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(71) Applicant:
**International Computers Ltd.**
**London, EC2A 1DS (GB)**

(72) Inventors:
- **Brenner, John Bernard**
  **Wokingham RG40 2DH (GB)**
- **Shaw, Michael Kenneth**
  **Blackwater, Camberley, Surrey GU17 9DD (GB)**

(74) Representative:
**Guyatt, Derek Charles et al**
**International Computers Limited**
**Intellectual Property Department**
**Cavendish Road**
**Stevenage, Herts, SG1 2DY (GB)**

## (54) Toll booth apparatus

(57) Apparatus for speeding up the processing of customers passing through toll booths (1), includes a data entry device (8), located adjacent to a queuing area for customers waiting to pass through the toll booth. Customers may enter data, such as ticket numbers, into the device. A computer (2) in the toll booth performs preliminary processing on the data, e.g. by printing tickets, while the customer is still queuing, so that the amount of processing when the customer reaches the toll booth is reduced.

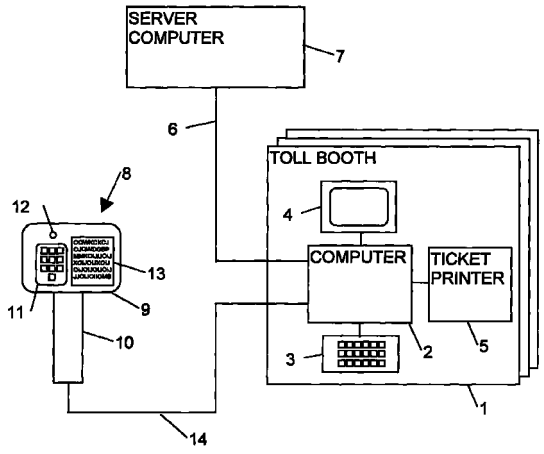



*FIG.1*

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## Description

### Background to the Invention

**[0001]** This invention relates to an apparatus for speeding up the processing of customers passing through toll booths. By a toll booth is meant any arrangement for controlling the passage of customers. The invention is particularly, although not exclusively, concerned with toll booths for use where the customers are travelling in vehicles.

**[0002]** Toll booths may be used, for example, to control entry to events such as sports events, or to services such as a rail shuttle service. They may also be used to at the exit rather than the entrance, as for example in the case of a car park.

**[0003]** The processing performed at the toll booth may include, for example, security checks, checking of previously purchased tickets or reservations, issuing tickets, and collecting payment.

**[0004]** A problem with toll booths is that the processing can take a long time, leading to delays for customers, and excessive queuing, or else requiring a large number of tool booths to be provided. The provision of extra toll booths is expensive, and may not be possible because of lack of space on the site.

**[0005]** The object of the present invention is to provide a way of speeding up the processing performed at toll booths. This increases throughput per toll booth and cuts queuing times. The potential benefits include increased throughput capacity from a given number of booths, opportunities to reduce the number of booths that need to be operational and staffed for a given capacity, and improved customer satisfaction.

### Summary of the Invention

**[0006]** According to the invention a toll booth system comprises: (a) a toll booth including data processing equipment for processing customers passing through the toll booth; (b) a data entry device, located adjacent to a queuing area for customers waiting to pass through the toll booth; and (c) processing means for receiving data entered at the data entry device and for performing preliminary processing activity in relation to a customer while that customer is queuing, before the customer reaches the toll booth.

**[0007]** The data entry device may comprise a keypad to allow the customer to key in information such as a ticket number. Alternatively, or additionally, the data entry device may comprise a reader for magnetic cards or smart cards. The data entry device may also comprise a means for communicating to the customer, such as for example a display device (e.g. lights) or a loudspeaker.

**[0008]** The preliminary processing activity may comprise, for example, fetching personalised information about the customer, performing validity checks, and printing tickets.

### Brief Description of the Drawing

**[0009]** The single Figure of the accompanying drawing is a block diagram of a toll booth system in accordance with the invention.

### Description of an Embodiment of the Invention

**[0010]** One toll booth system in accordance with the invention will now be described by way of example with reference to the accompanying drawing. In this particular example, the toll booth is intended to control entry of customers, travelling in vehicles, to a service for which tickets are required, such as a rail shuttle service. Customers may have purchased their tickets in advance, or may have ordered them by post or telephone, or may have done neither of these.

