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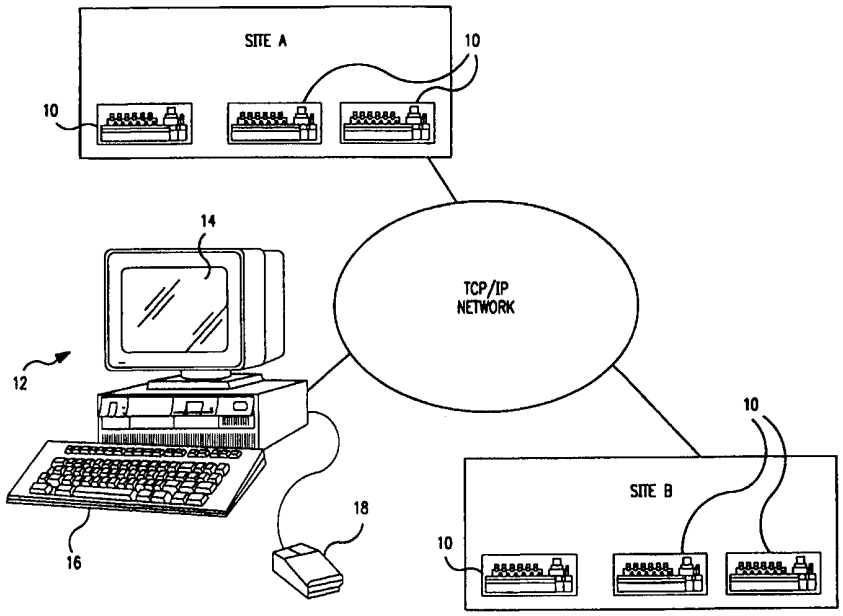

(57) Abstract

A system (10, 12), method, device and/or computer program product for remotely managing, monitoring and controlling a plurality of remote mail processing devices (10). The system (10, 12) comprises a remote monitoring means (12) for receiving operation related information from the mail processing device (10) over a communications network. The remote monitoring means (10) enables the user to A) monitor the status of the mail processing system (10), B) define the mail job, and C) define the threshold/setpoints for a mail processing system (10). This information, which defines the mail processing job, is then sent to the mail processing system (10) over the network.

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Description

SYSTEMS, METHODS AND COMPUTER PROGRAM PRODUCTS FOR MONITORING AND CONTROLLING MAIL PROCESSING DEVICES

Related Applications

The present application is a ***Continuation-In-Part*** Application of, and claims the benefit under 37 C.F.R. §1.53(b) of, co-pending Application Serial No. 09/016,715 entitled "*Systems, Methods and Computer Program Products for Monitoring and Controlling Mail Processing Devices*", filed on January 30, 1998. The present application also claims priority and benefit under 35 U.S.C. § 119(e) of U.S. Provisional Patent Application (No serial number assigned yet) entitled "*Systems and Method for Monitoring and Controlling Mail Processing Devices*", filed on May 14, 1998. Both of the aforementioned patent applications are hereby incorporated herein by reference.

Field of the Invention

The present invention relates generally to mail processing equipment and more particularly to automated mail processing systems. Specifically, the present invention relates to remote monitoring and control of mail processing systems and the features thereof.

Background of the Invention

Customized, high volume mail processing systems are used by financial institutions, insurance companies, public utilities, and various other businesses to prepare and mail letters and packages. Mail processing systems include mail inserting systems, sorting systems, and a range of modular attachments for increasing the productivity of large scale mail production operations. Mail insertion systems include a device known as a mail inserter, which physically "stuffs" individual envelopes with the appropriate contents. Many businesses, such as financial institutions and public utilities, often produce voluminous

mailings on a routine basis. As such, mailings are often performed at various locations to reduce the load on any given location and to be closer to the destination of the mailings.

Unfortunately, monitoring and controlling remotely-located high volume mailing systems with existing control systems may be difficult. Existing control systems may not readily facilitate monitoring multiple remotely-located mailing systems from a central location. Furthermore, existing control systems may not readily facilitate monitoring various operating performance indicators of individual mail inserter devices within multiple remotely-located mailing systems.

Disclosure of the Invention

It is therefore an object of the present invention to facilitate the monitoring of remotely-located high volume mailing systems from a central location.

It is another object of the present invention to facilitate the monitoring of various operating performance indicators of individual mail inserter devices within multiple remotely-located mailing systems.

Further objects of the invention will become apparent to those skilled in the art with reference to the accompanying figures and written description below.

In accordance with the present invention, systems, methods, and computer program products for managing and controlling, from a central location, a plurality of remotely situated mail processing devices are provided. Operation related information is displayed pertaining to each of said plurality of remotely situated mail processing devices such as, for instance, a mail insertion machine. Each mail insertion machine is represented on a computer

visual display as an interactive icon. Visible indicia are associated with each icon for conveying, in real time, operational status information pertaining to the mail inserting machine represented by the icon.

The indicia associated with the mail insertion machine icons change appearance in response to a change in the certain operation related information received from a respective mail insertion machine. The indicia can be displayed as a color selected from a plurality of colors, wherein each color represents a respective operational condition or status of the mail insertion machine. Each interactive mail insertion machine site is displayable as an icon in a manner depicting the geographical location of each mail insertion device as it relates to a larger area, such as, for instance, the continental United States, or South America. Interactive icons may be, *inter alia*, added, deleted, and their location and appearance on the display can be modified.

One embodiment of the present invention describes a system for remotely managing a plurality of remote mail processing devices. The system comprises receiving means for receiving operation related information from each of the remote mail processing devices. The system also includes monitoring means for remotely monitoring operation related information from each of the remote mail processing devices operatively connected to the receiving means.

According to another aspect of the present invention, each interactive icon is responsive to user actions for displaying selective operation related information about a respective mail insertion device. Each interactive icon accepts user selections via an input device. When the user activates an interactive icon, various operational information about the mail insertion device represented by the icon is displayed. This operational information may include machine status, fault information, and various other types of information related

to the operation and performance of the mail insertion device. Information about the operator of the mail insertion device may also be available.

The present invention is advantageous because users can be provided with the ability to monitor multiple mail insertion systems from a single location not necessarily proximate to the machines being monitored. Furthermore, the various stages of the insertion process can be monitored in real time. The present invention can facilitate managing automated mail processing systems to increase productivity and decrease costs associated with insertion. The present invention is also advantageous because a list of mail processing device operators can be created, modified, and sent out from a central location.

Brief Description of the Drawings

The foregoing advantages and features of the present invention will be appreciated more fully from the following description with reference to the accompanying drawings in which:

Figure 1 of the drawings is a schematic diagram of a system for monitoring multiple mail processing systems, in accordance with the present invention;

Figure 2 of the drawings schematically illustrates, in block diagram form, operations for managing a plurality of mail insertion devices, according to the present invention;

Figure 3 of the drawings schematically illustrates, in block diagram form, operations for controlling a plurality of mail insertion devices, according to the present invention;

Figure 4 of the drawings schematically illustrates a hierarchical arrangement of computer screens for managing a plurality of mail insertion devices, according to the present invention;

Figure 5 of the drawings illustrates a startup screen presented to the user upon startup of the present invention;

Figure 6 of the drawings illustrates an Organizational View screen according to the present invention;

Figure 7 of the drawings illustrates a Site View screen according to the present invention;

Figure 8 of the drawings illustrates a Machine View screen according to the present invention;

Figure 9 of the drawings illustrates a Percent to Goal screen according to the present invention;

Figure 10 of the drawings illustrates a Job at a Glance screen according to the present invention;

Figure 11 of the drawings illustrates a User Administration screen according to the present invention;

Figure 12 of the drawings illustrates a System Management screen according to the present invention;

Figure 13 of the drawings illustrates a pop-up screen for selecting a language for text to be displayed in;

Figure 14 of the drawings illustrates a Threshold Setting screen according to the present invention;

Figure 15 of the drawings illustrates a pop-up screen for Alarm Status;

Figure 16 of the drawings illustrates a Run Tag Editor screen according to the present invention;

Figure 17 of the drawings illustrates a Backup screen according to the present invention;

Figure 18 of the drawings illustrates a Restore screen according to the present invention; and

Figure 19 of the drawings illustrates an Operator Definition screen according to the present invention.

Best Mode for Carrying Out the Invention

The present invention now is described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of

the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art.

As will be appreciated by one of skill in the art, the present invention may be embodied as a method, data processing system, or computer program product. Accordingly, the present invention may take the form of an entirely hardware embodiment, an entirely software embodiment or an embodiment combining software and hardware aspects. Furthermore, the present invention may take the form of a computer program product on a computer-readable storage medium having computer-readable program code means embodied in the medium. Any suitable computer readable medium may be utilized including hard disks, CD-ROMs, optical storage devices, or magnetic storage devices.

The present invention is described below with reference to flowchart illustrations of methods, apparatus (systems) and computer program products according to the invention. It will be understood that each block of the flowchart illustrations, and combinations of blocks in the flowchart illustrations, can be implemented by computer program instructions. These computer program instructions may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create means for implementing the functions specified in the flowchart block or blocks. These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means which implement the function specified in the flowchart block

or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

Accordingly, blocks of the flowchart illustrations support combinations of means for performing the specified functions, combinations of steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the flowchart illustrations, and combinations of blocks in the flowchart illustrations, can be implemented by special purpose hardware-based computer systems which perform the specified functions or steps, or combinations of special purpose hardware and computer instructions.

As will readily be appreciated by those skilled in the art, mail processing systems can encompass several types of remote and/or local mail processing machines, including, but not limited to, mail insertion machines and mail sorting machines. In a conventional mail processing system, mail inserting machines (also referred to hereinafter as insertion machines or insertion devices) are utilized for stuffing inserts into awaiting envelopes. Thereafter, the stuffed envelopes are sealed and various other operations associated with mail processing are performed. Insertion machines typically operate at high speeds and can often stuff ten thousand (10,000) envelopes or more per hour. An exemplary insertion machine is described in Applicants' issued U.S. Patent No. 4,798,040 to Haas et al., the disclosure of which is incorporated herein by reference.

Referring now to **Figure 1**, a schematic diagram of multiple mail insertion machines monitored and controlled by computer systems, methods and computer program products, in accordance with the present invention, is illustrated. Sites **A** and **B** each have one or more mail insertion machines **10** and are monitored and controlled via the present invention operating on computer system **12**. Computer system **12** includes a display **14** for visually displaying information to a computer user, a central processing unit (CPU) and internal memory. Keyboard **16** and mouse **18** allow the user to provide input to the central processing unit. With the mouse **18**, the user may move a pointer on the display **14** to an area displaying an object. By pressing and releasing a button on the mouse **18** while the pointer is in the area displaying the object or icon, the user "activates" the icon. This is also referred to hereinafter as "clicking on" an icon. Computer system **12**, serves as data processing means for transmitting and receiving information from and to each mail insertion machine **10** and displaying same via display **14**. Other computing systems, including mainframe computing systems, may be utilized to facilitate communicating with the various mail processing devices being monitored and controlled.

The present invention may be stored in computer system **12**, either within internal memory or on internal disk storage. The present invention may also be stored on computer readable media and used therefrom by computer system **12**. As will be described in detail below, the present invention alters the operation of computer system **12**, allowing it to monitor and control a plurality of mail insertion devices in real time.

Referring now to the block diagram of **Figure 2**, operations for managing a plurality of mail insertion devices, according to one aspect of the present invention, are illustrated. Operations include receiving operation related information from mail insertion devices (Block **20**); representing each of the mail insertion devices as an interactive icon having indicia for displaying

operation related information for a respective mail insertion device (Block **22**); accepting selection of an interactive icon (Block **24**); and displaying operating status for the selected mail insertion device (Block **26**).

Operation related information includes, but is not limited to, organizational, site, machine, utility, and system administration information. Organizational information comprises site addition, deletion, and modification capability as well as instantaneous production and goal data. Site information comprises instantaneous production and goal data, job data, fault data, and alarm data with respect to a particular site. Machine information comprises instantaneous production and goal data, job data, fault data, and alarm data with respect to a particular machine. Utility information comprises alarm data, user administration data, shift data, language data, threshold setting data, and run-time manager data. System administration information comprises report data, remote machine setup data, backup and restore data, and run tag editor data.

It is to be understood that a user does not necessarily have to select an icon to view information about a particular mail insertion device. Various information relating to a mail insertion device may be automatically updated and displayed. The operations illustrated in **Figure 2** may be performed in the various "views" described in detail below using **Figures 4-18**.

Referring now to **Figure 3**, operations for controlling a plurality of mail insertion devices, according to one aspect of the present invention, are illustrated. Operations include receiving operation related information from mail processing devices (Block **30**); and monitoring the received operation related information with respect to mail processing device performance (Block **32**).

Referring now to **Figure 4**, a hierarchical arrangement **40** of computer screens for facilitating management of a plurality of mail insertion devices,

according to the present invention, is illustrated. From a main menu **40a** presented to the user on a computer display, the user may select an "Organizational View" **41** of multiple sites having mail insertion machines, a "Site View" **42** of individual sites having mail insertion machines, a "Machine View" **43** of individual insertion machines at a particular site; a "Utilities" **44** selection comprising several options; and a "System Administration" **45** selection comprising several options.

Various screens containing operating information are available from each of the respective Organizational View **41**, Site View **42**, and Machine View **43** screens. For example, the user may access the "Percent to Goal" screen **41a**, and the "Add" **41b**, "Modify" **41c**, or "Delete" **41d** settings screens from the Organizational View screen **41**. The user may access the "Percent to Goal" screen **42a**, the "Jobs at a Glance" screen **42b**, the "Faults at a Glance" screen **42c**, and the "Alarms" screen **42d** from the Site View Screen **42**. The user may access the "Percent to Goal" screen **43a**, the "Jobs at a Glance" screen **43b**, the "Faults at a Glance" screen **43c**, and the "Alarms" screen **43d** from the Machine View Screen **43**. Each of these screens, and the information presented thereby, are described in detail below.

The user may select (i.e., run) various utility programs via screens accessible via the "Utilities" screen **44** such as the "Alarms" screen **44a**, the "User Administration" screen **44b**, the "Shift Setup" screen **44c**, the "Language Setup" screen **44d**, the "Threshold Settings" screen **44e**, and the "Run-Time Manager" screen **44f**. In addition, the user may perform various administrative tasks via the "Systems Administration" screen **45** such as the "Reports" screen **45a**, the "Setup of Inserting Machine Operators" screen **45b**, the "Backup/Restore" screen **45c**, and the "Run-Tag Editor" screen **45d**. Each of these screens, and the information presented thereby, are described in detail below.

Logo Screen and Log-In

The initial screen on the user's display, when the present invention is initiated on a computer, is preferably a logo or start-up screen **50** such as that illustrated in **Figure 5**. Clicking at any point on the start-up screen **50** preferably activates a login procedure via a pop-up screen. For security reasons, it is required that the user enter a user name and password in order to proceed. As would be understood by those having skill in the art, options available to a user upon login may depend on permissions assigned to the particular user.

Once properly logged in, the present invention allows users to view various operational and performance information about multiple remotely-located mail insertion machines. Users are presented with a hierarchy of views depicting organizational, site, and machine-specific perspectives of their mail insertion machines. The user can display text throughout the various screens in a variety of languages including, but not limited to, English, Spanish, French, Italian, German and Dutch. Preferably, a language can be selected via a pop-up screen such as that illustrated in **Figure 13**. Each hierarchical view will be described below in detail.

