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(54) Filler valve for filling rigid containers using suction

(57) The invention falls into the field of systems for filling rigid containers with non-fizzy liquids, operating at low vacuum levels. A filler valve (1) is consituted of a cock body (2) and a central pipe (3) in the cock, the said elements being mutually coaxial and exclusively of the static type. A step element (13) is integrally secured to the internal portion of a liquid deflector element (9), the said element constituting the lower part of the central pipe (3) in the cock.

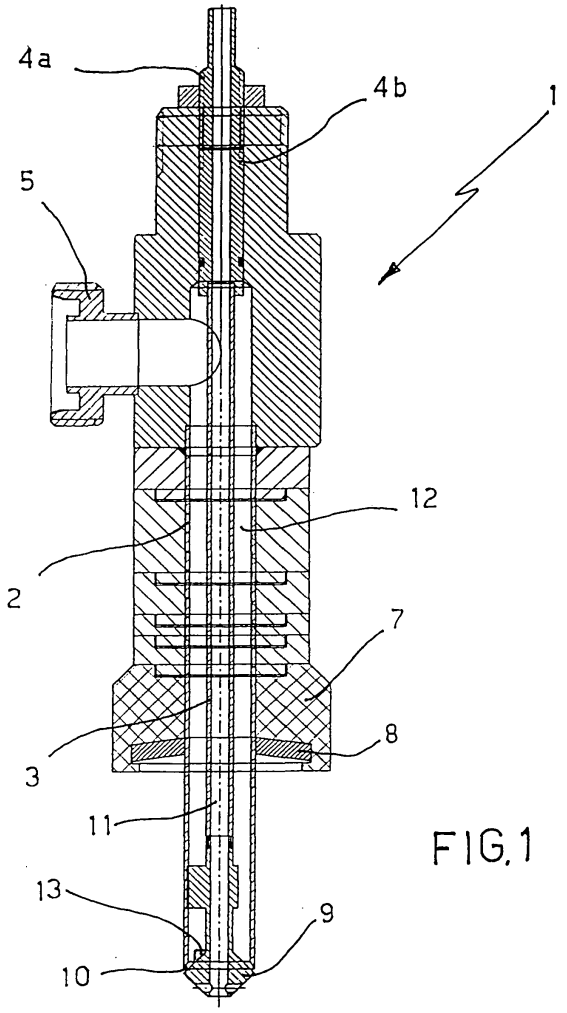

FIG.1

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Description

[0001] The invention relates to a device for filling rigid containers at low vacuum levels with flat, non-fizzy liquids.

[0002] Numerous low vacuum level bottling devices have been realised until now pertaining to the field of interest of the present invention and all appear to present at least two common characteristics: the first characteristic is constituted of the presence of mutually moving mechanical parts inside the liquid filler valve and the second characteristic regards the quantity of liquid recycled.

[0003] The presence of mutually moving parts leads to the drawback constituted of the disintegration of the surfaces exposed to the aforesaid mutual movement. Think, for example, of the wear of seals, which leads, inevitably, to the production of small parts thereof detaching, which can end up polluting the products metered out into the containers; it is also true that technology has developed dynamic seals realised using materials which are particularly compatible for food use but it is likewise true that this type of sealing element not only presents a particularly high cost but also appears difficult to source, unlike the traditional type of seals found in many countries, particularly in the third world.

[0004] The drawback of the disintegration of the surfaces exposed to mutual movement, nevertheless, also concerns the metallic parts, which, until not long ago, were covered with hard chromium; since it has been found that the disintegrating elements of this metallic surface protection may not be compatible with food use, recourse has been made to various alternative, non-polluting methods of hardening and covering the mutually moving mechanical elements but all of these present limits, be it, for example, due to the limited thickness of the covering, or the extremely high cost of relatively small production runs, as is the case with ceramic type coverings.

