(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 363 297 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.09.2011 Bulletin 2011/36

(51) Int Cl.:
B42D 15/00 *(2006.01)*

(21) Application number: **11156603.0**

(22) Date of filing: **04.10.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SK TR

(30) Priority: **17.07.2002 IT MI20021575**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
02777289.6 / 1 521 678

(71) Applicant: **Fabriano Securities S.r.l.**
20021 Ospiate di Bollate, MI (IT)

(72) Inventor: **Lazzerini, Maurizio**
20070, Cerro al Lambro (IT)

(74) Representative: **TBK**
Bavariaring 4-6
80336 München (DE)

Remarks:
This application was filed on 02-03-2011 as a divisional application to the application mentioned under INID code 62.

(54) **Security element for documents, bank notes, security paper and the like**

(57) A security element (10; 20; 30) for documents, bank notes, security paper and the like comprises a continuos supporting layer (31) on which there is at least one metallized layer (12; 22; 32) which forms at least one high-reflectance region (12; 22; 32). A layer of print (13; 24; 35) forming a low-reflectance region (13; 24; 35) is formed in another region than the metallized layer (12; 22; 32), in order to have, when the security element (10; 20; 30) is at least partially inserted in a document and the like, a different dimensional perception of the security element (10; 20; 30) when viewed under reflected light and when viewed against the light.

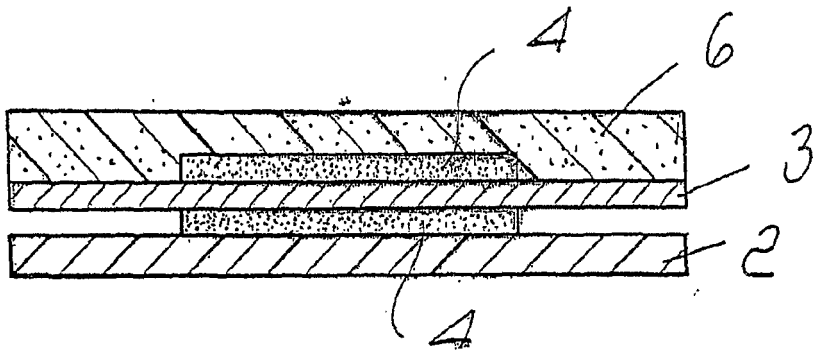


Fig. 4

EP 2 363 297 A2

Description

DESCRIPTION

[0001] The present invention relates to a security element for documents, bank note, security paper and the like.

[0002] As is known, security elements for documents, bank notes, security-paper and the like have been produced by using threads which, generally speaking, are constituted by a substrate made of clear plastic on which metallic layers, magnetic layers, microprinted layers, fluorescent layers magnetic codes combined with metallization technique and so forth have been applied, so as to provide the most disparate kinds of security element.

[0003] The threads thus provided are inserted in the paper fully or partially, in that the thread protrudes on the surface of the paper at discrete portions and is fully embedded in the paper in the remaining portions.

[0004] The current trend has been to provide security elements that would allow the public to perform easy and-straightforward verification, and for this purpose threads have been provided in which demetallized regions were provided on the metallized layer and could, for example, form lettering or the like, so as to allow the public to check the lettering; said threads, provided by means of a metallic surface that can also be of the high-reflectance .type, have the characteristic that once inserted in the document they are not visible under reflected light but are visible when held up to the light, i.e., by placing the document between a light source and the person who must perform the verification.

[0005] However, these kinds of solution have several drawbacks, the first one being the fact that the threads currently used allow lettering or characters that are approximately 0,8 mm high and are therefore not easily visible to users.

[0006] The aim of the invention is to solve the problems noted above by providing a security element for documents, bank notes, security paper and the like that allows to provide the user, i.e., the public with the possibility to immediately perceive the presence of the security element in the document together will a criterion that allows to assess its authenticity.

[0007] Within the scope of this aim, a particular object of the invention is to provide a security element that allows to use various combinations of methods that are already commercially, available, obtaining a particular combination of effecfs.

[0008] Another object of the present invention is to provide a security element that by virtue of its particular constructive characteristics is capable of giving the greatest assurances of reliability and safety in use.

[0009] Another object of the present invention is to provides a security element for documents, bank notes, security paper and the like that can be obtained easily starting from commonly commercially available elements and materials and is furthermore competitive from a purely economic standpoint.

[0010] This aim, these objects and others that will become better apparent hereinafter are achieved by a security elements for documents, bank notes, security paper and the like, according to the invention, characterized in that it comprises a continuous supporting layer on which there is at least one metallized layer that forms at least one high-reflectance region that is flanked, on at least one face, by at least one low-reflectance region in order to have, when the security element is at least partially inserted in a document and the like, a different dimensional perception of the security element when viewed under reflected light and when viewed against the light.

