Description

The invention refers to an over-door interphone system with the features of the preamble of the only claim.

DE-A-3 113 997 discloses an over-door interphone system with the features of the preamble of claim 1, in which the light emitting illumination means is not infrared. The camera is not for infrared light, but only sensitive to a visible light. The camera is actuated when the call switch is pushed whereas the light emitting illumination means is switched on manually by a switch in the master station unit. No information whatsoever is given as to at what time and by what element the camera and/or the illumination means are deactivated.

US-A-3 816 654 concerns an over-door interphone system with an infrared light emitting illumination means as well as an infrared camera.

It is the object of the invention to provide an advantageous over-door interphone system by which a visitor can be observed in a very discrete manner and which in addition operates very simply and effectively.

This object is solved by the features of the only claim.

An embodiment of the invention is shown in the drawings, in which:

Fig. 1 is a perspective view of a conventional remote station unit with a television camera shown in its installed condition;

Fig. 2 is a perspective view of another conventional remote station unit with an incorporated television camera shown with a cover being removed;

Fig. 3 is a schematic diagram of an over-door interphone system provided with a night-vision monitoring device in accordance with the first embodiment of the present invention;

Fig. 4 is a front view of a remote station unit employed in the first embodiment;

Fig. 5 is a side sectional view of the remote station unit of the first embodiment;

Fig. 6 is a rear view of the remote station unit of the first embodiment with its base removed;

Fig. 7 is a perspective view of a printed board and infrared light emitting diodes mounted thereon employed in the first embodiment of the present invention;

Fig. 8 is a circuit diagram showing the connection of the infrared light emitting diodes of the first embodiment;

Fig. 9 is a schematic view of a microphone and its associated parts, and

Fig. 10 is a block diagram of an illumination controller employed in the invention.

An over-door interphone system in accordance with the first embodiment of the present invention comprises a remote station unit 1 installed at an entrance of a house, a master station unit 2 installed inside the house and a signal transmission line 3 comprising an audio signal line and a video signal line connecting the remote station unit 1 and the master station unit 2 as shown in Fig. 3. The master station unit 2 comprises a video display 42 on which an object image obtained from a television camera 4 mounted in the remote station unit 1 is displayed and a hand set 5 for making a telecommunication with the side of the remote station unit 1.

The remote station unit 1 includes a television camera 4, a call switch 7, a speaker 8, a microphone 9 necessary for the telecommunication means and so forth in a housing 6 thereof as shown in Figs. 4 to 6. The housing 6 consists of a cover 61, a chassis 62 and a base 63. The base 63 is provided with terminals 43 to which the signal transmission line 3 and a power supply line are connected. The television camera 4 is composed of an optical unit 10 which is coupled to a printed board 15 carrying thereon solid state camera 14 of CCD or MOS type by means of coil springs 12 and screws 13 passing therethrough. The coil springs 12 are provided to hold the optical unit 10 and the solid state camera 14 mounted on the printed board 15 in a suitable distance, whereby an object image is focused on the photosensitive target site of the solid state camera 14 through an optical lens means 101 of the optical unit 10. As shown in Fig. 7, the optical unit 10 includes a printed board 11 mounting centrally thereof a casing 102 which covers the solid state camera 14 on the printed board 15, and includes the optical lens means 101 received in the front opening of the casing 102. A light entering through the optical lens means 101 will pass inside of the casing 102 and through an opening (not shown) formed in the printed board 11 to be focused on the target site of the solid state camera 14 on the printed board 15. A display controller 34 for the television camera 4 including the optical unit 10 and the solid state camera 14 is formed on a printed board 18 mounted at a location sideward of the optical unit 10 and behind the speaker 8 for arranging the television camera 4 to have a reduced thickness. On either side of the casing 102 there are formed a suitable number of infrared light emitting diodes 16 producing infrared light for an illumination purpose. These infrared light emitting diodes 16 are preferably divided into groups A and B located respectively on both sides of the casing 102 with the infrared light emitting diodes 16 being series connected in each group. As shown in Fig. 8, the infrared light emitting diodes 16 forming the groups A and B are connected in parallel relation to an illumination controller 25 such that one circuit of the diode groups will

operate to produce enough amount of illumination even if the other fails, providing safeguard against total illumination failure. An infrared light transmissive filter 33 is provided in an opening 61a of the cover 61 located in front of the optical unit 10 and the infrared light emitting diodes 16 in order to conceal the television camera 4 as well as the infrared light emitting diodes 16 from the eyes of the visitor.

