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(54) **A system for absorbing and/or scattering superfluous radiation in an optical motion sensor**

Anordnung zum Absorbieren und/oder Zerstreuen von Störlicht in einem optischen Bewegungsmelder

Dispositif pour absorber et/ou diffuser de la lumière parasite dans un détecteur de mouvement optique

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- **PATENT ABSTRACTS OF JAPAN vol. 098, no. 003, 27 February 1998 & JP 09 304175 A (ATSUMI ELECTRON CORP LTD), 28 November 1997**
- **PATENT ABSTRACTS OF JAPAN vol. 010, no. 038 (P-428), 14 February 1986 & JP 60 185920 A (MATSUSHITA DENKI SANGYO KK), 21 September 1985**

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Description

Background of the Invention

Field of the Invention

[0001] This invention relates generally to an infrared intrusion sensing system and in particular to a method and apparatus for restricting superfluous radiation not focused on a detector.

Description of Related Art

[0002] An infrared intrusion sensing system comprises a lens having a plurality of lines of focus for focusing infrared radiation that enters the system onto a detector. An enclosure surrounding the detector provides isolation from insect entry. The enclosure envelope is a protective volume of space for the optical path between the lens and the detector. Radiation focused by the lens to impinge in locations other than the detector is "superfluous" and is considered a source of false intrusion sensing by internal re-reflection inside the insect exclusion envelope. Elimination of superfluous radiation reaching the detector results in improved performance of the infrared intrusion sensing system and minimizes false alarms.

[0003] U.S. Patent No. 4,268,347 issued May 19, 1981 to Richard B. Stephens describes a process for forming reflectivity surfaces by particle track etching of a dielectric material. A textured surface is produced having conical cavities. The textured surface reduces light reflections, but it does not describe or suggest application in the infrared regions.

[0004] U.S. Patent 4,271,358 issued June 2, 1981 to Frank Schwarz describes the use of polyhydrocarbon plastics such as polyethylene, for the housing of infrared sensors and adding dyes or coloring water which strongly absorb in the visible but which are not strong absorbers in the farther infrared.

[0005] U.S. Patent No. 5,424,718 issued January 13, 1995 to Kurt Mühler et al. describes an IR intrusion detector using scattering to prevent false alarms by radiation outside the useful radiation band. Focusing mirrors are provided with a rough surface for infrared selectivity. In the wavelength range from 6 to 15 micrometers, the infrared radiation is specularly reflected and focused in accordance with the shape of the mirrors. Extraneous radiation in the visible and near-infrared range from about 0.4 micrometer or less up to 3 micrometers is diffusely scattered. However, there is no scattering of extraneous infrared radiation to prevent such radiation from being detected.

Summary of the Invention

[0006] The present invention provides a system and method as claimed in claims 1 and 12 herein.

[0007] Accordingly, it is therefore an object of this invention to absorb or scatter superfluous radiation entering an infrared intrusion sensing system.

[0008] It is another object of this invention to improve the performance of an infrared intrusion sensing system by providing means to absorb superfluous radiation and thereby reduce false alarms.

[0009] It is an object of this invention to provide a pigmentation within the walls of an insect exclusion enclosure of the infrared intrusion sensing system to absorb superfluous radiation.

[0010] It is another object of this invention to provide a textured surface on the inner walls of an insect exclusion enclosure within the infrared intrusion sensing system to scatter superfluous radiation.

[0011] It is another object of this invention to provide a contoured surface on the inner walls of an insect exclusion enclosure within the infrared intrusion sensing system to cause multiple lossy reflections of superfluous radiation within the valleys of the contours thereby attenuating the superfluous radiation.

[0012] It is another object of this invention to improve the performance of existing infrared intrusion systems by simply inserting a device into the system having the shape of an insect exclusion enclosure and including pigmentation, texturing and/or contouring on the device walls to absorb or scatter superfluous radiation.

[0013] It is a further object of this invention to provide an infrared intrusion sensor having a sealed housing for insect exclusion and an internal baffle for absorbing or scattering superfluous radiation.

[0014] These and other objects are further accomplished by an intrusion sensing system comprising a front assembly having a compound lens for focusing radiation, a circuit board including a radiation detector for sensing the radiation and circuitry for processing the detected radiation, a rear assembly for mating with the front assembly and enclosing the circuit board within the front assembly and the rear assembly, and the front assembly comprises means attached to the compound lens for excluding insects from the radiation detector and preventing superfluous radiation from reaching the radiation detector. The insect excluding means comprises an opening on a first end adjacent to the compound lens for receiving the focused radiation and an opening on a second end which is smaller than the opening on the first end for accepting the radiation detector extending therethrough from the adjacent circuit board. The insect excluding means comprises a pigmentation for absorbing the superfluous radiation, a textured surface for scattering superfluous radiation, and/or a contoured surface for preventing the superfluous radiation from reflecting onto the radiation detector. The front assembly comprises another window on a bottom end of the front assembly for receiving radiation, and the radiation entering the sensing system through the bottom end window strikes mirrors above the detector for reflecting the radiation onto the radiation detector. The pigmentation

provides a black color to the insect excluding means. The textured surface comprises repetitive, random deviations from a normal smooth surface to form a three-dimensional topography on the surface. The contoured surface comprises peaks and valleys for causing lossy reflections of the superfluous radiation within the valleys.

[0015] The objects are further accomplished by an intrusion sensing system comprising a front assembly having a compound lens for focusing radiation, a circuit board including a radiation detector positioned opposite the compound lens for sensing the radiation and circuitry for processing the detected radiation, a rear assembly for mating with the front assembly and enclosing the circuit board within the front assembly and the rear assembly, the front assembly comprises means attached to the compound lens for excluding insects from the radiation detector, and the front assembly further comprises means inserted within the insect excluding means for suppressing superfluous radiation. The insect excluding means and the suppressing means comprises an opening on a first end adjacent to the compound lens for receiving the focused radiation and an opening on a second end which is smaller than the opening on the first end for accepting the radiation detector extending therethrough from the adjacent circuit board. The suppressing means comprises a pigmentation for absorbing the superfluous radiation. Also, the insert suppressing means may comprise a textured surface for scattering superfluous radiation or a contoured surface for preventing the superfluous radiation from reflecting onto the radiation detector. The front assembly comprises another window on a bottom end of the front assembly for receiving radiation, and the radiation entering the sensing system through the bottom end window strikes mirrors above the detector for reflecting the radiation onto the radiation detector.

[0016] The objects are further accomplished by an intrusion sensing system comprising a front assembly having a compound lens for focusing radiation, a circuit board including a radiation detector for sensing the radiation and circuitry for processing the detected radiation, a baffle having a first open end attached around the perimeter of the radiation detector and a second open end facing the compound lens for suppressing superfluous radiation, and a rear assembly for sealably mating with the front assembly and enclosing the circuit board within the front assembly and the rear assembly thereby excluding insects from entering the sensing system. The baffle comprises an opening on a second end in front of the compound lens for receiving the focused radiation and an opening on a first end which is smaller than the opening on the second end for accepting the radiation detector extending therethrough from the adjacent circuit board. The baffle comprises a pigmentation for absorbing the superfluous radiation. Also, the baffle may comprise a textured surface for scattering superfluous radiation, or a contoured surface for preventing the superfluous radiation from reflecting onto the radiation detector. The front assembly comprises another window on a bottom end of the front assembly for receiving radiation, and the radiation entering the sensing system through the bottom end window strikes mirrors above the detector for reflecting the radiation onto the radiation detector.

[0017] The objects are further accomplished by a method of suppressing superfluous radiation in an intrusion sensing system comprising the steps of providing a front assembly having a compound lens for focusing radiation, sensing the radiation with a detector positioned on a circuit board including circuitry coupled to the detector for processing the sensed radiation, enclosing the intrusion sensing system with a rear assembly which is disposed adjacent to one side of the circuit board and joined together at the periphery of the front assembly, and providing a suppressing means within the front assembly for preventing superfluous radiation from reaching the detector and suppressing means attached to the compound lens prevents insects from entering the space envelope of the suppressing means within the system. The method comprises the step of adding a pigmentation to the material of the suppressing means for absorbing the superfluous radiation. The method also comprises the step of providing a textured surface on the suppressing means for scattering superfluous radiation. The method also comprises the step of providing a contoured surface on the suppressing means for preventing superfluous radiation from reflecting onto the radiation detector. The step of providing a contoured surface on the suppressing means comprises the step of providing peaks and valleys for causing lossy reflections of the superfluous radiation within the valleys.