[0011] Further characteristics and advantage will become apparent from the description of a preferred but not exclusive embodiment of a security clement for documents, bank notes, security paper and the like; illustrated only by way of non-limitative example with the aid of the accompanying drawings, wherein:

Figure 1 is a schematic view of a document and the like provided with the security element according to the invention, viewed under reflected light;

Figures 2 is a document and the like With the security element according to the invention, viewed against the light;

Figure 3 is a view of a first embodiment of a security element according to the invention;

Figure 4 is a schematic view of an arrangement of layers, taken along the plane IV-IV of Figure 3;

Figure 5 is a view of a security element with markings and characters perceivable in negative form;

Figure 6 is a schematic view of an arrangement of layers, taken along the plane VI-VI of Figure 5;

Figure 7 is a view of another embodiment with holographic regions

Figure 8 is a schematic view of an arrangement of layers, taken along the plane VIII-VIII of Figure 7;

Figure 9 is a view of another embodiment of the security element with magnetic portions;

Figure 10 is a schematic view of an arrangement of slayers, taken along the plane X-X of Figure 9;

Figure 11 is a schematic view of an arrangement of layers, taken along the plane XI-XI of Figure 9.

[0012] With reference to the cited figures, the security element for documents, bank notes, security paper and the like, according to the invention, is provided so as to be able to perceive immediately its presence inside a document, without thereby requiring particular visual acuity.

[0013] In particular, the security element according to me invention, once inserted in a document, bank note, security card or the like, has the particular characteristic of providing a different dimensional perception when viewed under reflected light and when viewed against the light.

[0014] Considering the first embodiment, shown in Figures 3 and 4, a security. element, generally designated by the reference numeral 1, is provided which has a supporting layer 2 that is advantageously formed by a thread or ribbon of plastic such as polyester, polypropylene, polycarbonate and the like and advantageously but not necessarily has a thickness between 8 and 206 μm, preferably between 15 and 23 μm. The security element thus provided is preset to be inserted in the paper both according to, the method that provides for full insertion in the paper and according to the method that provides for insertion by segments or windows. A metallized layer 3 is provided on the supporting layer 2, can be made of various materials and has die particularity of having a high reflectance, which is preferable than, or equal to, 1.2 Optical Density.

[0015] Said high-reflectance metallized layer can be obtained by means of various materials; such as aluminum, chromium, nickel or other metals or combinations of metals or by deposition of alloys.

[0016] As shown in Figures 3 and 4, on both faces of the metalized layer 3, which in practice forms a high-renectance region, there is a low-reflectance region that is advantageously constituted by a layer of print 4 applied by rotogravure, screen printing, offset printing or the like or by deposition and transfer of ribbons, lacquers, or in any case any method capable of providing a region that has a different reflectance and more specifically a certain. degree of opacity capable of absorbing light rays.

[0017] The layers 4 can be provided on both faces of the metallized layer or optionally on a single face.

[0018] The assembly is furthermore complected by providing a hot-melt adhesive layer 6, which facilitates the anchoring of the security element when it is inserted in the paper of the document and the like.

[0019] In the specific case, the printed layer affects the central region, while the metallized layer forms two high-reflectance regions at the longitudinal edges of the supporting layer

[0020] With this type of security element, when using a security element that has a supporting layer for example 4 mm wide, it is possible to provide a central printed region of 2 mm, which in practice delimits two high-reflectance bands of 1 mm at each edge.

[0021] By inserting this security element in the document under reflected light the user easily perceives the presence of an element whose width is defined by the printed region, i.e., by the central low-reflectance or high-opacity region.

[0022] When viewing the document against the light, instep one has a completely different dimensional perception, since the thread appears with its full width, which in the specific example is 4 mm.

[0023] By providing the printed layer on only one face, it is possible to have on one face a variation in dimensional perception under reflected light and against the light and to not see, on the opposite face, under reflected light, the presence of the ribbon, which is instead visible against the light.

[0024] With reference to Figures 5 and 6, it is possible to provide a security element, generally designated by the reference numeral 10, which has a supporting layer 11 again made of plastic, of the optically transparent type, on which there is a metallized, layer 1.2 that is subjected centrally or in another area thereof to demetallization, so as to producer region that can be affected by the printing 13, so that it is possible to obtain the high-reflectance region at the metallized layer that remains after demetallization and the low-reflectance region at the printed region.

[0025] In the printed region it is possible to provide characters, distinctive markings or the like 15, obtained in negative form, so that in addition to having a dimensional difference under reflected light and against the light, as in the preceding case, it is possible to have lettering revealed.

[0026] The lettering can also be provided on a continuous metallized layer, so that they are visible in reflected light, and these application can be provided on one face or on both faces.

[0027] It should be added to the above that in order to provide banded regions or the like with the presence of metal, for example alternated with printed regions, it is possible to use various known technologies, such as selective metallization with banded selective deposition by using special-anti-adhesion oils or by means of selective masks, or to provide the longitudinal, bands where printing is provided by demetallization of a preceding metallization. layer that is protected in the regions where it must persist by virtue of the deposition of protective lacquers that cannot be attacked by the acids used for demetallization.

