

08 635692

Class	Subclass
348	103

ISSUE CLASSIFICATION

5982418

UTILITY
SERIAL
NUMBER

08 635692

PATENT DATE

NOV 09 1999

PATENT
NUMBER

5982418

SERIAL NUMBER

08 635692

FILING DATE

11/23/99

CLASS

348

SUBCLASS

103

GROUP ART UNIT

2416

2615

EXAMINER

DIEP

APPLICANTS

APPLICANTS

APPLICANTS

APPLICANTS

N.D.

NONE

APPLICANTS

APPLICANTS

N.D.

NONE

APPLICANTS

Foreign priority claimed
35 USC 119 conditions met☐ yes ☒ no
☐ yes ☒ noAS
FILEDSTATE OR
COUNTRY

FL

SHEETS
DRWGS.

6

TOTAL
CLAIMS

22

INDEP.
CLAIMS

4

FILING FEE
RECEIVED

\$1,025.00

ATTORNEY'S
DOCKET NO.

14-430

Verified and Acknowledged

Examiner's Initials

N.D.

ADDRESS

JOHN J. TORRITTE
LORIN BUCKER DALEY AND DRISCOLL
200 PLATON AVENUE
FLORENCE, AL 36607

TITLE

DISPERSED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM

U.S. DEPT. OF COMM / PAT. & TM—PTO-436L (Rev.12-94)

PARTS OF APPLICATION
FILED SEPARATELYJ. Douglas
Applications Examiner

NOTICE OF ALLOWANCE MAILED

7-2-99

DIEP, NHON T.
Assistant Examiner N.D.

CLAIMS ALLOWED

Total Claims

22

Print Claim

1

ISSUE FEE

Amount Due

\$1210.00

Date Paid

7/11/99

DRAWING

Sheets Drawg.

6

Figs. Drawg.

6

Print Fig.

2

ISSUE
BATCH

NUMBER V26

Label
Area

PREPARED FOR ISSUE 7/3/99

WARNING: The information disclosed herein may be restricted. Unauthorized disclosure may be prohibited by the United States Code Title 35, Sections 122, 181 and 368. Possession outside the U.S. Patent & Trademark Office is restricted to authorized employees and contractors only.

08/635692

PATENT APPLICATION



08635692

VED FOR LICENSE



139625

Date
Entered
or
Counted

CONTENTS

Date
Received
or
Mailed

	1. Application _____ papers. <i>48</i>	
	2. <i>1st Ref.</i>	<i>7-22-96</i>
<i>10-28-96</i>	3. <i>Ref (3 mos)</i>	<i>10-31-96</i>
	4. <i>Amtd A</i>	<i>1-17-97</i>
<i>3-14-97</i>	5. <i>1st Ref (3 months)</i>	<i>3-18-97</i>
	6. <i>Amtd B</i>	<i>5-2-97</i>
<i>5-12-97</i>	7. <i>advisory action</i>	<i>5-13-97 M.L.</i>
	8. <i>Notice of Appeal</i>	<i>6-13-97</i>
	9. <i>Req Ext time</i>	<i>9-15-97</i>
	10. <i>Appeal Brief</i>	<i>9-15-97</i>
<i>10-7-98</i>	11. <i>Ref (3)</i>	<i>10-9-98</i>
	12. <i>Reconsideration</i>	<i>12-11-98</i>
<i>2-26-99</i>	13. <i>Ref (3 months)</i>	<i>3-1-99</i>
	14. <i>Amtd C</i>	<i>6-03-99</i>
<i>7-2-99</i>	15. <i>Notice of Allow</i>	<i>7-2-99</i>
<i>10-21-99</i>	16. <i>Formal Drawings (6 shs) set 1</i>	<i>9-16-99</i>
	17.	
	18.	
	19.	
	20.	
	21.	
	22.	
	23.	
	24.	
	25.	
	26.	
	27.	
	28.	
	29.	
	30.	
	31.	
	32.	

[illegible]

SEARCH NOTES		
	Date	Exmr.
SPE TOMMY CHIN VLI LE	16 Oct 96 17 Oct 96	N.D. N.D.
VLI LE 2615, APS SPE TOMMY CHIN 2615, 348	4 Mar 97	N.D. N.D.
ANAND NAC	Oct 198	N.D.
BRYAN TUA 3	Oct 198	N.D.
JASON TUA 2	15 Feb 9	N.D.

[illegible]

Staple Issue Slip Here

POSITION	ID NO.	DATE
CLASSIFIER		
EXAMINER	CP1	5/30/96
TYPIST	CP1	5/30/96
VERIFIER		
CORPS CORR.		
SPEC. HAND		
FILE MAINT.		
DRAFTING		

INDEX OF CLAIMS

Claim		Date			
Final	Original				
	1	✓	17 Feb 96		
	2	✓	17 Feb 96		
	3	✓	17 Feb 96		
1	4	✓	17 Feb 96		
	5	✓	17 Feb 96		
2	6	✓	17 Feb 96		
	7	✓	17 Feb 96		
11	8	✓	17 Feb 96		
11	9	✓	17 Feb 96		
1	10	✓	17 Feb 96		
7	11	✓	17 Feb 96		
6	12	✓	17 Feb 96		
	13	✓	17 Feb 96		
	14	✓	17 Feb 96		
	15	✓	17 Feb 96		
	16	✓	17 Feb 96		
	17	✓	17 Feb 96		
	18	✓	17 Feb 96		
	19	✓	17 Feb 96		
	20	✓	17 Feb 96		
	21	✓	17 Feb 96		
	22	✓	17 Feb 96		
	23	✓	17 Feb 96		
	24	✓	17 Feb 96		
	25	✓	17 Feb 96		
	26	✓	17 Feb 96		
	27	✓	17 Feb 96		
	28	✓	17 Feb 96		
	29	✓	17 Feb 96		
9	30	✓	17 Feb 96		
10	31	✓	17 Feb 96		
11	32	✓	17 Feb 96		
12	33	✓	17 Feb 96		
13	34	✓	17 Feb 96		
14	35	✓	17 Feb 96		
15	36	✓	17 Feb 96		
16	37	✓	17 Feb 96		
17	38	✓	17 Feb 96		
18	39	✓	17 Feb 96		
	40	✓	17 Feb 96		
	41	✓	17 Feb 96		
19	42	✓	17 Feb 96		
	43	✓	17 Feb 96		
20	44	✓	17 Feb 96		
21	45	✓	17 Feb 96		
22	46	✓	17 Feb 96		
	47				
	48				
	49				
	50				

SYMBOLS
✓ Rejected
- Allowed
- (Through numeral) Canceled
+ Restricted
N Non-elected
I Interference
A Appeal
O Objected

Claim		Date			
Final	Original				
	51				
	52				
	53				
	54				
	55				
	56				
	57				
	58				
	59				
	60				
	61				
	62				
	63				
	64				
	65				
	66				
	67				
	68				
	69				
	70				
	71				
	72				
	73				
	74				
	75				
	76				
	77				
	78				
	79				
	80				
	81				
	82				
	83				
	84				
	85				
	86				
	87				
	88				
	89				
	90				
	91				
	92				
	93				
	94				
	95				
	96				
	97				
	98				
	99				
	100				

STAPLE

AREA

☆U.S. GOVERNMENT PRINTING OFFICE 1998-440-169

7

PATENT NUMBER

ORIGINAL CLASSIFICATION

CLASS	SUBCLASS
348	153

APPLICATION SERIAL NUMBER

88/695,692

CROSS REFERENCE(S)

APPLICANT'S NAME (PLEASE PRINT)

Reuel A. FLY

CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)			
348	154			

IF REISSUE, ORIGINAL PATENT NUMBER

INTERNATIONAL CLASSIFICATION				
H	0	4	N	7/18

GROUP ART UNIT	ASSISTANT EXAMINER (PLEASE STAMP OR PRINT FULL NAME)
2713	DIEP, NHON T
	PRIMARY EXAMINER (PLEASE STAMP OR PRINT FULL NAME)
	BRYAN S. TUNG

PTO 270
(R1 V. 5-91)

ISSUE CLASSIFICATION SLIP

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE



US005982418A

United States Patent [19]
Ely

[11] Patent Number: 5,982,418
[45] Date of Patent: Nov. 9, 1999

[54] DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM
[75] Inventor: Reuel Andrew Ely, Plantation, Fla.
[73] Assignee: Sensormatic Electronics Corporation, Boca Raton, Fla.
[21] Appl. No.: 08/635,692
[22] Filed: Apr. 22, 1996
[51] Int. Cl.⁶ H04N 7/18
[52] U.S. Cl. 348/153, 348/154
[58] Field of Search 348/150, 153, 348/159, 143, 154, H04N 7/18

5,229,850	7/1993	Ioyoshima	348/153
5,359,363	10/1994	Kuban et al.	348/36
5,521,634	5/1996	McGrady	348/153
5,602,933	2/1997	Blackwell et al.	348/143
5,659,787	8/1997	Schultz	396/200, 56
5,724,475	3/1998	Kristen	389/100

Primary Examiner—Bryan Tung
Assistant Examiner—Nhon T. Diep
Attorney, Agent, or Firm—Robin, Blecker & Daley

[57] ABSTRACT

A video surveillance system includes a central control station and a plurality of video cameras each mounted inside a dome housing unit. A video data buffer memory, storing compressed video data generated by the camera, is mounted with each camera in the respective dome unit. Data buffered at the dome units may be selectively protected from overwriting in response to alarm signals and then retrieved for display or tape-recording by the central control station. Both live and buffered video signals are transmitted in compressed form over a data network that is also used for command, alarm and status messaging.

22 Claims, 6 Drawing Sheets

[56] References Cited

U.S. PATENT DOCUMENTS			
4,736,218	4/1988	Kutman	354/81
4,833,534	5/1989	Paff et al.	348/151
4,943,854	7/1990	Shiota et al.	348/159
5,109,278	4/1992	Ericksen et al.	358/108
5,111,291	5/1992	Ericksen et al.	358/108

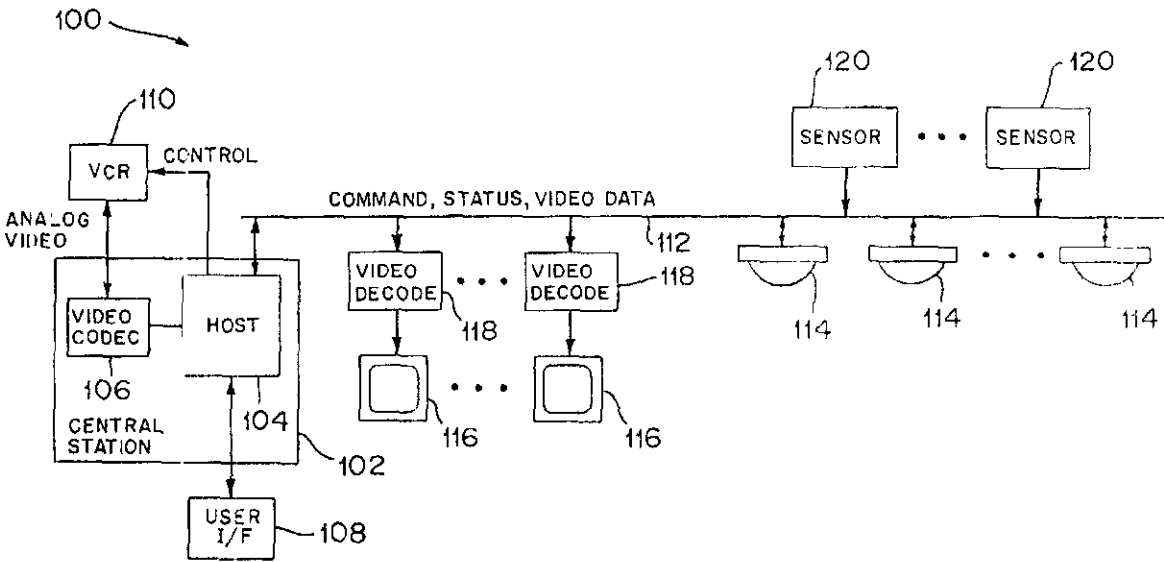


FIG. 1
(PRIOR ART)

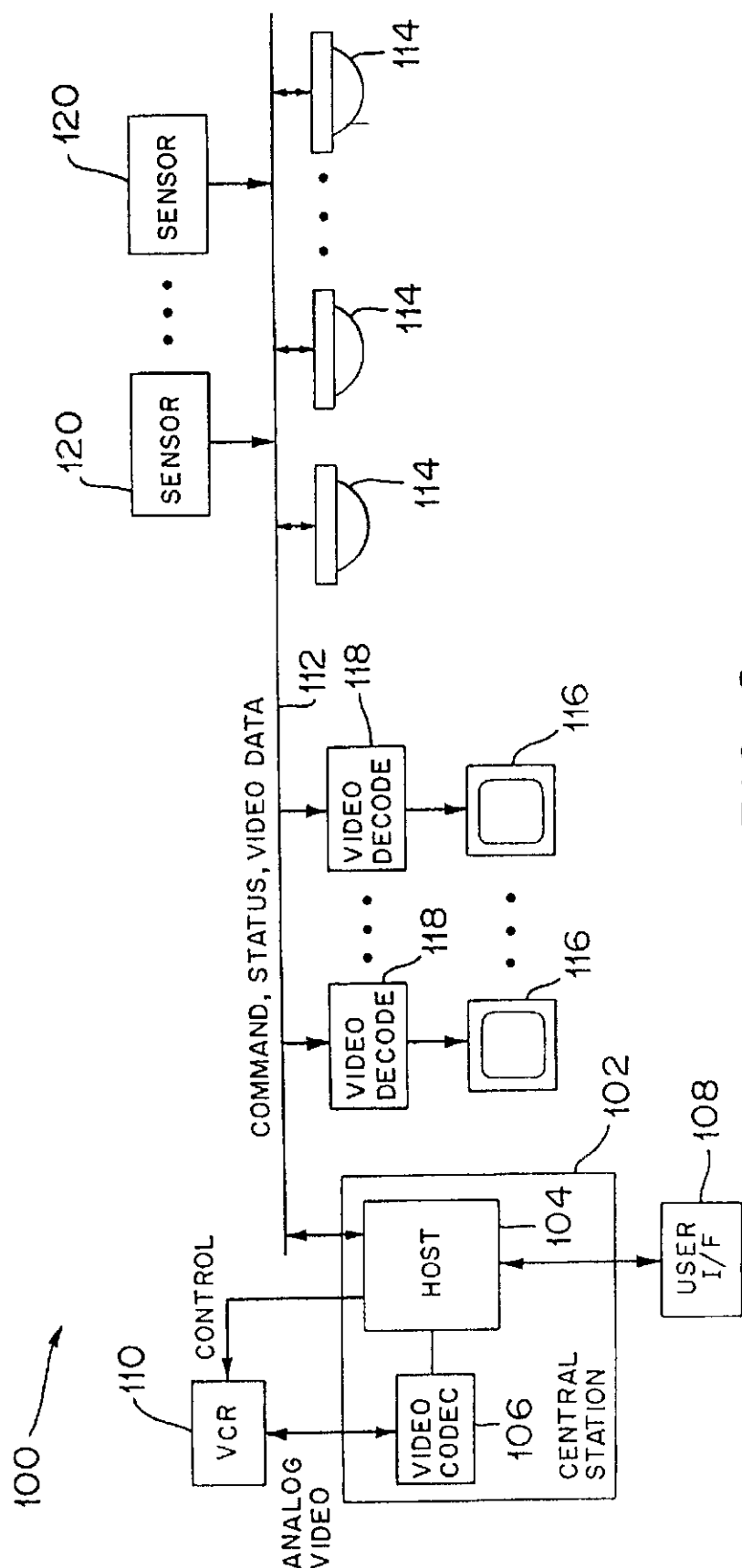


FIG. 2

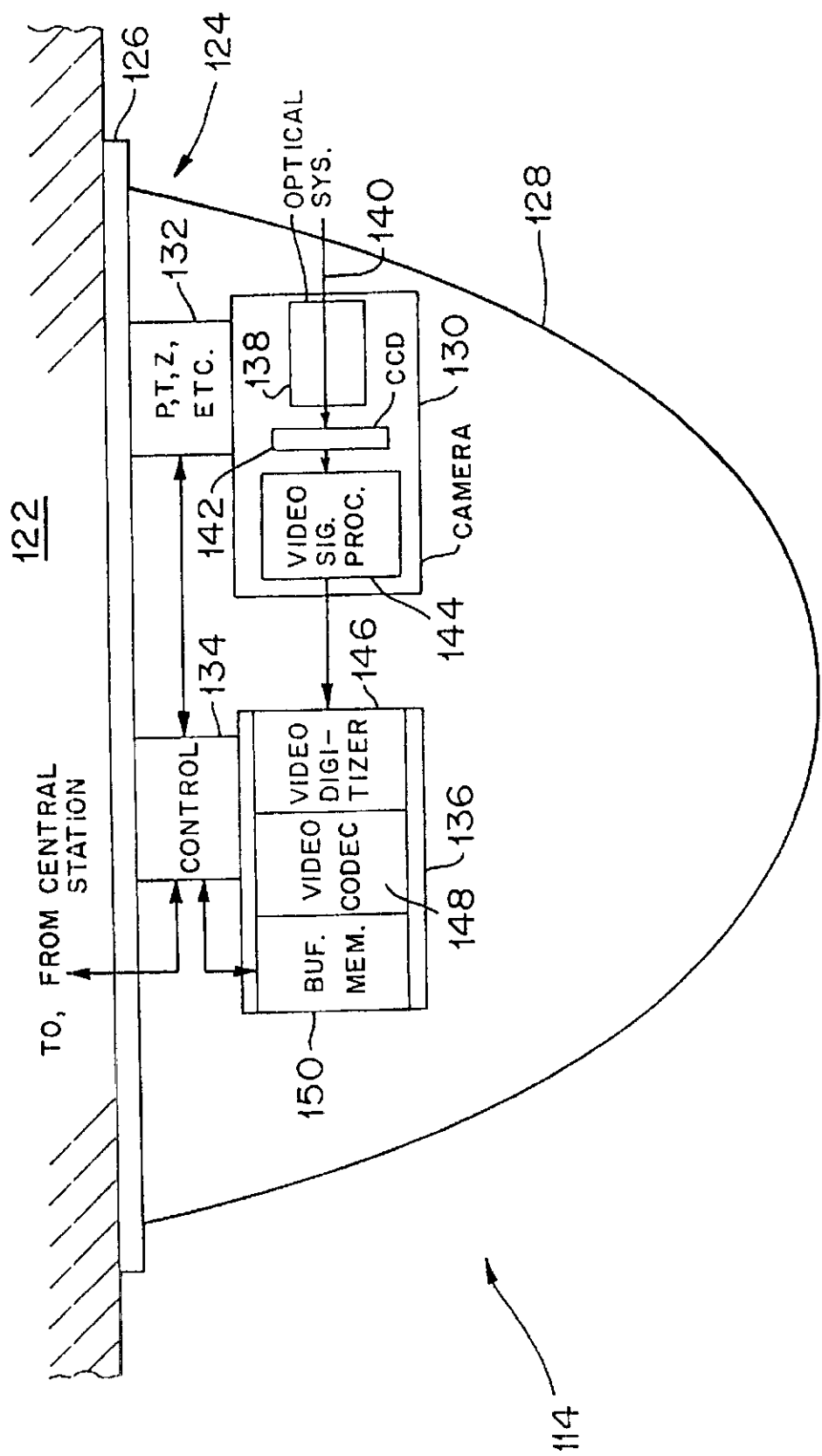


FIG. 3

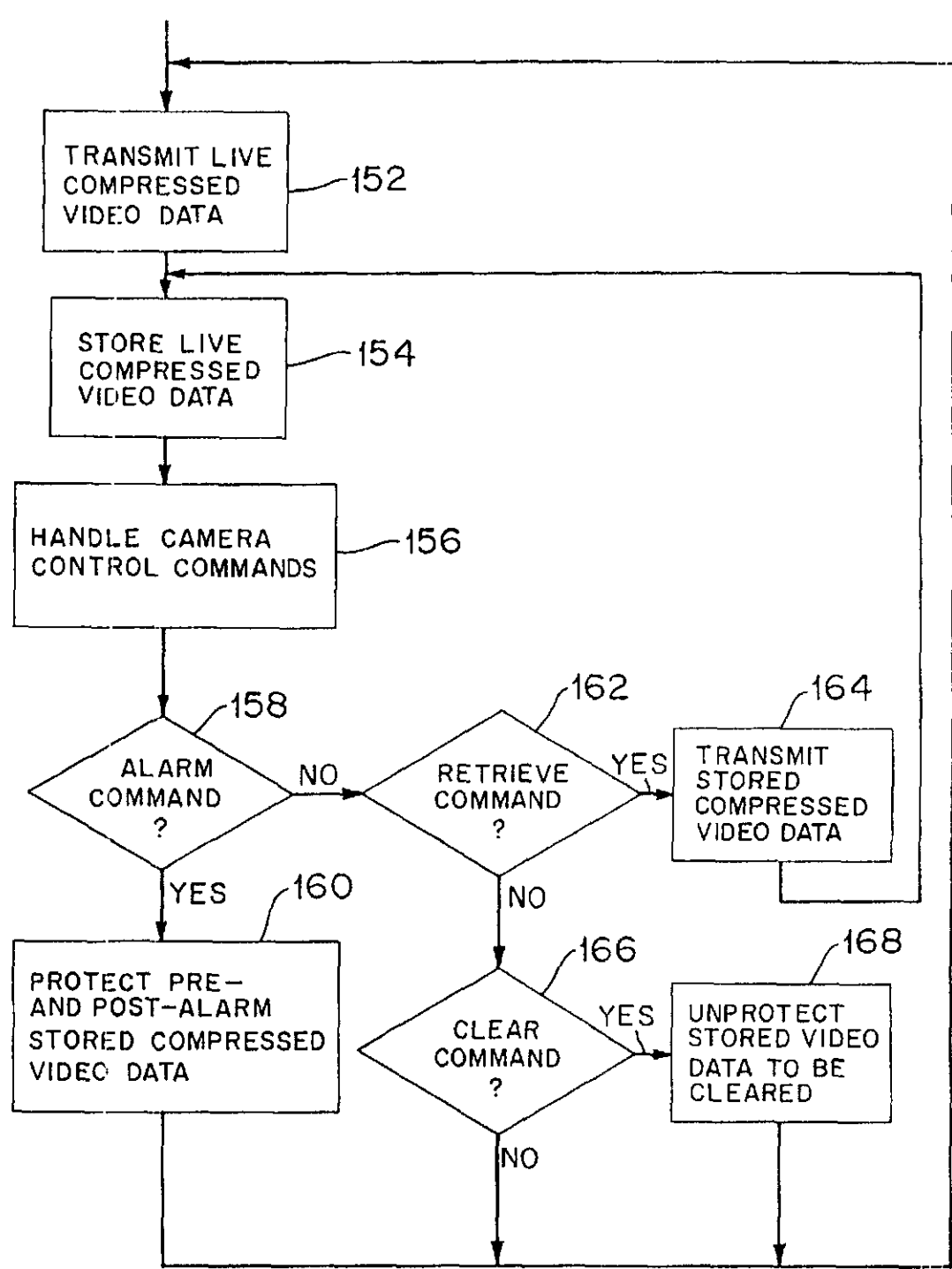


FIG. 4
CAMERA UNIT OPERATION

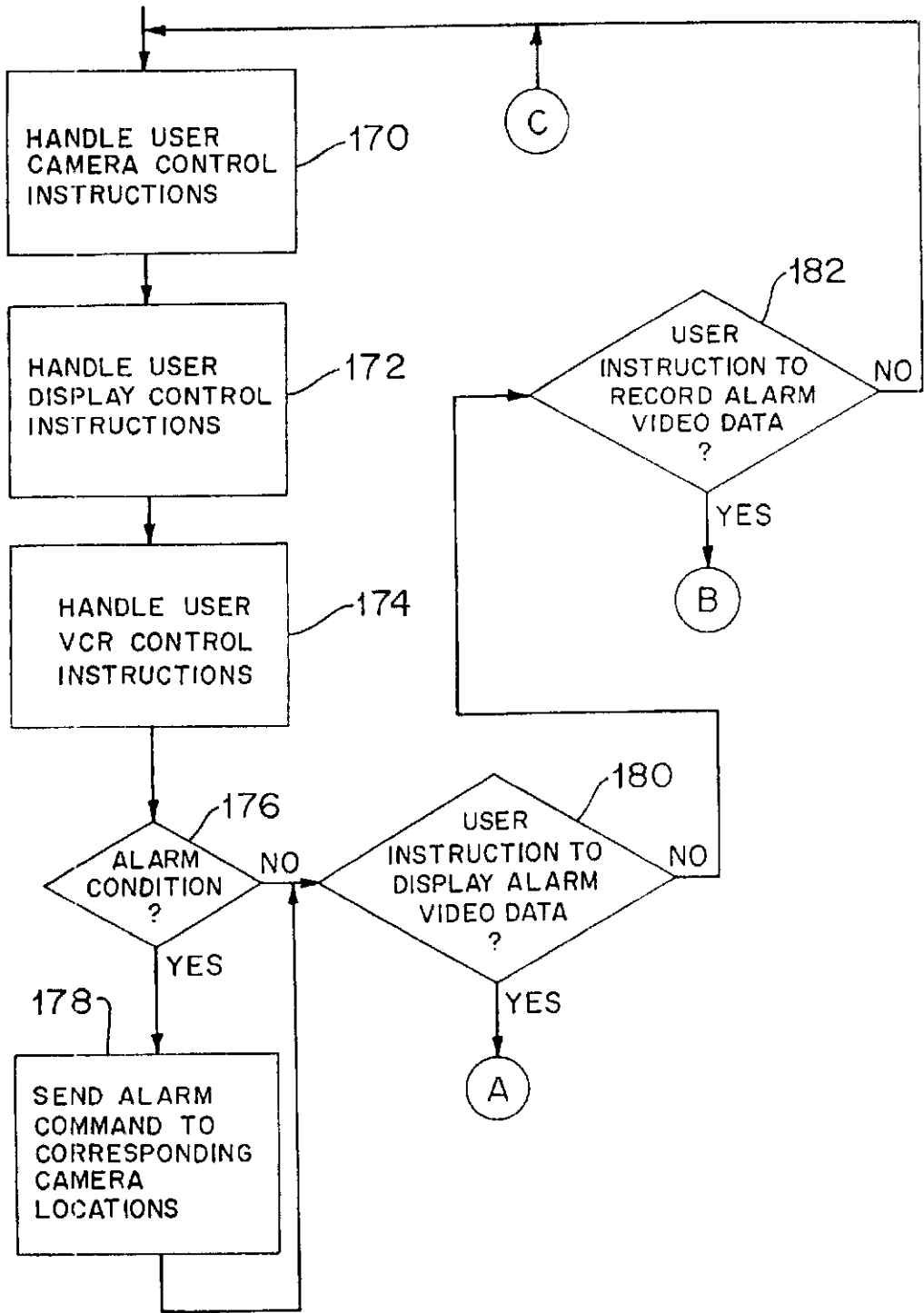
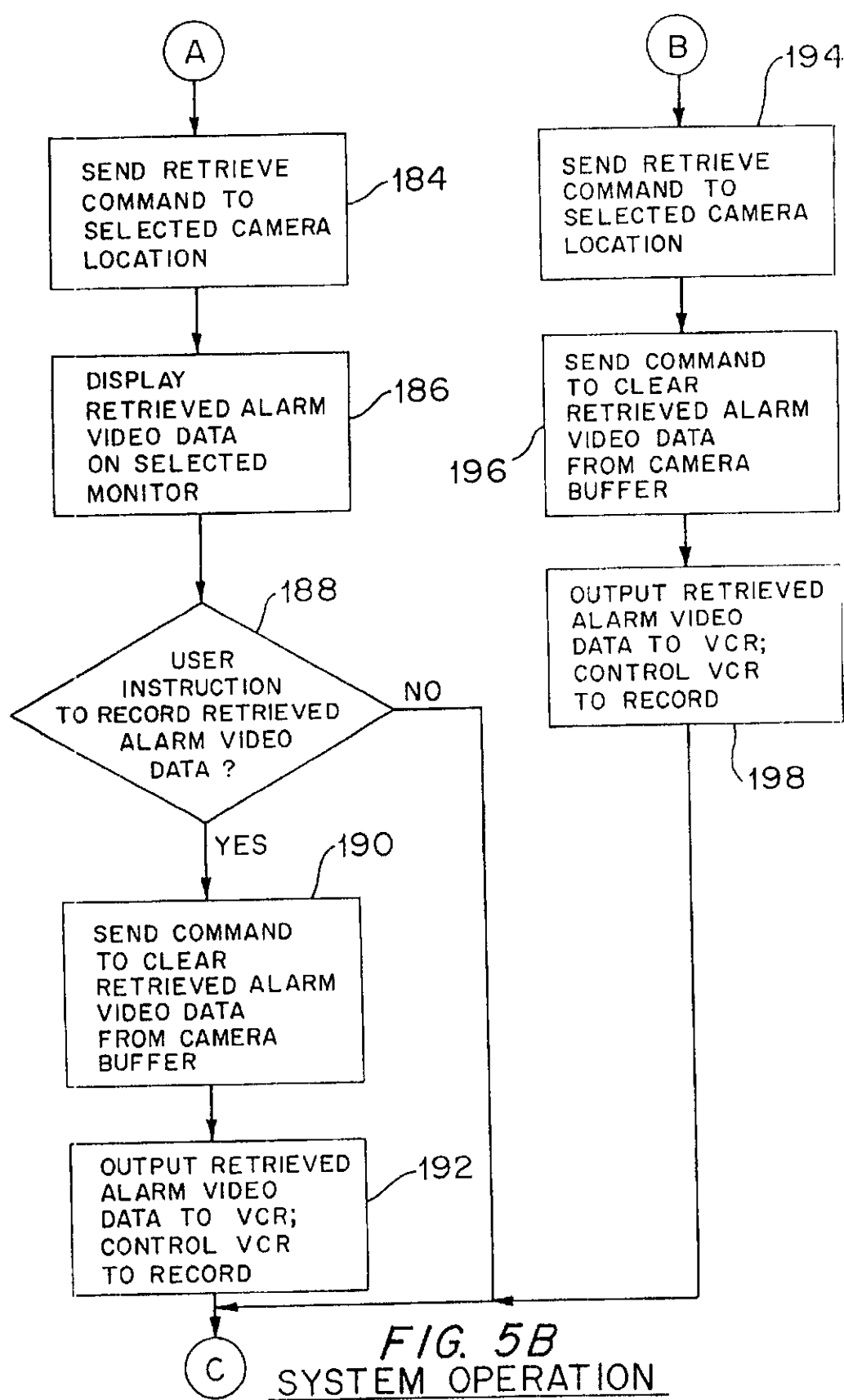


FIG. 5A
SYSTEM OPERATION



1

DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM

FIELD OF THE INVENTION

This invention is related to video surveillance systems, and more particularly to surveillance systems of the type which include sensors for advising the system of alarm conditions.

