

EUROPEAN QUALIFYING EXAMINATION 1999

PAPER A ELECTRICITY / MECHANICS

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CLIENT'S LETTER

Our technical department has again come up with a bright idea which we hope may prove commercially successful and for which we would like patent protection in Europe. It concerns a memory module reader for a cellular radio telephone, commonly known as a "mobile phone".

The term "memory module" is intended to refer to a data card, such as a chip card. The data card may be a passive memory card, i.e. having a read only memory (ROM), or an active processor card, i.e. capable of processing information internally within the card.

It is known in the field of cellular radio telephones to use a memory module such as a data card which may be removably inserted into the telephone. Data, such as subscriber identity information, is read from the inserted card and used in the subsequent operation of the telephone.

In addition to subscriber identity information, such as the subscriber telephone number and personal identification number (PIN), the chip card may store, for example, call charge information and a telephone directory.

Such chip cards which identify the subscriber are known, at least in Europe, as "SIM" (Subscriber Identity Module).

There are currently two different standards used for the SIM card and a third has been proposed. The functionality of the SIM card is the same for all standards, essentially only the exterior dimensions are different. The two current standards are (a) a credit-card size SIM card, and (b) a smaller plug-in SIM card about 20mm x 25mm. The proposed third standard is likely to be a mid-sized SIM card about half the size of a regular credit card. Although the credit-card format is perceived as a convenient size for the user from a practical standpoint, it is relatively large, and smaller card sizes are needed as miniaturisation

continues to drive down the overall size of the telephone. The smaller plug-in SIM card is intended to normally remain in the telephone.

It is desirable that a telephone should be operable with more than one card format. For example, a smaller plug-in SIM card can be used for business purposes and a SIM card having the credit-card format can be used for private purposes. When a telephone is to be used with more than one card there is the risk that a card not in use can be lost or damaged. This is particularly the case with the smaller plug-in SIM card.

We have carried out a brief search in the field of cellular radio telephones and have found the enclosed published patent applications DI and DII which may be of interest to you as background information. However, these telephones are relatively complicated and therefore expensive.

We enclose a description of an embodiment of our invention including drawings which has been prepared by our technical department.

In the accompanying drawings:

Figure 1 is a perspective view of the rear of a cellular radio telephone according to the invention, showing the battery pack attached to the main body of the telephone; and

Figure 2 is a similar view of part of the telephone of Figure 1 with the battery pack removed.

As shown in Figure 1, the telephone comprises a main body having a housing 10 and an antenna 12. A battery pack 11 is connected to the main body in a manner known per se to supply current to the telephone circuits via contacts (not shown). When the battery pack is in place, it forms part of the exterior surface of the telephone.

Referring now to Figure 2, a card reader 1 is incorporated in the housing 10 in the area which in use receives the battery pack 11. The housing 10 includes a compartment 2 for accommodating a SIM card of the credit-card format. The reading position of this large SIM card is depicted by the broken line 9 in

Figure 2. One edge of the large SIM card is located in a slot 8 in the main body of the telephone, and the opposite edge is held in place by a resilient retaining member 7. The other two (longer) edges of the SIM card fit between projecting side walls 15 bounding the compartment 2.

The card reader 1 comprises a set of electrical terminals 5 provided on the base of compartment 2. When the large SIM card is in the reading position depicted in Figure 2 by the broken line 9, corresponding contact pads provided on the SIM card make electrical contact with the terminals 5 to enable data to be read from the card.

The large SIM card may be removed by drawing back the resilient retaining member 7 which returns to its original position when the card has been removed.

A plug-in SIM card holder 3 is pivotally mounted at one end on the base of the compartment 2 by means of a hinge 4. The card holder 3 has side walls 16 and an end wall 17. Flanges 18 on the side walls 16 define channels into which a plug-in type SIM card (not shown) can be slidably inserted. A pivotable retaining flap 13 is provided at the open end of the holder 3 so as to maintain the card in its correct position and to prevent the card from accidentally falling out of the holder. The flap 13 is resiliently biased against the open end of the holder, however, the flap is shown in Figure 2 in an intermediate position for reasons of clarity. Alternatively, a separate closure member (not shown) can be snap-fitted on the open end of the holder.

