

UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

ELBEX VIDEO, LTD.,)	
)	
Plaintiff,)	
)	05 CV 3345 (CBA)(CLP)
v.)	
)	AMENDED COMPLAINT
AXIS COMMUNICATIONS, INC.,)	
)	
Defendant.)	
)	

Plaintiff, by way of complaint against the defendant, alleges that:

1. This is an action for patent infringement arising under the patent laws of the United States, Title 35, United States Code.
2. Plaintiff Elbex Video Ltd. (Elbex) is a corporation organized and existing under the laws of Japan.
3. Upon information and belief, Axis Communications, Inc. (“Axis”) is a corporation organized and existing under the laws of the State of Massachusetts, having a principle place of business located at 100 Apollo Drive, Chelmsford, Massachusetts 01824.
4. Upon information and belief, Axis sells allegedly infringing products in this judicial district, directly and through a distributor, and otherwise transacts business in this judicial district. Axis is subject to the personal jurisdiction of this Court.
5. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§1331 and 1338(a).
6. Venue is proper in this district under 28 U.S.C. §1391(b) and 28 U.S.C. §1400(b).

7. U.S. Patent No. 4,989,085 (“the ‘085 patent”), a copy of which is attached hereto as Exhibit A, was duly and legally issued on January 29, 1991 and is entitled “Apparatus For Remote Verification and Control of Close Circuit Television Cameras.”

8. U.S. Patent No. 4,943,864 (“the ‘864 patent”), a copy of which is attached hereto as Exhibit B, was duly and legally issued on July 24, 1990 and is entitled “Closed Circuit Television Apparatus For Supervisory System.”

9. U.S. Patent No. 4,945,417 (“the ‘417 patent”), a copy of which is attached hereto as Exhibit C, was duly and legally issued on July 31, 1990 and is entitled “Method And Apparatus For Remotely Pre-Setting Closed Circuit Television Camera.”

10. Elbex is the owner, by assignment, of all right, title and interest in and to the ‘085, ‘864 and ‘417 patents.

11. Upon information and belief, Axis has offered for sale, sold, installed and/or caused to be installed, closed circuit television products and systems in the United States.

12. Axis has infringed and/or has contributed to the infringement by others and/or has induced others to infringe and, unless enjoined, will continue to infringe and/or contribute to the infringement by others and/or induce others to infringe at least claim 1 of the ‘085 patent by selling, offering to sell, making, using, and/or installing, in the United States, closed circuit television products and systems covered by at least claim 1 of the ‘085 patent, or equivalents thereof, including, but not necessarily limited to the Axis 213 PTZ, Axis 231D, and Axis 232D Cameras, the Axis 241S/SA, Axis 241Q/QA, Axis 240Q and Axis 250S MPEG-2 video servers, the Axis 292 Video Decoder, the Axis Rack Solution and the Axis Camera Station software.

13. Axis has infringed and/or has contributed to the infringement by others and/or has induced others to infringe and, unless enjoined, will continue to infringe and/or contribute to the infringement by others and/or induce others to infringe at least claim 1 of the '864 patent by selling, offering to sell, making, using, and/or installing, in the United States, closed circuit television products and systems covered by at least claim 1 of the '864 patent, or equivalents thereof, including, but not necessarily limited to the Axis 206, Axis 206M, Axis 207/207W, Axis 210, Axis 210A, Axis 211, Axis 211A, Axis 216F, Axis 212PTZ, Axis 213 PTZ, Axis 214PTZ, Axis 225FD, Axis 230, Axis 231D, and Axis 232D Cameras, the Axis 241S/SA, Axis 241Q/QA, Axis 240Q , Axis 24Q/QA, Axis 241S/SA, Axis 24SSIV, Axis 250S MPEG-2 and Axis 282/282A video servers, the Axis 292 Video Decoder, the Axis Rack Solution and the Axis Camera Station and video management software.

14. Axis has infringed and/or has induced others to infringe and, unless enjoined, will continue to infringe and/or induce others to infringe claim 3 of the '417 patent by selling, offering to sell, making, using, and/or installing, in the United States, closed circuit television products and systems covered by claim 3 of the '417 patent, or equivalents thereof, including, but not necessarily limited to the Axis 212PTZ, Axis 213 PTZ, Axis 214PTZ cameras and the 231D and 232D motorized cameras.

15. Elbex has been damaged by Axis' infringement of the '085, '864 and '417 patents, in an amount to be determined at trial. Elbex's damages include lost profits which would have been made on the sale of products embodying the claimed inventions, but for the infringement by Axis and/or reasonable royalties adequate to compensate for the infringement.

16. The infringement of the '085, '864 and '417 patents by Axis has caused Elbex to suffer irreparable harm and injury. The infringement by Axis is in direct violation of Elbex's rights under Title 35, United States Code, to exclude others from making, using, selling and/or offering for sale products embodying the inventions of the '085, '864 and '417 patents. Elbex has no adequate remedy at law. Elbex will continue to suffer irreparable harm unless an injunction is issued enjoining and restraining Axis from infringing the '085, '864 and '417 patents.

WHEREFORE, Elbex respectfully prays for judgment against Axis, as follows:

- (a) that Axis has infringed and/or contributed to the infringement of and/or induced infringement of the '085 patent;
- (b) that Axis has infringed and/or contributed to the infringement of and/or induced infringement of the '864 patent;
- (c) that Axis has infringed and/or induced infringement of the '417 patent;
- (d) that an injunction issue permanently enjoining Axis and its agents, servants, and employees, and all those in active concert and participation with them, or any of them, from infringing and/or contributing to and/or inducing the infringement of the '085 patent;
- (e) that an injunction issue permanently enjoining Axis and its agents, servants, and employees, and all those in active concert and participation with them, or any of them, from infringing and/or contributing to and/or inducing the infringement of the '864 patent;

(f) that an injunction issue permanently enjoining Axis and its agents, servants, and employees, and all those in active concert and participation with them, or any of them, from infringing and/or inducing the infringement of the '417 patent;

(g) that an accounting be had, and judgment be rendered in Elbex's favor, and against Axis for damages adequate to compensate for the infringement of the '085, '864 and '417 patents, in an amount to be determined at trial, together with costs and interest;

(h) that attorney's fees, costs and disbursements incurred in connection with the prosecution of this litigation be awarded to Elbex; and

(i) for such other and further relief as the Court may deem just, proper and equitable under the circumstances.

Dated: May 30, 2006

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EXHIBIT A

United States Patent [19]
Elberbaum

[11] **Patent Number:** 4,989,085
 [45] **Date of Patent:** Jan. 29, 1991

[54] **APPARATUS FOR REMOTE VERIFICATION AND CONTROL OF CLOSE CIRCUIT TELEVISION CAMERAS**

[75] **Inventor:** David Elberbaum, Tokyo, Japan
 [73] **Assignee:** Elbex Video, Ltd., Tokyo, Japan
 [21] **Appl. No.:** 270,577
 [22] **Filed:** Nov. 14, 1988

[30] **Foreign Application Priority Data**
 Feb. 29, 1988 [JP] Japan 63-44543
 [51] **Int. Cl.⁵** H04N 7/18
 [52] **U.S. Cl.** 358/108; 358/210
 [58] **Field of Search** 358/108, 181, 86, 183, 358/87, 210

[56] **References Cited**
U.S. PATENT DOCUMENTS
 4,511,886 4/1985 Rodriguez 358/108 X
 4,673,974 6/1987 Ito et al. 358/108
 4,777,526 10/1988 Saitoh et al. 358/108
 4,831,438 5/1989 Bellman, Jr. et al. 358/108

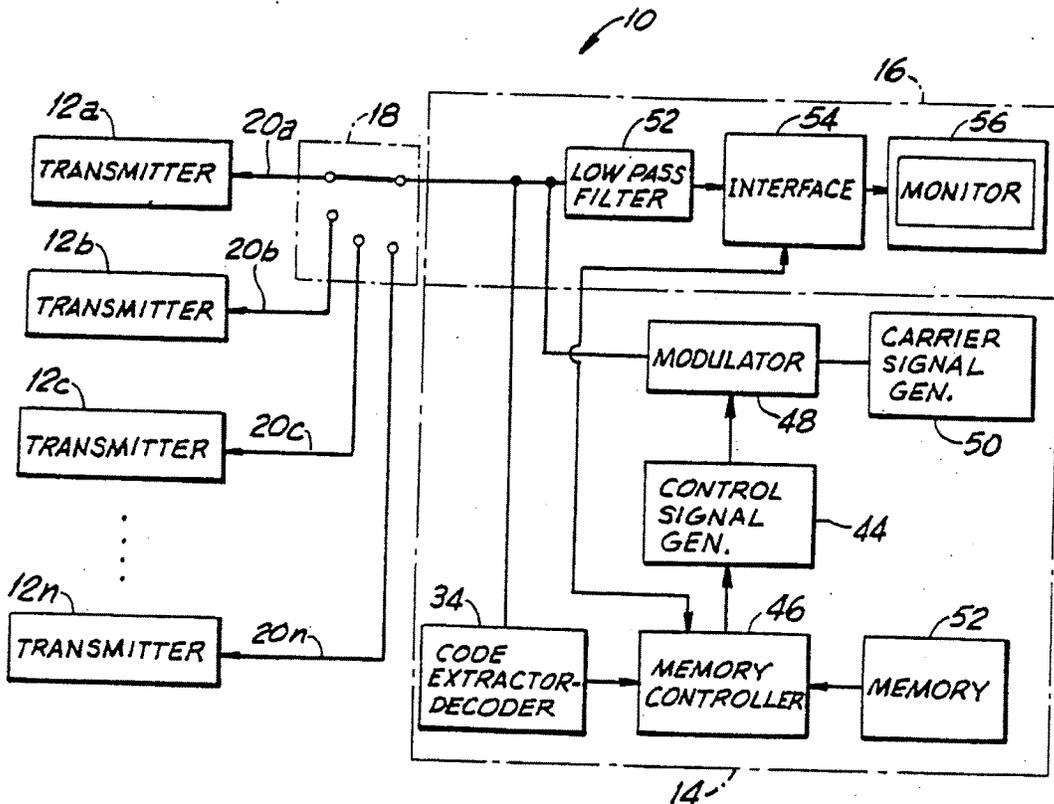
OTHER PUBLICATIONS
 "Elbex" brochure; Two-Way Signal Transmission-V-ideo and Audio from the Camera, Ext. Sync and Controls to the Camera through a Single Coax Cable (undated).

