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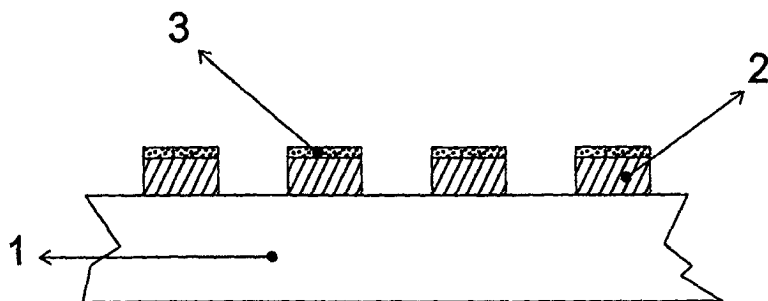
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(54) **STRUCTURE AND PREPARATION OF TRANSFERABLE SCREEN TINTS USED IN COLOR
RESTORATION OF PICTORIAL WORKS AND POLYCHROMED SCULPTURE**

(57) Structure and preparation of the Transferable Woven Backgrounds employed in the chromatic reintegration of paintings and polychrome engraving: The present invention defines the structure as well as different methods for preparing the Transferable Woven Backgrounds, on a basis of which a the chromatic reintegration is carried out of paintings and polychrome engraving, through the transfer by pressure and superimposition by three-colour process of the sign image

(dots, lines, etc.) that they support.

The different alternative methods are described for the preparation of said Transferable Woven Backgrounds: serigraphy, by screen printing; computerised, making use of output plotters; and preferentially by photomechanical means, through the employment of photosensitive emulsions exposed to the light in contact with woven negatives and their subsequent development.



FIGUR . 1

Description

OBJECT OF THE INVENTION

[0001] The present invention relates to the description of an element which makes possible the transfer of images such as are the transferable woven backgrounds, and to the different alternative methods of preparing such transferable woven backgrounds: by serigraphy, by computer programs and preferentially by photomechanical means.

[0002] These transferable woven backgrounds are employed in chromatic reintegration in paintings and polychrome engraving, and permit notable improvements to be achieved with respect to the conventional systems of reintegration insofar as they offer greater speed in technical implementation, as well as enhanced safety and objectivity in their development.

BACKGROUND OF THE INVENTION

[0003] An image, as may be a determined graphical design, laid on a first bearer substrate, can be transferred to a second substrate.

[0004] The first bearer substrate of the image are usually articles with a structure having some determined properties which make possible the transfer of the image that they support, there being different types of transfer substrates (for example the patents W09835840A1, W09339166A1, W09728012A1 and W09728974A1).

[0005] The image can be obtained on the first bearer substrate, generally a plastic film, by direct printing methods, such as serigraphy, ink-jet printing, heat transfer, xerography or laser printing (for example the patents W09518720, W09106042 and W09506567).

[0006] For the transfer of the image on to a second substrate, there exist different methods, such as transfer by moisture (for example the patent US3065120), based on the solubility in water of certain layers and on the insolubility of the areas of image to be transferred. There is also image transfer through the employment of pressure-sensitive adhesives (for example the patents US3276933, US3574049 and US3708320). And also, the transfer of images by the application of heat (for example the patents US3907974 and US3928710).

[0007] The transferable woven backgrounds, considered as a bearer substrate of an image formed by a graphical design of dots, lines, etc., are employed for the chromatic reintegration of paintings and polychrome engraving, as per the description provided in the Spanish application for Patent number P9802182; and permit the reproduction of the colour to be reintegrated in the lacunae of a work via a three-colour transfer process of the colours yellow, magenta and cyan, in their corresponding percentages, previously identified in some chromatic reference tables.

[0008] The development of these transferable woven

backgrounds for this defined application involves a series of specific technical demands, which mean that there are differences in obtaining them from other image transfer procedures developed, like for example tracing or other transfer systems by means of pressure or temperature. Thus, in the systems mentioned the transfer of the image is achieved as a whole and on a single layer on the receiver substrate, not so, the sign image of the transferable woven backgrounds which offer the possibility of being capable of being transferred in a partial or fragmented form without carrying along the adjoining image areas; and moreover, the complete final image is obtained by the superimposition of three different chromatic layers, corresponding to the colours yellow, magenta and cyan.

