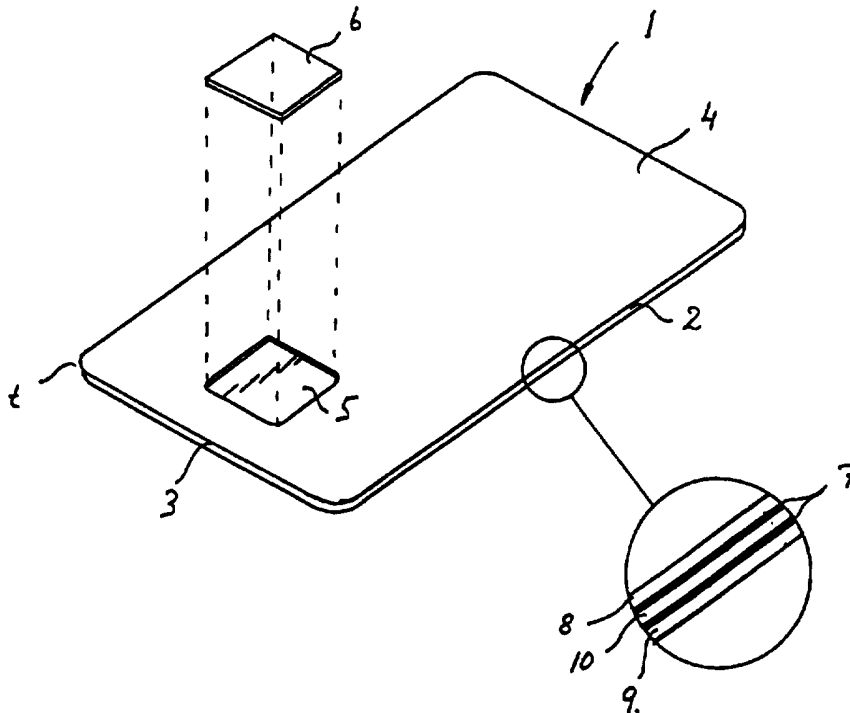




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<p>(21) International Application Number: PCT/SE96/00063 (22) International Filing Date: 23 January 1996 (23.01.96) (30) Priority Data: 9500243-2 24 January 1995 (24.01.95) SE (71) Applicant (for all designated States except US): ECO-CARD SWEDEN AB [SE/SE]; P.O. Box 79, S-840 93 Hede (SE). (72) Inventors; and (75) Inventors/Applicants (for US only): ZETTERLUND, Jan [SE/SE]; P.O. Box 23, S-840 95 Funäsdalen (SE). LILJE- MARK, Bengt [SE/SE]; P.O. Box 187, S-840 93 Hede (SE). (74) Agents: STENSTRÖM, Jesper et al.; H. Albihns Patentbyrå AB, P.O. Box 3137, S-103 62 Stockholm (SE).</p>	<p>(81) Designated States: CA, CN, JP, SG, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i> <i>In English translation (filed in Swedish).</i></p>	

(54) Title: CARD



(57) Abstract

Card (1; 1') comprising at least one information carrier (6; 6'), for example a telephone card or a credit card, wherein the card (1; 1') comprises at least two layers (8, 9; 8', 9') made of wood connected to each other, wherein each layer (8, 9, 10; 8', 9', 10') has a main fiber direction and that the fiber directions of the layers (8, 9, 10; 8', 9', 10') are orientated in at least two different directions.

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Card

The present invention relates to a card according to the preamble of claim 1. The invention also relates to a method for manufacturing such a card and a use thereof.

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The main object of the present invention is to bring about a card which is naturally decomposable and which is provided with an information carrier such as a microcircuit, a magnetic tape or the such like.

10 JP 56-64637 discloses a sound card made of paper with a magnetic tape attached to the front side or on both the front and rear sides of the paper card. The card is also provided with a space for notes. Disadvantages of this card are that it does not meet the requirement for resistance to wear which is expected for cards which will be used for a long period of time, and its ability to resist bending forces is poor. If the card comes  
15 into contact with water it can be destroyed.

