

Security layered construction

The present invention relates to a security layered construction for providing an ID page of an identification document or providing an
5 identification document having chip card format according to the preamble of Claim 1 or Claim 2. Furthermore, the present invention relates to an identification document for personal identification having a security layered construction of this type.

10 So-called contactless cards, which allow contactless access to a memory chip that forms a so-called transponder together with an antenna coil, have already been in use for some time and are preferably used in connection with automated access controls. Examples of these are access controls in the field of passenger transportation in the local service field
15 or even automated access controls on ski lift facilities.

Furthermore, using contactless cards of this type in the field of security-relevant access controls is also known, in order to allow only specific persons access to specific regions, for example.

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However, except for the above-mentioned fields of use, until now no general use of contactless cards or general contactless, electronically readable personal identification carriers is known, since a general universal usage is frequently-prevented by the absence of corresponding
25 infrastructure or peripheral equipment for detecting electronically stored data.

In addition, sometimes a lack of acceptance of electronic personal identification systems is recognizable, which may frequently be
30 attributed to an authenticity check of the personal identification carriers used not being possible without any problems.

From DE 100 32 128 A1 there is known a security element which, due to being disposed on the surface of a security paper, is to enable a forgery-proof document of value. In the known security element a wire conductor arranged on a transponder substrate is covered by an adhesive layer
5 which allows the security element to be disposed on the surface of the security paper. Claims 1 and 2 are delimited against this prior art document.

From DE 102 05 914 A1 there is known a method for manufacturing
10 polyester films with a transponder antenna coil, wherein the use of a polyester film of this type for manufacturing an IC card is discussed. For this purpose it is proposed to provide a conductor arrangement with a further outer cover layer, the conductor arrangement being contacted with a chip, being disposed on a transponder substrate and being covered
15 with a stabilizing film,.

DE 44 10 732 A1 discloses a method for producing a chip card, wherein a coil formed from a wire conductor is disposed on the surface of a transponder substrate and, following the contacting with a chip, is
20 covered by a cover layer.

From EP 0 745 955 A2 there is known a method for producing a chip card, wherein the chip disposed on the substrate is injection-moulded with a plastic material for sealing purposes.
25

DE 102 01 112 A1 discloses a method for manufacturing a chip card based on a laminated layered structure.

The present invention is based on the object of providing a security
30 layered construction that is used as an ID page or an identification document having chip card format and enables a merely small thickness with a plane-parallel design of the surfaces of the security layered

construction while receiving the chip in a hermetically sealed manner.

This object is achieved by a security layered construction having the features of Claim 1 or Claim 2.

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The security-layered construction according to the present invention allows the simple integration of a transponder, including a wire conductor used to implement a coil and a chip arrangement in contact therewith, into a layered construction which is especially suitable for use
10 as an ID page for an identification document or for use as an identification document having chip card format in that a viewing side of a cover layer or a viewing side of a binding cover layer arranged on each of the cover layers is provided with security printing.

15 The security layered construction for an identification document according to the present invention has a transponder layer and two cover layers, the transponder layer having a wire conductor positioned in one plane on a transponder substrate to implement at least one coil turn, which wire conductor contacts terminal areas of a chip arrangement. The
20 transponder substrate is made of a thermoplastic material, is received between the two cover layers and is covered to form a seal.

The combination according to the present invention of the security printing with the layered construction including the transponder provides
25 the possibility of performing an authenticity check, even without the aid of electronic data access means for access to the data stored on the chip arrangement, through a visual check of the security printing through conventional inspection of the security printing, or performing a check of the identification data using the suitable peripheral devices,
30 particularly a read device for detecting the personal identification data stored in the chip arrangement.

In addition, the security layered construction according to the present invention, through the arrangement of the transponder and the security printing in and/or on one and the same security layered construction, through the automatic assignment between the stored data on the chip arrangement and the security printing, allows the provision of a personal document which is as secure from forgery as possible. Thus, particularly because of the sealing cover of the transponder layer, which may for example be produced through a planar bonding of the cover layer to the transponder layer in a lamination or even gluing procedure, it is not possible to change the assignment between the security printing and the transponder without destroying the security layered construction. The afore-mentioned statement indicates that the term "sealing cover" means any cover which is to prevent direct access to the transponder and/or the chip arrangement.