Primary Examiner—James J. Groody

Assistant Examiner—Victor R. Kostak
Attorney, Agent, or Firm—Helfgott & Karas

[57] **ABSTRACT**
 A closed circuit television apparatus comprises a plurality of transmitters each including a remote-controlled television camera for generating video signals to a central supervisory station and a circuit for generating first code signals corresponding to a camera code allotted to the television camera, a receiver which receives the video signals and displays images corresponding to the received video signals. A controlling device is provided for controlling the television camera, receiving the first code signals, generating control signals to control the television camera and second code signals corresponding to the received first code signals, and transmitting the control signals and the second code signals to the television camera. A switching device is connected to the transmitters for selecting a transmitter to be connected to both, the receiver and the controlling device. Each transmitter includes a driving circuit for receiving the control signals and the second code signals generated in the controlling device, regenerating the control signals and the second code signals and operating the television camera based on the regenerated control signals when a code corresponding to the regenerated second code signals coincides with a code corresponding to the first code signals.

3 Claims, 2 Drawing Sheets



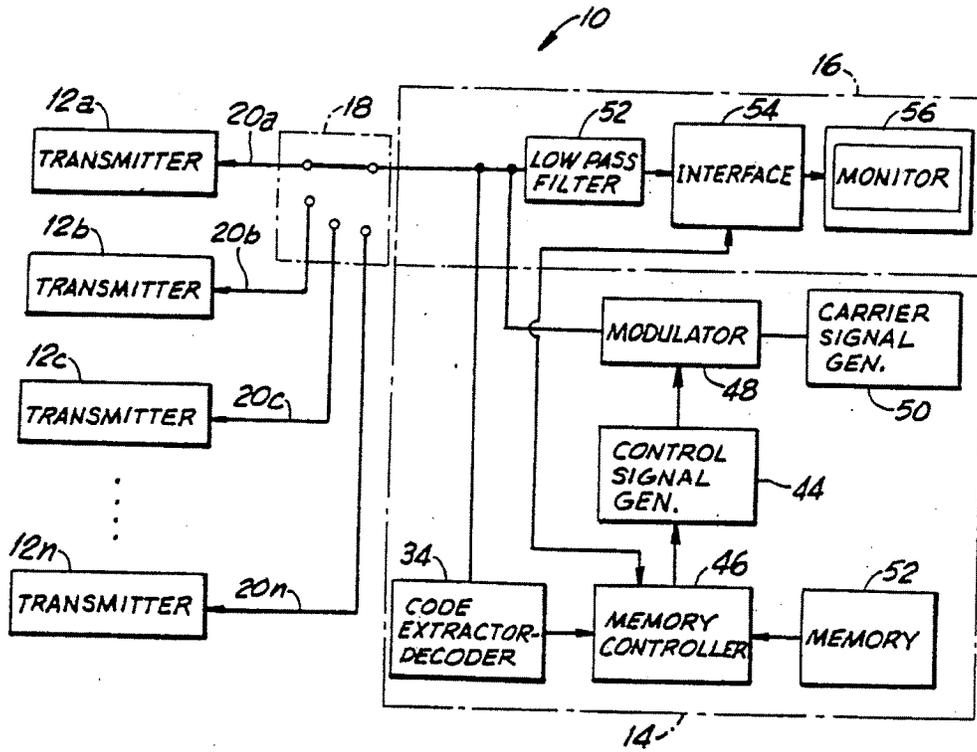


FIG. 1

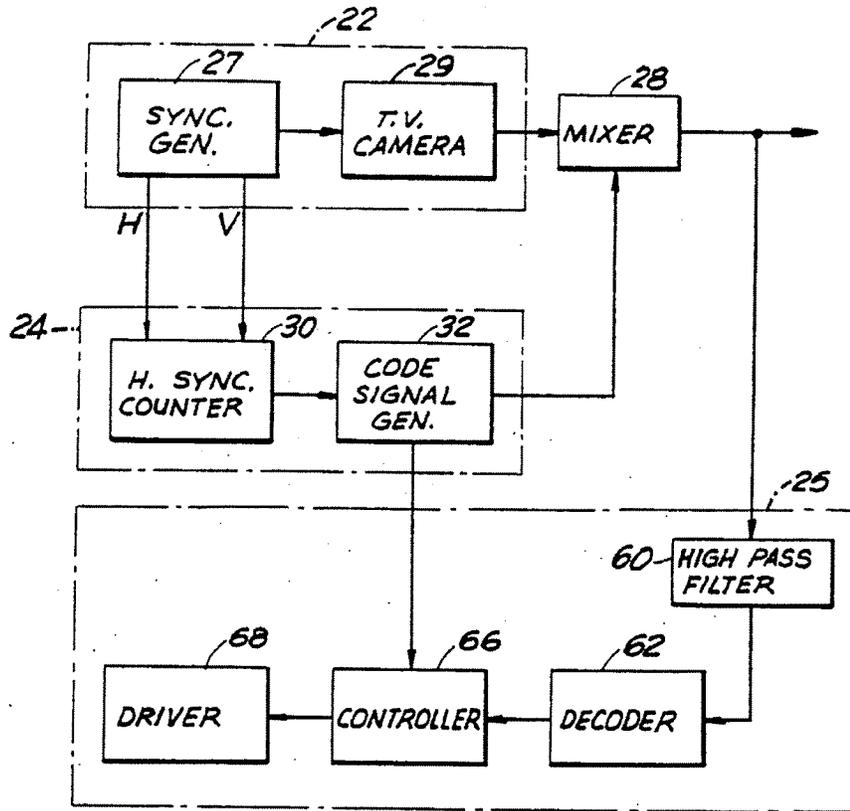


FIG. 2

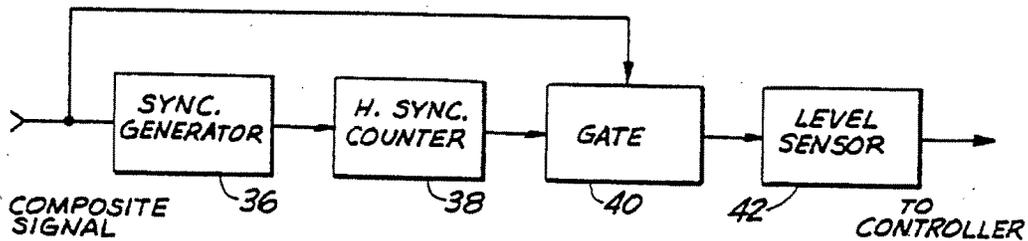


FIG. 3

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APPARATUS FOR REMOTE VERIFICATION AND CONTROL OF CLOSE CIRCUIT TELEVISION CAMERAS

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to a closed circuit television apparatus as a supervisory system, and more particularly to a closed circuit television apparatus in which operation of a television camera is remotely controlled.

2. Description of the Prior Art:

Generally, in a closed circuit television system such as a supervisory system, a remote-controllable television camera is located at each of a plurality of different places to be observed. At a central supervisory station, a monitor for receiving video signals from the selected television camera, a controlling device for controlling the operation and coordinates of the television camera, such as up-down (tilting), left-right (panning), far-near (focusing) and wide-tele (zooming), and a switching circuit for selecting one of the television cameras to be connected to the controlling device and the monitor, are located.

The positioning of each television camera coordinates such as tilting, panning, focusing and zooming are controlled by control signals supplied from the controlling device, and the television camera transmits video signals to the central supervisory station. The switching circuit includes a switch for the video signals and another switch for the control signals, and these two switches should be interlocked with each other.

A problem with such conventional closed circuit television apparatus is that if the two switches are not interlocked due to the break-down of the switching circuit, a wrong television camera coordinates could be repositioned.

Another conventional system uses two switches to be operated independently. In such conventional closed circuit system, the attendant must operate the switch to connect the monitor to the television camera that its coordinates must be repositioned and must connect the controlling device to the same television camera separately, which is laborious, time-consuming and may cause operational error as the attendant may connect a wrong camera to the controlling device.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a closed circuit television apparatus in which only the television camera that its video signal is received will be remotely operated by the attendant without error.

According to the present invention, a closed circuit television apparatus comprises a plurality of transmitting means each including a remote-controllable television camera for generating video signals and a circuit for generating 1st code signals corresponding to a camera code allotted to the television camera, a receiving means for receiving the video signals and for displaying images corresponding to the received video signals, a controlling means for controlling the television camera, for receiving the 1st code signals, for generating 2nd code signals corresponding to the received 1st code signals, for generating control signal to control the television camera and for transmitting said 2nd code signals and said control signals to the television camera, and a switching means for selecting the transmitting

means to be connected to the receiving means. The transmitting means further includes a driving circuit for receiving the control signals generated in the controlling means, for regenerating the control signals and the code signals and for operating the television camera coordinates based on the regenerated control signals when a code corresponding to the regenerated code signals coincides with a code allotted to the camera.

In the preferred embodiment of the present invention, said controlling means includes a circuit for generating said 2nd code signals and said control signals having a frequency corresponding to a kind of control, a circuit for generating carrier signals each having a frequency higher than the frequencies of said video signals, and a modulating circuit for modulating said carrier signals by said 2nd code signals and said control signals, and for outputting the modulated carrier signals to said switching means.

The driving circuit preferably includes a filter for extracting said carrier signals transmitted from said controlling means, a decoder for demodulating said 2nd code signals and said control signals from carrier signals obtained from the output of said filter and for outputting a code corresponding to said 2nd code signals and said control signals, a driver for actuating said television camera, and a controller for comparing said code, outputted from said decoder, with said camera code and for controlling said driver based on the control signals outputted from said decoder, when said code outputted from said decoder coincides with said camera code.