DE-B1-29 20 012 relates to an identity card comprising an IC-module. The card consists of a plastic or paper core which is coated on the front and rear sides with a film. There is a cavity in the core for a support element onto which the IC-module is  
20 applied. The film should consist of a highly elastic material in order to absorb the bending stresses which the card and consequently the core are subjected to. A disadvantage of coating a card made of paper, which has a thickness which corresponds to the standardized thickness of an identity card, telephone card, credit card or the like, with a film is that the thickness of the film must constitute a considerable part of the  
25 total thickness of the card if the requirement for rigidity will be fulfilled for the card. Consequently, the amount of non-environmentally friendly material becomes proportionally large in the card.

It is known from JP 11-52094 to apply a very thin plate of wood on the surface of a  
30 magnetic card, such as a telephone card or the like. The wooden layer has a thickness of only 0.2 to 0.5 microns. The purpose of applying the wood layer to the magnetic

card is to achieve a natural looking design and a natural feel for the user of the card. The thin wooden layer consequently does not contribute to the rigidity required for a telephone card but has only a decorative function.

- 5 An object of the present invention is to avoid the disadvantages which are associated with the cards which are mentioned in the above documents.

A further object of the present invention is to bring about a card made of wood which complies with the legislation relating to final user liability.

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Yet a further object of the present invention is to achieve a card made of wood of which the surface permits four-colour high resolution printing which means that images can be reproduced with a great wealth of details.

- 15 Yet a further object of the present invention is to achieve a card made of wood which does not crack in its longitudinal direction as is often the case for credit cards made of plastic.

According to the invention this is achieved with a card having the features mentioned  
20 in claim 1.

Some embodiments of the invention will be described in more detail below with reference to the accompanying drawings, in which:

- 25 Figure 1 is a perspective view of a card according to a first embodiment.

Figure 2 is a perspective view of a card according to a second embodiment.

Figure 1 shows a card 1 made of wood according to a first embodiment of the present  
30 invention which, for example, can be used as a means of payment in a telephone callbox, i.e. a telephone card. The card 1 has two long sides 2, two short sides 3 and a

thickness  $t$  which substantially corresponds to the dimensions of contemporary known telephone cards made of plastic to the European standard,  $85,6 \times 53,98 \times 0,76$  mm.

The card can of course also have another shape.

- 5 In the surface 4 of the card there is a cavity 5 which can receive an information carrier 6 in the shape of a microcircuit of which the contents can be adapted according to the intended purpose. The cavity 5 is placed centrally between the long sides 2 and in the vicinity of a short side 3 and has a depth which essentially corresponds to the thickness of the information carrier 6.

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Card 1 consists of three layers of wood which are bound to each other by a biodegradable adhesive 7. The three layers have essentially the same thickness. The fiber direction of the two outer layers 8,9 corresponds to the direction of the long side 2 of the card 1 while the intermediate layer 10 has a fiber direction which is essentially perpendicular to the fiber directions of the outer layers 8,9. With the fiber directions of the layers in this selected orientation, a card is achieved which fulfills the requirements which are placed on a telephone card in connection with flexural and torsional rigidity. The adhesive 7 is equally distributed over the surfaces of the layers and all the way out to the long and short sides 2,3 of the card 1 which leads to the adhesive 7 contributing to a good abrasion resistance for the long and short sides 2,3 of the card 1. The corners of the card 1 are advantageously rounded in order to, on the one hand, achieve a good strength and, on the other hand, a pleasant feel for the user.

Figure 2 shows a card 1' according to a second embodiment of the present invention. The card has the same dimensions and is constructed in the same manner as the card according to the first embodiment. The difference, however, resides in that the card 1' is constructed with a longitudinal recess 5' in the surface 4' of the card 1' which extends between the short sides 3' of the card 1' parallel with and in the vicinity of one of the long sides 2' of the card 1'. An information carrier 6' in the shape of a magnetic tape or a magnetic strip, which has a length, breadth and thickness corresponding to the dimensions of the recess 5', is applied to the recess 5'. The card 1' of the second

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embodiment according to the invention is suitable for use as a credit card, bank card or as a cash card.