When the large SIM card is not present in the compartment 2, the holder 3 can be raised to a generally upright position (as shown in the drawing) to facilitate insertion or removal of the smaller plug-in SIM card. With the plug-in SIM card in place, the holder 3 is swung towards the set of electrical terminals 5 until corresponding contact pads on the plug-in SIM card come into electrical contact with the terminals 5 to enable data to be read from the card.

In this position, the free end of holder 3 engages under the resilient retaining member 7 which acts to retain the holder 3 in the card-reading position. By releasing the retaining member 7, the holder 3 can be pivoted through 180° to a card storage position in which the holder 3, together with the plug-in SIM card,

is accommodated in a recess 6 provided in the base of the compartment 2. In this storage position the holder 3 lies wholly within the recess 6 so that a larger credit-card sized SIM card can be inserted into the card-receiving compartment 2. A notch 14 adjacent the recess 6 allows the card holder 3 to be easily extracted from the recess.

When the card holder 3 is in the card-reading position it prevents the insertion of a SIM card of the credit-card format. Hence only one SIM card may be operative, i.e. in contact with the terminals 5, at a given time. However, when it is desired to insert a SIM card of the credit-card format, the smaller plug-in SIM card does not have to be removed from the telephone, but is simply pivoted into the storage position.

As described above, the compartment 2 and the recess 6 are in the region of the telephone which, in use, is covered by the battery pack 11. The battery pack consequently serves to protect the underlying cards against dust and moisture as well as against mechanical influences. In order to achieve this, the edges of the compartment 2 should be provided with a suitable seal.

It is therefore necessary to remove the battery pack 11 before a SIM card may be inserted or removed, and to allow the card holder 3 to be pivoted between its two positions. In other words, it is not possible to change a SIM card while a battery pack is attached to the telephone.

