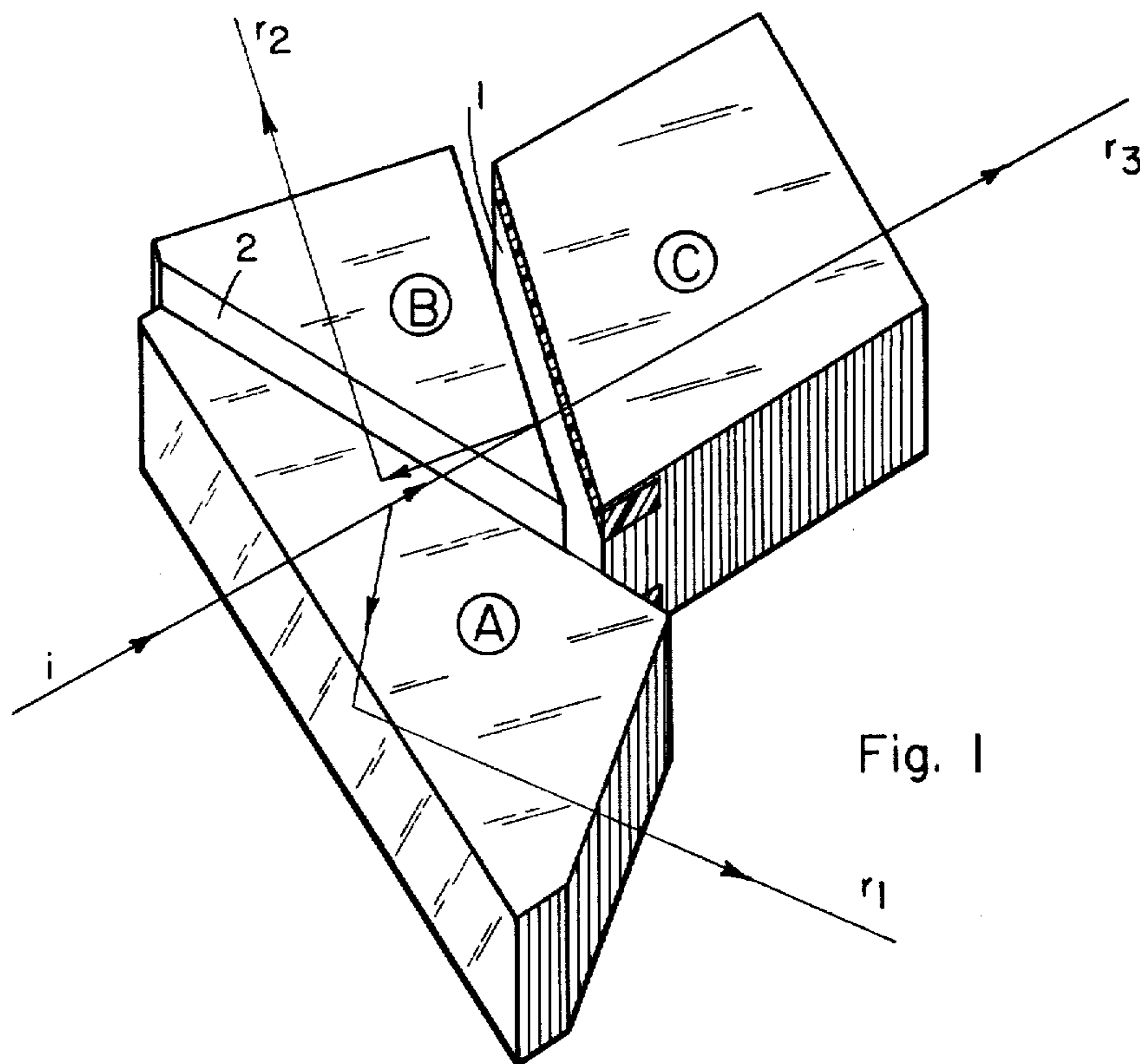
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[57] **ABSTRACT**

A beam splitting prism assembly in which at least some of the prisms are separated by an air gap, optionally connected at the edges through the beam splitting layers by means of strips of a thermo-plastic material.

3 Claims, 2 Drawing Figures





COLOR SPLITTING PRISM ASSEMBLY

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

The invention relates to a colour splitting prism assembly for colour television cameras which splits the incident light in such a camera into a plurality of beams of different spectral compositions intended for the pick-up tubes of the camera.