BACKGROUND OF THE INVENTION

A conventional closed-circuit video surveillance system, indicated generally by reference numeral 10, is illustrated in block diagram form in FIG. 1.

The surveillance system 10 includes a host computer 12, which controls the operation of the system, a video switch 14 which selectively interconnects input video signals (represented by dashed lines 16) with outputs of the switch (represented by dashed lines 18). Also included in the system 10 are video cameras 20, monitors 22, control consoles 24, and sensor devices 26. A local area network 28 is provided for interchange of command, status and alarm data between the system host 12 and the cameras 20, control consoles 24 and sensors 26.

A user interface 30 is also provided to permit a system operator to control operations of the system. The interface 30 may incorporate a monitor and a control console which are not shown separately from the user interface 30. Also included in the system 10 are one or more video cassette recorders 32 which are available to record video signals that are generated by the video cameras 20 and selectively routed to the VCRs 32 by way of the video switch 14. Video signals previously recorded by the VCRs 32 can be played back by the VCRs 32 and selectively routed through the switch 14 for viewing on one or more of the monitors 22. As is well known to those who are skilled in the art, system host 12 also controls the video switch 14 so that, in response to control signals entered via the control consoles 24, video signals generated by a selected one of the video cameras 20 is routed for viewing at a selected one of the monitors 22. Sensors 26 generate alarm signals in response to anomalous events such as unauthorized opening of doors, windows or display cases. The system host 12 operates to inform the human operator of the alarm conditions, and predetermined camera movements and routing of corresponding video signals to pre-selected monitors 22 may be automatically actuated in response to alarm signals. Movement of the cameras can also be controlled through commands issued by the system host, in response to pre-programmed surveillance routines, or in response to operator input through the control consoles 24 or the user interface 30.

It is generally a desired goal in video surveillance systems that video signals representative of conditions before, during and after the onset of an alarm event be recorded for current and future reference, subsequent legal proceedings, and so forth, and it is for this purpose that the VCRs 32 are provided. However, surveillance systems frequently include a large number of video cameras (e.g., dozens or hundreds of cameras), and the cost of video cassette recorders is too high to permit recording of the signals generated by more than a few of the cameras at any given time. In conventional systems, video signals indicative of conditions prior to an alarm event cannot be recorded, unless the output of a video camera has been routed for recording by a VCR prior to the time an alarm event occurs.

To maximize the recording capacity of the VCRs, it is known to provide space-division-multiplexed (e.g., quad

2

multiplexed) signals for recording on VCRs 32, and it is also known to operate the VCRs in a time lapse mode, with a reduced frame rate and switching among a number of cameras. When an alarm occurs, the time lapse mode can be automatically stopped in favor of a standard frame rate recording operation for the critical camera or cameras. In addition, critical cameras can be connected at all times for recording by a dedicated VCR. There are, however, disadvantages with all of these techniques. As noted above, it is quite expensive to provide a large number of VCRs, and if space-division-multiplexing is employed, the spatial resolution of the image signal is reduced, which may impair recognition of critical elements of the recorded images. On the other hand, time lapse recording suffers from reduced temporal resolution, so that again critical events may be missed. And, as noted before, if a camera having a view of an alarm event is not being recorded prior to the alarm event, the critical video information may simply fail to be captured.

An "intrusion monitoring system" disclosed in U.S. Pat. Nos. 5,109,278 and 5,111,291 (assigned to Commonwealth Edison) attempts to address some of these problems by providing an analog-to-digital converter and frame buffers at the output of a video multiplexer. Although the system disclosed in the Com Ed patents provides some capability for capturing and storing signals indicative of conditions at or before the time that an alarm event occurs, the system does not seem to be adapted to operate with a large number of cameras, and the temporal resolution is poor, especially when the system includes more than a minimal number of cameras.

OBJECTS AND SUMMARY OF THE INVENTION

It is accordingly an object of the invention to provide a video surveillance system having an improved capability for storage of video signals.

It is another object of the invention to provide a video surveillance system in which buffer storage is provided for video signals generated by all of the cameras in the system, and it is a further object to provide such buffer storage for all cameras in the system even when the number of cameras is large.

It is still a further object of the invention to provide a video surveillance system in which a human operator can conveniently control buffering and permanent recording of video signals generated by all of the video cameras in the system.

It is yet another object of the invention to provide a video surveillance system in which storage for video signals generated by each camera is carried out at low cost.

It is yet a further object of the invention to provide a video surveillance system which requires less cabling than conventional systems.

According to an aspect of the invention, there is provided a video surveillance system, including a central station, a plurality of video cameras located remotely from the central station for generating respective video signals, a plurality of storage devices, each located remotely from the central station and associated with a respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera, and connection circuitry for forming a signal path between the central station and each of the storage devices.

Further in accordance with this aspect of the invention, the connection circuitry may include a plurality of control devices each operatively connected to a respective one of the

storage devices for controlling the respective storage device to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage device. The surveillance system provided according to this aspect of the invention may further include a sensor device for generating an alarm signal indicative of an alarm condition, and circuitry for transmitting the alarm signal from the sensor device to the central station. The central station may respond to receiving the alarm signal by transmitting a storage signal to at least one of the control devices, such control device or devices responding to the storage signal by inhibiting over-writing of the oldest digital video data in the respective storage device or devices controlled by such control device or devices. Alternatively, the sensor device may be coupled to the connection circuitry for transmitting the alarm signal directly to the control device or devices, such device or devices responding to the alarm signal by inhibiting over-writing of the oldest digital video data in the respective storage device or devices controlled by such control device or devices.

Still further in accordance with this aspect of the invention, the central station may selectively transmit a retrieve signal to a selected one of the control devices, which responds to the retrieve signal by transmitting to the central station digital video data read out from the storage device controlled by the selected control device.

The system provided in accordance with this aspect of the invention may further include a display device associated with the central station for displaying images corresponding to the digital video data read out from the storage device and transmitted to the central station, as well as a video tape recorder controlled by the central station for recording signals corresponding to the digital video data read out from the storage device and transmitted to the central station.

The connection circuitry may include a common data transmission channel by which command signals are transmitted from the central station to the video cameras and digital video data read out from the storage devices is transmitted to the central station. The digital video data stored in the storage devices and transmitted by the data transmission channel may be compressed video data. Preferably each of the storage devices is a solid state memory and each is disposed in a respective housing together with the respective video camera.

According to another aspect of the invention, there is provided a surveillance video camera unit, including a housing which includes a light transmissive portion, a video camera disposed within the housing for forming an image from light which passes through the light transmissive portion of the housing and for converting the image into a video signal, and a storage device, disposed within the housing, for storing digital data representative of the video signal.

Further in accordance with the latter aspect of the invention, the video signal generated by the video camera may be an analog video signal, in which case the camera unit includes conversion circuitry disposed within the housing for converting the analog video signal into a digital video signal, and processing circuitry disposed within the housing for applying a data compression algorithm to the digital video signal to form compressed video data, the compressed video data being stored in the storage device. The conversion circuitry and the processing circuitry may be integrated with the video camera so that the video camera outputs the compressed video data to the storage device.

Still further in accordance with this aspect of the invention, the camera unit may include a control circuit disposed within the housing for controlling the storage device to operate as a ring buffer in which digital data representative of a video signal currently formed by the video camera is written over oldest digital data stored in the storage device. In response to receiving an event signal, the control circuit inhibits over-writing of the oldest digital data.

There may further be provided in the camera unit a plurality of motors disposed in the housing for changing pan, tilt and zoom conditions of the video camera, and the control circuit generates control signals for controlling the plurality of motors, the camera unit further including circuitry for transmitting the control signals from the control circuit to the plurality of motors. Preferably the storage device is a solid state memory.

According to still another aspect of the invention, there is provided a method of storing video signals, including the steps of generating digital video signals using a plurality of video cameras, storing the digital video signals generated by each camera in a respective storage device provided adjacent to the camera, and selectively transmitting to a central station the digital video signals stored in each storage device. Further in accordance with this aspect of the invention, the method may include operating the storage devices as ring buffers in which currently generated digital video signals are written over oldest digital video signals stored in the storage devices, and inhibiting the over-writing of the oldest digital video signals in response to receipt of an event signal. The method may also include the steps of tape-recording signals corresponding to the digital video signals transmitted to the central station, and displaying images corresponding to the digital video signals transmitted to the central station.

According to yet another aspect of the invention, there is provided a video surveillance system including a plurality of video cameras for generating the video signals, digital storage circuitry for storing the video signals in the form of digital video data, control circuitry for generating camera control commands, data transmission circuitry for forming a data communication channel by which the camera control commands are transmitted from the control circuitry to the plurality of video cameras, and circuitry for retrieving the stored digital data from the digital storage circuitry and for transmitting the retrieved digital video data to the control circuitry via the data communication channel formed by the data transmission circuitry.

The video signals generated by the video cameras may be analog video signals, in which case the digital storage circuitry includes circuitry for converting the analog video signals into digital video signals and circuitry for compressing the digital video signals to form compressed digital video data. Alternatively, the video signals generated by the video cameras may be in the form of compressed digital video data.

The digital storage circuitry may include a plurality of digital storage devices, each located adjacent to a respective one of the video cameras, and the retrieving circuitry may include a plurality of control devices, each associated with the respective one of the digital storage devices. Preferably, each of the storage devices is a solid state memory.

By providing a video surveillance system that includes camera units having digital storage for signals generated in the respective camera unit, video signals corresponding to conditions before, during and after an alarm event can be conveniently and reliably stored, and the locally stored

video can be read out and transmitted to an operator-attended station at a convenient time for viewing and permanent recording on video tape. The data communication network used for transmission of command and status data between the system central station and the video cameras may be provided with sufficient capacity to handle transmission of compressed video data buffered or currently generated at the video camera units, in which case separate video signal transmission cabling can be dispensed with.

The foregoing and other objects, features and advantages of the invention will be further understood from the following detailed description of preferred embodiments and practices of the invention and from the drawings, wherein like reference numerals identify like components and parts throughout.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a conventional video surveillance system.

FIG. 2 is a block diagram of a video surveillance system provided in accordance with the present invention.

FIG. 3 is a schematic illustration of a video camera unit used in the system of FIG. 2.

FIG. 4 is a flow chart of processes carried out in a control circuit that is part of the camera unit of FIG. 3.

FIGS. 5A and 5B together form a flow chart of processes carried out in a host computer that is part of the system of FIG. 2.

DESCRIPTION OF PREFERRED EMBODIMENTS AND PRACTICES

An embodiment of the invention will now be described, initially with reference to FIG. 2. Reference numeral 100 generally indicates a video surveillance system provided in accordance with the invention. The system 100 includes a central station 102 at which a host computer 104 is provided. Associated with the host computer 104 are a video data encoding/decoding device 106 and hardware and software required to provide a user interface, represented by block 108. The host computer 104 controls a video cassette recorder 110. A local area network (LAN) 112 is connected to the host computer 104. Data communicated between the host 104 and other components of the system 100 is carried over the LAN 112. Other system components connected to the host computer 104 via the LAN 112 include camera units 114, monitors 116 (each connected to the LAN 112 through a respective video data decoding device 118) and sensor devices 120. The sensor devices 120 are preferably of conventional types that detect, for example, unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences. The sensors 120 may also include conventional motion and/or heat sensing devices. The monitors 116 and the VCR 110 are also preferably conventional commercially-available items. It should be understood that although only one VCR 110 is shown in FIG. 2, two or more VCRs may be provided as part of the system 100.

Although the user interface 108 is represented separately from the monitors 116, it should be understood that the user interface preferably includes one or more of such monitors, as well as other input/output devices commonly provided as peripherals to personal computers. In addition, the user interface 108 may include one or more camera control devices such as the "TOUCHTRACKER" control consoles marketed by the assignee of this application. Additional

camera control consoles, although not shown, may be provided in the system at or remote from the central station 102, and connected to the host 104 through the LAN 112.

The camera units 114 are preferably of a design provided in accordance with an aspect of the invention, as illustrated in FIG. 3.

Each camera unit may be mounted at a ceiling 122 or at another appropriate location, and includes a housing 124 constituted, at least in part, by a base portion 126 and a dome portion 128. In accordance with conventional practice, the dome portion 128 is formed of a light-transmissive material that allows light to enter the interior of the housing 124, although the material of which dome 128 is made be "one way" so that the interior of the unit 114 is screened from view.

Mounted within the housing 124 of the camera unit 114, and preferably mounted on the base portion 126, are a video camera 130, motors and other structure 132 for changing pan, tilt, zoom and/or other conditions of the camera 130, a control circuit 134, and a memory board 136. The camera 130 may be of conventional design, and includes an optical system 138 that receives and forms into an optical image light 140 which passes through the dome 128 into the interior of the camera unit 114. The image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144. A suitable camera for use in the camera unit 114 is commercially available from the assignee of the present application, Sensomatic Electronics Corporation, as part number 2003-0037-00. Other suitable cameras are also commercially available.

The camera mounting structure, pan, tilt, and zoom motors, and so forth indicated by reference numeral 132 are also preferably of conventional design, such as are provided on commercially available camera dome units. The control circuit 134 may be a conventional microcontroller, such as is currently used in camera dome units to receive command signals from, and transmit status data to, a system central control station, and also for controlling the camera motors and detecting the status (such as position) of the camera motors, in a conventional manner. However, the control circuit 134 shown in FIG. 3 is also programmed, according to practices of the present invention, to carry out memory control, as well as data storage and retrieval functions that will be described below.

The memory board 136 is provided in accordance with the invention to receive an analog video signal output from the camera 130 and to digitize, compress and store the video signal. Components of the memory board 136 include a video digitizer circuit 146, a video data coding/decoding circuit 148 and a memory device 150. The video digitizer 146 may be suitably realized by the "WAVEWATCHER TV II" video digitizer card available from AITech International, Fremont, Calif. A suitable video codec is the model VCI-10, available from VistaCom, OY, Tietajantie 14, 02130, Espoo, Finland. The model VCI-10 compresses video data in accordance with the H.261 standard, and also provides the function of reconstituting video data that has been compressed in accordance with that standard. The memory device 150 may be constituted by one or more of RAM, EPROM, flash memory, and so forth. As will be seen, the memory device 150 functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134.

It is expected that, within a short time, there will become commercially available video cameras which incorporate

the video signal digitizing and compression functions carried out at blocks 146 and 148 in FIG. 3. For example, commercial introduction of a video camera which outputs compressed digital video data in accordance with the above-mentioned H.261 standard is anticipated. Such a camera could be used in place of the camera 130 shown in FIG. 3, and the separately-provided video digitizer 146 and video codec 148 could be omitted, with the compressed digital video signal output from the camera being stored directly in the memory device 150 under the control of the control circuit 134.

Operation of the camera unit 114 will now be described, with reference to FIG. 4, which illustrates processes carried out by the control circuit 134 under the control of a stored program. (It will be understood that the program memory is not shown separately from the control circuit 134.)

One ongoing process carried out under normal conditions by the control circuit 134 is transmission to the central station (via LAN 112) of compressed video data which represents video signals currently being generated by the camera 130. This process, represented by block 152, includes receiving the live compressed video data from the video codec 148 and coupling the data onto the LAN 112, either according to predetermined time slots, or in response to commands from the central station, or according to some other protocol. In parallel with the process represented by block 152, the live compressed video data formed by the video codec 148 is also stored in the memory 150. Preferably the memory addressing and writing of data into the memory is controlled by the control circuit 134 so that the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150. However, over-writing of the oldest data is subject to inhibition in response to alarm commands. On such occasions, the live compressed video data is written into a portion of the memory device 150 which does not hold video data that is to be preserved.

In a third ongoing process, represented by block 156, the control circuit 134 handles camera control commands received via the LAN 112. The handling of camera control commands is in accordance with conventional practice, and a further discussion thereof consequently will be omitted.

Concurrently with the ongoing processes of blocks 152, 154 and 156, the control circuit 134 is conditioned to receive occasional alarm commands, as indicated by decision block 158. When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150, and corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command.

The control circuit 134 is also conditioned (as indicated by decision block 162) to receive commands calling for reading-out and transmission to the central station of previously-stored compressed video data. The stored data to be retrieved may be data that was previously protected from over-writing in response to an alarm command, or may be other data that has previously been stored in the buffer memory 150. When a retrieve command is received, a process for reading out the stored data from the buffer memory and transmitting the read-out data via the LAN 112 is carried out, as represented by block 164. The transmission of the compressed video data that was read out from the

memory 150 may be in place of, or virtually in parallel with, continued transmission of "live" compressed video data. Preferably, as suggested by FIG. 4, transmission of stored compressed video data in response to corresponding retrieval commands does not interrupt ongoing storage of "live" video data.

As indicated by decision block 166, the control circuit 134 is also conditioned to receive "clear" commands, in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting "live" video data to be written over the now-unprotected stored video data.

Overall operation of the system 100 (FIG. 2) will now be described, with reference to FIGS. 5A and 5B, which illustrate processes carried out by the host computer 104.

As indicated at block 170 in FIG. 5A, one ongoing process performed by the host computer 104 entails controlling camera movements, etc., in response to instructions input by users of the system. The instructions may be received either through the user interface 108, or via separate camera control consoles, which are not shown. The receipt of user instructions, processing of same by the host computer 104, generation of command data and transmission of the command data via LAN 112, and camera movements (pan, tilt, zoom, etc.) in response to the commands are all preferably carried out in a conventional manner, and therefore will not be described further. The process 170 can also be considered as encompassing receipt and processing of status data transmitted on the LAN 112 by the camera units 114, in accordance with conventional practice. Although the discussion up to this point has suggested that all user camera control instructions are processed in the host 104 and then relayed to the cameras 114 via the LAN 112, it is also contemplated that camera control consoles (not shown) connected to the LAN 112 may generate commands that are addressed directly to, and processed only by, camera units 114.

Another ongoing function carried out by the host computer 104 is indicated at block 172 in FIG. 5A, and relates to handling user instructions for displaying "live" video signals generated by the cameras 114. In essence, the user instruction, as in conventional systems, specifies a particular camera unit, as well as a particular monitor on which the signals generated by the camera unit are to be displayed. In conventional systems, such as the system illustrated in FIG. 1, display control instructions are implemented by controlling a video switch to make an appropriate connection between an input and an output of the video switch. However, a salient characteristic of the system architecture shown in FIG. 2 is the omission of both the video switch and the analog video signal paths that are found in conventional systems. Instead, in the system of FIG. 2, video signals are transmitted over the LAN 112 in the form of compressed digital video data. The "routing" of live video from a selected camera unit to a selected monitor is therefore carried out on a "virtual" basis. This may be done in a number of ways. For example, live compressed video may be received by the host 104 from the camera unit (by way of LAN 112) and then retransmitted by the host 104 to the selected monitor 116, again via the LAN 112. Alternatively, the control circuit 134 of the selected camera unit 114 can be instructed to address live video data directly to the selected monitor 116. The latter technique may be advantageous in that, when live video is not required from a given camera unit, the camera unit can be instructed not to transmit live video data (or instructions to transmit can be omitted) thereby removing traffic from the LAN 112. In either of

these cases, it will be understood that the video signal intended for a specified monitor 116 is received in compressed digital form at the video decoder 118 associated with the monitor 116 and is decompressed and otherwise suitably processed at the decoder 118 to provide a signal which can be displayed on the monitor 116. According to another possible method of "routing" live video, the video decoders 118 may be conditioned to receive commands from the host 104, in response to which a video decoder associated with a selected monitor 116 decodes and processes all video data transmitted on the LAN 112 by the camera unit 114 selected for display on the respective monitor 116. In other words, the virtual routing connection is made via an instruction to the receiving device (the video decoder 118) rather than via an instruction to the sending device (the camera unit 114/control circuit 134).

Whether these techniques, a combination thereof, or other techniques are utilized, it will be appreciated that the LAN 112 should be selected so as to provide sufficient bandwidth to accommodate not only conventional command, status and alarm signaling, but also the transmission of live video data as required. In addition, the LAN 112 must also handle transmission of video data that has been buffered at the camera units 114, as will be described in more detail below.

It should be understood that conventional split-screen techniques, including use of video multiplexers such as conventional quad multiplexers, are also contemplated for incorporation in the system of FIG. 2, although hardware for performing these functions is not explicitly shown in the drawing.

Another ongoing function of the host computer 104, represented by block 174 in FIG. 5A, involves handling user instructions concerning operation of the VCR 110. The user instructions may include recording on videotape of either live or buffered video data received via the LAN 112, or playback of previously tape-recorded video signals. When compressed video data received via the LAN 112 by the host 104 is to be recorded, the received video data is supplied from the host 104 to the video coder/decoder 106 for decompression and conversion into an analog video signal which is supplied to the VCR 110. Concurrently, the host computer 104 provides a control signal that places the VCR in a mode for recording the analog video signal output from the video codec 106. When the user instruction indicates that playback of tape-recorded video is to be performed, the host 104 places the VCR 110 in a playback mode, and the analog video output from the VCR 110 is subjected to appropriate processing within the central station 102 and then routed for display on a selected monitor, which may be part of the user interface 108.

The system architecture shown in FIG. 2 assumes that conventional analog video tape recording is to be performed at VCR 110. However, an alternative contemplated by the invention provides for use of a digital video tape recorder (DVTR), in which case the video codec 106 processes the compressed video data supplied from the host 104 in an appropriate manner so as to output a digital video signal that is suitable for recording on the DVTR.

It is also contemplated to permanently record compressed video data in the same form as transmitted over LAN 112. For example, a suitable data recorder could be connected to LAN 112 to record compressed video data directly therefrom under control of the host 104. A data recorder could also be operated continuously to record all traffic on the LAN, including both live and buffered video data. Such a recorder may use linear or helical-scan tape recording, or may operate with a non-tape recording medium.

As indicated at blocks 176 and 178 of FIG. 5A, the host computer 104 is also responsive to alarm conditions, as may be indicated by signals generated from the sensor devices 120. When a signal indicative of an alarm condition is transmitted by a sensor 120 via the LAN 112 to the host computer 104, the host responds by sending an alarm command to certain predetermined camera units 114. For example, if the sensor 120 is associated with a given door, and indicates unauthorized opening of the door, the alarm command is sent to a camera unit or units that have the door within their field of view. As was discussed above in connection with blocks 158 and 160 of FIG. 4, the corresponding camera unit or units respond to the alarm command by protecting buffered video data which corresponds to a predetermined pre- and post-alarm time period. The protected data is then available for subsequent retrieval, display, and permanent recording via the VCR 110. After the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data (which will sometimes be referred to as "alarm data") can be selectively retrieved in response to user instruction either for display (block 180) or directly for tape recording (block 182).

If a user indicates that a block of alarm video data is to be displayed, the host 104 sends a retrieve command (via LAN 112) to the selected camera unit 114 (block 184, FIG. 5B). The desired alarm data is then read out from the buffer memory in the designated camera unit and transmitted via the LAN 112, as was discussed above in connection with blocks 162 and 164 (FIG. 4). The transmitted data is then "virtually routed" to a designated monitor (block 186), by, for example, any of the practices that were previously described in connection with routing of live video. The selected monitor may be a portion of the user interface 108, in which case the routing may be by way of the host 104. After the alarm data has been retrieved, the user has the option, indicated at block 188, of recording the retrieved alarm data. If this option is exercised, the alarm data, having been re-buffered at the host computer 104, can be cleared from the camera unit buffer by sending a clear command (block 190, FIG. 5B) which causes the camera unit to unprotect the data, as previously discussed in connection with block 168 (FIG. 4). The retrieved alarm data is then processed at the codec 106 and output as an analog video signal for recording by the VCR 110 (block 192). Of course, the host 104 concurrently provides a command signal to the VCR to place it in a recording mode.

As noted before, the user may opt to record alarm data buffered at a camera unit. If the user so elects (block 182), then the host 104 sends a retrieve command to the selected camera unit (block 194, FIG. 5B). After retrieval of the alarm data is complete, a clear command is sent (block 196) to the camera unit to clear the retrieved alarm data from the camera unit buffer, and the retrieved alarm data is recorded on the VCR (block 198).

The processes illustrated in FIGS. 5A and 5B call for un-protecting of alarm data buffered in camera units once the data has been retrieved by the central station for tape recording. However, other or additional camera buffer management practices are also contemplated. For example, assume that each camera unit buffer has a storage capacity which corresponds to thirty minutes of video signals, and that each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after). Each camera unit can be arranged so that, after a third block of alarm data has been protected and not cleared, then the

11

succeeding live data is written over the oldest of the three blocks of alarm data. As another alternative, the camera unit could send a message to the central station when a predetermined proportion of the camera unit's buffer memory has been utilized for protected storage, and then the central station would operate to direct retrieval of the alarm data from the buffers and clearing from the buffer of the retrieved data.

It is also contemplated that downloading of the alarm data from the camera units to the central station could be performed in background, as time becomes available on the LAN 112, rather than on a priority basis in response to commands issued by the central station.

It should be understood that retrieval of buffer data which has not been protected is also contemplated.

As an alternative to the "all-digital" architecture shown in FIG. 2, in which the LAN 112 provides the only link among the central station 102, the monitors 116 and the camera units 114, it is also contemplated in accordance with the invention to provide an architecture like that of FIG. 1, but utilizing camera units having local buffering capabilities like those of the unit illustrated in FIG. 3. In such an embodiment, both live and buffered video are output from the camera unit in the form of conventional analog video signals and are transmitted via appropriate signal lines to a video switch provided at the central station. The system host controls the video switch for routing in accordance with conventional practice, and the signals output from the video switch are transmitted via appropriate lines to the monitors and the VCRs. Such an embodiment would remove the burden of video data transmission from the LAN used for command, status and alarm messages, while still providing a capability for local buffering of video signals at the camera units, with selected retrieval of the buffered video at the command of the central system or according to predetermined procedures. However, if sufficient bandwidth is available on the LAN, the all-digital architecture of FIG. 2 is preferred, since neither the video switch nor the separate analog video transmission lines would be required.

Arms or other events that trigger protection of buffered video data may be initiated by techniques in addition to those discussed above. For example, in addition to or in place of sensor-generated alarms, an alarm condition can be generated by a system operator via the user interface, or an alarm condition can be detected by machine analysis of the content of live video signals generated by one or more of the camera units.

Various other changes in the foregoing apparatus and modifications in the described practices may be introduced without departing from the invention. The particularly preferred methods and apparatus are thus intended in an illustrative and not limiting sense. The true spirit and scope of the invention is set forth in the following claims.

What is claimed is:

1. A video surveillance system comprising:

a central station;

a plurality of video cameras, located remotely from said central station, for generating respective video signals;

a plurality of storage means, each located remotely from said central station and associated with a respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera;

connection means for forming a signal path between said central station and each of said storage means, said connection means including a plurality of control

12

means each operatively connected to a respective one of said storage means for controlling the respective storage means to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means;

sensor means for generating an alarm signal indicative of an alarm condition, and

means for transmitting said alarm signal from said sensor means to said central station;

wherein said central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective storage means controlled by said control means.

2. A video surveillance system according to claim 1, wherein said central station selectively transmits a retrieve signal to a selected one of said control means, said selected control means responding to said retrieve signal by transmitting to said central station digital video data read out from the storage means controlled by said selected control means.

3. A video surveillance system according to claim 2, further comprising display means associated with the central station for displaying images corresponding to the digital video data read out from the storage means and transmitted to the central station.

4. A video surveillance system according to claim 3, further comprising a video tape recorder controlled by said central station for recording signals corresponding to the digital video data read out from the storage means and transmitted to the central station.

5. A video surveillance system according to claim 1, wherein said connection means includes a common data transmission channel by which command signals are transmitted from said central station to said video cameras and digital video data read out from said storage means is transmitted to said central station.

6. A video surveillance system according to claim 1, wherein said digital video data stored in said storage means and transmitted by said data transmission channel is compressed digital video data.

7. A video surveillance system according to claim 1, wherein each of said storage means is a solid state memory.

8. A video surveillance system according to claim 1, wherein each of said storage means is disposed in a respective housing together with the respective video camera.

9. A video surveillance system, in accordance with claim 1, wherein:

the video cameras and the storage means associated with that video camera form a plurality of respective camera units

said connection means and said means for transmitting said alarm signal are part of a local area network (LAN) connected among all of said central station, said camera units and said sensor means, for transmitting said digital video data from said storage means to said central station and for transmitting said alarm signal from said sensor means to said central station.

10. A video surveillance system according to claim 9, further comprising a plurality of monitors, connected to said LAN, for receiving and displaying video signals corresponding to video signals generated by said camera units.

13

11. A video surveillance system according to claim 10, wherein digital video data transmitted via said LAN from one of said camera units to said central station is retransmitted via said LAN from said central station to one of said monitors for display on said one of said monitors.

12. A video surveillance system according to claim 10, wherein digital video data is transmitted via said LAN directly from one of said camera units to one of said monitors for display on said one of said monitors.

13. A video surveillance system according to claim 9, wherein control signals are transmitted via said LAN from said central station to said camera units for controlling said camera units.

14. A video surveillance system according to claim 9, further comprising a camera control console, connected to said LAN, for generating signals for controlling said camera units.

