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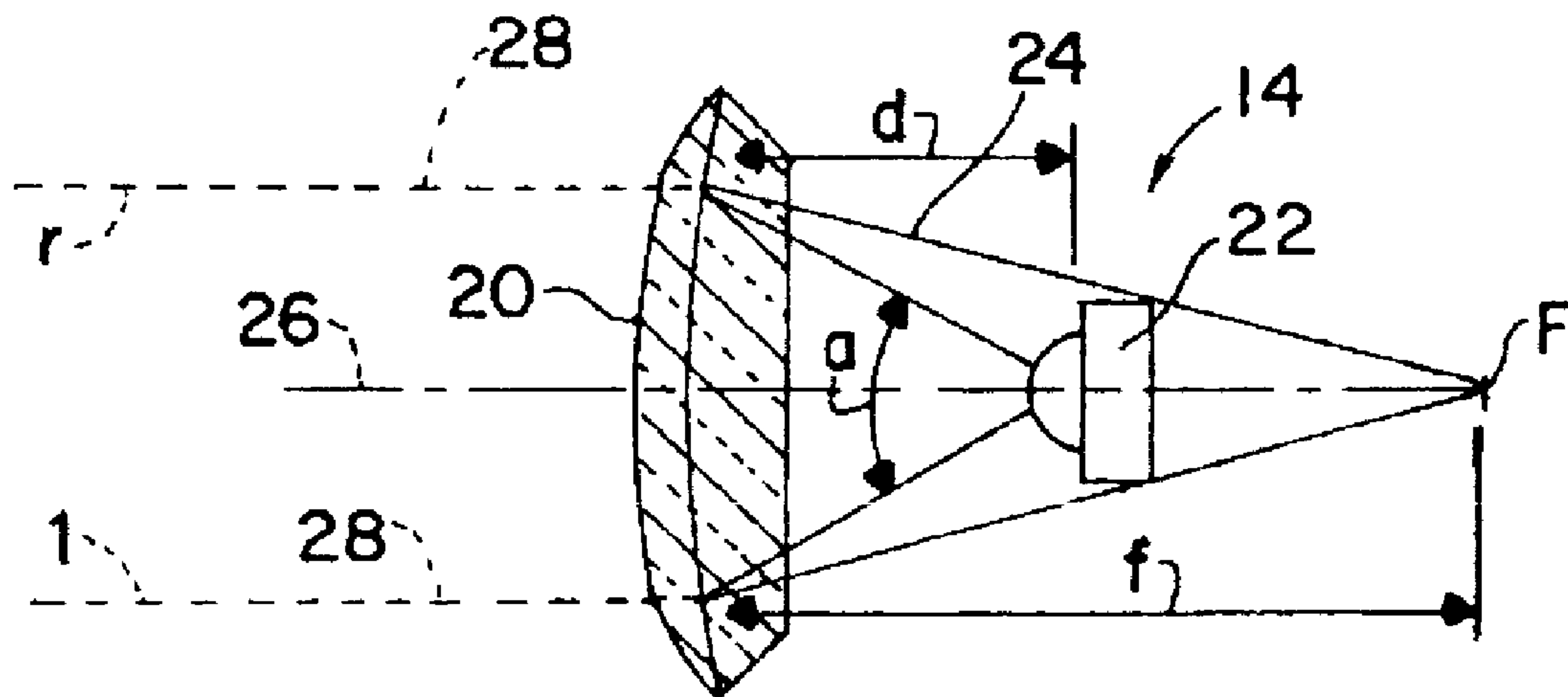
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(57) Abrégé/Abstract:

A cargo lamp assembly for vehicles includes a white light emitting diode having an aperture for emitting a light beam in horizontal and vertical planes of about 120°, and a lens for receiving the beam and reducing the beam in the horizontal plane to about 60° and reducing the beam in the vertical plane to about 60°.

Attorney Docket No. 02-4-148

A CARGO LAMP ASSEMBLY FOR VEHICLES

ABSTRACT OF THE DISCLOSURE

A cargo lamp assembly for vehicles includes a white light emitting diode having an aperture for emitting a light beam in horizontal and vertical planes of about 120°, and a lens for receiving the beam and reducing the beam in the horizontal plane to about 60° and reducing the beam in the vertical plane to about 60°.