Each view screen, organizational, site and machine, also presents the user with various toolbars containing icons for performing various functions. In the embodiment of the Organizational View Screen illustrated in **Figure 6**, two toolbars **62** and **64** are presented to the user. Each toolbar contains icons for performing specific functions. Preferably, toolbars **62** and **64** are presented to the user with the same configuration in all views in order to maintain a consistent and easy to use interface. It is understood, however, that certain functions may not be executable from certain screens. In this case, the icons representing those functions are shaded or greyed out indicating they are not a valid selection or operation from the present screen.

Table 1 below describes the function of each of the icons contained within toolbar **62**.

Table 1

Icon #	Icon Name	Icon Function
62a	Add (Site/Machine)	Add a site or a machine.
62b	Edit (Site/Machine)	Edit a selected site or machine.
62c	Delete (Site/Machine)	Delete a selected site or machine.
62d	Percent to Goal	Access the Percent to Goal panel.
62e	Job at a Glance	Access the Job at a Glance panel.
62f	Faults at a Glance	Access the Faults at a Glance panel.
62g	Alarms	Access the Alarms panel.
62h	Text	Toggle between a graphic and text display.
62i	User Administration	Access the User Administration panel.
62j	Site Settings	Access the Site Settings panel.
62k	Shift Settings	Access the Shift Settings panel.
62l	Threshold Settings	Access the Threshold Settings panel.
62m	Run Manager	Access the Run Manager panel.
62n	Shut-down Application	Shut-down the current application.

Table 2 below describes the function of each of the icons contained within toolbar **64**.

Table 2

Icon #	Icon Name	Icon Function
64a	Organizational View	Display all sites currently configured.
64b	Site View	Display the site settings for a selected site.
64c	Machine View	Display all the machines defined at a particular site.
64d	Utilities	Display the Alarms panel. Access other Utilities.

Icon #	Icon Name	Icon Function
64e	System Administration	Access various system administration tasks.
64f	Back	Return to the previous panel.
64g	Log off	Log out and return to main panel.
64h	Help	Access help panels.

It is understood that additional graphic designs may be utilized for each icon without departing from the spirit and intent of the present invention.

Organizational View

The Organizational View screen **41**, illustrated in **Figure 6**, preferably includes a geographical background on which the user can place up to twelve (12) sites having mail insertion machines in a geographically oriented arrangement. Although the illustrated embodiment depicts North America as the background, it is to be understood that any geographical depiction is possible using the present invention. Furthermore, no geographical background may be presented if so desired by the user. In the case where users do not have multiple sites, the organizational view can be deactivated and removed from the screen hierarchy.

The Organizational View screen **41** allows the user to display site icons **60** for each site having mail insertion machines. The user will be able to activate site icons **60** and be advanced to "Site View" for the respective site, as described in detail below.

The user can add, delete and modify information associated with each site by "clicking on" or otherwise activating the respective site icon **60** and then clicking on or otherwise activating the respective add, edit, or delete icons **62a**, **62b**, **62c**. If the user is modifying a site, a pop-up window with the selected site's information appears on the screen for editing when icon **62b** is activated.

If the user is deleting a site, the site icon will simply disappear from the screen when icon **62c** is activated. To add a site, the user activates icon **62a** and a pop-up window, designed to receive input from the user, appears on the screen.

Site View

Preferably, when the user "clicks on" or otherwise activates a site icon, a Site View screen is presented to the user for the site represented by the activated icon. A Site View screen displays the location of mail insertion machines at a selected site via machine icons. An exemplary Site View screen **42** is illustrated in **Figure 7**, wherein two insertion machines are represented by machine icons **70a** and **70b**. Preferably a maximum of twelve (12) mail insertion machines are displayed per Site View screen **42**, not to exceed a total of one hundred (100) machines.

For each mail insertion machine at a site, the following information is preferably available via a respective machine icon: machine status, actual and goal throughput, actual and goal envelope counts, percent completion for the current run, the current operator identification, and the current job identification. Preferably, all mail insertion machine information is available and displayable in real time. It is understood that the term "real time" shall mean a minimal refresh rate of any screen of 30 seconds or less.

The operational status or condition of a particular mail insertion machine is discernable at all times by the color of indicia surrounding each machine icon. Accordingly, the user does not have to activate the machine icon to determine the operational status of a respective mail insertion machine. As illustrated in **Figure 7**, each machine icon **70a**, **70b** has an area of indicia **71a**, **71b** immediately surrounding the graphic portion **72a**, **72b** of each machine icon that changes colors depending on the operating conditions of the

particular insertion machine. Exemplary operating conditions and their respective colors are presented in Table 3 below.

Table 3

Insertion Machine Operating Condition	Color Surrounding Machine Icon
Off	Background Color
Stopped	Grey
Running/Run Pending	Green
Jogging/Jog Pending	Yellow
Faulted/Insertion Machine Communications Failure	Red
Hold/Track Hold	Orange
Operator Break	Pink
Service	White

The present invention is not limited to color as a visual indication of insertion machine operational status. Operational status can be indicated by other visual schemes which change the display of an icon in response to actual machine operational condition changes. Machine status information available from Site View includes, but is not limited to, actual and goal throughput, actual and goal envelope counts, the percent complete for a current run, the current operator identification, and the current job identification number. The information that is displayed is the current information for the inserting machine and shows the progress being made on the job that is currently running on that machine.

Users in Site View can also arrange a series of machine icons to represent the physical layout of mail insertion machines. Icons can represent the type of insertion machine and indicate the type of communication protocols being utilized. The user can add, modify, and delete insertion machine icons

at each site. When adding an insertion machine, the user is prompted for the following information: type of insertion machine, machine identification, machine name, and various network parameters.

Machine View

When the user double clicks or otherwise activates an interactive machine icon in the Site View screen of **Figure 7** the Machine View screen **43** of **Figure 8** is presented for the mail insertion machine represented by that machine icon. Using the Machine View screen **43**, the user is able to view various operational information **74** including, but not limited to, the following: machine status, actual and goal throughput, actual and goal envelope counts, estimated time to completion, the currently running job identification, the current fault count, the average fault length, a bar graph of time usage, device information, software package information and operator information. In addition, the user will be able to view the current T1, T2 or T3 formula results for each machine. As is known to those with skill in the art, for Advanced User Interface (AUI) type insertion machines (manufactured by Bell & Howell Mail Processing Systems, Allentown, PA, and Durham, NC), T1 is defined as a throughput calculation of "envelopes per hour" and is calculated using the following equation:

*(run envelopes / (run time + fault time)) * 3600*

T2 is defined as a calculation of "percent utilization" and is calculated using the following equation:

*(total envelopes * 100) / (theoretical throughput)*

For both T1 and T2, the following definitions apply:

total envelopes = run envelopes + jog envelopes

*theoretical throughput = (average run speed * (run time + jog time + fault time)) / 3600*

average run speed = run machine cycles / (run time / 3600)

For Inserting System Machine Connection (ISMC) insertion machines (manufactured by Bell & Howell Mail Processing Systems) T1 is defined as follows:

*T1 = ((total envelopes - service envelopes) * 3600) / (run time + fault time)*

As is known by those skilled in the art, T2 is not calculated for ISMC insertion machines because the ISMC interface generally does not supply machine cycle information.

For both types of insertion machines, T3 is a user-defined formula, and can be configured in Site Settings for each site. The numerator is "run envelopes" and the denominator may be a sum of user selected time measurements. The user may select any or all of the following time measurements to be included in the denominator: run time, jog time, fault time, extended fault time, break time, service time, idle time, or suspend time. An exemplary T3 calculation is:

*(run envelopes / (run time + jog time + break time)) * 3600*

Remote Site Connectivity

The user can view other site information by going to the Organizational View of **Figure 6** and selecting another site's icon **64b**. The other site icon must have been previously configured in order to be present on the screen. Once the user has selected a remote site icon **64b**, the Site View, Machine View, "Percent to Goal" pop-up, "Job at a Glance" pop-up and "Faults at a Glance" pop-up will now display information from the remote site. The user is prohibited from changing setup information for the remote site. For instance, the user can not change thresholds or run tag goals for the remote site.

Other Screens and Windows

The following screens and pop-up windows are presented to the user when the user activates certain icons and/or automatically when certain events occur.

"Faults at a Glance" Pop-Up

Icons for providing fault and job information are preferably provided in both Machine View and Site View. The user can select this pop-up window (not shown) by clicking on the "Faults at a Glance" button **62f** on the left side of the Site View screen of **Figure 7** or the Machine View screen of **Figure 8**.

"Percent to Goal" Pop-Up

A Percent to Goal pop-up window **90**, illustrated in **Figure 9**, appears when the user clicks on the "%" icon **62d** in either Machine View of **Figure 8** or Site View of **Figure 7**. The Percent to Goal pop-up permits the user to view current statistics. The top portion **92** displays all information pertaining to an entire site. Statistics for jobs currently running or completed during the current shift on the insertion machines at the site may be included in the top portion **92**. A list **94** of jobs allows the user to select a job and view a summary of the selected job in the bottom portion **96** of the window **90**.

"Job at a Glance" Pop-Up

A Job at a Glance pop-up window **100**, illustrated in **Figure 10**, appears when the user clicks on the "Job at a Glance" button **62e** on the side of various screens. The top section **102** shows a summary of all elements of a job. The list **104** in the center portion of the window **100** contains all insertion machines running that particular job. When the user selects one of those insertion machines, details about the selected insertion machine will appear in the bottom section **106**. Preferred information displayed in the bottom section **106** includes, but is not limited to: machine identification, operators running

machine(s), current throughput, goal throughput, current accounts completed, and total accounts in job.

User Administration

The User Administration utility screen **110**, illustrated in **Figure 11**, allows the user to add, edit, and delete users, including changing the security group of which the user is a member. In the illustrated embodiment, the top left portion **112** of the screen **110** is used to configure a user's account. In the illustrated embodiment, the top right portion **114** of the screen **110** is used to configure security groups of users. Each security group preferably has a name and a set of designated privileges. The types of privileges include: status view, operator view, reports, alarm view, file transfer, edit configuration, job programming, maintain system, and edit users.

System Management and Utilities

Figure 12 illustrates the "System Management" screen in which the user is provided with various system management tools including report generation **120**, data backup **121**, scheduled data backup **122**, operator setup **123**, purge settings **124**, data restore **125**, and run tag editor **126.** Various utilities may also be provided for performing a variety of functions including configuring user accounts, changing the display language, and configuring shift setups. The user can view individual occurrences of alarms from the mail insertion machines as well as set alarm thresholds for specific jobs. Alarm messages preferably can be filtered either by job identification, insertion machine identification or both.

Thresholds are a significant feature of the present invention. Thresholds allow the user to pro-actively monitor the progress of inserting machines and take corrective actions if necessary. There are two different types of thresholds. The first type is alarm thresholds. Alarm thresholds (**Figure 14**) are based on occurrences of errors within a particular inserting machine. The

second type is production thresholds. Production thresholds are based on the progress of completed envelopes compared to the expected goal of completed envelopes for a particular job.

Alarm Thresholds

The user may set either Shift or Run tag thresholds (**Figure 15**) of three (3) different types: number of alarm occurrences, total duration of the alarms, or average duration of the alarms. The user may select to apply the threshold to a group of alarms for a shift or for a specific run tag. When an inserting machine crosses the threshold, the user is alerted with a pop-up which displays the violated threshold.

Example:

For Shift 1, a threshold is set for five occurrences of "AIM - reader" errors. If an inserting machine exhibits five of these errors, the user is alerted via an alert pop-up. Once the alert pop-up is dismissed, the count is re-initialized to zero and the threshold monitoring is resumed.

In addition, a pop-up window is presented to the user for viewing occurrences of thresholds on groups of errors. Table 4 below illustrates some of the errors that may be monitored and logged.

Table 4

General Error Type	Specific Error Type
Aim	System
Aim	Accessories
Aim	Reader
Aim	Cutter
Aim	Burster

General Error Type	Specific Error Type
Aim	Sheet Feeder
Aim	Turnover/Sequencer
Aim	Hold Module
Aim	Right Angle Turn
Aim	Accumulator
Aim	Diverter
Aim	Folder
Aim	Collector
Aim	Interface
Aim	Slitter
Aim	Other
Aim	All
Insert Feeder	System
Insert Feeder	Reader
Insert Feeder	Miss
Insert Feeder	Double
Insert Feeder	Other
Insert Feeder	All
Envelope Feeder	System
Envelope Feeder	Reader
Envelope Feeder	Miss
Envelope Feeder	Double
Envelope Feeder	Other
Envelope Feeder	All
Base Machine	-----

General Error Type	Specific Error Type
Finishing	Turnover
Finishing	Sealer
Finishing	Bridge
Finishing	Other
Finishing	All
Delivery	Modular Delivery
Delivery	Postage Meter
Delivery	Printer
Delivery	Output Device
Delivery	Other
Delivery	All

Preferably, a pop-up window automatically appears on the user's display when a threshold is crossed, in order to alert the user to the particular condition. Information that is preferably displayed in such a window includes: identification of insertion machine having an error, error type, number of occurrences of error, total errors, total time lost, and average reset time. Preferably, the item that caused the threshold to trigger the pop-up window will be highlighted. For example, if a threshold was set for an average reset time of two (2) minutes and the average reset time calculated equals three (3) minutes, the "Threshold Violation" pop-up window would appear on the user's display with the average reset time of three (3) minutes highlighted. If the user needs to see specific error occurrences, he/she can go to an Alarm Browser and filter the errors by machine identification or job identification.

It is understood that additional alarm thresholds may be utilized without departing from the spirit and intent of the present invention.

Production Thresholds

The user may set either Site or Run tag thresholds for production levels. The user selects a "percentage to be complete" and a time of day at which to check the threshold. When that time of day is reached, the system checks the threshold percentage against the actual percentage to see if the production threshold is met. If the actual production percentage is greater than or equal to the threshold percentage, the threshold is met. Otherwise, the production threshold is violated and an alert pop-up is displayed.

Example:

For a run tag of "job 17A", the machines should be 50% complete by 11:30 AM. At 11:30 AM the system checks to see if the machines are 50% to the goal. If the actual percentage is less than 50%, an alert pop-up is displayed.

In addition, a pop-up window is presented to the user for viewing occurrences of production threshold violations. Preferably, a pop-up window automatically appears on the user's display when a threshold is crossed, in order to alert the user to the particular condition. Information that is preferably displayed in such a window includes: identification of insertion machine having an error, error type, number of occurrences of error, total errors, total time lost, and average reset time. Preferably, the item that caused the threshold to trigger the pop-up window will be highlighted. For example, if a threshold was set for 50% job completion by 12:00 noon and only 45% was actually achieved at that time then a production threshold violation pop-up window would appear on the user's display showing the current percentage complete thereby giving the operator an indication of job performance.

It is understood that additional production thresholds may be utilized without departing from the spirit and intent of the present invention.

Run Tag Editor

The "Run Tag Editor" screen of **Figure 16** is accessed via the "System Management" screen of **Figure 12**. The Run Tag Editor is a utility that allows the user to correct any run tag assignment mistakes made by the inserting machine operator. Since data is labeled in the present invention by a run tag, it is important that the run tag be correct. Therefore, it is desirable for the user to be able to make corrections to run tags.

Within the Run Tag Editor screen **126**, the user may search all of the run tags **162** in the database. The list includes run tags that have completed at least one run in the database. The user is prohibited from editing run tags for inserter runs that are in progress. Once the user has received the results of the run tag search, he may select one, many, or all run tags to edit. Upon selection, he will create a new run tag for the selected items either by typing a new tag **164** in the box provided on the screen or by selecting a previously used run tag from the list **166** above the box. He can then modify the tags by clicking the Modify button **168** located near the bottom of the screen. A pop-up will be presented to the user to show that the database will be altered and the user must confirm this. Then, after the database is altered, the search list will be updated. Any errors that occur during this process will be displayed on the screen.

