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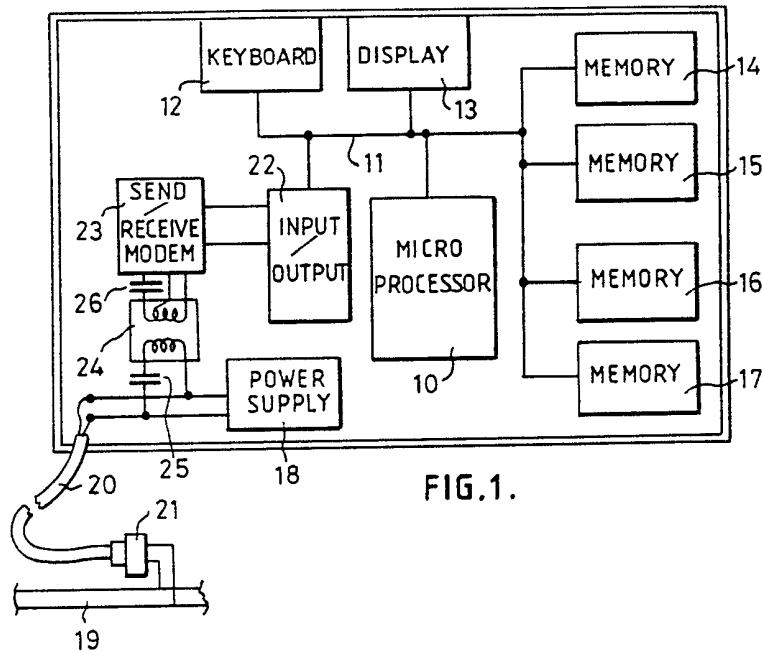
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(54) **Franking machine communication system**

(57) A franking system comprises a franking machine unit and peripheral units such as a weighscale, printer and computer. The franking machine unit and each peripheral unit is provided with a modem 23 coupled to the mains supply connection 20 for each unit. When the units are powered from a common mains electricity supply 19, data communication between the units is accomplished via the common mains power supply connections 20. Thus, there is no requirement for separate data input and output ports for data transmission with the secure housing of the franking machine; one access point is sufficient for both power supply and data transmission.