DESCRIPTION OF THE INVENTION

[0009] The present invention relates to the form of preparation and the structure of the transferable woven backgrounds that are employed for the chromatic reintegration of paintings and polychrome engraving.

[0010] The transferable woven backgrounds correspond to the transferable supports that contain the image of dots, strokes or whatever other design of signs valid for application in chromatic reintegration of paintings and polychrome engraving; these sign designs are implemented in each one of the three subtractive primary colours: yellow, magenta and cyan.

[0011] As is shown in figure 1, the structure of the transferable woven backgrounds is divided into two parts: support (1) and image (2).

[0012] The support (1) corresponds to a flexible, transparent material, of smooth surface and having a thickness of approximately 100 μ . On the other hand, the image (2) corresponds to the sign designs of colour in determined percentages, which shall be transferred, by means of pressure in the reintegration process, via pressure-sensitive adhesives applied to their surface (3).

[0013] The sign designs that the transferable woven backgrounds present, are characterised in that their corresponding percentage of signs which expresses the ratio between the area of dots or strokes in colour and the part of the support that is colour-free. As is shown for example in the different sign designs, specifically that of dots, of the figure 2, with (4) is illustrated a dot design for a percentage of about 20%; with (5) a dot design with a percentage of about 50%; and with (6) a dot design with a percentage of about 80%.

[0014] For the confection of these transferable woven backgrounds, different percentage increments can be taken of the signs selected, of 5%, 10%, etc.; whereby they cover a percentage interval of 0% to about 90%. As a consequence, if percentage increments of 10% are taken, in order to cover an interval of 0-90%, nine transferable woven backgrounds shall be required (10%, 20%, 30%, 40%, 50%, 60%, 70%, 80% and 90%) for each primary colour: nine for colour yellow, nine for col-

our magenta and nine for colour cyan.

[0015] The designs that constitute the transferable woven backgrounds are defined in terms of their alignment, this being, as is shown in figure 3, the number of signs (7) that are present in a determined length measured in the direction of their inclination (8). Thus, the transferable woven backgrounds can be of distinct alignments, as for example figure 4 shows, and it is possible to employ that which best adapts to the characteristics of the work to be reintegrated.

[0016] Moreover, the sign designs that constitute the transferable woven backgrounds, have distinct inclinations for each base colour, in this way in their superimposition in order to obtain the colour to be reproduced, the signs of each colour tend to remain juxtaposed. The preferred inclinations for dot designs must maintain a difference in inclination of 30° between the successive transferable woven backgrounds; specifically and in a preferential manner, as is shown in figure 5, 15° are used for the designs in colour magenta (13), 45° for those of colour cyan (14) and 75° for those of colour yellow (15).

[0017] Obtaining the image of dots, lines or whatever other type of stroke in each of the three base colours yellow, magenta and cyan, on the support can be implemented by different procedures: serigraphy, by conventional silk-screen printing; computer-aided, by means of plotters using thermal transfer or sublimation; or by photomechanical means, through the use of photo-sensitive emulsions exposed to light in contact with woven negatives, and subsequent development thereof.

DESCRIPTION OF THE DRAWINGS

[0018] For a better understanding of that which has been described in this specification, some drawings are attached by way of example.

In figure 1, a stratigraphic section of a transferable woven background is shown with a determined percentage of signs. Illustrated with (1) is the transparent and flexible support which holds the image of colour signs; (2) is the image of colour signs (dots, strokes, etc.); and (3) is the pressure-sensitive adhesive applied over the image of colour signs and which permits transfer thereof to be achieved.

In figure 2 are shown sign designs, specifically of dots, with different percentages. Shown with (4) is a design with a percentage of dots of 20%; with (5) a design with a percentage of dots of 50%; and with (6) a design with a percentage of dots of 80%.

Figure 3 shows a sign design, specifically of dots, with a determined alignment. Shown with (7) is the alignment of the dot design, specifically of 4 lines per centimetre, corresponding to the number of dots present on a determined length measured in the di-

rection of the inclination (8) thereof; with (8) is the inclination of 45° of the dot design.

