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

(11) **EP 4 140 353 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.03.2023 Bulletin 2023/09

(21) Application number: **22188566.8**

(22) Date of filing: **03.08.2022**

(51) International Patent Classification (IPC):
A44C 5/20 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A44C 5/2047; A44C 5/2076

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **27.08.2021 IT 202100022418**

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(54) SAFETY FASTENER FOR JEWELLERY

(57) Safety fastener for jewellery, comprising:
- a first longitudinal arm (10) having a free end with a front opening (10a);
- a second longitudinal arm (20) having a free end with a front opening (21a) and a seat (21) extending longitudinally inside the second arm from the front opening (21a);

the two free ends (10,20) being configured for mutual coupling;
- a V-shaped spring (30) comprising a first longitudinal leg (31) and a second longitudinal leg (32),

joined together at a vertex (30a) of a "V",
the V-shaped spring (30) is designed to be inserted inside the seat (21) of the second arm (20) via the front opening (21a) when the free ends of the first and second arms are coupled together;

- a locking lug (41a) extending transversely towards the inside of the seat (21) of the second arm (20), said lug having a length and position such that:
-- for the insertion of the V-shaped spring (30) inside the seat (21) of the second arm, the second leg (32) is elastically deformed towards the first leg (31) of the spring until the it passes beyond the lug (41a), and
-- once insertion has been completed, the free end of the second leg (32) of the spring (30), opposite to the vertex (30a), is arranged beyond the lug (41a) preventing extraction in the longitudinal direction of the spring and therefore opening of the fastener;

- a through key-hole (24), open in the transverse direction towards the seat (21) of the second arm (20), designed to allow the insertion of a pusher member for elastically deforming the spring and allowing the extraction thereof.

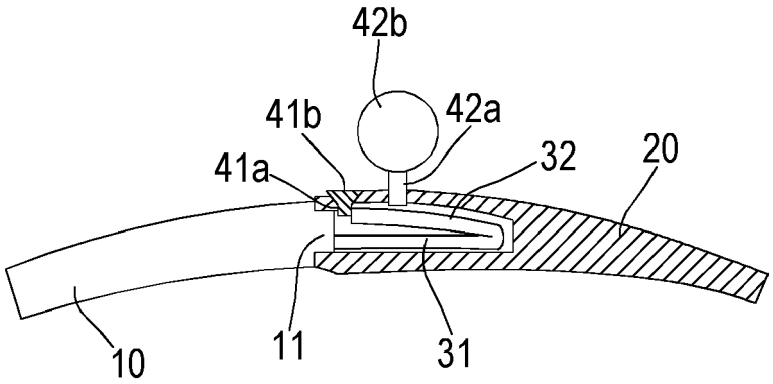

Fig.3

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Description

[0001] The present invention relates to a safety fastener for jewellery.

[0002] In the technical sector of jewellery there are known numerous examples of a fastening system for the stable, but reversible coupling together of two parts of a piece of jewellery such as a bracelet, necklace, pendant and the like. The difficulties of making fasteners which are both secure, so as to prevent accidental opening, but also easy to operate by a user who is not obliged to ask for assistance from other people, as well as being suitable for incorporation in the design of the jewellery without spoiling its aesthetic characteristics, are also known.

[0003] The technical problem which is posed therefore is that of providing a fastener for jewellery such as bracelets, necklaces and the like, which is secure and easy to operate during both closing and opening.

[0004] In connection with this problem, it is also required that this fastener should have small dimensions and be easy and inexpensive to produce and assemble, being able to be associated with different types of jewellery, while ensuring an attractive aesthetic appearance which is pleasing for users. These results are obtained according to the present invention by a safety fastener for jewellery according to the features of Claim 1.

[0005] Further details may be obtained from the following description of a nonlimiting example of embodiment of the subject of the present invention provided with reference to the attached drawings in which:

Figure 1: shows an exploded view of the fastener according to the present invention;
Figure 2: shows a perspective view of the fastener, partially assembled;
Figure 3: shows a schematic cross-section of the fastener assembled in the safety locking configuration;
Figure 4: shows a partial cross-section of the bracelet according to Fig. 3 in the released condition for opening; and
Figure 5: shows a perspective view of parts of a bracelet with fastener according to the invention.