Since the security printing according to the present invention is provided with person-specific identifying data, the security printing allows not only an authenticity check in regard to the authenticity of the document, but also the implementation of a dual identification system, which alternatively allows automatic detection of the data stored on the chip arrangement through a read procedure or detection of the identifying data included by the security printing through conventional inspection.

In accordance with the present invention the transponder substrate is made of a thermoplastic and is received between two cover layers made of a foamed plastic.

On the one hand the above-mentioned combination allows especially good adhesion of the layers to one another because of penetration of the thermoplastic material of the transponder substrate into the pores of the foamed plastic during a lamination procedure. On the other hand, in a subsequent method step to implement a book cover binding based on the

security layered construction, the cover layers may also be bonded to subsequent further layers through an adhesive bond, which is especially durable because of the porosity of the foamed plastic.

- 5 In accordance with the present invention the cover layer, positioned opposite a chip housing, has a window opening to at least partially receive the chip housing, so that the security layered construction is producible in the smallest possible thickness in spite of the supplementation of the transponder substrate with the cover layers.

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In a first alternative of the present invention according to Claim 1 the window opening of the cover layer according to the present invention is filled up with a partial region of the transponder substrate overlapping the chip housing in such a way that the partial region is flush with a top
15 of the cover layer.

- In a second alternative of the present invention according to Claim 2, for the secure hermetically sealed accommodation of the chip a seal layer is provided opposite the chip housing between the transponder substrate
20 and a cover layer, the window opening of the cover layer being filled up with a partial region of the seal layer overlapping the chip housing in such a way that the partial region is flush with a top of the cover layer.

- Both alternatives according to the invention independently of one
25 another enable a plane-parallel implementation of the surfaces of the security layered construction, which allows the application of extremely thin binding cover layers without the danger arising that the chip will stand out in the surface.

- 30 In a possible variation of the security layered construction, the wire conductor is positioned on the transponder substrate in such a way that the contact ends of the wire conductor provided for the contact with the

chip arrangement are guided off over the chip arrangement positioned in a substrate recess and are brought into contact with the terminal areas of the chip arrangement.

- 5 If the contact ends of the wire conductor run parallel to one another and transversely to a neighbouring wire conductor strand, an especially space-saving positioning of the transponder arrangement on the transponder substrate is possible. This is all the more true if a bridge region of one contact end runs over the neighbouring wire conductor
10 strand.

An especially durable bond between the wire conductor and the surface of the transponder substrate is provided if the wire circumference of the wire conductor is at least partially embedded in the surface of the
15 transponder substrate.

Particularly if the wire conductor is bonded to a transponder substrate made of a material which is essentially not plastically deformable, it is advantageous if the wire conductor is at least partially glued to the
20 surface of the transponder substrate.

High stability and tear resistance is achieved if the transponder substrate is produced using a polyimide or a polyimide derivative.

- 25 If the transponder substrate has a fabric structure, the stability and tear resistance in different directions is increased even further. In addition, a fabric structure may be sewed or glued especially durably to further layers. This is especially true for a nylon fabric.

- 30 A polyolefin foam is especially suitable for use for the cover layers. Paper-like material properties may be achieved in particular if a polyethylene foam having silicon dioxide as a filler is used.

Particularly with a multi-layered implementation of the transponder substrate and a positioning of the chip arrangement between the layers thus made possible, especially secure, hermetic sealing may be achieved.

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If the security layered construction has at least one cross-sectional reduction along a folding axis to define a book spine, folding over the two page regions of the security layered construction is possible, even with relatively stiff implementation of the security layered construction and/or the transponder substrate.

10

It is advantageous if the cover layers are provided with an inner and an outer binding cover layer to implement a book cover binding.

15 The identification document according to the present invention having a security layered construction of the type described above is implemented in one embodiment in the chip card format, i.e., like a so-called "chip card".

20 In a second embodiment, the identification document according to the present invention having a security layered construction in accordance with the type described above is provided with at least one ID page positioned in a book cover binding.