**[0011]** Referring to the drawing, in this example, the toll booth system comprises a number of manned toll booths 1. Each toll booth contains a computer 2, which in this example is a conventional personal computer (PC) with keyboard 3 and display unit 4. Each toll booth also contains a ticket printer 5, which in this example is a Fujitsu ATV-2 ticket printer. The computer 2 in each toll booth is connected, through a network 6, to a central server computer 7. The computer 2 runs customer processing software for processing the customers as they pass through the toll booth. This customer processing software may be conventional, and so will not be described in any further detail. In addition, the computer runs preprocessing software, which will be described below.

**[0012]** Customers waiting to pass through the toll booths wait in respective queuing lanes. The system also includes a number of data-entry devices 8, positioned adjacent to the queuing lanes. These devices may be similar to devices conventionally used for automatic entry barriers to car parks. Each data entry device comprises a robust all-weather housing 9, mounted on a steel post 10. The housing 9 contains a keypad 11, and a light 12.

**[0013]** The housing also carries a notice 13, providing instructions on how to use the device. In this example, the notice invites customers who have already ordered tickets by post or telephone to key in their ticket numbers, with an explanation that this will help to process the vehicle more quickly. The light 12 is illuminated to indicate that the ticket number has been accepted.

**[0014]** The data-entry device 8 is connected to the computer 2 in the toll booth by means of a buried RS 232 cable 14. The cable 14 is connected to the computer 2 by means of a specialised adaptor module and driver in the computer, or alternatively by using the normal ports provided for asynchronous terminals.

**[0015]** The preprocessing software in the computer 2 obtains the data input by a customer at the associated

data-entry device 8, and performs preliminary processing while the customer is still queuing, before the customer reaches the toll booth. The preprocessing software may be based on terminal emulation communicating with the server 7 (if the system is terminal-based), or may comprise one or more modules that integrate into the customer processing software in the computer 2.

**[0016]** The preliminary processing includes fetching personalised information about the customer from the server 7, performing validity checks, and printing tickets (if required). It can be seen that the preliminary processing enables the vehicle to be processed more quickly when it reaches the toll booth, since time-consuming activities such as performing validity checks and printing the tickets will already have been carried out by then. This significantly increases the throughput of the toll booth.

**[0017]** The preliminary processing may also provide information about the vehicle or driver which can be used to enhance the dialogue between the customer and the toll booth operator. For example, it may allow the use of a personalised greeting such as "Good morning Mr Smith".

**[0018]** The information obtained from the preliminary processing may also provide opportunities for the operator to increase revenue (e.g. by offering the customer enrolment in a loyalty scheme, or selling the customer additional products or services).

Some possible modifications

**[0019]** It will be appreciated that many modifications may be made to the system described above without departing from the scope of the present invention. For example, in addition to a keypad, the data-entry device may include a card reader for magnetic cards or smartcards, for customer identification.

**[0020]** In another possible modification, the data-entry device may also include a loudspeaker, which may be used for making announcements to the customer.

**[0021]** In the example described above, the toll booth is manually operated. In other embodiments of the invention, the toll booth may be automatic and unmanned. In this case, the preliminary stages of user interaction with the toll booth via the data-entry device enable completion to occur more immediately.

**[0022]** In the example described above, the data entry devices are connected directly to the computers in the toll booth, and the preliminary processing activity is performed in those computers. However, in other embodiments of the invention, the data entry devices may instead be connected to a server computer. The preliminary processing activity is performed in the server, and the results sent to the computers in the toll booths.

## Claims

1. A toll booth system comprising:

   (a) a toll booth (1) including data processing equipment (2) for processing customers passing through the toll booth;
   (b) a data entry device (8), located adjacent to a queuing area for customers waiting to pass through the toll booth; and
   (c) processing means (2) for receiving data entered at the data entry device and for performing preliminary processing activity in relation to a customer while that customer is queuing, before the customer reaches the toll booth.

2. A toll booth system according to Claim 1 wherein said data entry device (8) comprises a keypad (11) to allow the customer to key in information.

3. A toll booth system according to either preceding claim wherein the data entry device comprises a reader for magnetic cards or smart cards.

4. A toll booth system according to any preceding claim wherein said data entry device comprises means for communicating to the customer.

5. A toll booth system according to Claim 4 wherein said means for communicating to the customer comprises a display device.

6. A toll booth system according to Claim 4 wherein said means for communicating to the customer comprises a loudspeaker.

7. A toll booth system according to any preceding claim wherein said preliminary processing activity comprises fetching personal information about the customer.

8. A toll booth system according to any preceding claim wherein said preliminary processing activity comprises performing validity checks.

9. A toll booth system according to any preceding claim wherein said preliminary processing activity comprises printing tickets.

