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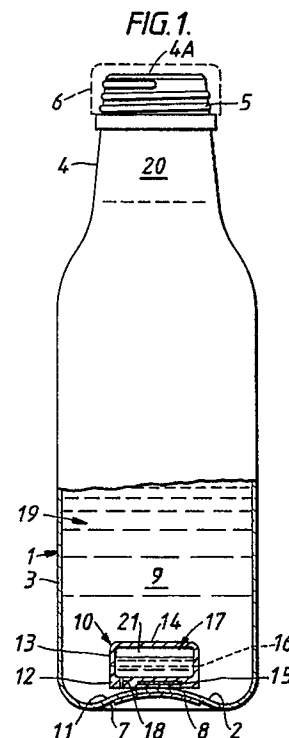
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(54) **A beverage package and a method of packaging a beverage containing gas in solution.**

(57) A beverage package and a method of packaging a beverage having gas in solution has a sealed bottle 1 with a primary chamber 9 containing the beverage and forming a primary headspace 20 comprising gas at a pressure greater than atmospheric. A hollow plastics moulded pod 10 forms a secondary chamber 17 which communicates with the beverage 19 by way of a restricted orifice 18. Beverage from the chamber 9 enters the chamber 17 by way of the orifice 18 and when the beverage is in equilibrium a secondary headspace 21 is formed in the insert. Upon opening the bottle 1, the pressure differential between the headspaces 20 and 21 ejects beverage from the insert 10 through orifice 18 to develop froth on the beverage. The insert 10 carries a permanent magnet 15 which is encapsulated within the plastics. The magnet 15 is attracted to a metallic strip 8 on the bottle base to retain the insert at its desired location in the bottle.

The insert 10 is dimensioned to be dropped into position on the bottle base through the bottle mouth and in an alternative arrangement the permanent magnet is carried on the bottle base to attract a metallic strip carried by the insert 10.



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TECHNICAL FIELD & BACKGROUND ART

The present invention relates to a beverage package and a method of packaging a beverage containing gas in solution and is particularly concerned with an improvement to the beverage package and method of packaging disclosed in our British Patent No. 2,183,592.

In our British Patent No. 2,183,592 there is disclosed a sealed container forming a primary chamber and within which is contained beverage (which may be alcoholic or non-alcoholic) having gas in solution therewith and forming a primary headspace comprising gas at a pressure greater than atmospheric. Located within the primary chamber, conveniently on a base portion of the container, is a hollow insert which forms a secondary chamber having a volume less than that of the primary chamber and which secondary chamber communicates with the beverage in the primary chamber through a restricted orifice. The secondary chamber contains beverage derived from the primary chamber and has a secondary headspace comprising gas at a pressure greater than atmospheric so that the gas pressures within the primary and secondary headspaces are substantially at equilibrium. When the sealed container is opened to open the primary headspace to atmospheric pressure, the secondary chamber of the insert is arranged so that the pressure differential caused by the decrease in pressure at the primary headspace causes beverage and/or gas (preferably beverage) in the secondary chamber to be ejected by way of the restricted orifice into the beverage of the primary chamber and said ejection causes gas in the solution to be evolved and form, or assist in the formation of, a head of froth on the beverage. In a preferred embodiment of this proposal the hollow insert is in the form of a plastics moulded pod which is inserted into the container prior to the container being charged with beverage. The pod is retained in position within the primary chamber, typically on or adjacent to the base of the container, by flexible lugs or tabs on the pod frictionally engaging a side wall of the container. Following such location of the pod, the primary chamber is charged with the beverage containing gas in solution and the container sealed as discussed in our aforementioned Patent.