25 In the present case, it has been shown to be especially advantageous if the at least one ID page is provided with the security layered construction. Alternatively, it is possible to implement the book cover binding as multi-layered in such a way that the security layered construction is positioned between an inner and an outer binding cover layer.

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In the following, preferred exemplary embodiments of the method for

producing a security layered construction and/or exemplary embodiments for a security layered construction are described in greater detail with reference to the drawing.

- 5 Fig. 1 shows a panel sheet having two transponder substrates for producing ID pages of a personal document in a top view;
- 10 Fig. 2 shows a panel sheet having four transponder substrates for producing a document for personal identification in the chip card format;
- 15 Figs. 3a through 3c show the production of a security layered construction in a first exemplary embodiment;
- 20 Figs. 4a through 4c show the production of a security layered construction in a second exemplary embodiment;
- 25 Fig. 5 shows a panel sheet including two security layered constructions for implementing ID pages;
- Fig. 6 shows a panel sheet including four security layered constructions for implementing personal documents in the chip card format;
- 30 Fig. 7 shows a schematic illustration of the arrangement of a wire conductor using a

wire conductor laying device on a
transponder substrate;

5 Fig. 8 shows an enlarged cross-sectional
illustration of the cross-sectional region
marked in Fig. 7 using section line VIII-
VIII;

10 Fig. 9 shows a wire laying device for laying a wire
conductor using ultrasound;

Fig. 10 shows a partial sectional illustration along
section line X-X in Figs. 1 and 2;

15 Fig. 11 shows an alternative embodiment of a
transponder substrate to the illustration in
Figs. 1 and 2, having a substrate recess to
receive a chip arrangement;

20 Fig. 12 shows a partial sectional illustration of the
transponder substrate shown in Fig. 11 along
section line XII-XII with placement of the
chip arrangement in the substrate recess;

25 Fig. 13 shows an illustration of the transponder
substrate corresponding to Fig. 12 during the
contacting of the wire conductor with the
terminal areas of the chip arrangement.

30 Fig. 1 shows a panel sheet 20, which is divided by a folding axis 21 into
two page regions 22, 23, which may also be implemented unequally. Two
neighbouring double leaf blanks 24, 25 extend transversely to the folding

axis 21, each running from the left page region 22 into the right page region 23, having outlines 26 which are shown by the dashed line shape.

The two identically implemented double leaf blanks 24, 25, positioned
5 on both sides of a middle axis 80, are each implemented as a transponder substrate 27, which in each case is provided in the left page region 22 with a transponder unit 28. The transponder unit 28 includes a chip 29 and an antenna 30 in contact therewith, which is implemented in the exemplary embodiment shown as a wire antenna made from an antenna
10 wire 31 laid on the surface of the transponder substrate 27.

Fig. 2 shows a panel sheet 64, which is divided into four chip card
formats 66 in accordance with the outlines 65, which are shown by the dashed lines. Corresponding to the chip card formats 66, four
15 transponder substrates 67 are provided, each of which has a transponder unit 28. Each transponder unit 28 includes a chip arrangement 29 and an antenna 30 in contact therewith, which is implemented in the case of the exemplary embodiment shown as a wire antenna made of an antenna wire
31 laid on the surface of the transponder substrate 67.

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Fig. 3a shows a partial sectional view of the transponder substrate 27 or
67 along section line III-III shown in Figs. 1 and 2 during the arrangement of the transponder unit 28 on the transponder substrate 27 or 67. In the case of the method sequence shown in Figs. 3a through 3c,
25 the transponder substrates 27 or 67 implemented in the panel sheet 20 or 64 are closed, i.e., implemented as windowless, and the chip arrangement 29 is applied to the surface of the transponder substrate 27 or 67 to produce the transponder unit 28. Subsequently, the antenna wire 31 is laid in multiple antenna turns with subsequent contacting of wire ends
30 32, 33 of the antenna 30 with external contacts 34, 35 of the chip arrangement 29 to produce a transponder layer 81.

