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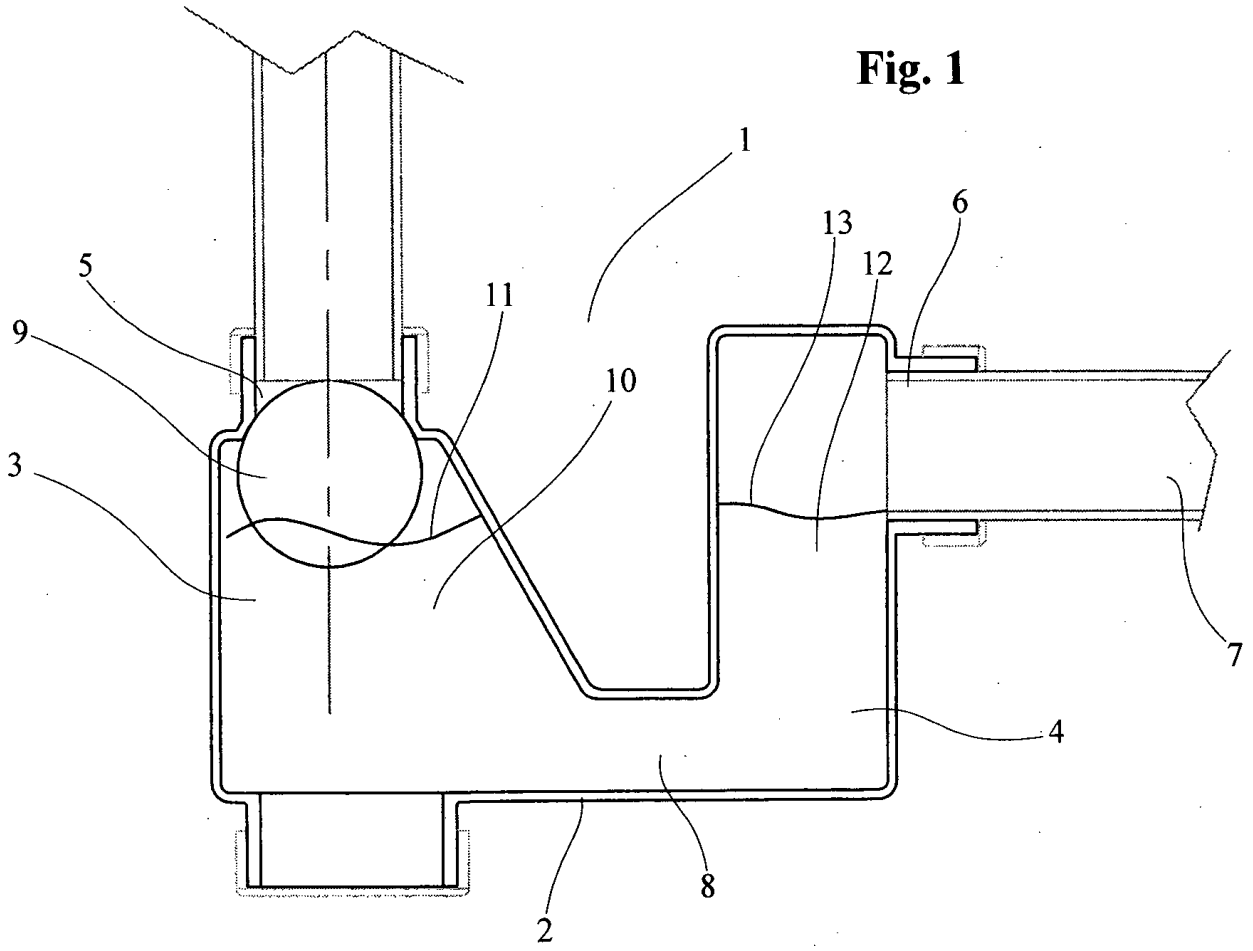
(71) Applicant: **Perdoncin, Benedetto**
35030 Vo' Euganeo (Padova) (IT)

(72) Inventor: **Perdoncin, Benedetto**
35030 Vo' Euganeo (Padova) (IT)

(54) DEVICE FOR PREVENTING ANIMALS COMING UP THROUGH CLEAR WATER DRAIN PIPES

(57) A device for preventing animals coming up through drain pipes, the device comprising a siphon (2) having a sphere arranged therein such that without any water coming from upstream the sphere (9) closes an inlet (5) to the siphon.