[0006] As shown in Fig. 1 and assuming only for easier description and without a limiting meaning a pair of reference axes respectively in a longitudinal direction X-X, corresponding to the greater dimension or length of the fastener and transverse direction Y-Y corresponding to the widthwise dimension of the fastener, a preferred embodiment of a safety fastener according to the invention comprises a first longitudinal arm 10 having a free end 11 and a second longitudinal arm 20 having a free end 20a with a front opening 21a.

[0007] A first seat 12 (Fig. 1) extends longitudinally inside the first arm 10 from its front opening 10a.

[0008] A seat 21 extends longitudinally inside the second arm from the front opening 21a.

[0009] The free end 11 of the first arm 10 and the free end 20a of the second arm 20 are configured for mutual coupling so as to join together the first arm and second arm in the longitudinal direction.

[0010] In particular, the coupling structures of the two ends 10a,20a may be configured to produce a form-fit such as to restore a continuity in the design of the outer surfaces of the two coupled arms 10,20.

[0011] For example and as shown in Fig. 2, the first arm 10 may be provided with a longitudinal, preferably cylindrical, extension 11a which has the longitudinally extending seat 12 formed inside it, and the front opening 21a of the seat 21 may have an internal diameter slightly greater than the external diameter of the extension 11a of the first arm so as to allow the insertion of the extension inside the seat in the longitudinal direction of extension.

[0012] A V-shaped spring 30 comprising a first longitudinal leg 31 and a second longitudinal leg 32 is fixed to the free end of the first arm 10.

[0013] The second leg 32 has a length smaller than the length of the first leg 31 and is joined to the first leg 31 at a vertex 30a of the "V" so as to be elastically deformable towards/away from the first leg 31.

[0014] The seat 21 of the second arm 20 extends inwards over a length such as to allow the insertion of the entire spring 30 in the longitudinal direction.

[0015] The first leg 31 of the spring 30 has one end 31a, opposite to the vertex 30a, which is fastened to the free end of the first arm 10, so that the V-shaped spring 30 is able to be inserted inside the seat 21 of the second arm 20 via the front opening 21a when the free ends 11a,20a of the first and second arm are coupled together.

[0016] The free end of the leg 31 of spring 30 may be fastened - for example soldered - to the seat 12 of the first arm 10 or to the seat 12 of the longitudinal extension 11a of the first arm 10.

[0017] It will be clear that other systems for fixing the spring 30 to the first arm 10 are possible, for example the spring could be formed as one piece with the end 11 of the arm 10, in particular in the case where the latter is made of a material which is not precious or suitable for use also as a V spring. "Longitudinal" is understood as meaning having a greater extension lengthwise; the arms and legs may have, for example, a curved or straight shape, depending on the design required for the jewellery.

[0018] As will become clearer below, the fastener has an element 41 for locking the said fastener so as to ensure secure engagement between the two arms of the jewellery, once it has been put on by coupling together the two ends of the arms of the fastener.

[0019] Moreover, the fastener also has a release element 42 which may be realized as a special key or a suitable unlocking element for opening the fastener again and removing the jewellery.

[0020] In greater detail, the locking element 41 may have a locking lug 41a extending transversely from an inner surface of the longitudinal seat 21 of the second

arm 20 towards the inside of the said seat 21. The lug 41a has in particular a length and a position such that, when the V-shaped spring 30 is inserted inside the seat 21 of the second arm, the second leg 32, sliding over the lug 41a, is deformed elastically towards the first leg 31 of the spring 30 so as to compress the same, reducing the transverse dimension thereof until it passes over the lug 41a.

[0021] In particular and as shown in Fig. 3, the lug 41a may be arranged at a first distance from the free end 20a of the second arm, being oriented transversely (for example orthogonally or inclined at an angle) with respect to the longitudinal direction so that, once insertion has been completed, the free end of the second leg 32 of the spring 30, opposite to the vertex 30a, is arranged beyond the lug 41a, preventing extraction of the spring in the longitudinal direction and therefore opening of the fastener.