Essentially such a camera comprises three pick-up tubes for the colour components of the different spectral compositions, and a prism arrangement which ensures splitting which is a combination of a plurality of prisms, for example three in number.

The positioning of the prisms relative to one another must be done very accurately and furthermore some prisms must be separated from one another by means of a very narrow air gap, of, for example, 15 microns.

According to United Kingdom patent specification No. 1,206,461 a beam splitting prism assembly is proposed for a colour television camera including adjacent prism surfaces, in which the air gaps are adjusted by means of metallic wire which is compressed between said surfaces at the edges, said wire being capable when compressed of distorting and adhering to the surfaces. A suitable metal is indium which is applied in the form of an open ring, the ends of which are overlapped.

In practice this assembly was not very satisfactory. The glass-to-indium transitions entail annoying reflections.

The assemblies whose strength and resistivity against shocks are not very large are in the long run still further affected by atmospheric influences. The minimum spacing of the prisms having such an indium spacer is not less than 30 microns which is rather large in practice.

Finally the method of producing such a composite prism is not simple.

The invention now provides a beam splitting assembly consisting of glass prisms, in which some of the surfaces of the prisms are separated by an air gap, [the] which may be smaller than that produced by an indium spacer. The edges of the prism surfaces [of this assembly] are provided with a small strip, at the [glass] prism surfaces bounding the air-gap, [optionally through a beam splitting layer or layers] of an adhering film of a thermoplastic material [located thereon]. These prism surfaces which bound the air-gap may be either glass surfaces or the surfaces of a beam-splitting layer or layers present on the glass surfaces.

Besides polyethylene terephthalate, poly-carbonate or poly-acrylates, which are excellently suitable, the use of polyethylene is preferred. There are a number of varieties of polyethylene in which the degree of polymerisation and the branching of the chain differs.

Known are "low density" and "high density" polyethylene which are both suitable.

The excellent bond which is obtained [is] between the thermoplastic material and the glass surfaces may also be obtained [by means of the] between the thermoplastic material and the surface of a beam splitting layer or layers which are obtained in the usual manner, which layers consist as a rule of chalcogenides such as ZnS, TiO₂ etc.

For adhering the film a continuous strip which is cut in one piece and which has a width of 2 to 3 mm is placed between the glass parts at a temperature of, for example, 150° C. and the assembly is compressed at a pressure of approximately 15 g/mm². Starting from a 20 microns thick film the spacing between the glass parts is approximately 15 microns. The plane parallelism of the relevant surfaces in the assembly is already within a few microns so that a separate spacer can be dispensed with.

A method according to which the beam splitting prism assembly according to the invention may be produced and which will not be further explained herein, is described in application Ser. No. 729,818, filed Oct. 4, 1976.

The film between the prism elements is transparent. It is advantageous if this film is coloured black in order to further reduce the possibility of undesired reflections.

The invention will be described with reference to the accompanying drawing in which:

FIG. 1 shows a prism assembly according to the invention; and

FIG. 2 shows a prism whose surface bounding an air-gap is provided with strips according to the invention.

As shown in FIG. 1, the prism assembly comprises prisms A, B and C separated by [at least one air-gap,] air-gaps 1 and [an interface] 2. Prism C, as shown in more detail in FIG. 2 has a surface 3 bounding the air-gap 1 which is provided with [a] polyethylene strips S.

The ray paths through the prism assembly are shown in FIG. 1. An incident ray *i* passes through prisms A and B and emerges from prism C as ray *r*₃. Part of the incident ray is reflected at the air-gaps 1 and 2 and emerges from prism B as *r*₂ while a portion of the incident ray is reflected at the air-gap [1] 2 and emerges from A as *r*₁.

What is claimed is:

1. A beam splitting prism assembly comprising a plurality of prisms having surfaces separated by an air gap, the edges of the prism surfaces bounding the air-gap being provided with a small strip at the [glass] prism surfaces, said strip comprising an adhering film of a thermoplastic material [located thereon forming a beam splitting layer].

2. A prism assembly as claimed in claim 1, wherein the thermoplastic material is polyethylene film.

3. A prism assembly as claimed in claim 2, wherein the film is coloured black.

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