With this arrangement, the television camera is controlled based on the control signals transmitted from the controlling means only when the code transmitted from the controlling means coincides with a camera code allotted to the television camera to be controlled. Therefore, only the correct television camera be operated, other television camera not be operated.

Further, since the controlling means regenerates the 2nd code signals based on the 1st code signals transmitted from the transmitting means and transmits the 2nd code signals to the transmitting means. Therefore, the attendant cannot error and only the television camera which is connected to the receiving means is controlled.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and features of the invention will become apparent from the following description of a preferred embodiment of the invention with reference to the accompanying drawings, in which:

FIG. 1 is a block diagram showing an electrical circuit of an embodiment of a closed circuit television apparatus according to the present invention;

FIG. 2 is a block diagram showing an electrical circuit of an embodiment of a transmitting means; and

FIG. 3 is a block diagram showing an embodiment of a decoder for code signals.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a closed circuit television apparatus 10, in which a plurality of transmitting devices 12a, 12b, 12c . . . and 12n for generating video signals and for transmitting the video signals to a central supervisory station are located at each of a plurality of different places to be observed.

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On the other hand, at the central supervisory station, a controlling device 14 for controlling the functions of the individual transmitting device 12a, 12b, 12c . . . and 12n, a displaying device or receiving device 16 for receiving the video signals from the transmitting devices 12a, 12b, 12c . . . and 12n and displaying images corresponding to received video signals, and a switching device 18 for selecting one of the transmitting device 12a, 12b, 12c . . . and 12n to be connected to the controlling device 14 and the receiving device 16.

Between the central supervisory station and the respective places to be observed, cables or transmission lines 20a, 20b, 20c . . . and 20n for the respective transmitting devices 12a, 12b, 12c . . . and 12n are built.

Each video signal is a composite picture signal which is composed by adding a composite synchronizing signal, etc. to a picture signal.

As shown in FIG. 2, each of the transmitting devices 12a, 12b, 12c . . . and 12n includes a known television camera 22, a code signal generating circuit 24 for generating 1st code signals corresponding to the camera code allotted to the television camera 22, a driving circuit 26 for driving the coordinates of the television camera 22, such as up-down (tilting), left-right (panning), far-near (focusing) and tele-wide (zooming), and a mixer 28 for injecting the 1st code signals to the video signals. The coordinates of the television camera 22 and the camera operation are remote controllable.

The television camera 22 includes a synchronizing signal generating circuit 27 and a video signal generating circuit 29. The television cameras 22 of the transmitting devices 12a, 12b, 12c . . . and 12n, for example, are allotted with specific camera codes "1", "2" . . . and "n", respectively.

Horizontal and vertical synchronizing signals generated by the synchronizing signal generating circuit 27 of the television camera 22 are supplied to the video signal generating circuit 29 and also to a counter 30 of the code signal generating circuit 24.

The horizontal synchronizing signals are supplied to the input terminal of the counter 30, while the vertical synchronizing signals are supplied to a clear or reference terminal of the counter 30. Therefore, the counter 30 counts the number of horizontal scanning lines of the television camera 22 in reference to every field or frame of the vertical scanning. The counted value of the counter 30 is supplied to a code signal generator 32 of the code signal generating circuit 24.

The code signal generator 32 outputs 1st code signals, corresponding to the camera code allotted to the television camera 22, to the mixer 28 only when the counted value of the counter 30 is a predetermined value, for example, during specific horizontal scanning lines in vertical trace of the video signals. The camera code allotted to the respective television camera 22 is set in the code signal generator 32.

The code signal generator 32 may be a circuit which generates 1st code signals every single horizontal scanning and outputs the 1st code signals only when the counted value of the counter 30 is a predetermined value, or may be a circuit which is operative only when the counted value is a predetermined value.

The 1st code signal is a binary or bar code signal having two levels, high or white which is the maximum level of a picture signal in a video signal and low or black which is the minimum of a picture signal in the video signal supplied from the television camera 22 to the mixer 28. Alternatively, the 1st code signal may be

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a sine-wave signal having a frequency corresponding to the camera code.

The mixer 28 injects the 1st code signals from the code signal generating circuit 24 to the video signals from the television camera 22 and then outputs the composite signals of the code and video signals to a predetermined transmission line.

The controlling device 14 includes a decoder 34 for extracting the 1st code signals from the composite signals transmitted from any one of the transmitting device and for generating 2nd code signals corresponding to the extracted 1st code signals.

The decoder 34, as shown in FIG. 3, includes a synchronizing signal separating circuit 36 for extracting horizontal and vertical synchronizing signals from the composite signals transmitted from the transmitting device, a counter 38 for counting the number of the separated horizontal sync pulses in reference to every field or frame of the separated vertical sync pulses, a gate circuit 40 allowing the composite signals, transmitted from the transmitting device to pass, only when the counted value of the counter 38 is a predetermined value, i.e., only during predetermined horizontal scanning lines, and a level sensor 42 for sensing the level of the output signals of the gate circuit 40 to generate 2nd code signals.

Hence, the gate allows the signals to pass during the same horizontal scanning lines in which the 1st code signals are generated by the transmitting device.

The output signals of the decoder 34 are supplied to a control signal generating circuit 44 via a controller 46. The control signal generating circuit 44 is activated by a push-button-type telephone apparatus or a tone encoder (on the market under the name such as "dual tone encoder", "touch tone encoder" and "dial tone").

The control signal generating circuit 44 includes a signal generator like the tone encoder, and a mixer for supplying to a modulating circuit 48 composite signals which are composed of the control signals generated by the control signal generator and 2nd code signals generated by the decoder 34.

Each control signal outputted from the signal generator is a composite signal of two signals different in frequency according to the kind of control and hence the control code. This composite signal is a combination of one of four different signals of frequencies f1, f2, f3, f4 and one of other four different signals of frequencies f5, f6, f7, f8, and is determined by depressing the control push buttons similar to a commonly known "dial tone" telephone apparatus.

The power-on command, the power-off command, the wiper-on command, and the wiper-off command are allotted, for example with the control codes "1", "2", "3" and "4", respectively. The control code may be one or more than one figure, and may be inputted by depressing the control push buttons to operate the tone encoder successively.

The signal generator for generating the control signals may be an alternative means operated by plurality of switches as substitute for the push buttons of the tone encoder. For this alternative form also, the control signal is a composite signal of two different signals according to the control code.

Further, the signal generator may include a control code setting circuit, and a processing circuit for generating control signals each having a frequency corresponding to the control code set by the setting circuit. This setting circuit may be operated by a key-pad, a

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plurality of switches, a joy stick, etc. Otherwise the setting circuit may be a remote-controller of radio or infrared system. The processing circuit may be a dial tone encoder or a computer serial coder.

The 2nd code signals may be a binary or bar code signal, or may be a sine-wave signal having a frequency different from the frequency of the control signal. The control signal may be a single signal or a combination of more than three signals having different frequencies according to the control code.

The modulating circuit 48 modulates the frequency of a carrier signal supplied from a carrier signal generating circuit 50, by the control and code signals from the control signal generating circuit 14. The modulated carrier signals are transmitted to a predetermined one of the transmitting device through the switching device 18 and via the transmission lines 20a 20b, 20c . . . and 20n, located between the switching device 18 and the transmitting device selected by the switching device 18, as a control information signal. Each carrier signal has a constant frequency higher than the maximum frequency of each video signal transmitted from the individual transmitting device 12a, 12b, 12c . . . and 12n to the receiving device 16.

Instead of modulating a single carrier signal by the 2nd code signal and the control signal, one of two carrier signals of different frequencies may have its frequency modulated by the 2nd code signals, and the other carrier signal may have its frequency modulated by the control signal.

The controlling device 14 includes a memory 52 in which information data indicating the location, the numeral, etc. of each television camera is memorized for every television camera. The information data in the memory 52 is read out by the controller 46.

The controller 46 includes a processor for the 2nd code signals supplied from the decoder 34. The controller 46 reads out from the memory 52 the information data concerning the television camera corresponding to the 2nd code signals transmitted from the decoder 34, and generates display signals to the monitor 58 to superimpose character and visual display on the reproduced image from the video signals transmitted from the transmitting devices 12a, 12b, 12c . . . and 12n to the receiving device 16.

The 2nd code signal is also supplied from the controller 46 to the control signal generating circuit 44 similar to the control signals. Other wise code information corresponding to the 2nd code signals for each television camera may be memorized in the memory 52, may be read out one of them from the memory 52 and outputted through the controller 46 to the control signal generating circuit 44 to be converted into a code of "dial tones" similar to the control signal.

The receiving device 16 includes a low-pass filter 54 which allows the video signals to pass and prevents the high frequency output signals of the controller device 14 from passing. The output signals of the filter 54 are supplied to a television receiver or monitor 58 via an interface 56 which superposes the display signals from the controller 46 on the output signals of the filter 54.

As a result, a visual character or illustrative display is superposed on the image reproduced from the video signals transmitted from one of the transmitting devices 12a, 12b, 12c . . . and 12n on the monitor 56 to identify the location being observed and the camera. Since the modulated carrier signals in the input signals to the receiving device 16 are eliminated by the filter 54, the

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picture or image reproduced on the monitor 56 cannot be affected by the control information signals even if the video signals and the control information signals are transmitted through a common transmission line.

The switching device 18 includes a switch having a plurality of fixed contacts connected independently to the transmission lines 20a, 20b, 20c . . . and 20n, and a movable contact adapted to be selectively connected to one of the fixed contacts, the movable contact being connected to the controlling device 14 and the receiving device 16. It may also be a known electronic sequential switcher commonly used in CCTV systems.