Fig. 1



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Description

[0001] This invention concerns a device for preventing animals coming up through clear or golden water drain pipes through the relative outflow section of the relative sanitation services.

Prior art

[0002] Generally clear or golden discharge water is the water from washbasins, bidets or sinks or washing machines.

[0003] The discharge section of the relative above-mentioned sanitation discharges generally refers to a drain or an opening at the bottom of a collection basin. Hereinafter, said drain or opening will be called the discharge outlet.

[0004] This water, collected in the water collection basin, is clear water, perhaps saponified to combine with greases and free of coarse or very large elements.

[0005] All the above-mentioned discharges, in order to prevent vapours from the pipes or discharge pipes coming up through the discharge outlet of the relative services are fitted with a siphon that is constantly full of a sufficient amount of water.

[0006] This water in the siphon, therefore, effectively prevents an air link between the discharge outlet and the relative drain pipes.

[0007] However, since in these pipes (pipelines, conduits, wells, grease separators, etc.) very often there are all kinds of animals, and especially small ones, like for example cockroaches, lizards, spiders, etc., these can quite easily come up through the pipes and come out of the discharge outlet.

[0008] Evidently the water in the siphon does not stop these animals coming up through the pipe to reach the discharge outlet, then to come out into the relative basin and move undisturbed in the domestic environment.

[0009] Actually, this water makes it easier for these animals get themselves up to the opening of the discharge outlet.

[0010] Currently, then, the only solution there is for averting this risk is to keep said discharges constantly closed with mechanical plugs that from within the basin are pushed to connect to the relative discharge outlet.

[0011] Sometimes this mechanical closing, like for example in showers, whose base has a drain that cannot be closed mechanically with a plug, is not physically there and so the above-described solution is not applicable.

[0012] Beforehand, or when the basin above is being filled, said mechanically closing plugs are removed to let the dirty/discharge water go out.

[0013] If, inadvertently, you forget to carry out the closing operation, after having drained away the water, it is clear that there remains a high risk of the above-mentioned animals coming up through the open discharge outlet without any impediment or obstacle to block their passage.

Presentation of the invention

[0014] The object of this invention is to overcome one or more of the drawbacks of the prior art.

[0015] A further object of this invention is to make available a device that automatically closes the outflow section.

[0016] Another object of this invention is to make available a device that is completely mechanical.

[0017] An important object of this invention is to make available a device that cannot be overcome by an animal trying to shift it.

[0018] Another object of this invention is to make available a device that is self-cleaning.

[0019] An even further object of this invention is to make available a device that is both simple and reliable.

[0020] A further object of this invention is to make available a device that is both inexpensive and easy to install.

[0021] Lastly, an important object of this invention is to make available a device that can be installed without any problems on any type of discharge that has, or which could be made to have, a siphon.

Exposition of the invention

[0022] One or more of the above-mentioned purposes are attained with the object of the invention as described and characterised by the attached claims.

[0023] In particular, the device of the invention is composed of a siphon, capable of keeping a certain head of water on a branch of which there is a sphere, where said sphere is capable of joining to close the discharge outlet from inside the siphon under the thrust of the water in the branch in which said sphere is present.

Advantageous characteristics of the invention

[0024] Advantageously, the invention is configured as a completely mechanical device, with automatic closing of the discharge outlet. Very relevantly, the water in the siphon lets the water in the basin above flow away even with slight overpressures.

[0025] It is important that the siphon has the truncated cone branch in which the sphere is present, both for self-cleaning and quick closing and for security against any animals that want to come up. It is appropriate that the connecting section between the two branches of the siphon is smaller than the section of the sphere. Advantageously, the section of the discharge outlet to which the sphere connects has a wear-resistant coating, ensuring it is long-lasting.