[0022] For release of the fastener, a through-hole 24, open in the transverse direction towards the seat 21 of the second arm 20, is arranged in a longitudinal position such as to allow the insertion of a pusher member designed to press against the second leg 32 of the V-shaped spring inserted inside the seat 21 so as to deform it elastically towards the first leg 31 and allow extraction of the spring 30.

[0023] In greater detail, the key-hole 24 is arranged at a greater distance than the lug 41a from the free end 20a of the second arm, preferably on a same side of the outer surface of the said arm, and crosses the wall of the arm so as to provide access to the longitudinal hollow seat 21 in a position such as to allow the pushing action against the second leg 32 of the spring 30 inserted inside the second arm 20.

[0024] According to a particularly preferred embodiment shown in the figures, the locking element 40 comprises a pin 41 with lug 41a and head 41b respectively designed to be inserted in the transverse direction inside a corresponding hole 23, passing towards the inside of the seat 21 of the second arm 20 of the jewellery, and inside a tapering 23a of the said hole, so as to restore the continuity of the outer surface of the arm.

[0025] As shown in Fig. 3, once insertion has been completed, the plug 41a may be arranged in contact with the free end of the second elastic leg 32 of the spring, which has returned into the stable expanded V position, rhus preventing extraction thereof in the longitudinal direction and hence opening of the jewellery.

[0026] The shape with the locking element in the form of a pin 41 which can be inserted in the second arm simplifies significantly production and assembly. Different configurations of the locking element are, however, possible, for example it is possible to form or fix the locking lug 41a directly inside the seat 21.

[0027] For release, the fastener may be provided in the form of a kit further comprising an unlocking key 42 with a cylindrical shank 42a and head 42b which can be gripped.

[0028] The shank 42a is designed for insertion inside the through key-hole 24, which is open in the transverse direction towards the seat 21 of the second arm 20; the length in the transverse direction of the key shank and the longitudinal position of the key-hole are designed to allow (see Fig. 4) a pushing action by the shank on the elastically deformable leg 32 of the V-shaped spring.

[0029] It is clear that a different elongated element suitable for insertion inside the key-hole 24 may be used to exert a pushing force on the second leg 32 of the spring 30.

[0030] With this structure the operating principle of the fastener is as follows:

- Preparation:

  -- the first arm 10 is prepared with free end of the first leg 31 of the spring 30 fastened - for example soldered - inside the corresponding first seat 12;
  -- the second arm 20 is prepared with the pin 41 stably inserted inside the respective hole 23 so that the lug 41a projects inside the seat 21;

  Closing:

  - the two arms 10,20 are arranged opposite each other in the longitudinal direction with their free ends 10a/11a, 20a aligned;
  - the free ends 10a,20a of the two arms 10,20 are coupled together by inserting the spring 30 inside the seat 21 of the second arm 20, causing the compression of the spring 30 until it passes over the locking lug 41a and until, if present, the extension 11 of the first arm 10 is fully inserted inside the opening 21a of the seat 21 of the second arm 20, so as to join together the two arms and restore the continuity in the longitudinal direction of their surfaces;
  - once coupling has been performed, the second leg 32 of the spring 30 is arranged with its end opposite to the vertex 30a in the position behind the locking lug 41a, thereby preventing extraction thereof in the longitudinal direction and therefore ensuring secure closing of the jewellery;

  Opening:

  - the shank 42a of the key 42 is inserted (Fig. 5) inside the associated key-hole 24 until it exerts a force in the transverse direction Y-Y on the second leg 32 of the spring; following the pushing action the leg 32 is elastically deformed towards the first arm 31, closing the spring and disengaging its free end from the lug 41a of the pin 41;
  - the two arms 10,20 are still joined together, but

free to move away from each other in the longitudinal direction, causing extraction of the spring 30 from the second arm 20 and opening of the jewellery which may be removed.

[0031] It is therefore clear how the fastener according to the invention is able to ensure in a simple and low-cost manner secure and easy use for a person when putting on/removing the jewellery.

