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H. C. GRANT, JR

2,012,230

REFLECTION PREVENTING MEANS

Filed Jan. 20, 1932

2 Sheets-Sheet 1

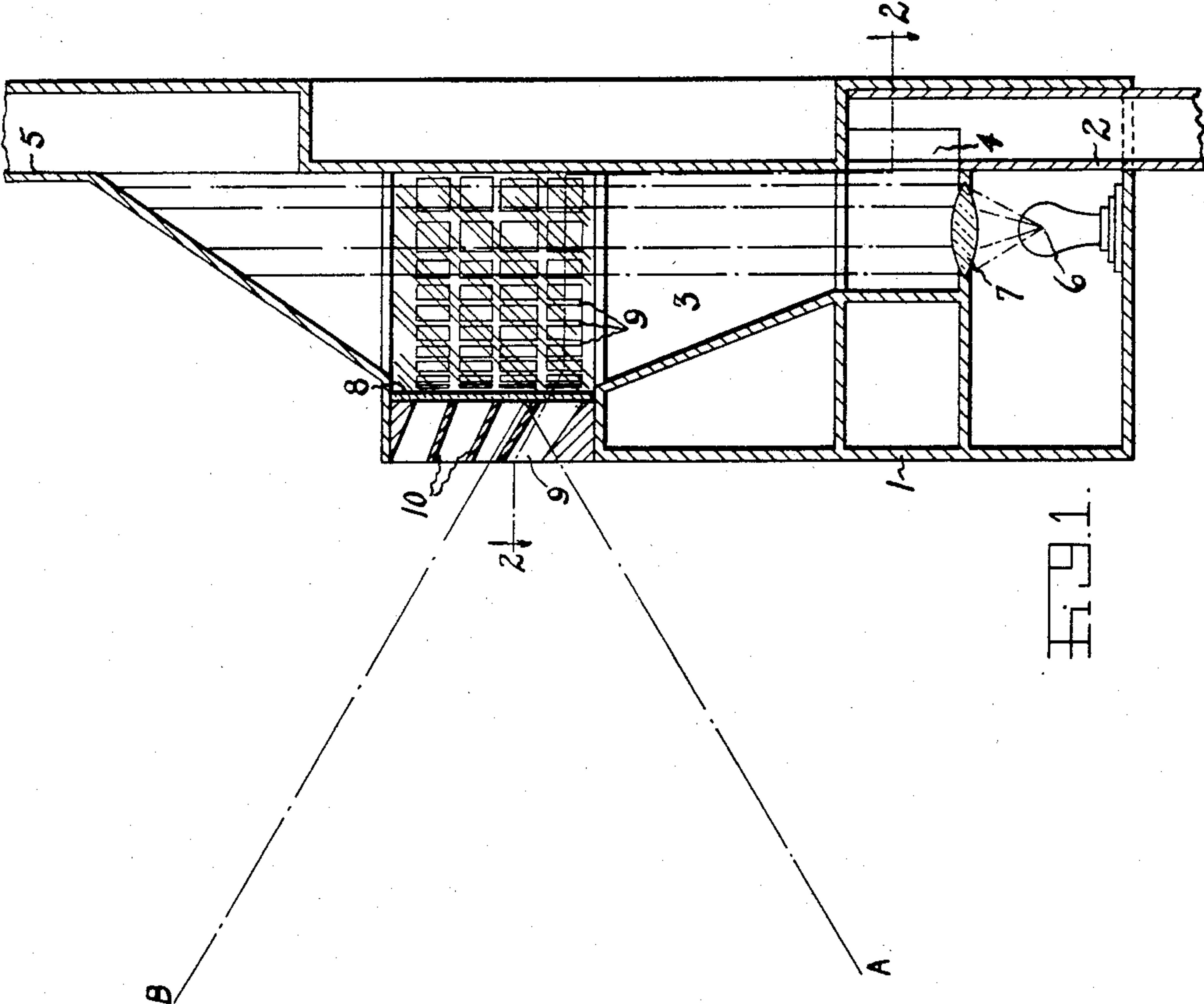


FIG. 1.