The printed board 18 carries the illumination controller 25 other than the display controller 34, while a printed board 18a beside the printed board 18 carries the call switch 7 for actuating the interphone system, the printed boards 18 and 18a being fixed to bosses 19 and 19a provided on the interior of the cover 61. A pushbutton 71 for the call switch 7 is urged by means of a coil spring 22 to project outwardly through a window 21 in the cover 61, the coil spring 22 being wound around a rib 72 projecting on the rear the pushbutton 71 and compressed between the enclosure of the call switch 7 and the pushbutton 71. When the pushbutton 71 is pressed against the bias of the coil spring 22, it pivots about an axis F1 to push an actuator button 73 of the call switch 7 at the end of the rib 72, actuating the call switch 7. On the other hand, there is provided in the center of the pushbutton 71 a widow 74 for passing therethrough light emitted from a position indicating light emitting diode 23 provided on the printed board 18. The speaker 8 for outputting a verbal message from the master station unit 2 is heat-welded to the cover 61 through a water-tight packing 20 while a microphone 9 for dispatching a verbal message from the remote station unit 1 is put in a rubber case 40 which is received in a cavity 24 of the cover 61 with a waterproof packing 41 interposed therebetween as shown in Fig. 9.

The infrared light emitting diodes 16 are controlled by the illumination controller 25. The illumination controller 25 has a circuit configuration, as shown in Fig. 10 that a synchronizing signal from a camera synchronizing signal generator 26 is amplified in a signal amplifier 27 and then output to drive the infrared light emitting diodes 16. The infrared light emitting diodes 16 are driven to ensure a sufficient illuminance level in an intermittent manner generating no flicker under the control of the synchronizing signal in a synchronous relation with the input of a trigger signal from a calling circuit 29 in response to the call switch 7.

As shown in Fig. 10, the illumination controller 25 is arranged so that the camera synchronizing signal generator 26 responds to the trigger signal from the calling circuit 29 for driving the infrared light emitting diodes 16 in synchronous with the video signal of the television camera 4 until it receives from a handset detector 35 a signal indicative of the handset 5 being hung up of the master station unit 2 after termination of the telecommunication, which is in contrast to the above embodiments 1 and 2 in which the illumination controller 25 is arranged to include the timer 28 for driving the infrared light emitting diodes 16 for the predetermined period of time.

Claims

1. An over-door interphone system including a master station unit (2) located inside of a house and a remote station unit (1) located outside of an entrance door of the house which remote station unit (1) being connected to the master station unit (2) for telecommunication between a visitor and a dweller, said remote station unit (1) comprises:

   a housing (6);

   a television camera (4) mounted within the housing (6) to comprise an optical unit (10) including optical lens means (101) disposed in front thereof;

   control circuit means mounted adjacent to the optical unit (10) for controlling the same;

   call switch means (7) within the housing (6) for calling the master station unit (2); and

   telecommunication means within the housing (6) for telephonic intercommunication between the master (2) and remote station unit (1); and

   said master station unit (2) comprises a video display (42) for monitoring the image of the visitor picked up by said television camera (4);

   said system being characterized in that it comprises an infrared light emitting illumination means (16) and an illumination control means (25) mounted on the side of the master station unit (2) in order to actuate said infrared light emitting illumination means (16) to produce, upon being operated at the master station unit, the infrared light intermittently in synchronism with the operation of said television camera (4) for a time period starting from the actuation of said call switch means (7) and ending with the hang-up of a hand-set (5) provided on the side of the master station unit (2), wherein said camera (14) is a solid state camera (14) sensitive to said infrared light.