[0028] As is evident it is possible to perform a whole range of combinations of elements always by utilizing the adjacent arrangement of a high-reflectance region and of a low-reflectance region, thus obtaining perceptual variations between the viewing of the document that contains the security element under reflected light and against the light

[0029] The security elements described above are preferably used fully inserted in the document.

[0030] If one uses the method of insertion by segments, it is possible to increase the security criteria by using a thread for example of the type shown in Figures 7 and 8.

[0031] In this case, the thread, generally designated by the reference numeral 20, is provided with A supporting layer 21 on which there is a high-reflectance region provided by metallized layers 21 made of various kinds of metal, on which a holographic lacquer 23 is applied. In this manner it is possible to combine the perception of the different dimensions for the portion that remains inserted in the document with a holographic viewing of the portions that remain externally.

[0032] It is optionally possible to provide, on the printed region that constitutes the low-reflectance region, desig-

nated by the reference numeral 24, characters 25 in negative form.

[0033] Advantageously, there is a protective layer 26 made of plastic, which protects the holographically treated surface.

[0034] Furthermore, the holographic surfaces, constituted for example by two bands, can be provided in mutually different manners.

[0035] It is also possible to apply to the metallized regions 22 a sequence of materials such as aluminium magnesium sulfide and chromium, which when struck by light emit most colors between 400 and 800 nanometers in the visual spectrum while maintaining a very high degree of reflection in-this manner it is possible to provide a security element that allows to provide a variety of elements that are easy to interpret and can allow to identify the validity of the document in which the thread is inserted.

[0036] It should be added to the above that in order to vary the color characteristics it is possible to provide a layer, of fluorescent or phosphorescent or iridescent material.

[0037] For the sake of completeness in description, it should also be added-that-on the security element 20 there are the usual adhesive and hot melt adhesive layers for connection and embedding, generally designated by the reference numeral 27.

[0038] According to what is shown in Figures 9 to 11, a security element, generally designated by the reference numeral 30 is provided which has a supporting layer 31 provided with metalized bands' or portions 32, optionally covered by holographic lacquer 33, which are arranged externally with respect to a low-reflectance printed region 35.

[0039] The printed region, if evaluated in a longitudinal direction, has advantageously an alternation of markings and characters 36 that are visible in negative form, with regions affected by magnetic elements 37 that are protected by a covering layer 38 on the face that lies opposite the one provided with the printed layer, which allow to provide a code that can be detected by a machine.

[0040] In this manner it is therefore possible to have, in the low-reflectance region, graphic markings that are visible in negative form and are alternated with regions where a magnetic code is provided.

[0041] With the solutions described above, which can be combined in various manners, a thread or ribbon 4 mm wide, which has from the edge a region of 1 mm of high-reflectance material and at the center a 2 mm region with low reflectance and negative letters, has on the other edge 1 mm of high-reflectance material.

[0042] In these conditions, if the bank note is viewed in reflected light, on both faces one notices the presence of a thread that is 2 mm wide; people with excellent eyesight might also detect the graphic markings or texts provided in the low-reflectance region.

[0043] By transferring the bank note or document from reflected light to backlit conditions, the dimensional difference become immediately evident, since the width changes from 2 to 4 mm and moreover the graphic markings or texts are particularly evident.

[0044] If the thread is inserted in the paper with the' technique of insertion by segments, one has regions where the thread is fully inserted and regions in which the thread is on the outer face of the document

[0045] By viewing the bank note in reflected light, on the face where the thread is fully covered one notices the presence of a thread that is 2 mm wide; when the bank note is viewed on the other face, where the thread is inserted by segments., between full insertion and non-insertion, one can see a 2-mm thread when it is covered by the paper, i.e., inserted, and a 4-mm thread when it is not covered by the paper or not inserted; in these positions one can see all the effects produced by any optional holographic method or other color changing method.

[0046] By moving the bank note from reflected light to backlit conditions and viewing the face in which the thread is fully inserted, one experiences a width variation from 2 to 4 mm, while by viewing the thread on the opposite face one sees an image with the same width but with an alternation of colors effects in register, following the pattern of the thread, which is covered or exposed.

[0047] In the execution of the thread it is preferable to use a supporting layer with a thickness of 15 to 23 μm, on which the metallized layer, preferably aluminum, is deposited and is applied selectively or demetallized in the regions where the printed layer is provided.

[0048] The aluminum is then printed, if the hologram is present, with a holographic lacquer and conventional embossing is performed.

[0049] Then the central region is printed by virtue of a known method.

[0050] It is optionally also possible, to print immediately the holographic lacquer onto clear polyester emboss it and then proceed with the step for selective metallization or demetallization by virtue of a known method; then the central region is printed as described earlier.

[0051] It is thus evident from what has been described above that the invention achieves the intended aim and objects, and in particular the fact is stressed that a security element for documents, bank notes, security paper and the like is provided which is extremely versatile and allows to provide a new kind of security document that provides a perceivable dimensional, variation between reflected light and backlit conditions.