Subsequently, the panel sheet 20 or 64, made of a thermoplastic material, such as polycarbonate, polypropylene, PET, or a polyimide, having the transponder substrates 27 or 67 implemented therein, is covered on both sides with a panel sheet 36, 37 made of a foamed plastic, such as a
5 foamed polyethylene having silicon dioxide as a filler, which has paper-like properties. As may be seen from Figs. 3b and 3c, the panel sheet 36, which is used to implement a cover layer 38 on the transponder substrate 27 or 67, is provided with a closed surface, while in contrast the panel sheet 37, which is used to implement a cover layer 39 on the
10 diametrically opposing side of the transponder substrate 27 or 67, is provided with window openings 40. The layered construction shown in Fig. 3b is processed in a laminator (not shown here in greater detail) into a security layered construction 41 shown in Fig. 3c. During the lamination procedure, a protuberance 43, which is tailored to the shape
15 of a chip housing 42 of the chip arrangement 29 and projects into the window 40 of the cover layer 39, forms in the transponder substrate 27 or 67 because of the effect of temperature and pressure. Because of the effect of heat during the lamination procedure, the transponder substrate 27 or 67 is also softened on the surface, with the result that in boundary
20 layers 59 implemented between the transponder substrate 27 or 67 and the cover layers 38, 39, the thermoplastic material of the transponder substrate 27 or 67 penetrates into cavities of the cover layers 38, 39, produced from a porous, elastic plastic material, and after solidification, this leads to anchoring of the cover layers 38, 39 on the surface of the
25 transponder substrate 27 or 67. Because of the porous and elastic implementation of the plastic material of the cover layers 38, 39, regions of the transponder unit 28 projecting out of the plane of the transponder substrate 27 or 67, such as the antenna wire 31 and a chip carrier 44 of the chip 29 provided here, penetrate into the cover layer 38, causing
30 deformation of the cover layer 38, without standing out on a free contact surface 45 of the cover layer 38.

As Fig. 3c shows, the result of the lamination procedure is a security layered construction 41 having plane-parallel contact surfaces 45, 46.

5 In Figs. 4a through 4c, an alternative embodiment of the production of a security layered construction 47 is shown, elements corresponding in their embodiment in Figs. 4a through 4c with the elements in Figs. 3a through 3c being provided with corresponding identification numbers.

10 Fig. 4a shows a partial sectional illustration of a panel sheet 48 or 68, which, in contrast to the panel sheet 20 or 64, includes transponder substrates 49 or 69, each of which is provided with a window opening 50. The window opening 50 allows positioning of the chip arrangement 29 on the transponder substrate 49 or 69 with the chip housing 42 received countersunk in the window opening 50. After corresponding
15 application of the chip arrangement 29, the antenna wire 31 is laid in a way already described with reference to Fig. 3a for producing a transponder layer 82 to implement an antenna 30 contacting the chip arrangement 29 in external contacts 34, 35.

20 As shown in Fig. 4b, the transponder substrate 49 or 69 is subsequently covered on top with a panel sheet 36 made of the previously described porous, elastic plastic material. A panel sheet 50, including seal layers 51 assigned to each of the transponder substrates 49 or 69, which are made of a thermoplastic like the transponder substrate 49 or 69, is
25 positioned on the bottom of the transponder substrate 49 or 69. Subsequently, a panel sheet 37 made of the porous, elastic plastic material described above is applied to the panel sheet 50 having the seal layers 51.

30 The layered arrangement shown in Fig. 4b is subsequently processed in a laminator into a laminate, a protuberance 52 corresponding to the shape of the chip housing 42 now being implemented in the seal layers 51. The

protuberance 52 projects into the window opening 40 of the lower cover layer 39 in this case.

The result of the method sequence shown in Figs. 3a through 3c or
5 respectively Figs. 4a through 4c is, based on the panel sheet 20 shown in Fig. 1, a panel sheet 53 shown in Fig. 5 in laminate construction, including two security layered constructions 41 or 47 divided from one another by the middle axis 80 (Fig. 1), which are provided with transponder units 28. Corresponding to the double leaf blanks 24, 25,
10 each security layered construction 41 or 47 may be used to implement an ID page 60, 61 after isolating the double leaf blanks 24, 25. In the present case, a region of a viewing side 62 of the cover layer 38, which covers each of the transponder units 28, is provided with security printing 63 as an authenticity feature.