Patentansprüche

1. Übertür-Wechselsprechanlage mit einer Hauptstationseinheit (2), die im Inneren eines Hauses angeordnet ist und einer Nebenstationseinrichtung (1), die außerhalb der Eingangstür des Hauses angeordnet ist, wobei die Nebenstationseinheit (1) mit der Hauptstationseinheit (2)

operate to produce enough amount of illumination even if the other fails, providing safeguard against total illumination failure. An infrared light transmissive filter 33 is provided in an opening 61a of the cover 61 located in front of the optical unit 10 and the infrared light emitting diodes 16 in order to conceal the television camera 4 as well as the infrared light emitting diodes 16 from the eyes of the visitor.

The printed board 18 carries the illumination controller 25 other than the display controller 34, while a printed board 18a beside the printed board 18 carries the call switch 7 for actuating the interphone system, the printed boards 18 and 18a being fixed to bosses 19 and 19a provided on the interior of the cover 61. A pushbutton 71 for the call switch 7 is urged by means of a coil spring 22 to project outwardly through a window 21 in the cover 61, the coil spring 22 being wound around a rib 72 projecting on the rear the pushbutton 71 and compressed between the enclosure of the call switch 7 and the pushbutton 71. When the pushbutton 71 is pressed against the bias of the coil spring 22, it pivots about an axis F1 to push an actuator button 73 of the call switch 7 at the end of the rib 72, actuating the call switch 7. On the other hand, there is provided in the center of the pushbutton 71 a widow 74 for passing therethrough light emitted from a position indicating light emitting diode 23 provided on the printed board 18. The speaker 8 for outputting a verbal message from the master station unit 2 is heat-welded to the cover 61 through a water-tight packing 20 while a microphone 9 for dispatching a verbal message from the remote station unit 1 is put in a rubber case 40 which is received in a cavity 24 of the cover 61 with a waterproof packing 41 interposed therebetween as shown in Fig. 9.

The infrared light emitting diodes 16 are controlled by the illumination controller 25. The illumination controller 25 has a circuit configuration, as shown in Fig. 10 that a synchronizing signal from a camera synchronizing signal generator 26 is amplified in a signal amplifier 27 and then output to drive the infrared light emitting diodes 16. The infrared light emitting diodes 16 are driven to ensure a sufficient illuminance level in an intermittent manner generating no flicker under the control of the synchronizing signal in a synchronous relation with the input of a trigger signal from a calling circuit 29 in response to the call switch 7.

As shown in Fig. 10, the illumination controller 25 is arranged so that the camera synchronizing signal generator 26 responds to the trigger signal from the calling circuit 29 for driving the infrared light emitting diodes 16 in synchronous with the video signal of the television camera 4 until it receives from a handset detector 35 a signal indicative of the handset 5 being hung up of the master station unit 2 after termination of the telecommunication, which is in contrast to the above embodiments 1 and 2 in which the illumination controller 25 is arranged to include the timer 28 for driving the infrared light emitting diodes 16 for the predetermined period of time.

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   call switch means (7) within the housing (6) for calling the master station unit (2); and

   telecommunication means within the housing (6) for telephonic intercommunication between the master (2) and remote station unit (1); and

   said master station unit (2) comprises a video display (42) for monitoring the image of the visitor picked up by said television camera (4);

   said system being characterized in that it comprises an infrared light emitting illumination means (16) and an illumination control means (25) mounted on the side of the master station unit (2) in order to actuate said infrared light emitting illumination means (16) to produce, upon being operated at the master station unit, the infrared light intermittently in synchronism with the operation of said television camera (4) for a time period starting from the actuation of said call switch means (7) and ending with the hang-up of a hand-set (5) provided on the side of the master station unit (2), wherein said camera (14) is a solid state camera (14) sensitive to said infrared light.