Beverage packages manufactured in accordance with our British Patent No. 2,183,592 have proved a considerable success commercially. However, disadvantages have been found in the use of discrete hollow pods with flexible retaining tabs as mentioned above. In particular, expensive equipment is required to press and locate the pods in successive containers on a high speed filling line prior to charging the containers with beverage. It

has also been found that, occasionally, the flexible tabs do not provide sufficient grip with the side wall of the container and during rough handling the pod may break loose to float on the beverage in the primary chamber or possibly become filled with beverage (thereby losing the secondary headspace) so that a sub-standard, or no, head of froth develops when the container is opened. It is an object of the present invention to provide a beverage package and a method of packaging a beverage containing gas in solution by which the aforementioned disadvantages may be alleviated so that a hollow pod for a beverage package such as that disclosed in G.B. 2,183,592 (but not exclusively such a package) can be quickly, easily and efficiently located in a container of the package.

STATEMENTS OF INVENTION & ADVANTAGES

According to the present invention there is provided a beverage package comprising a sealed container having a primary chamber containing beverage having gas in solution therewith and forming a primary headspace comprising gas at a pressure greater than atmospheric; an insert located in the primary chamber and having a secondary chamber with a volume less than that of the primary chamber and a restricted orifice through which the secondary chamber communicates with the beverage in the primary chamber, said secondary chamber comprising gas at a pressure greater than atmospheric so that the pressures within the primary and secondary chambers are substantially at equilibrium, said package being openable to open the primary headspace to atmospheric pressure and the secondary chamber being arranged so that on said opening the pressure differential caused by the decrease in pressure at the primary headspace causes at least one of beverage or gas (preferably beverage) in the secondary chamber to be ejected by way of the restricted orifice into the beverage of the primary chamber and said ejection causes gas in the solution to be evolved and form, or assist in the formation of, a head of froth on the beverage, and wherein said insert is retained magnetically at a predetermined location in the primary chamber of the container.

Further according to the present invention there is provided a method of packaging a beverage having gas in solution therewith which comprises providing a container with a primary chamber; locating in said primary chamber a hollow insert having a secondary chamber the volume of which is less than that of the primary chamber and a restricted orifice through which the secondary chamber communicates with the primary chamber, and retaining said insert magnetically at a predetermined location in the primary chamber; charging

and sealing the primary chamber with the beverage containing gas in solution to form a primary headspace in the primary chamber, and charging the secondary chamber with gas under pressure whereby the pressures in both the primary and secondary chambers are at equilibrium and gaseous pressures in both the primary and secondary chambers are at a pressure greater than atmospheric.

Preferably the secondary chamber contains beverage derived by way of the restricted orifice from the primary chamber to form a secondary headspace in the secondary chamber with the gaseous pressures in the primary and secondary chambers in equilibrium. With this latter preference the hollow insert in the beverage package of the present invention can serve exactly the same purpose in forming or assisting in the formation of a head of froth on the beverage when the package is opened as the hollow insert disclosed in our British Patent No. 2,183,592 and as such that purpose is not discussed herein in detail. However, the magnetic retention of the hollow insert as proposed by the present invention can provide considerable advantages over the frictionally retained insert of our prior proposal. In particular the insert may be simply dropped into the primary chamber through an open top of the container so that the insert falls under gravity and is magnetically attracted to be retained, usually on the base of the primary chamber in the container. This alleviates the requirement for equipment which loads the inserts into the containers from entering those containers and thereby may permit a container filling line to run at a higher speed. Furthermore, by use of appropriately sized permanent magnets, the magnetic attraction by which the inserts are retained in position can be selected to ensure that the inserts will not break free from their desired location except under severe adverse conditions which are unlikely to be encountered during normal handling or transport of the beverage package. As mentioned above, the insert will usually be located and magnetically retained in the primary chamber on the base of the container but it will be realised that alternative locations are possible, for example on a side wall of the container.

Preferably the insert carries a permanent magnet so that it is retained at its desired location by attraction to a compatible metallic material on or in the container. This metallic material may be an integral part of the container, for example in the base or a side wall thereof, or may be secured to the container for the purpose of retaining the insert. Similarly to the proposal in our aforementioned British Patent, the hollow insert may be in the form of a plastics moulded pod and desirably the magnet is encapsulated within the plastics of the pod to

be sealed from the beverage in the package.