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A CARGO LAMP ASSEMBLY FOR VEHICLES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to lamp units for vehicles and is directed more particularly to a cargo lamp assembly featuring a light emitting diode.

2. Description of the Prior Art

Combined cargo lamp and center high mounted stop lamp assemblies are generally known. In U.S. Patent No. 4,891,625, issued January 2, 1990 to Bradley C. Van Riper et al, there is shown and discussed a combined center high mounted stop lamp and cargo lamp assembly for pick-up trucks, vans, and the like. The assembly includes a housing for three side-by-side lamps. Each lamp features an incandescent bulb and a parabolic reflector, and an appropriate lens, red for the stop lamp lens and clear for the cargo lamp lenses.

Another combined cargo lamp and stop lamp is shown and described in U.S. Patent No. 6,086,230, issued July 11, 2000 to George Wooldridge et al. In this instance, the combination is adapted for disposition on a rear cargo door of a panel truck, sport utility vehicle, or the like, wherein a rear cargo door is pivotally mounted on a side edge thereof. The combination features two lamps, a stop lamp for exhibiting a stop-signal, and a cargo lamp for lighting the interior of the vehicle. The

1 assembly features various types of incandescent light
2 bulbs, such as snap-in, plug in and/or hard wired.

3 The use of incandescent bulbs presents a number
4 of problems. Their size requires an appropriately sized
5 housing. Their life duration requires periodic
6 replacement and can lead to loss of use at inopportune
7 times. Replacement requires service access facility. In
8 some instances, the temperature of functioning
9 incandescent bulbs, particularly in large numbers, can
10 result in problems relative to temperature-sensitive
11 cargo.

12 Thus, there is a need for a cargo lamp
13 assembly for vehicles, which assembly is devoid of
14 incandescent bulbs and, rather, relies upon light
15 emitting diodes (LED) for optical enhancement of a cargo
16 area.

17 There is further a need for such a cargo lamp
18 assembly in combination with a center high mounted stop
19 lamp assembly, the latter being of either a traditional
20 structure or of an LED based structure.

21

22 SUMMARY OF THE INVENTION

23 Accordingly, it is desirable to provide a cargo
24 lamp assembly for vehicles, the lamp including a white
25 light emitting diode and a lens for appropriately
26 configuring the beam of light emitted by the diode.

27 It is also desirable to provide a combined
28 cargo lamp assembly, as set forth immediately above, and
29 stop light assembly for vehicles.

1 A feature of the invention is the provision of
2 a cargo lamp assembly for vehicles. In accordance with
3 the invention, there is provided a cargo lamp assembly.
4 The assembly comprises a white light emitting diode
5 having an aperture for emitting a light beam in an arc
6 of 120° in a horizontal plane, and 120° in a vertical
7 plane, and a lens for receiving the beam and reducing
8 the beam to about 60° in the horizontal plane and in the
9 vertical plane and wherein said lens is adapted to
10 configure the light beam to an upper boundary in the
11 vertical plane deflected about 10° downwardly relative
12 to the horizontal plane and a lower boundary in the
13 vertical plane extending downwardly about 70° relative
14 to the horizontal plane.

15 Also disclosed is a cargo lamp assembly for
16 vehicles. The assembly may comprise a white light
17 emitting diode (LED) having an aperture for emitting a
18 light beam in an arc of x° to the left and x° to the
19 right of a central axis of the beam in a horizontal
20 plane, and a lens for reducing the beam to an arc of
21 about $1/2x^\circ$ to the left and about $1/2x^\circ$ to the right of
22 the central axis, the lens being configured in
23 horizontal cross section to provide a lens focal point
24 about twice the distance from the lens as the distance
25 of the LED from the lens.

26 Also disclosed is a cargo lamp assembly for
27 vehicles. The assembly may comprise a white LED having
28 an aperture for emitting a light beam in an arc of y°
29 above and y° below a central axis of the beam in a

1 vertical plane, and a lens for reducing the beam to an
2 arc including in the vertical plane an upper boundary
3 deflected downwardly about 10° relative to a horizontal
4 plane, and a lower boundary of about $1/2\gamma^\circ + 10^\circ$, the
5 lens being configured in vertical cross section to
6 provide a lens focal point coincident with the distance
7 from the lens to the LED.