[0026] Usefully, the sphere is hollow and much lighter than water, thereby providing an excellent closing action with low inertia.

[0027] The tapered conical section has a height/diameter ratio greater than 1, and preferably greater than 1.2, and even more preferably greater than 1.5.

[0028] With this taper it has been found that many an-

imals, which can climb vertical walls, find it difficult to overcome it because they can't grip the walls.

[0029] Advantageously, the degree of thrust of the sphere on the discharge outlet can be modified by changing the height of the discharge of the second branch, because the height of this can be regulated.

Brief description of the drawings

[0030] The technical characteristics of the invention, according to the above-mentioned purposes, can be clearly seen from the content of the claims below and its benefits will be even clearer in the detailed description that follows, made with reference to the enclosed drawings which represent just one example of an embodiment, where:

Fig. 1 shows a longitudinal vertical section view of the invention with the sphere that blocks the discharge outlet.

Fig. 2 shows horizontal section view of the invention orthogonal to that of fig. 1

Fig. 3 shows the device of fig. 1 where the sphere has shifted from its connection to the discharge outlet to let the liquid coming from the basin above to flow away.

Detailed description

[0031] With reference to the drawings, the device consists of a siphon 2 composed of at least two branches 3 and 4.

[0032] In the first branch 3 of the siphon 2 the discharge water flows through the discharge outlet 5.

[0033] From the second branch 4 of the siphon 2 the discharge water flows through the discharge 6 connected to the drainage system 7.

[0034] The two branches 3 and 4 of the siphon 2 re connected by a narrow hydraulic section 8.

[0035] Inside the first branch 3 of the siphon 3 there is a sphere 9 that can connect to the outflow mouth 5 blocking it hydraulically.

[0036] The action of blocking the discharge outlet 5 by the sphere requires sufficient thrust by the water 10 in the first branch 3 of the siphon 2.

[0037] The level 11 of this water 10 is set by the communicating vessels of the two branches 3 and 4 of the siphon 2.

[0038] Said level 11 therefore of the water 10 establishes the degree of thrust of the sphere against the discharge outlet 5, fixing the relative connection pressure.

[0039] By changing the level 13 of the water 12 coming out in branch 4, changing the height of the discharge 6 directly affects the connection pressure between the discharge outlet 5 and the relative sphere 9.

[0040] A lower position of the discharge 6 provides just a sufficient closing of the discharge outlet by the sphere 9, facilitating the flowing of the water coming from the basin above without standing water.

[0041] A higher position of the discharge 6 provides a closing of the discharge outlet 5 with high pressure by the sphere, avoiding that it could easily disconnect following unforeseen stress.

[0042] Normally, therefore, with a certain amount of water in the branch 3 of the siphon 2, the sphere 9 will block the passage, connecting with the relative discharge outlet, and preventing any animals, which have come up through the drain pipes 7 of the drainage network, and having first passed through the second branch 4 of the siphon 2 and through the narrow section 8, which have reached the first branch 3 of the siphon 2 from going beyond the discharge outlet 5 to freely reach the basin above.

[0043] Advantageously, the form of the sphere 9 also prevents any foothold for the above-mentioned animals, so they cannot clutch it and move it, which, with any action, will start to rotate, keeping its position, making any attempt to shift it by these animals absolutely futile.

[0044] Moreover, the taper configuration of the top part of the first branch 3 of the siphon 2, with a roughly truncated cone configuration, or the like, renders this device quick and safe to operate after the shifting of the sphere 9 due to the water flowing down from the basin above.

[0045] In fact, the sphere, without any bouncing or deviations, will quickly return to its closed position connected to the discharge outlet 5.

[0046] Moreover, this configuration prevents animals from staying around the sphere 9, seeking to quickly overcome the flow coming down when the discharge outlet 5 is open.

[0047] In fact, this inclination of the walls adjacent to the discharge outlet with a height/diameter ratio greater than 1 and preferably greater than 1.2 and even more preferably greater than 1.5, will establish a cleaning and a removal of any element or animal nearby or in the vicinity of the inclined walls next to the discharge outlet 5.