[0018] The objects are further accomplished by a method of suppressing radiation in an intrusion sensing system comprising the steps of providing a front assembly having a compound lens for focusing radiation, sensing the radiation with a detector positioned on a circuit board including circuitry coupled to the detector for processing the sensed radiation, enclosing the intrusion sensing system with a rear assembly which is disposed adjacent to one side of the circuit board and joined together at the periphery of the front assembly, excluding insects from the radiation detector with enclosure means attached to the compound lens and positioned within the front assembly, and inserting within the enclosure means for suppressing superfluous radiation. The suppressing means includes the use of a pigmentation on the walls of the enclosure means, a textured surface or/and a contoured surface on such walls.

Brief Description of the Drawings

[0019] The appended claims particularly point out and distinctly claim the subject matter of this invention. The various objects, advantages and novel features of this

invention will be more fully apparent from a reading of the following detailed description in conjunction with the accompanying drawings in which like reference numerals refer to like parts, and in which:

FIG. 1 is an exploded perspective view of a front assembly of an intrusion sensing system showing an insect exclusion enclosure and a compound lens;

FIG. 2 is an exploded perspective view of a rear assembly of the intrusion sensing system showing a detector and the front of the compound lens;

FIG. 3 is a perspective view of the insect exclusion enclosure showing a front view of the enclosure;

FIG. 4 is a front elevational view of the insect exclusion enclosure;

FIG. 5 is a cross-sectional view of the insect exclusion enclosure of FIG. 4 having attached thereto a compound lens and infrared detector showing repeated reflections of a superfluous radiation path and no reflection of a non-superfluous radiation path;

FIG. 6 is a cross-sectional view of the insect exclusion enclosure of FIG. 4 having attached thereto a compound lens and detector illustrating no reflections of an example superfluous radiation path when the insect exclusion enclosure has pigmentation;

FIG. 7 is a cross-sectional view of the insect exclusion enclosure of FIG. 4 having attached thereto a compound lens and infrared detector illustrating scattering of an example superfluous radiation path when the insect exclusion enclosure comprises texturing;

FIG. 8A shows a textured surface for the inner surfaces of the insect exclusion enclosure of FIG. 7 for scattering superfluous radiation;

FIG. 8B is a perspective view of a portion of a textured surface of the insect inclusion enclosure of FIG. 7;

FIG. 8C is an enlarged end elevational view of the textured surface of the insert exclusion enclosure of FIG. 8B showing texture height and texture length spacing;

FIG. 9 is a cross-sectional view of the insect exclusion enclosure of FIG. 4 having attached thereto a compound lens and infrared detection illustrating scattering of an example superfluous radiation path when the insect exclusion enclosure comprises contouring;

FIG. 10A is an exploded perspective view of an alternate embodiment of an intrusion sensing system having an insert device for absorbing or scattering superfluous radiation;

FIG. 10B is an exploded perspective view of the front housing assembly of FIG. 10A showing a pigmented, textured and/or contoured insert placed inside an insect exclusion enclosure;

FIG. 11A is an exploded perspective view of another alternate embodiment of an intrusion sensing system having a housing that seals out insects and a baffle attached around the perimeter of an infrared detector on a circuit board for absorbing and or scattering superfluous radiation; and

FIG. 11B is an exploded perspective view of the front housing assembly of FIG. 11A showing the compound lens attached to the front housing.

Description of Illustrative Embodiments

[0020] Referring now to FIG. 1, an exploded perspective view of a front assembly 10 of an intrusion sensing system 11 is shown which incorporates the invention of an insect exclusion enclosure 12 comprising means for absorbing or scattering superfluous radiation that is not focused on a detector 26. The insert exclusion enclosure 12 further provides a protected volume of space for optical paths between lenses 14, window 18 and a radiation detector 26 by preventing the entry of objects approximately 1 mm in diameter or larger which could interfere with the optical paths. Reducing superfluous radiation results in improved operating performance by minimizing false alarms for such an intrusion sensing system. A compound lens 14 attaches to the front of the insect exclusion enclosure 12 and has a plurality of lines of focus for focusing infrared radiation that enters the system onto the detector 26. The detector 26 is located near the focal point of the compound lens 14 and the curvilinear-shaped mirror 24. A window enclosure 18 provides for another source of radiation to reach the detector in addition to the compound lens 14. A front housing 16 encloses the compound lens 14 and the insect exclusion enclosure 12.

[0021] Referring to FIG. 2, an exploded perspective view of a rear assembly 20 of the intrusion sensing system 11 is shown. A circuit board 22, having an infrared detector 26, a curvilinear-shaped mirror 24 positioned above the infrared detector 26 for reflecting radiation onto the detector 26, insect exclusion enclosure gasket 28 that fits around the perimeter of the detector 26 for interfacing with one end of the insect exclusion enclosure 12, and other circuits, is placed in the front assembly 16 and the rear assembly 20 mates with the front assembly 16 and they snap together. Often there are openings in the rear assembly 20 for mounting purposes which also provides a means of entry for insects.

[0022] Referring to FIG. 3 and FIG. 4, FIG. 3 shows a perspective view of the insect exclusion enclosure 12 having a wide front opening 30 that is adjacent to the compound lens 14 and the smaller opening 32 of the back 32 into which the curvilinear-shaped mirror 24 and infrared detector 26 protrude in the assembled system. FIG. 4 is a front elevational view of the insect exclusion enclosure 12 showing side walls 31 and the smaller opening 32 at the back of the enclosure 12.

[0023] Referring to FIG. 5, a cross-sectional view of

the insect exclusion enclosure 12, compound lens 14 and infrared detector 26 is shown and an example superfluous radiation path 34 when the insect exclusion enclosure 12 does not comprise pigmentation, texturing and/or contouring. Also shown is a path 36 for beneficial or non-superfluous radiation which arrives directly at the infrared detector 26. The superfluous radiation path 34 arrives at the infrared detector 26 after repeated reflection inside the insect exclusion enclosure 12.

[0024] Referring now to FIG. 6, a cross-sectional view is shown of the insect exclusion enclosure 12 comprising pigmentation 40 added to the material forming the insect exclusion envelope. A superfluous radiation path 38 is illustrated being absorbed by a side 41 of the insect exclusion enclosure 12. The pigmentation 40 most effectively produces a black insect exclusion enclosure 12. The material used to injection mold the insect exclusion enclosure 12 is a polycarbonate plastic which may be embodied by Lexan 141 manufactured by General Electric Co., of Pittsfield, Massachusetts. The pigment used with the Lexan 141 comprises 0.2% carbon black of 24 nm particle size.

[0025] Referring to FIG. 7 and FIGS. 8A, 8B and 8C, FIG. 7 illustrates a cross-sectional view of the insect exclusion enclosure 12 comprising a textured surface 42. An example superfluous radiation path 44 strikes the textured surface 42 of the insect exclusion enclosure 12 and is scattered, so that it does not reflect and impinge upon the infrared detector 26. Surface texturing is defined as the repetitive or random deviations from the normal surface which form a three-dimensional topography of the surface. FIG. 8A shows a typical textured surface. FIG. 8B is a perspective view cf a portion of the textured surface of the insect exclusion enclosure 12. FIG. 8C shows an enlarged cross-sectional view of the textured surface of FIGS. 8A and 8B having a texture length spacing 43 of 0.008 inches and a texture height 45 of 0.003 inches.

[0026] Referring to FIG. 9, a cross-sectional view is illustrated of the insect exclusion enclosure 12 comprising contouring on the surfaces of its inner walls. A superfluous radiation path 48 is illustrated being attenuated by multiple lossy reflections by the sides 46 of the insect exclusion enclosure 12 by providing the contours 47 on the inner walls of the enclosure 12. Surface contouring 47 supersedes surface texturing as shown in FIGS. 8A and 8C when the texturing height exceeds the length of the traversing run. These dimensions cause repeated reflections within the valleys of the contouring as shown in FIG. 9, constituting repeated lossy ref lections.