In order to process the control signals to be transmitted from the controlling device 14, the driving circuit 26 of each transmitting device 12a, 12b, 12c . . . and 12n includes a high-pass filter 60, as shown in FIG. 2. The filter 60 extracts the modulated carrier signals transmitted from the controlling device 14 and supplies the extracted signals to a demodulator/decoder 62.

The demodulator/decoder 62 demodulates the signals outputted from the filter 60 and converts the demodulated coded "dial tones" into a code corresponding to the 2nd code signals, and outputs this code to a controller 66.

Similarly, the demodulator/decoder 64 demodulates and decodes the control signals, and transmits the decoded control signals to the controller 66.

The controller 66 controls the operation of the television camera 22, such as make-and-break of a power, make-and-break of a wiper and changes the axis of: tilting (up-down), panning (left-right), focusing (far-near) and zooming (tele-wide), based on the output signals of the demodulator/decoder 62. This controller 66, however, will transfer the control signals from the output of the decoder 62 to the driver 68, only when the 2nd code signals transmitted from the decoder 62 are identical and coincide with the 1st code signals transmitted from the code signal generator 32.

The driver 68 incorporates known circuits for actuating the functions of the television camera 22, such as make-and-break of a power, make-and-break of a wiper, and rotates motors bidirectionally to change the axis of tilting position, panning position and the lens, focusing and zooming rings, as controlled by the controller 66.

According to the closed circuit television apparatus 10, when the movable contact of the switching device 18 is connected to the predetermined one of the fixed contact, the transmitting device 12a, for example, connected to the fixed contact is connected simultaneously to the controlling device 14 and the receiving device 16 requiring a single switch to connect the transmitting device 12a, for example, to both the receiving device 16 and the controlling device 14.

Another advantage of the closed circuit television apparatus 10 is that since the composite signals outputted from the transmitting device 12a are supplied to the controlling device 14, the controlling device 14 outputs to the receiving device 16 the display information concerning the television camera 22 of the transmitting device 12a by utilizing the 1st code signals in the composite signals and reading out the data stored in the memory 52, whereby characters or illustrated display corresponding to the location and the camera connected are superposed on the image or picture reproduced from the video signals, on the monitor 56 of the receiving device 16. Therefore, observing the picture displayed on the monitor 56 of the receiving device 16, the attendant at the central supervisory station can iden-

tify the location and the television camera of the transmitting device connected to the receiving device without error.

Furthermore, the operator can unmistakably operate the controlling device 14 that generates the control signals and the code signals to remotely operate the television camera that generates the image being observed by the operator while remotely controlling the same camera he is observing. Further, since the television camera is controlled by the driving circuit 26 of the transmitting device according to the transmitted control signals only when the code transmitted from the controlling device 14 coincides with the camera code, there is no danger that a wrong television camera could be affected by the control signals.

Partly because the control signals are transmitted to the transmitting device connected to the receiving device 16, and partly because the controlling device 14 generates the code information based on the code signal transmitted to the controlling device 14 the attendant at the central supervisory station can remotely control, through the controlling device 14, only the television camera of the transmitting device connected to the controlling device 14 and the receiving device 16, the picture or image of which is displayed on the monitor 56 of the receiving device 16.

What is claimed is:

- 1. A closed circuit television apparatus comprising: a plurality of remote-controlled television cameras for generating video signals, each camera including a circuit for generating 1st code signals allotted to a respective television camera; receiving means for receiving said video signals and said 1st code signals; switching means for selecting a television camera to be connected to said receiving means; said receiving means including a monitor for displaying images corresponding to the video signals received in said receiving means; and controlling means for controlling said television camera;

said controlling means including control and code generator means for generating control signals to control said television camera and 2nd code signals corresponding to the 1st code signals received in said receiving means and for transmitting said control signals and said 2nd code signals to said television camera;

each television camera further including a command circuit receiving said control signals and said 2nd code signals generated in said controlling means and operating said television camera in accordance with said control signals when said 2nd code signals coincide with a code allotted to said television camera.

2. A closed circuit television apparatus according to claim 1, wherein said control and code generator means includes a circuit for generating said 2nd code signals and a circuit for generating said control signals each having a frequency corresponding to a type of control, a circuit for generating carrier signals each having a frequency higher than frequencies of said video signals, and a modulating circuit for modulating said carrier signals by said 2nd code signals and said control signals, and for outputting the modulated carrier signals to said switching means.

3. A closed circuit television apparatus according to claim 2, wherein said command circuit includes a filter for extracting said carrier signals transmitted from said controlling means, a decoder for demodulating said 2nd code signals and said control signals from said carrier signals obtained from an output of said filter and for outputting a code corresponding to said 2nd code signals and said control signals, a driver for actuating said television camera, and a controller connected to said driver and said decoder for comparing said code outputted from said decoder with the code allotted to said camera and for controlling said driver in accordance with the control signals outputted from said decoder when said code outputted from said decoder coincides with said code of said camera.

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EXHIBIT B

United States Patent [19]

[11] **Patent Number:** 4,943,864

Elberbaum

[45] **Date of Patent:** Jul. 24, 1990

[54] **CLOSED CIRCUIT TELEVISION APPARATUS FOR SUPERVISORY SYSTEM**

4,831,438 5/1989 Bellman, Jr. et al. 358/108
4,835,613 5/1989 Johnson 358/183

[75] **Inventor:** David Elberbaum, Tokyo, Japan

Primary Examiner—John K. Peng
Attorney, Agent, or Firm—Helfgott & Karas

[73] **Assignee:** Elbex Video, Ltd., Tokyo, Japan

[21] **Appl. No.:** 270,579

[57] **ABSTRACT**

[22] **Filed:** Nov. 14, 1988

A closed circuit television camera for a supervisory system includes a number of transmitting devices which generate video signals and are located at each of a number of different places to be observed, a television receiver which receives the video signals, and a switching device which selects one of the transmitting devices and connects the same to the television receiver. Each transmitting device includes a television camera having a specific code, a circuit for generating code signals and a circuit for generating composite signals. The receiver has a circuit for receiving the composite signals which also extracts the code signals from the composite signals and generates display signals to identify the television camera corresponding to the extracted code signals. Visual information corresponding to the display signals is displayed on a monitor.

[30] **Foreign Application Priority Data**

Feb. 25, 1988 [JP] Japan 63-40617

[51] **Int. Cl.⁵** H04N 7/18; H04N 5/268; H04N 7/10

[52] **U.S. Cl.** 358/108; 358/86; 358/181; 340/734

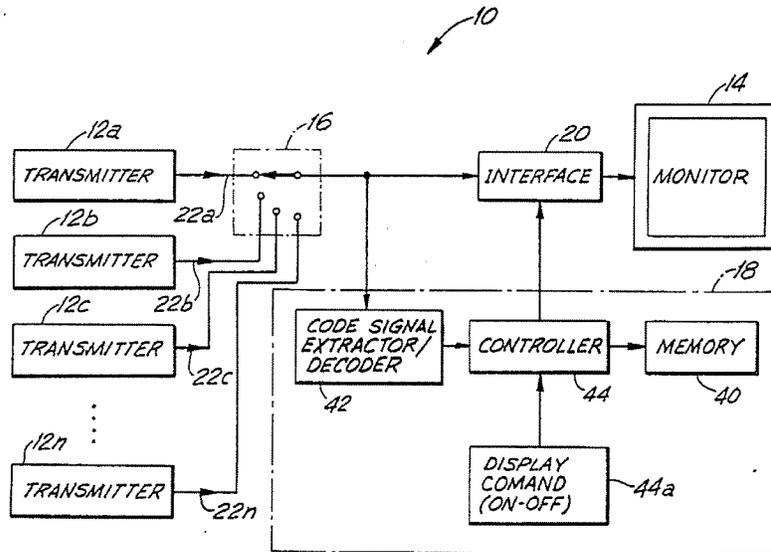
[58] **Field of Search** 358/86, 108, 181, 87; 340/734; 350/183