8 Also disclosed is a combined assembly of a
9 center high mounted stop lamp (CHMSL) assembly and a
10 cargo lamp assembly for a vehicle. The combined assembly
11 may comprise a housing for mounting on a rearwardly
12 facing wall surface of a body portion of the vehicle
13 proximate a top thereof and proximate a transverse
14 center of the vehicle, the housing having compartments
15 including at least one compartment for housing a CHMSL
16 component and having a stop lens. The housing may
17 further include left and right compartments,
18 respectively on opposite sides of the CHMSL
19 compartment, each having a cargo light lens and a white
20 LED for directing a beam of light to the respective
21 cargo light lens. Each of the cargo lamp assemblies
22 may comprise one of the cargo lenses and one of the
23 LEDs, the LEDs each having an aperture for emitting the
24 light beam in an arc of about 120° in horizontal and
25 vertical planes, and each of the cargo lenses being
26 adapted to reduce the light beam in a horizontal plane
27 to about 60° and reducing the light beam in a vertical
28 plane to about 60° .

29 The above and other features of the invention,

1 including various novel details of construction and
2 combinations of parts, will now be more particularly
3 described with reference to the accompanying drawings
4 and pointed out in the claims. It will be understood
5 that the particular device embodying the invention is
6 shown by way of illustration only and not as a
7 limitation of the invention. The principles and
8 features of this invention may be employed in various
9 and numerous embodiments without departing from the
10 scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

1 Reference is made to the accompanying drawings in which is
2 shown an illustrative embodiment of the invention, from which its
3 novel features and advantages will be apparent.

4 In the drawings:

5 FIG. 1 is a perspective view of one form of combined center
6 high mounted stop lamp assemblies and cargo lamp assemblies
7 illustrative of an embodiment of the invention;

8 FIG. 2 is a rear elevational view of the combined assemblies
9 of FIG. 1;

10 FIG. 3 is a diagrammatic view of a cargo lamp assembly,
11 including a sectional view of a lens portion of the assembly
12 taken along line III-III of FIG. 2; and illustrative of an
13 embodiment of the invention; and

14 FIG. 4 is a diagrammatic view of the cargo lamp assembly of
15 FIG. 3, including a sectional view of the lens portion of the
16 assembly taken along line IV-IV of FIG. 2.

17
18 DESCRIPTION OF THE PREFERRED EMBODIMENTS

19 Referring to FIGS. 1 and 2, it will be seen that an
20 illustrative embodiment of the invention includes a housing 10
21 for one or more center high mounted stop lamp (CHMSL) assemblies
22 12 and one or more cargo lamp assemblies 14. As illustrated in
23 FIGS. 1 and 2, the combined assemblies typically include a series
24 of the side-by-side stop lamp assemblies 12 and a cargo light
25 assembly 14 on opposite ends of the series of stop lamp
26 assemblies.

27 The housing 10 typically is mounted, as by a connector 16
28 (FIG. 1), to a rearwardly facing wall surface of a body portion

1 of a vehicle (not shown), such as a pick-up truck, or the like,
2 the housing being mounted proximate a transverse center of the
3 vehicle. The stop lamp assemblies 12 are each provided with a
4 stop lamp lens 18, usually red in color. The cargo lamp
5 assemblies 14 are each provided with a clear lens 20.

6 Referring to FIG. 3, it will be seen that each cargo lamp
7 assembly 14 includes a white LED 22 having an aperture for
8 emitting a light beam 24 in an arc a of about 120° in a
9 horizontal plane, about 60° to the right of a beam axis 26 and
10 60° to the left. The emitted beam 24 is emitted in the vertical
11 plane (FIG. 4) about 60° above the beam axis 26 and 60° below the
12 beam axis.

13 The cargo lamp assembly 14 includes the lens 20 which is
14 provided with a configuration different in horizontal section
15 (FIG. 3) than in vertical section (FIG. 4). The cargo lamp lens
16 20 reduces the arc a of the beam 24 in the horizontal plane to
17 about 60° , about 30° to the left of the beam axis 26 and 30° to
18 the right of the beam axis. A beam 28 emitted by the lens 20, in
19 the horizontal plane (FIG. 3) includes a right boundary r and a
20 left boundary l which are substantially parallel to each other.