[0027] Referring now to FIG. 10A and FIG. 10B, an exploded perspective view of an alternate embodiment of an intrusion sensing systems 50 is shown. FIG. 10A shows an exploded perspective view of the complete sensing system 50 comprising the rear assembly 20, circuit board 22 having mounted thereon the infrared detector 26 with a curvilinear-shaped mirror 24 mounted adjacent to and above the infrared detector 26, and a front assembly 16. FIG. 10B shows an exploded perspective view of the front assembly 15 comprising a front housing 16, an insect exclusion enclosure 12, a pigmented textured and/or contoured insert 52 having the general shape of the insect exclusion enclosure 12 which is placed inside the insect exclusion enclosure and the compound lens 14 which is attached to the insect exclusion enclosure 12 by engaging the lens tabs 17 over hooks 13 on the insect exclusion enclosure 12. A window 18 is slid onto the bottom of the insect exclusion enclosure 12. The insect exclusion enclosure 12 with the compound lens 14 and window 18 attached thereto and comprising the insert 52 snaps onto the rear of the front housing 16. The front assembly 15 then snaps into the rear assembly 20 and the insect exclusion enclosure 12 contacts the circuit board 22 via the insect exclusion enclosure gasket 28. This embodiment of the intrusion sensing system 50 comprises the benefits of absorbing and/or scattering of superfluous radiation by the insertion of the insert 52 into an existing intrusion sensing. system.

[0028] Referring now to FIG. 11A and FIG. 11B, an exploded perspective view of another alternate embodiment of an intrusion system 60 is shown. FIG. 11A shows an exploded perspective view of the system 60 comprising a rear housing 62, a circuit board 64, a superfluous radiation absorber or baffle 67 that has been pigmented, textured and/or contoured as previously described which is attached to the circuit board 64. The circuit board 64 is attached to the rear housing 62 and a front assembly 68 snaps together with the rear housing 62 sealing the system 60 against insect entry.

[0029] Referring to FIG. 11B, an exploded perspective of the front assembly 68 is shown. The front assembly 68 comprises a compound lens 72 attached to the front housing 70 by means of appropriate latches 76 on the front housing 70. A window 74 is attached to the bottom of the front housing 70 by appropriate snap latches 77. This embodiment provides an intrusion sensing system 60 in which the superfluous radiation absorber does not contact the front housing 70. When the sensing system 60 is assembled the rear housing 62 is mated with the front housing 68 and there are no openings for bug access to the inside. Also, there are no mounting holes that otherwise allow bug entry. The baffle 67, which is pigmented, textured and/or contoured to absorb or scatter superfluous radiation, is attached to the circuit board 64 around the perimeter of the infrared detector 65. When the sensor system 60 is used in an application, it may be mounted, for example, with tape means on the rear of housing 62.

[0030] This invention has been disclosed in terms of certain embodiments. It will be apparent that many modifications can be made to the disclosed apparatus without departing from the invention. Therefore, it is the intent of the appended claims to cover all such variations and modifications as come within the scope of this in-

vention.

Claims

1. An infrared intrusion sensing system (11,50,60), having a front housing (16,70) a compound lens (14,72) for focusing radiation, a radiation detector (26,65) positioned in the optical path of said compound lens, a circuit board (22,64) carrying said radiation detector and associated circuitry, and a rear housing (20,62) for mating with said front housing and enclosing said circuit board, wherein said radiation detector and associated circuitry are responsive to infrared radiation, **characterized by**:

   a baffle (12,67) positioned between said compound lens and said radiation detector;
   said baffle having a first opened end (30) adjacent said compound lens and a second opened end (32) adjacent said radiation detector, wherein said second opened end is smaller than said first opened end;
   said baffle being designed for suppressing radiation impinging on said baffle.

2. The intrusion sensing system as recited in Claim 1 wherein said baffle (12,67) includes an inner pigmented surface for absorbing said impinging radiation.

3. The intrusion sensing system as recited in Claim 2 wherein said inner pigmented surface has a black color to said baffle.

4. The intrusion sensing system as recited in Claim 1 wherein said baffle (12,67) includes a textured inner surface for scattering said impinging radiation.

5. The intrusion sensing system as recited in Claim 4, wherein said textured surface comprises repetitive, random deviations from a normal smooth surface to form a three-dimensional topography on said surface.

6. The intrusion sensing system as recited in Claim 1 wherein said baffle (12,67) includes a contoured inner surface for preventing said impinging radiation from reflecting onto said radiation detector.

7. The intrusion sensing system as recited in Claim 6, wherein said contoured surface comprises peaks and valleys for causing lossy reflections of said impinging radiation within said valleys.

8. The intrusion sensing system as recited in Claim 1, further comprising:

   a window (18,74) on a bottom end of said front housing (16,70);

   wherein radiation entering said intrusion sensing system (11,50,60) through said window (18,74) strikes a mirror (24,66) above said radiation detector (26,65) for reflecting said radiation onto said radiation detector (26,65).

9. The intrusion sensing system as recited in Claim 1, further comprising a gasket (28) positioned between the surface of said second end of said baffle (12) and the surface of said circuit board (22) from which the radiation detector (26) extends to form a seal between said baffle and said circuit board (22).

10. The intrusion sensing system as recited in Claim 1, wherein said baffle (12) is attached to said compound lens (14) for excluding insects from said radiation detector (26).

11. The intrusion sensing system as recited in Claim 1, wherein said rear housing (62) sealably mates with said front housing (70) for excluding insects from entering said sensing system (60).

12. A method of suppressing superfluous radiation in an infrared intrusion sensing system (11,50,60), having a front housing (16,70), a compound lens (14,72) for focusing radiation, a radiation detector (26,65) positioned in the optical path of said compound lens, a circuit board (22,64) carrying said radiation detector and associated circuitry, and a rear housing (20,62) for mating with said front housing and enclosing said circuit board, wherein said radiation detector and associated circuitry are responsive to infrared radiation, **characterized by**:

   providing a baffle (12,67) positioned between said compound lens and said radiation detector;
   said baffle having a first opened end (30) adjacent said compound lens and a second opened end (32) adjacent said radiation detector, wherein said second opened end is smaller than said first opened end;
   said baffle being designed for suppressing radiation impinging on said baffle.

13. The method as recited in Claim 12, wherein said baffle (12,67) includes an inner pigmented surface for absorbing said impinging radiation.

14. The method as recited in Claim 13, wherein said inner pigmented surface has a black color to said baffle.

15. The method as recited in Claim 12, wherein said

baffle (12,67) includes a textured inner surface for scattering said impinging radiation.

16. The method as recited in Claim 15, wherein said textured inner surface comprises repetitive, random deviations from a normal smooth surface to form a three-dimensional topography on said surface.

17. The method as recited in Claim 12, wherein said baffle (12,67) includes a contoured inner surface for preventing said impinging radiation from reflecting onto said radiation detector (26,65).

18. The method as recited in Claim 17, wherein said contoured inner surface comprises peaks and valleys for causing lossy reflections of said impinging radiation within said valleys.

19. The method as recited in Claim 12, further comprising:

providing a window (18,74) on a bottom end of said front housing (16,70);

wherein radiation entering said sensing system (11,50,60) through said window (18,74) strikes a mirror (24,66) above said radiation detector (26,65) for reflecting said radiation onto said radiation detector (26,65).

20. The method as recited in Claim 12, further comprising providing a gasket (28) positioned between the surface of said second end of said baffle (12) and the surface of said circuit board (22) from which the radiation detector extends to form a seal between said baffle and said circuit board (22).

21. The method as recited in Claim 12, wherein said baffle (12) is attached to said compound lens (14) for excluding insects from said radiation detector (26).

22. The method as recited in Claim 12, wherein said rear housing (62) sealably mates with said front housing (70) for excluding insects from entering said intrusion sensing system (60).

Patentansprüche

1. Infrarot-Intrusionserkennungssystem (11, 50, 60), mit einem vorderen Gehäuse (16, 70), einer Verbundlinse (14, 72) zur Fokussierung von Strahlung, einem Strahlungsdetektor (26, 65), der in dem optischen Pfad der genannten Verbundlinse positioniert ist, einer gedruckten Schaltung (22, 64), welche den genannten Strahlungsdetektor und eine zugeordnete Schaltkreisanordnung trägt, und einem hinteren Gehäuse (20, 62), das mit dem genannten Gehäuse zusammenpasst und die genannte gedruckte Schaltung einschließt, wobei der genannte Strahlungsdetektor und die zugeordnete Schaltkreisanordnung auf Infrarotstrahlung ansprechen, **gekennzeichnet durch**:

ein Baffle (12, 67), das zwischen der genannten Verbundlinse und dem genannten Strahlungsdetektor positioniert ist;

wobei das genannte Baffle ein erstes offenes Ende (30) angrenzend an die genannte Verbundlinse und ein zweites offenes Ende (32) angrenzend an den genannten Strahlungsdetektor aufweist, wobei das genannte zweite offene Ende kleiner ist als das genannte erste offene Ende;

wobei das genannte Baffle so gestaltet ist, dass es Strahlung unterdrückt, die auf das genannte Baffle auftrifft.

2. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das genannte Baffle (12, 67) eine innere pigmentierte Oberfläche zum Absorbieren der genannten auftreffenden Strahlung aufweist.

3. Infrarot-Intrusionserkennungssystem nach Anspruch 2, wobei die genannte innere pigmentierte Oberfläche zu dem genannten Baffle eine schwarze Farbe aufweist.

4. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das genannte Baffle (12, 67) eine texturierte innere Oberfläche aufweist, um die genannte auftreffende Strahlung zu streuen.

5. Infrarot-Intrusionserkennungssystem nach Anspruch 4, wobei die genannte texturierte Oberfläche sich wiederholende, zufällige Abweichungen von einer normalen glatten Oberfläche aufweist, so dass auf der genannten Oberfläche eine dreidimensionale Topographie gebildet wird.

6. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das genannte Baffle (12, 67) eine profilierte Oberfläche aufweist, die dazu dient es zu verhindern, dass die genannte auftreffende Strahlung zurück auf den genannten Strahlungsdetektor reflektiert wird.

7. Infrarot-Intrusionserkennungssystem nach Anspruch 6, wobei die genannte profilierte Oberfläche Gipfel und Täler aufweist, die mit Verlust behaftete Reflexionen der genannten auftreffenden Strahlung in den genannten Tälern verursachen.

8. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das System ferner folgendes um-

fasst:

ein Fenster (18, 74) an einem unteren Ende des genannten vorderen Gehäuses (16, 70);

wobei die genannte Strahlung, die durch das genannte Fenster (18, 74) in das genannte Infrarot-Intrusionserkennungssystem eintritt, auf einen Spiegel (24, 66) oberhalb des genannten Strahlungsdetektors (26, 65) auftrifft, so dass die genannte Strahlung zurück auf den genannten Strahlungsdetektor (26, 65) reflektiert wird.

9. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das System ferner eine Dichtung (28) umfasst, die zwischen der Oberfläche des genannten zweiten Endes des genannten Baffle (12) und der Oberfläche der genannten gedruckten Schaltung (22) positioniert ist, von wo sich der Strahlungsdetektor (26) erstreckt, so dass ein dichter Verschluss zwischen dem genannten Baffle und der genannten gedruckten Schaltung (22) erzeugt wird.

10. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das genannte Baffle (12) an der genannten Verbundlinse (14) angebracht ist, um Insekten aus dem genannten Strahlungsdetektor (26) auszuschließen.

11. Infrarot-Intrusionserkennungssystem nach Anspruch 1, wobei das genannte hintere Gehäuse (62) abdichtend mit dem genannten vorderen Gehäuse (70) zusammenpasst, um Insekten aus dem genannten Erkennungssystem (60) auszuschließen.

12. Verfahren zur Unterdrückung überflüssiger Strahlung in einem Infrarot-Intrusionserkennungssystem (11, 50, 60), mit einem vorderen Gehäuse (16, 70), einer Verbundlinse (14, 72) zur Fokussierung von Strahlung, einem Strahlungsdetektor (26, 65), der in dem optischen Pfad der genannten Verbundlinse positioniert ist, einer gedruckten Schaltung (22, 64), welche den genannten Strahlungsdetektor und eine zugeordnete Schaltkreisanordnung trägt, und einem hinteren Gehäuse (20, 62), das mit dem genannten Gehäuse zusammenpasst und die genannte gedruckte Schaltung einschließt, wobei der genannte Strahlungsdetektor und die zugeordnete Schaltkreisanordnung auf Infrarotstrahlung ansprechen, **gekennzeichnet durch**:

das Vorsehen eines Baffle (12, 67), das zwischen der genannten Verbundlinse und dem genannten Strahlungsdetektor positioniert ist;

wobei das genannte Baffle ein erstes offenes Ende (30) angrenzend an die genannte Verbundlinse und ein zweites offenes Ende (32) angrenzend an den genannten Strahlungsdetektor aufweist, wobei das genannte zweite offene Ende kleiner ist als das genannte erste offene Ende;

wobei das genannte Baffle so gestaltet ist, dass es Strahlung unterdrückt, die auf das genannte Baffle auftrifft.

13. Verfahren nach Anspruch 12, wobei das genannte Baffle (12, 67) eine innere pigmentierte Oberfläche zum Absorbieren der genannten auftreffenden Strahlung aufweist.

14. Verfahren nach Anspruch 13, wobei die genannte innere pigmentierte Oberfläche zu dem genannten Baffle eine schwarze Farbe aufweist.

15. Verfahren nach Anspruch 12, wobei das genannte Baffle (12, 67) eine texturierte innere Oberfläche aufweist, um die genannte auftreffende Strahlung zu streuen.

16. Verfahren nach Anspruch 15, wobei die genannte texturierte Oberfläche sich wiederholende, zufällige Abweichungen von einer normalen glatten Oberfläche aufweist, so dass auf der genannten Oberfläche eine dreidimensionale Topographie gebildet wird.

17. Verfahren nach Anspruch 12, wobei das genannte Baffle (12, 67) eine profilierte Oberfläche aufweist, die dazu dient es zu verhindern, dass die genannte auftreffende Strahlung zurück auf den genannten Strahlungsdetektor reflektiert wird.

18. Verfahren nach Anspruch 17, wobei die genannte profilierte Oberfläche Gipfel und Täler aufweist, die mit Verlust behaftete Reflexionen der genannten auftreffenden Strahlung in den genannten Tälern verursachen.

19. Verfahren nach Anspruch 12, wobei das Verfahren ferner folgendes umfasst:

Vorsehen eines Fenster (18, 74) an einem unteren Ende des genannten vorderen Gehäuses (16, 70);

wobei die genannte Strahlung, die durch das genannte Fenster (18, 74) in das genannte Infrarot-Intrusionserkennungssystem eintritt, auf einen Spiegel (24, 66) oberhalb des genannten Strahlungsdetektors (26, 65) auftrifft, so dass die genannte Strahlung zurück auf den genannten Strahlungsdetektor (26, 65) reflektiert wird.

20. Verfahren nach Anspruch 12, wobei das Verfahren

ferner das Vorsehen einer Dichtung (28) umfasst, die zwischen der Oberfläche des genannten zweiten Endes des genannten Baffle (12) und der Oberfläche der genannten gedruckten Schaltung (22) positioniert ist, von wo sich der Strahlungsdetektor erstreckt, so dass ein dichter Verschluss zwischen dem genannten Baffle und der genannten gedruckten Schaltung (22) erzeugt wird.

21. Verfahren nach Anspruch 12, wobei das genannte Baffle (12) an der genannten Verbundlinse (14) angebracht ist, um Insekten aus dem genannten Strahlungsdetektor (26) auszuschließen.

22. Verfahren nach Anspruch 12, wobei das genannte hintere Gehäuse (62) abdichtend mit dem genannten vorderen Gehäuse (70) zusammenpasst, um Insekten aus dem genannten Erkennungssystem (60) auszuschließen.

Revendications

1. Système (11, 50, 60) de détection d'intrusion par infrarouges, possédant un boîtier avant (16, 70), une lentille composée (14, 72) servant à focaliser le rayonnement, un détecteur de rayonnement (26, 65) placé sur le trajet optique de ladite lentille composée, une carte de circuit (22, 64) portant ledit détecteur de rayonnement et des circuits associés, et un boîtier arrière (20, 62) destiné à s'accoupler avec ledit boîtier avant et enfermant ladite carte de circuit, où ledit détecteur de rayonnement et les circuits associés réagissent au rayonnement infrarouge, le système étant **caractérisé par** :

un déflecteur (12, 67) placé entre ladite lentille composée et ledit détecteur de rayonnement ; ledit déflecteur ayant une première extrémité ouverte (30) qui est adjacente à ladite lentille composée et une deuxième extrémité ouverte (32) qui est adjacente audit détecteur de rayonnement, où ladite deuxième extrémité ouverte est plus petite que ladite première extrémité ouverte ;
ledit déflecteur étant conçu pour atténuer le rayonnement qui vient frapper ledit déflecteur.

2. Système de détection d'intrusion selon la revendication 1, où ledit déflecteur (12, 67) comporte une surface pigmentée interne servant à absorber le rayonnement qui vient la frapper.