[0052] It should be added to the above that in the examples of embodiment provided, the individual characteristics presented in relation to specific examples may actually be interchanged with other different characteristics that occur in other examples of embodiment,

[0053] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be deleted from the claims.

[0054] The invention thus conceived is susceptible of numerous modifications and variations, all of which are

within the scope of the- inventive concept,

[0055] All the details may furthermore be replaced with various technically equivalent elements.

[0056] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0057] In particular the low-reflectance region of the security element according to the present invention may comprise an ink. Preferably, the low-reflectance region comprises a non-metallic ink.

[0058] The invention can be modified in that the aluminium is printed, if the hologram is present, by a casting process instead of the embossing process.

[0059] Instead of aluminium, a noble metal, aluminium, chromium, copper, nickel or a combination thereof can be used. Preferably, the noble metal is gold.

[0060] At said low-reflectance region, graphic markings can be printed not only in negative form, but they can also be printed in positive form or in both forms so as to be perceivable against the light.

[0061] A security element for documents, bank notes, security paper and the like, which has the particularity that it comprises a continuous supporting layer on which there is at least one metallized layer that forms at least one high-reflectance region that is flanked, on at least one face, by at least one low-reflectance region in order to have, when the security element is at least partially inserted in a document and the like, a different dimensional perception of the security element when viewed under reflected light and when viewed against the light.

[0062] This application is a divisional application of European patent application no. 02 777 289.6 (the "parent application"), also published under no. EP-A-1 521 678. The following items corresponding to the originally filed claims of the parent application form part of the content of this description as filed.

1. A security element (1; 10; 20; 30) for documents, bank notes, security paper and the like, characterized in that it comprises a continuos supporting layer (2; 11; 21; 31) on which there is at least one metallized layer (3; 12; 22; 32) that forms at least one high-reflectance region that is flanked, on at least one face, by at least one low-reflectance region (4; 13; 24) in order to have, when the security element (1; 10; 20; 30) is at least partially inserted in a document and the like, a different dimensional perception of the security element (1; 10; 20; 30) when viewed under reflected light and when viewed against the light.

2. The security element (1; 10; 20; 30) according to item 1, characterized in that said high-reflectance region has a reflectance that is equal to, or greater than, 1.2 Optical Density.

3. The security element (1; 10; 20; 30) according to one or more of the preceding items wherein said metallized layer (3; 12; 22; 32) is made of a noble metal, aluminium, chromium, copper, nickel or a combination thereof.

4. The security element (1; 10; 20; 30) according to item 3, wherein the noble metal is gold.

5. The security element (1; 10; 20; 30) according to one or more of the preceding items wherein said metallized layer (3; 12; 22; 32) is subjected to an embossing or a casting process.

6. The security element (1;10; 20; 30) according to one or more of the preceding items, wherein said metallized layer (3; 12; 22; 32) is made of metal alloys deposited in vacuum.

7. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said low-reflectance region (4; 13; 24) is constituted by a layer of print (4; 13; 24) applied to at least one face of said metallized layer (3; 12; 22; 32).

8. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises a layer of print (4; 13; 24) on both faces of said metallized layer (3; 12; 22; 32).

9. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said low-reflectance layer (4; 13; 24) is formed in a region that does not have a metallized layer (3; 12; 22; 32).

10. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises said low-reflectance layer (4; 13; 24) in a central region that is longitudinally flanked on both edges by a high-reflectance layer.

11. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises, at said low-reflectance region (4; 13; 24), graphic markings (15; 25) printed in negative and/or positive form and perceivable against the light.

12. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises, on said high-reflectance region, graphic markings and the like printed with low-reflectance in order to be perceivable in reflected light.

13. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said security element (1; 10; 20; 30;) is fully Inserted in said document and the like.

14. The security element (1; 10; 20; 30) according to one or more of the preceding items, characterized in that said security element (1; 10; 20; 30) is inserted by segments in said document and the like.

15. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises a holographic lacquer (23; 33) on said high-reflectance region.

16. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises, on said metallized layer (3; 12; 22; 32), materials suitable to allow the emission of various colors.

17. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said materials comprise aluminium, magnesium sulfide and chromium.

18. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises a layer of fluorescent or phosphorescent or iridescent material.

19. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that it comprises magnetic elements (37) in said low-reflectance region (4; 13; 24).

20. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said magnetic elements (37) form a code that can be detected by a machine.

21. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said magnetic elements (37) are interleaved with portions provided with negative graphic markings.

22. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said low-reflectance.region (4; 13; 24) comprises ink and preferably non-metallic ink.

23. The security element (1; 10; 20; 30) according to one or more of the preceding items characterized in that said low-reflectance region (4; 13; 24) is applied by rotogravure, screen printing, offset printing or by deposition and transfer of ribbons or lacquers.

24. A document, banknote, security card and the like, characterized in that comprises a security element (1; 10; 20; 30) according to the preceding items fully inserted internally.