15 If the security layered constructions 41, 47 are to be integrated into a book cover binding, the bottom and top cover layers 38, 39 are each also provided with a binding cover layer (not shown here in greater detail), the security printing being positioned on a viewing side of a binding
20 cover layer in this case.

The result of the method sequence shown in Figs. 3a through 3c or
respectively Figs. 4a through 4c is, based on the panel sheet 64 shown in Fig. 2, a panel sheet 70, shown in Fig. 6 in laminate construction,
25 including four security layered constructions 41 or 47, which are provided with transponder units 28. Corresponding to the outlines 65 (Fig. 2), each security layered construction 41 or 47 may now be used to implement a personal document 71 in the chip card format after isolation. In the present case, a region of a viewing side 72 of the cover
30 layer 38, which covers each of the transponder units 28, is provided with security printing 73 as an authenticity feature.

Fig. 7 shows a schematic illustration of the laying of the antenna wire 31 on the transponder substrate 27, 67 using a wire conductor laying device 122, with ultrasound applied to it, having a wire guide 123.

- 5 The wire conductor laying device 122 illustrated in Fig. 7 is implemented as movable in three axes and has ultrasound applied to it, exciting the wire guide 123 to oscillating transverse movements (arrow 124), which are aligned perpendicularly to the laying plane 128 spanned by side edges 125, 126 of a substrate surface 127 in the example shown
10 in Fig. 7.

For laying, the antenna wire 31 is moved out of a wire guide nozzle 130 while performing a continuous advancing movement in the direction of the arrow 131, the wire guide 123 simultaneously executing a laying
15 movement 129 running parallel to the laying plane 128, which may be reconstructed in Fig. 7 from the shape of the wire conductor section already laid on the transponder substrate 27, 67. The oscillating transverse movement 124 is superimposed on this laying movement, which runs in the direction of the arrow 129 in the region of the forward
20 side edge 125. Resulting from this, there occurs in rapid succession, corresponding to the ultrasound frequency, an incidence or impact of the wire guide nozzle 130 on the antenna wire 31, which leads to compression and/or displacement of the substrate material in the region of a contact point 132.

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Fig. 8 shows the embedded arrangement of the antenna wire 31 in the transponder substrate 27, 67 in a sectional illustration which approximately corresponds to the section line VIII-VIII indicated in Fig. 7. The substrate illustrated here may also be a PVC film, this film having
30 an ultrasound power of 50 W and an ultrasound frequency of 40 kHz, for example, applied to it via the wire conductor laying device 122 to embed the antenna wire 31. The pressure force using which the wire guide

nozzle 130 is pressed against the substrate surface 127 may be in the range between 100 and 500 N for the above-mentioned substrate material. As may be seen from the illustration shown in Fig. 8, in an experiment which was performed, the antenna wire 31 was essentially
5 embedded in the transponder substrate 27, 67 on the basis of a compression of the substrate material in a compression region 133 of the substrate material, implemented here in the shape of a crescent moon, by setting the above-mentioned parameters.

10 Fig. 9 shows the wire conductor laying device 122 in a single illustration having an ultrasound emitter 134, which is positioned coaxially to the wire guide 123 and is connected rigidly thereto in a connection region 135. The wire conductor laying device 122 shown in Fig. 9 is implemented as rotationally symmetric overall. The wire guide 123 has a
15 central longitudinal hole 136, which changes into a wire capillary 137 in the region of the wire guide nozzle 130, having a diameter, tailored to the diameter of the antenna wire 31, that is narrower than that of the longitudinal hole 136. The wire guide capillary 137 is used primarily for the purpose of being able to align the antenna wire 31 precisely in the
20 laying plane 128 (Fig. 7).

In the exemplary embodiment shown in Fig. 9, two wire supply channels 138, 139, which run diagonally downward in the direction toward the wire guide nozzle 130, are positioned laterally on the wire guide 123
25 above the wire guide nozzle, discharging into the longitudinal hole 136. The wire supply channels 138, 139 are used for lateral introduction of the antenna wire 31 into the wire guide 123, so that the antenna wire 31, shown in Fig. 9, runs laterally diagonally into the wire supply channel 138, through the longitudinal hole 136, and is guided out of the wire
30 guiding capillary 137 through the wire guide 123. In this case, the arrangement of multiple wire supply channels 138, 139 permits the selection of the particular most favourable wire supply side on the wire

guide 123.