[0005] As far as the quantity of liquid recycled is concerned, the commonly known technique envisages continuous recycling in the event of an always closed filler valve, i.e. in the event there is no container in the filling station. This fact should be considered a drawback above all in the event that the liquid presents such particularities that it requires a new treatment before being reinstated in the filling line; at the least, there is dead time involved due to the realisation of the said new treatment.

[0006] A further drawback presented by the embodiments according to the commonly known techniques is the difficulty in executing a valid sanitation operation, in particular where the filler valve is concerned, considering the aforesaid existence of mechanical parts and relevant movement as well as the inevitable presence of particularly hidden and difficult to reach zones.

[0007] The aim of the present invention is to overcome all the aforesaid drawbacks.

[0008] In particular, the device for filling rigid containers at low vacuum levels with flat, non-fizzy liquids of the type applicable to rotary or linear filling machines, subject of the present invention, is characterised by the fact that the filler valve is exclusively of the static type since the said valve is always open, being devoid of a dynamic opening system and comprising a cock body and a central pipe in the cock, the said central pipe being inside, coaxial to the said cock body and secured to the said cock body by means of threading, and by the fact that a step element is integrally secured to the internal portion of a liquid deflector cone, the said deflector cone constituting the lower part of the central pipe in the cock.

[0009] This and other characteristics will better emerge from the detailed description that follows of a preferred embodiment, provided in the form of a non-limiting example, with reference to the accompanying drawings, in which:

- Figure 1 shows a filler valve body;
- Figure 2 shows the same elements as in the previous figure but inserted in a filling station;
- Figure 3 shows a schematic view of a filling station of a rotary type, with filler valve according to the present invention;

With reference to figure 1, 1 indicates a filler valve constituted of a cock body 2 and a central pipe 3 in the cock which is inside and coaxial to the said cock body.

[0010] The filler valve 1 is exclusively of the static type as the said valve is always open and devoid of a dynamic opening system.

[0011] The central pipe 3 is equipped, in its upper external portion, with male threading 4a to which corresponds relative female threading 4b machined onto the cock body 2.

[0012] At the filler valve 1, a union 5 is secured laterally for the connection of the said valve to a check valve 6 of a known type, as shown in figure 2.

[0013] A cap 7 is positioned coaxially to the cock body 2 and bears, inside it, a seal 8, also coaxial to the said cock body.

[0014] At the lower end of the central pipe 3 of the cock there is a deflector element 9 presenting two mutually overlapping tapers; the lower end of the cock body 2 and the tapered surface of the deflector element 9 designed to face the inside of the cock body 2 are drawn together to form a circumferential opening 10.

[0015] A channel 11 develops along the entire length of a central pipe 3 in the cock, coaxial thereto.

[0016] Between the cock body 2 and the central pipe 3 there exists a chamber with circumferential development 12.

[0017] A step element 13 is integrally secured to the tapered surface of the deflector element 9 designed to face the inside of the cock body 2.

[0018] In figure 3 the vacuum circuit is constituted of a first pipeline 16, a tube 17, a second tube 18, a recycling tank 19, and each of the containers 14 when the upper

edge thereof is in contact with the seal 8.

[0019] Again in figure 3, 15 indicates a support plate, of a commonly known type, for the containers 14.

[0020] The first pipeline 16 is connected directly, at the upper end of a central pipe 3 in the cock, with the channel 11 and the tube 17, and passing through a liquid tank 20.

[0021] The functioning modes of the invention will now be described with reference to numbers indicated in the figures.

[0022] When a container 14 reaches the filling station, the support plate 15 lifts the said container upwards until the upper edge thereof is resting on the seal 8. Only at this time is the vacuum circuit, constituted of elements 16, 17, 18, and 19 and the internal volume of the container 14, completely sealed and does the container filling commence by means of the suction effect created by the closure of the vacuum circuit.