21 The cargo lamp lens 20 reduces the arc a' of the beam 24 in
22 the vertical plane (FIG. 4) to about 60° . The beam 28 emitted by
23 the lens 20 in the vertical plane includes a top boundary t
24 deflected downwardly about 10° relative to the horizontal plane,
25 and a lower boundary b extending downwardly about 70° relative to
26 the horizontal plane.

27 In the horizontal plane, the LED 22 is disposed at a
28 distance d from the lens 20 which is about one-half a distance f

1 to a focal point F of the LED, as shown in FIG. 3. In the
2 vertical plane, the LED 22 is disposed substantially at the focal
3 point F.

4 Preferably, the LED 22 is at least an 18 lumen LED and the
5 lens 20 emits at least about 10 candela. In a combined assembly
6 with two LEDs, each LED is preferably at least an 18 lumen LED,
7 such that the two cargo light assemblies emit at least about 20
8 candela, a more than adequate lighting for pick-up truck cargo
9 areas. Alternatively, a single 40 lumen LED, scheduled for
10 production in 2004 or 2005, should prove useful.

11 If the LED 22 provides an aperture so as to emit a different
12 arc of beam, x° to the left and x° to the right of the axis 26 in
13 the horizontal plane and y° above and y° below the central axis
14 26 of the beam 24 in the vertical plane, the lens 20 reduces the
15 arc in the horizontal plane to about $1/2x^\circ$ to the left and $1/2x^\circ$
16 to the right of the axis 26, and reduces the arc in the vertical
17 plane defined by the upper boundary t deflected downwardly about
18 10° relative to the horizontal plane and the lower boundary b of
19 about $1/2y^\circ + 10^\circ$.

20 The lens 20 may be a "Fresnel" type lens, well known in the
21 art, configured to produce the above described arcs. A Fresnel
22 type lens provides the advantages of reduced material
23 requirement, ease of molding, and resulting reduced costs in
24 manufacture.

25 Further, the lenses 18, 20 may be molded in one piece. The
26 one piece lens can be all clear, inasmuch as the CHMSL LED emits
27 red light, or can be in part clear and in part red.

1 There is thus provided a cargo lamp assembly for vehicles,
2 the lamp including a white light emitting diode and a lens for
3 appropriately configuring the beam of light emitted from the
4 diode.

5 It will be understood that many additional changes in the
6 details, materials, and arrangement of parts, which have been
7 herein described and illustrated in order to explain the nature
8 of the invention, may be made by those skilled in the art within
9 the principles and scope of the invention as expressed in the
10 appended claims.

What is claimed is:

1. A cargo lamp assembly for vehicles, the assembly comprising:

a white light emitting diode (LED) having an aperture for emitting a light beam in an arc of about 120° in horizontal and vertical planes; and
a lens for receiving the beam and reducing the beam in a horizontal plane to about 60° and reducing the beam in a vertical plane to about 60° ,

the LED aperture includes a horizontal aperture component adapted for emitting the light beam extending 60° to the left and 60° to the right of a beam axis in the horizontal plane and a vertical aperture component for emitting the light beam extending 60° above the beam axis and 60° below the beam axis in the vertical plane; and

wherein said lens is adapted to configure the light beam to an upper boundary in the vertical plane deflected about 10° downwardly relative to the horizontal plane and a lower boundary in the vertical plane extending downwardly about 70° relative to the horizontal plane.

2. The cargo lamp in accordance with claim 1 wherein said LED is disposed about halfway between said lens in the horizontal plane and a focal point of said lens.

3. The cargo lamp in accordance with claim 1 wherein said LED is disposed at about a focal point of said lens in the vertical

plane.

4. The cargo lamp in accordance with claim 2 wherein said LED is disposed at about a focal point of said lens in the vertical plane.

5. The cargo lamp in accordance with claim 1 wherein said lens is a clear lens.

6. The cargo lamp in accordance with claim 5 wherein said LED is at least an 18 lumen LED and said lens emits at least about 10 candela.