[0048] In fact, the descent of the sphere 9 under the pressure of the discharge water coming from the basin above creates a high speed flow in the narrow section between the sphere and relative inclined surfaces of the first branch 3, self-cleaning said inclined surfaces. The above-mentioned quick flow ensures any nearby animals are removed and contributes to keeping the system clean with a forceful flow crossing the surfaces close to the discharge outlet. The sphere, however, also following a large flow of water, cannot leave the first branch 3 of the siphon, since the narrow section 8 is smaller than the diameter of the sphere, thereby keeping it in place. When there is no flow of water, the sphere will tend to take up its position blocking the discharge outlet 5.

[0049] It is very clear that all modifications and variants to the basic inventive concept are included.

[0050] Therefore the construction method of the siphon, shown just by way of example in the drawings, should not be construed as in any way limited to that.

[0051] Any construction methods that lead to the same

result should be considered as implementations within the reach of the average technician in the field, like for example a single monoblock siphon realised with an expansive or rotational method, or else with two or more elements united together by adhesives and/or ultrasound etc.

[0052] Clearly also the shape and the profile of the siphon can be significantly different, compatible with the use and the function for which they are made.

[0053] For example, an outflow of the connection to the drainage pipes at 90 degrees to the main body does not change the object of the invention as protected in its essence, as also a body of the siphon that has an angled configuration, with a variable angle between the positioning of the first branch 3 with respect to the second branch 4.

[0054] Beneficially, the branch 3 has an aperture of suitable dimensions for inserting the sphere 9 inside the branch itself.

[0055] Said aperture, which can be also used for cleaning the siphon 2, is advantageously positioned at the lower part of the siphon, which can be easily opened for inspection and/or maintenance.

Claims

1. Device for preventing animals coming up through clear water drain pipes, **characterised by** the fact that it consists of a siphon (2), which can hold a certain head (11) of water (10) in a branch (3) of the siphon (2), in which branch (3) there is a sphere (9) that can join to the discharge outlet (5) in order to close it from inside the siphon (2), under the thrust of the water (10) in the branch (3) in which is said sphere (9).

2. Device for preventing animals coming up through clear water drain pipes according to claim 1, **characterised by** the fact that it is configured as a completely mechanical device, automatically closing the discharge outlet.

3. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the head (11) of water (10) of the siphon (2) is such that it lets the water in the basin above flow out even with modest overpressure.

4. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the siphon (2) has at least one part of the surface, and preferably the one resting against the discharge outlet (5) of the branch (3) where there is sphere (9)with a truncated cone shape.

5. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the narrow section (8) connecting the two branches (3, 4) of the siphon (2) is smaller than the section of the sphere (9).