[0023] The filling of each container 14 is performed with a jet of liquid in a conical curtain form suitable to direct the liquid towards the walls of each container, following the conically-shaped surface of the deflector element 9, passing through the always open circumferential opening 10. It should be noted that the conical curtain would obviously develop for 360° around the deflector element and this would lead to air being withheld inside the containers. In the present invention, on the contrary, the presence of the step element 13 ensures the conical curtain of container filling liquid does not complete 360°, presenting instead a gap of sufficient size to release the air from inside the container, thereby helping to balance out the level of the free surface of the liquid inside the said containers.

[0024] In order to obtain a gap in the circumferential development of the conical curtain of container filling liquid which is sufficient to guarantee an effective bleeding effect, the width of the step element 13 must simply correspond to a few degrees, general less than ten.

[0025] It should also be noted that, since the filler valve 1 is always open, the amount of liquid recirculating is minimised.

[0026] The procedure is accomplished by means of the functioning of the device described above.

[0027] The lack of mutually moving mechanical parts inside the filler valve 1 results in a first advantage consisting in the lack of particles of worn materials capable of polluting the filling liquid.

[0028] A second advantage, also linked to the lack of moving parts in the filler valve, is given by the lack of particularly hidden parts with the consequence that sanitation of the said filler valve is particularly effective.

[0029] A further advantage of the present invention is constituted of the relatively modest quantity of liquid recirculating in the event that there is no container in the filling station as the filler valve is always open.

Claims

1. A device for filling rigid containers (14) at low vacuum levels with flat, non-fizzy liquids, of the type applicable to a applicable to rotary or linear filling machines, **characterised by** the fact that the filler valve (1) is exclusively of the static type since the said valve is always open, being devoid of a dynamic opening system, and comprising a cock body (2) and a central pipe (3) in the cock, the said central pipe being internal, coaxial to the said cock body and secured to the said cock body by means of threading (4a, 4b) and by the fact that a step element (13) is integrally secured to the internal portion of a liquid deflector element (9), the said deflector element constituting the lower part of the central pipe (3) in the cock.

2. A device according to claim 1 **characterised by** the fact the restraint between the cock body (2) and the central pipe (3) in the cock is suitable to allow the existence of a circumferential opening (10) between the lower end of the said cock body and the deflector element (9) present in correspondence with the lower portion of the said central pipe in the cock; the said circumferential opening constituting the outlet opening for the liquid for filling the containers (14).

3. A device according to claim 1 **characterised by** the fact the step element (3) constitutes a gap element in the conical curtain of liquid that is discharged from the cock body (2) passing through a circumferential opening (10); this gap element being suitable to balance out the level of the liquid inside the container (14), facilitating the discharge of air from the said container.

4. A device according to claims 1 and 3 **characterised by** the fact the width of the step element (13) is substantially less than ten degrees.

5. A procedure for filling rigid containers (14) at low vacuum levels with flat, non-fizzy liquids **characterised by** the fact that each of the said containers is used for the purpose of closing the vacuum circuit and triggering the said filling thereof, the said filling procedure being performed by means of suction with a low degree of vacuum.

6. A procedure according to claim 5 **characterised by** the fact that, during the phase in which each container (14) is filled, the said container is lifted up by a support plate (15) until an interception occurs between the upper edge of the said container and a seal (8) positioned internally to a cap (7); in correspondence with the said interception, the vacuum circuit seal is realised and the container (14) filling commences.

7. A procedure according to claim 5 **characterised by** the fact that the conical curtain of filling liquid discharged from the cock body (2) presents a gap because of the presence of the step element (13); the said gap being suitable to guarantee the discharging of air withheld in the internal walls of each of the containers and the said curtain of filling liquid.