[0032] The fastener according to the present invention, from tests carried out, may be advantageously formed by precision-casting, in precious metal, the first and second arms and the locking lug in the form of a pin to be inserted inside the hole, using for example a silicone rubber mould. This allows series production without the need to carry out 3D printing of the elements which make up the fastener, thereby resulting in a lower cost and greater quality of the finished product.

[0033] In addition, owing to the particular form of the component parts, it is possible to obtain the continuity of the engaged surfaces, ensuring an excellent aesthetic effect which is always sought after in the particular sector of jewellery.

[0034] Although not shown, the complete jewellery item may be in particular a wrist bracelet or neck chain.

[0035] Such a jewellery item with a security fastener may be obtained with a production process which involves the following steps:

- forming an elongated body of the jewellery item, for example in the form of a necklace or a bracelet, with two opposite ends;
- forming a first end of the body of the jewellery item with a first arm having a V-shaped spring 30 fixed thereto of a fastener according to one of the embodiments of the present invention described above;
- forming the other end of the body of the jewellery item with a second arm 20 of the fastener according to the present invention.

[0036] Although described in connection with a number of embodiments and a number of preferred examples of implementation of the invention, it is understood that the scope of protection of the present patent is determined solely by the claims below.

Claims

1. Safety fastener for jewellery, comprising:

- a first longitudinal arm (10) having a free end;
- a second longitudinal arm (20) having a free end with a front opening (21a) and a seat (21) extending longitudinally inside the second arm from the front opening (21a);

the free end of the first arm (10) and the free end of the second arm (20) being configured for mutual coupling so as to join together the first arm and second arm;

- a V-shaped spring (30) comprising a first longitudinal leg (31) and a second longitudinal leg (32);

wherein the second leg (32) has a length smaller than the length of the first leg (31) and is joined together with the first leg (31) at a vertex (30a) of the "V" so as to be elastically deformable towards/from the first leg (31);

and wherein an end of the first leg (31) opposite to the vertex (30a) is fixed to the free end of the first arm (10), so that the V-shaped spring (30) is designed to be inserted inside the seat (21) of the second arm (20) via the front opening (21a) when the free ends of the first and second arms are coupled together;

- a locking lug (41a) extending transversely towards the inside of the seat (21) of the second arm (20), the lug (41a) having a length and position such that:

-- for insertion of the V-shaped spring (30) inside the seat (21) of the second arm, the second leg (32) is elastically deformed towards the first leg (31) of the spring until it passes beyond the lug (41a), and

-- once insertion has been performed, the free end of the second leg (32) of the spring (30), opposite to the vertex (30a), is arranged beyond the lug (41a), preventing extraction in the longitudinal direction of the spring and therefore opening of the fastener;

- a through key-hole (24), open in the transverse direction towards the seat (21) of the second arm (20) in a longitudinal position such as to allow the insertion of a pusher member designed to press against the second leg (32) of the V-shaped spring inserted inside the seat (21) so as to deform it elastically and allow extraction of the spring (30).

2. Safety fastener according to Claim 1, **characterized in that** the free ends of the first arm (10) and of the second arm (20) have respective coupling structures configured to produce a form-fit joint such that a continuity in the design of one or more outer surfaces of the two arms (10;20) is restored when they are joined together.

3. Safety fastener according to one of the preceding claims, wherein the first arm (10) has a longitudinal

- preferably cylindrical - extension (11a), and the front opening (21a) in the seat (21) has an internal diameter or width slightly bigger than the external diameter or width of the longitudinal extension (11a) of the first arm, so as to allow the insertion in the longitudinal direction of the longitudinal extension (11a) inside the front opening (21a).

4. Safety fastener according to the preceding claim, wherein the longitudinal extension (11a) is internally hollow so as to form a seat (12) extending longitudinally inside it and designed to receive the end (31a) of the first leg (31) of the spring (30) in order to fix it to the first arm (10).