3. Système de détection d'intrusion selon la revendication 2, où ladite surface pigmentée interne possède une couleur noire pour ledit déflecteur.

4. Système de détection d'intrusion selon la revendication 1, où ledit déflecteur (12, 67) comporte une surface interne texturée servant à diffuser le rayonnement qui vient la frapper.

5. Système de détection d'intrusion selon la revendication 4, où ladite surface texturée comprend des écarts aléatoires répétitifs par rapport à une surface lisse normale de façon à former sur ladite surface une topographie tridimensionnelle.

6. Système de détection d'intrusion selon la revendication 1, où ledit déflecteur (12, 67) comporte une surface interne mise en forme afin d'empêcher que le rayonnement qui vient la frapper ne soit réfléchi sur ledit détecteur de rayonnement.

7. Système de détection d'intrusion selon la revendication 6, où ladite surface mise en forme possède des crêtes et des creux servant à provoquer des réflections avec pertes pour le rayonnement venant la frapper à l'intérieur desdits creux.

8. Système de détection d'intrusion selon la revendication 1, comprenant en outre :

une fenêtre (18, 74) disposée sur une extrémité inférieure dudit boîtier avant (16, 70) ;

où le rayonnement qui entre dans ledit système de détection d'intrusion (11, 50, 60) par ladite fenêtre (18, 74) tombe sur un miroir (24, 66) se trouvant au-dessus dudit détecteur de rayonnement (26, 65) de façon à réfléchir ledit rayonnement sur ledit détecteur de rayonnement (26, 65).

9. Système de détection d'intrusion selon la revendication 1, comprenant en outre un joint (28) placé entre la surface de ladite deuxième extrémité dudit déflecteur (12) et la surface de ladite carte de circuit (22) de laquelle le détecteur de rayonnement (26) fait saillie afin de former une jonction hermétique entre ledit déflecteur et ladite carte de circuit (22).

10. Système de détection d'intrusion selon la revendication 1, où ledit déflecteur (12) est attaché à ladite lentille composée (14) de manière à empêcher que des insectes n'atteignent ledit détecteur de rayonnement (26).

11. Système de détection d'intrusion selon la revendication 1, où ledit boîtier arrière (62) est accouplé de façon hermétique avec ledit boîtier avant afin d'empêcher que des insectes n'entrent dans ledit système de détection (60).

12. Procédé d'atténuation de rayonnement superflu dans un système (11, 50, 60) de détection d'intrusion par infrarouges, possédant un boîtier avant

(16, 70), une lentille composée (14, 72) servant à focaliser le rayonnement, un détecteur de rayonnement (26, 65) placé sur le trajet optique de ladite lentille composée, une carte de circuit (22, 64) portant ledit détecteur de rayonnement et des circuits associés, et un boîtier arrière (20, 62) destiné à être accouplé avec ledit boîtier avant et enfermant ladite carte de circuit, où ledit détecteur de rayonnement et les circuits associés réagissent au rayonnement infrarouge, le procédé étant **caractérisé par** les opérations suivantes :

prévoir un déflecteur (12, 67) placé entre ladite lentille composée et ledit détecteur de rayonnement ;
ledit déflecteur ayant une première extrémité ouverte (30) adjacente à ladite lentille composée et une deuxième extrémité ouverte (32) adjacente audit détecteur de rayonnement, où ladite deuxième extrémité ouverte est plus petite que ladite première extrémité ouverte ;
ledit déflecteur étant conçu pour atténuer le rayonnement qui vient frapper ledit déflecteur.

13. Procédé selon la revendication 12, où ledit déflecteur (12, 67) comporte une surface pigmentée interne servant à absorber le rayonnement qui vient la frapper.

14. Procédé selon la revendication 13, où ladite surface pigmentée interne possède une couleur noire pour ledit déflecteur.

15. Procédé selon la revendication 12, où ledit déflecteur (12, 67) comporte une surface interne texturée servant à diffuser le rayonnement qui vient la frapper.

16. Procédé selon la revendication 15, où ladite surface texturée comprend des écarts aléatoires répétitifs par rapport à une surface lisse normale de façon à former sur ladite surface une topographie tridimensionnelle.

17. Procédé selon la revendication 12, où ledit déflecteur (12, 67) comporte une surface interne mise en forme afin d'empêcher que le rayonnement qui vient la frapper ne soit réfléchi sur ledit détecteur de rayonnement.

18. Procédé selon la revendication 17, où ladite surface mise en forme possède des crêtes et des creux servant à provoquer des réflections avec pertes pour le rayonnement venant la frapper à l'intérieur desdits creux.

19. Procédé selon la revendication 12, comprenant en outre :

l'opération consistant à prévoir une fenêtre (18, 74) disposée sur une extrémité inférieure dudit boîtier avant (16, 70) ;

où le rayonnement qui entre dans ledit système de détection d'intrusion (11, 50, 60) par ladite fenêtre (18, 74) est incident sur un miroir (24, 66) se trouvant au-dessus dudit détecteur de rayonnement (26, 65) de façon à réfléchir ledit rayonnement sur ledit détecteur de rayonnement (26, 65).

20. Procédé selon la revendication 12, comprenant en outre l'opération qui consiste à prévoir un joint (28) placé entre la surface de ladite deuxième extrémité dudit déflecteur (12) et la surface de ladite carte de circuit (22) de laquelle le détecteur de rayonnement (26) fait saillie afin de former une jonction hermétique entre ledit déflecteur et ladite carte de circuit (22).

21. Procédé selon la revendication 12, où ledit déflecteur (12) est attaché à ladite lentille composée (14) de manière à empêcher que des insectes n'atteignent ledit détecteur de rayonnement (26).

22. Procédé selon la revendication 12, où ledit boîtier arrière (62) est accouplé de façon hermétique avec ledit boîtier avant afin d'empêcher que des insectes n'entrent dans ledit système de détection (60).