CLIENT'S DRAWINGS

1/2

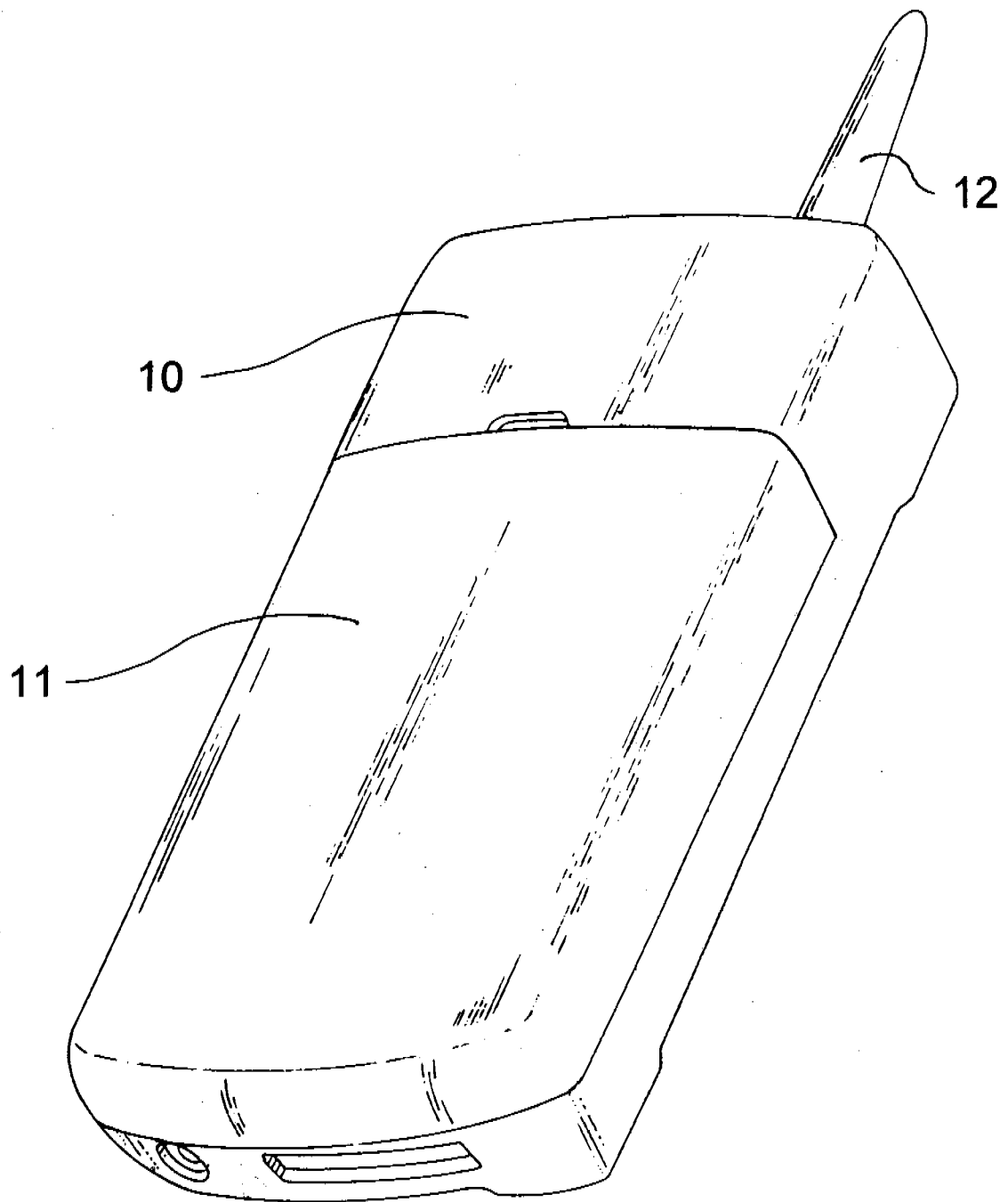


Fig 1

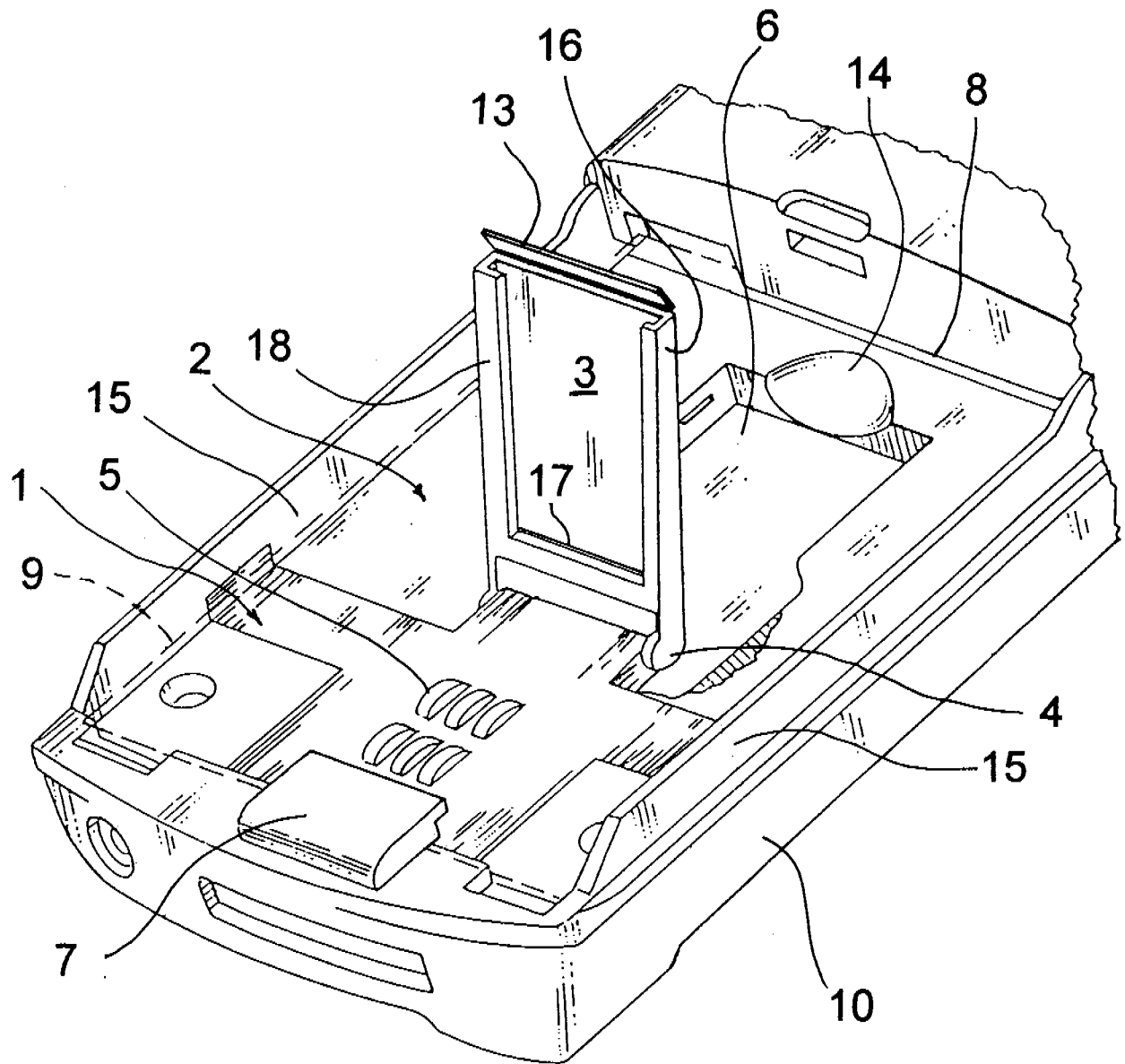


Fig 2

DOCUMENT DI (State of the Art)

This invention relates to a cellular radio telephone which can be used with cards of various formats.

This is achieved by providing exchangeable adapters intended to be mounted in the telephone, each of the adapters being capable of accepting a card of a particular format.

5

A preferred embodiment of the invention will be described with reference to the accompanying drawings in which:

Figure 1 shows a perspective view of a radio telephone in accordance with the invention;

10

Figure 2 shows an adapter which is only capable of accepting a conventional credit-card sized SIM card; and

Figure 3 shows an adapter which is only capable of accepting a plug-in SIM card.

15

It has recently become usual for radio telephones to be used with different identification cards, not only SIM cards of credit-card sized format, but also smaller, so-called plug-in SIM cards. The radio telephone illustrated in Figure 1 is for the most part well known in the art and only the modifications which have been made thereto in accordance with the invention will be further described.

20

A first adapter 4, shown in Figure 2, is inserted into the telephone 1 in the region of the side wall 14. In order to accept a larger SIM card 5, the adapter 4 is provided with a slot at one end into which the card can be introduced. A recess 9 in the wall of the radio telephone facilitates access to the slot when the adapter 4 is mounted therein.

25

A second adapter 6, capable of accepting a smaller SIM card 12, is shown in Figure 3. This adapter 6 comprises a pivotable card holder 10 into which the card 12 can be introduced from one end. In order to enable the radio telephone to be used with this adapter, the side wall 14 is provided with an opening 18

through which the card holder 10 can pivot to the position shown. After the SIM card 12 has been introduced into the card holder 10, it can be pivoted into the closed operative position, where it is clipped in place.

- 5 Both adapters 4 and 6 have the same arrangement of contact terminals 7, corresponding to the contact pads 13 on the respective cards. The terminals 7 are connected by means of a flat cable 11 with the circuitry of the telephone 1.