25. A document, banknote, security card and the like, characterized in that it comprises a security element (1; 10; 20; 30) according to the preceding items inserted by segments.

Claims

1. A security element (10; 20; 30) for documents, bank notes, security paper and the like, comprises a continuos supporting layer (31) on which there is at least one metallized layer (12; 22; 32) which forms at least one high-reflectance region (12; 22; 32), **characterized in that** a layer of print (13; 24; 35) forming a low-reflectance region (13; 24; 35) is formed in another region than the metallized layer (12; 22; 32), in order to have, when the security element (10; 20; 30) is at least partially inserted in a document and the like, a different dimensional perception of the security element (10; 20; 30) when viewed under reflected light and when viewed against the light.

2. The security element (10; 20; 30) according to claim 1, **characterized in that** said high-reflectance region has a reflectance that is equal to, or greater than, 1.2 Optical Density.

3. The security element (10; 20; 30) according to one or more of the preceding claims, wherein said metallized layer (12; 22; 32) is made of a noble metal, aluminium, chromium, copper, nickel or a combination thereof.

4. The security element (10; 20; 30) according to claim 3, wherein the noble metal is gold.

5. The security element (10; 20; 30) according to one or more of the preceding claims, wherein said metallized layer (12; 22; 32) is subjected to an embossing or a casting process.

6. The security element (10; 20; 30) according to one or more of the preceding claims, wherein said metallized layer (12; 22; 32) is made of metal alloys deposited in vacuum.

7. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** it comprises said low-reflectance region (13; 24; 35) in a central region that is longitudinally flanked on both edges by a high-reflectance layer.

8. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** it comprises, at said low-reflectance region (13; 24; 35), graphic markings (15; 25) printed in negative and/or positive form and perceivable against the light

and/or **in that** it comprises, on said high-reflectance region (12; 22; 32), graphic markings and the like printed with low-reflectance in order to be perceivable in reflected light.

9. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** it comprises a holographic lacquer (23; 33) on said high-reflectance region (12; 22; 32).

10. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** it comprises, on said metallized layer (12; 22; 32), materials suitable to allow the emission of various colors.

11. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** said materials comprise aluminium, magnesium sulfide and chromium.

12. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** it comprises a layer of fluorescent or phosphorescent or iridescent material and/or **in that** it comprises magnetic elements (37) in said low-reflectance region (13; 24; 35).

13. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** said magnetic elements (37) form a code that can be detected by a machine and/or **in that** said magnetic elements (37) are interleaved with portions provided with negative graphic markings.

14. The security element (10; 20; 30) according to one or more of the preceding claims, **characterized in that** said low-reflectance region (13; 24; 35) comprises ink and preferably non-metallic ink and/or **in that** said low-reflectance region (13; 24; 35) is applied by rotogravure, screen printing, offset printing or by deposition and transfer of ribbons or lacquers.

15. A document, banknote, security card and the like, **characterized in that** it comprises a security element (10; 20; 30) according to any of the preceding claims, the security element (10; 20; 30) being fully inserted internally or being inserted by segments.