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7 Claims, 2 Drawing Sheets



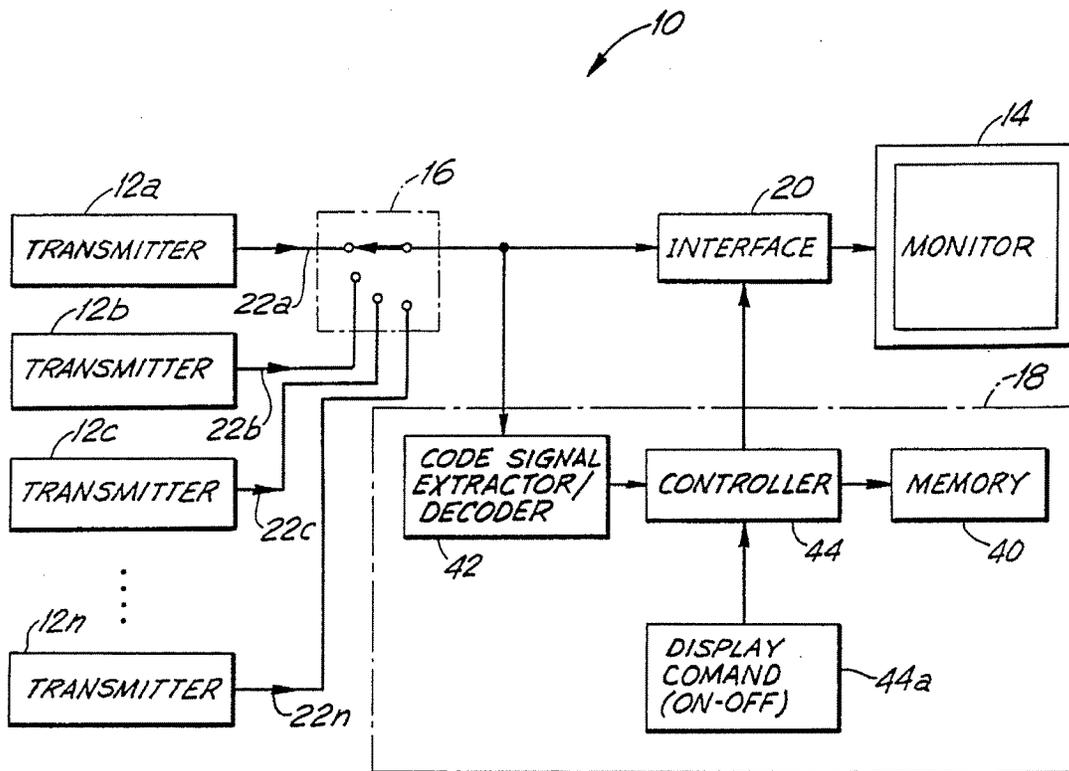


FIG. 1

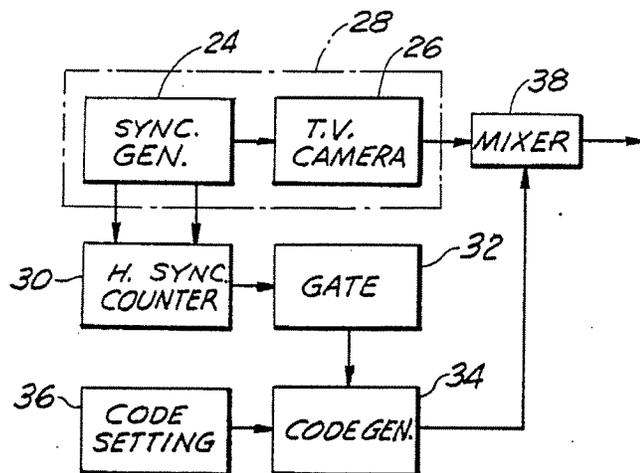


FIG. 2

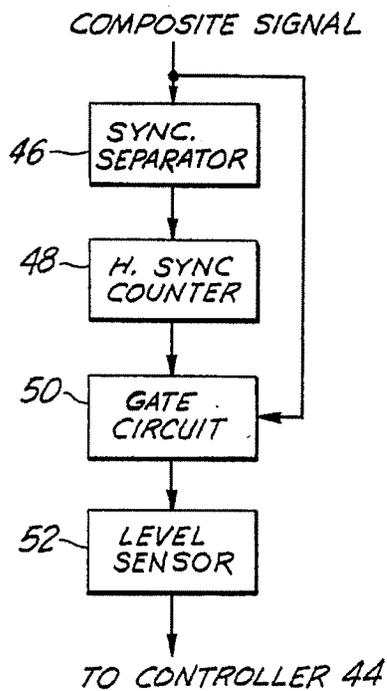


FIG. 3

CLOSED CIRCUIT TELEVISION APPARATUS FOR SUPERVISORY SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a closed circuit television apparatus suitable for a supervisory system.

2. Description of the Prior Art

Generally, as a supervisory system for observation of different locations from a central supervisory station, a closed circuit television apparatus is employed. At each location to be observed, a television camera is used, and at the central supervisory station, a monitor for receiving video signals transmitted from the selected television cameras and a switching device for selectively connecting the television cameras to the monitor are located.

In this type of supervisory system, the attendant must identify the television camera transmitting the video signals corresponding to the image being reproduced on the monitor. For this purpose, in the conventional supervisory system the attendant identifies the television camera by the connection condition of the switching device, but the attendant may occasionally misconceive such connection condition.

Another conventional system, superpose characters on the reproduced image on the monitor. The conventional system however is limited to few characters, furthermore these characters cannot be switched off, removed or having their position shifted from the reproduced image on the receiver or monitor at the monitoring station. The conventional system, therefore, is disadvantaged by the character superpose on top of important object to be surveyed so that said character interrupts the identification of an important portion in the image on the monitor.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a closed circuit television apparatus, with which it is possible to identify easily and correctly the television camera transmitting the video signals, by generating unrestricted visual alpha numeric characters or illustrative display together with the image or picture being reproduced on a monitor.

According to the present invention, a closed circuit television apparatus comprises a plurality of transmitting means for generating videos signals, a receiving means for receiving the video signals, and a switching means for selectively connecting the transmitting means to the receiving means. Each of the transmitting means includes a television camera to which a specific code is allotted, a circuit for generating code signals corresponding to the specific code, and a circuit for generating a composite signal wherein the code signals are injecting into the video signal. The receiving means includes a circuit for receiving the composite signal, for extracting the code signal from the received composite signal and for generating a display signal pertaining to the television camera corresponding to the extracted code signal, and a monitor or receiver for displaying visually information corresponding to the display signal together with images corresponding to the video signals.

The code signal generating circuit may be a circuit for generating said code signal during one or more

desired horizontal scanning period of said television camera.

In the preferred embodiment of the present invention, the code signal generating circuit includes a code setting circuit in which said code is set, a counter for counting the number of horizontal scanning lines of said television camera every field or frame of vertical scanning, and a circuit for generating, when the counted value of the counter is a predetermined value, said code signal corresponding to said code set in said code setting circuit.

The code signal can be a signal having two levels, high which is a white level and low which is a black level of a picture signal in said video signal.

The display signal generating circuit preferably includes a memory for storing said display signal for each of said television cameras, an extracting circuit for extracting said code signal from said composite signals, and a control circuit for reading out the display signal corresponding to said extracted code signal from said memory based on an output signal of said extracting circuit and for supplying said read-out display signal to said receiving means.

The display signal generating circuit preferably includes a memory for storing said display signal for each of said television cameras, an extracting circuit for extracting said code signal from said composite signals, and a control circuit for reading out the display signal corresponding to said extracted code signal, based on an output signal of said extracting circuit, and for supplying said read-out display signal to said receiving means, said extracting circuit including a circuit for counting horizontal synchronizing signals in said video signal every field or frame of vertical scanning, a gate circuit for allowing said composite signals to pass when the counted value of said counting circuit is a predetermined value, and a circuit for reproducing said code signal based on an output signal of said gate circuit.

The reproducing circuit preferably includes a level sensor for reproducing said code signal based on the level of the output signal of said gate circuit.

With the closed circuit television apparatus thus constructed, since character information such as a description of the location of the television camera is generated by the display signal generating circuit based on the code signals transmitted from the television camera, it is possible to easily and correctly identify the image reproduced on the receiver. Further, since the character information corresponding to the television camera is displayed on the receiver based on a code signal transmitted from the television camera being connected to the receiver, it is possible to identify correctly the television camera being connected to the receiver.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and features of the invention will become apparent from the following description of a preferred embodiment of the invention with reference to the accompanying drawings, in which:

FIG. 1 is a block diagram showing an embodiment of an electrical circuit of a closed circuit television apparatus according to the present invention;

FIG. 2 is a block diagram showing an embodiment of an electrical circuit of a transmitting device; and

FIG. 3 is a block diagram showing an embodiment of a code signal extracting circuit.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a closed circuit television apparatus 10 for a supervisory system, in which image pick-up devices or transmitting devices 12a, 12b, 12c . . . and 12n for generating respective video signals are located at each of a plurality of different places to be observed. On the other hand, at a central supervisory station, a television receiver or monitor 14 for reproducing an image corresponding to the video signal transmitted from a selected one of the transmitting devices 12a, 12b, 12c . . . and 12n, a switching device 16 for selecting one of the transmitting devices to be connected to the monitor 14, a display signal generating circuit 18 for generating a display signal identifying the transmitting device connected to the monitor 14, and an interface 20 for composing an output signal of the display signal generating circuit 18 with the video signal, are located. Between the central supervisory station and the respective places to be observed, cable-like transmission lines 22a, 22b, 22c . . . and 22n for the transmitting devices 12a, 12b, 12c . . . and 12n are built.

The video signal is a composite signal which is composed by adding a composite synchronizing signal to an image signal. The display signal is a character or illustrative information for visually identifying on the monitor 14 the location observed and the television camera connected to it.

As shown in FIG. 2, each of the transmitting devices 12a, 12b, 12c . . . and 12n has a known television camera 28 including a synchronizing signal generating circuit 24 and a video signal generating circuit 26. Vertical and horizontal synchronizing signals generated by the synchronizing signal generating circuit 24 are supplied to the video signal generating circuit 26 and a counter 30.

The horizontal synchronizing signal is supplied to an input terminal of the counter 30, and the vertical synchronizing signal is supplied to a clear or reference terminal of the counter 30, whereby the counter counts the number of horizontal scanning lines every field or every frame of the vertical scanings of the television camera 28. The counted value of the counter 30 is supplied to a gate signal generating circuit 32.

The gate signal generating circuit 32 outputs a gate signal to a code signal generating circuit 34 only when the counted value of the counter 30 is a predetermined value, i.e., during a predetermined one or more horizontal scanning period.

The code signal generating circuit 34 is connected to a code setting circuit 36 in which camera codes are set one for each television camera 28. Therefore, only when the gate signal is supplied to the code signal generating circuit 34, the code signal generating circuit 34 outputs to a mixer 38 a code signals corresponding to the code set in the code setting circuit 36.

The codes "1", "2", "3" . . . and "n", for example, are allotted to the television cameras of the transmitting devices 12a, 12b, 12c . . . and 12n respectively.

The code signal generating circuit 34 is a circuit which generates a code signal every line scanning and gates the code signal by the gate signal. But the code signal generating circuit 34 may be an alternative circuit which is operative to generate a code signal only when the counted value of the counter 30 is a predetermined value.

The code signal is a binary or bar code signal having two levels, high or white which is the maximum level of

a picture signal in a video signal supplied from the television camera 28 to the mixer 38 and low or black which is the minimum level of the picture signal. Alternatively, the code signal may be a sine-wave signal having a frequency corresponding to the code. This code signal is generated during a period of one or more horizontal scanning line during the vertical blanking period of the video signal or immediately after vertical blanking period.

The mixer 38 superposes the code signal supplied from the code signal generating circuit 34 over the video signal supplied from the television camera 28, and then outputs to a predetermined transmitting line a composite signal of the code signal and the video signal.