Figure 4 shows different sign designs, specifically of dots, all of them having the same percentage of 30%, but with different alignments. Shown with (9) is a design with an alignment of 10 l/cm; with (10) a design with an alignment of 5 l/cm; with (11) a design with an alignment of 3 l/cm; and with (12) a design with an alignment of 2 l/cm.

Figure 5 shows sign designs having different inclinations. Shown with (13) is a dot design with a inclination of 15° corresponding to the colour magenta; with (14) is a dot design with a inclination of 45° corresponding to the colour cyan; and with (15) a dot design with a inclination of 75° corresponding to the colour yellow.

Figure 6 shows schematically the arrangement of the elements of assembly for carrying out the exposure to actinic light of the emulsified support. Shown with (16) is a woven negative; with (17) is the emulsified support; with (18) is the emulsion of the woven negative; with (19) is the support of the woven negative; with (20) is the support that is emulsified; with (21) is the emulsion that is applied to the support; with (22) is the actinic light beam; and with (23) is a glass plate or rigid transparent support.

PREFERRED EMBODIMENT OF THE INVENTION

[0019] The preparation of the transferable woven backgrounds employed for chromatic reintegration of paintings and polychrome engravings can be carried out by means of different procedures, which are expounded in independent fashion in each of the following sections, the procedure of procurement by photomechanical means being dealt with in a preferential manner.

1.- Obtaining the transferable woven backgrounds by screen-printing procedures.

[0020] The printed reproduction system such as serigraphy, permits the transferable woven backgrounds to be procured by means of the printing on the transparent support of the transferable woven backgrounds, of the sign image previously created by conventional methods on a silk screen.

[0021] In order to obtain the sign image on the silk screen, one starts with woven positives, which can be created by data processing means (via cameras) or else by photo-mechanical means (employing high-contrast photographic film exposed in contact with contact screens); with the pertinent characteristics of alignment, percentage and inclination of the signs that the transferable woven backgrounds must have.

[0022] Once the sign image is printed on the support,

and employing the same silk screen, a pressure-sensitive coating of adhesive is applied over the image, so that its transfer is made possible.

2.- Obtaining the transferable woven backgrounds by computerised procedures.

[0023] Obtaining the transferable woven backgrounds by computerised procedures is based on recording the output information through the use of printers or plotters based on thermal transfer or sublimation.

[0024] The sign image (dots, lines, etc.) of different percentages, inclinations and alignments, created with the graphics applications presently commercially available, are printed on transparent supports previously treated with a transferable substrate, thus obtaining the transferable woven backgrounds of each of the three base colours.

[0025] It is important to note the need to employ in these systems, base colours distinct from those available with them, with regard to enhancing chromatic stability.

3.- Obtaining the transferable woven backgrounds by photo-mechanical procedures.

[0026] The procurement by photo-mechanical means of the transferable woven backgrounds of each one of the three base colours, yellow, magenta and cyan, in their different percentages, inclinations and alignments, is based on employing *photo-sensitive emulsions* exposed to the light in contact with *woven negatives*, and subsequent development thereof.

[0027] The *woven negatives* that contain the sign image, based on which the transferable woven backgrounds are obtained, can be created by computerised means, making use of cameras, or else by photomechanical means, making use of high-contrast photographic films exposed for distinct development times through the contact frames.

[0028] These woven negatives are of high-contrast in black and white, and their structure comprises a transparent support on which is laid a sign image having sufficient opacity to impede the passage of light through it.

[0029] Moreover, the *photosensitive emulsion* employed in the preparation of the transferable woven backgrounds is made up from dichromate emulsions, the fundamental components of which are a colloid and a sensitiser.

[0030] The colloid can be from different sources: animal (gelatine, fish glue, albumen, casein, etc.), vegetable (gum Arabic) or synthetic (polyvinyl alcohol).

[0031] The sensitiser can likewise be of different types: Potassium dichromate, Ammonium dichromate, Sodium dichromate, or else a mixture of chromic acid and piridine or quinoline.