The cards 1;1' according to the above embodiments are milled out from a sheet  
5 consisting of three layers of wood which are bound to each other so that a plywood structure is achieved. A biodegradable adhesive 7;7' is used as adhesive. Accordingly, the cards solely consist of biodegradable material: layers of wood and biodegradable adhesive. The fiber directions of the two outer layers 8,8';9,9' are orientated so that they coincide with the direction of the long side 2;2' of the card 1;1' while the inter-  
10 mediate layer 10;10' has a fiber direction which is essentially perpendicular to the fiber directions of the outer layers 8,8';9,9'. With this arrangement the card has a greater flexural rigidity in the longitudinal direction which is desirable with regard to the flexural loads which the card is subjected to during use. In order to achieve good strength characteristics in the card 1;1' it is important that the natural fiber structure of  
15 the wood is preserved, i.e. that the fibers are orientated in the plane of the layers so as to achieve an unbroken fiber structure.

In connection with the milling out of the card 1;1' from the sheet, a cavity 5;5', which will receive the information carrier 6,6', is also milled out. Subsequently the informa-  
20 tion carrier 6;6' is fixed into the milled out recess 5;5' by means of a biodegradable adhesive.

In association with the treatment of the card, a layer of paint or varnish in the form of a base print is placed over the whole or part of the surface or surfaces 4;4' of the card  
25 1;1', following which an image in one or more colours or a text is printed directly on the surface or surfaces 4;4' of the cards 1;1' and/or the parts which are coated with the base print. If the natural appearance and texture of the wood is to remain, the surface or surfaces 4;4' of the card 1;1' can be coated with a transparent varnish.

30 In order to obtain a good quality picture or text printed on the card 1;1', it is appropriate that the wood material consists of a type of wood with a tight fiber structure so

that a fine surface smoothness and a large surface density are obtained. This is the case of woods from broad-leaf trees. Woods from broad-leaf trees have also the properties that they do not absorb liquids as easily as woods from, for example, coniferous trees.

- 5 In the case that the information carrier 6;6' is made of a material which is not biodegradable, the information carrier 6;6' can be broken off or pressed out from the rear side of the card 1;1' so that the information carrier 6;6' is separated from the card 1;1' and can be handed in to an environmental station while the card 1;1' is thrown away and taken care of in the normal waste handling system.

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The invention is not limited to the embodiments shown and a plurality of variations are conceivable within the scope of the patent claims. Thus, it is conceivable to form a card made of wood with more or less than three layers. Furthermore, it is also possible to apply more than one information carrier onto a card. Instead of applying the  
15 information carrier in a cavity in the card, it is conceivable to fasten the information carrier directly to the surface of the card. It is also possible to imagine placing the information carrier between the outer layers of the card in a recess in the intermediate layer, whereat the information carrier is connected to contact surfaces on one or both of the outer layers or that information is transmitted or received wirelessly.

### Claims

1. Sheet-shaped card (1; 1') for at least one information carrier (6; 6'), for example a telephone card or a credit card, characterized in that the card (1; 1') comprises at least two layers (8, 9, 10; 8', 9', 10') of wood joined to each other, wherein each layer (8, 9, 10; 8', 9', 10') has a main fiber direction, and that the fiber directions of the layers (8, 9, 10; 8', 9', 10') are orientated in at least two different directions.
2. Card according to Claim 1, characterized in that the number of layers (8, 9, 10; 8', 9', 10') is three, that the fiber directions of the two outer layers (8, 9; 8', 9') correspond to the directions of a long side (2; 2') of the card (1; 1'), and that the intermediate layer (10; 10') has a fiber direction which is essentially perpendicular to the fiber directions of the outer layers (8, 9; 8', 9').
3. Card according to Claims 1 or 2, characterized in that the layers (8, 9, 10; 8', 9', 10') have essentially equally large thickness.
4. Card according to Claims 1 or 2, characterized in that the layers (8, 9, 10; 8', 9', 10') are joined to each other by a biodegradable adhesive (7; 7').
5. Card according to Claim 4, characterized in that the wood material consists of a wood from a broad-leaf tree.
6. Card according to Claim 1, characterized in that at least one cavity (5; 5') is arranged in one surface (4; 4') of the card (1; 1') and that the information carrier (6; 6') is applied in the cavity (5; 5').
7. Card according to Claim 6, characterized in that the cavity (5; 5') is placed centrally between two long sides (2; 2') of the card (1; 1') and in the vicinity of one short side (3; 3') of the card (1; 1') and that the depth of the cavity (5; 5') corresponds essentially to the thickness of the information carrier (6; 6').