The display signal generating circuit 18 extracts the code signal in the composite signal transmitted from the transmitting device, and generates the display signal identifying the television camera corresponding to the extracted code signal. The display signal generating circuit 18 may comprise, for example, a memory 40 for storing display signals indicating the location, the numeral, etc. of the respective television camera, a decoder or extracting circuit 42 for extracting the code signal form the composite signal, and a controller 44 for reading out from the memory 40 the display signal identifying the television camera corresponding to the extracted code signal based on the output signal of the extracting circuit 42 and then supplying this display signal to the interface 20 to superimpose the display signal on the receiver or monitor 14 together with the reproduced image or picture of the corresponding television camera.

The extracting circuit 42 decodes the code signal by utilizing the synchronizing signal transmitted from the transmitting device and by sensing, timing and reading the code signal high and low levels transmitted from the transmitting device.

The extracting circuit 42, as shown in FIG. 3, may comprise, for example, a synchronizing signal separating circuit 46 for extracting vertical and horizontal synchronizing signals in the composite signal transmitted from the transmitting device, a counter 48 for counting the number of horizontal line scanings of the television camera 28 every field or frame of the vertical scanning, a gate circuit 50 for outputting the composite signal, which is transmitted from the transmitting device, only when the counted value of the counter 30 is a predetermined value, and a level sensor 52 for sensing a level of the output signal of the gate circuit 50 to reproduce the code signal.

The reproduced code signal is supplied from the extracting circuit 42 to the controller 44. The controller 44 generates the display signal by retrieving and reading out the stored information in the memory 40 corresponding to the code signal reproduced by the level sensor 52.

The display signal supplied from the controller 44 to the interface 20 is superposed on the video signal in the interface 20 so that a character or illustration corresponding to the display signal is displayed on the monitor 14.

The switching device 16 has a plurality of fixed contacts connected to the respective transmission lines 22a, 22b, 22c . . . and 22n, and a movable contact or it may be a commonly available automatic sequencing electronic switching device. One end of the movable contact or the input of an electronic sequencing switcher is selectively connected to one of the fixed

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contacts, and the other end or the output of an electronic sequencing switcher is connected to the display signal generating circuit 18 and the interface 20.

In the closed circuit television apparatus 10, for example, when the transmitting device 12a is connected to the monitor 14 by the switching device 16, the video signal transmitted from the transmitting device 12a is inputted to the monitor 14 via the switching device 16 and the interface 20, thereby reproducing on the monitor 14 the image or picture derived from the television camera 28 of the transmitting device 12a.

Meanwhile, the code signal corresponding to the television camera 28 of the transmitting device 12a is inputted to the display signal generating circuit 18, which hence supplies to the interface 20 the display signal corresponding to the television camera 28 of the transmitting device 12a. Thus the character or illustration corresponding to the location etc. of the television camera 28 of the transmitting device 12a is displayed on the monitor 14 as superposed on the reproduced picture or image. Accordingly the attendant can identify, from the picture on the monitor 14, the place (to be observed) corresponding to the reproduced image.

It is preferable that the code signal is generated during the blanking period of the vertical retrace of the video signal, whereby the reproduced image is not affected by the code signal, even if the code signal is injected to the video signal, and a clear image or picture can be obtained on the monitor 14. Even if the code is injected immediately after the blanking period, only a minor disturbance can be observed of the black and white bars along single horizontal scanning line.

What is claimed is:

- 1. A closed circuit television apparatus comprising:
 - a plurality of transmitting means for generating video signals;
 - a receiving means for receiving said video signals;
 - a switching means for selectively connecting said transmitting means to the receiving means;
 - each of said transmitting means including a television camera to which a specific code is allotted, a circuit for generating code signals corresponding to said specific code, and a circuit for generating composite signals wherein the code signals are injected into the video signals; and
 - said receiving means including a circuit for receiving said composite signals, for extracting said code signals from the received composite signals and for generating display signals identifying the television camera corresponding to the extracted code signals, and a receiver for displaying visually information corresponding to said display signals together

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with reproduced images or pictures corresponding to said video signals.

2. A closed circuit television apparatus according to claim 1, wherein said code signal generating circuit is a circuit for generating said code signal during one or more desired horizontal scanning period of said television camera.

3. A closed circuit television apparatus according to claim 2, wherein said code signal generating circuit includes a code setting circuit in which said code is set, a counter for counting the number of horizontal scanning lines of said television camera every field or frame of vertical scanning, and a circuit for generating, when the counted value of the counter is a predetermined value, said code signal corresponding to said code set in said code setting circuit.

4. A closed circuit television apparatus according to claim 2 or 3, wherein said code signal is a signal having two levels, high which is a white level and low which is a black level of a picture signal in said video signal.

5. A closed circuit television apparatus according to claim 1, wherein said display signal generating circuit includes a memory for storing said display signal for each of said television cameras, an extracting circuit for extracting said code signal from said composite signals, and a control circuit for reading out the display signal corresponding to said extracted code signal from said memory based on an output signal of said extracting circuit and for supplying said read-out display signal to said receiving means.

6. A closed circuit television apparatus according to claim 3, wherein said display signal generating circuit includes a memory for storing said display signal for each of said television cameras, an extracting circuit for extracting said code signal from said composite signals, and a control circuit for reading out the display signal corresponding to said extracted code signal based on an output signal of said extracting circuit, and for supplying said read-out display signal to said receiving means, said extracting circuit including a circuit for counting horizontal synchronizing signals in said video signal every field or frame of vertical scanning, a gate circuit for allowing said composite signals to pass when the counted value of said counting circuit is a predetermined value, and a circuit for reproducing said code signal based on an output signal of said gate circuit.

7. A closed circuit television apparatus according to claim 6, wherein said code signal is a signal having two levels, high which is a white level and low which is a black level of a picture signal in said video signal, said reproducing circuit including a level sensor for reproducing said code signal based on the level of the output signal of said gate circuit.

* * * * *

EXHIBIT C

United States Patent [19]
Elberbaum

[11] **Patent Number:** 4,945,417
 [45] **Date of Patent:** Jul. 31, 1990

[54] **METHOD AND APPARATUS FOR REMOTELY PRE-SETTING CLOSED CIRCUIT TELEVISION CAMERA**

[75] **Inventor:** David Elberbaum, Tokyo, Japan
 [73] **Assignee:** Elbex Video, Ltd, Tokyo, Japan
 [21] **Appl. No.:** 271,200
 [22] **Filed:** Nov. 14, 1988

[30] **Foreign Application Priority Data**
 Nov. 16, 1987 [JP] Japan 62-287549

[51] **Int. Cl.⁵** H04N 5/30
 [52] **U.S. Cl.** 358/210; 358/108
 [58] **Field of Search** 358/108, 210, 87, 209, 358/125

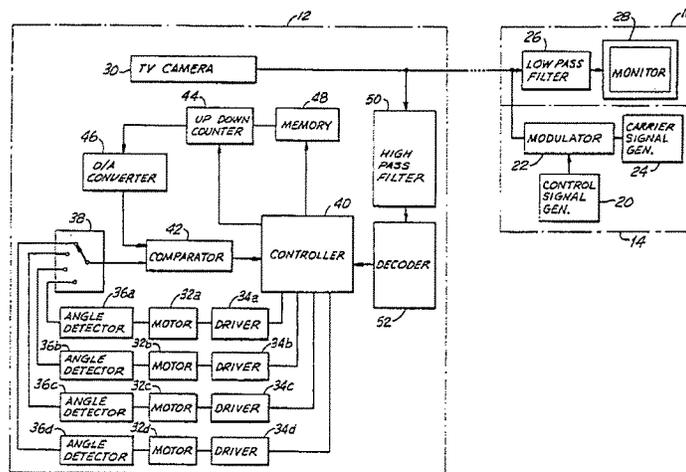
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Primary Examiner—James J. Groody
Assistant Examiner—Victor R. Kostak
Attorney, Agent, or Firm—Helfgott & Karas

[57] **ABSTRACT**

In a closed circuit television apparatus, a television camera comprises an imaging device for generating video signals, a driver adapted to the imaging device to be rotated in order to change coordinates positions of the imaging device, a detector for detecting an angle of the coordinates positions of the imaging device as electrical signals, and a memory in which an information is stored and from which the information is read out. A controller is provided for receiving a command to store the control information for setting the imaging device in predetermined coordinates positions and a command to change the coordinates positions of the imaging device. The controller reads out from the memory the control information corresponding to the change command upon receipt thereof, and operates the driver until the output signals of the detector coincide with the read-out control information.