Backup/Restore

The data backup and restore functionality is divided into three (3) separate screens and each is accessed via the "System Management" screen of **Figure 12**. Such screens include the Backup screen **(Figure 17)**, the Restore screen **(Figure 18)**, and the Scheduled Backup screen (not shown).

The user may choose to backup **(Figure 17)** one, many, or all of the following data types: run tag information **171**, operator setup information **172**, or system configuration information **173.** The user selects the data to be

saved, selects the media (hard disk **174**, tape **175** or floppy **176**) and then executes the backup. Any errors that occur will be displayed on the screen.

The user may choose to restore **(Figure 18)** any data type from a backup file. First, the user selects the restoration media (hard disk **174**, tape **175** or floppy **176**). The selected media is accessed in order to present an archive list **181** or source list **182** of restorable data to the user. The user can then select to restore one , many , or all of the data in the backup file. Any errors that occur will be displayed on the screen for the user.

The user will be able to choose to schedule a backup for future or repeated execution. The user will select the data types and the media just as he would for a regular backup. The user would then select the time and interval at which the backup will occur. After making these selections, the user will be able to schedule the backup. The backup would then execute at the appropriate time. The user will also be able to use this screen to remove a command for a scheduled backup. The list at the top of the screen will display all currently scheduled backup parameters and the user would select any of them for viewing or deletion. Any errors that would occur during the setting of backup parameters will be displayed to the user. Any errors that would occur during a scheduled backup will be written to a log file.

A user can also define the valid list of operators for a given mail processing machine at a remote location. **Figure 19** illustrates the "Operator Definition" screen **123** selectable from the System Management screen of **Figure 12**. The Operator Definition screen **123** allows a system level user to identify operators of particular mail processing machines and define the level of access and/or control the operator will have with respect to the mail processing machine. The user will enter a unique Operator ID **190**, password **192**, and optional description **194** in the dialog box **196** on the upper portion of the screen. Next, the user will choose and assign the authority levels for this

operator using the dialog box **198** in the lower center portion of the screen. This information is then communicated from the central location over a computer network to the specific mail processing machine in question. This information can be stored such that it can not be edited from the remote mail processing machine.

Hardware and Software Requirements

The present invention can be implemented in a variety of communications environments including a Local Area Network (LAN) and Wide Area Network (WAN) environments. The present invention can be implemented in communications environments utilizing TCP/IP communications protocol, such as the Internet, and environments utilizing SNA protocol. Hardware for implementing the present invention is generally consistent with typical personal computing equipment, and does not generally require special environmental conditions other than a typical office environment. Preferably, the present invention is implemented on an International Business Machines (IBM®) or IBM®-compatible personal computer and software capable of supporting a thin wire Ethernet TCP/IP environment. Even more preferable is a server based on an Intel® 486 or Pentium® processor and having at least sixteen (16) megabytes of memory to perform all functions efficiently, and having data storage capacity of at least four (4) gigabytes. Also preferred is a printer suitable for text and color graphical report printing; automatic back-up capability for data and configuration files; and trackball or mouse support. The present invention may be implemented via other computing devices, including, but not limited to, mainframe computing systems and mini-computers. It is preferable to use a high resolution color display; however, a standard personal computer monitor may be used.

The present invention may be written in various computer languages including, but not limited to, C++, Smalltalk, Java, and other conventional programming languages such as BASIC, FORTRAN and COBOL.

The present invention runs on current standard desktop computer platforms such as, but not limited to, Windows®, Windows 95®, Windows NT®, UNIX®, and OS/2®. The present invention utilizes, in part, many standard features of current desktop configurations, such as the ability to store data locally, connect to the Internet, and display visual information.

Computer readable program code means is provided for receiving processing system operation related information from each of a plurality of mail insertion devices, and for representing each of the mail insertion devices as an interactive icon on a display connected to a data processing system. Each interactive icon has indicia associated therewith which displays the operation related information for a respective mail insertion device and changes appearance in response to a change in the operation related information. Computer readable program code means is provided for displaying selective operation related information about a respective mail insertion device in response to user actions, and for displaying operation related information for each mail insertion device in real time. Computer readable program code means is provided for selecting an interactive icon via an input device operatively connected to the data processing system, and for displaying operating status for the mail insertion device represented by the selected icon.

Computer readable program code means is provided for displaying the indicia surrounding an icon as a color selected from a plurality of colors, wherein each color represents an operational condition of a mail insertion device. Computer readable program code means is provided for displaying interactive icons in a manner depicting geographical locations of respective mail insertion devices. Computer readable program code means is also provided for adding, deleting, and modifying the location and appearance of the interactive icons.

The present invention is not limited in scope to systems, methods and computer program products for monitoring and controlling mail insertion machines. The present invention may be utilized for monitoring and controlling various mail processing systems including mail sorters, printers and other equipment related thereto. The foregoing is illustrative of the present invention and is not to be construed as limiting thereof. Although a few exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the exemplary embodiments without materially departing from the novel teachings and advantages of this invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims.

In the claims, means-plus-function clauses are intended to cover the structures described herein as performing the recited function and not only structural equivalents but also equivalent structures. Therefore, it is to be understood that the foregoing is illustrative of the present invention and is not to be construed as limited to the specific embodiments disclosed, and that modifications to the disclosed embodiments, as well as other embodiments, are intended to be included within the scope of the appended claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

THAT WHICH IS CLAIMED:

1. A system for managing a plurality of mail processing devices comprising:

(a) receiving means for receiving operation related information from at least one of said mail processing devices;

(b) monitoring means operatively connected to said receiving means for monitoring operation related information from at least one of said mail processing devices; and

(c) transmission means for sending data to at least one of said mail processing devices.

2. The system of claim 1 wherein operation related information includes mail processing device organizational information, site information, machine information, utility information, and system administration information.

3. The system of claim 2 wherein mail processing device organizational information includes mail processing device site addition information, mail processing device site deletion information, and mail processing device site edit information, and mail processing device site job goal information.

4. The system of claim 2 wherein mail processing device site information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail processing device site.

5. The system of claim 2 wherein mail processing device machine information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail processing device.

6. The system of claim 2 wherein mail processing device utility information includes alarm information, user administration information, shift information, language information, threshold setting information, and run-time manager information with respect to said plurality of mail processing devices.

7. The system of claim 2 wherein mail processing device system administration information includes report information, machine setup information, backup and restore information, and run tag editor information with respect to said plurality of mail processing devices.

8. The system of claim 1 wherein said receiving means and monitoring means are centrally located not necessarily proximate to any of said plurality of mail processing devices.

9. The system of claim 1 wherein said receiving and monitoring means are coupled to a networked communications system for exchanging data with said mail processing devices.

10. The system of claim 1 implemented as a computer software program loaded on a general purpose computer.

11. The system of claim 1 implemented as a computer software program loaded on a specific purpose computer.

12. A method of managing a plurality of mail processing devices comprising the steps of:

(a) receiving operation related information from at least one of said mail processing devices;

(b) monitoring operation related information from at least one of said mail processing devices; and

(c) transmitting data to at least one of said mail processing devices.

13. The system of claim 12 wherein operation related information includes mail processing device organizational information, site information, machine information, utility information, and system administration information.

14. The method of claim 13 wherein mail processing device organizational information includes mail processing device site addition information, mail processing device site deletion information, and mail processing device site edit information, and mail processing device site job goal information.

15. The method of claim 13 wherein mail processing device site information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail processing device site.

16. The method of claim 13 wherein mail processing device machine information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail processing device.

17. The method of claim 13 wherein mail processing device utility information includes alarm information, user administration information, shift information, language information, threshold setting information, and run-time manager information with respect to said plurality of mail processing devices.

18. The method of claim 13 wherein mail processing device system administration information includes report information, machine setup information, backup and restore information, and run tag editor information with respect to said plurality of mail processing devices.

19. The method of claim 12 wherein said receiving means and monitoring means are centrally located not necessarily proximate to any of said plurality of mail processing devices.

20. The method of claim 12 wherein said receiving and monitoring means are coupled to a networked communications system for exchanging data with said mail processing devices.

21. A remote device for managing at least one mail processing device, said device comprising:

(a) operating parameter monitoring means for remotely monitoring the operating parameters of said at least one selected mail processing device; and

(b) computer network communications means coupled to the monitoring means for transferring data between the remote device and said at least one mail processing device.

22. The device of claim 19 further comprising alarm threshold setting means for setting alarm threshold levels of tolerable error counts for specified types of errors for a specified job on a specified mail processing device.

23. The device of claim 20 further comprising production threshold setting means for setting production threshold levels of output goals to be completed within or by a specified time for a specified job on a specified mail processing device.

24. The device of claim 21 wherein said operating parameter monitoring means monitors the production threshold levels and alarm threshold levels of a selected mail processing device in real-time and outputs a message when said threshold levels have been violated.

25. The device of claim 20 wherein said specified types of errors include aim errors, insert feeder errors, envelope feeder errors, finishing errors, and delivery errors.

26. The device of claim 21 wherein said output goals represent the number of envelopes processed at a specified time.

27. The device of claim 19 further comprising operator setup means for remotely creating, maintaining, and communicating a list of valid mail processing device operators for a specified mail processing device.

28. The device of claim 19 further comprising run-tag editing means for remotely accessing, editing, and re-saving stored run-tag data for a specified job on a specified mail processing device.

29. The device of claim 26 wherein said run-tag editing means is capable of searching and selecting individual and multiple run-tags from a stored run-tag database.

30. The device of claim 22 implemented as a computer software program loaded on a general purpose computer.

31. The device of claim 22 implemented as a computer software program loaded on a specific purpose computer.

AMENDED CLAIMS

[received by the International Bureau on 16 June 1999 (16.06.99);
original claims 1-31 amended; new claims 32-58 added (13 pages)]

1. A system for remote real-time monitoring of at least one mail inserter machine comprising:

(a) receiving means located remotely from said mail inserter machine for receiving operation related information from said mail inserter machine;

(b) monitoring means operatively connected to said receiving means for monitoring the operation related information received from said mail inserter machine and updating display of the operation related information in real time; and

(c) transmission means for sending data to said mail inserter machine.

2. The system of claim 1 wherein the operation related information includes mail inserter machine organizational information, site information, machine information, utility information, and system administration information.

3. The system of claim 2 wherein the mail inserter machine organizational information includes mail site addition information, mail inserter machine site deletion information, mail inserter machine site edit information, and mail inserter machine site job goal information.

4. The system of claim 2 wherein the mail inserter machine site information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail inserter machine site.

5. The system of claim 2 wherein the mail inserter machine information includes production information, goal information, job information,

fault information, and alarm information with respect to said mail inserter machine.

6. The system of claim 2 wherein the mail inserter machine utility information includes alarm information, user administration information, shift information, language information, threshold setting information, and run-time manager information with respect to said mail inserter machine.

7. The system of claim 2 wherein the mail inserter machine system administration information includes report information, machine setup information, backup and restore information, and run tag editor information with respect to said mail inserter machine.

8. The system of claim 1 wherein said receiving means and monitoring means are centrally located not necessarily proximate to said mail inserter machine.

9. The system of claim 1 wherein said receiving and monitoring means are coupled to a networked communications system for exchanging data with said mail inserter machine.

10. The system of claim 1 implemented as a computer software program loaded on a general purpose computer.

11. The system of claim 1 implemented as a computer software program loaded on a specific purpose computer.

12. A method for real-time monitoring of at least one mail inserter machine comprising the steps of:

(a) receiving operation related information from a mail inserter machine;

(b) monitoring the operation related information received from said mail inserter machine, and updating display of the operation

related information in real time; and

(c) transmitting data to said mail inserter machine.

13. The method of claim 12 wherein the operation related information includes mail inserter machine organizational information, site information, machine information, utility information, and system administration information.

14. The method of claim 13 wherein the mail inserter machine organizational information includes mail inserter machine site addition information, mail inserter machine site deletion information, mail inserter machine site edit information, and mail inserter machine site job goal information.

15. The method of claim 13 wherein mail inserter machine site information includes production information, goal information, job information, fault information, and alarm information with respect to a specified mail inserter machine site.

16. The method of claim 13 wherein mail inserter machine information includes production information, goal information, job information, fault information, and alarm information with respect to said mail inserter machine.

17. The method of claim 13 wherein mail inserter machine utility information includes alarm information, user administration information, shift information, language information, threshold setting information, and run-time manager information with respect to said mail inserter machine.

18. The method of claim 13 wherein mail inserter machine system administration information includes report information, machine setup information, backup and restore information, and run tag editor information with respect to said mail inserter machine.

19. The method of claim 12 wherein said receiving means and monitoring means are centrally located not necessarily proximate to said mail inserter machine.

20. The method of claim 12 wherein said receiving and monitoring means are coupled to a networked communications system for exchanging data with said mail inserter machine.

21. A remote real-time monitoring device for remotely monitoring at least one mail inserter machine, said device comprising:

(a) operating parameter monitoring means located remotely from said at least one mail inserter machine for remotely monitoring operating parameters of said at least one mail inserter machine and for updating display of the operating parameters in real time; and

(b) computer network communications means coupled to the operating parameter monitoring means for transferring data between the remote device and said at least one mail inserter machine.

22. The device of claim 21 further comprising alarm threshold setting means for setting alarm threshold levels of tolerable error counts for specified types of errors for a specified job on said mail inserter machine.

23. The device of claim 22 further comprising production threshold setting means for setting production threshold levels of output goals to be completed within or by a specified time for a specified job on said mail inserter machine.

24. The device of claim 23 wherein said operating parameter monitoring means monitors the production threshold levels and alarm threshold levels of said mail inserter machine in real-time and outputs a message when said threshold levels have been violated.

25. The device of claim 21 wherein said specified types of errors include aim errors, insert feeder errors, envelope feeder errors, finishing errors, and delivery errors.

26. The device of claim 22 wherein said output goals represent the number of envelopes processed at a specified time.

27. The device of claim 21 further comprising operator setup means for remotely creating, maintaining, and communicating a list of valid mail processing device operators for said mail inserter machine.

28. The device of claim 21 further comprising run-tag editing means for remotely accessing, editing, and re-saving stored run-tag data for a specified job on said mail inserter machine.

29. The device of claim 28 wherein said run-tag editing means is capable of searching and selecting individual and multiple run-tags from a stored run-tag database.

30. The device of claim 21 implemented as a computer software program loaded on a general purpose computer.

31. The device of claim 21 implemented as a computer software program loaded on a specific purpose computer.

32. The system of claim 1 wherein said monitoring means updates display of the operation related information on a computer display screen at a rate of at least about one update per thirty seconds.

33. The system of claim 1 wherein said receiving means receives operation related information from a plurality of mail inserter machines located at a plurality of geographically separated sites.

34. The method of claim 12 wherein receiving the operation related information includes receiving the operation related information from a plurality of mail inserter machines located at a plurality of geographically separated sites.

35. The method of claim 12 wherein updating display of the operation related information in real time includes updating display of the operation related information at a rate of at least about one update per thirty seconds.

36. A computer program product comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a) receiving operation related information from at least one mail inserter machine from a location remote from said at least one mail inserter machine; and

(b) updating display of the operation related information received from said mail inserter machine in real time.

37. The computer program product of claim 36 wherein receiving the operation related information includes receiving the operation related information over a TCP/IP network.

38. The computer program product of claim 36 comprising sending data to said mail inserter machine.

39. The computer program product of claim 36 wherein receiving the operation related information includes receiving the operation related information from a plurality of mail inserter machines located at geographically separated sites.