The container may be of any appropriate form such as a glass or plastics bottle, a can or a carton all of which are well known in the art. The invention was however primarily developed for use with glass bottle containers. The recycling of glass is to be encouraged and is now conventional practice in many countries. During such recycling glass bottles are crushed and metal parts are magnetically removed from the crushed material; with the preferred arrangement mentioned above where the hollow plastics insert carries a permanent magnet, such magnet and insert may readily be removed magnetically from a crushed glass container.

In another embodiment the container carries a permanent magnet to which a compatible metallic material on or in the hollow insert is attracted to retain the insert at its desired location. For example, a permanent magnet may be secured to or otherwise retained on the underside of the base of the container. This proposal may be less desirable than the insert carrying the magnet because during handling of the containers preparatory to them receiving the inserts in a filling line, it is possible for magnets on the containers to pick up stray metallic elements and this could require additional cleaning of the containers. However, it is also possible that magnets carried by the containers could additionally serve for automatically controlling movement, handling or stocktaking of the containers. Where the magnet (or magnetic material) is located on the container it can be provided with a protective cover which may serve to retain it or the magnetic material on the container. It is also possible for a permanent magnet (or magnetic material) to be encapsulated in the material of the container during the moulding thereof.

If required the hollow insert can be retained in the container by magnetic attraction between a magnet carried by the insert and a magnet carried by the container.

DRAWINGS

Embodiments of the present invention as applied to a beverage package having a bottle container will now be described, by way of example only, with reference to the accompanying illustrative drawings, in which:-

Figure 1 shows a first embodiment of the beverage package in which a glass bottle is shown in part section to illustrate the hollow insert therein with the insert carrying a permanent magnet by which it is retained on the base of the bottle, and

Figure 2 shows the bottom portion of a plastics moulded bottle in which the insert therein is retained by magnetic attraction to a permanent

magnet carried on the exterior of the plastics bottle.

DETAILED DESCRIPTION OF DRAWINGS

The beverage package shown in Figure 1 comprises a conventional wide mouthed glass bottle 1 having a domed base 2 extending upwardly from which is a cylindrical side wall 3 with a neck 4 having an open top 4A and provided with an external screw thread 5 to which is to be fitted and sealed a screw closure cap indicated at 6. The base 2 provides an externally concave surface 7 to which is adhesively secured a ferro-metallic strip or foil 8.

The bottle 1 forms a primary chamber 9 and is conveyed in an upstanding condition along a beverage filling line during which, and prior to being charged with beverage, a hollow insert in the form of a plastics pod 10 is deposited into the primary chamber. The pod 10 is dimensioned to pass through the open top and neck 4 of the bottle and is deposited in the primary chamber simply by being dropped through the bottle mouth so that it falls directly (or substantially so) onto the convex surface 11 presented by the interior of the domed base 2.

The hollow pod 10 is conveniently profiled as a cylindrical-disc shape with a bottom wall 12, a cylindrical side wall 13 and a top wall 14. Encapsulated within the plastics of the bottom wall 12 is a small permanent magnet 15. Typically, the pod 10 will be formed from two complementary injection moulded plastics shells which are spin welded or otherwise secured together along a split line indicated at 16 to form a secondary chamber 17. The magnet 15 is encapsulated within the plastics of the shell having the bottom wall 12 during the moulding thereof. Formed within the bottom wall 12 (either simultaneously with or subsequent to the moulding thereof) is a restricted aperture 18 which communicates between the primary chamber 9 and the secondary chamber 17. As the pod 10 falls into the primary chamber 9, the magnet 15 is attracted to the metallic strip 8 and this attraction serves to centralise the pod on the base 2 and to retain the pod firmly in abutment with the base 2. It will be appreciated that the magnet 15 will be selected so that its attraction to the strip 8 will firmly retain the pod in position at its desired location on the base 2 throughout the handling to which the bottle and package is likely to be subjected during subsequent processing, transport and storage.