15. A video surveillance system according to claim 9, further comprising a data recorder, connected to said LAN, for recording digital video data transmitted via said LAN.

16. A video surveillance system according to claim 9, wherein digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a video signal corresponding to said digital video data is generated at said one of said camera units.

17. A video surveillance system according to claim 9, wherein digital video data stored in one of said camera units is transmitted via said LAN to said central station from one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units.

18. A video surveillance system according to claim 9, wherein:

first digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a video signal corresponding to said first digital video data is generated at said one of said camera units; and

second video data stored in one of said camera units is transmitted via said LAN to said central station from said one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units.

19. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition;

message means interconnecting said central station, said camera units and said sensors, for transmitting command messages from said central station to said camera units and for transmitting said alarm signals from said sensors to said central station;

14

a plurality of monitors for receiving and displaying video signals corresponding to video signals generated by said camera units,

a video switch,

first analog signal lines, connected between said video switch and said camera units, for transmitting analog video signals from said camera units to said video switch; and

second analog signal lines, connected between said video switch and said monitors, for transmitting analog video signals from said video switch to said monitors;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said second analog signal lines to route analog video signals from said camera units to said monitors;

said analog video signals routed to said monitors from said camera units including analog video signals corresponding to signals retrieved from said digital storage devices pursuant to command signals transmitted via said message means from said central station to said camera units

each of said camera units including control means for controlling the respective digital storage device to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective digital storage device; and

said central station responding to receiving an alarm signal from one of said sensors by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective digital storage device controlled by said control means

20. A video surveillance system according to claim 19, wherein said message means includes a local area network (LAN) connected among said central station, said camera units and said sensors

21. A video surveillance system according to claim 19, wherein said analog video signals routed to said monitors from said camera units include live video signals

22. A video surveillance system according to claim 19, further comprising:

a plurality of video cassette recorders (VCRs); and

third analog signal lines, connected between said video switch and said VCRs, for transmitting analog video signals from said video switch to said VCRs;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said third analog signal lines to route analog video signals from said camera units to said VCRs

* * * * *

PATENT APPLICATION SERIAL NO. 08/635692

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

K. Powell
10/25/10



C4-430

TITLE: DISTRIBUTED VIDEO DATA STORAGE IN
VIDEO SURVEILLANCE SYSTEM

INVENTOR: REUEL ANDREW ELY

ABSTRACT OF THE DISCLOSURE

A video surveillance system includes a central control station and a plurality of video cameras each mounted
5 inside a dome housing unit. A video data buffer memory, storing compressed video data generated by the camera, is mounted with each camera in the respective dome unit. Data buffered at the dome units may be selectively protected from over-writing in response to alarm signals and then
10 retrieved for display or tape-recording by the central control station. Both live and buffered video signals are transmitted in compressed form over a data network that is also used for command, alarm and status messaging.



1,026 00

10/08/635692

C4-430

**DISTRIBUTED VIDEO DATA STORAGE IN
VIDEO SURVEILLANCE SYSTEM**

5 FIELD OF THE INVENTION

This invention is related to video surveillance systems, and more particularly to surveillance systems of the type which include sensors for advising the system of alarm conditions.

10

BACKGROUND OF THE INVENTION

A conventional closed-circuit video surveillance system, indicated generally by reference numeral 10, is illustrated in block diagram form in Fig. 1.

15 The surveillance system 10 includes a host computer 12, which controls the operation of the system, a video switch 14 which selectively interconnects input video signals (represented by dashed lines 16) with outputs of the switch (represented by dashed lines 18). Also included
20 in the system 10 are video cameras 20, monitors 22, control consoles 24, and sensor devices 26. A local area network 28 is provided for interchange of command, status and alarm data between the system host 12 and the cameras 20, control consoles 24 and sensors 26.

25 A user interface 30 is also provided to permit a system operator to control operations of the system. The interface 30 may incorporate a monitor and a control console which are not shown separately from the user interface 30. Also included in the system 10 are one or
30 more video cassette recorders 32 which are available to record video signals that are generated by the video cameras 20 and selectively routed to the VCRs 32 by way of the video switch 14. Video signals previously recorded by the VCRs 32 can be played back by the VCRs 32 and
35 selectively routed through the switch 14 for viewing on one

or more of the monitors 22. As is well known to those who are skilled in the art, system host 12 also controls the video switch 14 so that, in response to control signals entered via the control consoles 24, video signals generated by a selected one of the video cameras 20 is routed for viewing at a selected one of the monitors 22. Sensors 26 generate alarm signals in response to anomalous events such as unauthorized opening of doors, windows or display cases. The system host 12 operates to inform the human operator of the alarm conditions, and predetermined camera movements and routing of corresponding video signals to pre-selected monitors 22 may be automatically actuated in response to alarm signals. Movement of the cameras can also be controlled through commands issued by the system host, in response to pre-programmed surveillance routines, or in response to operator input through the control consoles 24 or the user interface 30.

It is generally a desired goal in video surveillance systems that video signals representative of conditions before, during and after the onset of an alarm event be recorded for current and future reference, subsequent legal proceedings, and so forth, and it is for this purpose that the VCRs 32 are provided. However, surveillance systems frequently include a large number of video cameras (e.g., dozens or hundreds of cameras), and the cost of video cassette recorders is too high to permit recording of the signals generated by more than a few of the cameras at any given time. In conventional systems, video signals indicative of conditions prior to an alarm event cannot be recorded, unless the output of a video camera has been routed for recording by a VCR prior to the time an alarm event occurs.

To maximize the recording capacity of the VCRs, it is known to provide space-division-multiplexed (e.g., quad multiplexed) signals for recording on VCRs 32, and it is

also known to operate the VCRs in a time lapse mode, with a reduced frame rate and switching among a number of cameras. When an alarm occurs, the time lapse mode can be automatically stopped in favor of a standard frame rate recording operation for the critical camera or cameras. In addition, critical cameras can be connected at all times for recording by a dedicated VCR. There are, however, disadvantages with all of these techniques. As noted above, it is quite expensive to provide a large number of VCRs, and if space-division-multiplexing is employed, the spatial resolution of the image signal is reduced, which may impair recognition of critical elements of the recorded images. On the other hand, time lapse recording suffers from reduced temporal resolution, so that again critical events may be missed. And, as noted before, if a camera having a view of an alarm event is not being recorded prior to the alarm event, the critical video information may simply fail to be captured.

An "intrusion monitoring system" disclosed in U.S. Patent Nos. 5,109,278 and 5,111,291 (assigned to Commonwealth Edison) attempts to address some of these problems by providing an analog-to-digital converter and frame buffers at the output of a video multiplexer. Although the system disclosed in the Com Ed patents provides some capability for capturing and storing signals indicative of conditions at or before the time that an alarm event occurs, the system does not seem to be adapted to operate with a large number of cameras, and the temporal resolution is poor, especially when the system includes more than a minimal number of cameras.

OBJECTS AND SUMMARY OF THE INVENTION

It is accordingly an object of the invention to provide a video surveillance system having an improved capability for storage of video signals.

It is another object of the invention to provide a video surveillance system in which buffer storage is provided for video signals generated by all of the cameras in the system, and it is a further object to provide such
5 buffer storage for all cameras in the system even when the number of cameras is large.

It is still a further object of the invention to provide a video surveillance system in which a human operator can conveniently control buffering and permanent
10 recording of video signals generated by all of the video cameras in the system.

It is yet another object of the invention to provide a video surveillance system in which storage for video signals generated by each camera is carried out at low
15 cost.

It is yet a further object of the invention to provide a video surveillance system which requires less cabling than conventional systems.

According to an aspect of the invention, there is
20 provided a video surveillance system, including a central station, a plurality of video cameras located remotely from the central station for generating respective video signals, a plurality of storage devices, each located remotely from the central station and associated with a
25 respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera, and connection circuitry for forming a signal path between the central station and each of the storage devices.

30 Further in accordance with this aspect of the invention, the connection circuitry may include a plurality of control devices each operatively connected to a respective one of the storage devices for controlling the respective storage device to operate as a ring buffer in
35 which digital video data representative of video signals

currently generated by the respective video camera is written over oldest digital video data stored in the respective storage device. The surveillance system provided according to this aspect of the invention may
5 further include a sensor device for generating an alarm signal indicative of an alarm condition, and circuitry for transmitting the alarm signal from the sensor device to the central station. The central station may respond to receiving the alarm signal by transmitting a storage signal
10 to at least one of the control devices, such control device or devices responding to the storage signal by inhibiting over-writing of the oldest digital video data in the respective storage device or devices controlled by such control device or devices. Alternatively, the sensor
15 device may be coupled to the connection circuitry for transmitting the alarm signal directly to the control device or devices, such device or devices responding to the alarm signal by inhibiting over-writing of the oldest digital video data in the respective storage device or
20 devices controlled by such control device or devices.

Still further in accordance with this aspect of the invention, the central station may selectively transmit a retrieve signal to a selected one of the control devices, which responds to the retrieve signal by transmitting to
25 the central station digital video data read out from the storage device controlled by the selected control device.

The system provided in accordance with this aspect of the invention may further include a display device associated with the central station for displaying images
30 corresponding to the digital video data read out from the storage device and transmitted to the central station, as well as a video tape recorder controlled by the central station for recording signals corresponding to the digital video data read out from the storage device and transmitted
35 to the central station.

The connection circuitry may include a common data transmission channel by which command signals are transmitted from the central station to the video cameras and digital video data read out from the storage devices is transmitted to the central station. The digital video data stored in the storage devices and transmitted by the data transmission channel may be compressed video data. Preferably each of the storage devices is a solid state memory and each is disposed in a respective housing together with the respective video camera.

According to another aspect of the invention, there is provided a surveillance video camera unit, including a housing which includes a light transmissive portion, a video camera disposed within the housing for forming an image from light which passes through the light transmissive portion of the housing and for converting the image into a video signal, and a storage device, disposed within the housing, for storing digital data representative of the video signal.

Further in accordance with the latter aspect of the invention, the video signal generated by the video camera may be an analog video signal, in which case the camera unit includes conversion circuitry disposed within the housing for converting the analog video signal into a digital video signal, and processing circuitry disposed within the housing for applying a data compression algorithm to the digital video signal to form compressed video data, the compressed video data being stored in the storage device. The conversion circuitry and the processing circuitry may be integrated with the video camera so that the video camera outputs the compressed video data to the storage device.

Still further in accordance with this aspect of the invention, the camera unit may include a control circuit disposed within the housing for controlling the storage

device to operate as a ring buffer in which digital data representative of a video signal currently formed by the video camera is written over oldest digital data stored in the storage device. In response to receiving an event
5 signal, the control circuit inhibits over-writing of the oldest digital data.

There may further be provided in the camera unit a plurality of motors disposed in the housing for changing pan, tilt and zoom conditions of the video camera, and the
10 control circuit generates control signals for controlling the plurality of motors, the camera unit further including circuitry for transmitting the control signals from the control circuit to the plurality of motors. Preferably the storage device is a solid state memory.

15 According to still another aspect of the invention, there is provided a method of storing video signals, including the steps of generating digital video signals using a plurality of video cameras, storing the digital video signals generated by each camera in a respective
20 storage device provided adjacent to the camera, and selectively transmitting to a central station the digital video signals stored in each storage device. Further in accordance with this aspect of the invention, the method may include operating the storage devices as ring buffers
25 in which currently generated digital video signals are written over oldest digital video signals stored in the storage devices, and inhibiting the over-writing of the oldest digital video signals in response to receipt of an event signal. The method may also include the steps of
30 tape-recording signals corresponding to the digital video signals transmitted to the central station, and displaying images corresponding to the digital video signals transmitted to the central station.

According to yet another aspect of the invention,
35 there is provided a video surveillance system including a

plurality of video cameras for generating the video signals, digital storage circuitry for storing the video signals in the form of digital video data, control circuitry for generating camera control commands, data
5 transmission circuitry for forming a data communication channel by which the camera control commands are transmitted from the control circuitry to the plurality of video cameras, and circuitry for retrieving the stored digital data from the digital storage circuitry and for
10 transmitting the retrieved digital video data to the control circuitry via the data communication channel formed by the data transmission circuitry.

The video signals generated by the video cameras may be analog video signals, in which case the digital storage
15 circuitry includes circuitry for converting the analog video signals into digital video signals and circuitry for compressing the digital video signals to form compressed digital video data. Alternatively, the video signals generated by the video cameras may be in the form of
20 compressed digital video data.

The digital storage circuitry may include a plurality of digital storage devices, each located adjacent to a respective one of the video cameras, and the retrieving circuitry may include a plurality of control devices, each
25 associated with the respective one of the digital storage devices. Preferably, each of the storage devices is a solid state memory.

By providing a video surveillance system that includes camera units having digital storage for signals generated
30 in the respective camera unit, video signals corresponding to conditions before, during and after an alarm event can be conveniently and reliably stored, and the locally stored video can be read out and transmitted to an operator-attended station at a convenient time for viewing and
35 permanent recording on video tape. The data communication

network used for transmission of command and status data between the system central station and the video cameras may be provided with sufficient capacity to handle transmission of compressed video data buffered or currently
5 generated at the video camera units, in which case separate video signal transmission cabling can be dispensed with.

The foregoing and other objects, features and advantages of the invention will be further understood from the following detailed description of preferred embodiments
10 and practices of the invention and from the drawings, wherein like reference numerals identify like components and parts throughout.

DESCRIPTION OF THE DRAWINGS

15 Fig. 1 is a block diagram of a conventional video surveillance system.

Fig. 2 is a block diagram of a video surveillance system provided in accordance with the present invention.

20 Fig. 3 is a schematic illustration of a video camera unit used in the system of Fig. 2.

Fig. 4 is a flow chart of processes carried out in a control circuit that is part of the camera unit of Fig. 3.

25 Figs. 5A and 5B together form a flow chart of processes carried out in a host computer that is part of the system of Fig. 2.

DESCRIPTION OF PREFERRED EMBODIMENTS AND PRACTICES

An embodiment of the invention will now be described, initially with reference to Fig. 2. Reference numeral 100
30 generally indicates a video surveillance system provided in accordance with the invention. The system 100 includes a central station 102 at which a host computer 104 is provided. Associated with the host computer 104 are a video data encoding/decoding device 106 and hardware and
35 software required to provide a user interface, represented

by block 108. The host computer 104 controls a video cassette recorder 110. A local area network (LAN) 112 is connected to the host computer 104. Data communicated between the host 104 and other components of the system 100 is carried over the LAN 112. Other system components connected to the host computer 104 via the LAN 112 include camera units 114, monitors 116 (each connected to the LAN 112 through a respective video data decoding device 118) and sensor devices 120. The sensor devices 120 are preferably of conventional types that detect, for example, unauthorized opening of doors, windows and display cases and the like and generate alarm signals indicative of these occurrences. The sensors 120 may also include conventional motion and/or heat sensing devices. The monitors 116 and the VCR 110 are also preferably conventional commercially-available items. It should be understood that although only one VCR 110 is shown in Fig. 2, two or more VCRs may be provided as part of the system 100.

Although the user interface 108 is represented separately from the monitors 116, it should be understood that the user interface preferably includes one or more of such monitors, as well as other input/output devices commonly provided as peripherals to personal computers. In addition, the user interface 108 may include one or more camera control devices such as the "TOUCHTRACKER" control consoles marketed by the assignee of this application. Additional camera control consoles, although not shown, may be provided in the system at or remote from the central station 102, and connected to the host 104 through the LAN 112.

The camera units 114 are preferably of a design provided in accordance with an aspect of the invention, as illustrated in Fig. 3.

Each camera unit may be mounted at a ceiling 122 or at another appropriate location, and includes a housing 124

constituted, at least in part, by a base portion 126 and a dome portion 128. In accordance with conventional practice, the dome portion 128 is formed of a light-transmissive material that allows light to enter the interior of the housing 124, although the material of which dome 128 is made be "one way" so that the interior of the unit 114 is screened from view.

Mounted within the housing 124 of the camera unit 114, and preferably mounted on the base portion 126, are a video camera 130, motors and other structure 132 for changing pan, tilt, zoom and/or other conditions of the camera 130, a control circuit 134, and a memory board 136. The camera 130 may be of conventional design, and includes an optical system 138 that receives and forms into an optical image light 140 which passes through the dome 128 into the interior of the camera unit 114. The image formed by the optical system 138 is converted into an electrical signal at CCD 142 and the resulting signal is subjected to conventional analog signal processing at video signal processing circuit 144. A suitable camera for use in the camera unit 114 is commercially available from the assignee of the present application, Sensormatic Electronics Corporation, as part number 2003-0037-00. Other suitable cameras are also commercially available.

The camera mounting structure, pan, tilt, and zoom motors, and so forth indicated by reference numeral 132 are also preferably of conventional design, such as are provided on commercially available camera dome units. The control circuit 134 may be a conventional microcontroller, such as is currently used in camera dome units to receive command signals from, and transmit status data to, a system central control station, and also for controlling the camera motors and detecting the status (such as position) of the camera motors, in a conventional manner. However, the control circuit 134 shown in Fig. 3 is also programmed,

according to practices of the present invention, to carry out memory control, as well as data storage and retrieval functions that will be described below.

The memory board 136 is provided in accordance with
5 the invention to receive an analog video signal output from the camera 130 and to digitize, compress and store the video signal. Components of the memory board 136 include a video digitizer circuit 146, a video data coding/decoding circuit 148 and a memory device 150. The video digitizer
10 146 may be suitably realized by the "WAVEWATCHER TV II" video digitizer card available from AITech International, Fremont, California. A suitable video codec is the model VCI-10, available from VistaCom, OY, Tietajantie 14, 02130, Espoo, Finland. The model VCI-10 compresses video data in
15 accordance with the H.261 standard, and also provides the function of reconstituting video data that has been compressed in accordance with that standard. The memory device 150 may be constituted by one or more of RAM, EEPROM, flash memory, and so forth. As will be seen, the
20 memory device 150 functions as a buffer for the video signal generated by the camera 130, and is controlled by the control circuit 134.

It is expected that, within a short time, there will become commercially available video cameras which
25 incorporate the video signal digitizing and compression functions carried out at blocks 146 and 148 in Fig. 3. For example, commercial introduction of a video camera which outputs compressed digital video data in accordance with the above-mentioned H.261 standard is anticipated. Such a
30 camera could be used in place of the camera 130 shown in Fig. 3, and the separately-provided video digitizer 146 and video codec 148 could be omitted, with the compressed digital video signal output from the camera being stored directly in the memory device 150 under the control of the
35 control circuit 134.

Operation of the camera unit 114 will now be described, with reference to Fig. 4, which illustrates processes carried out by the control circuit 134 under the control of a stored program. (It will be understood that
5 the program memory is not shown separately from the control circuit 134.)

One ongoing process carried out under normal conditions by the control circuit 134 is transmission to the central station (via LAN 112) of compressed video data
10 which represents video signals currently being generated by the camera 130. This process, represented by block 152, includes receiving the live compressed video data from the video codec 148 and coupling the data onto the LAN 112, either according to predetermined time slots, or in
15 response to commands from the central station, or according to some other protocol. In parallel with the process represented by block 152, the live compressed video data formed by the video codec 148 is also stored in the memory 150. Preferably the memory addressing and writing of data
20 into the memory is controlled by the control circuit 134 so that the memory 150 serves as a ring buffer, in which currently generated compressed video data is written over the oldest compressed video data that had previously been stored in the memory 150. However, over-writing of the
25 oldest data is subject to inhibition in response to alarm commands. On such occasions, the live compressed video data is written into a portion of the memory device 150 which does not hold video data that is to be preserved.

In a third ongoing process, represented by block 156,
30 the control circuit 134 handles camera control commands received via the LAN 112. The handling of camera control commands is in accordance with conventional practice, and a further discussion thereof consequently will be omitted.

Concurrently with the ongoing processes of blocks 152,
35 154 and 156, the control circuit 134 is conditioned to

receive occasional alarm commands, as indicated by decision block 158. When an alarm command is received, a process (indicated by block 160) is carried out in which the control circuit 134 protects from over-writing compressed digital video data previously stored in the memory 150, and
5 corresponding to a time interval beginning at a predetermined time prior to receipt of the alarm command, and continuing for a predetermined time after receipt of the alarm command.

10 The control circuit 134 is also conditioned (as indicated by decision block 162) to receive commands calling for reading-out and transmission to the central station of previously-stored compressed video data. The stored data to be retrieved may be data that was previously
15 protected from over-writing in response to an alarm command, or may be other data that has previously been stored in the buffer memory 150. When a retrieve command is received, a process for reading out the stored data from the buffer memory and transmitting the read-out data via
20 the LAN 112 is carried out, as represented by block 164. The transmission of the compressed video data that was read out from the memory 150 may be in place of, or virtually in parallel with, continued transmission of "live" compressed video data. Preferably, as suggested by Fig. 4,
25 transmission of stored compressed video data in response to corresponding retrieval commands does not interrupt ongoing storage of "live" video data.

As indicated by decision block 166, the control circuit 134 is also conditioned to receive "clear"
30 commands, in response to which the control circuit removes a previously protected block of stored video data from protection, thereby permitting "live" video data to be written over the now-unprotected stored video data

Overall operation of the system 100 (Fig. 2) will now be described, with reference to Figs. 5A and 5B, which illustrate processes carried out by the host computer 104.

As indicated at block 170 in Fig. 5A, one ongoing process performed by the host computer 104 entails controlling camera movements, etc., in response to instructions input by users of the system. The instructions may be received either through the user interface 108, or via separate camera control consoles, which are not shown. The receipt of user instructions, processing of same by the host computer 104, generation of command data and transmission of the command data via LAN 112, and camera movements (pan, tilt, zoom, etc.) in response to the commands are all preferably carried out in a conventional manner, and therefore will not be described further. The process 170 can also be considered as encompassing receipt and processing of status data transmitted on the LAN 112 by the camera units 114, in accordance with conventional practice. Although the discussion up to this point has suggested that all user camera control instructions are processed in the host 104 and then relayed to the cameras 114 via the LAN 112, it is also contemplated that camera control consoles (not shown) connected to the LAN 112 may generate commands that are addressed directly to, and processed only by, camera units 114.

Another ongoing function carried out by the host computer 104 is indicated at block 172 in Fig. 5A, and relates to handling user instructions for displaying "live" video signals generated by the cameras 114. In essence, the user instruction, as in conventional systems, specifies a particular camera unit, as well as a particular monitor on which the signals generated by the camera unit are to be displayed. In conventional systems, such as the system illustrated in Fig. 1, display control instructions are

implemented by controlling a video switch to make an appropriate connection between an input and an output of the video switch. However, a salient characteristic of the system architecture shown in Fig. 2 is the omission of both
5 the video switch and the analog video signal paths that are found in conventional systems. Instead, in the system of Fig. 2, video signals are transmitted over the LAN 112 in the form of compressed digital video data. The "routing" of live video from a selected camera unit to a selected
10 monitor is therefore carried out on a "virtual" basis. This may be done in a number of ways. For example, live compressed video may be received by the host 104 from the camera unit (by way of LAN 112) and then retransmitted by the host 104 to the selected monitor 116, again via the LAN
15 112. Alternatively, the control circuit 134 of the selected camera unit 114 can be instructed to address live video data directly to the selected monitor 116. The latter technique may be advantageous in that, when live video is not required from a given camera unit, the camera
20 unit can be instructed not to transmit live video data (or instructions to transmit can be omitted) thereby removing traffic from the LAN 112. In either of these cases, it will be understood that the video signal intended for a specified monitor 116 is received in compressed digital
25 form at the video decoder 118 associated with the monitor 116 and is decompressed and otherwise suitably processed at the decoder 118 to provide a signal which can be displayed on the monitor 116. According to another possible method of "routing" live video, the video decoders 118 may be
30 conditioned to receive commands from the host 104, in response to which a video decoder associated with a selected monitor 116 decodes and processes all video data transmitted on the LAN 112 by the camera unit 114 selected for display on the respective monitor 116. In other words,
35 the virtual routing connection is made via an instruction

to the receiving device (the video decoder 118) rather than via an instruction to the sending device (the camera unit 114/control circuit 134).

Whether these techniques, a combination thereof, or
5 other techniques are utilized, it will be appreciated that the LAN 112 should be selected so as to provide sufficient bandwidth to accommodate not only conventional command, status and alarm signaling, but also the transmission of live video data as required. In addition, the LAN 112 must
10 also handle transmission of video data that has been buffered at the camera units 114, as will be described in more detail below.

It should be understood that conventional split-screen techniques, including use of video multiplexers such as
15 conventional quad multiplexers, are also contemplated for incorporation in the system of Fig. 2, although hardware for performing these functions is not explicitly shown in the drawing.

Another ongoing function of the host computer 104,
20 represented by block 174 in Fig. 5A, involves handling user instructions concerning operation of the VCR 110. The user instructions may include recording on videotape of either live or buffered video data received via the LAN 112, or playback of previously tape-recorded video signals. When
25 compressed video data received via the LAN 112 by the host 104 is to be recorded, the received video data is supplied from the host 104 to the video coder/decoder 106 for decompression and conversion into an analog video signal which is supplied to the VCR 110. Concurrently, the host
30 computer 104 provides a control signal that places the VCR in a mode for recording the analog video signal output from the video codec 106. When the user instruction indicates that playback of tape-recorded video is to be performed, the host 104 places the VCR 110 in a playback mode, and the
35 analog video output from the VCR 110 is subjected to

appropriate processing within the central station 102 and then routed for display on a selected monitor, which may be part of the user interface 108.

5 The system architecture shown in Fig. 2 assumes that conventional analog video tape recording is to be performed at VCR 110. However, an alternative contemplated by the invention provides for use of a digital video tape recorder (DVTR), in which case the video codec 106 processes the compressed video data supplied from the host 104 in an
10 appropriate manner so as to output a digital video signal that is suitable for recording on the DVTR.

It is also contemplated to permanently record compressed video data in the same form as transmitted over LAN 112. For example, a suitable data recorder could be
15 connected to LAN 112 to record compressed video data directly therefrom under control of the host 104. A data recorder could also be operated continuously to record all traffic on the LAN, including both live and buffered video data. Such a recorder may use linear or helical-scan tape
20 recording, or may operate with a non-tape recording medium.

As indicated at blocks 176 and 178 of Fig. 5A, the host computer 104 is also responsive to alarm conditions, as may be indicated by signals generated from the sensor devices 120. When a signal indicative of an alarm
25 condition is transmitted by a sensor 120 via the LAN 112 to the host computer 104, the host responds by sending an alarm command to certain predetermined camera units 114. For example, if the sensor 120 is associated with a given door, and indicates unauthorized opening of the door, the
30 alarm command is sent to a camera unit or units that have the door within their field of view. As was discussed above in connection with blocks 158 and 160 of Fig. 4, the corresponding camera unit or units respond to the alarm command by protecting buffered video data which corresponds
35 to a predetermined pre- and post-alarm time period. The

protected data is then available for subsequent retrieval, display, and permanent recording via the VCR 110. After the compressed video data stored at one of the camera units has been protected pursuant to an alarm command, the data
5 (which will sometimes be referred to as "alarm data") can be selectively retrieved in response to user instruction either for display (block 180) or directly for tape-recording (block 182).

If a user indicates that a block of alarm video data
10 is to be displayed, the host 104 sends a retrieve command (via LAN 112) to the selected camera unit 114 (block 184, Fig. 5B). The desired alarm data is then read out from the buffer memory in the designated camera unit and transmitted via the LAN 112, as was discussed above in connection with
15 blocks 162 and 164 (Fig. 4). The transmitted data is then "virtually routed" to a designated monitor (block 186), by, for example, any of the practices that were previously described in connection with routing of live video. The selected monitor may be a portion of the user interface
20 108, in which case the routing may be by way of the host 104. After the alarm data has been retrieved, the user has the option, indicated at block 188, of recording the retrieved alarm data. If this option is exercised, the alarm data, having been re-buffered at the host computer
25 104, can be cleared from the camera unit buffer by sending a clear command (block 190, Fig. 5B) which causes the camera unit to unprotect the data, as previously discussed in connection with block 168 (Fig. 4). The retrieved alarm data is then processed at the codec 106 and output as an
30 analog video signal for recording by the VCR 110 (block 192). Of course, the host 104 concurrently provides a command signal to the VCR to place it in a recording mode.

As noted before, the user may opt to record alarm data buffered at a camera unit. If the user so elects (block
35 182), then the host 104 sends a retrieve command to the

selected camera unit (block 194, Fig. 5B). After retrieval of the alarm data is complete, a clear command is sent (block 196) to the camera unit to clear the retrieved alarm data from the camera unit buffer, and the retrieved alarm data is recorded on the VCR (block 198).

The processes illustrated in Figs. 5A and 5B call for un-protecting of alarm data buffered in camera units once the data has been retrieved by the central station for tape-recording. However, other or additional camera buffer management practices are also contemplated. For example, assume that each camera unit buffer has a storage capacity which corresponds to thirty minutes of video signals, and that each alarm command initiates protection of buffered video signals corresponding to a ten minute period (say five minutes prior to the alarm and five minutes after). Each camera unit can be arranged so that, after a third block of alarm data has been protected and not cleared, then the succeeding live data is written over the oldest of the three blocks of alarm data. As another alternative, the camera unit could send a message to the central station when a predetermined proportion of the camera unit's buffer memory has been utilized for protected storage, and then the central station would operate to direct retrieval of the alarm data from the buffers and clearing from the buffer of the retrieved data.

It is also contemplated that downloading of the alarm data from the camera units to the central station could be performed in background, as time becomes available on the LAN 112, rather than on a priority basis in response to commands issued by the central station.

It should be understood that retrieval of buffer data which has not been protected is also contemplated.

As an alternative to the "all-digital" architecture shown in Fig. 2, in which the LAN 112 provides the only link among the central station 102, the monitors 116 and

the camera units 114, it is also contemplated in accordance with the invention to provide an architecture like that of Fig. 1, but utilizing camera units having local buffering capabilities like those of the unit illustrated in Fig. 3.