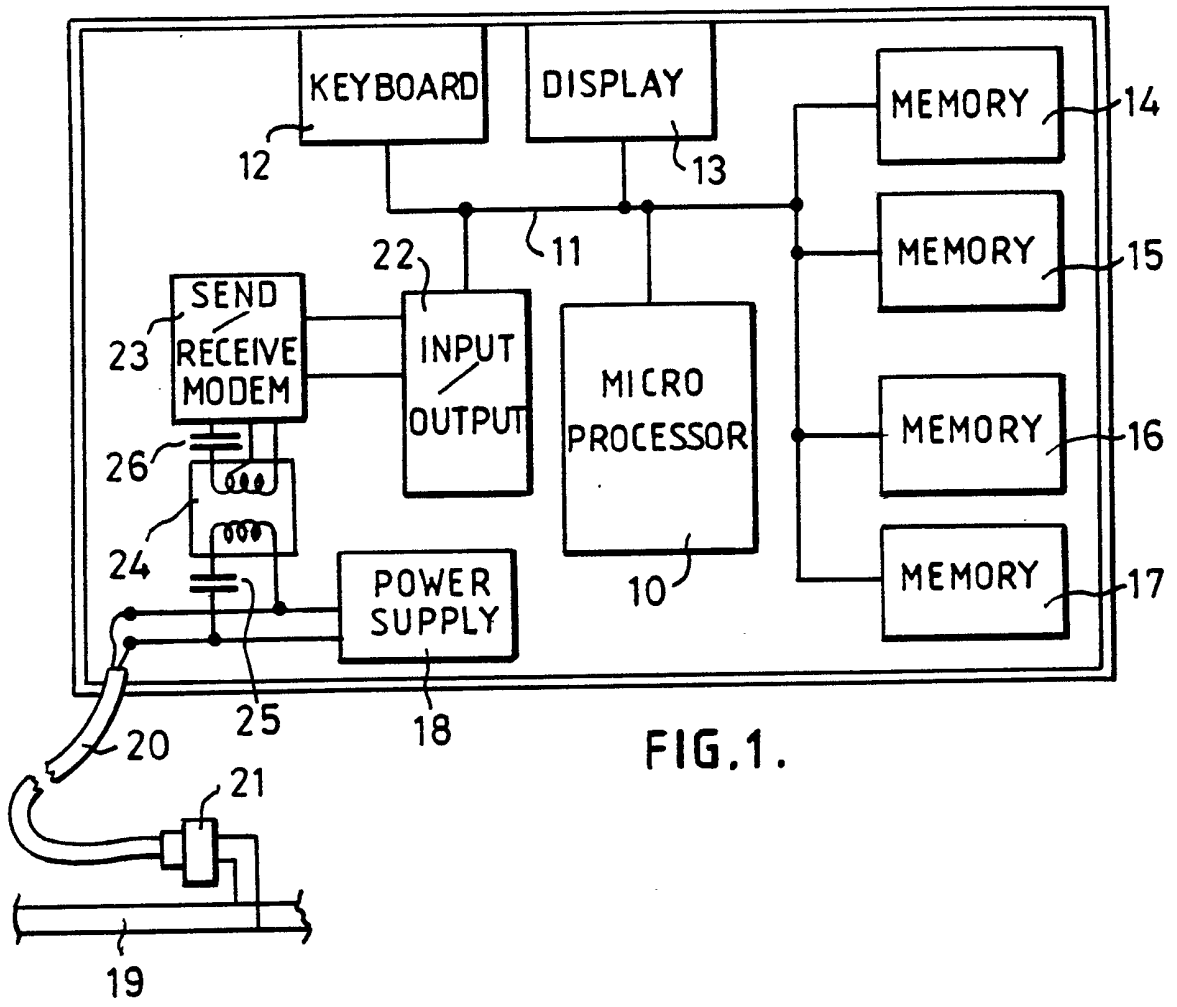


FIG. 1.

FIG. 2.

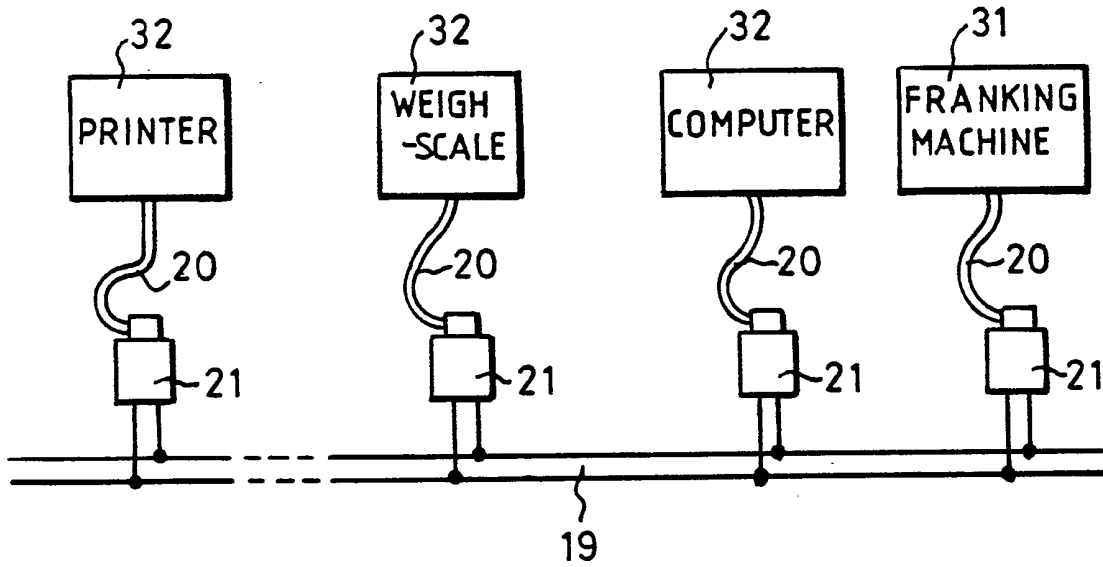


FIG. 3 .

FRANKING SYSTEM

This invention relates to franking systems and in particular to systems incorporating a franking machine in communication with other devices or equipment.

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Franking machines for printing franking impressions on mail items often are used in a stand alone arrangement without connection or communication with other devices. The franking machines are provided with a keyboard for the
10 input of data by a user and a display device for displaying the input data and data relating to the operational status of the machine to the user. However, it is sometimes desired to provide a system in which a franking machine is able to receive data inputs from other
15 devices and in which the franking machine can output data to other devices. For example, with a stand alone franking machine the user would need to weigh a mail item, ascertain the appropriate postal charge for the item and then enter that charge on the keyboard to cause a frank of
20 that value to be impressed on the item. However if the weighing apparatus is connected to the franking machine data relating to the weight of the item can be input directly to the franking machine. The franking machine is provided with means to utilise the weight data to
25 calculate a postal charge appropriate to that weight and the postal service required and to impress a frank. As a result manual input of the postal charge data by the user is not required. Instead of providing the franking machine with a keyboard and display device, the machine
30 may be connected to, and be controlled from, a work station or personal computer. Franking machines are provided with a franking meter for accounting for postage value used in franking operations and for maintaining a record of credit available for use. Initially a credit
35 register is loaded with a value of credit purchased for use in franking and when the value of credit falls to zero or a low predetermined value, further credit must be

loaded into the register before further franking operations can be effected. This may be accomplished by taking the franking machine to a postal authority centre or, more conveniently, may be effected by means of a connection via the telephone network to the postal authority resetting centre. In some instances it is desired to construct the printing mechanism of the franking machine as a separate module or unit from the franking meter and hence it is necessary to provide communication from the meter to the printing mechanism. Thus it will be seen that increased convenience in use of a franking machine can be obtained by connecting the franking machine to other equipment such as, for example, a weighscale, computer or telephone network.