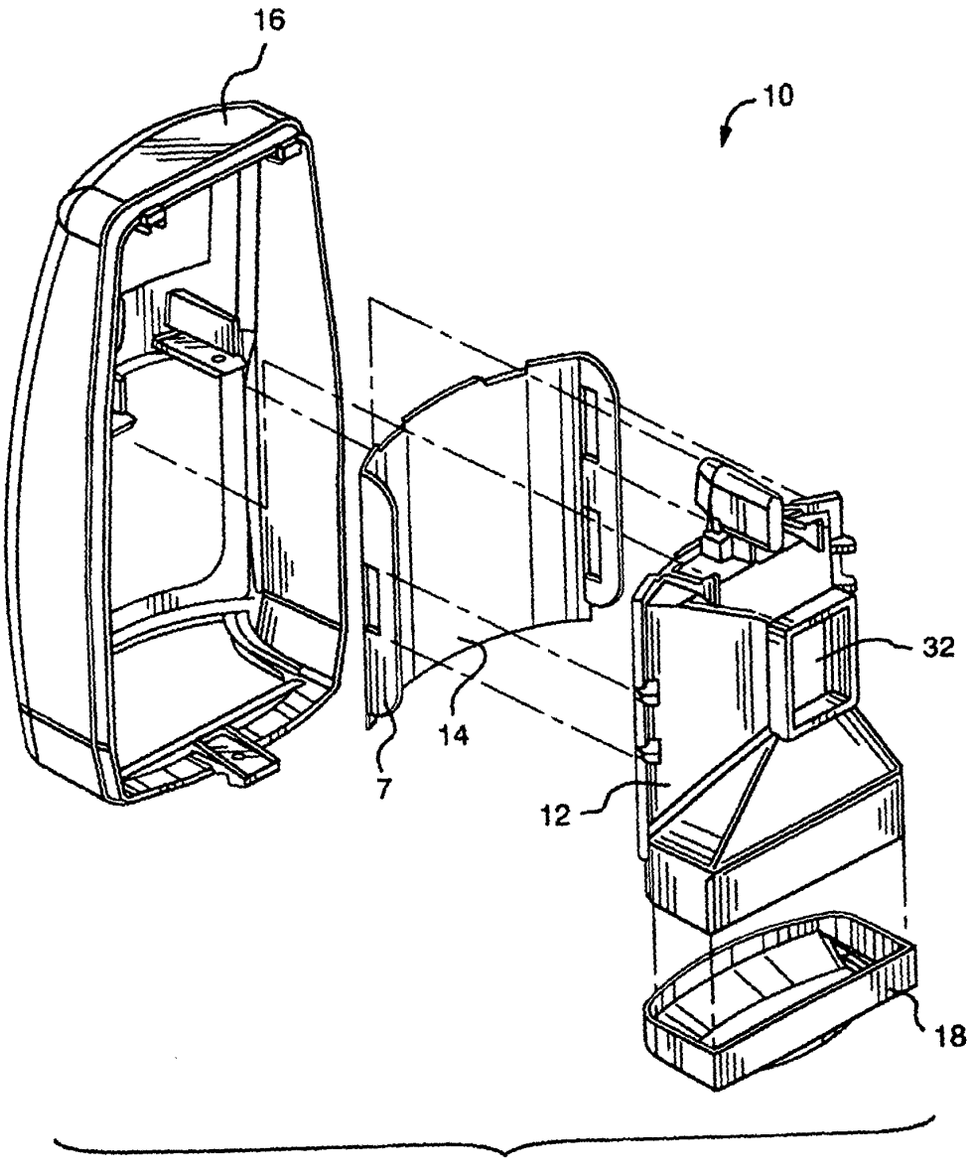

FIG. 1

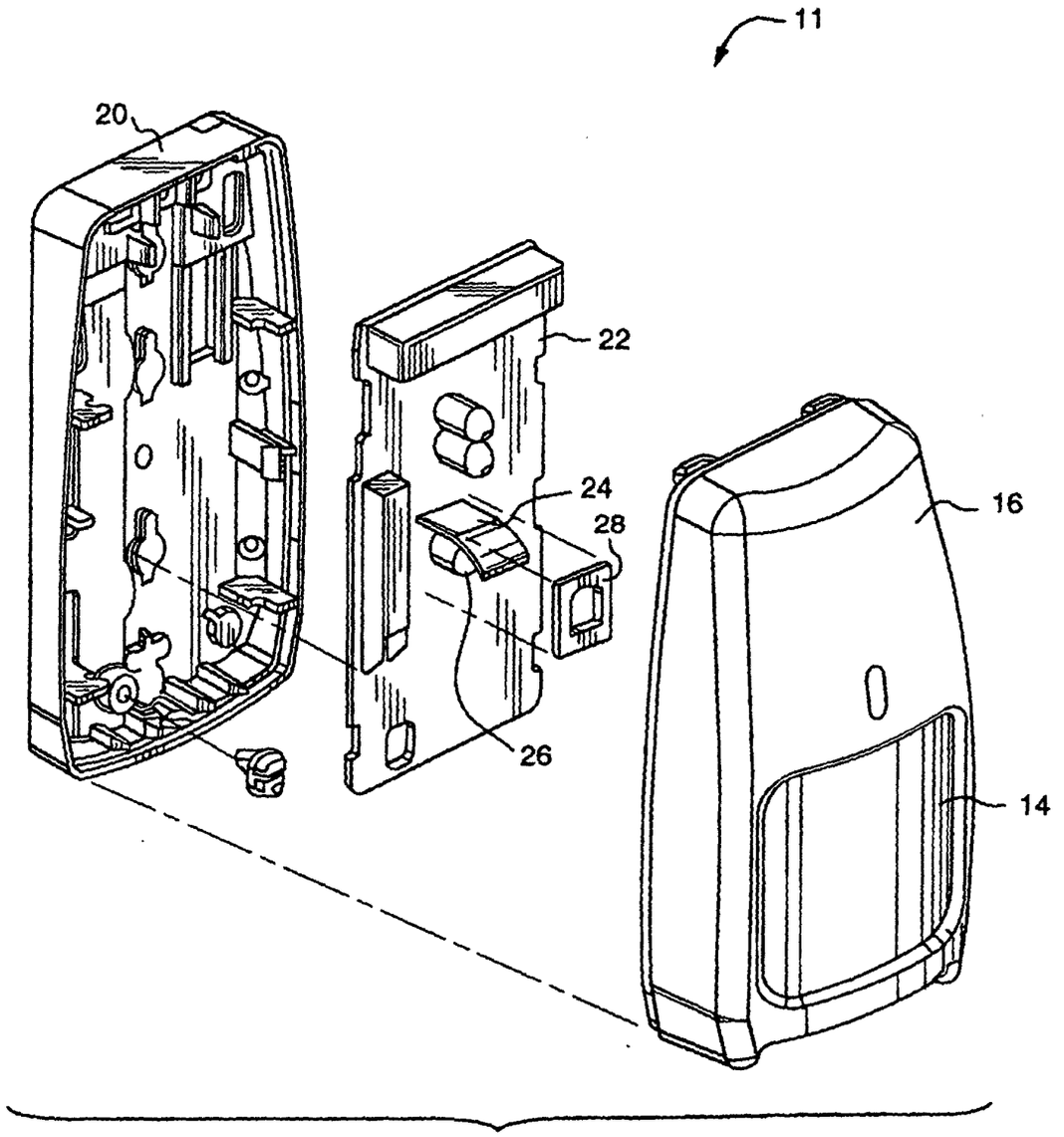

FIG. 2

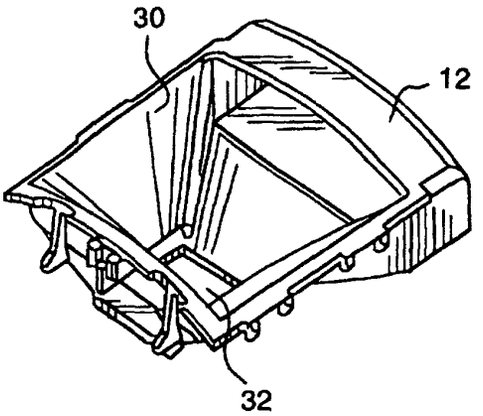

FIG. 3

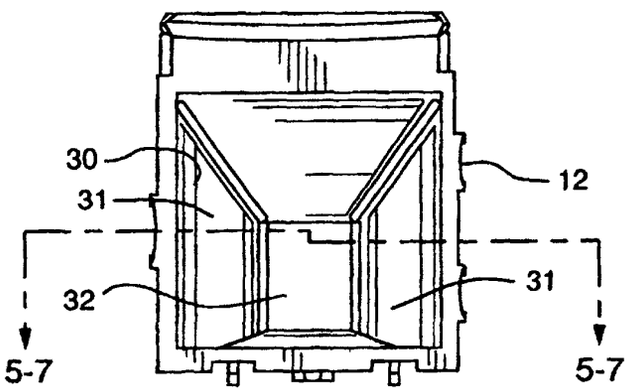

FIG. 4

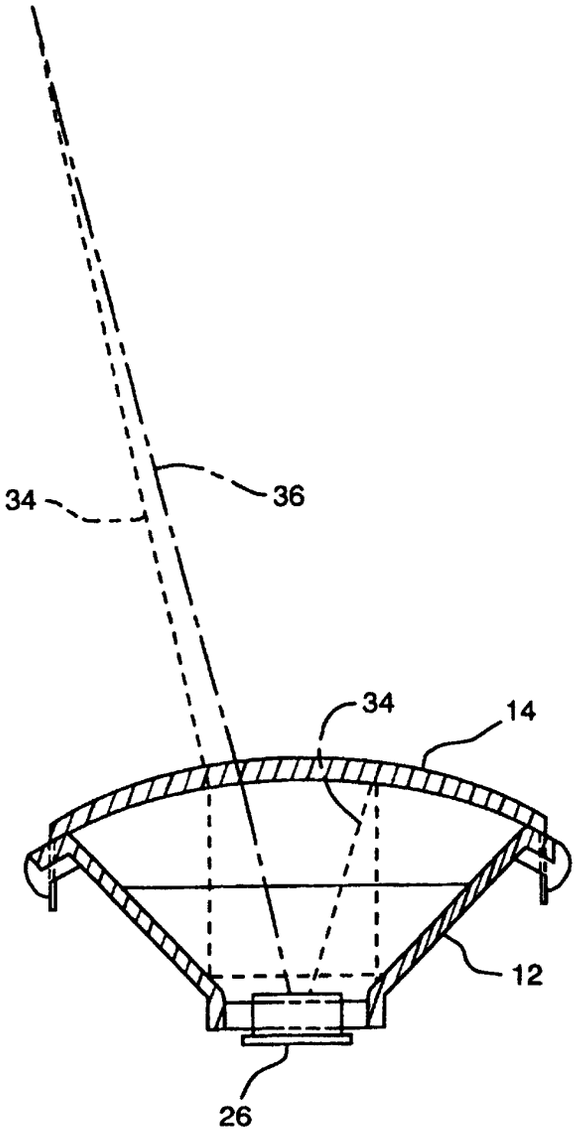