5 In such an embodiment, both live and buffered video are output from the camera unit in the form of conventional analog video signals and are transmitted via appropriate signal lines to a video switch provided at the central station. The system host controls the video switch for

10 routing in accordance with conventional practice, and the signals output from the video switch are transmitted via appropriate lines to the monitors and the VCRs. Such an embodiment would remove the burden of video data transmission from the LAN used for command, status and

15 alarm messages, while still providing a capability for local buffering of video signals at the camera units, with selected retrieval of the buffered video at the command of the central system or according to predetermined procedures. However, if sufficient bandwidth is available

20 on the LAN, the all-digital architecture of Fig. 2 is preferred, since neither the video switch nor the separate analog video transmission lines would be required.

Alarms or other events that trigger protection of buffered video data may be initiated by techniques in

25 addition to those discussed above. For example, in addition to or in place of sensor-generated alarms, an alarm condition can be generated by a system operator via the user interface, or an alarm condition can be detected by machine analysis of the content of live video signals

30 generated by one or more of the camera units.

Various other changes in the foregoing apparatus and modifications in the described practices may be introduced without departing from the invention. The particularly preferred methods and apparatus are thus intended in an

35 illustrative and not limiting sense. The true spirit and

scope of the invention is set forth in the following claims.

What is claimed is:

1. A video surveillance system, comprising:
 - a central station;
 - a plurality of video cameras, located remotely
 - 5 from said central station, for generating respective video signals;
 - a plurality of storage means, each located remotely from said central station and associated with a respective one of the video cameras for storing digital
 - 10 video data representative of the video signal generated by the respective video camera; and
 - connection means for forming a signal path between said central station and each of said storage means.
- 15 2. A video surveillance system according to claim 1, wherein said connection means includes a plurality of control means each operatively connected to a respective one of said storage means for controlling the respective storage means to operate as a ring buffer in which digital
- 20 video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means.
3. A video surveillance system according to claim 2,
- 25 further comprising:
 - sensor means for generating an alarm signal indicative of an alarm condition; and
 - means for transmitting said alarm signal from said sensor means to said central station.
- 30 ~~SECRET~~ 4. A video surveillance system according to claim 3, wherein said central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by
- 35 inhibiting overwriting of said oldest digital video data in

a
the respective storage means controlled by said control means.

5. A video surveillance system according to claim ⁴/₁, wherein said sensor means is coupled to said connection means for transmitting said alarm signal directly to at least one of said control means, said at least one of said control means responding to said alarm signal by inhibiting overwriting of said oldest digital video data in the respective storage means controlled by said control means.

a
10 ²/₁. A video surveillance system according to claim ⁴/₁, wherein said central station selectively transmits a retrieve signal to a selected one of said control means, said selected control means responding to said retrieve signal by transmitting to said central station digital video data read out from the storage means controlled by said selected control means.

³/₁. A video surveillance system according to claim ²/₁, further comprising display means associated with the central station for displaying images corresponding to the digital video data read out from the storage means and transmitted to the central station.

⁴/₁. A video surveillance system according to claim ³/₁, further comprising a video tape recorder controlled by said central station for recording signals corresponding to the digital video data read out from the storage means and transmitted to the central station.

a
⁵/₁. A video surveillance system according to claim ⁴/₁, wherein said connection means includes a common data transmission channel by which command signals are transmitted from said central station to said video cameras and digital video data read out from said storage means is transmitted to said central station.

a
⁶/₁. A video surveillance system according to claim ⁵/₁, wherein said digital video data stored in said storage

means and transmitted by said data transmission channel is compressed digital video data.

11. A video surveillance system according to claim 1, wherein each of said storage means is a solid state memory.

12. A video surveillance system according to claim 1, wherein each of said storage means is disposed in a respective housing together with the respective video camera.

13. A surveillance video camera unit, comprising:
a housing including a light transmissive portion;
a video camera, disposed within said housing, for forming an image from light which passes through said light transmissive portion of said housing and for converting said image into a video signal; and

storage means, disposed within said housing, for storing digital data representative of said video signal.

14. A surveillance video camera unit according to claim 13, wherein said video signal is an analog video signal, and further comprising:

conversion means, disposed within said housing, for converting said analog video signal into a digital video signal; and

processing means, disposed within said housing, for applying a data compression algorithm to said digital video signal to form compressed video data;

said compressed video data being stored in said storage means.

15. A surveillance video camera unit according to claim 14, wherein said conversion means and said processing means are integrated with said video camera so that said video camera outputs said compressed video data to said storage means.

16. A surveillance video camera unit according to claim 13, further comprising control means, disposed within said housing, for controlling said storage means to operate

as a ring buffer in which digital data representative of a video signal currently formed by said video camera is written over oldest digital data stored in said storage means.

5 17. A surveillance video camera unit according to claim 16, wherein said control means, in response to receiving an event signal, inhibits said overwriting of said oldest digital data.

10 18. A surveillance video camera unit according to claim 17, further comprising a plurality of motors disposed in said housing for changing pan, tilt and zoom conditions of said video camera, said control means generating control signals for controlling said plurality of motors, said camera unit further comprising means for transmitting said control signals from said control means to said plurality of motors.

15 19. A surveillance video camera unit according to claim 13, wherein said storage means is a solid state memory.

20 20. A method of storing video signals, comprising the steps of:

generating digital video signals using a plurality of video cameras;

25 storing the digital video signals generated by each camera in a respective storage device provided adjacent to the camera; and

selectively transmitting to a central station the digital video signals stored in each storage device.

30 21. A method according to claim 20, further comprising the steps of:

operating said storage devices as ring buffers in which currently generated digital video signals are written over oldest digital video signals stored in said storage devices; and

inhibiting said overwriting of said oldest digital video signals in response to receipt of an event signal.

22. A method according to claim 20, further comprising the step of tape-recording signals corresponding to said digital video signals transmitted to the central station.

23. A method according to claim 20, further comprising the step of displaying images corresponding to said digital video signals transmitted to the central station.

24. A video surveillance system, comprising:
a plurality of video cameras for generating video signals;
digital storage means for storing said video signals in the form of digital video data;
control means for generating camera control commands;
data transmission means for forming a data communication channel by which said camera control commands are transmitted from said control means to said plurality of video cameras; and
means for retrieving said stored digital video data from said digital storage means and for transmitting the retrieved digital video data to said control means via said data communication channel formed by said data transmission means.

25. A video surveillance system according to claim 24, wherein said video signals generated by said video cameras are analog video signals, said digital storage means including means for converting said analog video signals into digital video signals and means for compressing said digital video signals to form compressed digital video data.

26. A video surveillance system according to claim 24, wherein said video signals generated by said video cameras are in the form of compressed digital video data.

27. A video surveillance system according to claim 5 24, wherein said digital storage means includes a plurality of digital storage devices, each located adjacent to a respective one of said video cameras.

28. A video surveillance system according to claim 10 27, wherein said means for retrieving includes a plurality of control devices, each associated with a respective one of said digital storage devices.

29. A video surveillance system according to claim 28, wherein each of the storage devices is a solid state memory.

ADDA2

COMBINED DECLARATION AND POWER OF
ATTORNEY FOR PATENT APPLICATION

ATTORNEY DOCKET:
NO. C4-430

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as
stated below next to my name.

I believe I am the original, first and sole inventor (if only
one name is listed below) or an original, first and joint inventor (if
plural names are listed below) of the subject matter which is claimed
and for which a patent is sought on the invention entitled

DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM

the specification of which (check one)
☒ is attached hereto.

☐ was filed on _____, as application Serial
No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the
contents of the above-identified specification, including the claims,
as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is
material to the examination of the application in accordance with
Title 37, Code of Federal Regulations, Section 1.56(a).

I hereby claim foreign priority benefits under Section 119 of
Title 35, United States Code, of any foreign application(s) for
patent or inventor's certificate(s) listed below and have also
identified below any foreign application for patent or inventor's
certificate having a filing date before that of the application(s)
or inventor's certificate(s) on which priority is claimed:

PRIOR FOREIGN APPLICATIONS		Filing Date day/mo/yr	Priority Claimed Under 35 USC 119	
COUNTRY	SERIAL NO.		Yes	No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION SERIAL NO.	FILING DATE day/mo/yr	STATUS Patented, Pending, Aband.

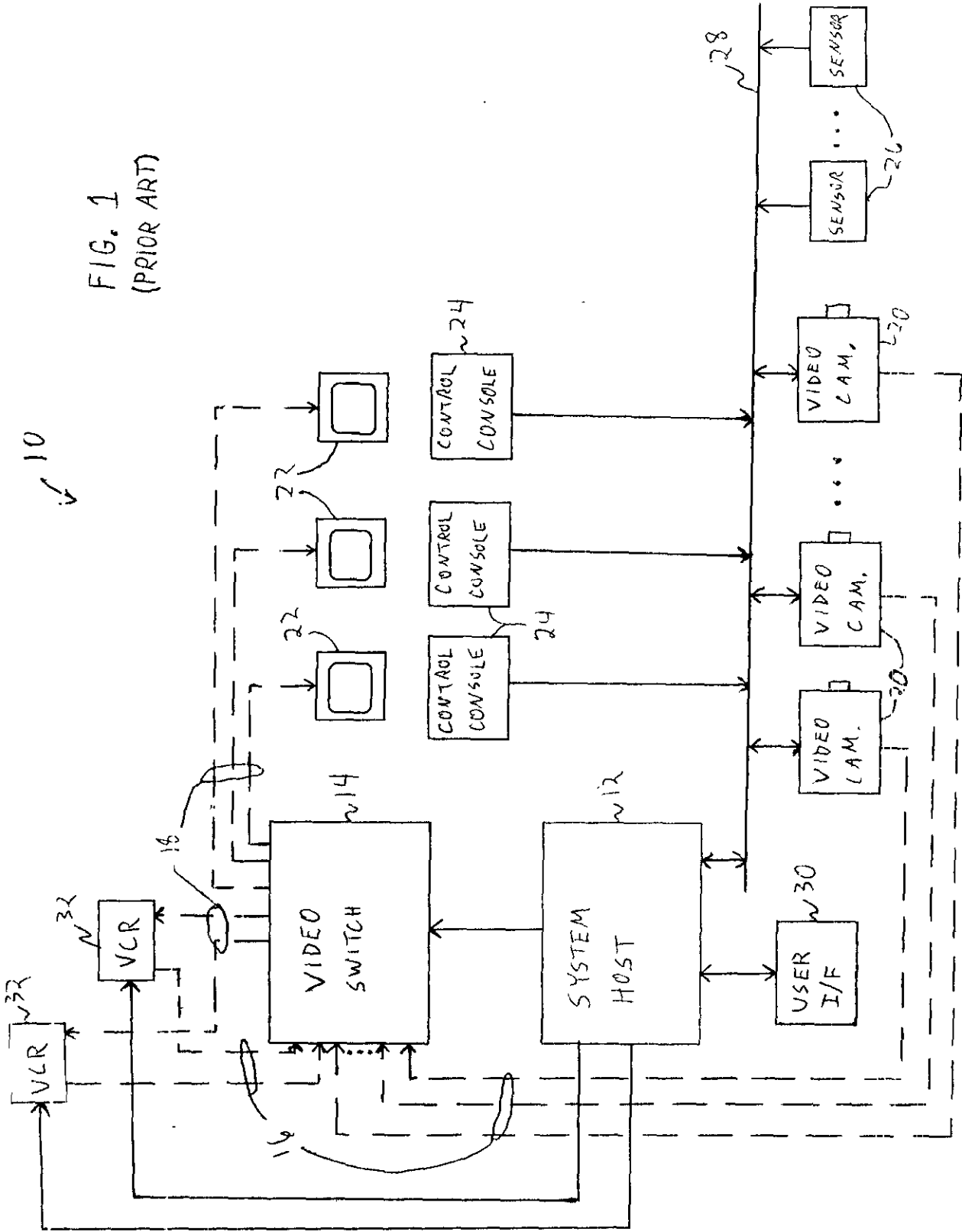
7
I hereby appoint James J. Daley, Registration No. 24,158, Herbert Blecker, Registration No. 20,368, John J. Torrente, Registration No. 26,359, Marylee Jenkins, Registration No. 37,645, Nathaniel Levin, Registration No. 34,860, Joe H. Shallenburger, Registration No. 37,937, and Paul T. Kashimba, Registration No. 29,180 as my attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Please address all correspondence to John J. Torrente at Robin, Blecker, Daley & Driscoll, 330 Madison Avenue, New York, New York 10017. Please direct telephone calls to (212) 682-9640.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of Sole or First Joint Inventor <u>Reuel Andrew Ely</u>	Inventor's Signature <u>Reuel Andrew Ely</u>	Date <u>4/15/96</u>
Residence <u>Plantation, Florida 32</u>		Citizenship <u>USA</u>
Post Office Address <u>560 NW 66th Avenue</u> <u>Plantation, Florida 33317</u>		

FIG. 1
(PRIOR ART)



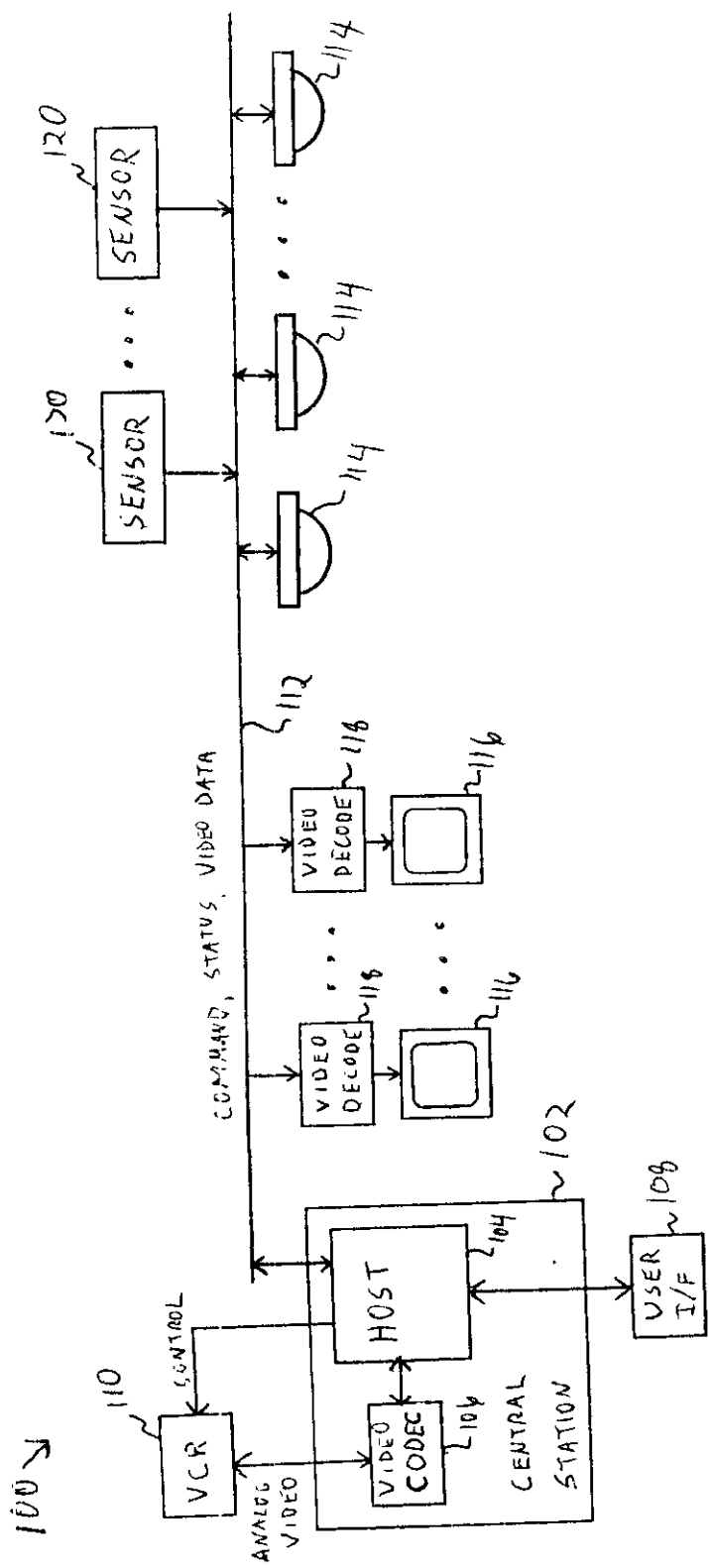


FIG. 2

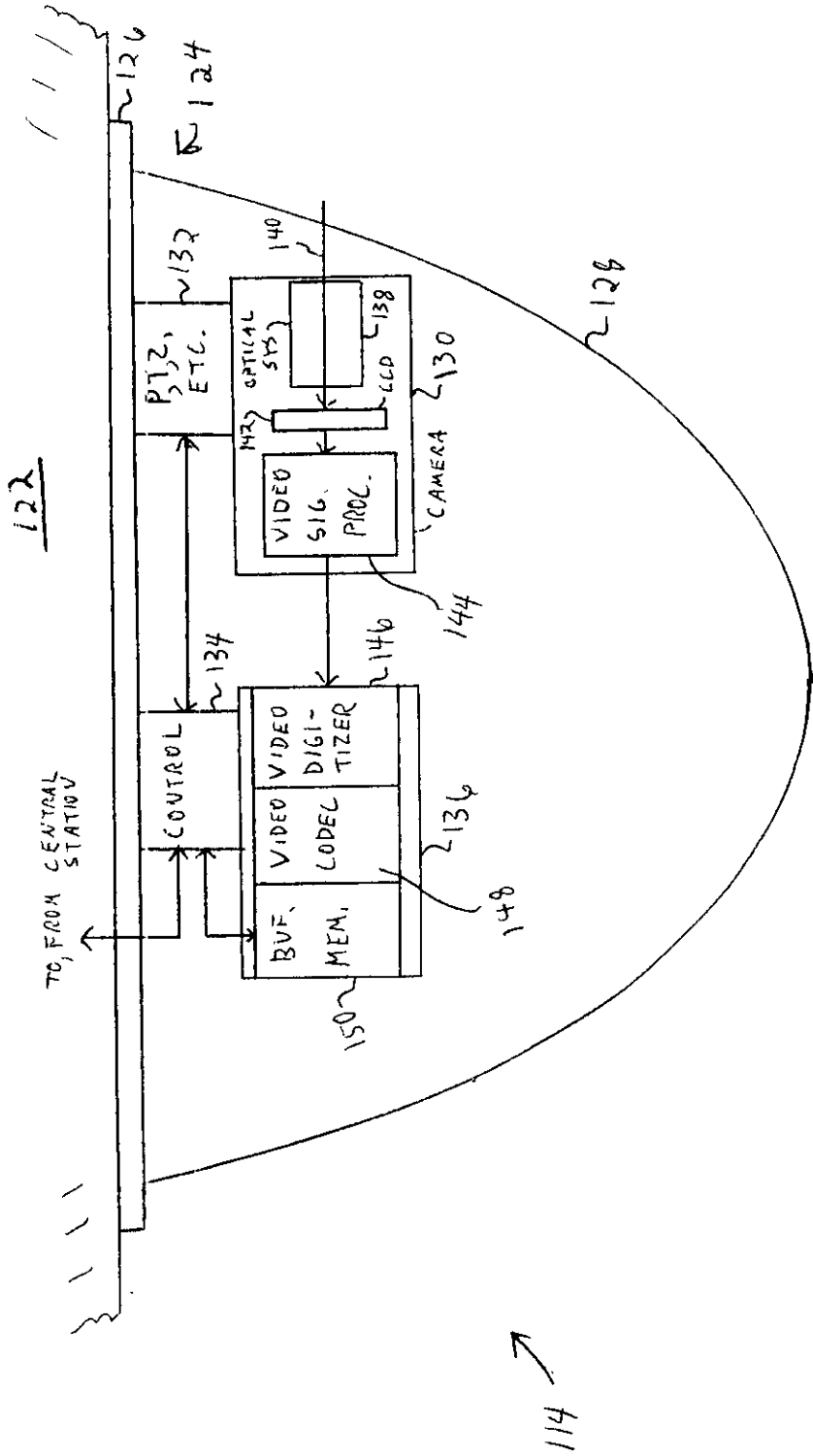


FIG. 3

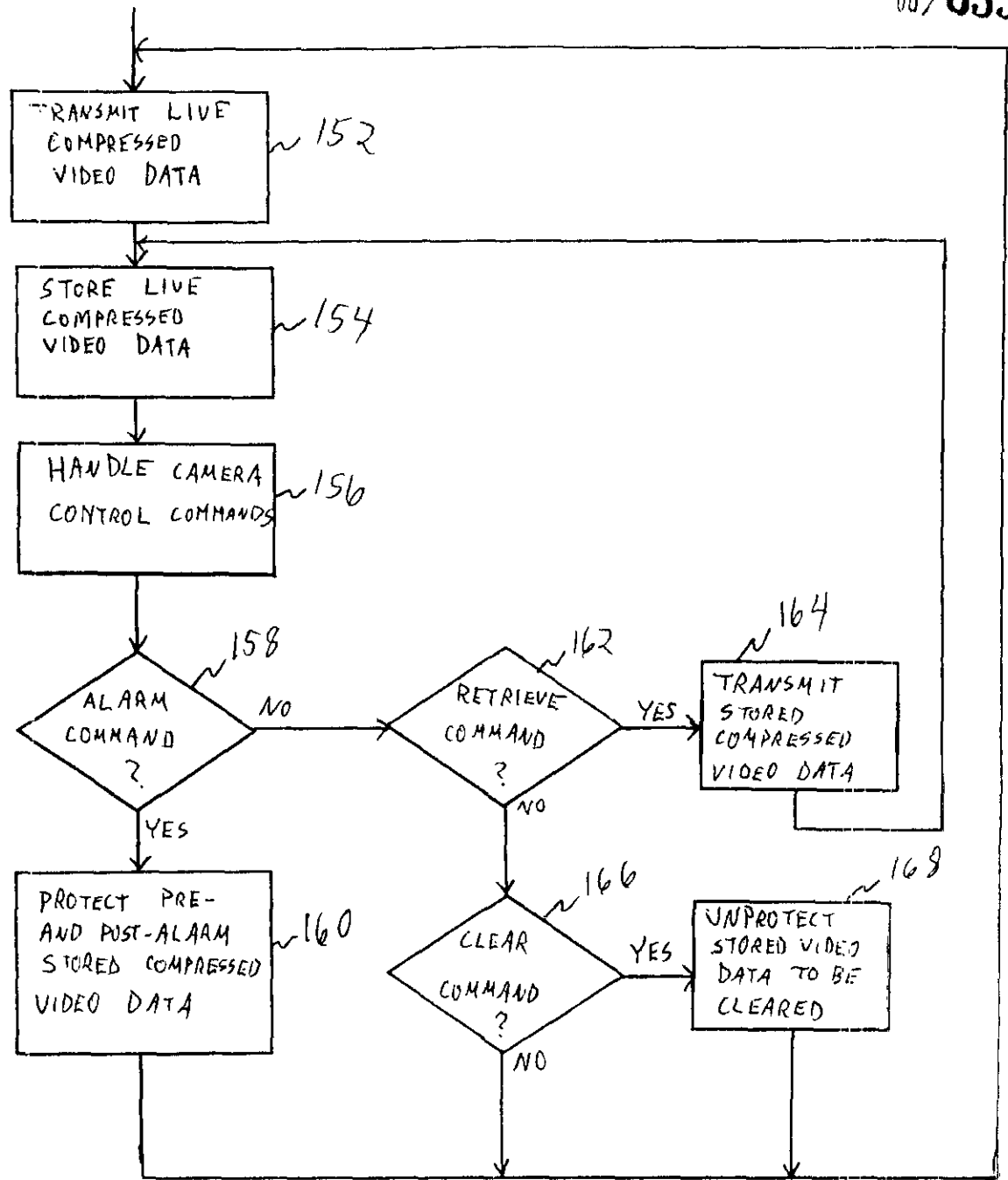


FIG. 4 CAMERA UNIT OPERATION

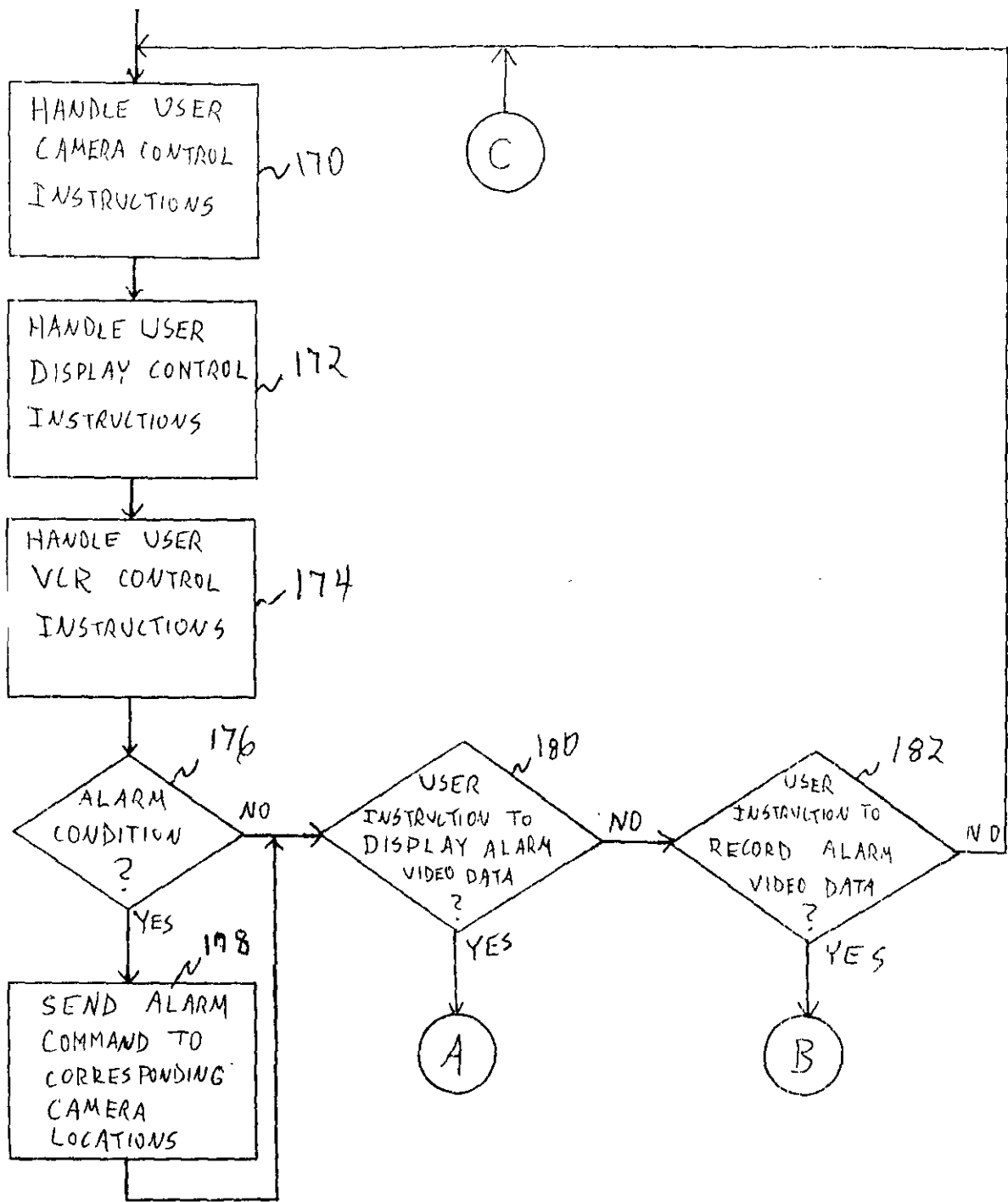


FIG. 5A

SYSTEM OPERATION

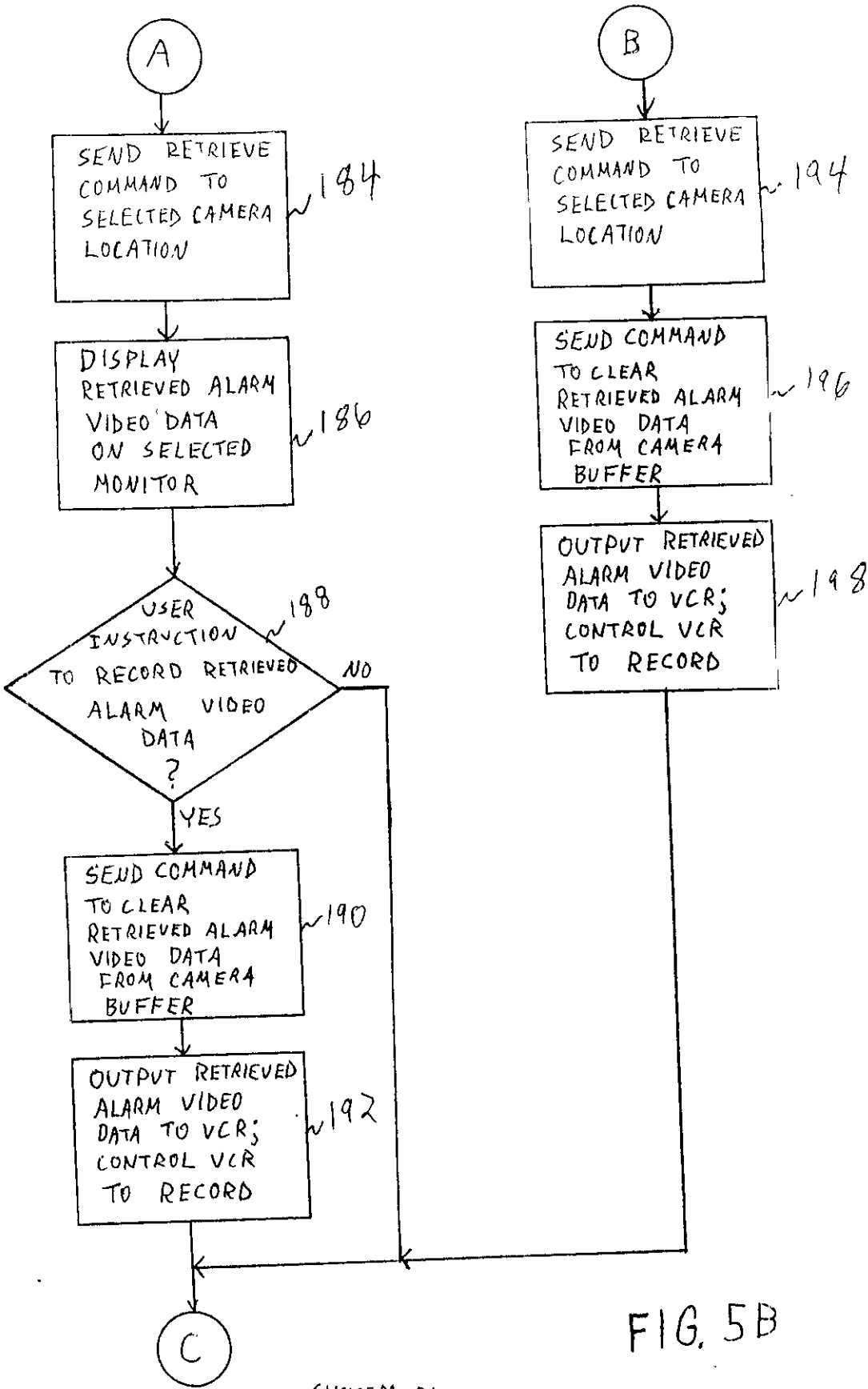


FIG. 5B

SYSTEM OPERATION



08/635692

ROBIN, BLECKER, DALEY & DRISCOLL

330 MADISON AVENUE
NEW YORK, NEW YORK 10017-5001
(212) 682-9640

ALBERT ROBIN
HERBERT BLECKER
JAMES J DALEY
MARIE V DRISCOLL
HOWARD B BARNABY
JOHN J TORRENTE

MARYLEE JENKINS
LEON J BECHET
NATHANIEL LEVIN
JOSEPH SHALLENBURGER*
ROBERT A BECKER
*NOT ADMITTED IN NEW YORK

TELEX
126337

CABLE
RTEROBIN
NEW YORK

FACSIMILE
212 682-9648

CERTIFICATE OF MAILING BY EXPRESS MAILING
"EXPRESS MAIL" LABEL NUMBER: EM254500190US
"POST OFFICE TO ADDRESSEE"
DATE OF DEPOSIT: April 22, 1996

I hereby certify that this correspondence and enclosed patent application is being deposited by me on April 22, 1996, with the United States Postal Service as Express Mail Label Number **EM254500190US**, in the depository located at 330 Madison Avenue, New York, New York 10017, and addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

John J. Torrente

Name of Person Making Deposit

Signature of Person Making Deposit

Assistant Commissioner
for Patents
Washington, D.C. 20231

RE: Filing of Patent Application
Our File C4-430

Dear Sir:

Enclosed for filing is a patent application of Reuel Andrew Ely for a DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM, the application comprising a Specification of 22 pages; 29 Claims, including 4 independent Claims; 6 sheets of Informal Drawings (Figures 1-5B); an Abstract and our check in the amount of \$1,026.00 in payment of the filing fee, which has been calculated as follows: \$750 base filing fee, \$198.00 for 9 claims in excess of 20; and \$78.00 for one independent claim.