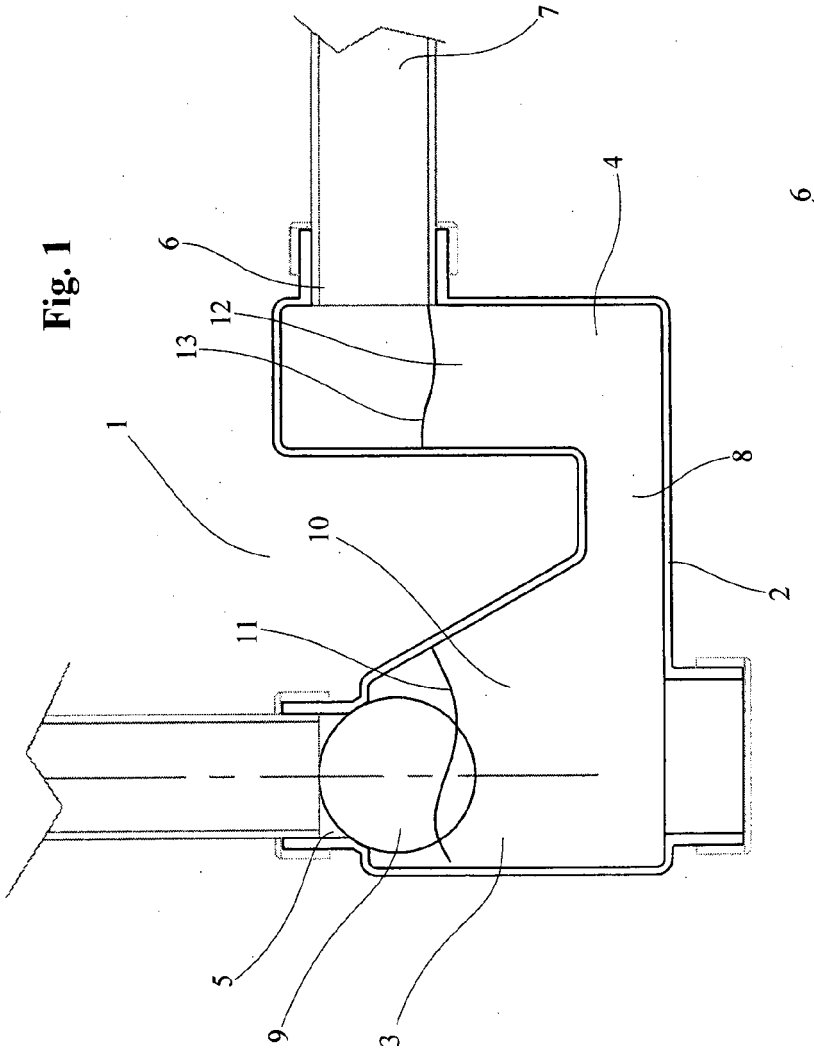
6. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the section of the discharge outlet (5) to which the sphere (9) joins, has a wear-resistant coating, ensuring its reliability over time.

7. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the sphere (9) is hollow and lighter than water.

8. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that truncated cone section of the branch (3) of the siphon (2) has a height/diameter ratio greater than 1, and preferably greater than 1.2 and even more preferably greater than 1.5.

9. Device for preventing animals coming up through clear water drain pipes according to one or more of the previous claims, **characterised by** the fact that the discharge (6) of the second branch (4) of the siphon (2) can have its height adjusted to change the degree of pressure of the sphere (9) on the discharge outlet (5).