FIG. 5

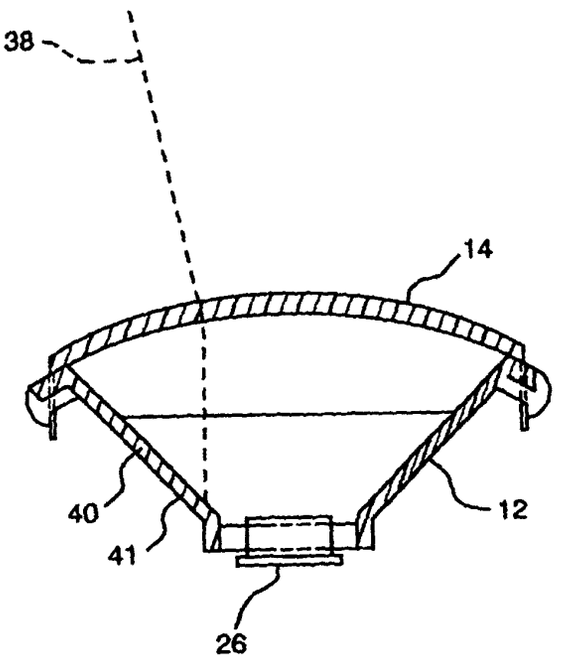

FIG. 6

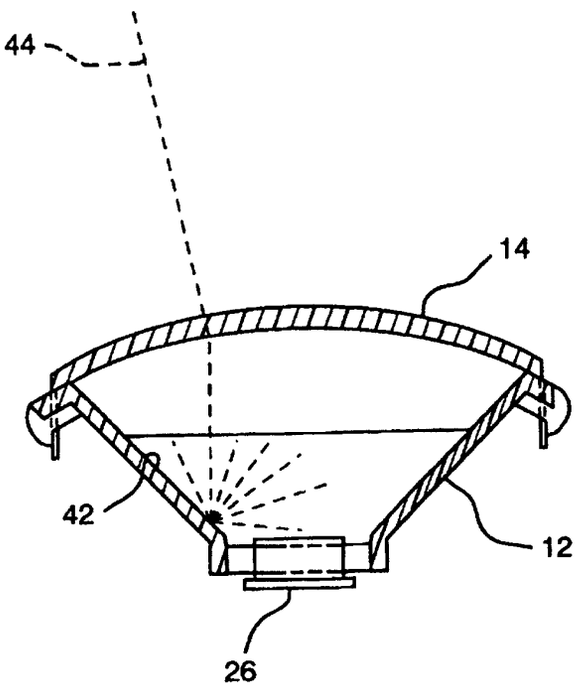

FIG. 7

FIG. 8A

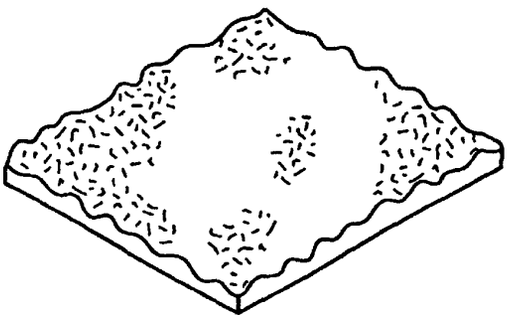

FIG. 8B

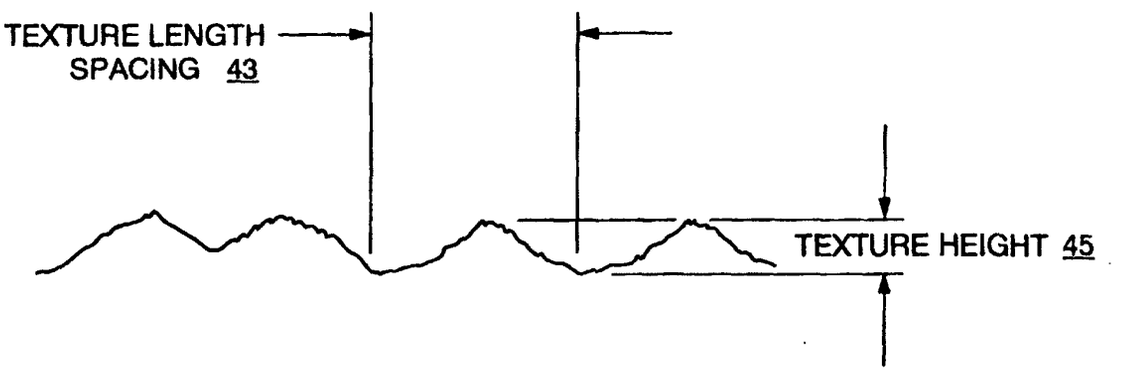

FIG. 8C