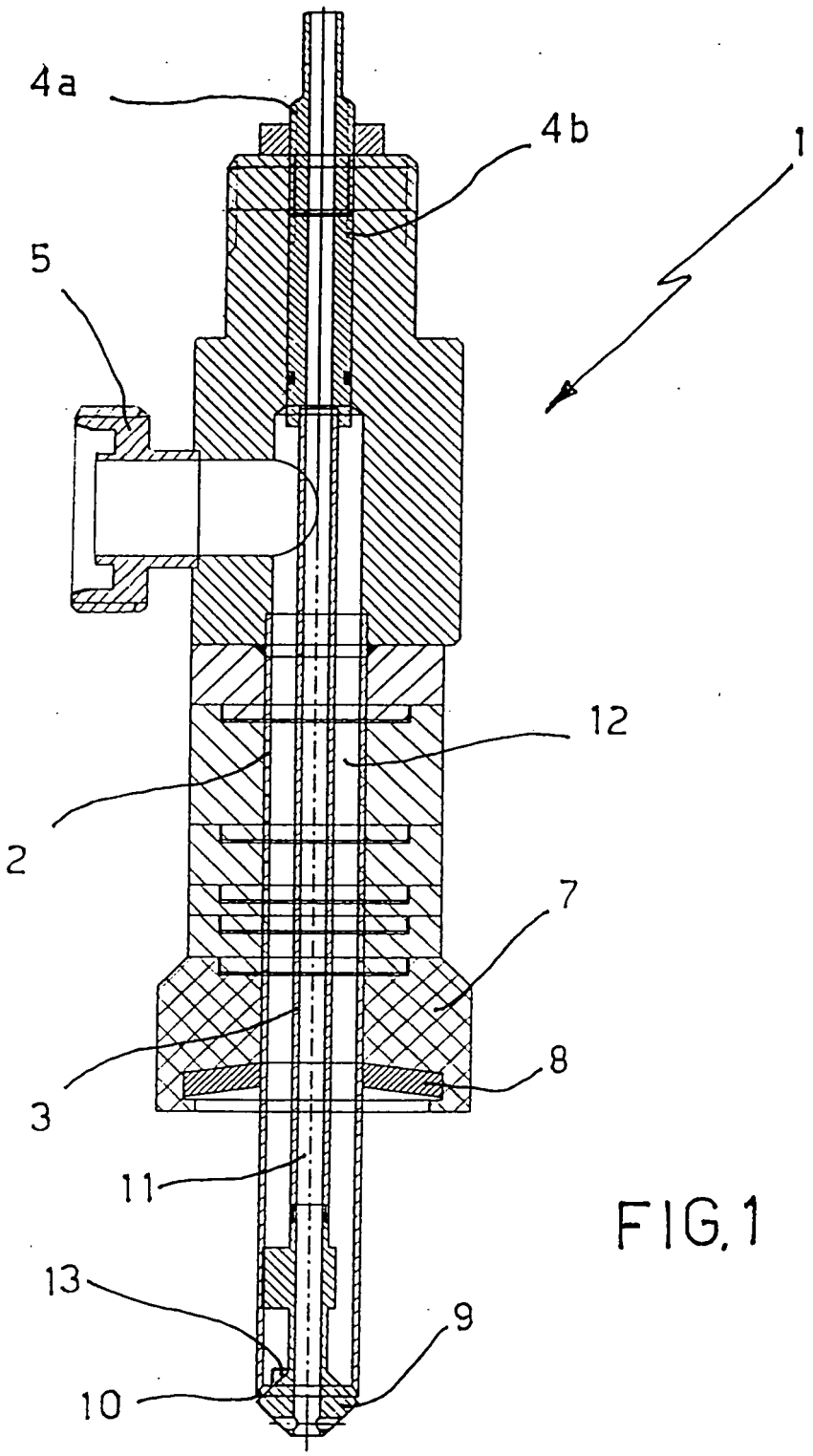

FIG.1

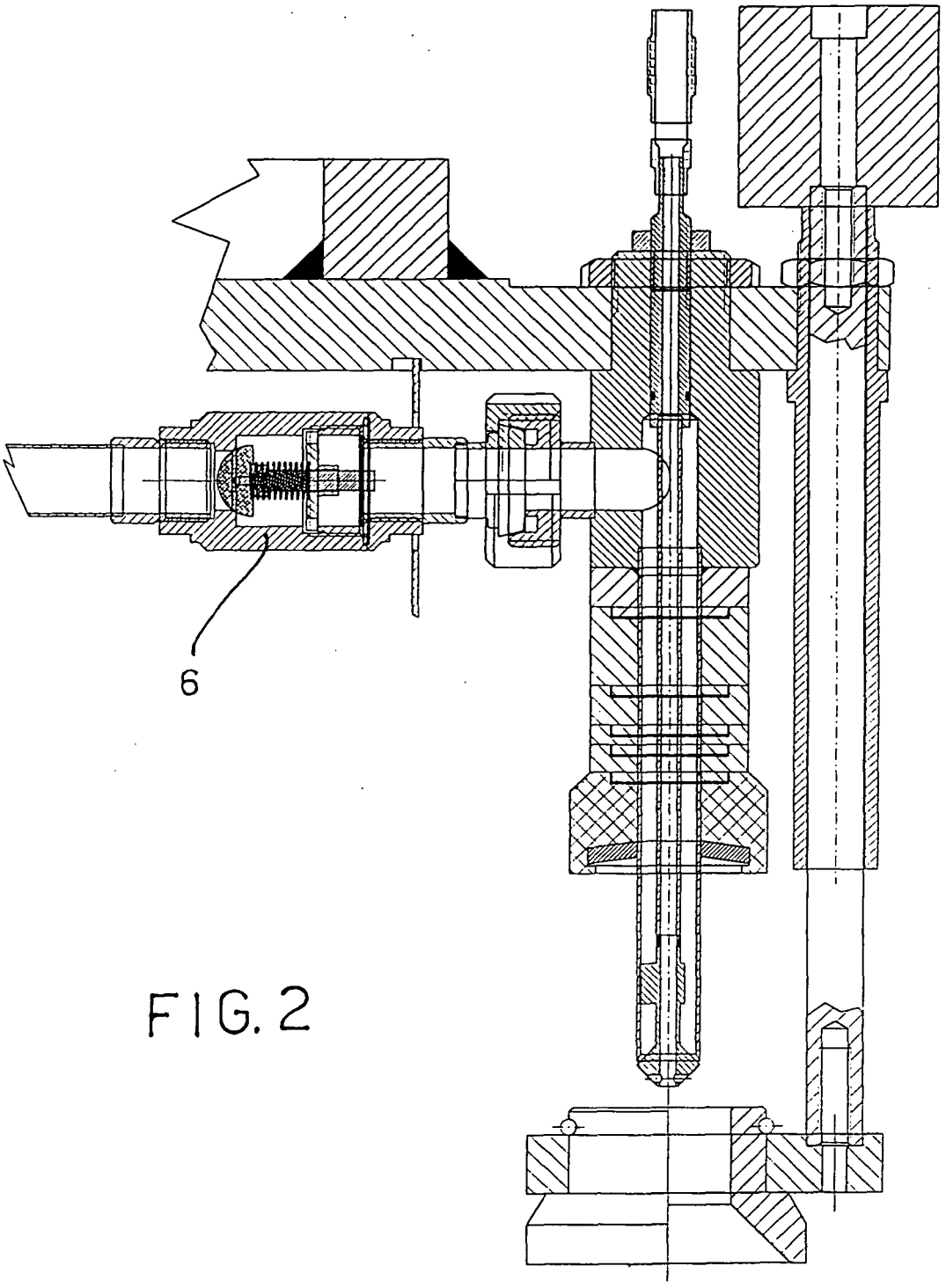

FIG. 2

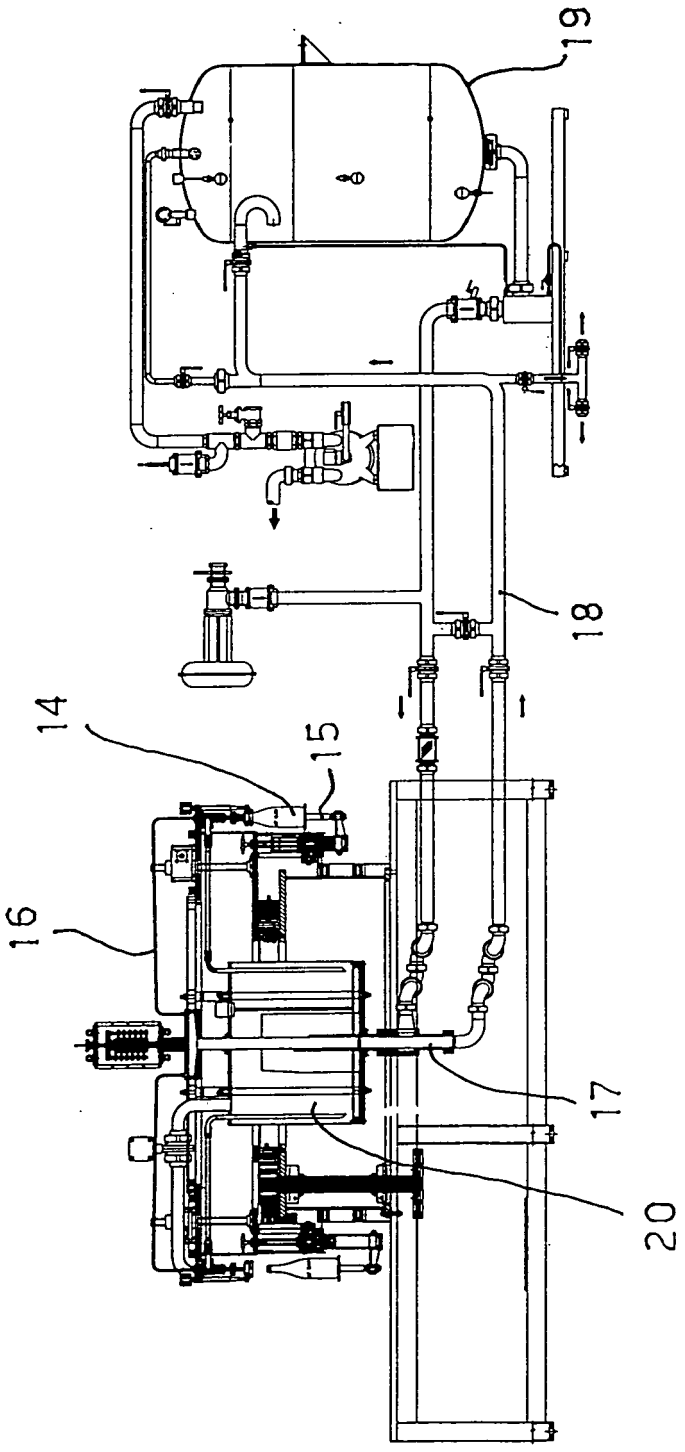

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 06 02 3911

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 087 065 A (LARRIEU HENRI) 31 December 1971 (1971-12-31) * page 2, line 32 - page 5, line 16; figure *	1-7	INV. B67C3/16
X	US 1 437 916 A (SHELOR FREDERICK L) 5 December 1922 (1922-12-05) * page 1, line 77 - line 90 * * page 2, line 49 - line 61 * * page 6, line 69 - line 78; figures 1-7 *	1-7	
A	EP 0 994 067 A2 (TETRA PAK PLASTICS LTD [CH]) 19 April 2000 (2000-04-19) * paragraph [0020]; figures 1,2 *	1,5	
A	EP 0 737 644 A1 (PWA GERAETE UND APPARATEBAU GM [DE]) 16 October 1996 (1996-10-16) * column 8, line 50 - column 9, line 15; figures 1,5 *	1,5	
			TECHNICAL FIELDS SEARCHED (IPC) B67C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 February 2007	Wartenhorst, Frank

CATEGORY OF CITED DOCUMENTS

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