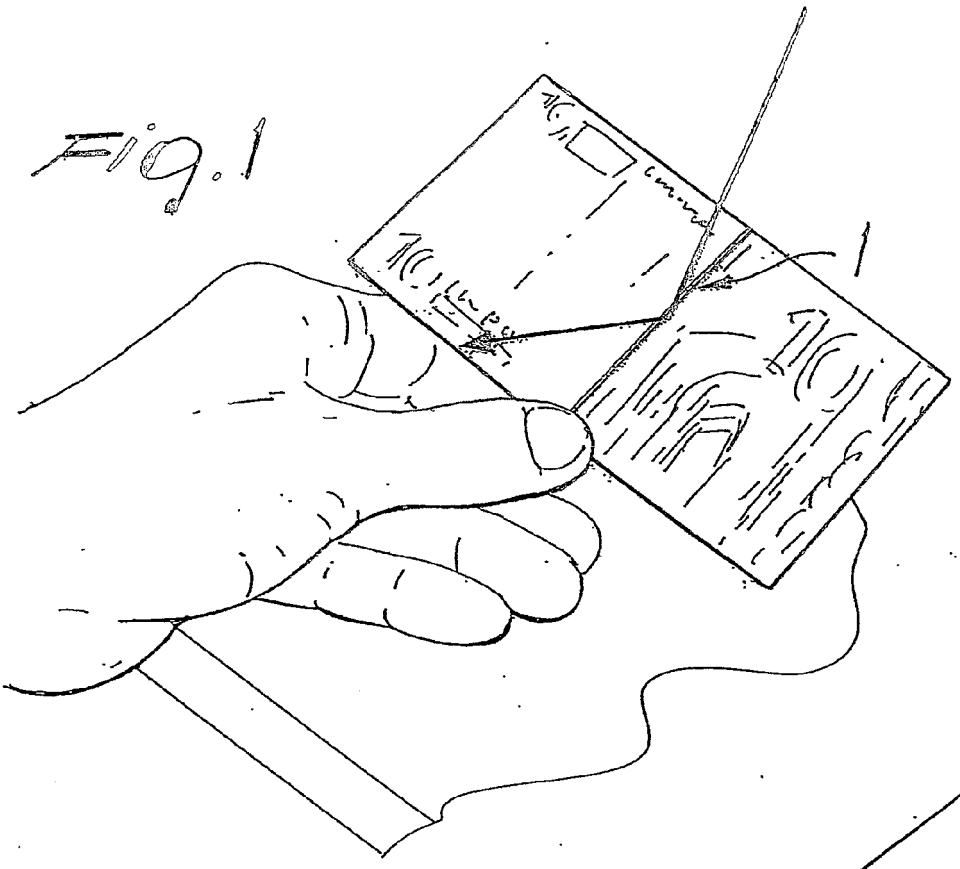


Fig. 1

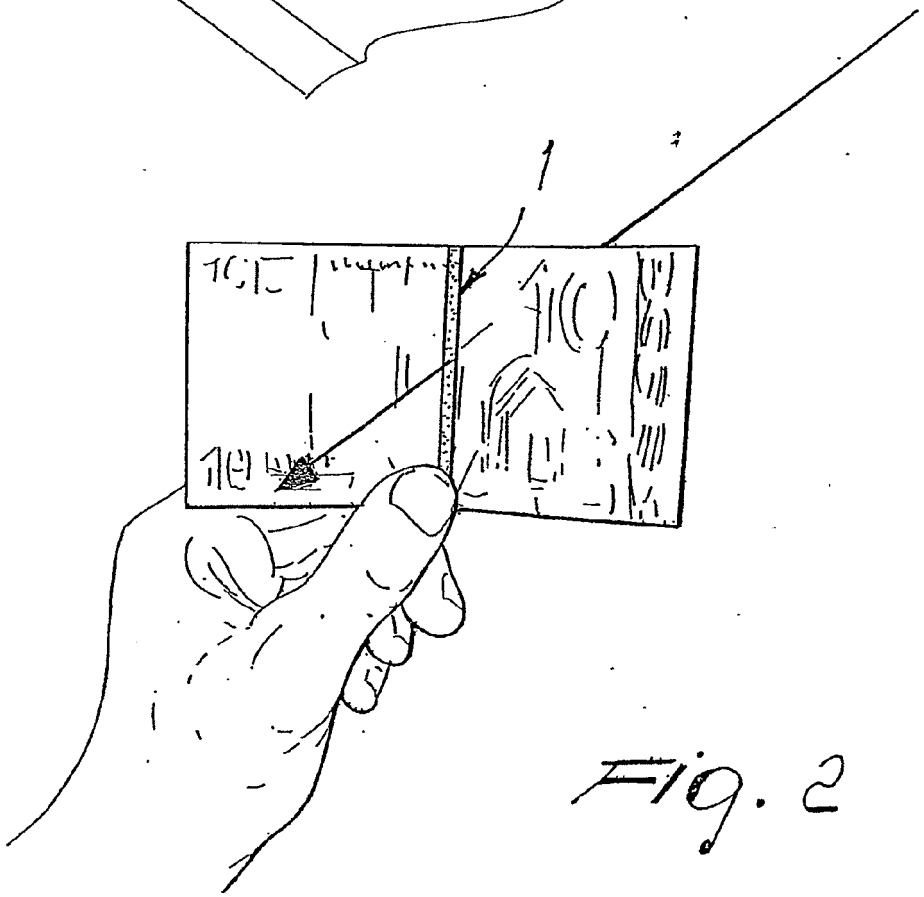


Fig. 2