It is a simple matter to exchange the adapters, since these are merely inserted into the telephone and, if
10 necessary, secured by means of screws (not shown).

DRAWINGS OF DOCUMENT D1 (State of the Art)

1/2

FIG1

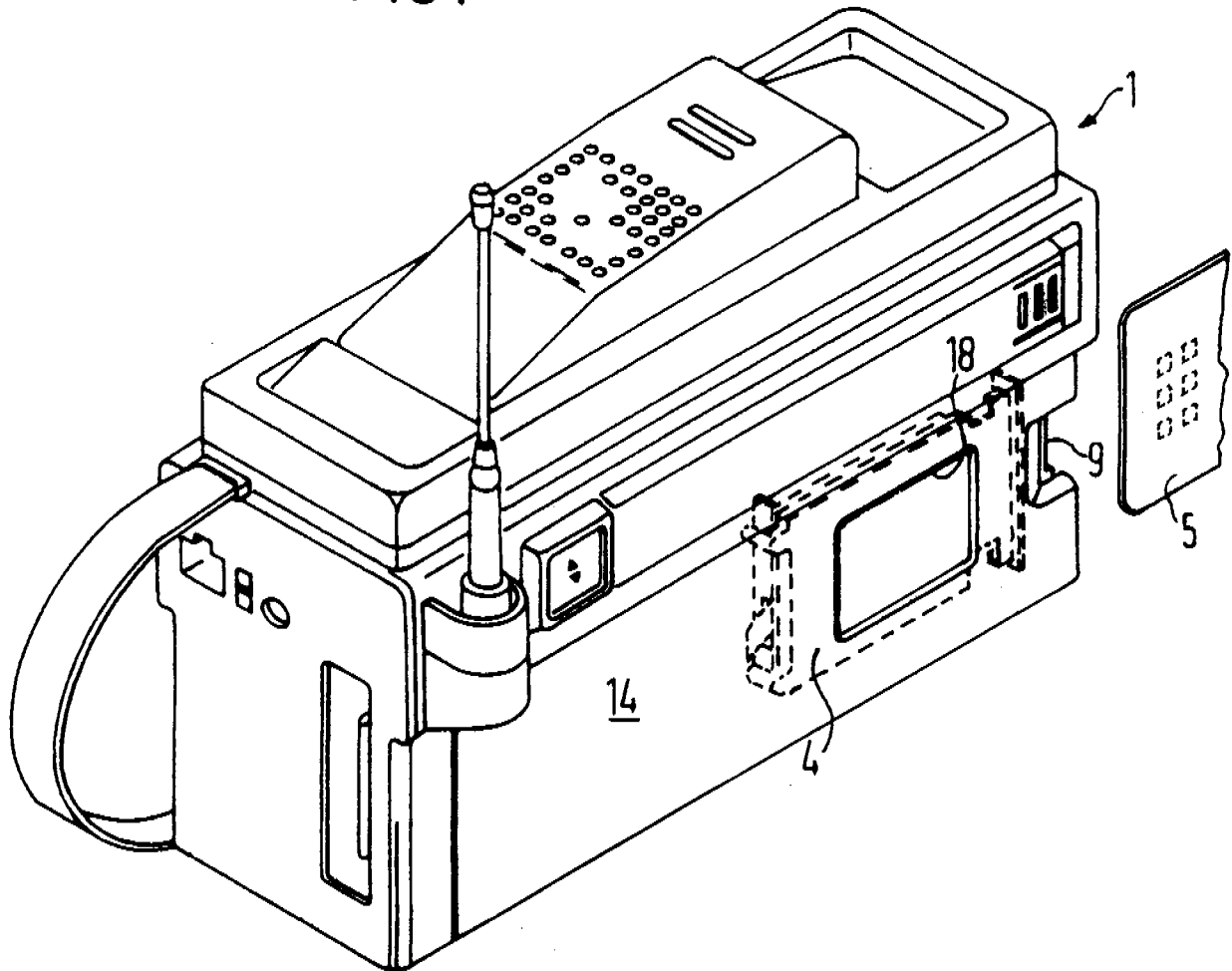


FIG 2

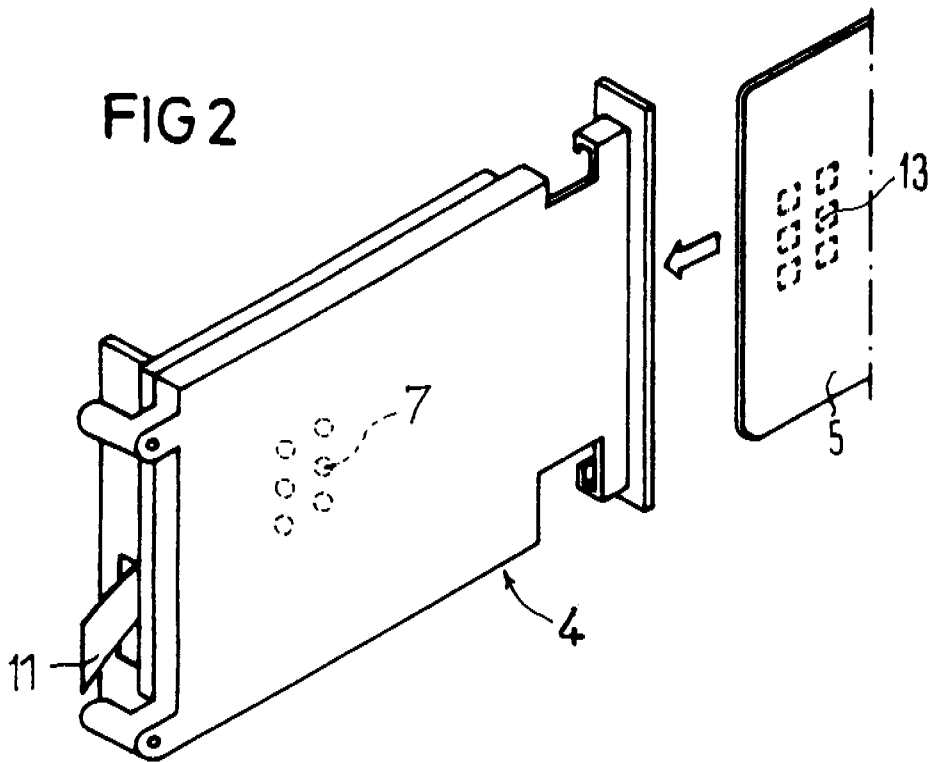
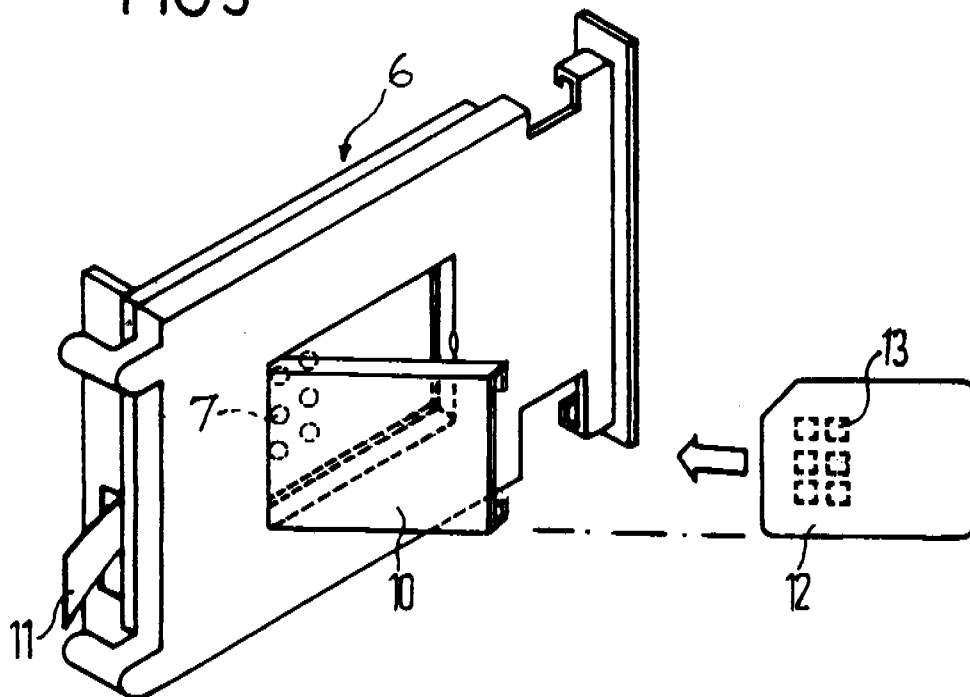