8. Card according to Claim 6, characterized in that the cavity (5; 5') extends between two short sides (3; 3') of the card (1; 1') and is parallel with and in the vicinity of a long side (2; 2') of the card (1; 1') and that the size of the cavity (5; 5') corresponds with the size of the information carrier (6; 6').
9. Card according to Claim 7 or 8, characterized in that the information carrier (6; 6') consists of a microcircuit, a magnetic tape, a hologram, or a characteristic associated with an individual, and which can cooperate with an information reading and/or transmitting unit separate from the card (1; 1').
10. Card according to Claims 1-9, characterized in that at least one side of the card (1; 1') is provided with a layer forming a base print for colour printing.
11. Method for manufacturing a sheet-shaped card (1; 1') containing at least one information carrier (6; 6'), for example a telephone card or a credit card, characterized in that several cards (1; 1') are simultaneously made from a sheet of wood which comprises at least two layers (8, 9, 10; 8', 9', 10') of wood joined to each other, wherein each layer (8, 9, 10; 8', 9', 10') has a main fiber direction, and that the fiber directions of the layers (8, 9, 10; 8', 9', 10') are orientated in at least two different directions.
12. Method according to Claim 11, characterized in that the card (1; 1') is made through milling.
13. Method according to Claim 11, characterized in that the number of layers (8, 9, 10; 8', 9', 10') in the sheet is three, wherein the fiber directions of the two outer layers (8, 9; 8', 9') correspond to the direction of a long side (2; 2') of the card (1; 1') and wherein the intermediate layer (10; 10') has a fiber direction which is essentially perpendicular to the fiber directions of the outer layers (8, 9; 8', 9').

14. Method according to Claim 11 or 13, characterized in that the layers (8, 9, 10; 8', 9', 10') have essentially equal thicknesses.
15. Method according to Claim 11, characterized in that the layers (8, 9, 10; 8', 9', 10') are joined to each other with a biodegradable adhesive (7; 7').
16. Method according to Claim 11, characterized in that the wood material is a wood from a broad-leaf tree.
- 10 17. Method according to Claim 11, characterized in that at least one cavity (5; 5') is milled in a surface of the card and that the information carrier (6; 6') is applied to the cavity (5; 5').
- 15 18. Method according to Claim 17, characterized in that the cavity (5; 5') is milled out centrally between two long sides (2; 2') of the card (1; 1') and in the vicinity of one short side of the card (1; 1') and that the depth of the cavity (5; 5') essentially corresponds to the thickness of the information carrier (6; 6').
- 20 19. Method according to Claim 17, characterized in that the cavity (5; 5') extends between two short sides (3; 3') of the card (1; 1') and parallel to and in the vicinity of a long side (2; 2') of the card (1; 1') and that the dimensions of the cavity (5; 5') correspond with the dimensions of the information carrier (6; 6').
- 25 20. Method according to any of Claims 11-19, characterized in that the information carrier (6; 6') consists of a microcircuit, a magnetic tape, a hologram, or a characteristic associated with an individual and can cooperate with an information reader or transmitter unit separated from the card.
- 30 21. Method according to any of Claims 11-20, characterized in that at least one side of the card (1, 1') is equipped with a layer forming a base print for colour printing.