5. Safety fastener according to one of the preceding claims, wherein the locking lug (41a) is arranged at a first distance from the free end (20a) of the second arm, and the key-hole (24) is arranged at a greater distance than the lug (41a) from the free end (20a) of the second arm.

6. Safety fastener according to one of the preceding claims, wherein the second arm (20) comprises a hole (23) passing in the transverse direction towards the inside of the longitudinal seat (21) and wherein the locking lug (41a) forms part of a pin (41) inserted inside said hole (23).

7. Safety fastener according to the preceding claim, **characterized in that** the hole (23) is provided with a tapering (23a) and the pin (41) with locking lug (41a) has a head (41b) designed to be inserted inside the tapering so as to restore the continuity of the outer surface of the second arm.

8. Kit comprising a safety fastener according to one of the preceding claims and a pusher member configured to be inserted inside the key-hole (24) of the second arm (20) so as to press against the second leg (32) of the V-shaped spring inserted inside the seat (21) so as to deform it elastically and allow extraction of the spring (30).

9. Kit according to the preceding claim, wherein the pusher member is a key (42) with a shank (42a) designed to be inserted inside the key-hole (24) and a gripping head (42b).

10. Jewellery item, **characterized in that** it comprises a safety fastener according to one of Claims 1-7 or a kit according to one of Claims 8-9.

11. Process for the production of a jewellery item, comprising the following:

- forming an elongated body of the jewellery item, for example in the form of a necklace or a bracelet, with two opposite ends;
- forming a first end of the body of the jewellery item with the first arm of a fastener according to one of Claims 1-7, with the V-shaped spring (30) of the fastener fixed to the free end of the first arm;
- forming the other end of the body of the jewellery item with the second arm (20) of the fastener.