[0032] In addition to these main components, colloid and sensitiser, other additives form part of the photo-

sensitive emulsion, such as plastifiers, bactericides, colourings and tightening agents. Specifically in a preferential manner, glycerine and sucrose are employed as plastifiers; phenol as bactericide; for colouring, synthetic organic pigments of each of the three base colours, cyan, magenta and yellow (phthalocyanine blue, dimethyl quinacridone and monoazoic compound, respectively); and a tenso-active reagent such as Triton® (X-100).

[0033] In a preferential manner for preparing the photosensitive emulsions from a gelatine-based colloid, and employing Ammonium dichromate as sensitiser, the procedure is as follows.

[0034] An aqueous solution is prepared of gelatine [4.3 % (p/p)] which, once hydrated, is warmed to achieve its complete dissolution. Once dissolved, one adds the tenso-active reagent (Triton® X-100 [0.2 % (p/p)]), the plastifiers (sucrose [3.3 % (p/p)], glycerine [2.2 % (p/p)]), the corresponding colouring agent, be this magenta, cyan or yellow, (magenta [3 % (p/p)], cyan [1.7 % (p/p)], yellow [1.7 % (p/p)]), and the bactericide (phenol [0.2 % (p/p)]), agitating the system until a homogeneous preparation is achieved. To this preparation of coloured gelatine, the sensitiser [0.4 % (p/p)] is added, and the system is again made homogeneous by agitation.

[0035] The solution so prepared is applied over the transparent support so that a uniform coating is obtained.

[0036] Once the transparent support has been coated with the emulsion prepared, and the latter has dried, one proceeds to expose it to the light in contact with the woven negative as is shown in figure 6. To this end, the emulsion-coated support (17) is placed in contact with the woven negative (16), so that the emulsion of the woven negative (18) is in contact with the support (20) which is holding the applied emulsion (21); both components (emulsion-coated support (17) and woven negative (16) are put in close contact in order to ensure a faithful reproduction of the sign design of the negative, to this end a montage can be made of both components between two glass plates (23) to which pressure is applied, or else mount them in a pneumatic press.

[0037] With the woven negative (16) and the emulsion-coated support (17) arranged in the form described, the exposure takes place of the emulsion-coated support (17) to an actinic light (22) through the woven negative (16).

[0038] When the exposure is concluded, the emulsion-coated support is developed in a bath of warm water [45 °C], in which the parts where the actinic light has not touched and which remain soluble are eliminated, and the parts which were touched by the actinic light and made insoluble, remain; the end result on conclusion of the development shall be a sign image that is positive with respect to the woven negative employed, and of the base colour, yellow, magenta or cyan, added to the photosensitive emulsion in its preparation.

[0039] On conclusion of the development, the support with the sign image is washed in running water. Next,

with the intention of hydrolysing the sign image, in such a way that subsequently its transfer can be made in a precise manner without dragging of the adjacent signs, the image is subjected to an enzyme bath in an aqueous solution of papain [0.6 % for 60 minutes]. Finally, and once the image is dry, a coat is applied thereto of a solution of pressure-sensitive adhesive [microcrystalline wax in xylene at 50%], so as to permit its subsequent transfer.

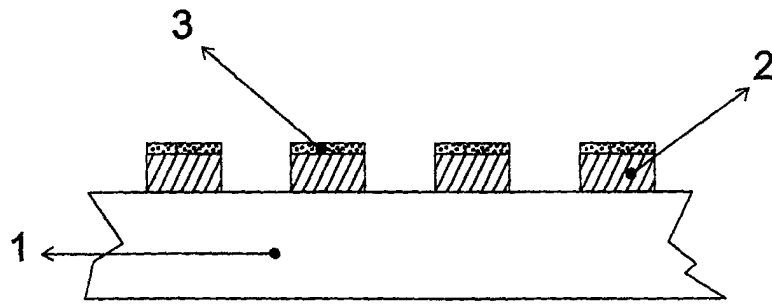
[0040] In the manner described the transferable woven backgrounds shall be obtained of each one of the three base colours, yellow, magenta and cyan, with their corresponding inclinations towards each colour, and in their different percentages and alignments.