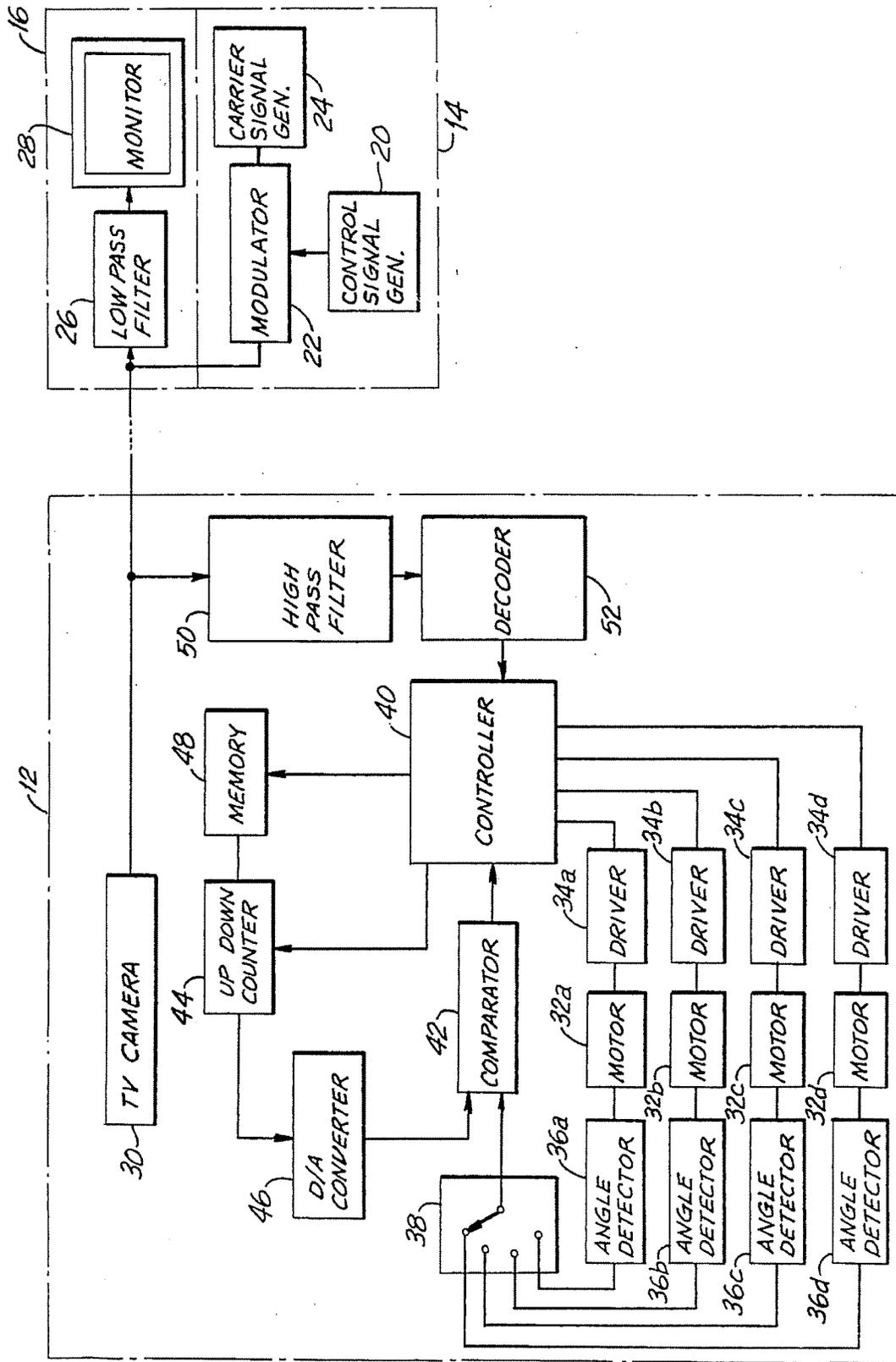
3 Claims, 1 Drawing Sheet



U.S. Patent

Jul. 31, 1990

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METHOD AND APPARATUS FOR REMOTELY PRE-SETTING CLOSED CIRCUIT TELEVISION CAMERA

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to a television camera suitable for a supervisory system, and also to a closed circuit television apparatus using such television camera. More particularly, the present invention relates to a television camera capable of multi presetting and positioning the television camera coordinates such as tilting, panning, focusing and zooming, and also to a closed circuit television apparatus using said camera.

2. Description of the Prior Art:

Generally, in a closed circuit television system such as a supervisory system, a remote-controllable television camera is located at each of a plurality of different places to be observed. At a central supervisory station, a monitor for receiving video signals from the selected television camera, a controlling device for controlling the coordinates of the television camera, such as up-down (tilting), left-right (panning), far-near (focusing) and wide-tele (zooming), and a switching circuit for selecting one of the television cameras to be connected to the controlling device and the monitor, are located.

The positioning of each television camera coordinates, such as tilting, panning, focusing and zooming, are controlled by control signals supplied from the controlling device, whereby the television camera is positioned to observe a specified object or scene and transmits to the central supervisory station video signals corresponding to the observation of the specified object or scene.

With this conventional apparatus, each coordinates of the television camera must be controlled and positioned independently every time the coordinates of the television camera are to be changed. Consequently, when resetting the television camera to observe a specified position, the positioning of the television camera coordinates, such as tilting, panning, focusing and zooming, must be changed individually, which is laborious.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a television camera which can be preset to observe a multi predetermined specified object or scene with ease, and also to provide a closed circuit television apparatus using such television camera.

Another object of the present invention is to provide a closed circuit television apparatus with which it is not necessary to transmit the coordinates values to the television camera or from the television camera to a controlling device.

A television camera according to the present invention comprises an imaging means for generating video signals, a driving means adapted to the imaging means to be rotated in order to change coordinates positions of the imaging means, a detecting means for detecting the angle of the coordinates positions of the imaging means as electrical signals, a memory means in which information is stored and from which the information is read out, and a controlling means for receiving a command to store control information for setting the imaging means in a predetermined coordinates position and a command to change the coordinates position of the imaging means, for storing output signals of the detect-

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ing means as the control information in the memory means corresponding to the store command upon receipt thereof, for reading out from the memory means the control information corresponding to the change command upon receipt thereof, and for operating the driving means until the output signals of the detecting means coincide with the read-out control information.

A closed circuit television apparatus according to the present invention comprises a television camera for transmitting video signals, a monitoring device for receiving the video signals from the television camera and for displaying a picture corresponding to the video signals, a controlling device for generating a command to control the television camera, and the television camera including an imaging means for generating video signals, a driving means adapted to the imaging means to be rotated in order to change the coordinates positions of the imaging means, a detecting means for detecting the angle of the coordinates positions of the imaging means as electrical signals, a memory means in which information is stored and from which the information is read out, and a controlling means for receiving a command to store control information for setting the imaging means in a predetermined coordinates position, for storing output signals of the detecting means as the control information in the memory means corresponding to the store command upon receipt thereof, for reading out from the memory means the control information corresponding to the change command upon receipt thereof, and for operating the driving means until the output signals of the detecting means coincide with the read-out control information.

As the store command is given to the controlling means of the television camera, the detecting means output corresponding to the coordinates positions of the television camera, such as tilting, panning, focusing and zooming at that time, is memorized in the memory means as the control information in order to reproduce the same coordinates positions at another time.

On the other hand, as the change command is received to the controlling means of the television camera, the control information corresponding to the change command is read out from the memory means, whereupon the actual value of the coordinates of the television camera, such as tilting, panning, focusing and zooming, at the time of receiving the change command is compared to the read-out control information. As a result, the driving means are operated until the detecting means generate signal commensurate with the read out signal from the memory means corresponding to the change command.

With the television camera of the present invention, partly because the control information corresponding to the coordinates positions of the television camera when the store command is received is memorized in the memory means, and partly because the coordinates positions of the television camera are changed commensurate with the change command when the change command is received, it is possible to reproduce multi preset observation coordinates positions of the television camera with ease.

With the closed circuit television apparatus of the present invention, since the storing and reading of the control information take place at the television-camera side, it is not necessary to transmit the actual value of the coordinates of the television camera to the controlling device, or from the controlling device.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objects and features of the invention will become apparent from the following description of a preferred embodiment of the invention with reference to the accompanying drawing, in which:

FIG. 1 shows a block diagram showing an embodiment of a closed circuit television apparatus using a television camera according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The drawing shows a closed circuit television apparatus 10, in which a television camera 12 is located at each of a plurality of different places to be observed. The television camera 12 generates video signals corresponding to the observed object or scene and transmits the video signals to a central supervisory station. At the central supervisory station, an operating device or controlling device 14 for controlling the coordinates of the television camera 12, such as tilting, panning, focusing and zooming, and a monitoring device 16 for receiving the video signals transmitted from the television camera 12, are located. Between the central supervisory station and the respective place to be observed, a transmission line 18 such as a cable is built.

The transmitted video signal is a composite video signal which is composed by adding a composite synchronizing signal, etc. to an image signal.

The controlling device 14 includes a circuit 20 for generating various kinds of control signals for controlling the coordinates positions of the television camera 12. Various kinds of controls or commands are a command to change each coordinates position of the television camera 12 independently, a command to store control information for reproducing the coordinates positions of the television camera 12, and a command to change the coordinates positions to different coordinates positions corresponding to the stored or memorized control information. Further, a code is allotted to each of the commands.

The control signal generating circuit 20 includes a push-button-type telephone apparatus, or a tone encoder (put on the market under the name such as "dual tone encoder" and "touch tone encoder") used in the telephone apparatus.

The codes "11", "12", "13", "14", "15", "16", "17" and "18", for example, are allotted to a command to rotate, in one direction, a motor for adjustment of tilting, a command to reversely rotate the motor for adjustment of tilting, a command to rotate, in one direction, a motor for adjustment of panning, a command to reversely rotate the motor for adjustment of panning, a command to rotate, in one direction, a motor for adjustment of focusing, a command to reversely rotate the motor for adjustment of focusing, a command to rotate, in one direction, a motor for adjustment of zooming, and a command to reversely rotate the motor for adjustment of zooming, respectively. The code for each command may be one or more figures.

Other codes are allotted to the control information such as a store command code and a code to the command to change the coordinates positions to a different coordinates positions corresponding to the stored control information. The codes composed more than one figures allotted for each command includes an address code of one or more figures designating the address for the control information.

Each code is sent and received one figure after another by depressing the buttons of the push-button-type telephone apparatus or the tone encoder. Thus, if the code is one figure, a composite signal of two signals of different frequencies determined according to the code is outputted from the control signal generating circuit 20 as a control signal. On the other hand, if the code is more than one figure, the composite signal for each figure of the code is generated from the control signal generating circuit 20 as a control signal. This composite signal is composed of one of four signals having different frequencies f_1 , f_2 , f_3 , f_4 and one of other four signals having different frequencies f_5 , f_6 , f_7 , f_8 .

The control signal generating circuit 20 may have a plurality of switches as substitute for the push-button-type switches of the tone encoder, also in this case the control signal is a composite signal of two different kinds of signals corresponding to the number of the codes.

The control signal generating circuit 20 may be constructed of a setting circuit for setting the command code and the address code, and a processing circuit for generating control signals each having a frequency corresponding to the code set in the setting circuit as substitute for the telephone apparatus or tone encoder. The setting circuit may include a key-pad, a plurality of switches, a joy stick, or the like. Otherwise the setting circuit may be a remote-controlling device of radio system, an IR system or the like. The processing circuit may be a dial tone encoder or a computer serial coder.