With the pod 10 deposited in the primary chamber 9, the bottle is conveyed to a filling station where it is charged with appropriate beverage 19 containing gas in solution and thereafter to a sealing station where the screw cap 6 is fitted.

Subsequent to being charged with beverage and sealed, the effect within the primary and secondary chambers of the bottle 1 and pod 10 is substantially the same as in those chambers of the beverage can package discussed in the preferred embodiment of our British Patent No. 2,183,592. Consequently beverage flows from the primary chamber 9 by way of the restricted orifice 18 into the secondary chamber 17 so that when the contents of the bottle are in equilibrium the beverage in the primary chamber forms a primary headspace 20 and that in the secondary chamber 17 forms a secondary headspace 21. The pressure in the headspaces 20 and 21 is greater than atmospheric and upon removal of the cap 6 for consumption or dispensing of the beverage 19, the primary headspace 20 is opened to atmosphere and the pressure differential created by gas in the secondary headspace 21 ejects beverage from the secondary chamber 17 by way of the restricted orifice 18 and into beverage in the primary chamber 9. The so ejected beverage is subjected to cavitation causing gas in solution to be liberated therefrom - this "seeds" the beverage in the primary chamber causing further gas in solution to be liberated and form a head of froth on the beverage in an identical manner to that discussed in our aforementioned British Patent.

It is to be realised that the pod 10 is shown with a simple profile for convenience of description. In practice it is likely that the profile will differ, for example its bottom wall 12 may be shaped to present a substantially complementary fit to the base 7 of the bottle; its profile may be shaped to ensure that, irrespective of the orientation of the bottle when charged with beverage and sealed, a secondary headspace will always be maintained within the secondary chamber (with this in mind it is also possible that the position of the restricted orifice 18 will differ from that shown).

In the embodiment of Figure 2 the bottom portion of a bottle package is shown comprising a plastics bottle 1A having a substantially hemispherical base 2A. Located within the primary chamber 9 of the plastics bottle is the hollow plastics pod 10 which is conveniently shown with a different profile to seat in substantially complementary manner on the base 2A but serves the same purpose as the pod in the Figure 1 embodiment. A permanent magnet is omitted from the pod 10 in Figure 2 but encapsulated within the plastics of the bottom wall of the pod is a ferro-metallic bar, strip or foil 8A. The bar 8A and thereby the pod is attracted to and retained on the bottom 2A of the plastics bottle by a permanent magnet 25 secured to the underside of the base 2A. The magnet 25 may be adhesively secured to the base 2A or retained thereon by a plastics cover or base cup 26 which may form a

stand for the bottle 1A. The base cup 26 has a circular rim 27 secured to the cylindrical wall of the bottle 1A, conveniently by welding, adhesive or mechanical snap engagement.

Claims

1. A beverage package comprising a sealed container having a primary chamber containing beverage having gas in solution therewith and forming a primary headspace comprising gas at a pressure greater than atmospheric; an insert located in the primary chamber and having a secondary chamber with a volume less than that of the primary chamber and a restricted orifice through which the secondary chamber communicates with the beverage in the primary chamber, said secondary chamber comprising gas at a pressure greater than atmospheric so that the pressures within the primary and secondary chambers are substantially at equilibrium, said package being openable to open the primary headspace to atmospheric pressure and the secondary chamber being arranged so that on said opening the pressure differential caused by the decrease in pressure at the primary headspace causes at least one of beverage or gas (preferably beverage) in the secondary chamber to be ejected by way of the restricted orifice into the beverage of the primary chamber and said ejection causes gas in the solution to be evolved and form, or assist in the formation of, a head of froth on the beverage, and wherein said insert is retained magnetically at a predetermined location in the primary chamber of the container.
2. A package as claimed in claim 1 in which the container has an openable top and the insert is dimensioned to pass through said top when open.
3. A package as claimed in either claim 1 or claim 2 in which the insert comprises a hollow plastics moulded pod.
4. A package as claimed in claim 3 in which the hollow pod is formed by two injection moulded complementary shells welded together.
5. A package as claimed in any one of the preceding claims in which the insert carries a magnetic material by which it is magnetically retained at said predetermined location.
6. A package as claimed in claim 5 when appendant to either claim 3 or claim 4 in which the

magnetic material is secured to the pod by the moulding of the plastics thereto.