Claims

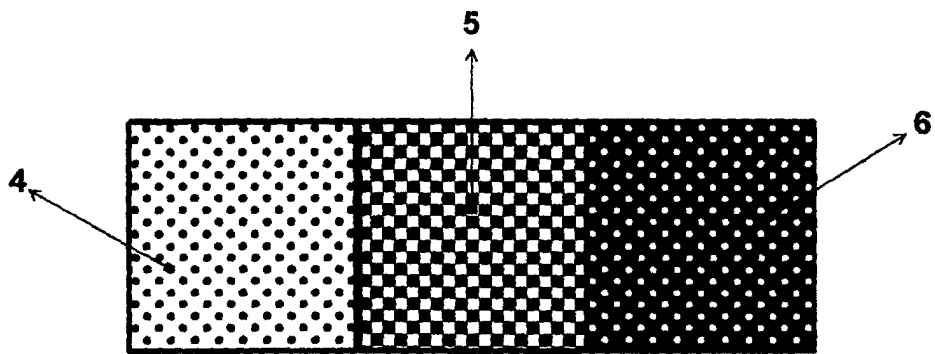
1. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, **characterised in that** they are transferable supports the structure of which is divided into two parts:
 - the support of a flexible material, transparent
 - and the image represented by sign designs implemented in each one of the three subtractive primary colours: yellow, magenta and cyan, and the transfer of which is implemented by means of pressure-sensitive adhesives which permit the transfer of the sign image to another surface.
2. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, in accordance with preceding claim, **characterised in that** have sign designs for colour in different percentages, determined by the ratio between the area of dots or strokes with colour and the part of the support colour-free, as well as distinct inclinations for each base colour, and the possibility of making them with different alignments.
3. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, in accordance with preceding claims, **characterised in that** the procurement of the image on the support can be obtained by different alternative methods: serigraphy, computerised or photomechanical.
4. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, in accordance with preceding claim, **characterised in that** its procurement by means of serigraphy is

produced through stamping the previously created sign image on a transparent support.

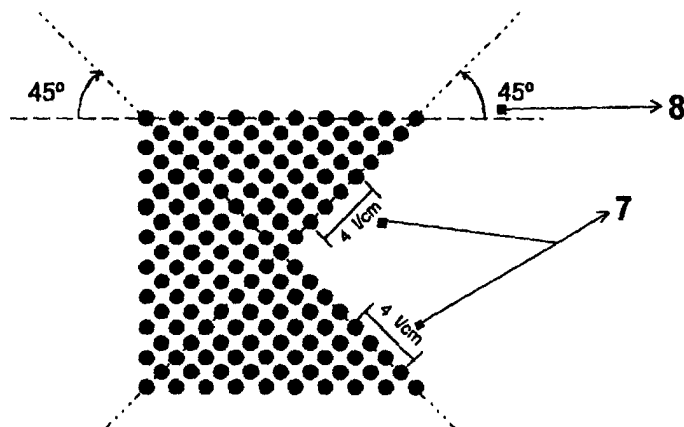
5. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, in accordance with claim 3, **characterised in that** its procurement by computerised means is produced through the use of printers or plotters based on heat transfer or sublimation.
6. Structure and preparation of the Transferable Woven Backgrounds employed for the chromatic re-integration of paintings and polychrome engraving, in accordance with claim 3, **characterised in that** its procurement through photomechanical means is carried out through the use of photosensitive emulsions exposed to the light in contact with woven negatives, and subsequent development thereof.



