



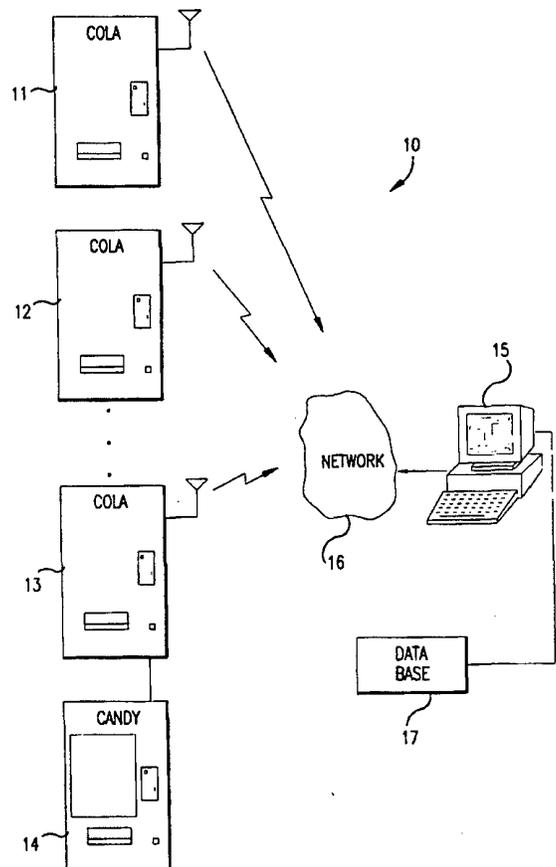
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(54) Title: SYSTEM FOR MONITORING REMOTE VENDING MACHINES

(57) Abstract

A system for remotely monitoring a plurality of vending machines from a central computer. The system includes a sensing and communication circuit that monitors the operation of the vending machine, translates the monitored operation into a common signal form whatever the machine, and transmits data packets including pertinent information back to the central computer. The sensing and communication circuit includes a plurality of sensors disposed throughout the vending machine. A microprocessor reads the output signals produced by the sensors and generates a data packet that is indicative of the sensor values and the operation of the vending machine. This microprocessor is coupled to a modem that transmits the data packet over a network to the central computer system. The central computer is similarly equipped with a modem to receive the data packets. Information regarding the operation of the vending machines is displayed in a graphical format or printed in reports to allow a user to quickly determine the status of a remote vending machine. Further the data on the machines can be historically processed so as to provide status over time information.



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SYSTEM FOR MONITORING REMOTE VENDING MACHINES

Technical Field

5 The present invention relates to communications systems in general and, in particular, to systems for monitoring the operation of one or more remote vending machines and transmitting data from the remote vending machines to a central computer system.

10 Background Art

This application is a continuation in part of Application U.S. Serial No. 08/108,815 filed August 18, 1993, System For Monitoring Remote Vending Machines.

15 Vending machines, once provided by bottlers or shopkeepers solely as a secondary source of advertising or as a convenience to customers, are now viewed as significant sources of income. However, in order to operate a series of vending machines at a profit, an efficient system must be provided for adequately insuring security, maintaining, filling and removing money
20 collected at the machines. Typically, a route of a number of vending machines employs service technicians who restock the machines, empty money and perform minor repairs on-site. These technicians often have a schedule to visit each vending machine at a predetermined time
25 interval. The particular time interval used is often based on prior experience concerning when the machine will need refilling or when the change box will become full. If the service visits are too infrequent, the machine can remain empty for a period of time, thereby missing sales
30 opportunities. Alternatively, if the service visits are too frequent, then the service technician's services are not being efficiently used. Also, visits are typically scheduled over a route of machines grouped together by geography no matter a particular machine's service needs.
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In order to help vending machine operators become more efficient, prior systems for monitoring remote

vending machines have been proposed. For example, Sedam U.S. Patent 4,412,292 discloses a system that monitors the status of a vending machine and transmits data to a central computer via a dedicated phone line. Cedrone U.S. Patent 4,766,548 discloses a system for monitoring the operation of a machine and periodically reporting data from the machine to a central computer via a non-dedicated telephone line.

While such prior art systems have been available for several years, they have not achieved widespread use in the marketplace. One reason for this is that these systems require each remote vending machine to be connected to its own telephone line. Providing each vending machine with a telephone line presents numerous problems including the fact that the telephone company must be called to install a line for each machine. The telephone line extending from the machine is subject to vandalism or unauthorized use and the fact that once a vending machine is coupled to a telephone line, it is inconvenient to move the machine to another location.

An alternative communications system between a vending machine and central computer is disclosed in Jackson U.S. Patent 5,142,694. Jackson discloses a system whereby a dedicated, special purpose radio communication system is used to transmit information from the remote vending machines to the central computer. The problem with this type of radio frequency communication system is that a vending machine operator must purchase specific radio communications equipment for which the operator may not have the skill or support staff to maintain. Also, the operator may have to lease space throughout a given geographic area at which to place numerous radio transceivers or repeaters. Finally, such a radio communication system occupies space on the radio frequency spectrum that may be prohibitively expensive to purchase or utilize.

In addition to the above, most vending machine manufacturers have proprietary wiring and internal communication systems within their vending machines, wiring and communication systems which may even vary between successive machines of the same model type. This presents problems for any monitoring of the operation of remote vending machines by typically requiring a system to be useable with only a single type of machine. This necessitates a uniquely designed and built monitoring and communication system for each type of machine. The uniqueness of individual machines also presents problems in developing correct monitoring system reports due to the difference between the information available machine to machine.

In light of the problems with the prior art systems for monitoring and communicating with a remote vending machine, there is a need for a new type of vending machine monitoring system. The system should not require a dedicated telephone line to be connected to each vending machine or the use of specialized radio frequency communication equipment. The system should allow the owner or operator of one or more vending machines to automatically keep count of the product delivered by the machine, the money collected, maintenance problems, and/or alarm conditions experienced at a remote vending machine. The information should be presented to an operator in an intuitive fashion, thereby allowing the user to readily determine the status of a remotely located vending machine. The information should be retained and/or organized so as to communicate meaningful data about the user's business, and then be summarized in reports on conditions.

In addition, the information should be presented to the operator in a common way for all vending machines so as to allow the operator to more easily comprehend and act on such information.

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