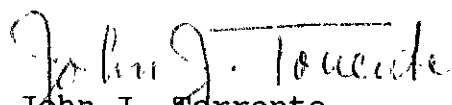
PATENT OWNER
Ex 2014

Assistant Commissioner
for Patents
April 22, 1996
Page Two

Also enclosed are a "Combined Declaration and Power of Attorney for Patent Application" and an "Assignment," as well as a "Recordation Form Cover Sheet" and our check in the amount of \$40.00.

Authorization is given for the charging of any further fee for effecting filing to our Deposit Account 18-1644.

Respectfully submitted,


John J. Torrente
Reg. No. 26,359
Attorney for Applicant

JJT/lb
Encl.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on:

NATHANIEL LEVIN

July 18, 1996

Date of Signature

Signature

PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : Unassigned
Art Unit : 2415
Assistant Commissioner
for Patents
Washington, D.C. 20231

#2
Rose
7-31-96

S I R:

INFORMATION DISCLOSURE STATEMENT

This Information Disclosure Statement is filed pursuant to 37 CFR 1.97 and 1.98.

Enclosed in duplicate is PTO-1449 listing the references AA and AB. Photocopies of the references are also enclosed.

Respectfully submitted,



Nathaniel Levin
Reg. No. 34,860

ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017

10 JUL 18 1996

RECEIVED

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE (Rev. 7-80) PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. C4-430	SERIAL NO. 08/635,692
	APPLICANT Reuel A. Ely	
	FILING DATE April 22, 1996	ART UNIT 2415 2713

LIST OF ART CITED BY APPLICANT
(Use several sheets if necessary)

U.S. PATENT DOCUMENTS

EXAMINER INITIAL	DOCUMENT NO.	DATE	NAME	CLASS	SUB- CLASS	FLG. DATE IF APPROP
N.D.	AA 5 1 0 9 2 7 8	04/28/92	Erickson et al.	358	108	
N.D.	AB 5 1 1 1 2 9 1	05/05/92	Erickson et al.	358	108	
	AC					
	AD					
	AE					
	AF					
	AG					
	AH					
	AI					
	AJ					
	AK					

U.S. PATENT DOCUMENTS													
EXAMINER INITIAL		DOCUMENT NO.						DATE	NAME		CLASS	SUB- CLASS	FLG. DATE IF APPROP
	AL												
FOREIGN PATENT DOCUMENTS													
		DOCUMENT NO.						DATE	COUNTRY	CLASS	SUB- CLASS	TRANSLATION YES NO	
	AM												
	AN												
	AO												
	AP												
	AQ												
OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)													
	AR												
	AS												
	AT												
EXAMINER <i>N. Drep</i>										DATE CONSIDERED <i>16 OCT 96</i>			
EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609; Draw line through citation if not in conformance <u>and</u> not considered. Include copy of this form with next communication to applicant.													



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO
04/25/92	04/25/95	ELY	R 1-130

JOHN J. TORRENTE
NORTH BLECKER DALEY AND DRISCOLL
330 MADISON AVENUE
NEW YORK NY 10017

EXAMINER

DIEP, H

ART UNIT	PAPER NUMBER
----------	--------------

26.15

3

DATE MAILED: 01/31/96

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

08/635,692

Applicant(s)

Reuel A. Ely

Examiner

N. Diep

Group Art Unit

2615



☒ Responsive to communication(s) filed on Apr 22, 1996

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-29 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 1-29 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority Under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received. _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e)

Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 2615

DETAILED ACTION

Claim Rejections - 35 U.S.C. § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 9, 11, 20, 24-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Toyoshima (US 5,229,850).

Toyoshima, in figure 7, discloses a video monitoring system comprising the same central station (elements 2) and a plurality of video cameras (elements 11) and a plurality of storage means (elements 13), connection means includes a common data transmission channel (element 3) as specified in claims 1 and 20; and connection means includes a common data transmission channel (element 3) as specified in claim 9; and storage means is a solid state memory (element 13A) as specified in claim 11; and generating means (element 11) and a digital storage means (element 13), control means (element 16) and data transmission means (element 1) and retrieving means (element 25) as specified in claim 24; and video signals are analog video signal and conversion means (element 1, A/D converter) and compressing means (element 14, col. 42-49) as specified in claim 25; and video signals are compressed signals (element 14, col. 42-49) as specified in claim 26; and storage means located adjacent to a respective video cameras (element

Art Unit: 2615

1) as specified in claim 27; and means for retrieving (element 25) as specified in claim 28; and storage device is a solid state memory (element 13A)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-8, 10 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima.

Toyoshima, in figure 7, shows substantially the same control means (element 16 and col.6, lines 1-19) as specified in claim 2; and a sensor means and means for transmitting alarm signal (element 15) as specified in claim 3; and sensor means is coupled to the connection means for transmitting alarm signal directly to control means (elements 15, 16) as specified in claims 5 and 21; and central station controlling means for selectively transmitting signal and inhibiting overwriting digital video signal (element 26 and col. 6, lines 48-55) as specified in claims 4, 6 and 21; and a display means (element 24) as specified in claims 7 and 23; and video data is compressed digital video data (elements 14, col. 42-49) as specified in claim 10. Toyoshima also teaches the using of the two frame memory storage to store and sent signal without losing valuable information; however, Toyoshima does not particularly disclose details such as:

Art Unit: 2615

- (a) a frame memory storage is a ring buffer memory as specified in claims 2 and 21; and
- (b) a video tape recorder as specified in claims 8 and 22.

Regarding (a), the examiner takes official notice that the ring buffer memory is well known in the art and commonly applicable as a frame memory storage device for distinctly storing data.

Regarding (b), the examiner, again, takes official notice that the use of a video tape recorder in connection with a TV receiver/display monitor is well known in the art and commonly used as home entertainment arrangement for recording data. Therefore, either of the above features (a) or (b) are considered as well known and would not be given any patentable value over Toyoshima.

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima as applied to claim 1 above, and further in view of Paff et al (US 4,833,534).

Toyoshima, as applied to claim 1 above, fails to particularly disclose that the storage means is disposed in a respective housing together with the respective camera. Paff et al., teaches the using of enclosures to house and ceiling mount their respective cameras of the surveillance systems (col. 1, lines 9-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to place the whole video camera unit of Toyoshima inside an enclosure. Doing so would help to house, ceiling mount the unit, make the unit as inconspicuous as possible to improve the effectiveness and marketability of the system.

Art Unit: 2615

Serial Number: 08/635,692

Page 5

6. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima in view of Paff et al.

Toyoshima, in figure 7, discloses substantially the same surveillance video camera unit comprising a video camera (element 11) and storage means (element 13A) as specified in claim 13; and video signal is an analog video signal and conversion means (element 1, A/D converter) and processing means (element 14, col. 5, lines 41-49) as specified in claim 14; and conversion means and processing means are integrated with the camera (element 1) as specified in claim 15; and control means (element 16) as specified in claim 16; and control means for inhibiting overwriting of signal (elements 16 and 25) as specified in claim 17. It is noted, Toyoshima does not disclose that his surveillance camera unit can be placed inside a housing including a light transmissive portion. Paff et al., teaches the using of enclosures which can be transmissive to light (col. 4, lines 4), to house and ceiling mount their respective cameras of the surveillance systems (col. 1, lines 9-20) . It would have been obvious to one of ordinary skill in the art at the time the invention was made to place the whole video camera unit of Toyoshima inside an enclosure. Doing so would help to house, ceiling mount the unit, make the unit as inconspicuous as possible, therefore to improve the effectiveness and marketability of the system.

7. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Toyoshima and Paff et al., as applied to claim 17 above, and further in view of Kutman (US 4,736,218).

Art Unit: 2615

The combination of Toyoshima and Paff et al., as applied to claim 17 above, fails to particularly disclose a plurality of motors disposed in the housing for changing pan, tilt and zoom and a control means to generating control signals to control these motors. Kutrnan teaches the using of motors controlled by a controller, all are located inside the same housing unit as a video camera to control the panning, tilting and zooming of the video camera (col. 3, lines 55-56 and col. 12, lines 26-31). It would have been obvious for one of ordinary skill in the art at the time the invention was made to modify the system of the combination of Toyoshima and Paff et al., to include motors for controlling panning, tilting and zooming . Doing so would help to provide a maximum amount of viewing coverage or subtended angle and therefore greatly improve the system capability and marketability.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Kuban et al., discloses a device for omnidirectional image viewing providing pan-tilt orientation, and magnification within a selected field of view for use in variety of application.

b. McGary discloses an image transmission system and method automatically reduce the size of digital data signals transmitted from visual sensors.

c. Shiota et al., discloses a video surveillance system for selectively processing and selecting processing and displaying the outputs of a plurality of TV cameras.

Serial Number: 08/635,692

Page 7

Art Unit: 2615

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon Diep whose telephone number is (703) 305-4648. The examiner can normally be reached on Monday-Friday from 7:00 A.M. to 4:00 P.M. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tommy Chin, can be reach on (703) 305-4715. The fax number for this art unit is (703) 308-5399.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-4700.

N. D.

N. Diep

October 27, 1996

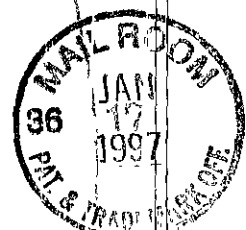

TOMMY P. CHIN
SUPERVISORY PATENT EXAMINER
GROUP 2600

Notice of References Cited			Application No 08/635,692		Applicant(s) Reuel A Elv	
			Examiner N. Diep		Group Art Unit 2618 2713	
Page 1 of 1						
U.S. PATENT DOCUMENTS						
	DOCUMENT NO	DATE	NAME		CLASS	SUBCLASS
A	5,521,634	05/28/96	McGary		348	153
B	5,229,850	07/20/93	Toyoshima		348	153
C	4,943,854	07/24/90	Shiota et al		348	159
D	4,833,534	05/23/89	Paff et al.		348	151
E	4,736,218	04/05/88	Kutman		354	81
F	5,359,363	10/25/94	Kuban et al		348	36
G						
H						
I						
J						
K						
L						
M						
FOREIGN PATENT DOCUMENTS						
	DOCUMENT NO	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						
NON-PATENT DOCUMENTS						
	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)					DATE
U						
V						
W						
X						

Attachment 3

The drawings submitted with this application were declared informal by the applicant. Accordingly they have not been reviewed by a draftsperson at this time. When formal drawings are submitted, the draftsperson will perform a review.

Direct any inquiries concerning drawing review to the Drawing Review Branch (703) 305-8404.



PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN VIDEO
SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2615 ✓

Assistant Commissioner
for Patents
Washington, D.C. 20231

S I R:

RECEIVED
JAN 20 97
GROUP 2630

AMENDMENT

In response to the Office Action issued October 31, 1996,
please amend the subject application as follows:

IN THE CLAIMS

Cancel claims 1-3, 5 and 13-29.

Amend claim 4 by rewriting the same as below:

(Amended) A video surveillance system [according to claim
3], comprising:
a central station;
a plurality of video cameras, located remotely from said
central station, for generating respective video signals;
a plurality of storage means, each located remotely from
said central station and associated with a respective one of the

I hereby certify that this correspondence is being deposited with the United States Postal Service as
First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C.
20231, on:

NATHANIEL LEVIN

Signature

A1
cont

1-30-97

video cameras for storing digital video data representative of the video signal generated by the respective video camera;

connection means for forming a signal path between said central station and each of said storage means, said connection means including a plurality of control means each operatively connected to a respective one of said storage means for controlling the respective storage means to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means;

sensor means for generating an alarm signal indicative of an alarm condition; and

means for transmitting said alarm signal from said sensor means to said central station;

wherein said central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective storage means controlled by said control means.

Claim 5, line 1, change "3" to -- 4 --.

Claim 6, line 1, change "2" to -- 4 --.

Claim 9, line 1, change "1" to -- 4 --.

Claim 10, line 1, change "2" to -- 4 --.

Claim 11, line 1, change "1" to -- 4 --.

Claim 12, line 1, change "1" to -- 4 --.

Add new claims 30-46 as below:

SUPPLY

30. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition; and

a local area network (LAN) connected among all of said central station, said camera units and said sensors, for transmitting said digital video data from said digital storage devices to said central station and for transmitting said alarm signals from said sensors to said central station. --

31. A video surveillance system according to claim 30, further comprising a plurality of monitors, connected to said LAN, for receiving and displaying video signals corresponding to video signals generated by said camera units.

32. A video surveillance system according to claim 31, wherein digital video data transmitted via said LAN from one of said camera units to said central station is retransmitted via said LAN from said central station to one of said monitors for display on said one of said monitors.

33. A video surveillance system according to claim 31, wherein digital video data is transmitted via said LAN directly

from one of said camera units to one of said monitors for display on said one of said monitors. ↵

↵ ~~34~~¹³. A video surveillance system according to claim ~~30~~⁹, wherein control signals are transmitted via said LAN from said central station to said camera units for controlling said camera units. ↵

↵ ~~35~~¹⁴. A video surveillance system according to claim ~~30~~⁹, further comprising a camera control console, connected to said LAN, for generating signals for controlling said camera units. ↵

↵ ~~36~~¹⁵. A video surveillance system according to claim ~~30~~⁹, further comprising a data recorder, connected to said LAN, for recording digital video data transmitted via said LAN. ↵

↵ ~~37~~¹⁶. A video surveillance system according to claim ~~30~~⁹, wherein digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a video signal corresponding to said digital video data is generated at said one of said camera units. - ↵

↵ ~~38~~¹⁷. A video surveillance system according to claim ~~30~~⁹, wherein digital video data stored in one of said camera units is transmitted via said LAN to said central station from one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units. ↵

↵ ~~39~~¹⁸. A video surveillance system according to claim ~~30~~⁹, wherein:

first digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a

A2
cont

video signal corresponding to said first digital video data is generated at said one of said camera units; and

second video data stored in one of said camera units is transmitted via said LAN to said central station from said one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units. S

40. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of monitors for displaying video signals corresponding to digital video data stored in said digital storage devices; and

a local area network (LAN) connected among all of said central station, said camera units and said monitors, for transmitting said digital video data from said digital storage devices to said central station and for transmitting said digital video data to said monitors from at least one of said central station and said camera units. -

41. A video surveillance system according to claim 40, wherein said central station, said monitors and said camera units are connected to each other only by said LAN. --

A2
cont

SUB B1
R

42. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition;

message means interconnecting said central station, said camera units and said sensors, for transmitting command messages from said central station to said camera units and for transmitting said alarm signals from said sensors to said central station;

a plurality of monitors for receiving and displaying video signals corresponding to video signals generated by said camera units;

a video switch;

first analog signal lines, connected between said video switch and said camera units, for transmitting analog video signals from said camera units to said video switch; and

second analog signal lines, connected between said video switch and said monitors, for transmitting analog video signals from said video switch to said monitors;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected

ones of said second analog signal lines to route analog video signals from said camera units to said monitors;

said analog video signals routed to said monitors from said camera units including analog video signals corresponding to signals retrieved from said digital storage devices pursuant to command signals transmitted via said message means from said central station to said camera units. *5*

5 43. A video surveillance system according to claim 42, wherein.

each of said camera units includes control means for controlling the respective digital storage device to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective digital storage device; and

said central station responds to receiving an alarm signal from one of said sensors by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective digital storage device controlled by said control means. --

5 ²⁰~~44~~. A video surveillance system according to claim ¹⁹~~42~~, wherein said message means includes a local area network (LAN) connected among said central station, said camera unit ⁵~~and~~ said sensors. *5*

→ ~~21~~
45. A video surveillance system according to claim ~~42~~¹⁹, wherein said analog video signals routed to said monitors from said camera units include live video signals. →

→ ~~22~~
46. A video surveillance system according to claim ~~42~~¹⁹, further comprising:

a plurality of video cassette recorders (VCRs); and

third analog signal lines, connected between said video switch and said VCRs, for transmitting analog video signals from said video switch to said VCRs;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said third analog signal lines to route analog video signals from said camera units to said VCRs. →

REMARKS

Claims 4, 6-12 and 30-46 are now in this application, claims 1-3, 5 and 13-29 have been cancelled in this Amendment, and new claims 30-46 added.

Claims 4 and 6-12 stand rejected and are now presented for reconsideration in view of the following remarks.

Claim 4 has been rewritten in independent form so as to incorporate the limitations of claims 1-3, but has not been changed in scope. Claim 4 stands "rejected under 35 U.S.C. § 103(a) as being unpatentable over" the Toyoshima reference.

Claim 4 is directed to a video surveillance system which includes a central station, a plurality of video cameras and a plurality of alarm condition sensors. Associated with each video camera is a ring buffer which stores video data representing the signal generated by the respective camera. In response to an alarm signal transmitted from one of the sensors to the central station, the central station transmits a storage signal to a control device to inhibit overwriting of video data in one of the ring buffers.

As explained at page 8, lines 28-35, the claimed system can store video signals corresponding to conditions before, during and after an alarm event, and the stored signals are available for subsequent review and permanent recording.

In explaining the rejection of claim 4, the Examiner referred to element 26 of Toyoshima and a passage at column 6, lines 48-55 of Toyoshima's disclosure, and the Examiner asserted that Toyoshima discloses a "central station controlling means" which selectively transmits a signal and inhibits overwriting a digital video signal.

Applicant notes that the control console 26 of Toyoshima's system is said, at the cited passage in column 6 of the reference, to selectively send either a signal to retrieve a video signal previously stored at a remote camera location, or to terminate transmission of a live signal from the remote location. This is different from the feature recited in claim 4 of a central station which responds to an alarm signal by transmitting a storage signal to inhibit overwriting of video data in a remote storage device. Although Toyoshima teaches inhibiting overwriting in a remote video

signal storage device in response to detection of an alarm condition (column 9, lines 35-44), this is done only by a remote control unit in response to a signal provided by a sensor 15 directly connected to the remote camera unit.

A careful reading of Toyoshima's disclosure indicates that the reference fails to teach the technique recited in claim 4, in which an alarm signal is transmitted from a sensor to the central station, and then the central station responds to the alarm signal by transmitting another signal to the remote storage location to inhibit overwriting of the data in the storage device at the remote location. Toyoshima's design philosophy teaches away from the technique of claim 4, because Toyoshima emphasizes that no signal path is provided between the remote camera unit and the central station until after an alarm condition is noted and the relevant video data has been stored. Moreover, the system of claim 4 provides greater flexibility in alarm handling than does Toyoshima's system, because in the claimed system, alarm conditions are associated with specific cameras only indirectly via the central station, whereas in Toyoshima, each alarm condition is fixed in its association with a given camera by the hard-wired connection between the alarm sensor and the respective camera.

It is accordingly submitted that claim 4 is patentably distinguished from the Toyoshima reference by virtue of its recitation of an alarm signal transmitted to the central station and a storage signal transmitted from the central station to

inhibit overwriting in a remote ring buffer, in response to the alarm signal.

Claims ~~5~~-12 are all directly or indirectly dependent on claim 4, and are submitted as patentable on the same basis as claim 4.

The video surveillance system defined in new independent claim 30 departs from the Toyoshima reference by reciting a central station, a plurality of video camera units including storage devices therein, and a plurality of sensors, all connected together by a local area network (LAN). Support for this LAN-based system architecture is provided in Fig. 2 of the present application and is discussed at page 9, line 28 to page 10, line 18 of the present application.

Claim 30 is submitted as patentably distinguished from the Toyoshima reference because claim 30 recites a LAN constituting a fixed digital signal path among the central station, camera units and sensors, whereas Toyoshima et al. teaches directly away from any fixed video data transmission facility between a remote camera and a central station. Rather, Toyoshima emphasizes the desirability of providing the digital video transmission path only on a dial-up basis. (See, for example, col. 1, lines 55-64, at which the main object of Toyoshima's invention is stated as "to provide a video monitoring system capable of establishing a communication path between the sending station which acquires the video signal and the receiving station which monitors the acquired video signal through a display only when monitoring is desired . . ."; emphasis added).

Claims 31-39 are all dependent, directly or indirectly, on claim 30, and are submitted as patentable on the same basis as claim 30.

The second new independent claim, which is claim 40, is like claim 30 in that it recites a LAN-based video surveillance system which provides a fixed video data signal path between a central station and remote cameras. Accordingly, claim 40 and its dependent claim 41 are submitted as patentably distinct from the Toyoshima reference on substantially the same basis as claim 30.

The last new independent claim, which is claim 42, is directed to an alternative system architecture discussed at page 20, line 33 to page 21, line 22 of the present application. According to this system, remote cameras are provided with video data buffering capability, and analog video signal transmission, using a video switch, is employed to route video signals from the camera units to monitors and VCRs. The system of claim 42 is believed to be patentably distinct from, and indeed directly contrary to, the teachings of the Toyoshima reference, which emphasizes the desirability of substituting a dial-up digital transmission system for analog video switching. Claim 42 and its dependent claims 43-46 are therefore submitted as patentable over the Toyoshima reference.

Allowance of the pending claims and passage of this application to issue are respectfully requested.

Respectfully submitted,



Nathaniel Levin
Registration No. 34,860

ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017
(212) 682-9640



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO
----------------	-------------	----------------------	--------------------

08/11/35; 09/25/12	4/24/96	ELY	000000
--------------------	---------	-----	--------

1

JOHN J. CORNELL
ROBIN BAKER DALRY AND ASSOCIATES
330 MADISON AVENUE
NEW YORK NY 10017

26ML/0318

7

EXAMINER

DEE, N

ART UNIT	PAPER NUMBER
----------	--------------

2615

5

DATE MAILED: 03-10/97

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action SummaryApplication No.
08/635,692Applicant(s)
Reuel A. FlyExaminer
N. DiepGroup Art Uni.
2615☒ Responsive to communication(s) filed on Jan 17, 1997☒ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

- ☒ Claim(s) 4, 6-12 and 30-46 is/are pending in the application
Of the above, claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 4, 6-12, and 30-46 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claims _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
- ☐ received.
- ☐ received in Application No. (Series Code/Serial Number) _____.
- ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
- * Certified copies not received: _____
- ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- ☒ Notice of References Cited, PTO-892
- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☐ Interview Summary, PTO-413
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Serial Number: 08/635,692

Page 2

Art Unit: 2615

DETAILED ACTION

Response to Amendment

1 Applicant's arguments filed 1/17/97 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 112

The following is a quotation of 37 CFR 1.71(a)-(c):

(a) The specification must include a written description of the invention or discovery and of the manner and process of making and using the same, and is required to be in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention or discovery appertains, or with which it is most nearly connected, to make and use the same.

(b) The specification must set forth the precise invention for which a patent is solicited, in such manner as to distinguish it from other inventions and from what is old. It must describe completely a specific embodiment of the process, machine, manufacture, composition of matter or improvement invented, and must explain the mode of operation or principle whenever applicable. The best mode contemplated by the inventor of carrying out his invention must be set forth.

© In the case of an improvement, the specification must particularly point out the part or parts of the process, machine, manufacture, or composition of matter to which the improvement relates, and the description should be confined to the specific improvement and to such parts as necessarily cooperate with it or as may be necessary to a complete understanding or description of it.

Art Unit: 2615

The specification is objected to under 37 CFR 1.71 because as originally filed, it does not provide support for the invention as is now claimed.

2 Claims 42-46 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicant own application teaches **away from using analog signals by means of A/D converters** (page 8, lines 13-20), therefor applicant's disclosure could not handle the transmission of analog signals as are now claimed without introducing new subject matters.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 30-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoshima (US 5,229,850) in view of the applicant's admitted prior art (Fig. 1 of applicant's application) and further in view of Blackwell et al. (US 5,602,933).

Art Unit: 2615

Newly amended claims 30-46 recites all limitations which were rejected by the first office action and the following additional features:

- a. monitors for displaying (Prior art's fig. 1, element 22);
- b. recorder (Prior art's fig. 1, element 32);
- c. a video switch (Prior art's fig. 1, element ~~32~~¹⁴);
- d. video switch's control (Prior art's fig. 1, element 12).
- e. first analog signal lines (Prior art's fig. 1, broken lines);
- f. second analog signal lines (Prior art's fig. 1, broken lines);
- g. third analog signal lines (Prior art's fig. 1, broken lines); and
- h. system is connected to the local area network (LAN);

With regards to a-g: It is noted that Toyoshima does not particularly disclose all elements from a-g. Applicant own prior art's figure 1 discloses all the above elements for use in the surveillance camera system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Toyoshima to include all elements in the applicant's admitted prior art. Doing so would help to better monitor and shorten the response time which is critical in case of alarm conditions.

With regards to h: Toyoshima alone or in combination with applicant prior art does not particularly disclose that the entire surveillance system is being connected to the local area network (LAN). Blackwell et al., teaches the using of the local area network in the method and apparatus for verification of remotely accessed data. It would have been obvious for one of

Ar Unit: 2615

ordinary skill in the art at the time the invention was made to modify the system of Toyoshima to interconnect with the local area network (LAN). Doing so would help to improve the reliability of the system and also it is easier to share information with authority in case of alarm conditions.

Response to Arguments

5. In response to applicant's argument that claim 4 stands rejected, the examiner respectfully disagrees. Claim 4 recites that: "the central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest video data in the respective storage means controlled by said control means". Toyoshima, in col. 6, lines 1-19 and in conjunction to Toyoshima's third embodiment disclosed in columns 11-12, clearly teaches that the controller, in responding to the detection signal, first enables the A/D converter, put the frame memory in a write-enable state, converts an analog signal to digital signal corresponding to the video of the object when the monitored particular event is detected, and stores the converted signal in the frame memory. Writing image signal in the frame memory is made until the frame memory is filled to capacity and writing and reading are inhibited to maintain the stored video signal. The limitations of newly amended claim 4 are therefor anticipated by Toyoshima.

Serial Number: 08/635,692

Page 6

Art Unit: 2615

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhon Diep whose telephone number is (703) 305-4648.

N. D.

Nhon Diep

March 5, 1997


TOMMY P. CHIN
SUPERVISORY PATENT EXAMINER
GROUP 2600

Notice of References Cited		Application No. 08/635,692	Applicant(s) Reuel A. Fly			
		Examiner N. Diep	Group Art Unit 2615 2713	Page 1 of 1		
U.S. PATENT DOCUMENTS						
	DOCUMENT NO	DATE	NAME	CLASS	SUBCLASS	
A	5,602,933	2/11/97	Blackwell et al.	348	143	
B						
C						
D						
E						
F						
G						
H						
I						
J						
K						
L						
M						
FOREIGN PATENT DOCUMENTS						
	DOCUMENT NO	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						
NON-PATENT DOCUMENTS						
	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)				DATE	
U						
V						
W						
X						



PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN VIDEO
SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2615

Box AF
Assistant Commissioner
for Patents
Washington, D.C. 20231

S I R:

AMENDMENT

In response to the Office Action issued March 18, 1997, please
amend the subject application as follows:

IN THE CLAIMS

Cancel claim 43.