40. The computer program product of claim 36 wherein updating display of the operation related information in real time includes updating display of the operation related information at a rate of at least about one update per thirty seconds.

41. A system for remote real-time monitoring of at least one mail sorting machine, said system comprising:

(a) receiving means for receiving operation related information from said mail sorting machine from a location remote from said at least one mail sorting machine; and

(b) monitoring means operatively connected to said receiving means for monitoring the operation related information received from said mail sorting machine and updating display of the operation related information in real time.

42. The system of claim 41 comprising transmission means for sending data to said mail sorting machine.

43. The system of claim 42 wherein said receiving means receives operation related information from a plurality of mail sorting machines located at a plurality of sites geographically separated from each other.

44. The system of claim 41 wherein said monitoring means updates display of the operation related information on a computer display screen at a rate of at least about one update per thirty seconds.

45. A method for remote real-time monitoring of at least one mail sorting machine comprising:

(a) receiving operation related information from a mail sorting machine from a location remote from said mail sorting machine; and

(b) updating display of the operation related information in real time.

46. The method of claim 45 comprising transmitting data to said mail sorting machine.

47. The method of claim 45 wherein receiving the operation related information includes receiving the operation related information from a plurality of mail sorting machines located at geographically separate sites.

48. The method of claim 45 wherein updating display of the operation related information in real time includes updating display of the operation related information at a rate of at least about one update per thirty seconds.

49. A computer program product comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a) receiving, from a user, a threshold percentage value relating to percentage completion of a job by at least one mail processing machine and a time value for checking whether the mail

processing machine has reached the percentage;

(b) receiving at least one measured percentage value indicating the percentage completion of a job by the mail processing machine from a location remote from the mail processing machine;

(c) when the time value is reached, determining whether the measured percentage value equals the threshold percentage value; and

(d) if the measured percentage value is less than the threshold percentage value, displaying an alarm to the user.

50. The computer program product of claim 49 wherein receiving at least one measured percentage value includes receiving at least one measured percentage value from one or more mail inserter machines.

51. The computer program product of claim 49 wherein receiving at least one measured percentage value includes receiving at least one measured percentage value from one or more mail sorting machines.

52. The computer program product of claim 49 wherein alerting the user includes displaying a pop-up window to the user.

53. The computer program product of claim 52 wherein the pop-up window displays the measured percentage value.

54. The computer program product of claim 49 comprising updating display of the measured percentage value in real time.

55. The computer program product of claim 54 wherein updating display of the measured percentage value includes updating display at a rate of at least about one update per thirty seconds.

56. A run tag editor comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

(a) searching a database for run tags indicative of jobs performed by at least one mail processing machine;

(b) displaying run tags extracted from the database to a user;

(c) receiving input from a user allowing modification of the displayed run tags and addition of new run tags; and

(d) storing the modified or new run tags in the database.

57. The computer program product of claim 56 wherein run tags are indicative of jobs performed by a mail inserter machine.

58. The computer program product of claim 56 wherein the run tags are indicative of jobs performed by a mail sorting machine.

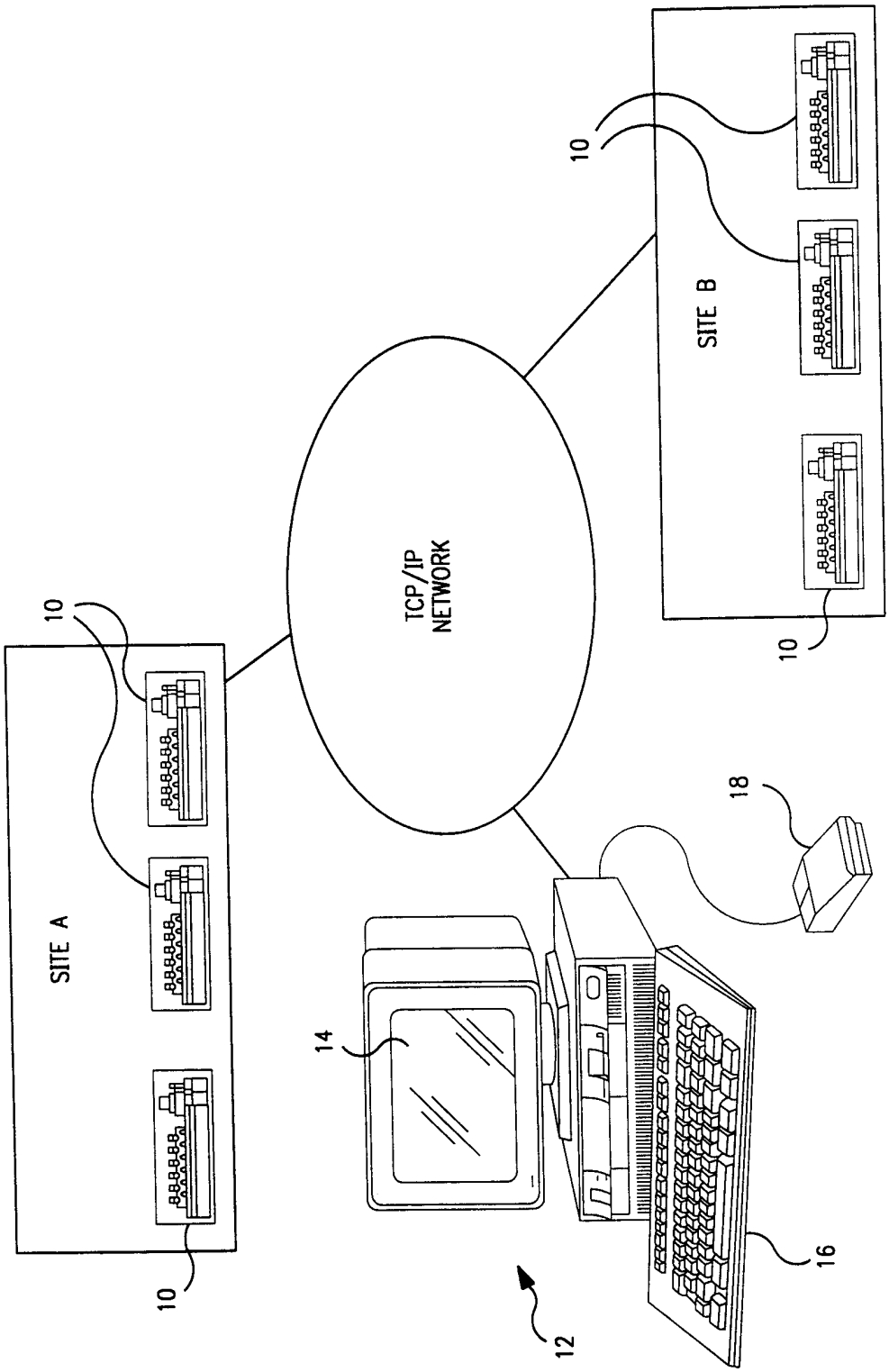


FIG. 1

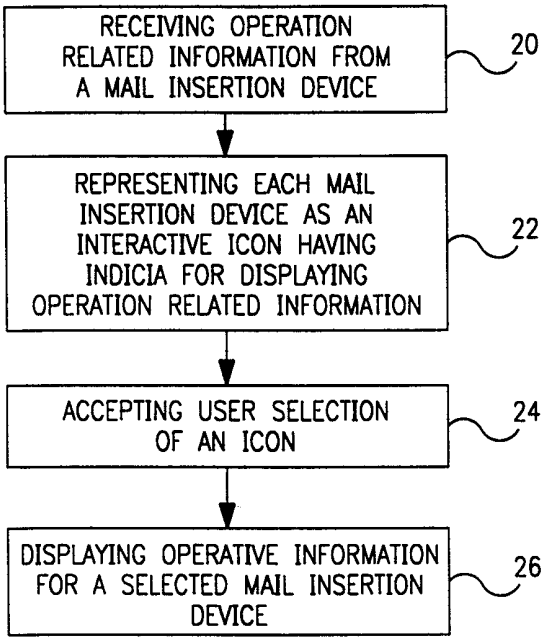

RECEIVING OPERATION RELATED INFORMATION FROM A MAIL INSERTION DEVICE
20
REPRESENTING EACH MAIL INSERTION DEVICE AS AN INTERACTIVE ICON HAVING INDICIA FOR DISPLAYING OPERATION RELATED INFORMATION
22
ACCEPTING USER SELECTION OF AN ICON
24
DISPLAYING OPERATIVE INFORMATION FOR A SELECTED MAIL INSERTION DEVICE
26

FIG. 2

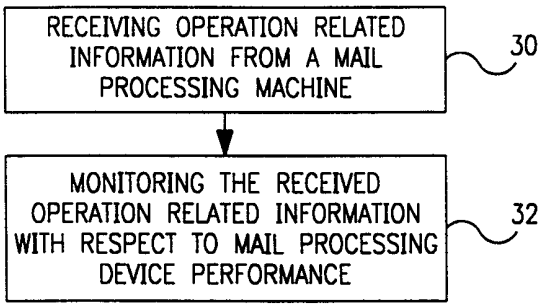

RECEIVING OPERATION RELATED INFORMATION FROM A MAIL PROCESSING MACHINE
30
MONITORING THE RECEIVED OPERATION RELATED INFORMATION WITH RESPECT TO MAIL PROCESSING DEVICE PERFORMANCE
32

FIG. 3

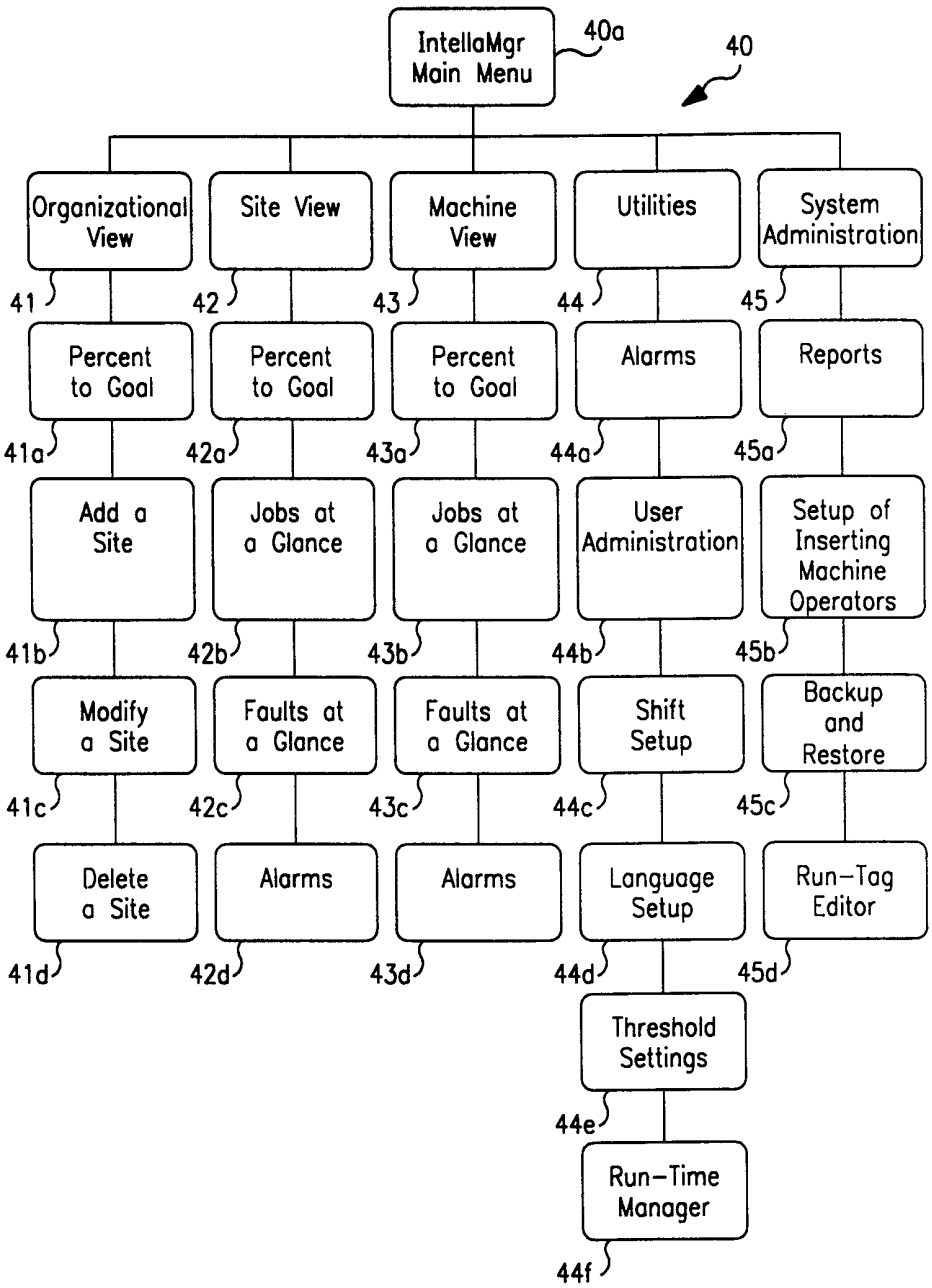

IntellaMgr Main Menu
40a
40
Organizational View
Site View
Machine View
Utilities
System Administration
41
42
43
44
45
Percent to Goal
Percent to Goal
Percent to Goal
Alarms
Reports
41a
42a
43a
44a
45a
Add a Site
Jobs at a Glance
Jobs at a Glance
User Administration
Setup of Inserting Machine Operators
41b
42b
43b
44b
45b
Modify a Site
Faults at a Glance
Faults at a Glance
Shift Setup
Backup and Restore
41c
42c
43c
44c
45c
Delete a Site
Alarms
Alarms
Language Setup
Run-Tag Editor
41d
42d
43d
44d
45d
Threshold Settings
44e
Run-Time Manager
44f