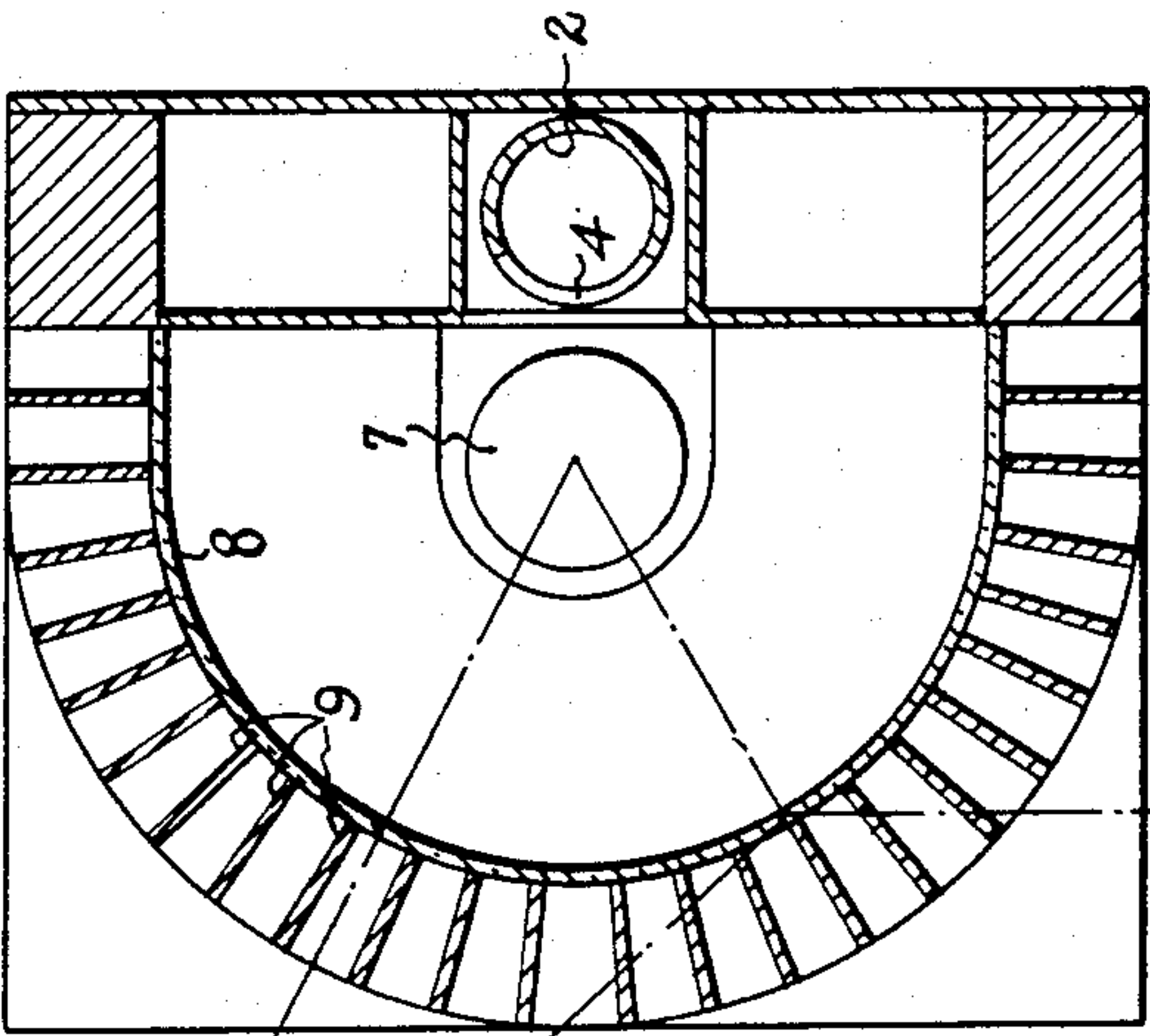


FIG. 2.