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1. Übertür-Wechselsprechanlage mit einer Hauptstationseinheit (2), die im Inneren eines Hauses angeordnet ist und einer Nebenstationseinrichtung (1), die außerhalb der Eingangstür des Hauses angeordnet ist, wobei die Nebenstationseinheit (1) mit der Hauptstationseinheit (2)

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für eine Telekommunikation zwischen einem Besucher und einem Hausbewohner verbunden ist, und wobei die Nebenstationseinheit (1) aufweist:

ein Gehäuse (6);

- eine Fernsehkamera (4), die in dem Gehäuse (6) angeordnet ist und eine optische Einheit (10) mit optischen Linsenmitteln (101), welche in deren Vorderseite angeordnet sind, aufweist;
- Steuerschaltkreismittel, die der optischen Einheit (10) benachbart angeordnet sind, um diese zu steuern;
- Rufschaltmittel (7) in dem Gehäuse (6) zum Rufen der Hauptstationseinheit (2); und
- Telekommunikationsmittel in dem Gehäuse (6) zum Telefon-Kommunikation zwischen der Haupt-(2) und der Nebenstationseinheit (1); und
- wobei die Hauptstationseinrichtung (2) ein Videodisplay (42) aufweist, um das Bild des Besuchers, das von der Fernsehkamera (4) aufgenommen worden ist, wiederzugeben;
- wobei das System dadurch gekennzeichnet ist, daß es ein Infrarotlicht aussendendes Beleuchtungsmittel (16) und ein Beleuchtungssteuermittel (25) aufweist, welches auf der Seite der Hauptstationseinrichtung (2) angeordnet ist, um das Infrarotlicht aussendende Beleuchtungsmittel (16) zu betätigen, um bei Betätigung an der Hauptstationseinheit das Infrarotlicht synchron mit dem Betrieb der Fernsehkamera (4) intermittierend für eine Zeitdauer zu erzeugen, die mit der Betätigung des Rufschaltmittels (7) beginnt und mit dem Aufhängen des Handgeräts (5), das auf der Seite der Hauptstationseinrichtung (2) vorgesehen ist, endet, wobei die Kamera (14) eine Festkörper-Kamera (14) ist, die für infrarotes Licht empfindlich ist.

Revendications

1. Système d'interphone de dessus de porte, comprenant une station pilote (2) située à l'intérieur d'une maison et une station à distance (1) située à l'extérieur d'une porte d'entrée de la maison, cette station à distance (1) étant connectée à la station pilote (2) pour télécommunication entre un visiteur et un habitant, ladite station à distance (1) comprenant :

un boîtier (6),

une caméra de télévision (4) montée dans le boîtier (6) pour comprendre une unité optique (20) incluant un système de lentille optique (101) disposé devant elle,

un système de circuit de commande monté adjacent à l'unité optique (10), pour la commander,

un système d'interrupteur d'appel (7) situé dans le boîtier (6), pour appeler la station pilote (2), et

un système de télécommunication dans le boîtier (6), pour intercommunication téléphonique entre le pilote (2) et la station à distance (1), et

ladite station pilote (2) comprend un affichage vidéo (42) pour surveiller l'image du visiteur prise par ladite caméra de télévision (4),

ledit système d'interphone étant caractérisé en ce qu'il comprend un moyen d'éclairage (16) émettant une lumière infrarouge et un moyen de commande d'éclairage (25) monté sur le côté de la station pilote (2), en vue d'actionner ledit moyen d'éclairage à lumière infrarouge (16) pour produire, lorsqu'il est actionné sur la station pilote, la lumière infrarouge par intermittence, en synchronisme avec le fonctionnement de ladite caméra de télévision (4), pendant une période de temps partant de l'actionnement dudit système interrupteur d'appel (7) et finissant au raccrochage d'un combiné (5) prévu sur le côté de la station pilote (2), ladite caméra (14) étant une caméra à semiconducteur (14) sensible à ladite lumière infrarouge.

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