Alternatively, the control signal may be a single kind of signal or a composite signal of more than two signals having frequencies different from each other according to the code.

The control signals generated from the control signal generating circuit 20 are supplied to a modulating circuit 22. The modulating circuit 22 modulates each frequency of carrier signals, generated from a carrier signal generating circuit 24, by the control signals. The carrier signal generated from the carrier signal generating circuit 24 has a constant frequency adequately higher than the maximum frequency of the video signals transmitted from the television camera 12 to the monitoring device 16.

The modulated carrier signals are transmitted from a circuit portion between the television camera 12 and the monitoring device 16 to the television camera 12. The frequency range of the modulated carrier signal is higher than the maximum frequency of the video signals transmitted from the television camera 12 to the monitoring device 16.

A signal to be transmitted from the controlling device 14 to the television camera 12 may be the control signal itself, if the frequency of each control signal is higher than that of the video signals.

The monitoring device 16 includes a low-pass filter 26 which allows the video signals to pass and prevents the modulated carrier signals from passing, and a monitor or television receiver 28 connected to the output terminal of the low-pass filter. The picture reproduced on the television receiver 28 is not affected by the modulated carrier signals, because the modulated carrier signals are eliminated from the input signals of the monitoring device 16 by the filter 26.

The television camera 12 includes a camera body 30 such as an image processing device. The camera body 30 generates video signals through the transmission line 18. The tilt positioning, the pan positioning, the focus

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positioning and the zoom positioning of the camera body 30 are positioned by motors 32a, 32b, 32c, 32d, respectively. These motors are driven by their corresponding drivers 34a, 34b, 34c, 34d.

Angle detectors 36a, 36b, 36c, 36d are connected to the shaft of the mechanical assemblies of the corresponding motor 32a, 32b, 32c, 32d independently. Each angle detector generates to an electronic switch 38 such as a multiplexer, voltage commensurate with the angle of rotation of the shaft of the mechanical assemblies of the corresponding motor. Alternatively, the mechanical switch may be used.

The electronic switch 38 includes a plurality of impute poles connected to the respective output terminals of the corresponding angle detectors 36a, 36b, 36c, 36d. The common pole of the switch 38 is controlled by the controller 40 to scan in synchronized sequence all the impute poles of the switch 38. The controller 40 controls the drivers 34a, 34b, 34c, 34d commensurate with the control signals, therefor synchronizes the scanning of the impute poles of the switch 38 to coincide the scanning of the respective detector output with the control signal to the corresponding driver of the motor to be controlled. The common pole of the switch 38 is connected to one of input terminals of a comparator 42.

To the other input terminal of the comparator 42 is connected to the output terminal of a digital-analogue converter 46. A counted value of a counter 44 is converted into an analogous value by the digital-analogue converter 46 which is connected to the output of the counter 44. The comparator 42 generates coincidence signals when the two input signals coincide with each other. The counter 44 is an up-down counter of preset type which is controlled by the controller 40.

The television camera 12 also includes a memory 48 in which control information is stored and from which the control information is read out. The storing and reading of the control information are controlled by the controller 40.

The modulated carrier signals transmitted from the controlling device 14 to the television camera 12 are extracted by a high-pass filter 50, which allows the carrier signals to pass and are then generated to a decoder 52 connected to the output side of the filter 50.

The decoder 52 generates to the controller 40 signals corresponding to the command transmitted from the controlling device 14 as the control signals are demodulated from the modulated carrier signals by a demodulating circuit (not shown) and then the demodulated control signals are decoded by a known circuit (not shown) such as a touch tone decoder.

In operation, when for changing any of the coordinates position such as tilting, panning, focusing and zooming of the television camera body 30, control signals corresponding to the command to rotate one of the motors 32a, 32b, 32c, 32d in one direction or reversely are transmitted from the controlling device 14 to the television camera 12, signals corresponding to the command are transmitted from the decoder 52 to the controller 40.

Based on the signals transmitted from the decoder 52, the controller 40 activates any one of the drivers 34a, 34b, 34c or 34d. Since one of the motors corresponding to the command is thereby rotated, any of the functions, i.e., tilting, panning, focusing and zooming, of the camera body 30 is corrected so that the coordinates positions of the television camera 12 are changed to the new positions instructed by the controlling device 14.

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When commanding to change a single coordinate of the television camera, the attendant can control the television camera 12 while observing the picture on the television receiver 28, so that the optimum picture is displayed on the television receiver 28.

On the other hand, when control signals corresponding to the command to store control information are transmitted from the controlling device 14 to the television camera 12, signals corresponding to the store command and the address are transmitted from the decoder 52 to the controller 40.

The controller 40 generates the control signals to the switch 38 to scan in synchronized sequence the impute poles of the switch 38, thereby for every angle detector output, namely, for each coordinates position of tilting, panning, focusing and zooming, connects the impute poles of the switch 38 to the comparator 42, thereby connects in synchronized sequence all of the angle detectors to the comparator 42, enable the counter 44 to continue counting up or down until coincidence signals are supplied in the synchronized sequence from the comparator 42, and stores a value of the output of the counter 44 in a memory 48 in the synchronized sequence when the coincidence signals are supplied.

As a result, actual values of tilting, panning, focusing and zooming are memorized in the memory means. If the control information is already memorized at the memory portion designated by the address code, the control information of that memory portion is renewed to a new actual value. This memorized actual value is used as control information to reproduce the preset coordinates position of the television camera which position corresponds to the actual value.

The command to store the control information is transmitted by the operator after the coordinates positions of the television camera are changed individually until the optimum observation picture is displayed on the television receiver 28. Thus, it is possible to memorize the control information corresponding to the optimum observation position of the television camera.

For storing a plurality of kinds of control information, series commands, in which the address codes are allotted, are transmitted to the television camera 12.

As control signals corresponding to the command to change the coordinates positions of the television camera 12 are transmitted from the controlling device 14 to the television camera 12, signals corresponding to the change command and the address are transmitted from the decoder 52 to the controller 40.

Thus, the controller 40, for each and all coordinates positions of the television camera, i.e., tilting, panning, focusing and zooming, generates a signal to the switch 38 to scan in synchronized sequence the switch 38 and thereby connect the output of all of the angle detectors in synchronized sequence to the comparator 42, reads out in synchronized sequence the information corresponding to each and all of the coordinates positions in the memory 48, presets the read-out information in the counter 44, and controls each and all of the drivers to rotate the corresponding motor until coincidence signals are supplied in synchronized sequence from the comparator 42. As a result, the camera body 30 is changed to the predetermined preset coordinates positions according to the change command.

What is claimed is:

1. A television camera comprising:
 - imaging means for generating video signals;

driving means adapted to the imaging means to be rotated in order to change coordinates positions of said imaging means;

detecting means for detecting the angle of the coordinates positions of said imaging means as electrical signals;

memory means in which information is stored and from which the information is read out; and

controlling means for receiving a command to store control information for setting said imaging means in a predetermined coordinates position and a command to change the coordinates position of said imaging means, for storing output signals of said detecting means as the control information in said memory means corresponding to the store command upon receipt thereof, for reading out from said memory means the control information corresponding to the change command upon receipt thereof, and for operating said driving means until the output signals of said detecting means coincide with the read-out control information,

said controlling means including a counter in which the control information memorized in said memory means may be preset, a digital-to-analog converter for converting a counted value of said counter into an analog value, means for comparing output signals of said converter with the output signals of said detecting means and for generating coincidence signals when said output signals of said converter and said detecting means coincide with each other, and a controller for receiving the store command, the change command and the coincidence signals, for enabling said counter, upon receipt of the store command, to continue counting until the coincidence signals are generated, for storing the counted value of said counter, as the coincidence signals are generated, in said memory means at a portion thereof corresponding to the store command, for reading out from said memory means, upon receipt of the change command, the control information corresponding to the change command, for presetting the read-out control information in said counter, and for operating said driving means until the coincidence signals are generated.

2. A television camera according to claim 1, wherein said driving means includes a reversely rotatable motor, and said detecting means includes an angle detector for detecting an amount of rotation of said motor.

3. A closed circuit television apparatus comprising: a television camera for transmitting video signals;

a monitoring device for receiving the video signals from said television camera and for displaying a picture corresponding to the video signals;

a controlling device for generating a command to control said television camera;

said television camera including:

imaging means for generating video signals;

driving means adapted to the imaging means to be rotated in order to change the coordinates positions of said imaging means;

detecting means for detecting the angle of the coordinates positions of said imaging means as electrical signals;

memory means in which information is stored and from which the information is read out, and

controlling means for receiving a command to store control information for setting said imaging means in a predetermined coordinates position, for storing output signals of said detecting means as the control information in said memory means corresponding to the store command upon receipt thereof, for reading out from said memory means the control information corresponding to the change command upon receipt thereof, and for operating said driving means until the output signals of said detecting means coincide with the read-out control information,

said controlling device including a circuit for generating control signals each having a frequency corresponding to the kind of control, a circuit for generating carrier signals each having a frequency higher than the frequency of each video signal, and a modulating circuit for modulating the carrier signals by the control signals, and said controlling means including a filter for receiving the modulated carrier signals generated in said controlling device, and for extracting the carrier signals, a decoder for demodulating the control signals from the extracted carrier signals and for generating signals corresponding to the demodulated signals, and a controller for storing, when the signals corresponding to the store command are received from said decoder, the output signals of said detecting means as the control information in said memory means, for reading out from said memory means, when the signals corresponding to the change command are received from said decoder, the control information corresponding to the change command, and for operating said driving means until the output signals of said detecting means coincide with the readout control information.

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CERTIFICATE OF SERVICE

I, the undersigned, Michael F. Sarney, hereby certify that, on the 30th day of May, 2006, I caused to be served a true and correct copy of

AMENDED COMPLAINT

by electronic mail and by U.S. Mail, first class, by depositing the same in a depository of the United States Postal Service, on:

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