10. A method of processing customers passing through a toll booth, the method comprising:

    (a) providing a data entry device, located adjacent to a queuing area for customers waiting to pass through the toll booth;
    (b) allowing customers to enter data at the data entry device while waiting in said queuing area;

and

(c) performing preliminary processing activity on said data while the customer is queuing, before the customer reaches the toll booth.

**11.** A method according to Claim 10 wherein said customers enter data by means of a keypad.

**12.** A method according to Claim 10 or 11 wherein said customers enter data by means of a magnetic card or smart card.

**13.** A method according to any one of Claims 10 to 12 wherein said preliminary processing activity comprises fetching personal information about the customer.

**14.** A method according to any one of Claims 10 to 13 wherein said preliminary processing activity comprises performing validity checks.

**15.** A method according to any one of Claims 10 to 14 wherein said preliminary processing activity comprises printing tickets.

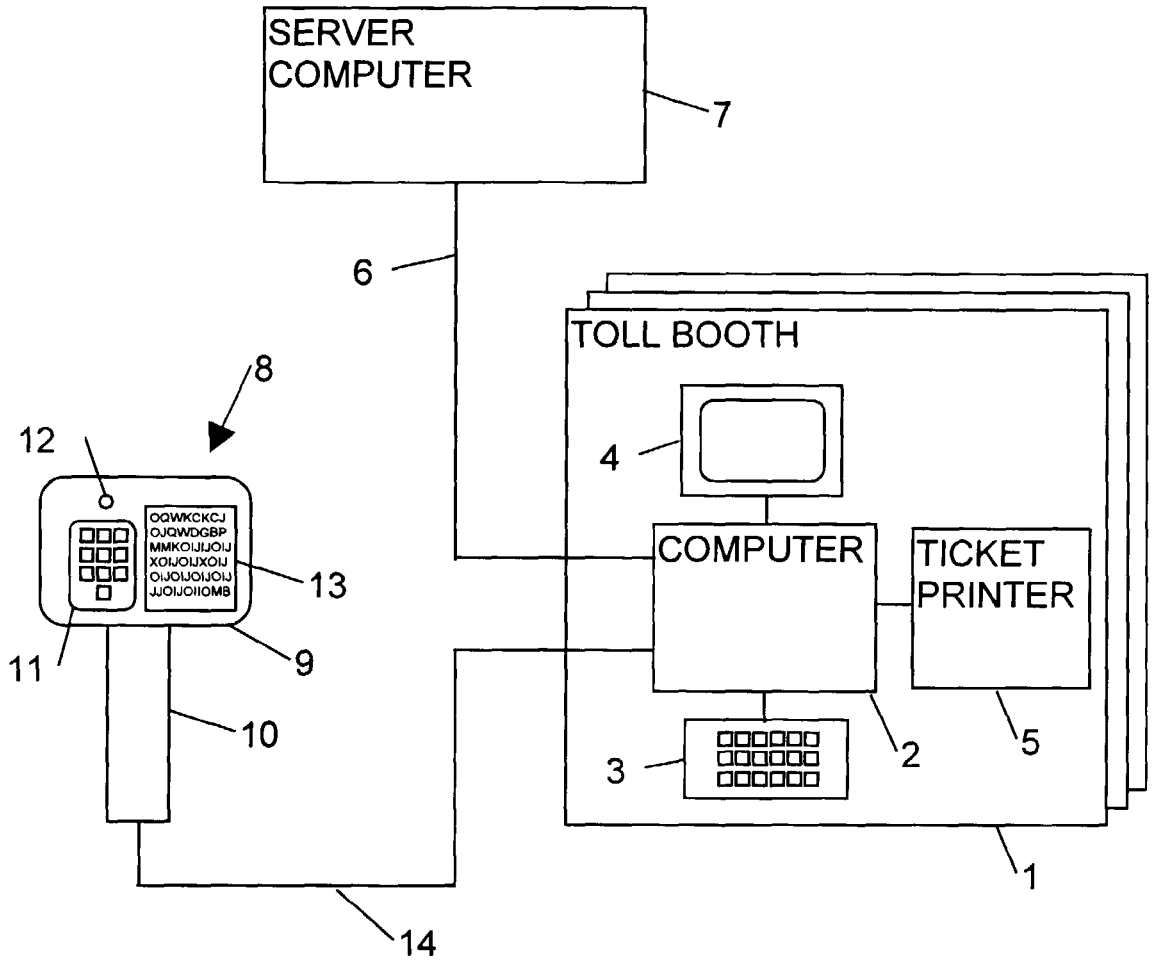

SERVER
COMPUTER
7
6
TOLL BOOTH
8
12
4
COMPUTER
TICKET
PRINTER
13
11
9
10
3
2
5
1
14

*FIG.1*