As may also be seen from Fig. 9, the wire guide nozzle 130 is implemented as convex in the region of a wire outlet opening 140, in order to allow the most careful possible deflection for the antenna wire 31 in the region of the contact point 132 (Fig. 7) or the wire outlet opening 140 during the laying procedure shown in Fig. 7.

Although it is not shown in greater detail in Fig. 9, the wire guide 123 may be provided with a wire cutting device and a wire advancing device. In this case, the wire cutting device may be integrated directly into the wire guide nozzle 130.

Fig. 10 shows a partial sectional illustration of the region of the antenna wire 31 shown in Figs. 1 and 2 running over the chip arrangement 29.

Fig. 11 shows the wire ends 32 and 33 of an antenna 30, which is positioned on a transponder substrate 155 having a substrate recess 156 to receive a chip arrangement 158 (Fig. 12). In order to be able to guide the wire ends 32, 33 off over the substrate recess 156, similarly as in the region of the chip arrangement 29 in the exemplary embodiment shown in Fig. 10, the application of ultrasound to the antenna wire 31 is interrupted in the region of the substrate recess 156.

As may be seen further from Fig. 11 and, in addition, also from Figs. 1 and 2, the contact ends (32, 33) run parallel to one another and transversely to a neighbouring wire conductor strand (163), a bridge region (164) of the contact end (33) running over the neighbouring wire conductor strand (163).

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Fig. 12 shows, in a view of the transponder substrate 155 corresponding to the section line XII-XII in Fig. 11, the placement of the chip

arrangement 158 in the substrate recess 156, in which the terminal areas 159 of the chip arrangement 158 are applied to the wire ends 32 and 33.

5 Fig. 13 shows the subsequent bonding of the terminal areas 159 of the chip unit 158 to the wire ends 32 and 33 using a thermode 160, which provides a material bond between the antenna wire 31 and the terminal areas 159 under the effect of pressure and temperature.

10 Furthermore, it is clear from Figs. 12 and 13 that the substrate recess 156 is dimensioned in such a way that it essentially receives the chip arrangement 158. To simplify the alignment of the terminal areas 159 of the chip arrangement 158 during the placement of the chip unit 158 preceding the actual contacting, the chip unit 158 may be provided on its contact side 161 having the terminal areas 159 with an alignment aid 162, implemented here as web-like. The alignment aid 162 is 15 dimensioned corresponding to the spacing a (Fig. 11), which the wire ends 32, 33 have from one another in the region of the substrate recess 156.

CLAIMS

1. A security layered construction (41) for providing an ID page of an identification document or providing an identification document having chip card format, the security layered construction having a transponder layer (81), the transponder layer having a chip arrangement (29, 158) arranged on a transponder substrate (27, 67) and a wire conductor (31) positioned in one plane on the transponder substrate to implement at least one coil turn, which wire conductor is in contact with terminal areas (34, 35, 159) of the chip arrangement (29, 158) in order to form a transponder unit (28), the transponder substrate (27, 67) being made of a thermoplastic and being received between a first cover layer (39) positioned opposite a chip housing (42) of the chip arrangement (29) and a second cover layer (38), and the transponder layer being covered using the cover layers to form a seal, a viewing side (62, 72) of the first or second cover layer or a viewing side of a binding cover layer arranged on each of the cover layers being provided with security printing (63, 73) having person-specific identifying data.
characterized in that
the cover layers (38, 39) are made of a foamed plastic and the first cover layer (39) has a window opening (40) to at least partially receive the chip housing, the window opening (40) being filled up with a partial region of the transponder substrate (27, 67) overlapping the chip housing (42) in such a way that the partial region is flush with a top of the first cover layer (39).