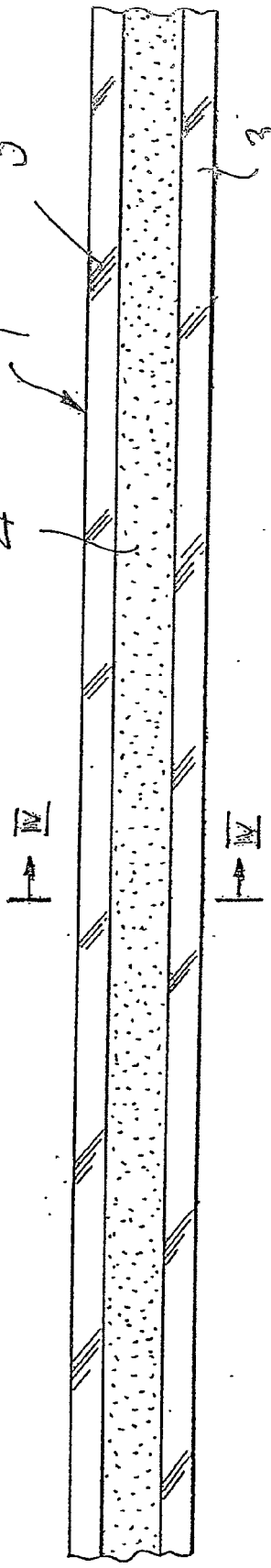


Fig. 3

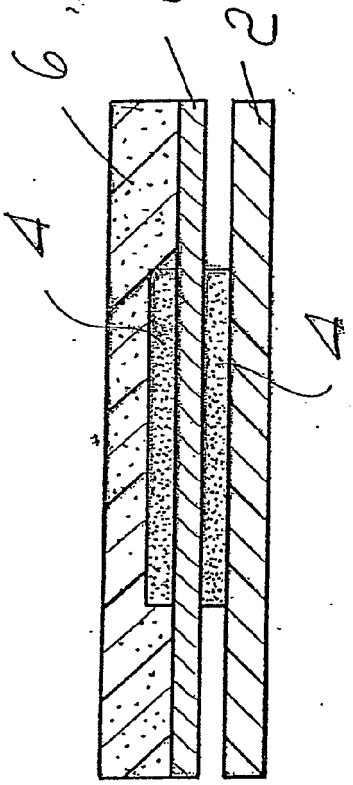
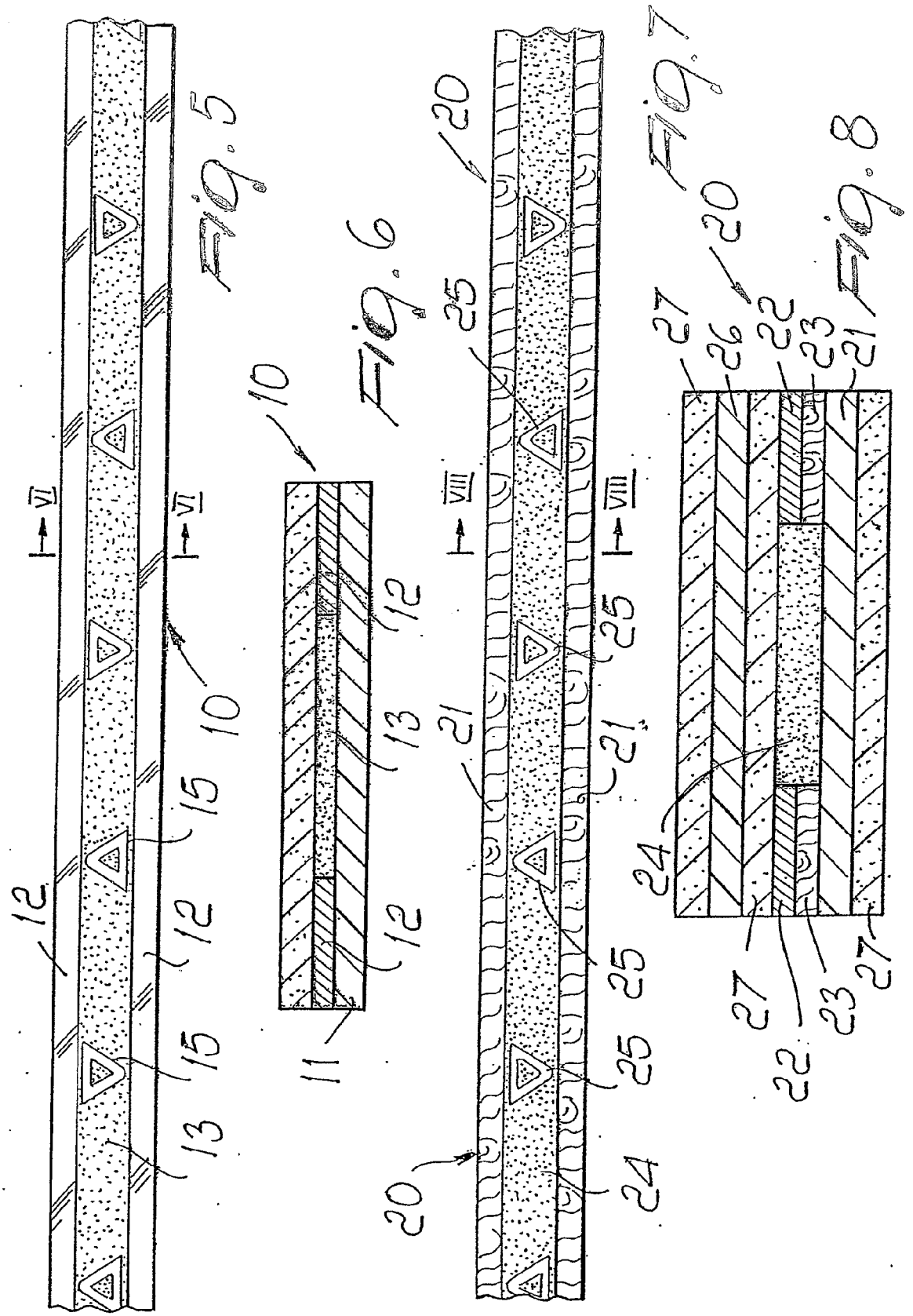