Fig.1

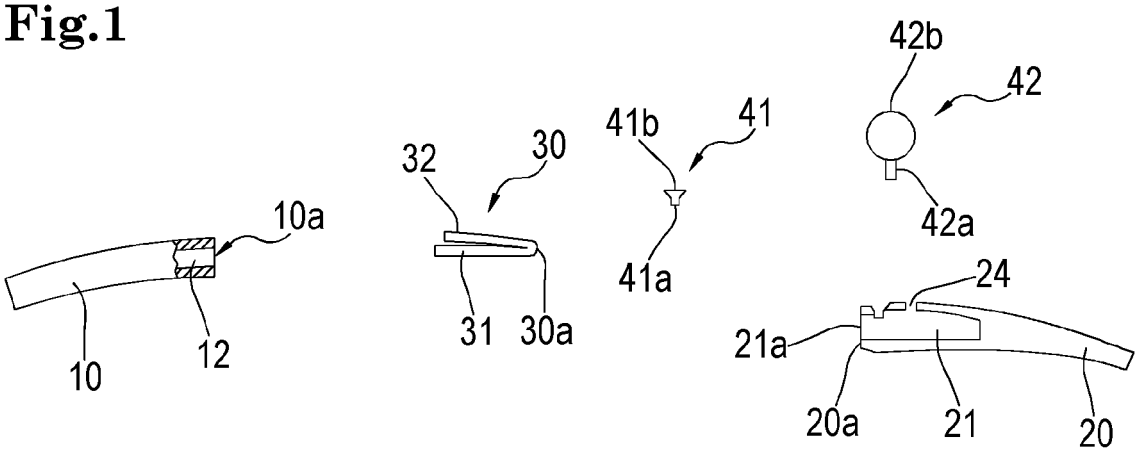


Fig.2

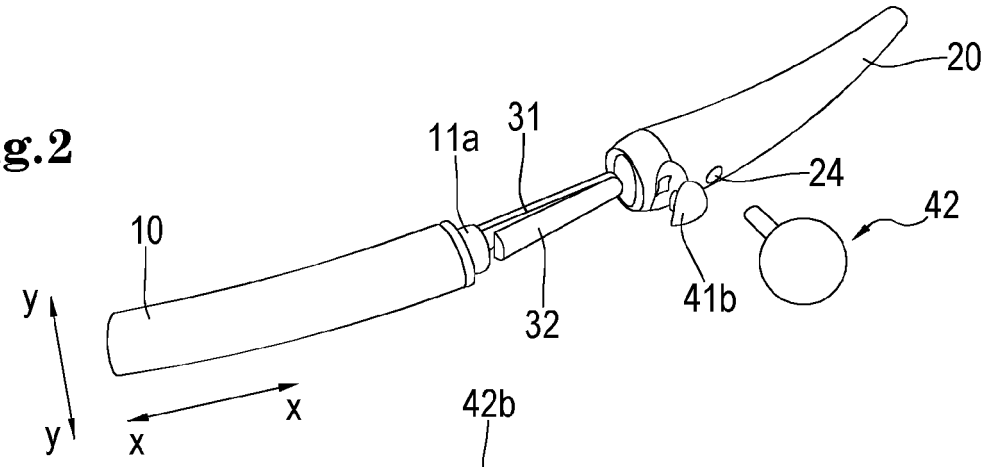
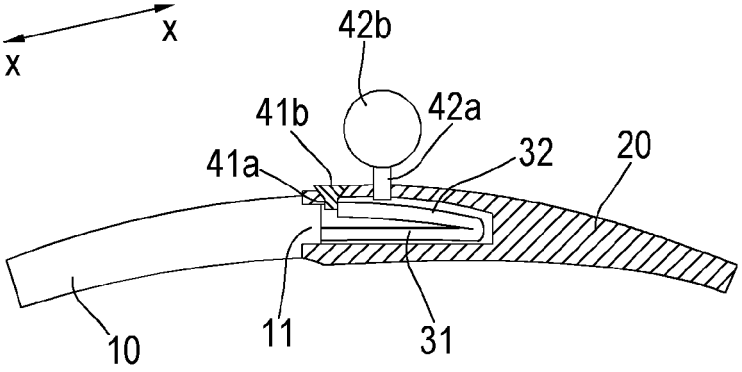


Fig.3



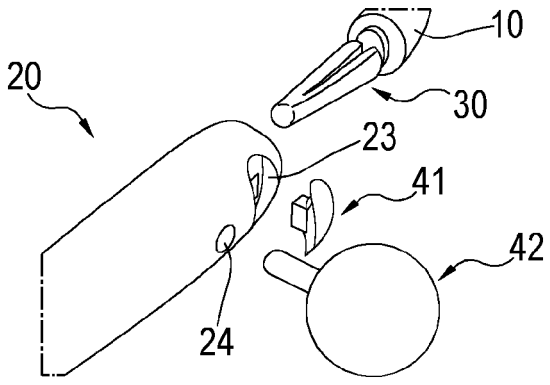


Fig.5

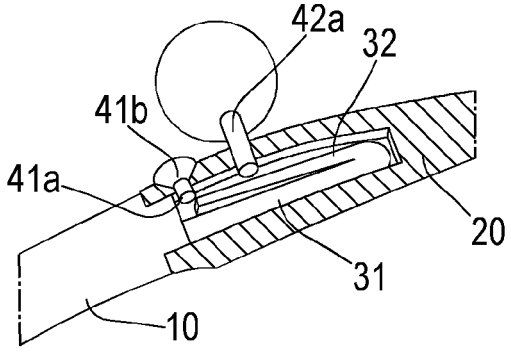


Fig.4

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EUROPEAN SEARCH REPORT

Application Number
EP 22 18 8566

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP S63 196212 U (HIDEMI KAWAKAMI) 16 December 1988 (1988-12-16)	1,5,8-11	INV. A44C5/20
Y	* Description; figures *	2-4	
A		6,7	
X	FR 656 170 A (VUILLERMOZ FRANCOIS-GUSTAVE) 30 April 1929 (1929-04-30) * figure 5 *	1	
Y	US 833 458 A (HAUSHERR GUSTAV [US]) 16 October 1906 (1906-10-16)	2-4	
A	* figures *	6,7	

TECHNICAL FIELDS SEARCHED (IPC)

A44C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	12 December 2022	Gallego, Adoración

CATEGORY OF CITED DOCUMENTS

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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12-12-2022

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82