Amend claim 42 by rewriting the same as below:

42. A video surveillance system, comprising:
a central station;
a plurality of camera units each including a
respective video camera for generating respective video signals and
a respective digital storage device for storing digital video data
representative of the video signal generated by the respective
video camera;

a plurality of sensors each for generating a
respective alarm signal indicative of an alarm condition;

I hereby certify that this correspondence is being deposited with the United States Postal Service as
First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C.
20231 on

NAIDANIEL LEM JUNG

Signature

April 29, 1997
Date of Signature

Please Enter
5/19/97

BI
cont. RF
5/17/97

N.D.
#6B
Rosa
5/7/97
RECEIVED
MAY-6 97
GROUP 2600

message means interconnecting said central station, said camera units and said sensors, for transmitting command messages from said central station to said camera units and for transmitting said alarm signals from said sensors to said central station;

a plurality of monitors for receiving and displaying video signals corresponding to video signals generated by said camera units;

a video switch;

first analog signal lines, connected between said video switch and said camera units, for transmitting analog video signals from said camera units to said video switch; and

second analog signal lines, connected between said video switch and said monitors, for transmitting analog video signals from said video switch to said monitors;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said second analog signal lines to route analog video signals from said camera units to said monitors;

said analog video signals routed to said monitors from said camera units including analog video signals corresponding to signals retrieved from said digital storage devices pursuant to command signals transmitted via said message means from said central station to said camera units

each of said camera units including control means for controlling the respective digital storage device to operate as

B1
ConcQ

a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective digital storage device; and

said central station responding to receiving an alarm signal from one of said sensors by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective digital storage device controlled by said control means.

Claim 44, line 3, change "unit" to --units--.

REMARKS

Claims 4, 6-12, 30-42 and 44-46 remain in this application, claim 43 having been canceled in this amendment. It is noted that the above-indicated amendment to claim 42 merely incorporates therein the features originally recited in former claim 43, so that no new issue is believed to be presented by this amendment.

The pending claims stand rejected and are now presented for reconsideration in view of the following remarks.

The specification was objected to under 37 C.F.R. 1.71, and claims 42 and 44-46 were rejected under 35 U.S.C. §112, first paragraph, on the ground that the inventions recited in those claims are not supported by the specification. This objection and rejection are respectfully traversed.

It is believed that the Examiner has failed to consider the passage at page 20, line 33 to page 21, line 22 of the present

application which provides explicit support for the features recited in claims 42 and 44-46. Quoting from the first sentence of that passage (page 20, line 33 to page 21, line 4), the application specifically states that "[a]s an alternative to the 'all-digital' architecture shown in Fig. 2, ... it is also contemplated in accordance with the invention to provide an architecture like that of Fig. 1, but utilizing camera units having local buffering capabilities like those of the unit illustrated in Fig. 3."

Applicant also respectfully differs with the Examiner's characterization of the passage at page 8, lines 13-20 as "teaching away" from using analog signals. That passage should clearly be understood as describing the "all-digital" aspect of the invention described in the preceding paragraph (page 7, line 34 to page 8, line 12), and is in no way inconsistent with the alternative system architecture explicitly described at pages 20-21.

It is therefore felt that the objection to specification and the rejection under §112 are not well founded and should be withdrawn.

The pending claims were "rejected under 35 U.S.C. §103(a) as being unpatentable over" an asserted combination of the Toyoshima and Blackwell et al. references taken with prior art described in the present application.¹

Claim 4 is directed to a "video surveillance system" which includes "a central station", "a plurality of video cameras"

¹ It is assumed that the rejection under §103 was intended to apply to claims 4 and 6-12, although this was not expressly stated in the pending Office Action.

located remotely from the central station, and "a plurality of storage means, each located remotely from the central station, each of the storage means "being associated with a respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera". Claim 4 further recites "connection means for forming a signal path between" the central station and each of the storage means, the connection means "including a plurality of control means each operatively connected to a respective one" of the storage means "for controlling the respective storage means to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means". Further elements recited in claim 4 are "sensor means for generating an alarm signal indicative of an alarm condition", and "means for transmitting" the alarm signal from the sensor means to the central station. Claim 4 concludes with the recitation that the central station "responds to receiving" the alarm signal "by transmitting a storage signal to at least one of" the control means, and that the control means responds to the storage signal "by inhibiting overwriting" of the oldest digital video data in the respective storage means controlled by the control means.

Thus, to highlight a key feature of claim 4 which is believed to patentably distinguish claim 4 from the prior art of record, the central station receives an alarm signal and responds to the alarm signal by transmitting a storage signal to a storage device located

remotely from the central station, to "freeze" (inhibit overwriting of) video data in the remotely located storage device. Such a "central station" which freezes the video data stored in a storage device remotely located from the central station simply is not disclosed or suggested by the Toyoshima reference nor by the other prior art of record. The "controller 16" referred to at col. 6, line 1-19 of Toyoshima cannot satisfy the claimed "central station" since Toyoshima's controller 16 only controls storage devices (e.g., frame memories 13) which are co-located with the controller 16.² It therefore is not the case that Toyoshima "anticipates" claim 4, and it is submitted that claim 4, and its dependent claims 6-12, are patentable over the prior art of record.

Claims 30 and 40 are both directed to "all-digital" video surveillance systems in which a local area network (LAN) is used to transmit digital video data from video camera/video data storage units to a central station. In addition, in claim 40 the LAN also transmits digital video data from the central station or from the camera/storage units to video display monitors.

In explaining the pending rejection of claims 30 and 40, the Examiner conceded that neither the Toyoshima reference, nor the prior art system described in the present application, includes the

² It is noted that the arrangement recited in claim 4, in which the central station reacts to alarm signals by selectively freezing the contents of remotely-located video data storage devices, provides much more flexibility in terms of assigning (or reprogramming assignments of) associations between alarm sensor devices and video cameras/memory units to be controlled in response to the outputs of sensor devices than is possible in the system architecture shown in the Toyoshima reference.

feature of using a LAN to transmit digital video data from video camera/video data storage units to a central station. However, the Examiner attempted to make up for this deficiency by relying on the teachings related to use of local area networks in the Blackwell et al. reference.

Applicant respectfully urges that the actual teachings of the Blackwell et al. reference do not support the Examiner's reliance thereon. As far as the applicant is able to determine from the Blackwell et al. reference, the LAN's shown therein are only used for local communications, and so fail to teach transmitting video signals between video camera/video data storage units and a central station via a LAN. Moreover, it is not seen that the Blackwell reference ever indicates that the LANs are used for transmitting video data.

It is therefore submitted that the prior art relied upon by the Examiner fails to disclose the claimed features of using a LAN to transmit digital video data from a camera/storage unit to a central station or from a central station or camera unit to a display monitor. Claims 30 and 40 are therefore believed patentable over the prior art of record.

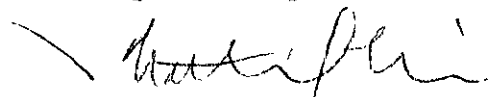
The respective dependent claims 31-39 and 41 are also submitted as patentable on the same basis as the parent independent claims 30 and 40. In addition, claim 32, which is dependent on claim 30, recites that digital video data transmitted via the LAN from one of the camera units to the central station is retransmitted via the LAN from the central station to one of the

video display monitors. This feature, as well, is absent from the prior art relied upon by the Examiner.

Claim 42, as now amended (i.e., as equivalent to former claim 43) recites a central station which responds to receipt of an alarm signal by transmitting a storage signal to at least one control means present in a respective video camera/digital video storage unit to inhibit overwriting of the oldest digital video data in the respective storage unit. Among other functions, the central station also controls a video switch. No such central station which sends a signal to "freeze" data in a camera/storage unit is disclosed in the Toyoshima reference or elsewhere in the prior art of record. Claim 42, as now amended, is therefore submitted as patentable. The remaining dependent claims 44-46 are believed patentable on the same basis.

It is believed that all of the pending rejections have now been overcome, and that the application is in condition for allowance. Passage of this case to issue is respectfully requested.

Respectfully submitted,



Nathaniel Levin
Registration No. 34,860

ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017
(212) 682-9640



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
Address COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

SERIAL NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NO.
08/635,692	04/22/96	ELY	R C4-430

26N2/0513
JOHN J TORRENTE
ROBIN BLECKER DALEY AND DRISCOLL
330 MADISON AVENUE
NEW YORK NY 10017

EXAMINER	
DIEP, N	
ART UNIT	PAPER NUMBER
2615	7

DATE MAILED: 05/13/97

Below is a communication from the EXAMINER in charge of this application

COMMISSIONER OF PATENTS AND TRADEMARKS

ADVISORY ACTION

☒ THE PERIOD FOR RESPONSE:

- a) ☐ is extended to run _____ or continues to run _____ from the date of the final rejection
- b) ☒ expires three months from the date of the final rejection or as of the mailing date of this Advisory Action, whichever is later. In no event however, will the statutory period for the response expire later than six months from the date of the final rejection

Any extension of time must be obtained by filing a petition under 37 CFR 1.136(a), the proposed response and the appropriate fee. The date on which the response, the petition, and the fee have been filed is the date of the response and also the date for the purposes of determining the period of extension and the corresponding amount of the fee. Any extension fee pursuant to 37 CFR 1.17 will be calculated from the date of the originally set shortened statutory period for response or as set forth in b) above

☐ Appellant's Brief is due in accordance with 37 CFR 1.192(a).

☒ Applicant's response to the final rejection, filed 7 May 97 has been considered with the following effect, but it is not deemed to place the application in condition for allowance:

1. ☐ The proposed amendments to the claim and /or specification will not be entered and the final rejection stands because:
- a) ☐ There is no convincing showing under 37 CFR 1.116(b) why the proposed amendment is necessary and was not earlier presented
 - b) ☐ They raise new issues that would require further consideration and/or search (See Note).
 - c) ☐ They raise the issue of new matter (See Note).
 - d) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal
 - e) ☐ They present additional claims without cancelling a corresponding number of finally rejected claims

NOTE: _____

2. ☐ Newly proposed or amended claims _____ would be allowed if submitted in a separately filed amendment cancelling the non-allowable claims

3. ☒ Upon the filing an appeal, the proposed amendment ☒ will be entered ☐ will not be entered and the status of the claims will be as follows

Claims allowed: _____

Claims objected to: _____

Claims rejected: 4, 6-12 AND 30-46

However;

☒ Applicant's response has overcome the following rejection(s): Claims 42-46, 35 U.S.C. 112, 1st Para. as indicated in paragraph 2 of Paper No. 5

4. ☐ The affidavit, exhibit or request for reconsideration has been considered but does not overcome the rejection because _____

5. ☐ The affidavit or exhibit will not be considered because applicant has not shown good and sufficient reasons why it was not earlier presented

☐ The proposed drawing correction ☐ has ☐ has not been approved by the examiner.

☐ Other

TOMMY P. CHIN
SUPERVISORY PATENT EXAMINER
BACUER000WNER

\$300 119

PATENT
C4-430



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : Reuel A. Ely

Serial No. : 08/635,692

For : DISTRIBUTED VIDEO DATA STORAGE IN
VIDEO SURVEILLANCE SYSTEM

Filed : April 22, 1996

Examiner : N. Diep

Art Unit : 2615

Assistant Commissioner
for Patents
Washington, D.C. 20231

S I R:

NOTICE OF APPEAL

Applicant hereby appeals the decision of the Examiner
stating final rejections of claims 4, 6-12 and 30-46 in the
Office Action mailed in the above application on March 18, 1997.

This notice of appeal is filed by mail certification on this
10th day of June, 1997.

The fee for the notice of appeal (\$300.00) is covered by cur
appended check in that amount. Authorization is granted hereby
for the charge of any further fee in connection with this appeal
to our Deposit Account 18-1644.

Respectfully submitted,

ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017
(212) 682-9640

Nathaniel Levin
Reg. No. 34,860

Hereby certify that this correspondence is being deposited with the United States Postal Service as
First Class Mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D C
June 10, 1997

NATHANIEL LEVIN

Signature

June 10, 1997

Date of Signature

07/10/97
01/11/97

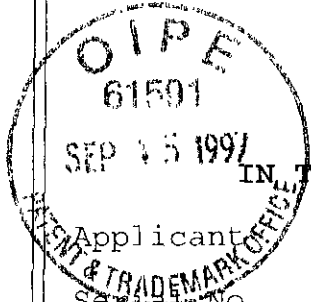
KC/OPR

00000171 08635692

300.00 OP

Note
7/12/97

11/6/97 2015



PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE
IN VIDEO SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2615
Assistant Commissioner
for Patents
Washington, D.C. 20231

#9
Rose
10-297

S I R:

REQUEST AND FEE FOR EXTENSION OF TIME

Request is hereby made for an extension of the time for filing an Appeal Brief. A Notice of Appeal for the above-identified application was filed on June 10, 1997. The initially-set two month period for filing an appeal brief based on the filing of the Notice of Appeal expired on July 10, 1997. An Appeal Brief is accordingly filed herewith on this 10th day of September, 1997. A one-month extension is sought, to and including September 10, 1997, and the fee of \$110 in payment for such extension is filed herewith. Authorization is granted for the charge of any additional fee supporting entry of the accompanying response to our Deposit Account 18-1644.

Respectfully submitted,

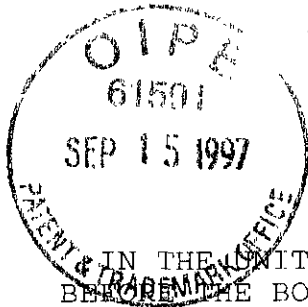
ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017
(212) 682-9640

Marylee Jenkins
Reg. No. 37,645
Attorney of Record

09/29/1997 STH:RNTD 00000144 08635692 110.00 OP
01-EE-4115

MARYLEE JENKINS

September 10, 1997
Date of Signature



PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN VIDEO
SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2615
Assistant Commissioner
for Patents
Washington, D.C. 20231

#10
Roso
10-297

Sir:

APPLICANT'S BRIEF ON APPEAL

By Notice of Appeal, timely filed on June 10, 1997 by mail certification, Applicant appealed from the decision of the Examiner stating final rejection of claims 4, 6-12 and 30-46 in the Office Action mailed in the above application on March 18, 1997.

This brief is filed in triplicate with an Appendix. A check for \$300 for payment for filing this brief on appeal pursuant to 37 C.F.R. § 1.17(f) is enclosed herewith.

I. Real Party in Interest

As indicated in an Assignment of record herein, the subject application is assigned to Sensormatic Electronics Corporation, a Delaware corporation. The Assignment was recorded at Reel 7996, Frame 0642 on April 22, 1996.

September 10, 1997
Date of Signature

MARYLEE JENKINS

Signature

II. Related Appeals and Interferences

There are no related appeals or interferences known to appellant, his undersigned representative or assignee which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

The claims which have been rejected and are on appeal are claims 4, 6-12, 30-42 and 44-46, of which claims 4, 30, 40 and 42 are in independent form. Claims 1-3, 5, 13-29 and 43 have been canceled. No claims stand allowed. The attached Appendix sets forth all appealed claims.

IV. Status of Amendments

An Amendment after final action was filed on April 29, 1997 by mail certification for the purpose of amending claims 42 and 44 and canceling claim 43. In the Advisory Action mailed on May 13, 1997, the Examiner indicated that the Amendment after final action would be entered upon filing of a Notice of Appeal and an Appeal Brief. Further in the Advisory Action, the Examiner indicated that the Amendment after final action had overcome the objection to the Specification pursuant to 37 C.F.R. § 1.71 and the rejection of claims 42-46 pursuant to 35 U.S.C. § 112, first paragraph. Accordingly, the above statement of the Status of Claims and the attached Appendix take into account entry of the Amendment after final action.

V. Summary of Invention

The present invention is directed to a video surveillance system that can store video signals corresponding to conditions before, during and after an alarm event with the stored signals being available for subsequent review and permanent recording (Page 8, lines 28-35).

The video surveillance system 100 as shown in Figs. 2 and 3 includes a central control station 102 and a plurality of video cameras 130 each mounted inside a camera unit 114 (Page 9, lines 28-33; Page 11, lines 8-12). A video data buffer memory 150, storing compressed video data generated by a camera 130, is mounted with each camera in a respective camera unit 114 (Page 12, lines 7-9 and lines 17-22; Page 13, lines 19-28; Fig. 3). If an alarm signal is generated by a sensor 120 indicating an alarm condition, the alarm signal is transmitted to the central station 102, which, in turn, transmits a signal to one of the camera units 114, causing the data buffered in the buffer memory 150 of the camera unit to be protected from being overwritten (Page 5, lines 3-8; Page 18, lines 24-35). The compressed video data recorded by the camera 130 can then be retrieved for display or tape-recording by the central control station 102 (Page 5, lines 27-35; Page 18, line 35 to Page 19, line 8).

The video surveillance system operates through a local area network ("LAN") 112 connected to the central station 102, camera units 114, monitors 116 and sensors 120 to provide an "all-digital" video surveillance system (Page 10, lines 2-9; Page 20, line 33 to

Page 21, line 1; Fig. 2). This permits digital video data generated by the camera 130 and stored in the memory 150 to be transmitted to the central station 102 as well as the transmission of alarm signals from the sensors 120 indicating an alarm condition to be sent to the central station 102 (Page 4, lines 19-29; Page 5, lines 3-8; Page 6, lines 1-10; Figs. 2 and 3).

VI. Issue

Since the objection to the Specification and the Section 112 rejection of claims 42-46 were overcome by the Amendment after final action, there is only a single issue remaining on appeal.

The single issue on appeal is whether the Examiner was in error in rejecting the independent claims¹ under 35 U.S.C. § 103(a) as being unpatentable over Toyoshima, U.S. Patent No. 5,229,850 ("Toyoshima reference") in view of Applicant's admitted prior art (Fig. 1) ("Applicant's admitted prior art") and further in view of Blackwell et al., U.S. Patent No. 5,602,933 ("Blackwell et al. reference").

VII. Grouping of Claims

For purposes of this appeal, Applicant will address only the rejection of the independent claims, relying on Ex parte Kochan, 131 U.S.P.Q. 204 (Bd. App. 1960), for allowance of the dependent

¹ It is assumed that the rejection under 35 U.S.C. § 130(a) was intended to apply as well to independent claim 4 although the rejection of independent claim 4 was not expressly stated in the Office Action mailed on March 18, 1997.

claims, since they differ in scope from the parent independent claims submitted as being patentable. In this connection, it is fully appreciated that the Board, should it not reverse the Examiner on the rejection of the independent claims, will summarily dispense with any consideration of the dependent claims.

The claims fall into two groups, namely, independent claims 4 and 42 and independent claims 30 and 40. Independent claim 4 and independent claim 42 and their corresponding dependent claims 6-12 and claims 44-46, respectively, will stand or fall together. Independent claim 30 and independent claim 40 and their corresponding dependent claims 31-39 and claim 41, respectively, will stand or fall together. Argument is provided separately for independent claims 4 and 42 and independent claims 30 and 40 as they do not stand or fall together.

VIII. Argument

There are no rejections or objections under 35 U.S.C. § 112 nor any rejections under 35 U.S.C. §§ 101 or 102 or under 37 C.F.R. § 1.71.

Although the final Office Action mailed on March 18, 1997 does not clearly state the grounds on which independent claim 4 stands rejected, for purposes of this appeal brief, it is assumed that all of the independent claims stand rejected under 35 U.S.C. § 103(a).

As will be shown, it is believed that the teachings of the prior art do not support the Examiner's conclusion that the present invention, as recited in the independent claims, is obvious.

A. Discussion of the Applied Prior Art

1. The Toyoshima reference

The Toyoshima reference discloses a video monitoring system that includes a memory for storing and transmitting a video signal immediately following the occurrence of an event.

In the system of Toyoshima, a sensor 15 detects the occurrence of a particular event and a detection signal from the sensor 15 indicative of the occurrence is input to a controller 16 of a video transmitter 1. When the controller 16 receives the detection signal, it first enables a A/D converter 12, puts the frame memory 13A in a write-enabled state, converts the digital video signal to an analog video signal corresponding to the video of the object when the monitored particular event is detected, and stores the converted signal in the frame memory 13A. Writing image signals into the frame memory 13A continues until the frame memory 13A is filled to capacity. Writing and reading are then inhibited to maintain the stored video signals. When writing to the frame memory 13A is inhibited, the other frame memory 13B is put in a write- and read-enabled state. Subsequent video frames are then temporarily stored in the frame memory 13B and sequentially read out.

The controller 16 of Toyoshima is also responsible for sending video signals from the transmitter 1 to the video receiver 2 through a transmission path 3. The transmitted video signals are then reproduced by the video receiver 2 which inputs the demodulated analog video signals to a CRT display 24 at a control

console 26. The console 26 of Toyoshima permits the operator to request transfer of the video stored during the occurrence of the particular event or to request or instruct termination of a monitoring event.

2. Applicant's admitted prior art

Applicant's admitted prior art is directed to a conventional closed-circuit video surveillance system as shown in Fig. 1 of the application.

The surveillance system 10 includes a host computer 12, a video switch 14, video cameras 20, monitors 22, control consoles 24, sensor devices 26, a user interface 30 and video cassette recorders ("VCRs") 32. The host computer 12 controls the operation of the system 10 with a local area network ("LAN") 28 providing for interchange of command, status and alarm data between the host computer 12 and the cameras 20, control consoles 24 and sensors 26.

The host computer 12 of the system 10 can: (1) permit video signals that were previously recorded by the VCRs 32 to be selectively routed through the switch 14 for viewing on one or more of the monitors 22 or to be played back on the VCRs 32; (2) alert a system operator to an alarm condition so that predetermined camera movements and routing of corresponding video signals to pre-selected monitors 22 can be automatically actuated in response to the alarm condition; and (3) issue a command to be sent to control movement of the cameras in response to pre-programmed surveillance

routines or in response to operator input through the control consoles 24 or the user interface 30.

3. Blackwell et al. reference

The Blackwell et al. reference discloses a remote verification system which includes a plurality of remote terminals 20, 22 and 24 positioned in a remote location (the "remote location") and a plurality of verification terminals 30, 32 and 34 positioned at a central verification facility (the "verification location"). The remote terminals are interconnected for communication with each other via a local area network ("LAN"). The verification terminals 30, 32 and 34 at the central verification facility are also interconnected and form another local area network ("LAN"). Communication between the terminals at the remote location and the terminals at the verification location is provided through a communications network 36. (see Fig. 1 and col. 5, l. 65 to col. 6, l. 14).

B. Independent Claim 4

1. Examiner's Comparison of Independent Claim 4 with the Applied Prior Art and Reasons Underlying the Final Rejection

Since only paragraph 5 of the Final Office Action (Paper No. 5 mailed on March 18, 1997) mentions claim 4, it appears that the Examiner relied on just the Toyoshima reference to reject independent claim 4. In the apparent rejection of claim 4, the Examiner recites the following claim language:

... the central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest video data in the respective storage means controlled by said control means.

The Examiner then points to disclosure in the Toyoshima reference at "col. 6, lines 1-19 and in conjunction to Toyoshima's third embodiment disclosed in columns 11-12." It should be noted that while the Examiner's rejection of independent claim 4 appears to be a Section 103 rejection, the Examiner concludes with the statement that "[t]he limitations of newly amended claim 4 are therefore anticipated by Toyoshima." (emphasis added)

2. Grounds for Reversing the Rejection - Argument on Behalf of Patentability of Independent Claim 4

With reference to the attached Appendix, independent claim 4 is directed to a video surveillance system, which comprises:

a central station:

a plurality of video cameras, located remotely from said central station, for generating respective video signals;

a plurality of storage means, each located remotely from said central station and associated with a respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera;

connection means for forming a signal path between said central station and each of said storage means, said connection means including a plurality of control means each operatively connected to a respective one of said storage means for controlling the

respective storage means to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means;

sensor means for generating an alarm signal indicative of an alarm condition; and

means for transmitting said alarm signal from said sensor means to said central station;

wherein said central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective storage means controlled by said control means.

The video surveillance system of independent claim 4 recites in pertinent part a central station that receives an alarm signal from sensor means by transmitting means and that responds to the alarm signal by transmitting a storage signal to a storage device located remotely from the central station to inhibit overwriting of video data in the remotely located storage device.

With respect to the Toyoshima reference, its video monitoring system lacks a central station that inhibits overwriting of video data stored in a storage device remotely located from the central station, as claimed. The controller 16 of Toyoshima does not disclose or suggest the central station, as claimed, since the controller 16 only controls storage devices (e.g., frame memories 13) that are located with the controller 16. (see Fig. 1 of Toyoshima). Further the controller 16 of Toyoshima does not

disclose or suggest a central station that receives an alarm signal from sensor means by transmitting means and responds to the alarm signal by transmitting a storage signal to a storage device located remotely from the station to inhibit overwriting of video data stored in a storage device.

Nor does the control console 26 disclose or suggest such a central station. Rather the Toyoshima reference only discloses that the control console 26 controls and receives information concerning the video cameras and does not disclose or suggest that the control console 26 receives an alarm signal from the sensor 15. Rather the sensor 15 sends the detection signal of the occurrence of an abnormal event to the controller 16.

The system of the present invention provides increased flexibility in terms of assigning or reprogramming assignments of associations between alarm sensor devices and video cameras/memory units to be controlled in response to the output of sensor devices than is possible in the system architecture in the Toyoshima reference. This is based upon the alarm signal being sent to the central station for handling by the central station. Additionally, by having the alarm signal sent to the central station, the system operator is provided with direct knowledge of the alarm condition. By contrast, in the Toyoshima reference, a communication path must be established between the video transmitter 1 and the video receiver 2 before information relating to the alarm is provided to the operator.

It is therefore submitted that the Examiner's rejection of independent claim 4 based upon the Toyoshima reference is in error and that the video surveillance system of independent claim 4 is not as in the words of the Examiner "anticipated" by Toyoshima.

Although the Examiner does not appear to apply Applicant's admitted prior art to independent claim 4 in the final Office Action, it is submitted that Applicant's admitted prior art does not disclose or suggest the video surveillance system, as claimed. Particularly, Applicant's admitted prior art does not disclose a plurality of storage means or connection means, as claimed. Nor does Applicant's admitted prior art disclose a central station that responds to a received alarm signal by transmitting a storage signal to inhibit overwriting of video data stored in the storage device remotely located from the central station, as claimed.

The Examiner also does not appear to apply the Blackwell et al. reference to independent claim 4 in the final Office Action, it is nevertheless submitted that the Blackwell et al. reference does disclose or suggest the video surveillance system, as claimed. Independent claim 4 should therefore be held patentable.

Independent claim 42 also recites the feature that the central station responds to receiving an alarm signal from a sensor by transmitting a storage signal to at least one of control means to inhibit overwriting of the oldest digital video data in the respective digital storage device controlled by control means. Independent claim 42 should therefore be held patentable on the same basis as independent claim 4.

C. Independent Claim 30

1. Examiner's Comparison of Independent Claim 30 with the Applied Prior Art and Reasons Underlying the Final Rejection

In paragraph 4 of the Final Office Action (Paper No. 5 mailed on March 18, 1997), the Examiner acknowledged that "Toyoshima alone or in combination with applicant prior art does not particularly disclose that the entire surveillance system is being connected to the local area network (LAN)." The Examiner, however, continued by stating that "Blackwell et al., teaches the using of the local area network in the method and apparatus for verification of remotely accessed data" and that it would have been obvious "to modify the system of Toyoshima to interconnect with the local area network (LAN)."

2. Grounds for Reversing the Rejection - Argument on Behalf of Patentability of Independent Claim 30

Independent claim 30 is directed to a video surveillance system, which comprises:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition; and

a local area network (LAN) connected among all of said central station, said camera

units and said sensors, for transmitting said digital video data from said digital storage devices to said central station and for transmitting said alarm signals from said sensors to said central station.

The video surveillance system of independent claim 30 recites in pertinent part the use of a local area network ("LAN") connected to the central station, camera units and sensors to transmit digital video data from a digital camera/storage unit to the central station and to transmit alarm signals from the sensors to the central station.

As acknowledged by the Examiner in the rejection, neither the Toyoshima reference nor Applicant's admitted prior art, alone or in alleged combination, discloses or suggests a video surveillance system connected by means of a LAN so that digital video data can be transmitted from a digital camera/storage unit to the central station and alarm signals from the sensors can be transmitted to the central station.

Nor does the Blackwell et al. reference disclose or suggest such content. The Blackwell et al. reference discloses a remote verification system which includes remote terminals positioned at a remote location and verification terminals of a central verification facility positioned at a verification location. The remote terminals are interconnected for communication with each other via one LAN and the verification terminals are interconnected for communication with each other via another LAN. Communication between the remote terminals and the central verification facility, however, is provided through the communications network 36. (see

Fig. 1 of Blackwell et al.) There is no suggestion that a LAN connects among all of the central station, camera units and sensors to transmit digital video data from a digital camera/storage unit to a central station and to transmit alarm signals from the sensors to the central station. Nor is there any suggestion that the LANs of Blackwell et al. transmit video data from a digital camera/storage unit to a central station and transmit alarm signals from sensors to the central station, as claimed.

Even if the references were combinable, as suggested, such alleged combination would not disclose or suggest the video surveillance system, as claimed. The LAN disclosed in Blackwell et al. does not disclose connection of an entire system. Nor is there any suggestion for such an interconnection in any of the applied prior art. Rather, similar to the Toyoshima reference which discloses a transmission path 3, the system of Blackwell et al. discloses a communication network 36. Accordingly, no connection via a LAN among all of the central station, camera units and sensors to transmit digital video data from a digital camera/storage unit to a central station and to transmit alarm signals from the sensors to the central station, as claimed, is disclosed or suggested by the prior art.

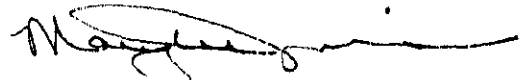
It is therefore submitted that the Examiner has engaged in improper hindsight to the subject application in the rejection of independent claim 30 and is therefore in error with respect to the rejection. Independent claim 30 should therefore be held patentable.

Independent claim 40 also recites the feature that a local area network is connected among all of the central station, camera units and monitors for transmitting digital video data from digital storage devices to the central station and for transmitting the digital video data to the monitors from at least one of the central station and the camera units. Independent claim 40 should therefore be held patentable on the same basis as independent claim 30.