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When a franking system comprising a franking meter and a number of external devices is installed in a work area, communication between the meter and external devices has been provided by means of electrical cables. Use of electrical cables tends to be inconvenient because the cables have to be tailored to the specific installation and have to be routed between items in such a manner that they are not hazardous to users of the system and do not interfere with handling of mail items in the work area. Furthermore if changes to the system are required, such as addition of items or re-location of items, the existing electrical cables may need to be replaced with new cables tailored to the new system.

30 It will be appreciated that in order to prevent attempted fraudulent use of the machine, the franking meter in a franking machine is constructed in a secure manner to prevent unauthorised access to the electronic circuits of the meter. To this end, the circuits are housed in a secure housing. Any connections to external devices need to pass through the wall of the secure housing and hence tend to reduce the security of the circuits within the

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housing and it is necessary to route all electrical connections between the exterior and interior of the housing via interface circuits designed to prevent application of excess voltage to the circuits of the
5 meter.

According to one aspect of the invention a franking system includes a franking meter device at a first location; at least one external device at a second
10 location separated from said first location; said devices each including power supply means having a power input energisable from a common mains supply distribution system and data transmitting means operable to apply data signals to the power input and data receiving means responsive to
15 data signals at said power input.

According to another aspect of the invention a franking meter comprises a secure housing containing electronic means for carrying out accounting and control functions
20 and input/output means for input and output of data respectively to and from the electronic means; a power input for electrical power to energise said electronic and input/output means; transmitting means connected to the input/output means and operable by said electronic means
25 to generate a carrier modulated by output data signals from the electronic means and to apply the modulated carrier to the power input; receiving means connected to the input/output means and operative in response to a carrier modulated by input data signals at the power input
30 to demodulate the carrier and apply said input data signals to the electronic means.

An embodiment of the invention will now be described with reference by way of example to the drawings in which:-
35 Figure 1 is a block circuit diagram of a franking meter,

Figure 2 is a block circuit diagram of a device for communicating with the franking meter, and

Figure 3 is a diagram illustrating a franking system comprising a number of inter-communicating devices.

Referring first to Figure 1, a franking meter comprises a
5 micro-processor 10 communicating via a system bus 11 with
a keyboard 12, a display device 13 and memories 14, 15, 16
and 17. As is customary, the keyboard is utilised by a
user to input data to the meter and the display device 13
10 is provided for the display of an echo of the data on the
keyboard and for the display of instructional data to the
user of the meter, for example relating to the operational
status of the machine and to accounting data maintained by
the meter. Operation of the microprocessor 10 is
15 controlled by program routines stored in the read only
memory 16. The memories 14 and 15 are utilised by the
microprocessor to store accounting data relating to usage
of the meter for franking. In order to ensure integrity of
the accounting data, data stored in one memory 14 is
20 replicated in the other memory 15 and additionally data
stored in each of the memories 14, 15 is duplicated.
Accordingly each item of data is stored in quadruplicate
between the two memories. The memories 14 and 15 provide a
number of registers for storing different items of
25 accounting data. A credit register stores a value of
credit available for use in franking operations, a tote
register stores a value of postage used in franking
operations and an item register stores a count of the
number of items franked. The memory 17 is a random access
30 memory used as a working store by the microprocessor. The
circuits of the franking meter are energised by a power
supply module 18 which is connected to a mains electricity
power supply distribution cables 19 by means of a flexible
cable 20 and plug and socket 21.

35 In order to permit signals from external devices to be
input to the micro-processor and for signals from the
micro-processor to be output to external devices, an

input/output device 22 is connected to the system bus 11. While communication between the input/output device 22 and external devices may be by way of a multi-way plug and socket connection and electrical signal cables, it is preferred in accordance with the present invention to
5 utilise the mains electricity distribution cables for data communication. A modem 23 is connected to the input/output device 22 and is connected to the mains input of the franking machine by means of an isolation
10 transformer 24. A capacitor 25, connected in series with a primary winding of the transformer 24 serves to filter out low frequency signals such as the AC mains frequency and a capacitor 26 connected in series with a secondary winding of the transformer forms, with the secondary winding, a
15 tuned circuit having a resonant frequency equal to the carrier frequency. The modem operates with amplitude shift key (ASK) modulation in which the carrier has ON and OFF states. However, if desired, frequency shift key (FSK) modulation may be used.