FIG 3



DOCUMENT DII (State of the Art)

This invention relates to a cellular radio telephone.

It is known in the field of cellular radio telephones to use a memory module such as a data card which may be removably inserted into the telephone. Data, such as subscriber identity information, is read from the
5 inserted card and used in the subsequent operation of the telephone. The data card may be a so-called "chip card" which includes a memory in the form of an integrated circuit device in which information is stored.

In addition to subscriber identity information, such as the telephone number of the subscriber and a
10 personal identity number (PIN), the chip card may store call charge information, a telephone number directory and false PIN entries.

At present chip cards of different formats are available, thus giving rise to compatibility problems.

15 According to the invention, such problems are overcome in that the radio telephone is capable of accepting two or more memory modules simultaneously, but in a selective manner.

An embodiment of a cellular radio telephone according to the invention is shown schematically in the single figure of the drawing.

20

A radio telephone includes a housing 2 and a handset 3 removably mounted on a base 4. The handset is connected to the base by a cable in a conventional manner. For use in a car, the housing 2 may be mounted in the boot and the handset and base in the passenger compartment.

25 The housing 2 encloses a transmitter-receiver 5 connected to an external antenna 6 and to a microprocessor 7. The transmitter-receiver 5 is also connected to the base 4. Instructions for operating the telephone

are stored in a memory device 8 coupled to the microprocessor.

Subscriber related data is stored in a first SIM card 9 which is removably stored in the housing 2. The SIM card 9 is of the plug-in format. A recess or compartment 11 is provided in the housing 2 so that the SIM card 9 can be plugged in and removed in a simple manner. A light emitting diode (LED) 18 is located on the base 4 and is illuminated to indicate when information from the first SIM card is being used.

A second SIM card 12 in credit-card format may be inserted into a separate card reader 10. The external card reader 10 is connected to the microprocessor 7 by means of data transmission lines 15. A light emitting diode 19 is located on the card reader 10 and is illuminated to indicate when information from the second SIM card 12 is being used.

A third SIM card 14, which may have the same or a different format from the first or second SIM card, may be inserted into a further card reader 13. The external card reader 13 is connected to the microprocessor 7 by means of data transmission lines 16. A light emitting diode 17 is located on the card reader 13 and is illuminated to indicate when information from the third SIM card 14 is being used.

In use, the microprocessor 7 monitors which SIM cards are present. If only one card is present, then data from that card will be used. If no card is present, the telephone will not operate. On the other hand, if two or more cards are present, the microprocessor will use data from one of the cards in a predetermined sequence stored in the memory 8. Thus, the sequence might be in the order SIM 3-SIM 2-SIM 1. If SIM 3 is present, data from that card will be used. If SIM 3 is absent, data from SIM 2 will be used. If neither SIM 3 nor SIM 2 is present, then data from SIM 1 will be used.

The sequence may be fixed, however, it is preferred that the sequence can be varied by the user. This can be achieved by menu selection with the aid of the keyboard on the handset 3.

Whilst the card readers 10 and 13 have been illustrated as being at locations remote from the housing 2, it is contemplated that they could be mounted on or in the housing 2.

DRAWING OF DOCUMENT DII (State of the Art)