IX. Conclusion

The final rejection of the claims based on the Toyoshima reference, Applicant's admitted prior art and the Blackwell et al. reference is deficient since this applied prior art, either alone or in alleged combination, fails to disclose or suggest the video surveillance system, as claimed. It is therefore requested that the Board reverse this final rejection and find the claims to be patentable.

Respectfully submitted,



Marylee Jenkins
Reg. No. 37,645
An Attorney of Record

ROBIN, BLECKER, DALEY & DRISCOLL
330 Madison Avenue
New York, New York 10017
(212) 682-9640

APPENDIX - CLAIMS ON APPEAL

4. A video surveillance system, comprising:
- a central station;
 - a plurality of video cameras, located remotely from said central station, for generating respective video signals;
 - a plurality of storage means, each located remotely from said central station and associated with a respective one of the video cameras for storing digital video data representative of the video signal generated by the respective video camera;
 - connection means for forming a signal path between said central station and each of said storage means, said connection means including a plurality of control means each operatively connected to a respective one of said storage means for controlling the respective storage means to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective storage means;
 - sensor means for generating an alarm signal indicative of an alarm condition; and
 - means for transmitting said alarm signal from said sensor means to said central station;
- wherein said central station responds to receiving said alarm signal by transmitting a storage signal to at least one of said control means, said at least one of said control means

responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective storage means controlled by said control means.

6. A video surveillance system according to claim 4, wherein said central station selectively transmits a retrieve signal to a selected one of said control means, said selected control means responding to said retrieve signal by transmitting to said central station digital video data read out from the storage means controlled by said selected control means.

7. A video surveillance system according to claim 6, further comprising display means associated with the central station for displaying images corresponding to the digital video data read out from the storage means and transmitted to the central station.

8. A video surveillance system according to claim 7, further comprising a video tape recorder controlled by said central station for recording signals corresponding to the digital video data read out from the storage means and transmitted to the central station.

9. A video surveillance system according to claim 4, wherein said connection means includes a common data transmission channel by which command signals are transmitted from said central station to said video cameras and digital video data read out from said storage means is transmitted to said central station.

10. A video surveillance system according to claim 4, wherein said digital video data stored in said storage means and transmitted by said data transmission channel is compressed digital video data.

11. A video surveillance system according to claim 4, wherein each of said storage means is a solid state memory.

12. A video surveillance system according to claim 4, wherein each of said storage means is disposed in a respective housing together with the respective video camera.

30. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition; and

a local area network (LAN) connected among all of said central station, said camera units and said sensors, for transmitting said digital video data from said digital storage devices to said central station and for transmitting said alarm signals from said sensors to said central station.

31. A video surveillance system according to claim 30, further comprising a plurality of monitors, connected to said LAN, for receiving and displaying video signals corresponding to video signals generated by said camera units.

32. A video surveillance system according to claim 31, wherein digital video data transmitted via said LAN from one of said camera units to said central station is retransmitted via said

LAN from said central station to one of said monitors for display on said one of said monitors.

33. A video surveillance system according to claim 31, wherein digital video data is transmitted via said LAN directly from one of said camera units to one of said monitors for display on said one of said monitors.

34. A video surveillance system according to claim 30, wherein control signals are transmitted via said LAN from said central station to said camera units for controlling said camera units.

35. A video surveillance system according to claim 30, further comprising a camera control console, connected to said LAN, for generating signals for controlling said camera units.

36. A video surveillance system according to claim 30, further comprising a data recorder, connected to said LAN, for recording digital video data transmitted via said LAN.

37. A video surveillance system according to claim 30, wherein digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a video signal corresponding to said digital video data is generated at said one of said camera units.

38. A video surveillance system according to claim 30, wherein digital video data stored in one of said camera units is transmitted via said LAN to said central station from one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units.

39. A video surveillance system according to claim 30, wherein:

first digital video data is transmitted via said LAN from one of said camera units at substantially the same time that a video signal corresponding to said first digital video data is generated at said one of said camera units; and

second video data stored in one of said camera units is transmitted via said LAN to said central station from said one of said camera units in response to a retrieve command transmitted via said LAN from said central station to said one of said camera units.

40. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of monitors for displaying video signals corresponding to digital video data stored in said digital storage devices; and

a local area network (LAN) connected among all of said central station, said camera units and said monitors, for transmitting said digital video data from said digital storage devices to said central station and for transmitting said digital

video data to said monitors from at least one of said central station and said camera units.

41. A video surveillance system according to claim 40, wherein said central station, said monitors and said camera units are connected to each other only by said LAN.

42. A video surveillance system, comprising:

a central station;

a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera;

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition;

message means interconnecting said central station, said camera units and said sensors, for transmitting command messages from said central station to said camera units and for transmitting said alarm signals from said sensors to said central station;

a plurality of monitors for receiving and displaying video signals corresponding to video signals generated by said camera units;

a video switch;

first analog signal lines, connected between said video switch and said camera units, for transmitting analog video signals from said camera units to said video switch; and

second analog signal lines, connected between said video switch and said monitors, for transmitting analog video signals from said video switch to said monitors;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said second analog signal lines to route analog video signals from said camera units to said monitors;

said analog video signals routed to said monitors from said camera units including analog video signals corresponding to signals retrieved from said digital storage devices pursuant to command signals transmitted via said message means from said central station to said camera units

each of said camera units including control means for controlling the respective digital storage device to operate as a ring buffer in which digital video data representative of video signals currently generated by the respective video camera is written over oldest digital video data stored in the respective digital storage device; and

said central station responding to receiving an alarm signal from one of said sensors by transmitting a storage signal to at least one of said control means, said at least one of said control means responding to said storage signal by inhibiting overwriting of said oldest digital video data in the respective digital storage device controlled by said control means.

44. A video surveillance system according to claim 42, wherein said message means includes a local area network (LAN)

connected among said central station, said camera units and said sensors.

45. A video surveillance system according to claim 42, wherein said analog video signals routed to said monitors from said camera units include live video signals.

46. A video surveillance system according to claim 42, further comprising:

a plurality of video cassette recorders (VCRs); and
third analog signal lines, connected between said video switch and said VCRs, for transmitting analog video signals from said video switch to said VCRs;

said central station controlling said video switch to couple selected ones of said first analog signal lines to selected ones of said third analog signal lines to route analog video signals from said camera units to said VCRs.



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, DC 20231

DS

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/638,692	04/22/96	ELY	R (4-430)

JOHN J. TORRENTE
ROBIN BLECKER DALEY AND DRISCOLL
330 MADISON AVENUE
NEW YORK, NY 10017

LN02/1009

EXAMINER
STEPHEN

ART UNIT	PAPER NUMBER
2713	11

DATE MAILED: 10/09/98

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/635,692	Applicant(s) Ely	
	Examiner N. Diep	Group Art Unit 2713	

☒ Responsive to communication(s) filed on Sep 15, 1997

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 4, 6-12, 30-42, and 44-46 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 4, 6-12, 42, and 44-46 is/are allowed.

☒ Claim(s) 30-41 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 2713

DETAILED ACTION

Response to Amendment

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

3. Claims 30-35, 38 and 40-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Schieltz (US 5,659,787).

Schieltz discloses a data communication network with highly efficient polling procedure comprising the same video surveillance system comprises a central station and a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera and a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition and a local area network (LAN)

Art Unit: 2713

connected among all of the central station, the camera units and the sensors, for transmitting the digital video data from the digital storage devices to the central station and for transmitting the alarm signals from the sensors to the central station (Fig. 1, elements 18, 12, 30, col. 7, lines 25-34 and col. 7, line 1-7) as specified in claims 30 and 40; further comprising a plurality of monitors, connected to the LAN, for receiving and displaying video signals generated by the camera units (Fig. 1, element 16) as specified in claim 31; wherein digital data transmitted via the LAN from one of the camera units to the central station is retransmitted via the LAN from the central station to one of the monitors for display on the one of the monitors (Fig. 12, 18, 16) as specified in claim 32; wherein digital video data is transmitted via the LAN directly from one of the camera units to one of the monitor for display on the one of the monitors (Col. 6, lines 41-44) as specified in claim 33; wherein control signals are transmitted via the LAN from the central station to the camera units for controlling the camera units and further comprising a camera control console, connected to the LAN, for generating signals for controlling the camera unit (Fig. 2, elements 46, 26) as specified in claims 34-35; wherein digital video data is transmitted via the LAN from one of the camera units at substantially the same time that a video signal corresponding to the digital video data is generated at the one of the camera units (Col. 6, lines 48-54) as specified in claim 37, wherein digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to a retrieve command transmitted via the LAN from the central station to the one of the camera units (Fig. 2, element 22, 38, 36 and col. 7,

Art Unit: 2713

lines 45-57) as specified in claim 38; and wherein the central station, the monitors and the camera units are connected to each other only by the LAN (Fig.2) as specified in claim 41.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 36-37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieltz.

As applied to claim 30 above, Schieltz further discloses that the system can further comprise a data recorder for recording digital video data (Col. 7, lines 25-34) as specified in claim 36 and first digital video data is transmitted via the LAN from one of the camera units at substantially the same time that a video signal corresponding to the digital video data is generated at the one of the camera units as specified in claims 37 and 39; it is noted that Schieltz fails to particularly disclose that:

a. the data recorder, **connected to the LAN**, for recording digital video data transmitted via the LAN as specified in claim 36;

Art Unit: 2713

b. first digital video data is transmitted via the LAN from one of the camera units at **substantially the same time** that a video signal corresponding to the digital video data is generated at the one of the camera units and **second digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to a retrieve command transmitted via the LAN from the central station to one of the camera units** as specified in claims 37 and 39.

With regard to **a**: Even though, Schieltz fails to particularly disclose that the data recorder is being connected to the LAN; however, the system Schieltz disclosed clearly teaches the using of LAN network to connect various components of the security system such as camera units, camera control consoles, system control, workstation, etc. It would have been obvious to one skilled in the art at the time the invention was made to improve the system of Schieltz by connecting the data recorder to the LAN for better overall control and faster operation.

With regard to **b**: At column 6, lines 48-54, Schieltz teaches that video generated by the cameras are transmitted to the system control module and after appropriate switching within the system control module, respective output video signals are provided to the monitors, it is the examiner's opinion that the above process is subject to some time delay; however, the video generated by the cameras and the respective output video signals are provided to the monitors is considered to be substantially at the same time. Therefore, claim 37 would not be given any patentable value over Schieltz. With regard to the limitation of "second digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to

Art Unit: 2713

a retrieve command transmitted via the LAN from the central station to one of the camera units”.

The examiner considers this limitation as to be obvious over Schieltz, since the data recorder as taught by Schieltz is clearly used to record data for later review and with the LAN network, the data recorded can be retrieved as desired by control signal sent from the system control.

Allowable Subject Matter

6 Claims 4, 6-12, 42 and 44-46 are allowed.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Kristen (US 5,724,475) discloses a compressed digital video reload and play back system.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Nhon Diep** whose telephone number is **(703) 305-4648**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tommy Chin**, can be reach on (703) 305-4615.

Any response to this action should be mailed to:

Application/Control Number: 08/635,692

Page 7

Art Unit: 2713

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communication intended for entry)

or:

(703) 308-5399, (for informal or draft communications, please label

“PROPOSED” or “DRAFT”)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA., Sixth Floor (Receptionist).

N. D.

N. Diep

October 7, 1993

Bryan Tung
BRYAN TUNG
PRIMARY EXAMINER

Notice of References Cited		Application No. 08/635,692	Applicant(s) Ely			
		Examiner N. Diep	Group Art Unit 2713	Page 1 of 1		
U.S. PATENT DOCUMENTS						
		DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
	A	5,724,475	3/98	Kristen	386	109
	B	5,659,787	8/97	Schieltz	395	200.56
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					
FOREIGN PATENT DOCUMENTS						
		DOCUMENT NO	DATE	COUNTRY	NAME	CLASS
	N					SUBCLASS
	O					
	P					
	Q					
	R					
	S					
	T					
NON-PATENT DOCUMENTS						
		DOCUMENT (Including Author, Title, Source, and Pertinent Pages)				DATE
	U					
	V					
	W					
	X					

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231, on:

NATHANIEL LEVIN

Signature

December 9, 1998
Date of Signature



G12713

PATENT
C4-430

12/18
12/18

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2713

RECEIVED

DEC 16 1998

Group 2700

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

RESPONSE

Applicant submits the following remarks in response to the Office Action dated October 9, 1998.

Claims 4, 6-12, 30-42 and 44-46 remain in this application. It is noted with appreciation that claims 4, 6-12, 42 and 44-46 have been allowed. Claims 30-41 stand rejected and are now presented for reconsideration in view of the points set forth below.

Claims 30-41 were rejected as either being anticipated by or obvious in view of the Schieltz reference.

Claim 30 is directed to a "video surveillance system" which includes "a central station", "a plurality of camera units each including a respective video camera for generating respective video signals and a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera", "a plurality of

12/18/98
7

sensors each for generating a respective alarm signal indicative of an alarm condition" and "a local area network (LAN) connected among all of" the central station, the camera units and the sensors, for transmitting the digital video data from the digital storage devices to the central station and for transmitting the alarm signals from the sensors to the central station.

To emphasize the most pertinent aspects of claim 30, applicants note that each of the camera units includes "a respective digital storage device" which stores digital video data representing the video signal generated by the video camera which is also part of the camera unit. Moreover, the LAN transmits the digital video data from the digital storage devices included in the camera units to the central station.

The Schieltz reference, upon which the Examiner exclusively relies, is commonly assigned with the present application, and is primarily directed to a polling procedure to be carried out in a local area network which interconnects devices making up a video surveillance system. The video surveillance system disclosed in Fig. 1 of Schieltz, and generally described at column 6, line 13 to column 7, line 33 thereof is similar to the prior art system shown in Fig. 1 of the present application and described at page 1, line 12 to page 2, line 17 of the present application. Applicant particularly notes that the surveillance camera domes 12 shown in Fig. 1 of Schieltz are nowhere stated in that reference to include the claimed "respective digital

storage device for storing digital video data".

From the foregoing, it will also be understood that the LAN 26 shown in Schieltz is not used for "transmitting ... digital video data from said digital storage devices to said central station", as also recited in claim 30. Instead, in the video surveillance system of Schieltz, the video signals generated by the cameras 12 are transmitted to the central station ("system control module 18") by way of a junction box 20 and input video signal connections 22, which are shown as being separate from the LAN 26. (See Fig. 1 and column 6, lines 41-44 of the reference.)

It is therefore submitted that claim 30 is patentably distinguished from the video surveillance system of Schieltz, because of the recitation in claim 30 of the digital video data storage devices included in the camera units, and the use of the LAN for transmitting digital video data from the storage devices to the central station. Claims 31-39 are all directly or indirectly dependent on claim 30, and are submitted as patentable on the same basis as claim 30.

The only other rejected independent claim is claim 40. Claim 40 recites the same features that were referred to above in distinguishing claim 30 from the Schieltz reference. These are, to repeat, digital storage devices, included in each of a plurality of camera units, for storing digital video data generated by the video camera of the respective camera unit, and using a LAN to transmit digital video data from the storage

devices to the central station of the video surveillance system. Thus claim 40 is believed to be patentable on the same basis as claim 30. Furthermore, claim 40 additionally recites that the LAN interconnects a plurality of video display monitors, with the system central station and the camera units. Noting that the LAN 26 shown in Fig. 1 of Schieltz is not connected to the display monitors 16, it is submitted that this additional feature provides another basis for patentability of claim 40.

Claim 41 is dependent on claim 40 and is submitted as patentable on the same basis as claim 40.

In view of the foregoing, it is submitted that patentability of all of the pending claims has been established. Passage of this case to issue is respectfully solicited.

Respectfully submitted,



Nathaniel Levin
Reg. No. 34,860

ROBIN, BLECKER & DALEY
330 Madison Avenue
New York, New York 10017
(212) 682-9640



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

JOHN J. TOPPONE,
DORTH BLOOMER VALLEY AND PRISCILLA
150 MADISON AVENUE
NEW YORK NY 10017

1.002.0001

EXAMINER

DEPT. H

ART UNIT	PAPER NUMBER
----------	--------------

2713

DATE MAILED:

01/01/99

13

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action SummaryApplication No.
08/635,692Applicant(s)
ElyExaminer
Nhon DiepGroup Art Unit
2713☒ Responsive to communication(s) filed on Dec 11, 1998☐ This action is **FINAL**.☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims☒ Claim(s) 4, 6-12, 30-42, and 44-46 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 4, 6-12, 42, and 44-46 is/are allowed.☒ Claim(s) 30-41 is/are rejected.☐ Claim(s) _____ is/are objected to.☐ Claims _____ are subject to restriction or election requirement.**Application Papers**☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.☐ The drawing(s) filed on _____ is/are objected to by the Examiner.☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.☐ The specification is objected to by the Examiner.☐ The oath or declaration is objected to by the Examiner.**Priority under 35 U.S.C. § 119**☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been☐ received.☐ received in Application No. (Series Code/Serial Number) _____.☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).**Attachment(s)**☐ Notice of References Cited, PTO-892☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____☐ Interview Summary, PTO-413☐ Notice of Draftsperson's Patent Drawing Review, PTO-948☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit:

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 30-41 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 30-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schieltz, in view of Toyoshima (both were cited in the previous Office Actions).

Schieltz discloses a data communication network with highly efficient polling procedure comprising the same video surveillance system comprises a central station and a plurality of camera units each including a respective video camera for generating respective video signals and a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition and a local area network (LAN) connected among all of the central station, the camera units and the sensors, for transmitting the digital video data from the digital storage devices to the central station and for transmitting the alarm signals from the sensors to the central station (Fig. 1,

Art Unit:

elements 18, 12, 30, col. 7, lines 25-34 and col. 7, line 1-7) as specified in claims 30 and 40; further comprising a plurality of monitors, connected to the LAN, for receiving and displaying video signals generated by the camera units (Fig. 1, element 16) as specified in claim 31; wherein digital data transmitted via the LAN from one of the camera units to the central station is retransmitted via the LAN from the central station to one of the monitors for display on the one of the monitors (Fig. 12, 18, 16) as specified in claim 32; wherein digital video data is transmitted via the LAN directly from one of the camera units to one of the monitor for display on the one of the monitors (Col. 6, lines 41-44) as specified in claim 33; wherein control signals are transmitted via the LAN from the central station to the camera units for controlling the camera units and further comprising a camera control console, connected to the LAN, for generating signals for controlling the camera unit (Fig. 2, elements 46, 26) as specified in claims 34-35; that the system can further comprise a data recorder for recording digital video data (Col. 7, lines 25-34) as specified in claim 36; and wherein digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to a retrieve command transmitted via the LAN from the central station to the one of the camera units (Fig. 2, element 22, 38, 36 and col. 7, lines 45-57) as specified in claim 38; and wherein the central station, the monitors and the camera units are connected to each other only by the LAN (Fig.2) as specified in claim 41. It is noted that Schieltz fails to particularly disclose that:

a. a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera and as specified in claims 30 and 40;

Art Unit:

b. the data recorder, **connected to the LAN**, for recording digital video data transmitted via the LAN as specified in claim 36;

c. first digital video data is transmitted via the LAN from one of the camera units at **substantially the same time** that a video signal corresponding to the digital video data is generated at the one of the camera units and **second digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to a retrieve command transmitted via the LAN from the central station to one of the camera units** as specified in claims 37 and 39.

With regard to **a**: Toyoshima shows a respective digital storage device for storing digital video data representative of the video signal generated by the respective video camera (Fig. 1, elements 11, 13A and 13B). It would have been obvious to one skilled in the art at the time the invention was made to modify the surveillance camera dome system of Schieltz to include a digital storage device as taught by Toyoshima. Doing so would help to store images from individual surveillance system for further review.

With regard to **b**: Even though, Schieltz fails to particularly disclose that the data recorder is being connected to the LAN; however, the system Schieltz disclosed clearly teaches the using of LAN network to connect various components of the security system such as camera units, camera control consoles, system control, workstation, etc. It would have been obvious to one skilled in the art at the time the invention was made to improve the system of Schieltz by connecting the data recorder to the LAN for better overall control and faster operation.

Art Unit:

With regard to c: At column 6, lines 41-65, Schieltz teaches that video generated by the cameras are transmitted to the system control module and after appropriate switching within the system control module, respective output video signals are provided to the monitors, it is the examiner's opinion that the above process is subject to some time delay; however, the video generated by the cameras and the respective output video signals are provided to the monitors is considered to be substantially at the same time. Therefore, claim 37 would not be given any patentable value over Schieltz. With regard to the limitation of "second digital video data stored in one of the camera units is transmitted via the LAN to the central station from one of the camera units in response to a retrieve command transmitted via the LAN from the central station to one of the camera units". The examiner considers this limitation as to be obvious over Schieltz, since the data recorder as taught by Schieltz is clearly used to record data for later review and with the LAN network, the data recorded can be retrieved as desired by control signal sent from the system control.

Response to Arguments

4. Applicant's arguments filed 12/11/98 have been fully considered but they are not persuasive.

With regard to the applicant's argument that the LAN 26 shown in Schieltz is not used for "transmitting ... digital video data from digital storage devices to the central station" (page 3, lines 2-10). The examiner respectfully disagrees and would like to direct the applicant's attention to col. 6, lines 55-65 of Schieltz where it states that "A local area network connection 26 is

Art Unit:

provided to interconnect for data communication the system control module 18, the cameras 12 and the control consoles 14". It is the examiner opinion that the LAN could be very well used to transmit digital video data from digital storage devices of the cameras unit to the central station as is used to transmit alarm signals from auxiliary sensors to central station (Fig. 1, elements 30, 26 and 18).

With regard to the applicant's argument that the LAN 26 shown in Fig. 1 of Schieltz is not connected to the display monitors 16 (Page 4, lines 5-7). The examiner respectfully disagrees. Fig. 1 of Schieltz clearly shows that the display monitors are connected to the system control and the system control is part of the LAN network and therefore, it is considered that the display monitors are connected to the LAN.

Contact Information

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Nhon Diep** whose telephone number is **(703) 305-4648**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tommy Chin**, can be reach on (703) 305-4615.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Application/Control Number: 08/635,692

Page 7

Art Unit:

or faxed to:

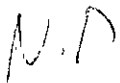
(703) 308-9051, (for formal communication intended for entry)

or:

(703) 308-5399, (for informal or draft communications, please label

“PROPOSED” or “DRAFT”)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, VA., Sixth Floor (Receptionist).

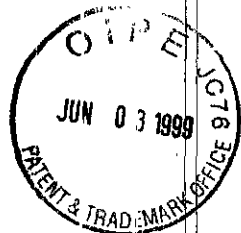


N. Diep

February 26, 1999


BRYAN TUNG
PRIMARY EXAMINER

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Assistant Commissioner for Patents, U.S. Patent and Trademark Office, Washington, D.C. 20231, on: June 1, 1999



June 1, 1999
Date of Signature

JOHN J. TORRENTE

Signature

C1
cont

6/10/99

PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No. : 08/635,692
Filed : April 22, 1996
For : DISTRIBUTED VIDEO DATA STORAGE
IN VIDEO SURVEILLANCE SYSTEM
Examiner : N. Diep
Art Unit : 2713
Assistant Commissioner
for Patents
Washington, D.C. 20231
S I R :
Group 2700

RECEIVED

JUN 09 1999

AMENDMENT UNDER 37 CFR § 1.121(a)

In response to the Office Action of March 1, 1999,
please amend the above-identified application as follows:

IN THE CLAIMS

Amend claim 30 as follows:

⁹_A 30. (Amended) A video surveillance system,
[comprising] in accordance with claim 1, wherein:
[a central station;]
the video cameras and the storage means
associated with that video camera form a plurality of respective
camera units [each including a respective video camera for
generating respective video signals and a respective digital
storage device for storing digital video data representative of
the video signal generated by the respective video camera; and

C1
Concl

a plurality of sensors each for generating a respective alarm signal indicative of an alarm condition; and] said connection means and said means for transmitting said alarm signal are part of a local area network (LAN) connected among all of said central station, said camera units and said sensor means [sensors], for transmitting said digital video data from said [digital] storage [devices] means to said central station and for transmitting said alarm [signals] signal from said [sensors] sensor means to said central station. --.

Cancel claims 40-41.

REMARKS

Claim 30 has been amended. Claims 40-41 have been cancelled. Claims 4, 6-12, 42 and 44-46 have been allowed.

Claim 30 has been amended to depend from allowed claim 4. Due to such dependency, claim 30 is now believed to overcome the Examiner's rejection of this claim under 35 USC § 103(a) as unpatentable based on the Schieltz patent taken with the Toyoshima patent. Claim 30 is thus believed allowable. For similar reasons, claims 31-39, which ultimately depend from claim 30, are also believed to overcome the aforesaid rejection and be allowable.

In view of the above, it is submitted that all claims in the application, as amended, are now allowable. Accordingly,

reconsideration of the claims and passage of same to issue is respectfully requested.

Respectfully submitted,


John J. Torrente
Registration No. 26,359
An Attorney of Record

ROBIN, BLECKER & DALEY
330 Madison Avenue
New York, New York 10017
(212) 682-9640



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

LIBRARY
UNITED STATES DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231

EXAMINER

ART UNIT	PAPER NUMBER
----------	--------------

DATE MAILED: 12/15/2015

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Notice of Allowability	Application No. 08/635,692	Applicant(s) Ely	
	Examiner Nhon Diep	Group Art Unit 2713	

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance and Issue Fee Due or other appropriate communication will be mailed in due course.

☒ This communication is responsive to amendment filed 6/3/99.

☒ The allowed claim(s) is/are 4, 6-12, 30-39, 42 and 44-46 which were renumbered as 1-22, respectively.

☐ The drawings filed on _____ are acceptable.

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.
☐ received in Application No. (Series Code/Serial Number) _____.
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

A SHORTENED STATUTORY PERIOD FOR RESPONSE to comply with the requirements noted below is set to EXPIRE **THREE MONTHS** FROM THE "DATE MAILED" of this Office action. Failure to timely comply will result in ABANDONMENT of this application. Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

☐ Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL APPLICATION, PTO-152, which discloses that the oath or declaration is deficient. A SUBSTITUTE OATH OR DECLARATION IS REQUIRED.

☒ Applicant MUST submit NEW FORMAL DRAWINGS

☒ because the originally filed drawings were declared by applicant to be informal.
☐ including changes required by the Notice of Draftsperson's Patent Drawing Review, PTO-948, attached hereto or to Paper No. _____.
☐ including changes required by the proposed drawing correction filed on _____, which has been approved by the examiner.
☐ including changes required by the attached Examiner's Amendment/Comment.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the reverse side of the drawings. The drawings should be filed as a separate paper with a transmittal letter addressed to the Official Draftsperson.

☐ Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Any response to this letter should include, in the upper right hand corner, the APPLICATION NUMBER (SERIES CODE/SERIAL NUMBER). If applicant has received a Notice of Allowance and Issue Fee Due, the ISSUE BATCH NUMBER and DATE of the NOTICE OF ALLOWANCE should also be included.

Attachment(s)

☐ Notice of References Cited, PTO-892
☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
☐ Notice of Informal Patent Application, PTO-152
☐ Interview Summary, PTO-413
☐ Examiner's Amendment/Comment
☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
☐ Examiner's Statement of Reasons for Allowance


BRYAN TUNG
PRIMARY EXAMINER



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

NOTICE OF ALLOWANCE AND ISSUE FEE DUE

DATE MAILED
07/02/99
07/02/99
07/02/99
07/02/99

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP ART UNIT	DATE MAILED
05/01/99	07/02/99	1000	07/02/99	07/02/99
First Named Applicant	05/01/99			

TITLE OF INVENTION: 05/01/99 VIDEO DATA STORAGE IN VIDEO SURVEILLANCE SYSTEM

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN TYPE	SMALL ENTITY	FEE DUE	DATE DUE
05/01/99	05/01/99	05/01/99	05/01/99	05/01/99	05/01/99	05/01/99

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT.
PROSECUTION ON THE MERITS IS CLOSED.

THE ISSUE FEE MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED.

HOW TO RESPOND TO THIS NOTICE:

- I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is changed, pay twice the amount of the FEE DUE shown above and notify the Patent and Trademark Office of the change in status, or

B. If the status is the same, pay the FEE DUE shown above.
- If the SMALL ENTITY is shown as NO:

A. Pay FEE DUE shown above, or

B. File verified statement of Small Entity Status before, or with, payment of 1/2 the FEE DUE shown above
- II. Part B-Issue Fee Transmittal should be completed and returned to the Patent and Trademark Office (PTO) with your ISSUE FEE. Even if the ISSUE FEE has already been paid by charge to deposit account, Part B Issue Fee Transmittal should be completed and returned. If you are charging the ISSUE FEE to your deposit account, section "4b" of Part B-Issue Fee Transmittal should be completed and an extra copy of the form should be submitted.
- III. All communications regarding this application must give application number and batch number. Please direct all communications prior to issuance to Box ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PATENT AND TRADEMARK OFFICE COPY

PART B—ISSUE FEE TRANSMITTAL

Complete and mail this form, together with appl. fees, to: **Box ISSUE FEE**
Assistant Commissioner for Patents
Washington, D.C. 20231

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

Note: The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

John J. Torrente (Depositor's name)

John J. Torrente (Signature)

September 14, 1999 (Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP/ART UNIT	DATE MAILED
First Named Applicant				

TITLE OF INVENTION

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed

Robin, Blecker & Daley

1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE **Sensormatic Electronics Corporation**

Recorded: 4/22/96 Reel: 7996 Frame: 0642

(B) RESIDENCE: (CITY & STATE OR COUNTRY)

Boca Raton, Florida

Please check the appropriate assignee category indicated below (will not be printed on the patent)

☐ Individual ☒ Corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

☒ Issue Fee **10**
☒ Advance Order - # of Copies

4b. The following fees or deficiency in these fees should be charged to:

DEPOSIT ACCOUNT NUMBER **18-1644**
(ENCLOSE AN EXTRA COPY OF THIS FORM)

☒ Issue Fee **10**
☒ Advance Order - # of Copies

The COMMISSIONER OF PATENTS AND TRADEMARKS is requested to apply the Issue Fee to the application identified above

(Authorized Signature) *John J. Torrente*
John J. Torrente Reg No: 26,359

(Date)
09/14/99

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

Burden Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

PART B—ISSUE FEE TRANSMITTAL

Complete and mail this form, together with appli.

ees, to: **Box ISSUE FEE**
Assistant Commissioner for Patents
Washington, D.C. 20231

MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 1 through 4 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

Patent Office
Patent Office
Patent Office
Patent Office



Note. The certificate of mailing below can only be used for domestic mailings of the Issue Fee Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Issue Fee Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Box Issue Fee address above on the date indicated below.