FIG. 4

FIG. 5

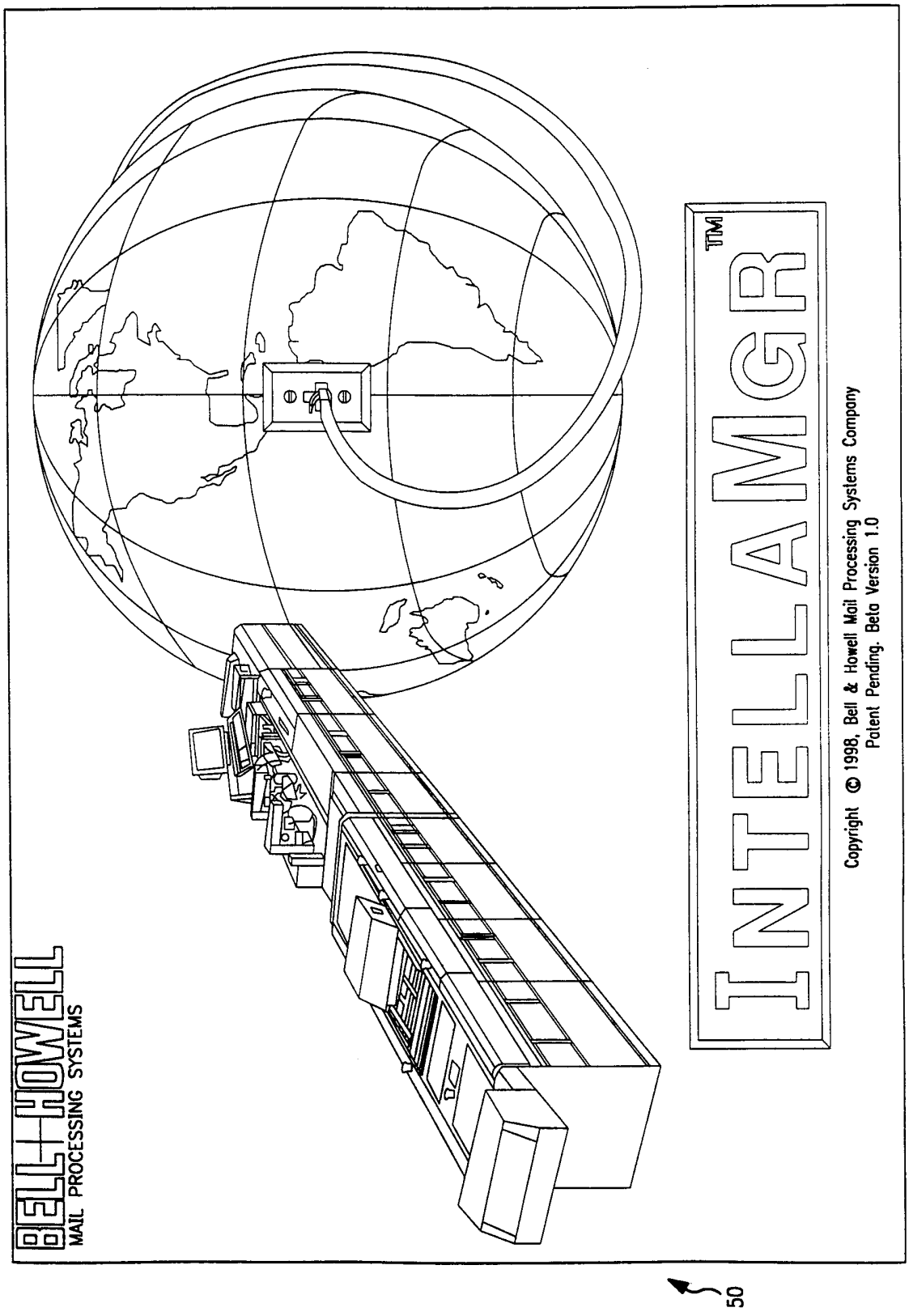

BELL+HOWELL
MAIL PROCESSING SYSTEMS
INTELLAMGR™
Copyright © 1998, Bell & Howell Mail Processing Systems Company
Patent Pending. Beta Version 1.0
50

FIG. 6

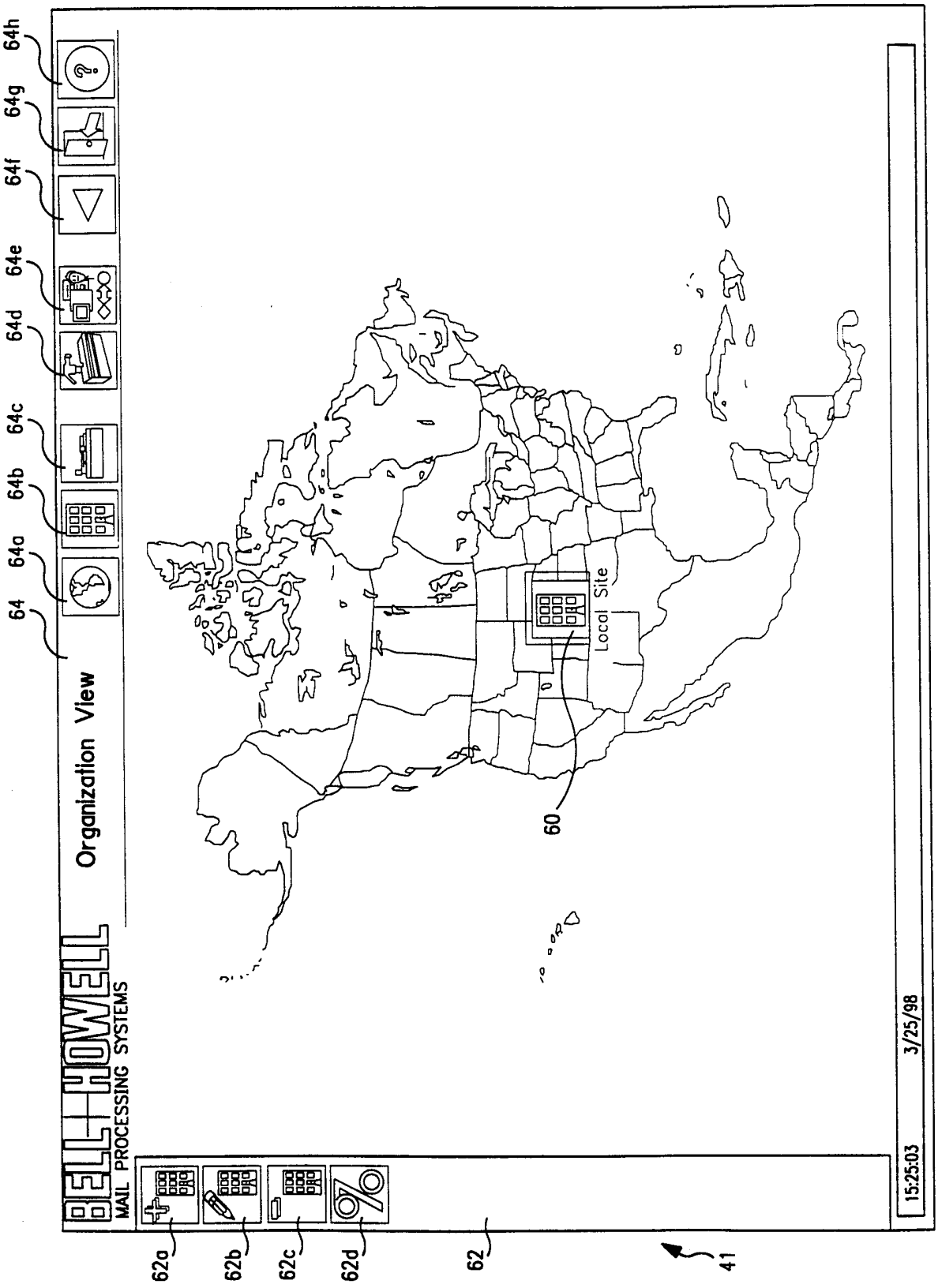

64
64a
64b
64c
64d
64e
64f
64g
64h
BELL+HOWELL
MAIL PROCESSING SYSTEMS
Organization View
Local Site
60
15:25:03
3/25/98
62a
62b
62c
62d
62
41

FIG. 7

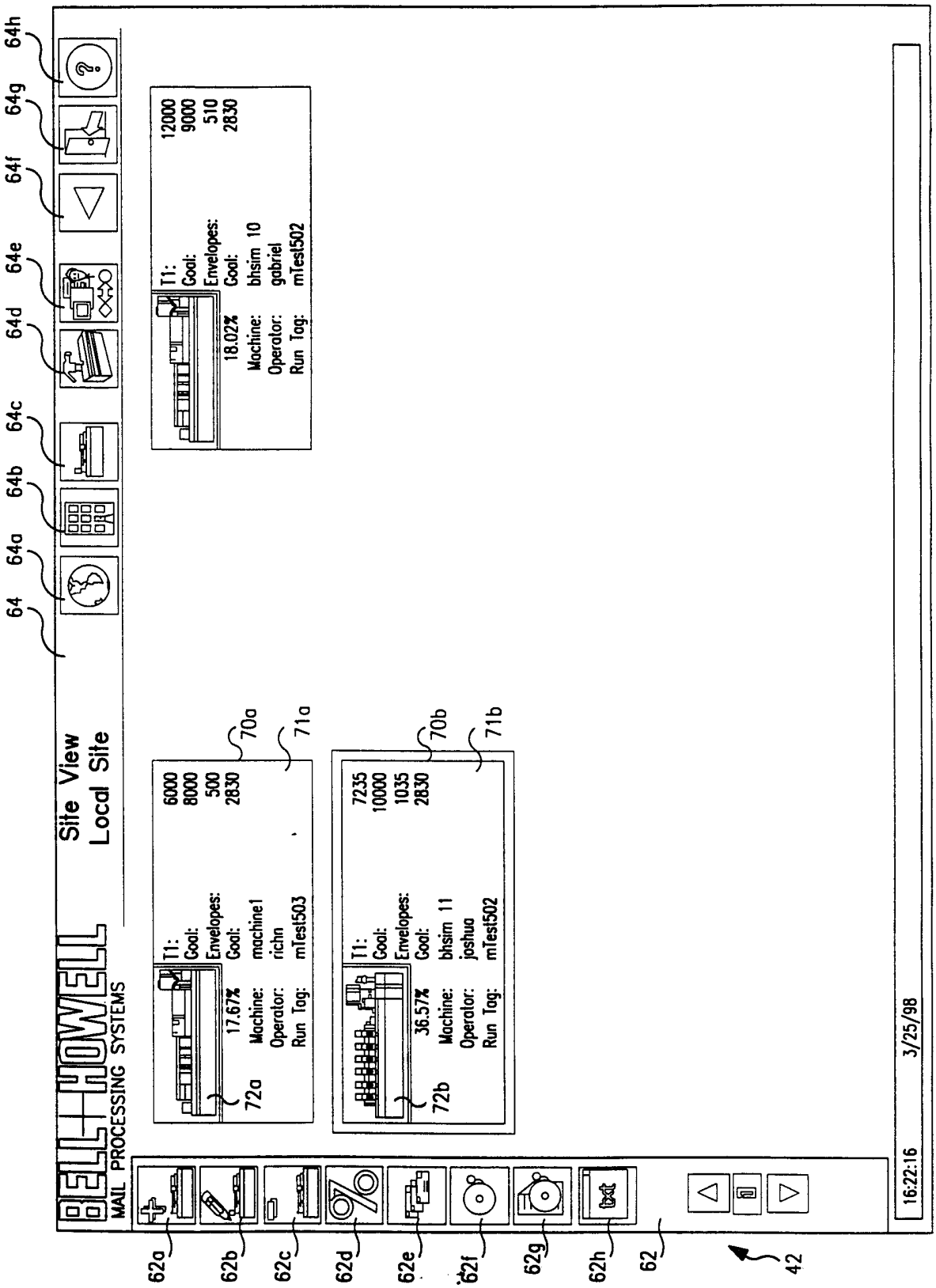
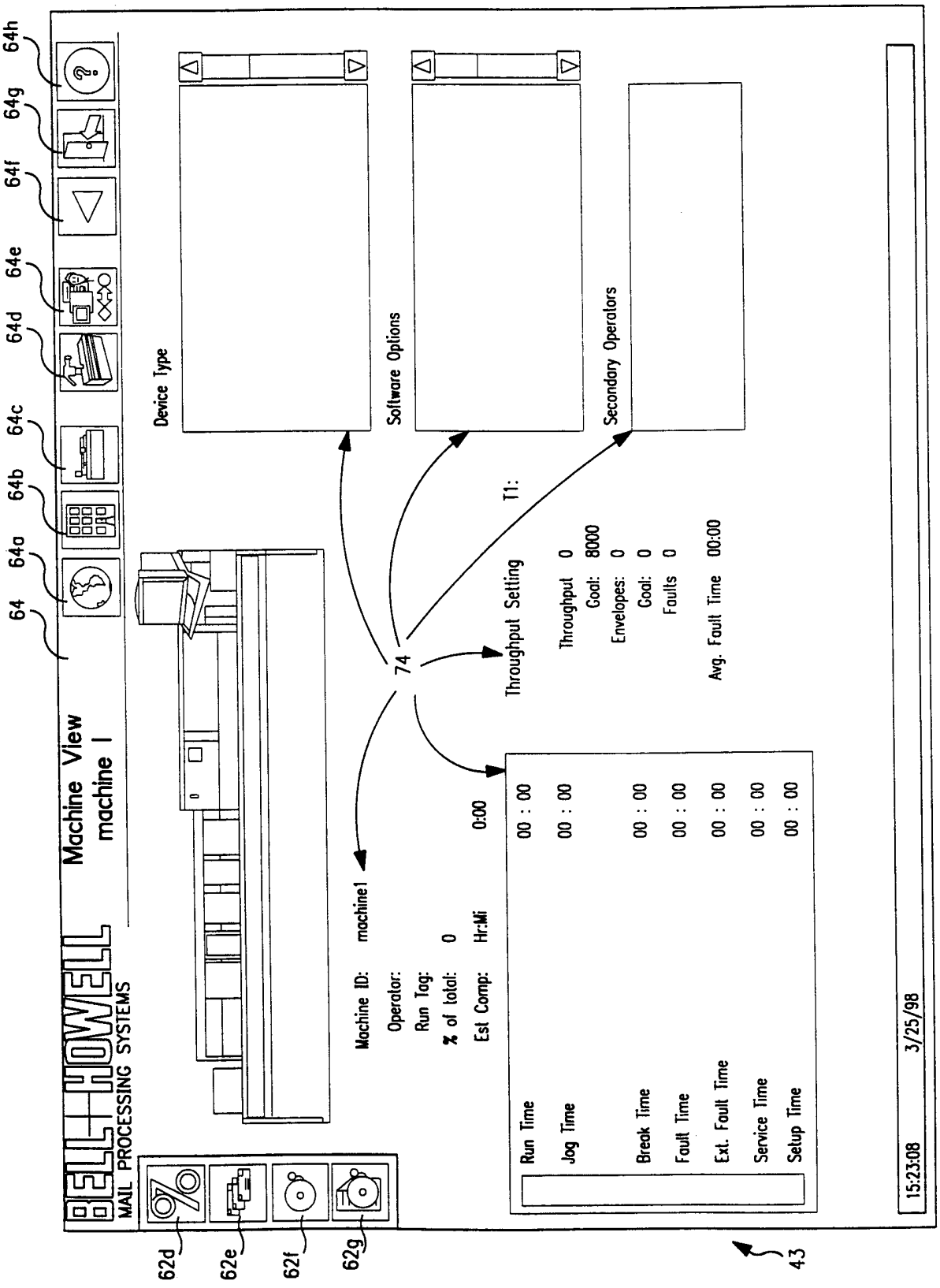

BELL+HOWELL
MAIL PROCESSING SYSTEMS
Site View
Local Site
64
64a
64b
64c
64d
64e
64f
64g
64h
T1:
Goal:
Envelopes:
Goal:
6000
8000
500
2830
17.67%
Machine: machine1
Operator: richn
Run Tag: mTest503
72a
70a
71a
T1:
Goal:
Envelopes:
Goal:
7235
10000
1035
2830
36.57%
Machine: bhsim 11
Operator: joshua
Run Tag: mTest502
72b
70b
71b
T1:
Goal:
Envelopes:
Goal:
12000
9000
510
2830
18.02%
Machine: bhsim 10
Operator: gabriel
Run Tag: mTest502
16:22:16
3/25/98
62a
62b
62c
62d
62e
62f
62g
62h
62
42

FIG. 8


64
64a
64b
64c
64d
64e
64f
64g
64h
BELL+HOWELL
MAIL PROCESSING SYSTEMS
Machine View
machine 1
Device Type
Software Options
Secondary Operators
74
T1:
Throughput Setting
Throughput 0
Goal: 8000
Envelopes: 0
Goal: 0
Faults 0
Avg. Fault Time 00:00
Machine ID: machine1
Operator:
Run Tag:
% of total: 0
Est Comp: Hr:Mi 0:00
Run Time 00 : 00
Jog Time 00 : 00
Break Time 00 : 00
Fault Time 00 : 00
Ext. Fault Time 00 : 00
Service Time 00 : 00
Setup Time 00 : 00
15:23:08 3/25/98
62d
62e
62f
62g
43