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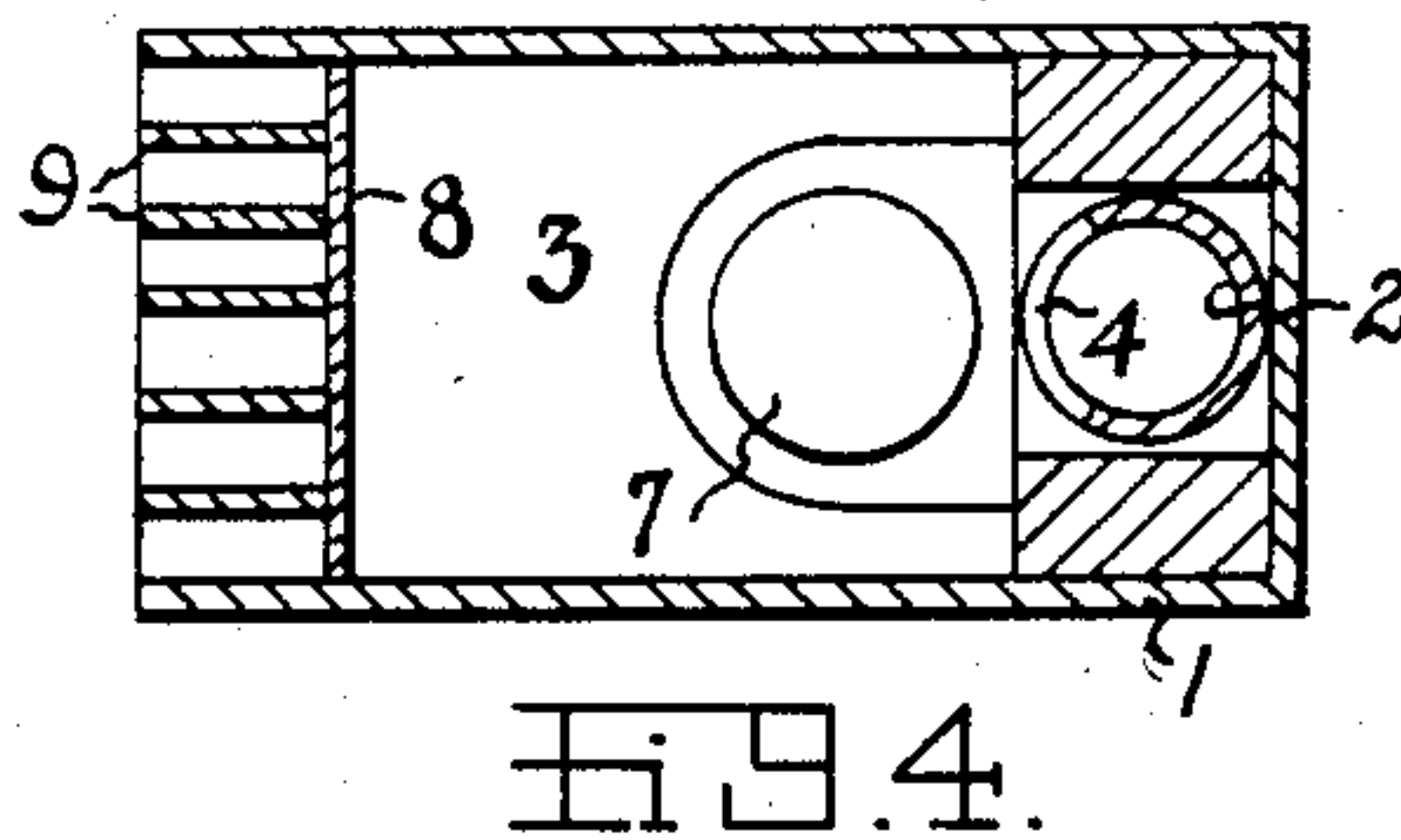
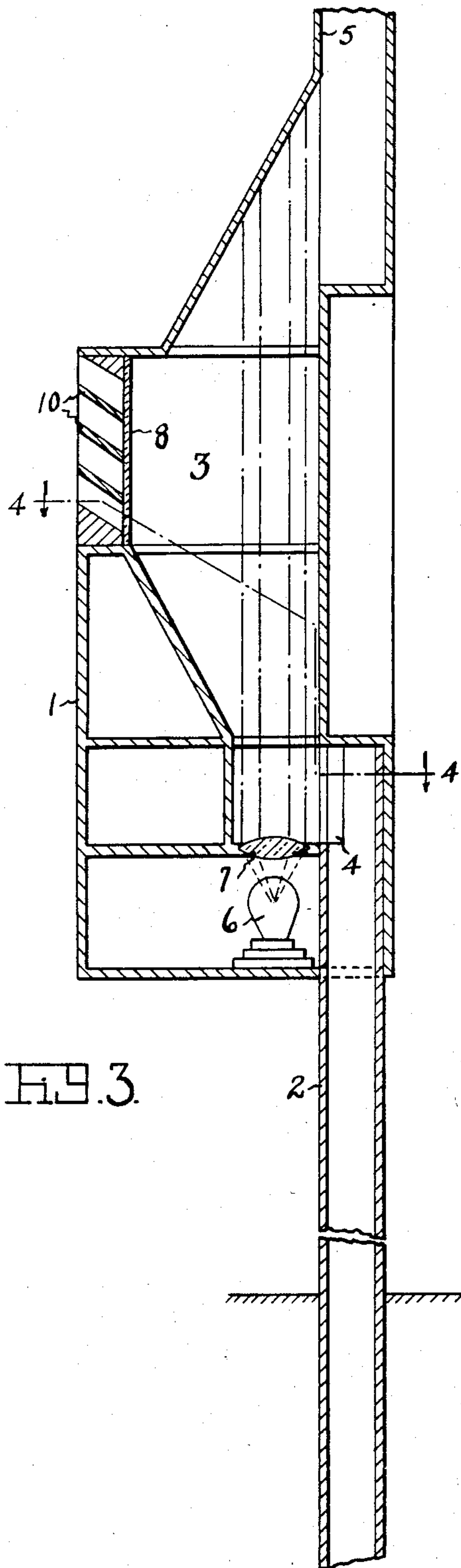
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2 Sheets-Sheet 2