7. A package as claimed in either claim 5 or claim 6 in which the magnetic material is encapsulated within the material of the insert.
8. A package as claimed in any one of claims 5 to 7 in which the magnetic material carried by the insert is a permanent magnet.
9. A package as claimed in any one of the preceding claims in which the container carries a region of magnetic material to which magnetic material carried by the insert is attracted to retain the insert at said predetermined location.
10. A package as claimed in claim 9 in which the region of metallic material is encapsulated within the material of the container.
11. A package as claimed in claim 9 in which the region of magnetic material carried by the container is located on the exterior of the container.
12. A package as claimed in claim 11 in which a protective cover is provided over the magnetic material on the exterior of the container.
13. A package as claimed in any one of claims 9 to 12 in which the region of magnetic material carried by the container is a permanent magnet.
14. A package as claimed in any one of the preceding claims in which the container is substantially of glass or plastics material.
15. A package as claimed in any one of the preceding claims in which the secondary chamber contains beverage derived from the primary chamber and has a secondary headspace therein.
16. A method of packaging a beverage having gas in solution therewith which comprises providing a container with a primary chamber; locating in said primary chamber a hollow insert having a secondary chamber the volume of which is less than that of the primary chamber and a restricted orifice through which the secondary chamber communicates with the primary chamber, and retaining said insert magnetically at a predetermined location in the primary chamber; charging and sealing the primary chamber with the beverage containing gas in solution to form a primary headspace in the

primary chamber, and charging the secondary chamber with gas under pressure whereby the pressures in both the primary and secondary chambers are at equilibrium and gaseous pressures in both the primary and secondary chambers are at a pressure greater than atmospheric.

17. A method as claimed in claim 16 which comprises charging the secondary chamber with beverage derived from the primary chamber by way of the restricted orifice to form a secondary headspace in the secondary chamber whereby the pressures in the primary and secondary headspaces are at equilibrium.
18. A method as claimed in either claim 16 or claim 17 in which the container has an open top and which comprises depositing the insert in the primary chamber by dropping the insert through said open top and permitting the insert to fall under gravity onto a base of the container where it is magnetically retained.