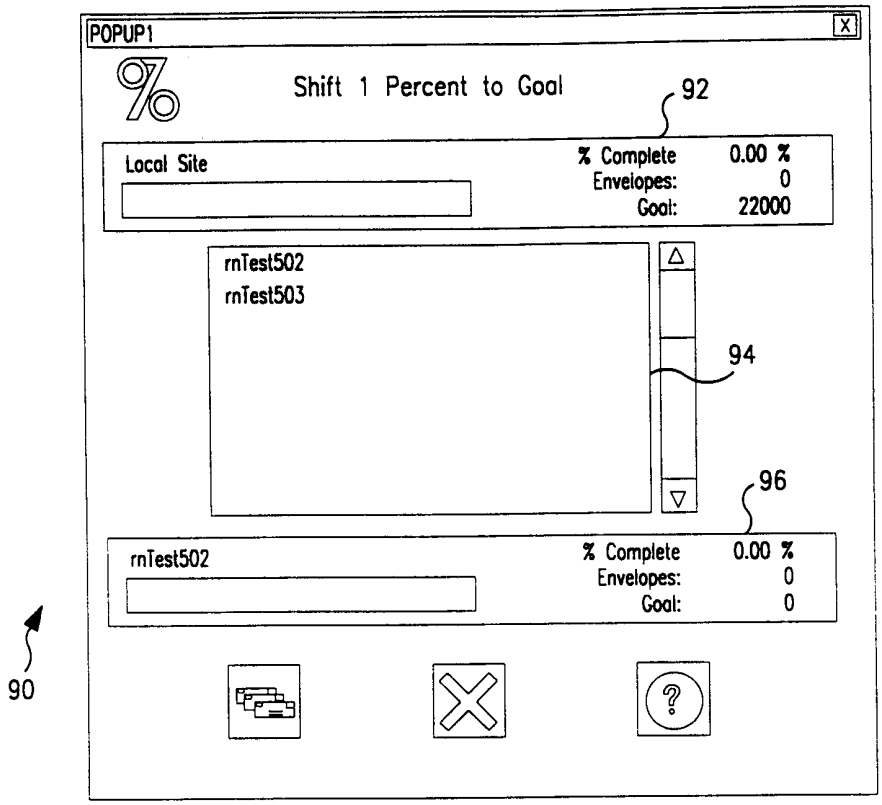

POPUP1
Shift 1 Percent to Goal
92
Local Site
% Complete 0.00 %
Envelopes: 0
Goal: 22000
rnTest502
rnTest503
94
96
rnTest502
% Complete 0.00 %
Envelopes: 0
Goal: 0
90

FIG. 9

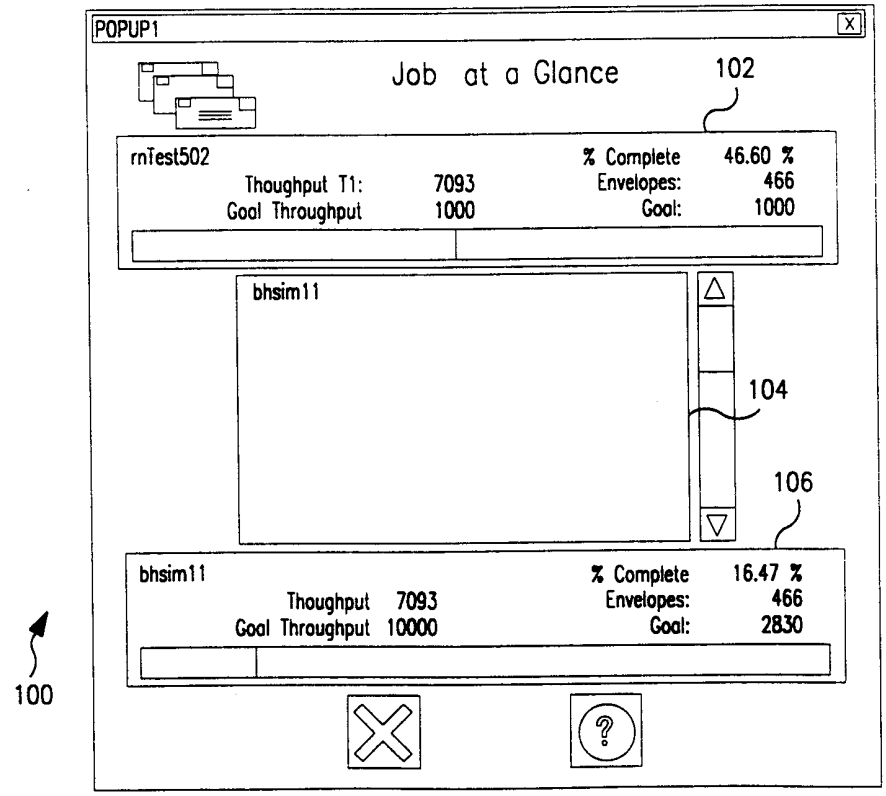

POPUP1
Job at a Glance
102
rnTest502
% Complete 46.60 %
Thoughput T1: 7093
Envelopes: 466
Goal Throughput 1000
Goal: 1000
bhsim11
104
106
bhsim11
% Complete 16.47 %
Thoughput 7093
Envelopes: 466
Goal Throughput 10000
Goal: 2830
100

FIG. 10

FIG. 11

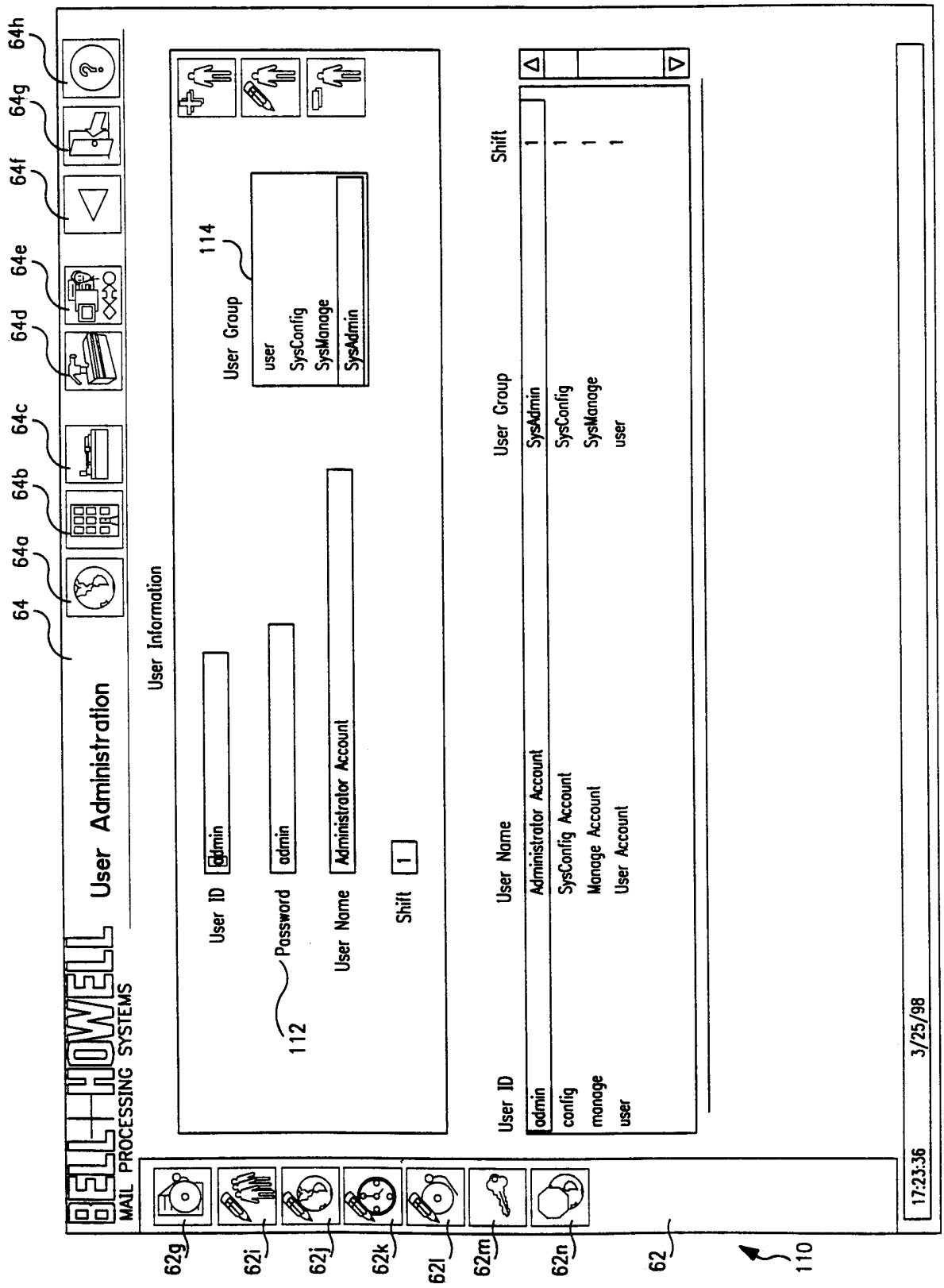

BELL+HOWELL
MAIL PROCESSING SYSTEMS
User Administration
User Information
User ID
admin
Password
admin
User Name
Administrator Account
Shift
1
User Group
114
user
SysConfig
SysManage
SysAdmin
112
User ID
User Name
User Group
Shift
admin
Administrator Account
SysAdmin
1
config
SysConfig Account
SysConfig
1
manage
Manage Account
SysManage
1
user
User Account
user
1
17:23:36
3/25/98
64
64a
64b
64c
64d
64e
64f
64g
64h
62g
62i
62j
62k
62l
62m
62n
62
110

FIG. 12

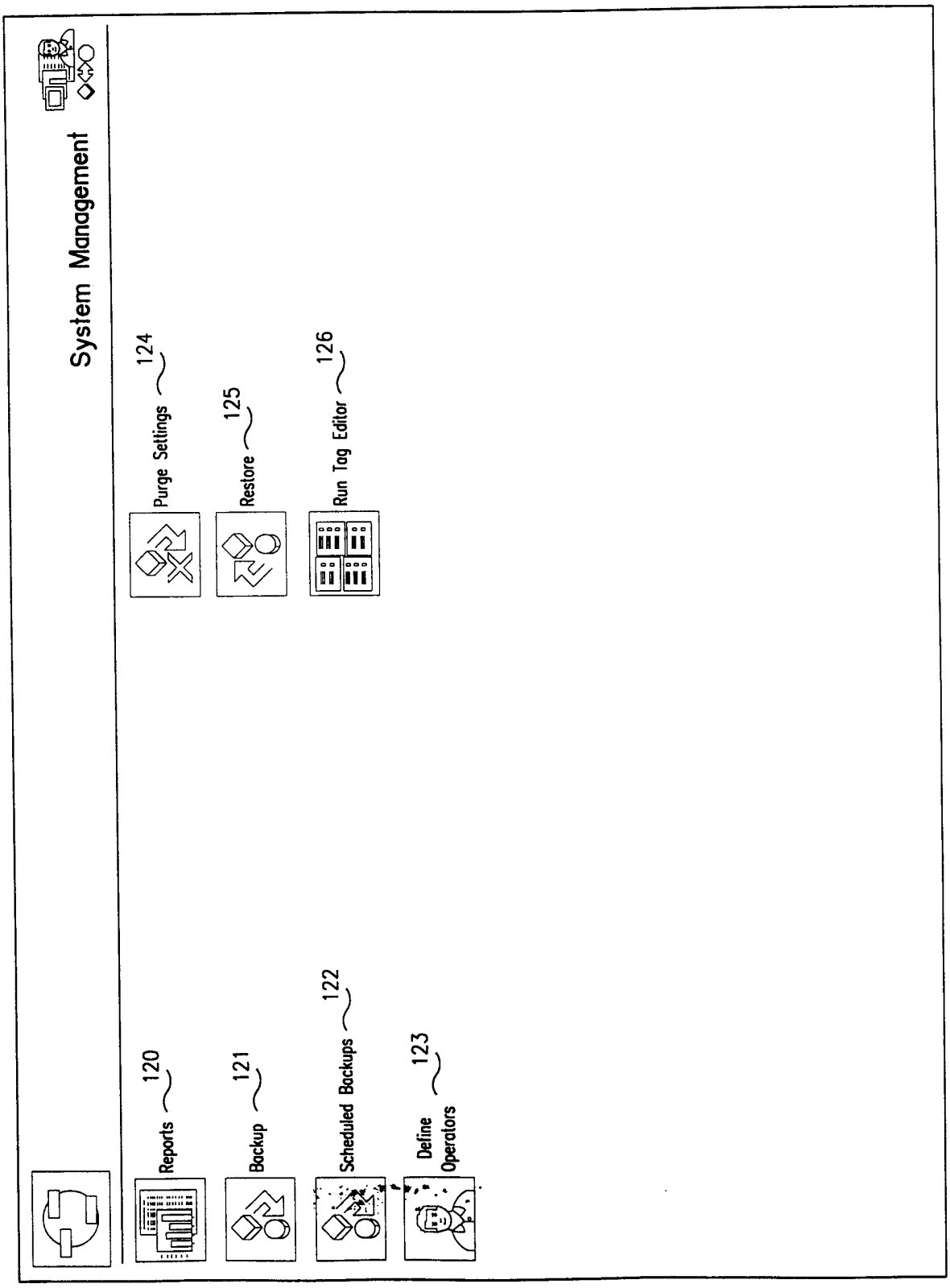

System Management
Reports
120
Backup
121
Scheduled Backups
122
Define Operators
123
Purge Settings
124
Restore
125
Run Tag Editor
126

FIG. 13

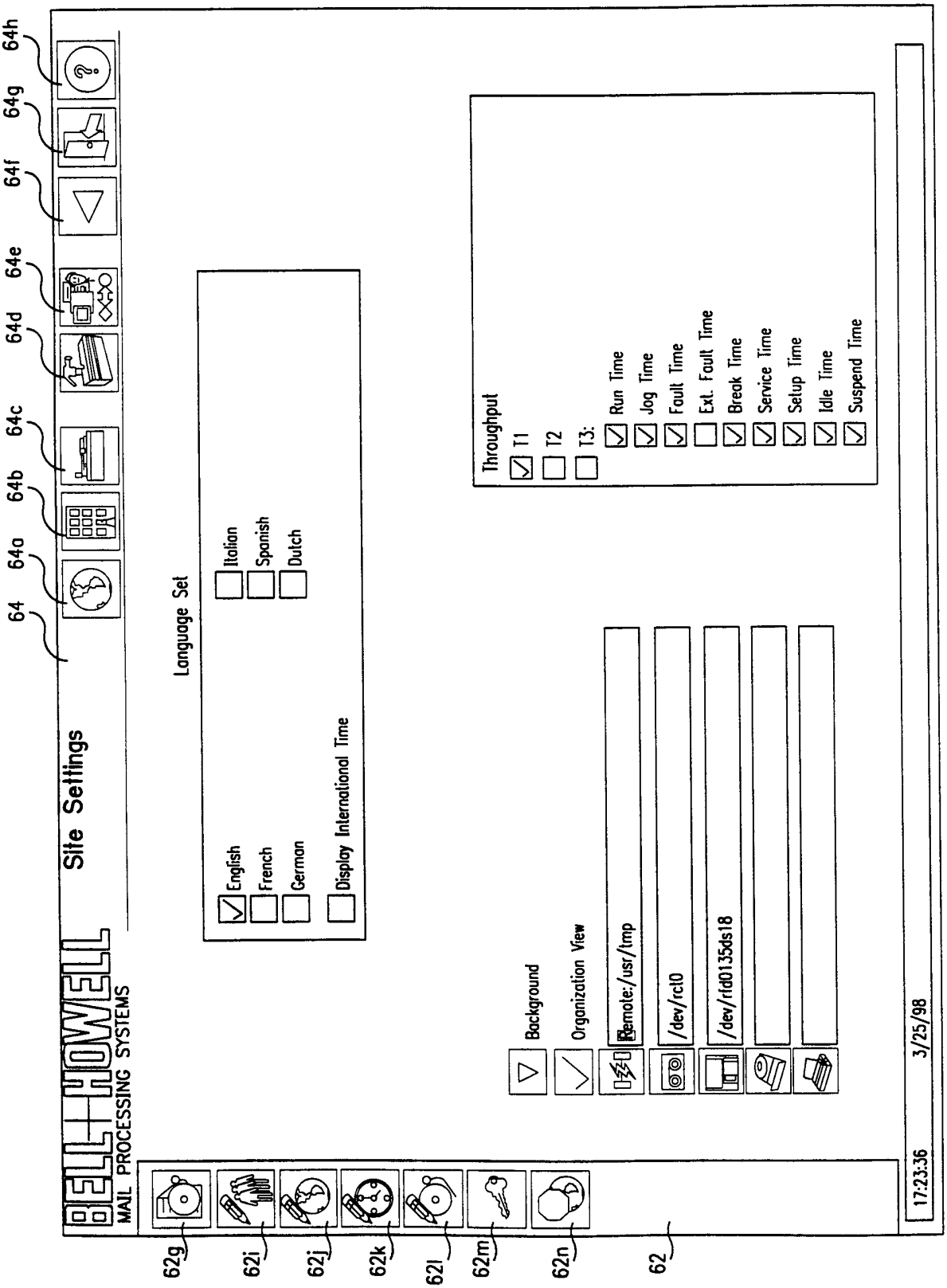

64
64a
64b
64c
64d
64e
64f
64g
64h
BELL+HOWELL
MAIL PROCESSING SYSTEMS
Site Settings
Language Set
English
French
German
Display International Time
Italian
Spanish
Dutch
Throughput
T1
T2
T3:
Run Time
Jog Time
Fault Time
Ext. Fault Time
Break Time
Service Time
Setup Time
Idle Time
Suspend Time
Background
Organization View
Remote:/usr/tmp
/dev/rct0
/dev/rid0135ds18
17:23:36
3/25/98
62g
62i
62j
62k
62l
62m
62n
62