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## UNITED STATES PATENT OFFICE

2,012,230

## REFLECTION PREVENTING MEANS

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Walter Kidde & Company, Inc., New York, N. Y.,  
a corporation of New York

Application January 20, 1932, Serial No. 587,674

11 Claims. (Cl. 88—1)

This invention deals with means for preventing reflection from a surface normally capable of causing reflection and is particularly adapted for use with smoke detecting apparatus.

5 One of the objects of this invention is to provide apparatus which may be used with smoke detecting devices such as the type disclosed in Patent No. 1,516,608 issued November 25, 1924 to Walter Kidde et al.

10 A further object of this invention is the provision of a normally reflective transparent wall for use with smoke detecting apparatus and so constructed as to substantially prevent reflection so that one may look through the wall without  
15 observing reflection of other objects exterior to the wall.

These and many other objects as will appear from the following disclosure are secured by means of this invention.

20 This application is a continuation in part of my copending application, Serial No. 416,402, filed December 26, 1929.

This invention resides substantially in the combination, construction, arrangement, relative  
25 location of parts, steps and series of steps all as will be set forth in detail in the following specification in connection with the attached drawings and defined in the appended claims.

Referring to the drawings—

30 Figure 1 is a vertical cross-sectional view through one form of device embodying the principles and construction of this invention;

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1;

35 Fig. 3 is a vertical cross-sectional view through a modified form of device of a construction similar to that of Figs. 1 and 2;

Fig. 4 is a cross-sectional view taken on the line 4—4 of Fig. 3;

40 In smoke detecting apparatus similar to the type disclosed in the above mentioned patent and the type to be described below, a beam of light is employed which is observed through a window or transparent wall and which becomes visible  
45 when smoke, gases, suspended matter and the like move into the path of the beam of light. It has been found, however, that suitably constructed transparent walls through which such a beam of light can be observed reflect objects  
50 external to the wall so as to interfere with the vision of an observer with the result that he cannot clearly observe the beam of light. The general purpose of this invention is to provide a transparent wall in combination with the other  
55 necessary elements which substantially elimi-

nates the reflection of objects exterior to the wall to the eye of an observer regardless of his position with respect thereto.