FIGUR 1



FIGUR 2



FIGUR 3

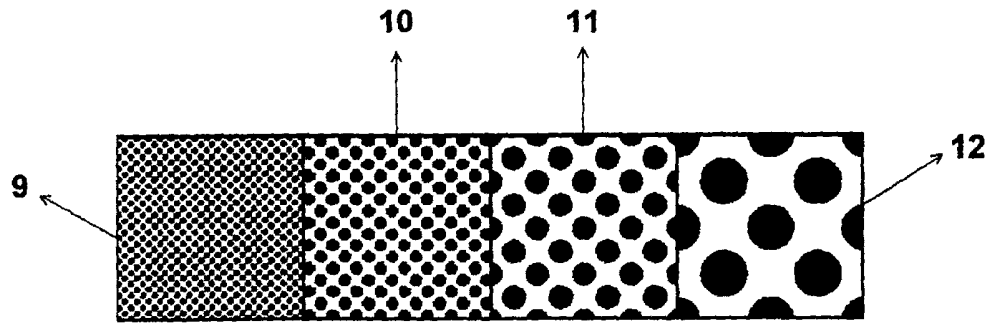


FIGURE 4

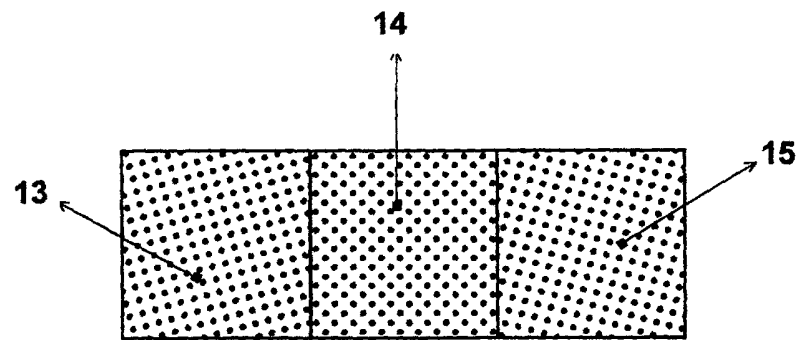


FIGURE 5

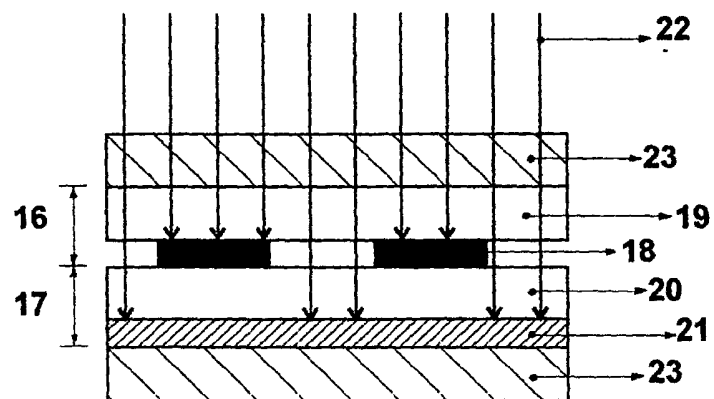


FIGURE 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES00/00020

A. CLASSIFICATION OF SUBJECT MATTER		
IPC7 B44C1/16, B44D3/22, B41M3/12, G09F3/10		
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)		
IPC7 B44C1/16, B44D3/00, 3/22, B41M3/12, 5/00, 7/00, G09F3/10, G03F5/00, 5/20		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
WPI, EPDOC, CIBEPAT, PAJ		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9106042 A (ESSELTE LETRASET LIMITED) 02 May 1991 (02.05.91) page 2, line 11 – page 3, line 3; page 4, lines 14-35; figure 1	1, 3, 4, 5
A	EP 461796 A (MAYNARD, ARTHUR W.) 18 December 1991 (18.12.91) column 4, line 35 – column 5, line 56; figure 1	1, 3, 4
A	US 5681660 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 28 October 1997 (28.10.97) column 4, lines 16-60; figure 2	1, 3, 4
A	EP 060070 A (MINNESOTA MINING AND MANUFACTURING COMPANY) 15 September 1982 (15.09.82) page 5, line 29 – page 6, line 32; page 7, line 3 – page 8, line 13; claims 1, 2; figures 1-4	1, 3, 6
A	WO 9835840 A1 (HUNT GRAPHICS EUROPE LIMITED) 20 August 1998 (20.08.98) page 9, line 14 – page 10, line 24; claims 1, 15, 16; figures 1, 2	1, 3, 5
☒ Further documents are listed in the continuation of box C. ☒ Patent family members are listed in annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 19 April 2000 (19.04.00)		Date of mailing of the international search report 26 April 2000 (26.04.00)
Name and mailing address of the ISA/ S. P. T. O.		Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES00/00020

C. (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 4330586 A (FIEUX) 18 May 1982 (18.05.82) column 3, lines 33-52; column 5, line 45 – column 6; line 17; figure 1	1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

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Information on patent family members

International Application No

PCT/ES 00/00020

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US 4330586 A	18.05.1982	NONE	

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