FIG. 14

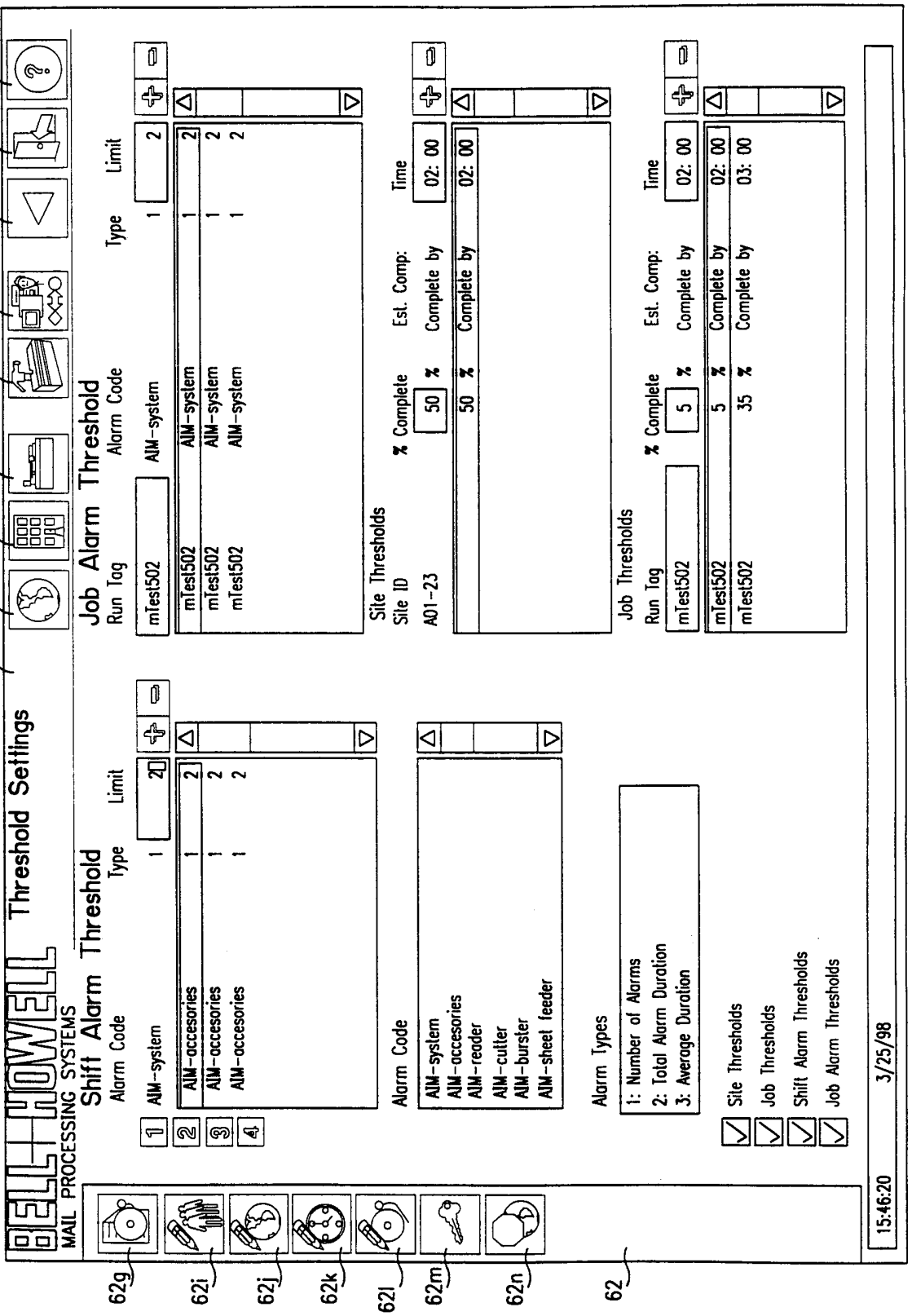

64
64a
64b
64c
64d
64e
64f
64g
64h
BELL+HOWELL
MAIL PROCESSING SYSTEMS
Threshold Settings
Shift Alarm Threshold
Alarm Code
Type
Limit
AIM-system
1
20
AIM-accesories 1 2
AIM-accesories 1 2
AIM-accesories 1 2
Job Alarm Threshold
Run Tag
Alarm Code
Type
Limit
mTest502
AIM-system
1
2
mTest502 AIM-system 1 2
mTest502 AIM-system 1 2
mTest502 AIM-system 1 2
Site Thresholds
Site ID
% Complete
Est. Comp:
Time
A01-23
50 %
Complete by
02: 00
50 % Complete by 02: 00
Job Thresholds
Run Tag
% Complete
Est. Comp:
Time
mTest502
5 %
Complete by
02: 00
mTest502 5 % Complete by 02: 00
mTest502 35 % Complete by 03: 00
Alarm Code
AIM-system
AIM-accesories
AIM-reader
AIM-cutter
AIM-burster
AIM-sheet feeder
Alarm Types
1: Number of Alarms
2: Total Alarm Duration
3: Average Duration
Site Thresholds
Job Thresholds
Shift Alarm Thresholds
Job Alarm Thresholds
15:46:20
3/25/98
62g
62i
62j
62k
62l
62m
62n
62

FIG. 15

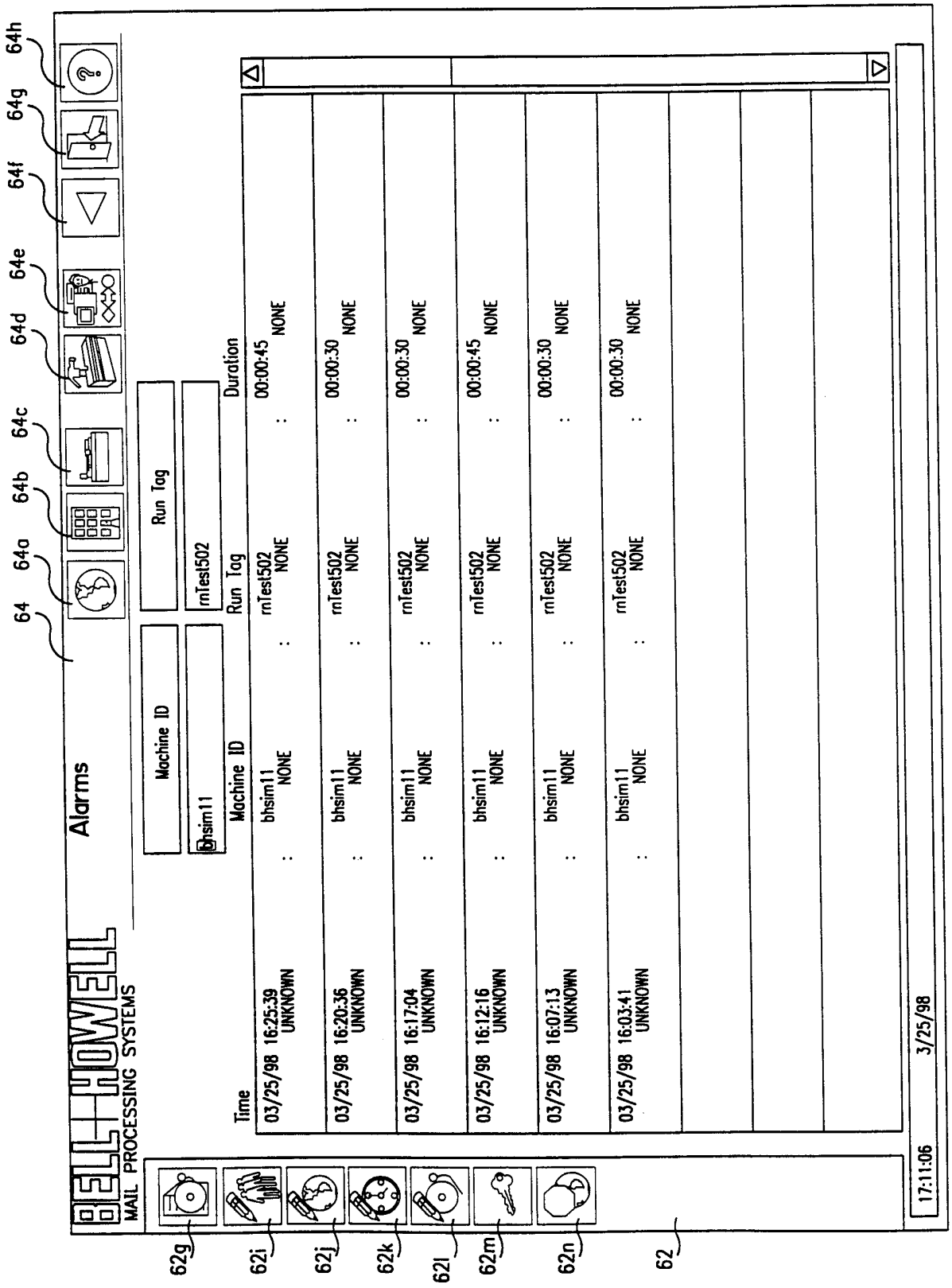

BELL+HOWELL
MAIL PROCESSING SYSTEMS
Alarms
Machine ID
bhsim11
Run Tag
rnTest502
Time
Machine ID
Run Tag
Duration
03/25/98 16:25:39 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:45 NONE
03/25/98 16:20:36 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:30 NONE
03/25/98 16:17:04 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:30 NONE
03/25/98 16:12:16 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:45 NONE
03/25/98 16:07:13 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:30 NONE
03/25/98 16:03:41 UNKNOWN : bhsim11 NONE : rnTest502 NONE : 00:00:30 NONE
17:11:06
3/25/98
64
64a
64b
64c
64d
64e
64f
64g
64h
62g
62i
62j
62k
62l
62m
62n
62

FIG. 16

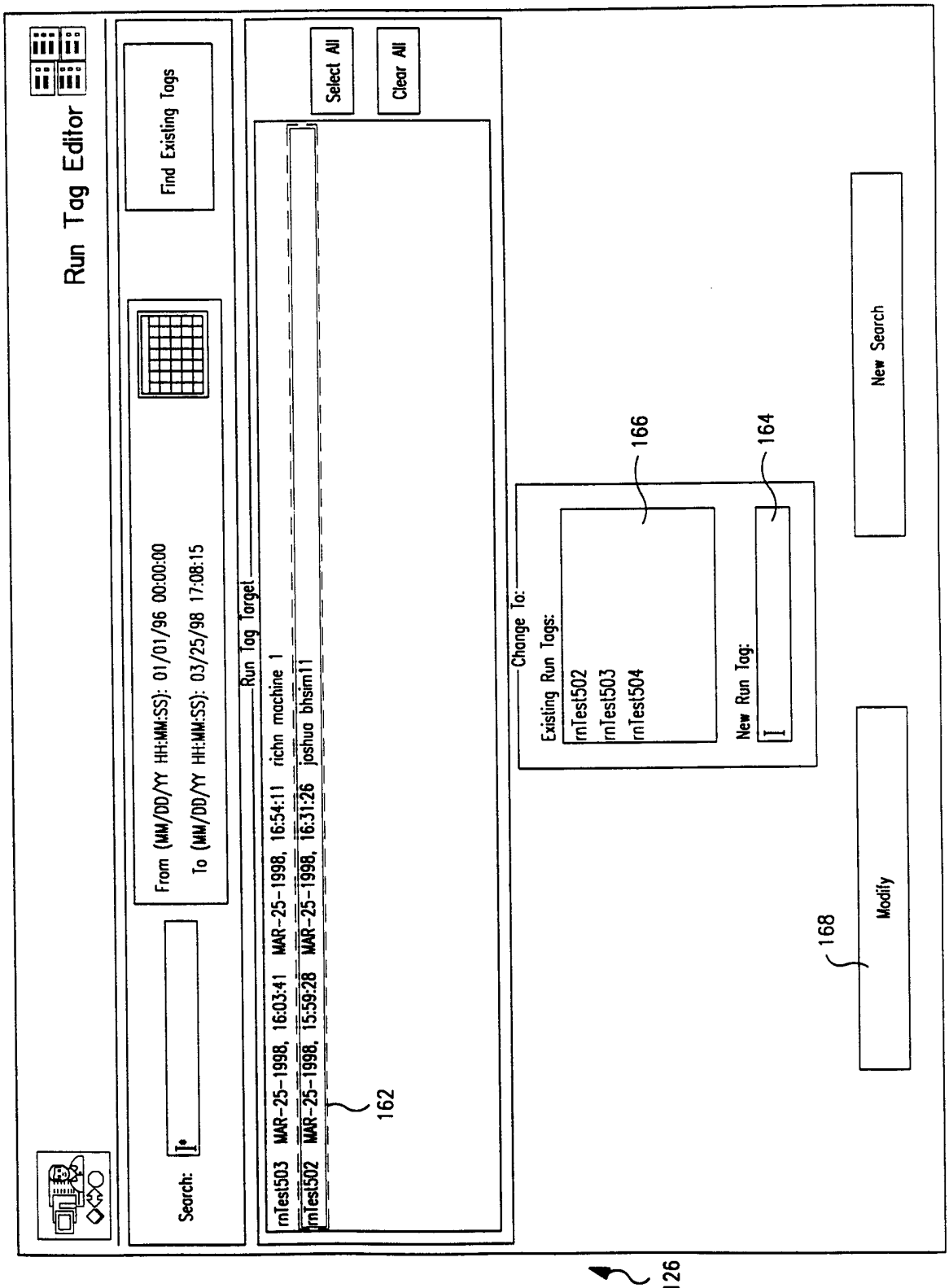

Run Tag Editor
Find Existing Tags
From (MM/DD/YY HH:MM:SS): 01/01/96 00:00:00
To (MM/DD/YY HH:MM:SS): 03/25/98 17:08:15
Search:
Run Tag Target
Select All
Clear All
rnTest503 MAR-25-1998, 16:03:41 MAR-25-1998, 16:54:11 richn machine 1
rnTest502 MAR-25-1998, 15:59:28 MAR-25-1998, 16:31:26 joshua bhsim11
162
Change To:
Existing Run Tags:
rnTest502
rnTest503
rnTest504
166
New Run Tag:
164
New Search
Modify
168
126