John J. Torrente

(Depositor's name)

(Signature)

September 14, 1999

(Date)

APPLICATION NO.	FILING DATE	TOTAL CLAIMS	EXAMINER AND GROUP/ART UNIT	DATE MAILED
2 04 130	342 153 400	426	UTILITY NO	10/04/99
First Named Applicant: SENSORMATIC ELECTRONICS CORPORATION				

TITLE OF INVENTION: **SENSORMATIC ELECTRONICS CORPORATION TELEPHONE SURVEILLANCE SYSTEM**

ATTY'S DOCKET NO.	CLASS-SUBCLASS	BATCH NO.	APPLN. TYPE	SMALL ENTITY	FEE DUE	DATE DUE
2 04 130	342 153 400	426	UTILITY	NO	\$1210.00	10/04/99

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363). Use of PTO form(s) and Customer Number are recommended, but not required.

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" indication form PTO/SB/47) attached.

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

Robin, Blecker &

1 Daley

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)
PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. Inclusion of assignee data is only appropriate when an assignment has been previously submitted to the PTO or is being submitted under separate cover. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE **Sensormatic Electronics Corporation**

Recorded: 4/22/96 Reel: 7996 Frame: 0642

(B) RESIDENCE: (CITY & STATE OR COUNTRY)

Boca Raton, Florida

Please check the appropriate assignee category indicated below (will not be printed on the patent)

☐ Individual ☒ Corporation or other private group entity ☐ government

4a. The following fees are enclosed (make check payable to Commissioner of Patents and Trademarks):

☒ Issue Fee

10

☒ Advance Order - # of Copies

4b. The following fees or deficiency in these fees should be charged to:

DEPOSIT ACCOUNT NUMBER **18-1644**

(ENCLOSE AN EXTRA COPY OF THIS FORM)

☒ Issue Fee

10

☒ Advance Order - # of Copies

The COMMISSIONER OF PATENTS AND TRADEMARKS IS requested to apply the Issue Fee to the application identified above.

(Authorized Signature)
John J. Torrente, Reg No: 26,359(Date)
09/14/99

NOTE: The Issue Fee will not be accepted from anyone other than the applicant; a registered attorney, agent, or the assignee or other party in interest as shown by the records of the Patent and Trademark Office.

Ten Hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending on the needs of the individual case. Any comments on the amount of time required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS OFFICE. SEND FEES AND THIS FORM TO: Box Issue Fee, Assistant Commissioner for Patents, Washington D.C. 20231

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

TRANSMIT THIS FORM WITH FEE

(10-96) Approved for use through 06/30/99. OMB 0651-0033

Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PATENT OWNER

Ex 2014

SEP 17 1999

RECEIVED

17

7540
51 94/10/4185

BATCH V26
PATENT
C4-430

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Reuel A. Ely
Serial No.: 08/635,692
For : DISTRIBUTED VIDEO DATA STORAGE IN
VIDEO SURVEILLANCE SYSTEM
Filed : April 22, 1996
Examiner : N. Diep
Art Unit : 2713



Asst. Commissioner of
Patents
Washington, D.C. 20231
Attn: BOX ISSUE FEE

Sir:

LETTER FILING FORMAL DRAWINGS

Formal drawings for the above-captioned application
are appended.

This submission is responsive to the Notice of
Allowability mailed on July 2, 1999.

Respectfully submitted,

John J. Torrente
John J. Torrente
Reg. No. 26,359
An Attorney of Record

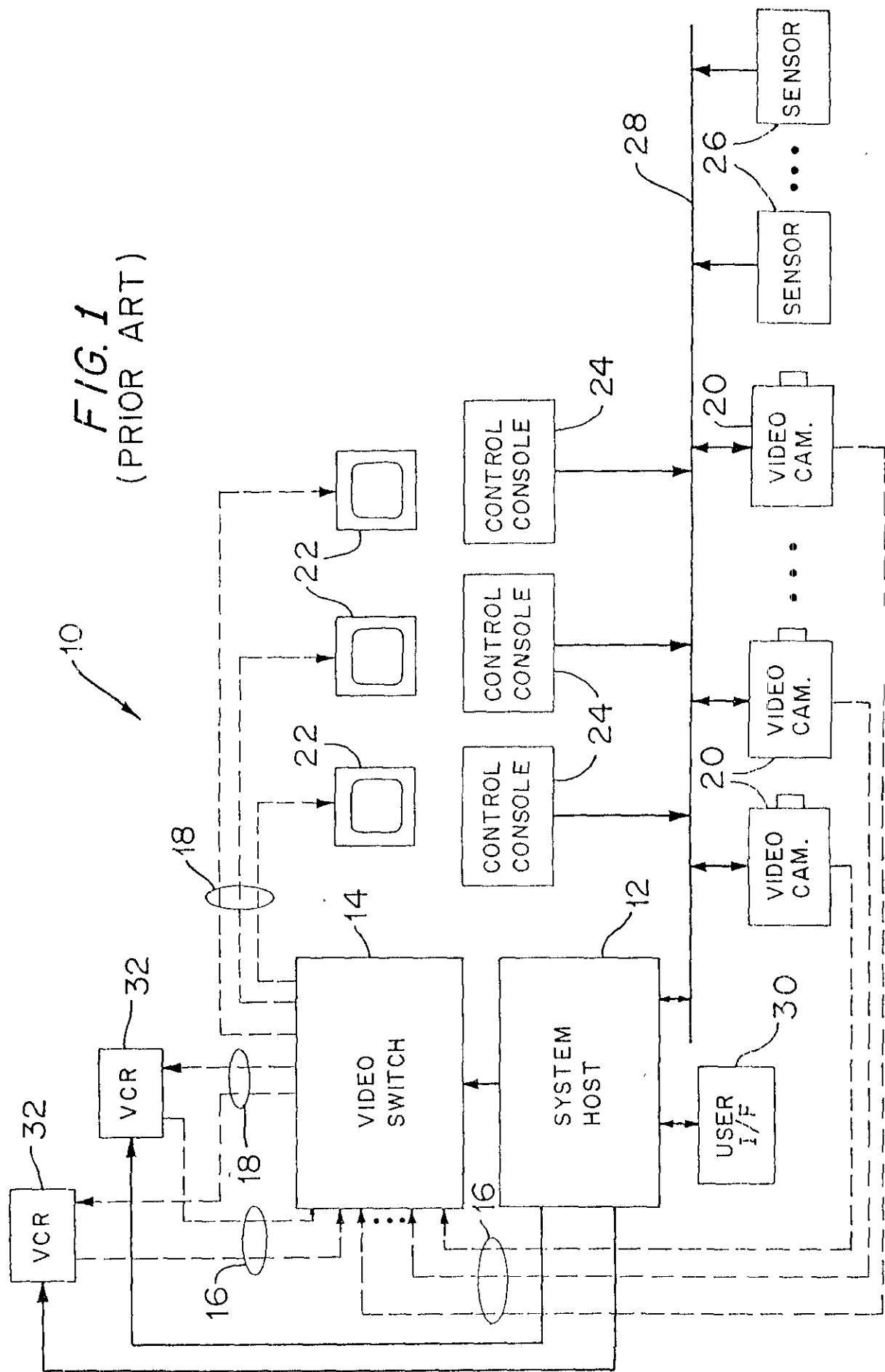
ROBIN, BLECKER & DALEY
330 Madison Avenue
New York, New York 10017
(212) 682-9640

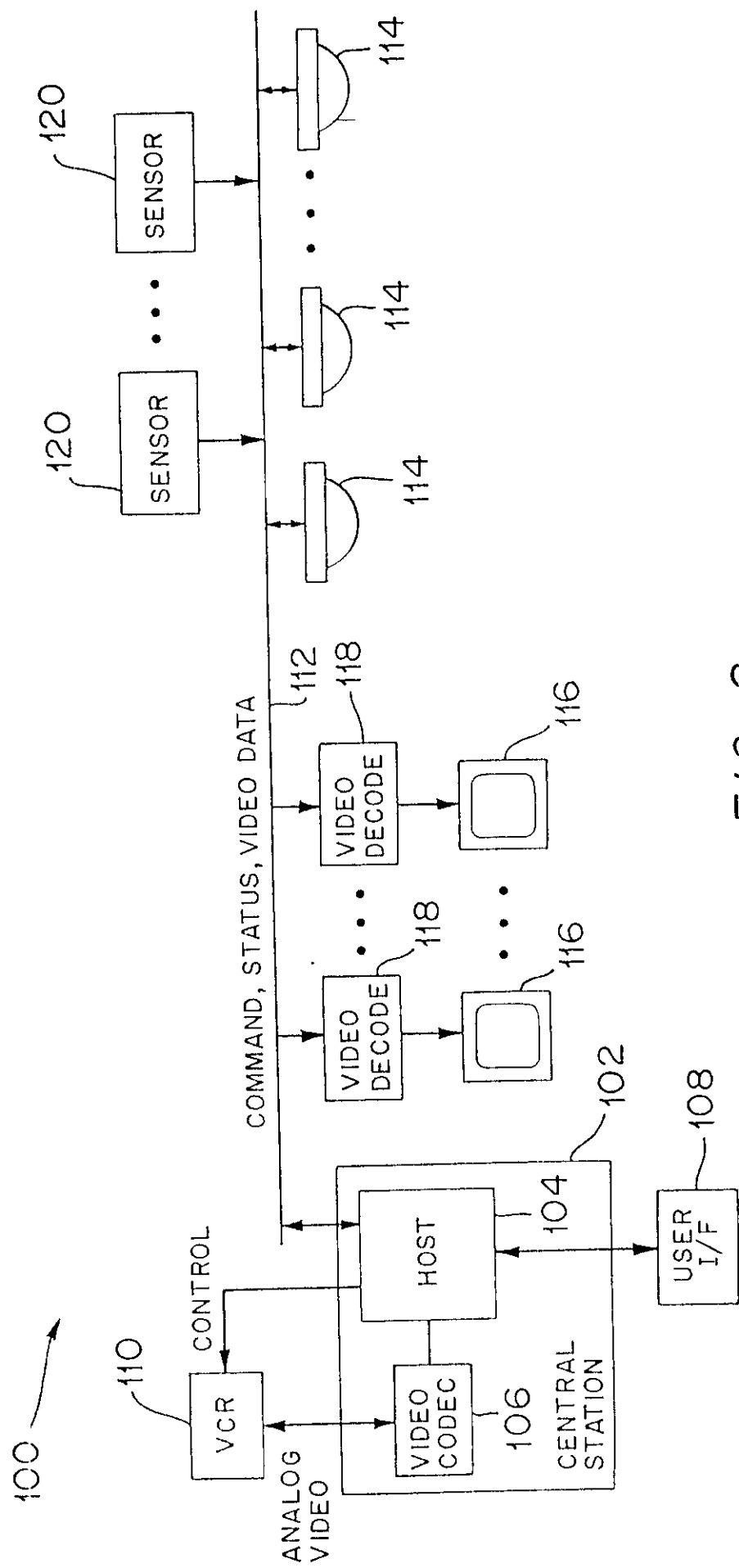
I hereby certify that this correspondence is being deposited
with the United States Postal Service as first class mail in
an envelope addressed: Assistant Commissioner of Patents and
Trademarks, Washington, D.C. 20231, on September 14, 1999.

John J. Torrente
Attorney

John J. Torrente
Signature

September 14, 1999
Date of Signature





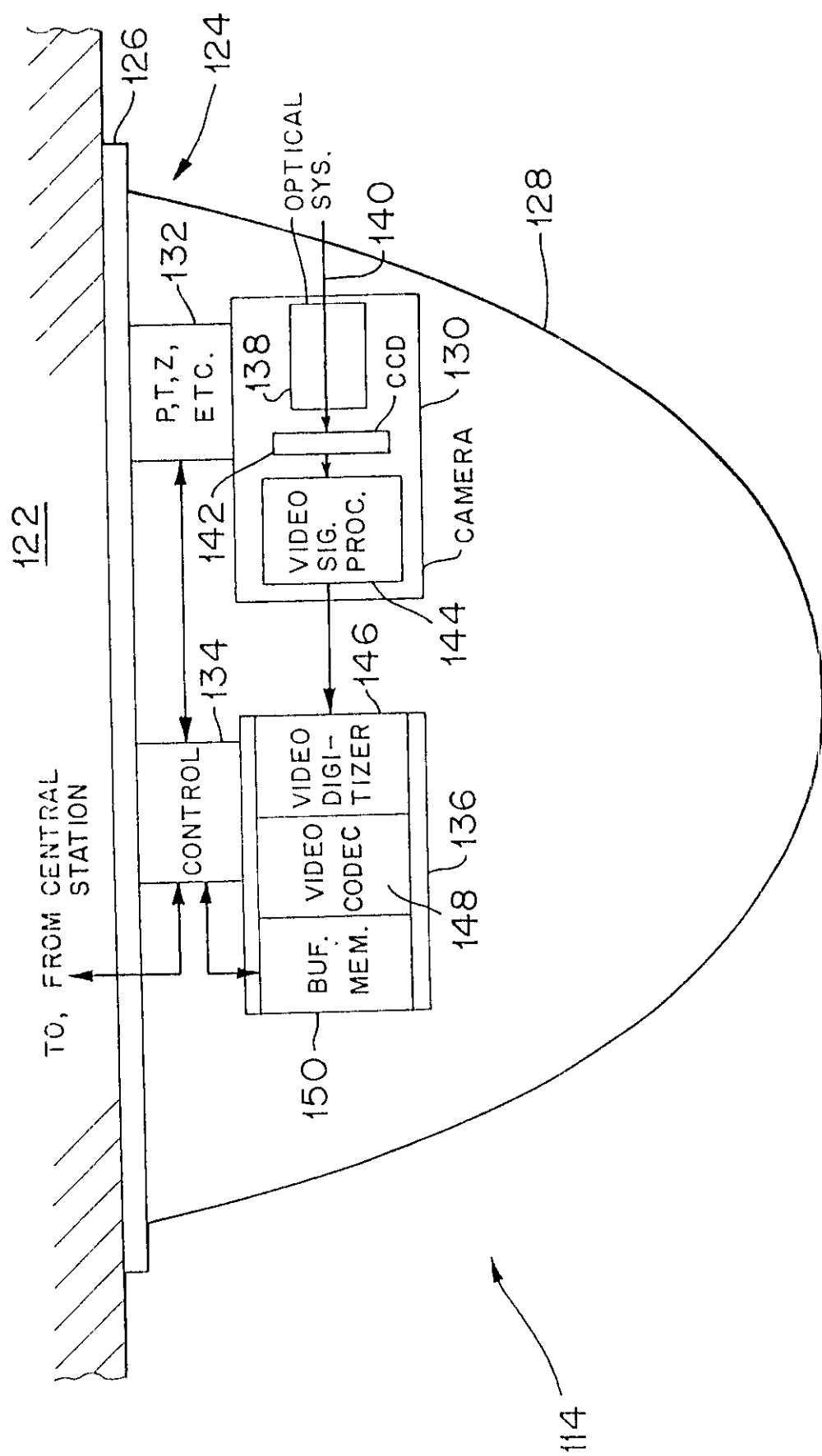


FIG. 3

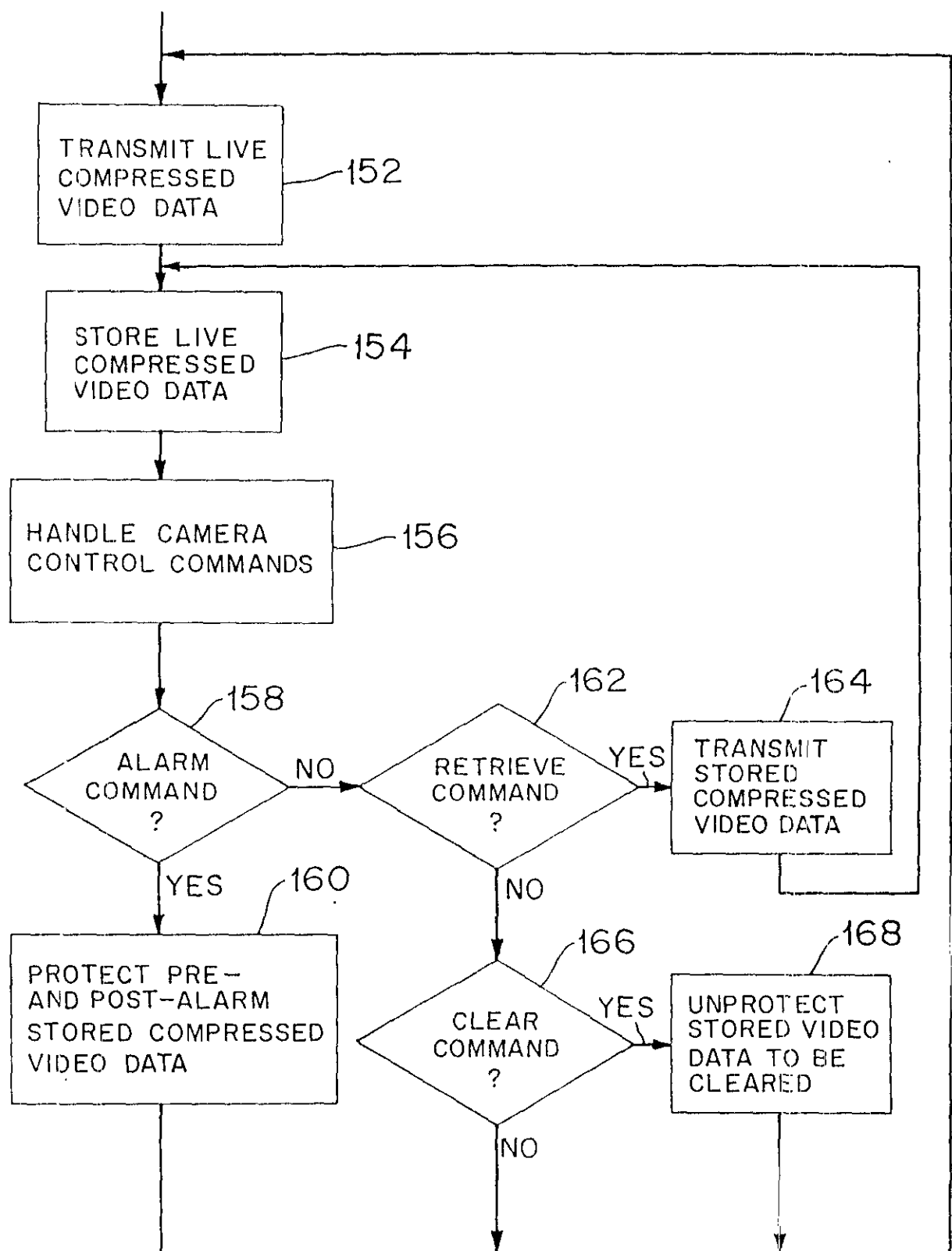


FIG. 4
CAMERA UNIT OPERATION

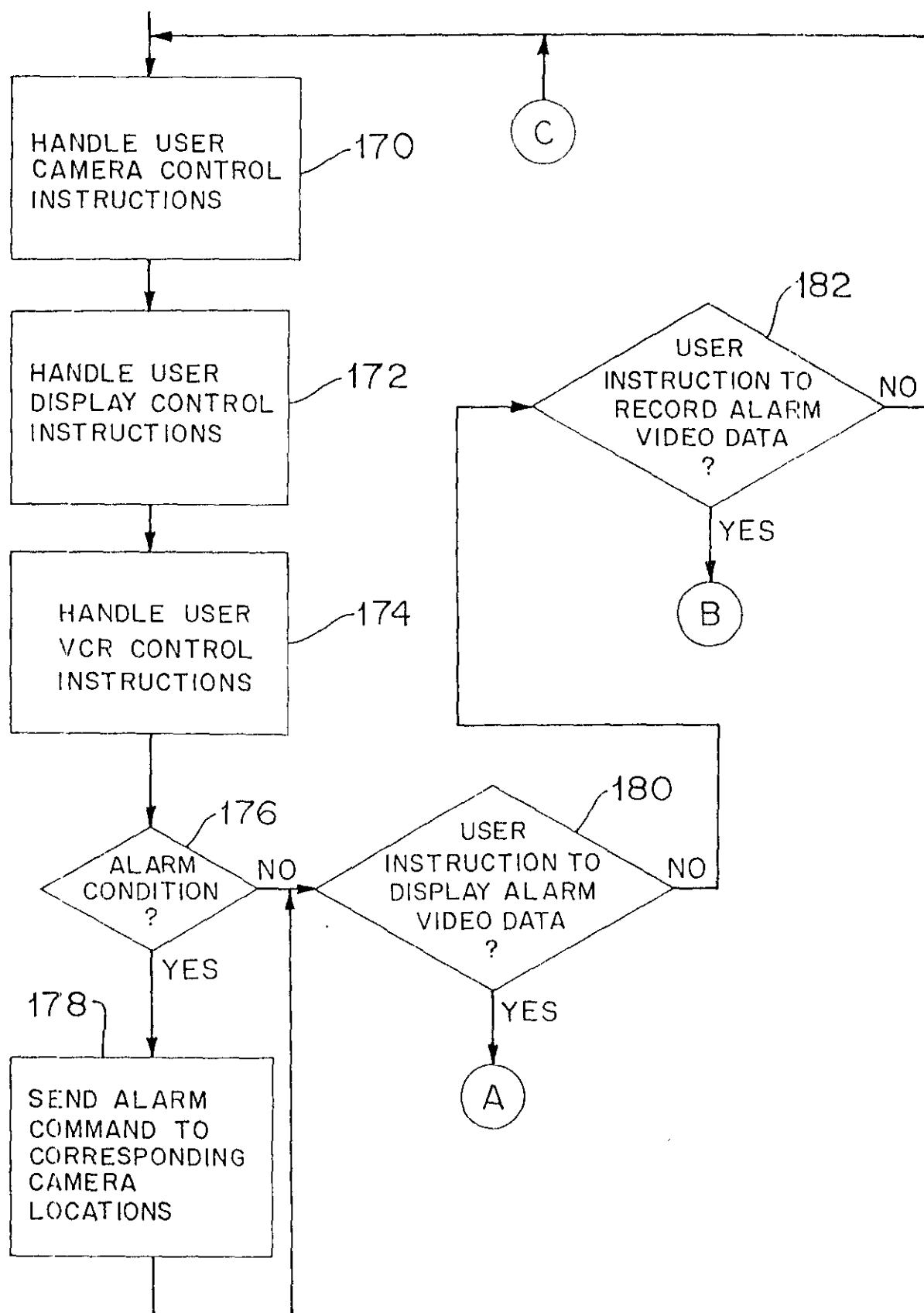
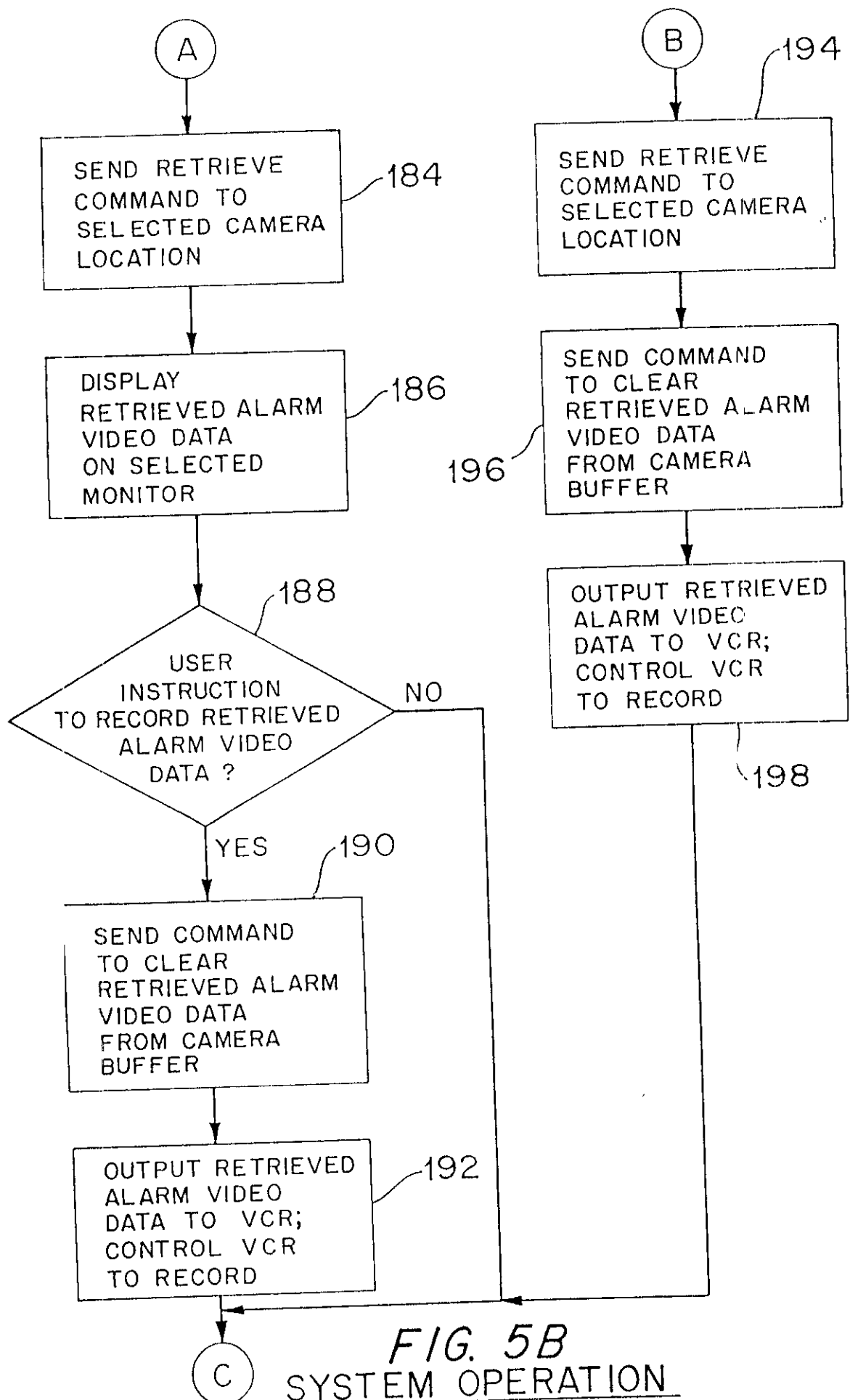


FIG. 5A
SYSTEM OPERATION



PATENT APPLICATION FEE DETERMINATION RECORD

Effective October 1, 1995

Application or Docket Number

635692

CLAIMS AS FILED - PART I

(Column 1)

(Column 2)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

FOR	NUMBER FILED	NUMBER EXTRA
BASIC FEE		
TOTAL CLAIMS	29 minus 20 =	* 9
INDEPENDENT CLAIMS	4 minus 3 =	* 1
MULTIPLE DEPENDENT CLAIM PRESENT		

RATE	FEE
	375.00
x\$11=	
x39=	
+125=	
TOTAL	

RATE	FEE
	750.00
x\$22=	198
x78=	78
+250=	
TOTAL	1026

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

(Column 1)

(Column 2)

(Column 3)

SMALL ENTITY

OR

OTHER THAN
SMALL ENTITY

AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	* 25	Minus ** 29	= -
Independent	* 3	Minus *** 4	= -
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

RATE	ADDITIONAL FEE
x\$11=	
x39=	
+125=	
TOTAL	
ADDITIONAL FEE	

RATE	ADDITIONAL FEE
x\$22=	
x78=	
+250=	
TOTAL	
ADDITIONAL FEE	

AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

RATE	ADDITIONAL FEE
x\$11=	
x39=	
+125=	
TOTAL	
ADDITIONAL FEE	

RATE	ADDITIONAL FEE
x\$22=	
x78=	
+250=	
TOTAL	
ADDITIONAL FEE	

AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
Total	*	Minus **	=
Independent	*	Minus ***	=
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM			

RATE	ADDITIONAL FEE
x\$11=	
x39=	
+125=	
TOTAL	
ADDITIONAL FEE	

RATE	ADDITIONAL FEE
x\$22=	
x78=	
+250=	
TOTAL	
ADDITIONAL FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20"

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3"

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

PAGE DATA ENTRY CODING SHEET

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS
WASHINGTON, D.C.

EXAMINING

000

DATE 5/30/96

2ND EXAMINER

DATE _____

REPORT

08/635692

**TYPE
COPY**

[illegible]

Special

GROUP
ARTS

01405

**SHEETS OF
DRAWING**

TOYOTA CLAIMS

INDEPENDENT CLAIMS

SMALL ENTITIES?

THE
LAW OF
THE
STATE OF
NEW YORK
IN SENATE,
JANUARY 1, 1903.
REPORT
OF THE
COMMISSIONERS OF THE
LAND OFFICE,
IN RESPONSE TO A RESOLUTION
PASSED BY THE SENATE
MAY 1, 1899.
ALBANY:
J. B. LEECH, STATE PRINTER.
1903.

FOR THE

ATTORNEY DOCKET NUMBER

CONTRA DADA

CONT	STATES
CODE	CODE

UNITED STATES DEPARTMENT OF AGRICULTURE

THE UNIVERSITY OF CHICAGO

COMPONENT

PARENT FILING
DATE
MONTH DAY YEAR

FOREIGN
PROPERTY
CLAIMED

COUNTRY
CODE

PCT/FOREIGN APPLICATION SERIAL NUMBER

FOREIGN
FILING DATE
MONTH DAY YEAR

PATENT OWNER