The invention will be better understood by detailed reference to the drawings.

In Figs. 1 and 2 the device is shown comprising a casing 1 of any suitable and desirable construction to meet particular conditions, which has formed on the back thereof a conduit 2 having an opening 4 therein which places the interior 3 of the casing in communication with the conduit. As is well known in this art this conduit is connected to one or more pipes leading to different parts of a building structure or ship, for example, where fire is likely to occur  
15 so that the smoke from such a fire may be conducted to the interior of casing 1. The top of the casing is directly connected to a conduit 5 which extends upwardly and to which, if desired, a blower may be connected for creating a suction in the conduit system. Mounted within the casing as at 6 is a light source of any suitable type, the light from which is transmitted as a beam of parallel rays by means of a suitable lens 7. The upper part of the casing is provided with  
25 a transparent wall 8 of glass or other transparent material which is in the form as shown in Figs. 1 and 2 of a semi-circular wall through which the interior of casing 1 may be observed from any point in front of the apparatus. Surrounding and enclosing the transparent wall 8 is a cellular shell of non-reflecting and preferably opaque material comprising a number of vertical partitions 9 arranged radially about the center of the transparent wall and a plurality  
35 of partitions 10 lying at right angles thereto. The partitions 10 as illustrated in Fig. 1 may lie at various angles with the horizontal. The partitions 9 and 10 therefore form a sort of "egg crate" construction which divides the area of the transparent wall into a plurality of smaller areas, permitting the interior of the casing to be observed from different vertical and horizontal points of view, but at the same time preventing undesirable reflection to the observer of objects  
45 lying external to the transparent wall. How this construction accomplishes this result will be described hereinafter.

The partitions 10 need not necessarily be inclined at the particular angles to the horizontal  
50 shown as this requirement is determined by the position of the device in use. If it is placed on the floor against a wall, for example, the partitions 10 will incline downwardly from the forward edges thereof and preferably at varying  
55



angles with the horizontal so, as pointed out above, the interior of the casing may be readily viewed by persons of different height or at different elevations. If the device is mounted  
 5 above the normal eye level then the partitions 10 would incline upwardly from their forward edges but again at varying angles with the horizontal to permit one to look easily into the casing. If the device is placed on the level with the  
 10 eyes of an observer of average height then the partitions 10 could be horizontal. However, this is not a preferable arrangement, as in this case an observer might be troubled with his own reflection, since he can view the transparent wall at right angles thereto. It is therefore preferable, although not absolutely necessary, that the  
 15 partitions be arranged at angles such that an observer cannot view the transparent wall perpendicularly to the wall. In the two cases where the partitions 10 are inclined it is desirable that their angle of inclination increase from the top downwardly in the case where the device is below the eye level and from the bottom upwardly in the case where the device is above the normal  
 20 eye level. The general result of such construction is that it is possible for persons of different heights and at different elevations to look easily into the interior of the casing through the transparent wall regardless of its elevation. It is apparent that it is within the scope of this invention to employ different angles of inclination for the walls 10, the same angle of inclination or to use parallel horizontal walls.

The construction of Figs. 3 and 4 only differs  
 35 from that of Figs. 1 and 2 in that the transparent wall 8 is flat instead of curved and, of course, the enclosing cellular structure is likewise flat.

The structure shown in Figs. 1 and 2 is particularly adapted to be placed upon the floor of  
 40 a building or on the bulkhead of a ship and the interior thereof by reason of this construction is visible from any point around it. The arrangement of Figs. 3 and 4 although employing the same principles and similar construction is better adapted to be mounted on the wall above the floor level so that the transparent wall will have its central axis approximately in the line of vision of a person of normal height.

In Figs. 1 and 2 is illustrated by the dotted lines how reflection of objects is prevented. For example, in Fig. 1 an object at A cannot be seen by reflection by an observer at B because the partitions 9 and 10 intercept the light from the object and prevent its reflection to the observer. Similarly as is shown at Fig. 2 an object at C will not be seen by reflection by an observer at D while the observer can easily look through the transparent wall and see the beam of light.