22. The use of a sheet-shaped card (1; 1') comprising at least two layers (8, 9, 10; 8', 9', 10') of wood joined to each other, wherein each layer (8, 9, 10; 8', 9', 10') has a main fiber direction and the fiber directions of the layers (8, 9, 10; 8', 9', 10') are orientated in at least two different directions, as a telephone card or a credit card in a telephone machine, a bank machine, or in some other apparatus which comprises a reading and/or registering means.

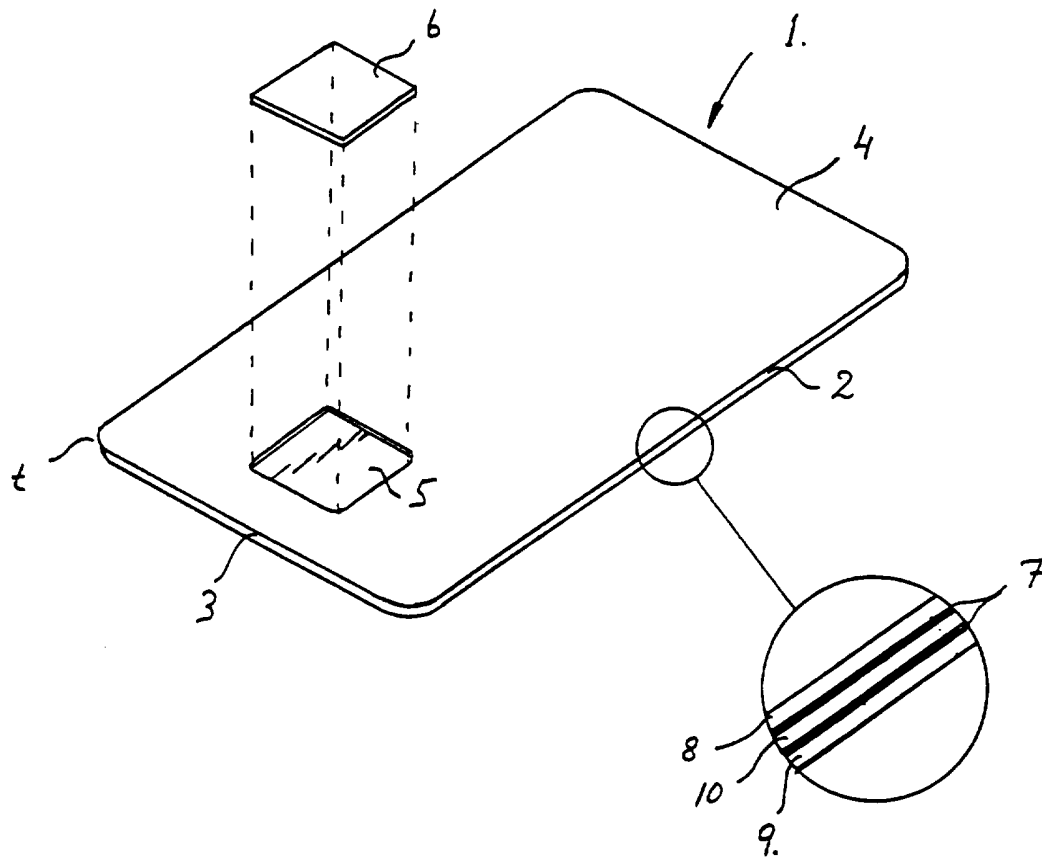


Fig. 1.