Fig. 1



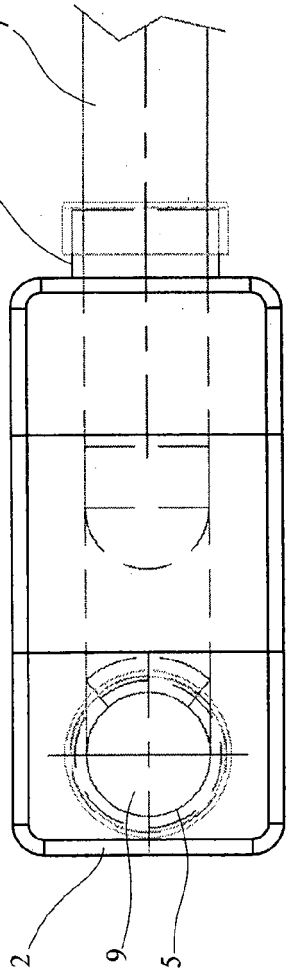
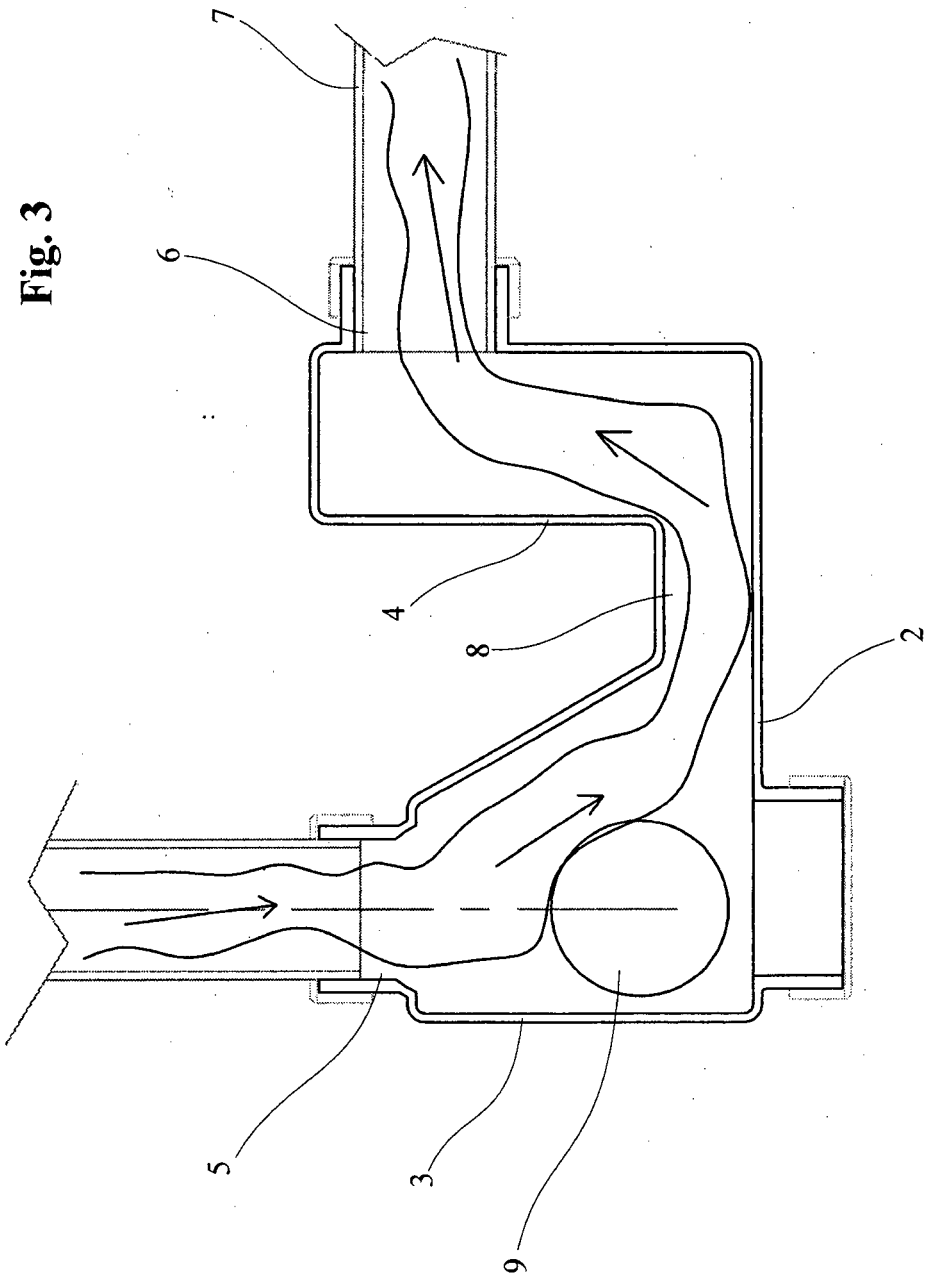


Fig. 2

Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 15 00 1791

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 Y	US 236 125 A (ELECTUS B. WARD) 28 December 1880 (1880-12-28) * the whole document * -----	1-9 1-9	INV. E03F7/06
X	US 592 690 A (JOHN W. BRAGGER) 26 October 1897 (1897-10-26) * the whole document * -----	1-4,6-9	
X	CN 201 010 956 Y (XIAOCHUN LI [CN]) 23 January 2008 (2008-01-23) * figure 1 * -----	1-9	
Y	US 5 662 138 A (WANG WEN-HSING [TW]) 2 September 1997 (1997-09-02) * figure 4 * -----	1-9	
			TECHNICAL FIELDS SEARCHED (IPC) E03F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 November 2015	Horst, Werner

CATEGORY OF CITED DOCUMENTS

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19-11-2015

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US 592690 A	26-10-1897	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82