If, in addition to the above, it is desired to prevent an observer absolutely from seeing his own reflection, the partitions must be arranged at angles such that the observer cannot view the transparent wall perpendicularly to the wall from any point of view.

By reason of the partitions employed to break up the area of the transparent wall into the plurality of smaller areas it is at once apparent that it is substantially impossible for an observer to see the reflection of any object in front thereof so as to interfere with his view of the interior of the casing, nor, with the proper design, is it possible for the observer to see his own reflection.

Of course the partitions should be of a material having a substantially non-reflecting sur-

face, and are preferably opaque, so that the various objects of the invention may be properly carried out.

From the foregoing disclosure it will be apparent that this invention involves certain principles of construction, operation and use which may be embodied in and carried out by numerous other physical forms of apparatus without departing from these principles and features of construction. It is to be understood, therefore, that the physical forms disclosed in the drawings have been given for purposes of illustration and are not presented in any limiting sense. The scope of the invention has been defined in the appended claims.

What I seek to secure by United States Letters Patent is:

1. In an apparatus of the type described the combination comprising a casing, a normally reflective transparent wall forming part of said casing through which the interior thereof is to be observed, and a plurality of partitions mounted adjacent said transparent wall on the side from which the interior of the casing is to be observed whereby it is divided into a plurality of smaller transparent areas separated from each other in all directions.

2. In an apparatus of the type described the combination comprising a casing, a normally reflective transparent wall forming part of said casing through which the interior thereof is to be observed, and a plurality of vertical and transverse partitions in front of said transparent wall dividing it into a number of smaller transparent isolated areas on the side from which it is observed.

3. In an apparatus of the type described the combination comprising a casing, a normally reflective transparent wall forming part of said casing through which the interior thereof may be observed, and a plurality of transverse partitions overlying said transparent wall on the side from which the interior of the casing is to be observed and extending at angles with respect to the horizontal.

4. In an apparatus of the type described the combination comprising a casing, a normally reflective transparent wall forming part of said casing through which the interior thereof is to be observed, and a plurality of substantially vertical partitions and transverse partitions extending at an angle with the horizontal dividing the transparent wall into a plurality of smaller transparent areas, said partitions being outside said wall.

5. An apparatus as described comprising a casing having a transparent normally reflecting wall, through which the interior of the casing is to be observed, and a non-reflecting cell-forming structure overlying said wall on the side from which the interior of the casing is to be observed rendering the wall visible in a limited area from any one point through which area the interior of the casing is observable without reflection of external objects.

6. An apparatus as described comprising a casing having a transparent normally reflecting wall, through which the interior of the casing is to be observed, and a cellular wall made up of a series of cells of non-circular form surrounding the transparent wall on the side from which the interior of the casing is to be observed, through which the interior of the casing is observable, without reflection of external objects.

7. An apparatus as described comprising a casing having a transparent normally reflecting wall,



through which the interior of the casing is to be observed, and a cell structure formed by opaque, non-reflecting partitions on the outside face of the wall.

- 5 8. The combination with a transparent normally light-reflecting and refracting wall forming part of a casing, the interior of which is to be observed, of a non-reflecting cellular mask outside said wall through which the interior of said casing is visible but which restricts the area of the wall visible from any one point and prevents the reflection of external objects.

- 10 9. The combination with a transparent normally light-reflecting and refracting wall forming part of a casing, the interior of which is to be observed, of a cellular mask on the outside face of said wall, and having cell defining walls lying at an oblique angle with the transparent wall, so that

the interior of the casing is visible only when the line of sight is not normal to the transparent wall.

10. The combination with a transparent normally light reflecting and refracting wall viewable from a wide angular range both vertically and horizontally, of cellular structure mounted outside of and enclosing said transparent wall to divide it into limited areas, each cell having converging walls. 5

11. In an apparatus of the type described the combination comprising a casing, a normally light reflective transparent wall forming part of the casing through which the interior thereof is to be observed and opaque cellular means on the outside of said wall preventing reflection of objects external of the casing to the eye of an observer. 15

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