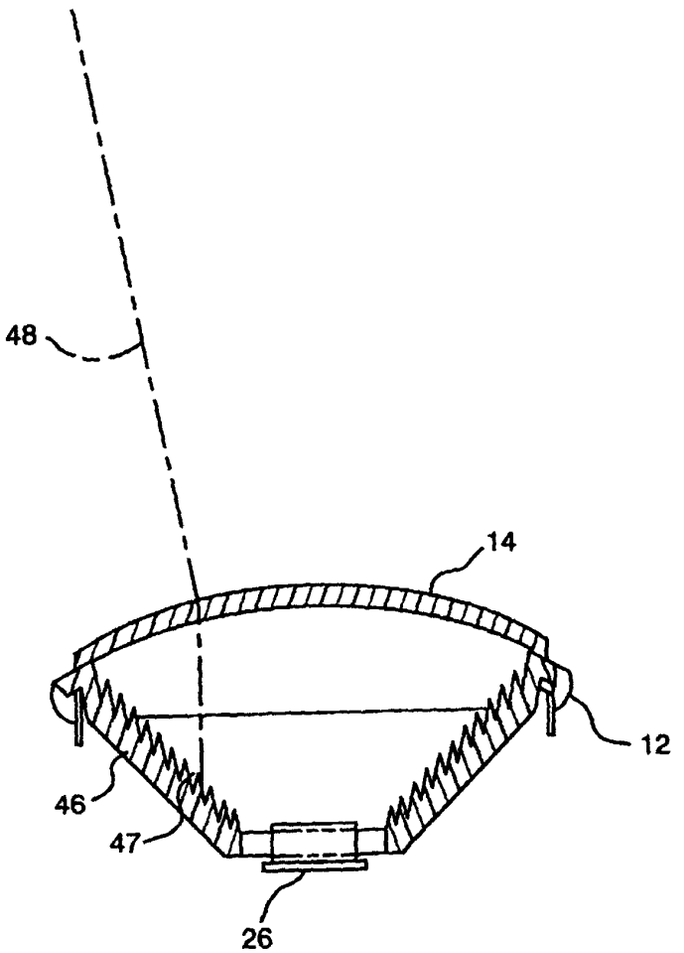

FIG. 9

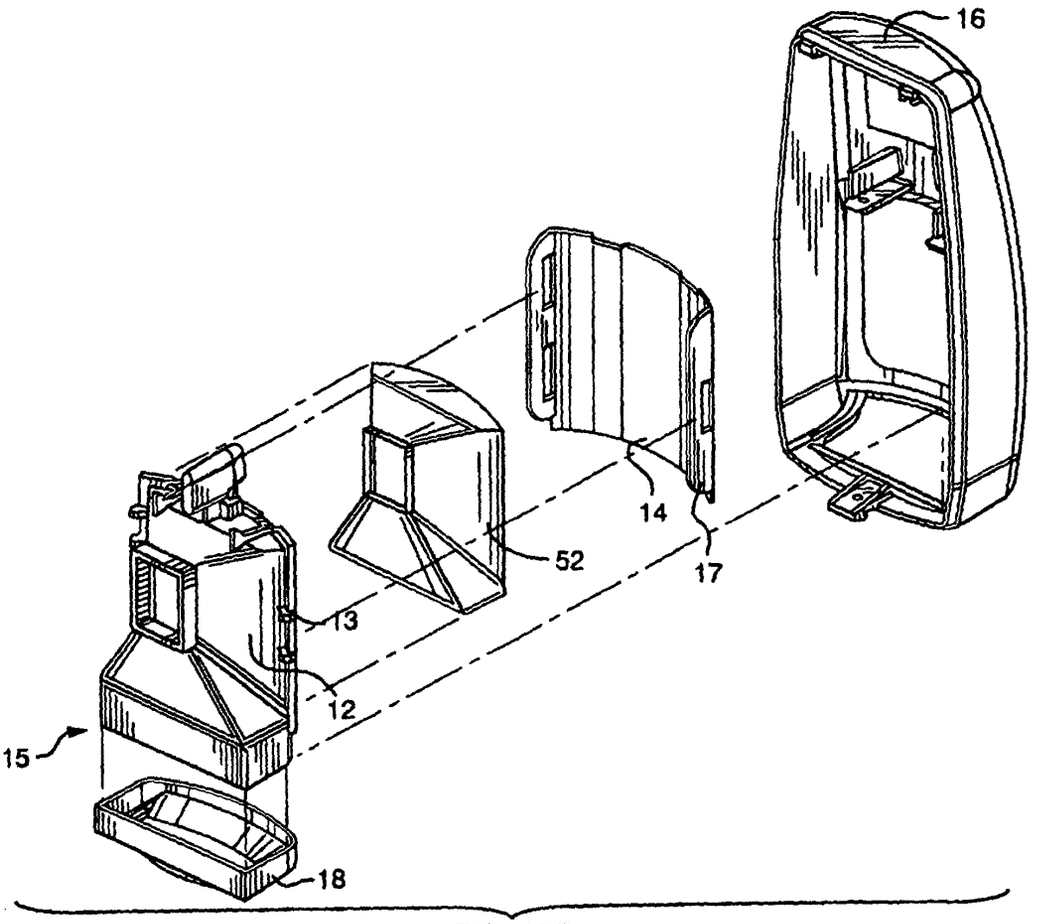

FIG. 10B

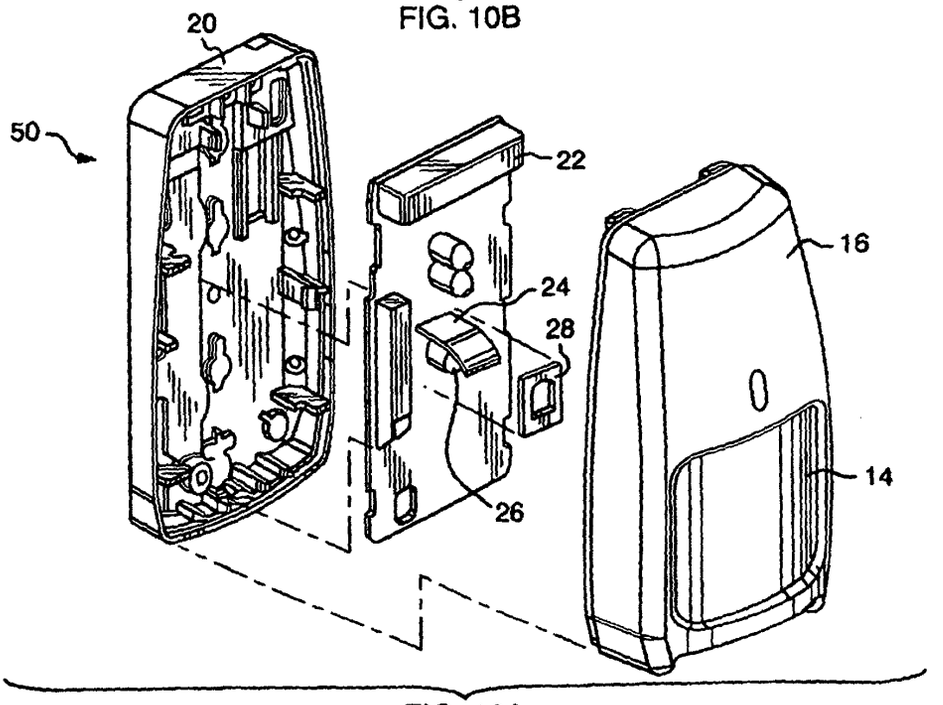

FIG. 10A

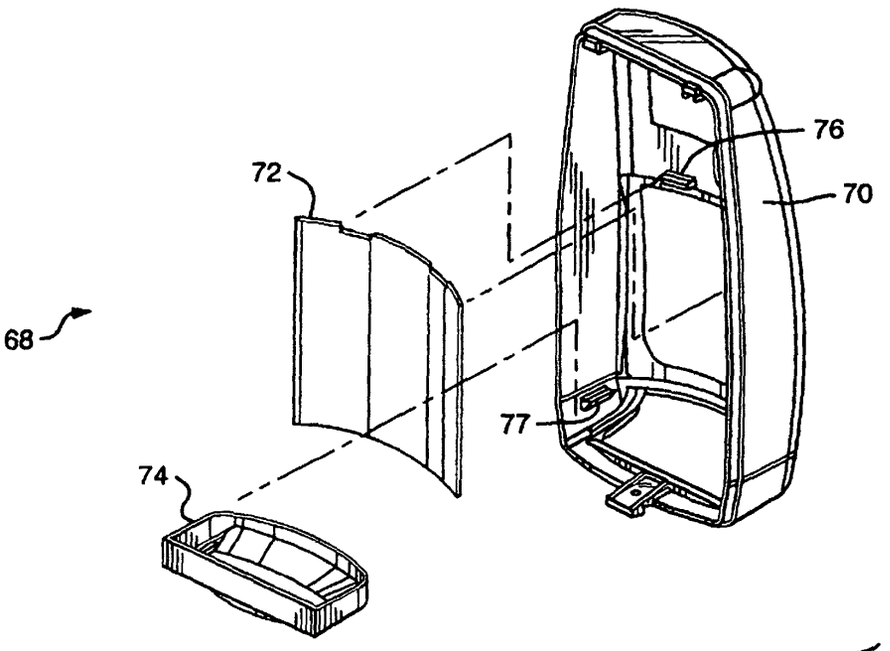

FIG. 11B

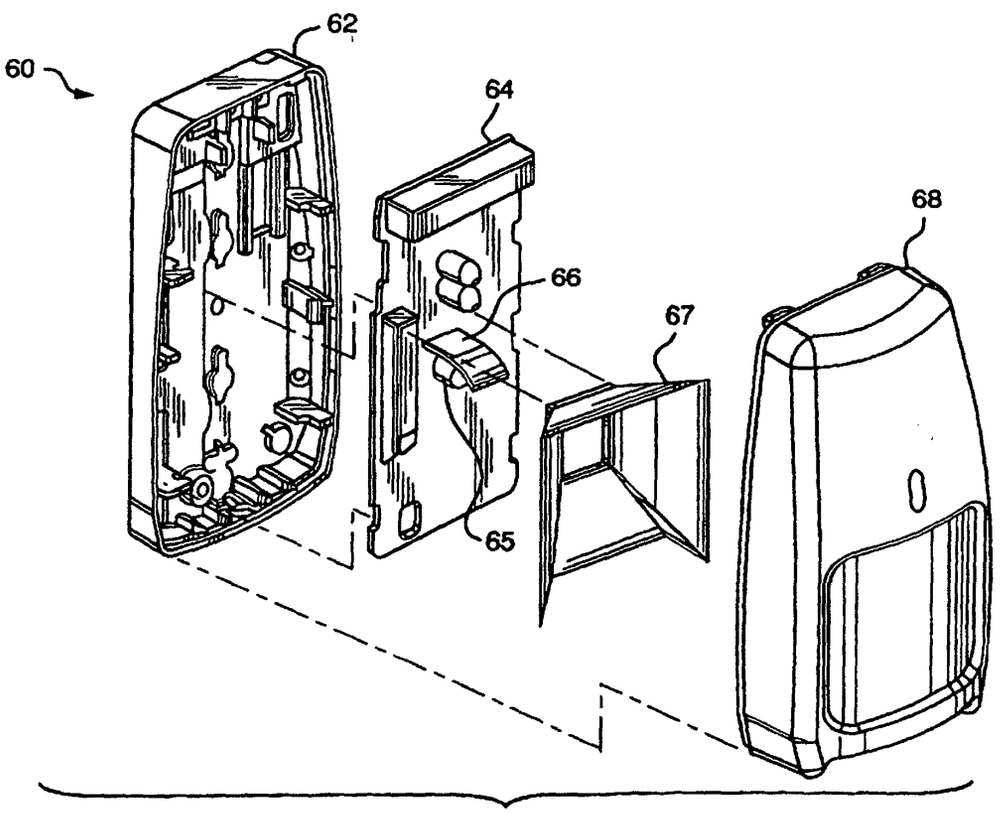

FIG. 11A