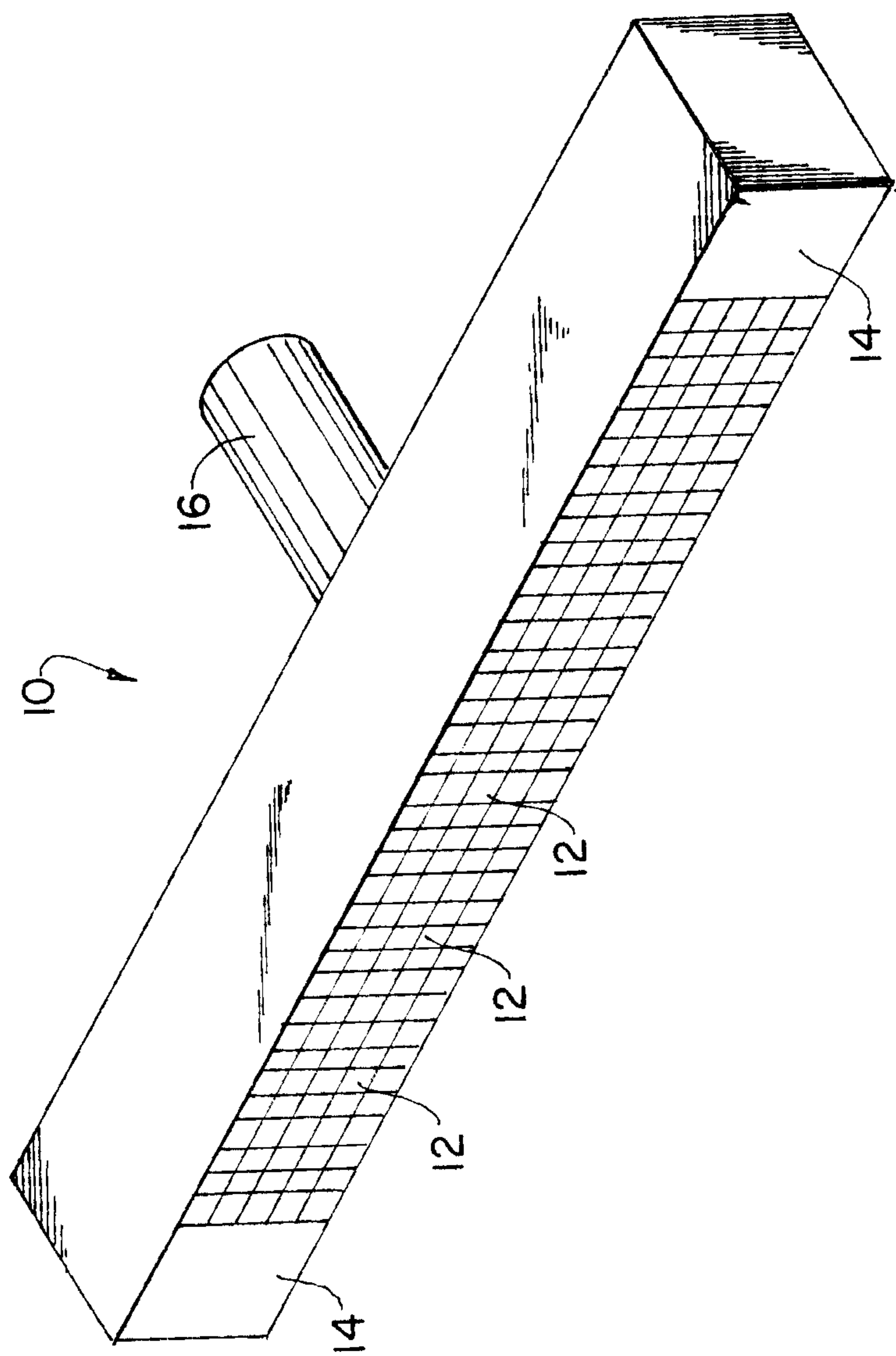


FIG. 1

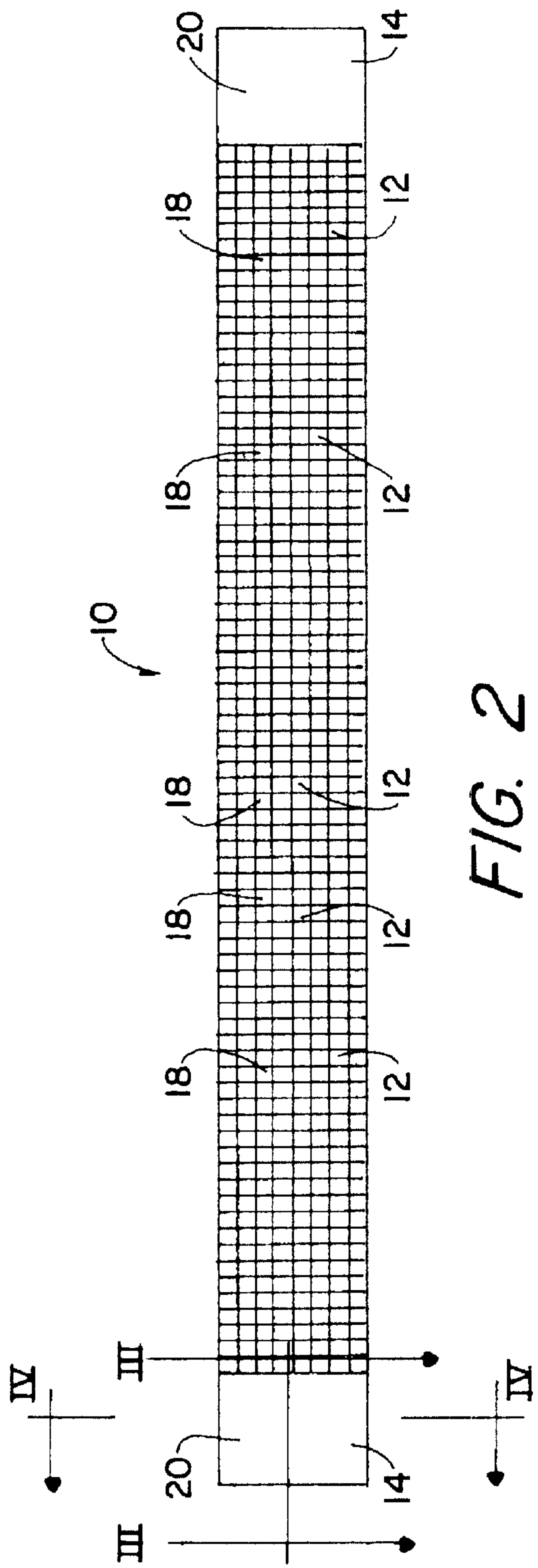