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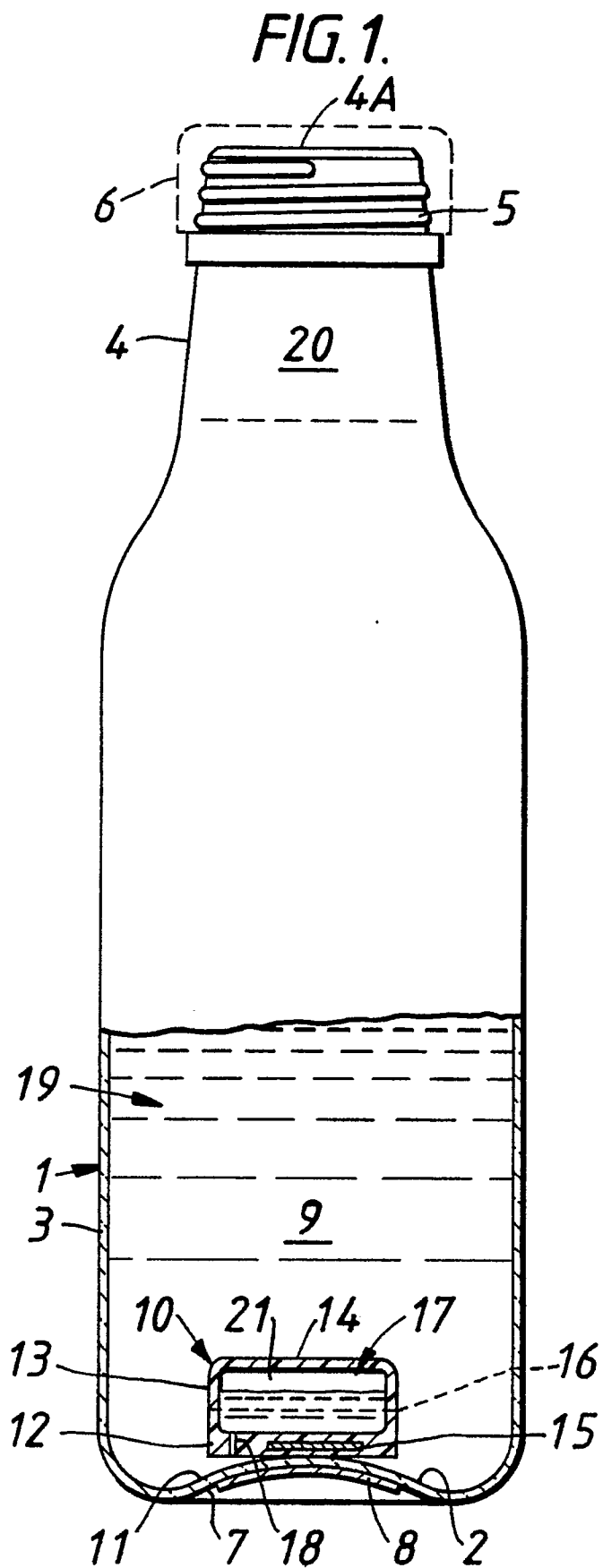
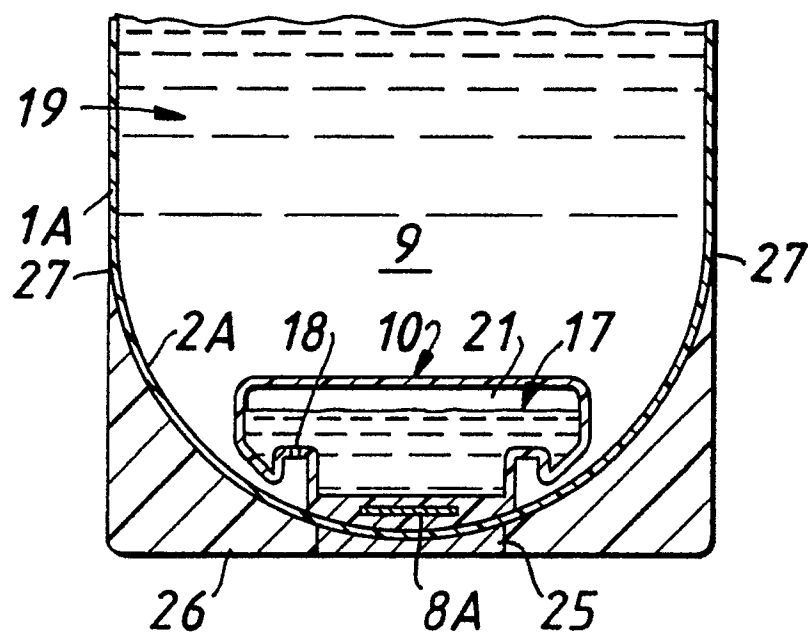


FIG. 2.





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EUROPEAN SEARCH REPORT

Application Number

EP 91 30 0675

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
D,Y	EP-A-0 227 213 (ARTHUR GUINNESS SON & CO.) * Abstract; figures 1,5 * -- --	1,2,16-18	B 65 D 81/32 B 67 D 3/04
Y	FR-A-1 280 046 (LABORATOIRES ROBERT ET CARRIERE S.A.) * Page 2, lines 4-41; fig. * -- -- -- --	1,2,16-18	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B 65 D B 67 D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of search 22 May 91	Examiner VAN DEN BOSSCHE E.J.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons ----- &: member of the same patent family, corresponding document			