FIG. 17

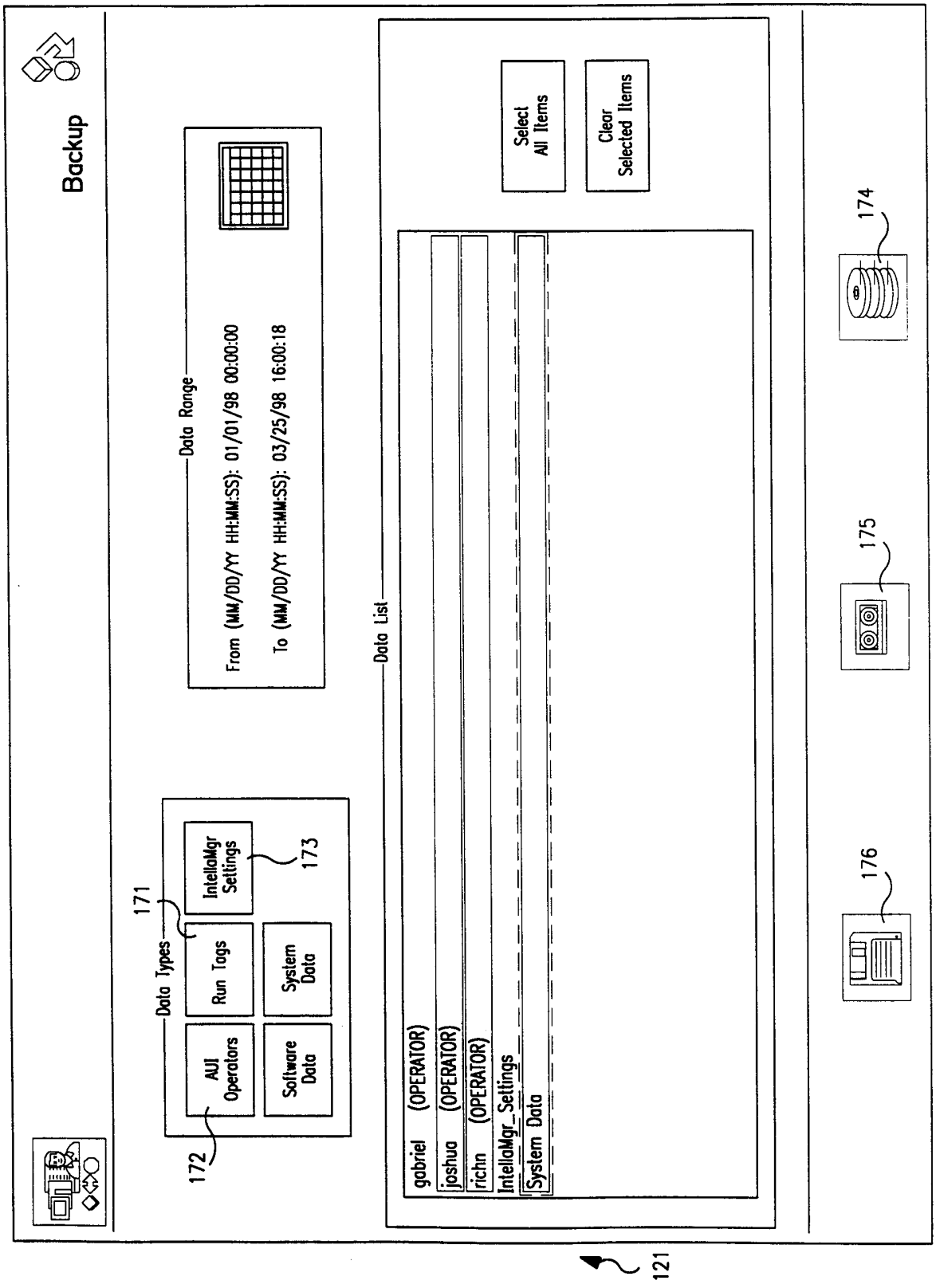

Backup
Data Range
From (MM/DD/YY HH:MM:SS): 01/01/98 00:00:00
To (MM/DD/YY HH:MM:SS): 03/25/98 16:00:18
Select All Items
Clear Selected Items
Data List
gabriel (OPERATOR)
joshua (OPERATOR)
richn (OPERATOR)
IntellaMgr_Settings
System Data
Data Types
AUI Operators
Run Tags
System Data
Software Data
IntellaMgr Settings
171
172
173
174
175
176
121

FIG. 18

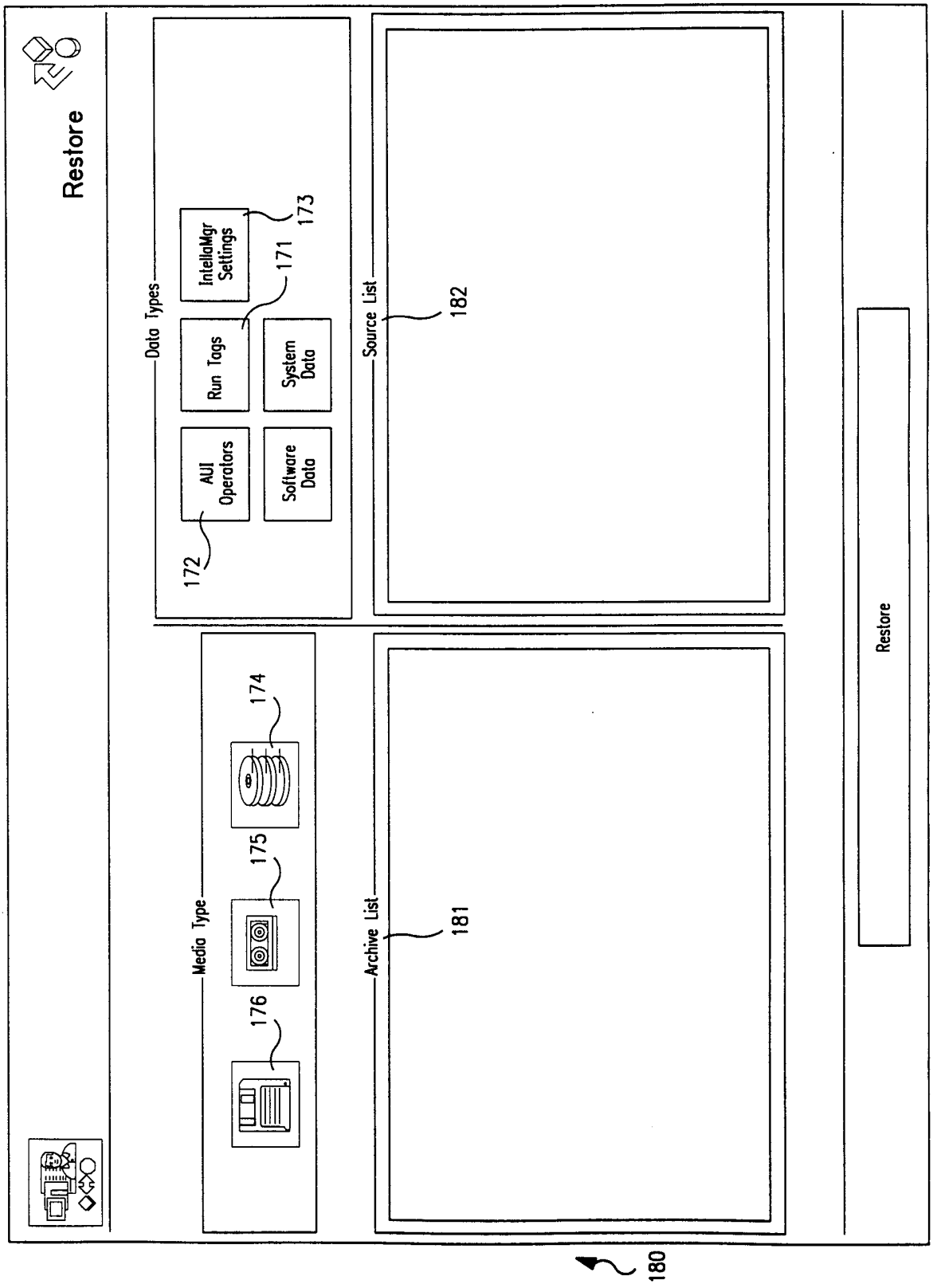
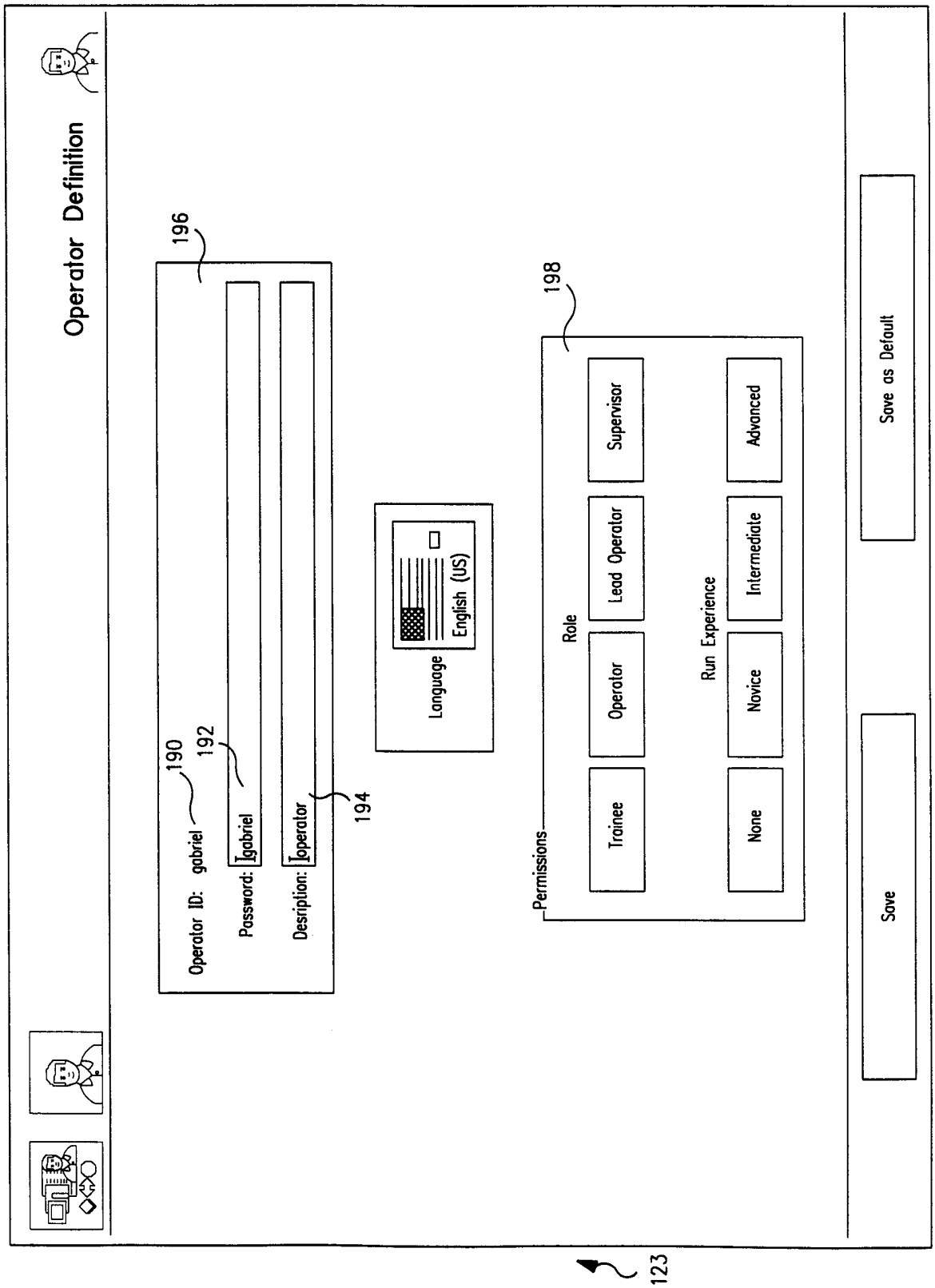

Restore
Data Types
IntelliMgr Settings
Run Tags
System Data
AUI Operators
Software Data
Source List
Media Type
Archive List
Restore
171
172
173
174
175
176
180
181
182

FIG. 19


Operator Definition
196
Operator ID: gabriel
190
Password: gabriel
192
Description: operator
194
Language
English (US)
198
Permissions
Role
Trainee
Operator
Lead Operator
Supervisor
Run Experience
None
Novice
Intermediate
Advanced
Save
Save as Default
123

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/01699

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :GO6F 17/60
US CL :Please See Extra Sheet.
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 345/326, 333, 334, 348; 364/138, 140.01, 146, 188, 191, 192, 400, 468.01, 468.06, 468.09; 705/1, 7, 8, 9

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, 3,522,588 A (CLARKE, JR. et al) 04 August 1970, see abstract.	1-31
A	US 3,582,621 A (LAWLER) 01 June 1971, see abstract.	1-31
A	US 4,346,446 A (ERBSTEIN et al) 24 August 1982, see abstract.	1-31
A	US 4,517,637 A (CASSELL) 14 May 1985, see abstract.	1-31
X	US 4,752,950 A (LE CARPENTIER) 21 June 1988, see abstract.	1, 8-12, 19-21 & 27
A	US 4,798,040 A (HAAS et al) 17 January 1989, see abstract.	1-31

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 07 APRIL 1999	Date of mailing of the international search report 16 APR 1999
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer EDWARD R COSIMANO Telephone No. (703) 308-3900

Form PCT/ISA/210 (second sheet)(July 1992)★

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/01699

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,837,701 A (SANSONE et al) 06 June 1989, see abstract.	1, 8-12, 19-21 & 27
Y	US 5,305,055 A (EBNER et al) 19 April 1994, see abstract.	2-7, 13-18, 22-26 & 28-31
Y	US 5,309,556 A (SISMILICH) 03 May 1994, see abstract.	2-7, 13-18, 22-26 & 28-31
Y	US 5,470,218 A (HILLMAN et al) 28 November 1995, see abstract.	2-7, 13-18, 22-26 & 28-31
A	US 5,471,399 A (TANAKA et al) 28 November 1995, see abstract.	1-31
X	US 5,628,249 A (CORDERY et al) 13 May 1997, see abstract.	1, 8-12, 19-21 & 27
X	US 5,684,706 A (HARMAN et al) 04 November 1997, see abstract.	1, 8-12, 19-21 & 27
Y, P	US 5,812,394 A (LEWIS et al) 22 September 1998, see abstract.	2-7, 13-18, 22-26 & 28-31
A, P	US 5,859,778 A (KURODA et al) 12 January 1999, see abstract.	1-31
Y, E	US 5,870,698 A (RIEDEL et al) 09 February 1999, see abstract.	2-7, 13-18, 22-26 & 28-31

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/01699

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

705/8; 345/326, 348; 364/138, 146, 188, 400, 468.01, 468.06, 468.09