FIG. 2

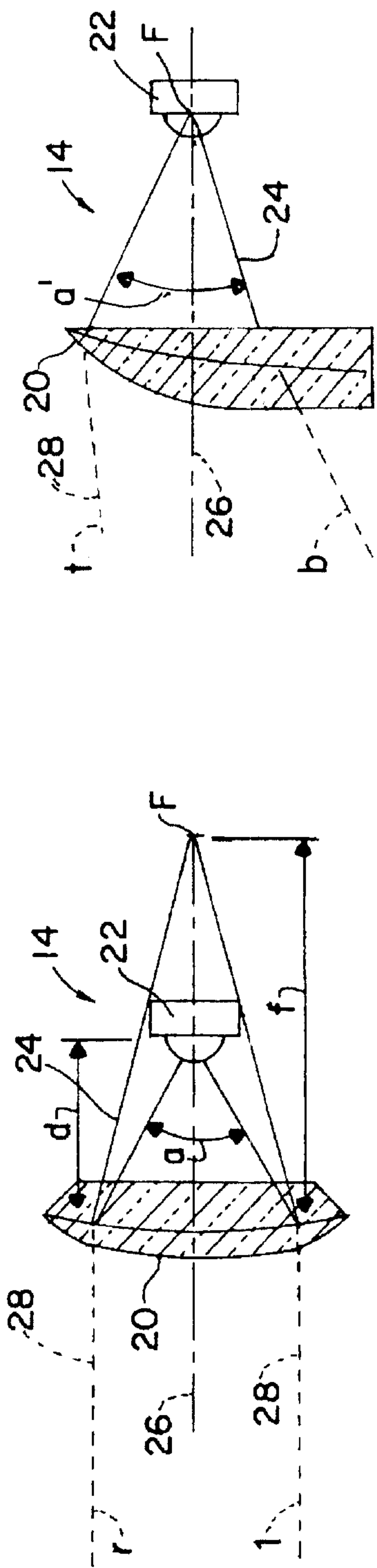


FIG. 3

FIG. 4