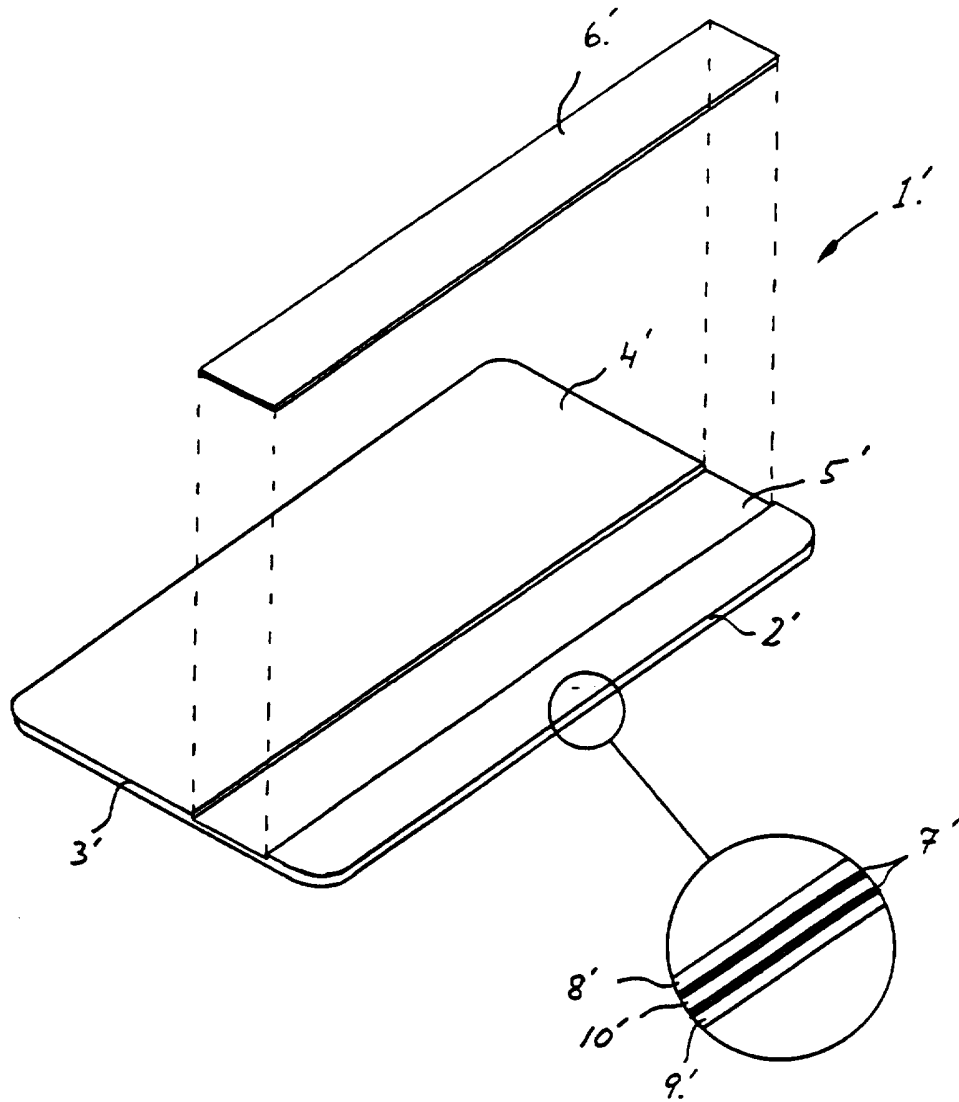


Fig. 2.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 96/00063

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G06K 19/02, B42D 15/10 // B42D 107:00, 109:00, 209:00  
 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)

IPC6: B42D, G06K

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

SE,DK,FI,NO classes as above

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

DIALOG 652, 653, 654

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X	US 4869532 A (YOSHIA ABE ET AL), 26 Sept 1989 (26.09.89), column 2, line 16 - line 22; column 5, line 58 - line 63, figures 1-3B, abstract	1-5,22
Y	column 2, line 16 - line 22; column 5, line 58 - line 63, figures 1-3B, abstract --	6-21
Y	US 5208450 A (MITSUAKI UENISHI ET AL), 4 May 1993 (04.05.93), column 8, line 13 - column 10, line 7, figures 1-8, abstract --	6-7,9-21
Y	US 4682017 A (YOSHIHIKO NAKAHARA ET AL), 21 July 1987 (21.07.87), column 1, line 37 - line 59, figures 4-5 --	6,8-9,17, 19-20

Further documents are listed in the continuation of Box C.

See patent family annex.

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PCT/SE 96/00063

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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Inform

patent family members

05/02/96

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