2. A security layered construction (47) for providing an ID page of an identification document or providing an identification document having chip card format, the security layered construction having a transponder layer (82), the transponder layer having a chip arrangement (29, 158) arranged on a transponder substrate (49, 69) and a wire conductor (31) positioned in one plane on the transponder substrate to implement at least one coil turn, which wire conductor is in contact with terminal areas (34, 35, 159) of the chip arrangement (29, 158) in order to form a transponder unit (28), the transponder substrate (27, 67) being made of a thermoplastic and being received between a first cover layer (39) positioned opposite a chip housing (42) of the chip arrangement (29) and a second cover layer (38), and the transponder layer being covered using the cover layers to form a seal, a viewing side (62, 72) of the first or second cover layer or a viewing side of a binding cover layer arranged on each of the cover layers being provided with security printing (63, 73) having person-specific identifying data.
- characterized in that
- the cover layers (38, 39) are made of a foamed plastic, the first cover layer (39) has a window opening (40) to at least partially receive the chip housing, and a seal layer (51) is provided opposite the chip housing (42) between the transponder substrate (49, 69) and the cover layer (39), the window opening (40) being filled up with a partial region of the seal layer (51) overlapping the chip housing (42) in such a way that the partial region is flush with a top of the first cover layer (39).

3. The security layered construction according to one of the preceding Claims,
characterized in that
the wire conductor (31) is positioned on the transponder substrate
5 (155) in such a way that the contact ends (32, 33) of the wire
conductor provided for the contact with the chip arrangement (158)
are guided off over the chip arrangement (158) positioned in a
substrate recess (156) and are in contact with the terminal areas
(159) of the chip arrangement.
- 10 4. The security layered construction according to one of the preceding
Claims,
characterized in that
the contact ends (32, 33) run parallel to one another and transversely
to a neighbouring wire conductor strand (163).
- 15 5. The security layered construction according to Claim 4,
characterized in that
a bridge region (164) of one contact end (33) runs over the
neighbouring wire conductor strand (163).
- 20 6. The security layered construction according to one of the preceding
Claims,
characterized in that
the wire circumference of the wire conductor (31) is at least partially
embedded in the surface (127) of the transponder substrate (27, 67).
- 25 7. The security layered construction according to one of Claims 1
through 5,
characterized in that
at least some sections of the wire conductor are glued to the surface
of the transponder substrate.

8. The security layered construction according to one of the preceding Claims,
characterized in that
the transponder substrate (27, 67, 49, 69) is produced using a
5 polyimide or a polyimide derivative.
9. The security layered construction according to one of the preceding Claims,
characterized in that
the transponder substrate has a fabric structure.
- 10 10. The security layered construction according to Claim 9,
characterized in that
the fabric structure has a nylon fabric.
11. The security layered construction according to one of the preceding Claims,
15 characterized in that
at least the first or second cover layer (38, 39) has a polyolefin foam.
12. The security layered construction according to Claim 11,
characterized in that
at least the first or second cover layer (38, 39) has a polyethylene
20 foam.
13. The security layered construction according to Claim 12,
characterized in that
the polyethylene foam has silicon dioxide as a filler.

14. The security layered construction according to one of the preceding Claims,
characterized in that
the transponder substrate is implemented as multi-layered.
- 5 15. The security layered construction according to one of the preceding Claims,
characterized in that
the security layered construction (41, 47) has at least one reduction
in cross-section to define a folding edge along a folding axis (21).
- 10 16. The security layered construction according to one of the preceding Claims,
characterized in that
the cover layers (38, 39) of the security layered construction (41, 47)
are provided with an inner and an outer binding cover layer to
15 implement a book cover binding.
17. An identification document for personal identification, having a
security layered construction according to one of Claims 1 through
16,
characterized by
20 an embodiment in the chip card format (66).
18. An identification document for personal identification, having a
security layered construction according to one of Claims 1 through
16,
characterized by
25 an embodiment having at least one ID page (60, 61) positioned in a
book cover binding.

19. The identification document according to Claim 18,
characterized in that
the at least one ID page (60, 61) is provided with the security layered
construction (41, 47).
- 5 20. The identification document according to Claim 18,
characterized in that
the book cover binding is implemented as multi-layered and the
security layered construction is positioned between an inner and an
outer binding cover layer.