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In order to ensure security of the electronic circuits of the franking meter from attempts to use the meter fraudulently, the electronic circuits are housed in a secure housing. By utilising the power supply input to the
25 meter as a connection for transmission and reception of data signals no additional access to the interior of the housing is required. Accordingly the security of the circuits is not reduced due to any requirement to provide additional connections extending through the wall of the
30 housing for data communication purposes.

Figure 2 shows a block circuit diagram of an external device intended for communicating with the franking meter described hereinbefore. The device may be any one of a
35 number of devices, for example a weighscale, computer, printer or modem, with which communication with the franking meter is desired. The device as shown in Figure 2

comprises electronic circuits 27 which are specific to the particular device for carrying out the functions of that device. If the device is a weighscale, the circuits 27 would include means responsive to weight of a mail item
5 and for generating digital output signals representing weight data. The device may be provided with a keyboard and display to enable local operation of the device or the circuits may include means responsive to receipt of control signals to enable remote operation of the device.
10 A modem 28 connected to the circuits 27 is connected via an isolation transformer 29 to a mains supply input 30 to a power supply module 33. The modem and isolation transformer are connected in the same manner as the modem 23 and isolation transformer 24 of the franking meter.
15 Thus data can be transmitted from the circuits 27 to the mains distribution cables and similarly data carried as modulation of a carrier on the distribution cables can be received by the circuits 27.

20 Figure 3 shows a franking system in which devices of the system are interconnected for data communication by means of the mains electricity distribution cables. Thus a franking machine 31 is connected by its power supply input connection to the distribution cables and likewise
25 external devices 32 such as a weighscale, computer and printer are connected by means of their power supply input connections to the distribution cables. Accordingly data may be transmitted by modulation of a carrier by a modem in one device such as the franking machine via the
30 distribution cables to the other devices where it is demodulated and input to the electronic circuits of those devices. It will be appreciated that when data is transmitted, it includes an address corresponding to that one of the devices for which it is intended. When received
35 by the other devices in the system, the address is tested and only that device corresponding to the address accepts and responds to the data.

Interference signals may result in corruption and loss of integrity of the data in transmission between a transmitting one of the devices and a receiving device. Accordingly in order to prevent such corrupted data from being accepted as data by the receiving device, a check on the data is carried out by the receiving device. This may be accomplished by causing the transmitting device to transmit each data block twice. The received blocks of a pair are compared for equality and if they are equal the data block is accepted. Alternatively, the second transmission of a data block may be effected in reverse order to that of the first transmission of that block. The receiving device then compares the first transmission of the block with the second transmission but in reverse order. If desired each block of data may be transmitted with check sum and/or parity bits to provide an additional check on integrity of the received data block.

The franking meter may act as master device of the franking machine system and all communications may be controlled by the franking meter. However if desired, one of the devices external to the franking meter may act as master device of the system and control communication between devices.

Instead of the modem and isolation transformer being located internally in the housing of the franking meter, they may be located externally of the meter as a separate module. The module may be fastened securely to the meter housing and may be fitted as an optional additional facility at the factory. Alternatively the module may be provided in a form suitable for connection by a user. In this case, the meter would be provided with connections, with protective interface circuits between these connections and the meter circuits, to which the modem is connected by the user. In a similar manner, the modem and

isolation transformer for the other devices communicating with the franking meter may be located in a module external of the device.

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CLAIMS

1. A franking system including a franking meter device at a first location; at least one external device at a second location separated from said first location; said devices
5 each including power supply means having a power input energisable from a common mains supply distribution system and data transmitting means operable to apply data signals to the power input and data receiving means responsive to data signals at said power input.
- 10 2. A franking system as claimed in claim 1 in which the data transmitting means includes means to modulate a carrier frequency with output data signals and to apply the modulated carrier to the power input and in which the
15 receiving means includes means to demodulate a modulated carrier received from the power input to produce input data signals.
3. A franking meter comprising a secure housing containing
20 electronic means for carrying out accounting and control functions and input/output means for input and output of data respectively to and from the electronic means; a power input for electrical power to energise said electronic and input/output means; transmitting means
25 connected to the input/output means and operable by said electronic means to generate a carrier modulated by output data signals from the electronic means and to apply the modulated carrier to the power input; receiving means connected to the input/output means and operative in
30 response to a carrier modulated by input data signals at the power input to demodulate the carrier and apply said input data signals to the electronic means.
4. A franking system constructed and arranged to operate
35 substantially as hereinbefore described with reference to the drawings.

5. A franking meter constructed and arranged to operate substantially as hereinbefore described with reference to Figure 1 of the drawings.

5 6. A device intended for communication with a franking meter and constructed and arranged to operate substantially as hereinbefore described with reference to Figure 2 of the drawings.

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