Fig. 4


VII
VII
10
12
15
13
12
12
13
15
Fig. 5
10
12
13
12
11
Fig. 6
20
25
VIII
VIII
21
25
21
25
25
24
20
Fig. 7
20
27
26
22
23
21
24
27
22
23
27
Fig. 8

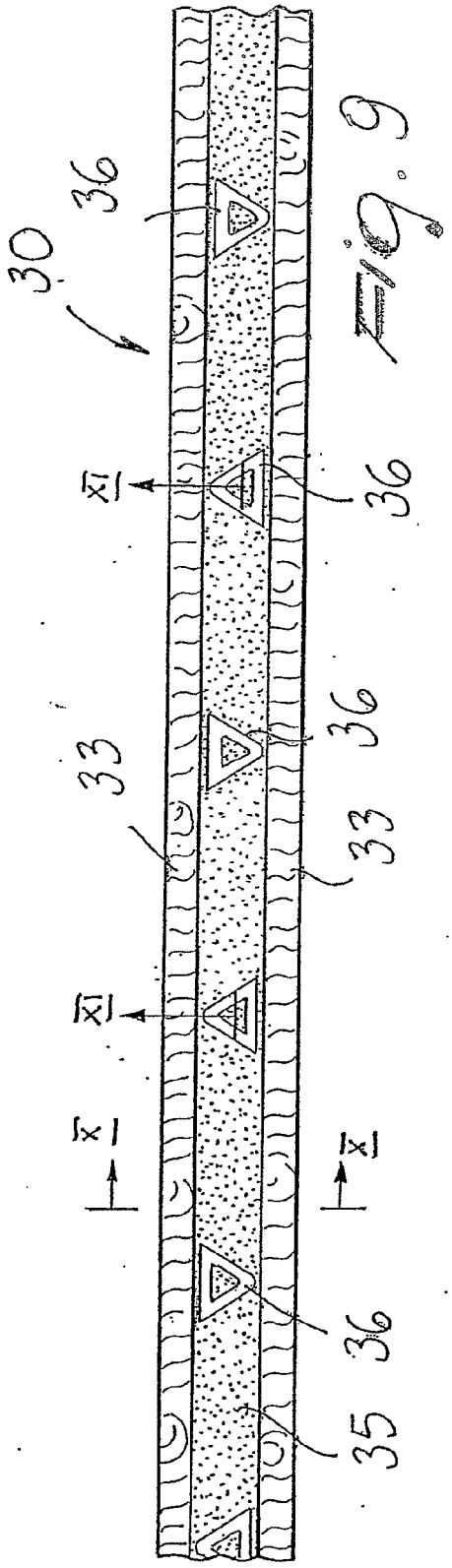


Fig. 9

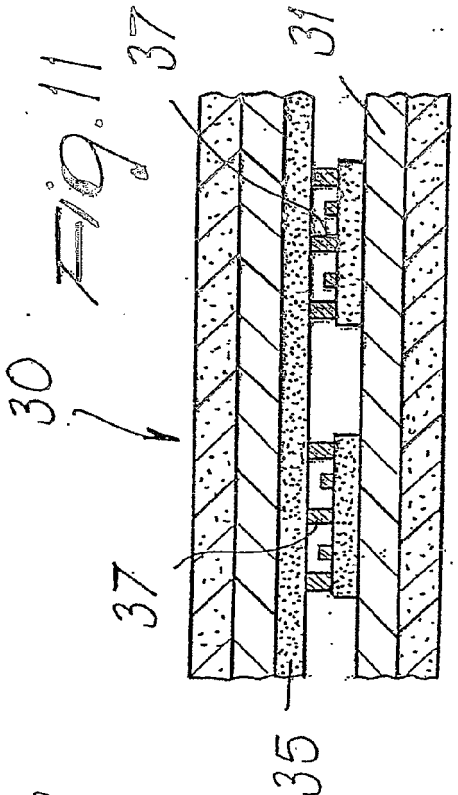


Fig. 11

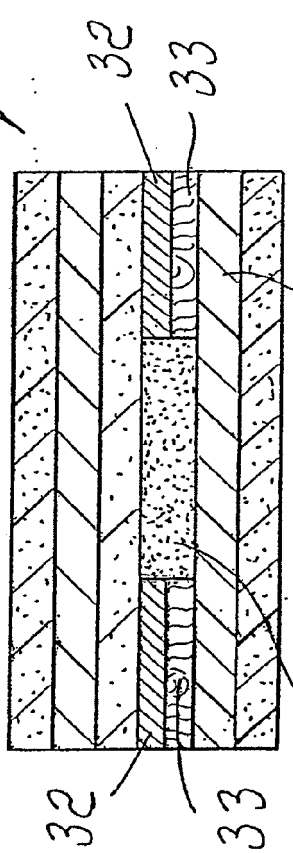


Fig. 10

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 02777289 A **[0062]**
- EP 1521678 A **[0062]**