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(11) **EP 0 860 361 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.08.1998 Bulletin 1998/35

(51) Int. Cl.⁶: **B65B 39/00, B67C 3/26**

(21) Application number: **98103163.6**

(22) Date of filing: **23.02.1998**

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **25.02.1997 IT BO970090**

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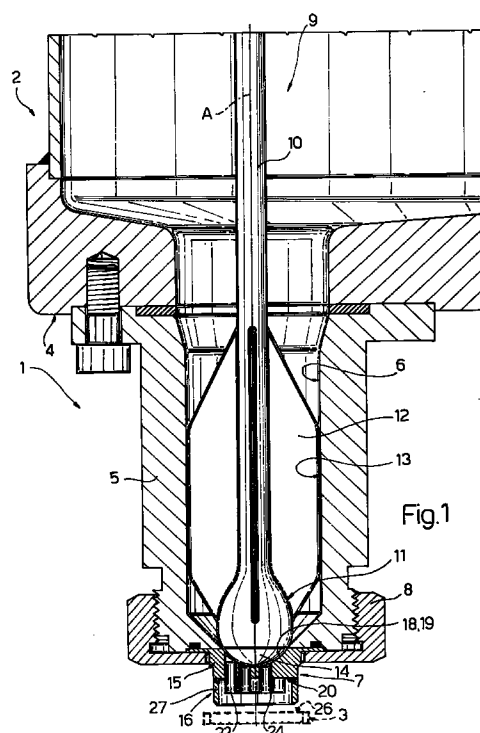
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Remarks:

Amended claims in accordance with Rule 86 (2)
EPC.

(54) **Liquid dispensing nozzle**

(57) A device (1) for dispensing liquids, wherein an output distributing element (7), located at the end of a supply conduit (6), has an upper input portion (15) communicating with the conduit (6) and engaged in fluidtight manner by a valve element (9) movable axially inside the conduit (6), and a lower output portion (16) having a number of holes (17) communicating with the conduit (6); each hole (17) is defined at the bottom by a horizontal flat surface (20), and has a respective tubular element (23) fitted inside the hole (17) itself and having an end portion (24) projecting from and crosswise to the flat surface (20).



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Description

The present invention relates to a liquid dispensing device.

More specifically, the present invention relates to a liquid dispensing device of the type comprising a supply conduit; a liquid output distributing element fitted to the bottom end of the conduit and which is engaged by a bottle for filling; and a valve element movable with respect to the supply conduit to engage the distributing element in fluidtight manner and regulate supply of the liquid.

Known dispensing devices of the above type are normally fed along a circular path by a carousel conveyor rotating about a vertical axis, and are engaged cyclically by the bottles for filling. More specifically, each distributing element comprises an input portion having a substantially conical inner surface, defining an end portion of the conduit, and engaged in fluidtight manner by the valve element; and a tubular output portion, which is defined externally by a substantially cylindrical outer surface so sized as to be partly insertable inside a bottle, and comprises one or more vertical through holes defined at the top by the substantially conical inner surface, and at the bottom by a flat horizontal surface crosswise to the substantially cylindrical outer surface.

Dispensing devices of the above type involve several drawbacks, due to the fact that, once a given amount of liquid is dispensed inside the bottle and the valve element is set to close the input portion of the distributing element, the liquid left inside the vertical holes has neither sufficient force nor speed to be fed into the bottle before this is detached from the output portion of the valve element. As a result, the remaining liquid drips from the holes and, given the substantial continuity of the bottom edges of the holes and said flat surface, also spreads over the flat surface to form a film of liquid which, as the conveyor is rotated, is hurled outwards of the conveyor.

It is an object of the present invention to provide a liquid dispensing device designed to overcome the aforementioned drawbacks.

According to the present invention, there is provided a dispensing device for liquids, comprising a supply conduit; an output distributing element for the liquid, fitted to the bottom of the conduit and engaged by a bottle for filling; and a valve element movable with respect to the conduit to engage the distributing element and regulate supply of the liquid from the conduit; the distributing element comprising an upper input portion defining an end portion of the conduit, and a lower output portion having at least one through hole communicating with said conduit and defined at the bottom by a flat surface crosswise to the hole itself; and the dispensing device being characterized in that said distributing element comprises a tubular element fitted inside said hole and having an end portion projecting from and crosswise to said flat surface.

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view, with parts in section and parts removed for clarity, of a preferred embodiment of the dispensing device according to the present invention;

Figure 2 shows a larger-scale top plan view of a detail in Figure 1;

Figure 3 shows a section along line III-III in Figure 2.

Number 1 in Figure 1 indicates a liquid dispensing device fittable to the periphery of a known carousel bottling conveyor (indicated as a whole by 2) rotating substantially continuously about a vertical axis (not shown) to feed device 1 along a given circular path extending in series through a loading station (not shown) where device 1 is engaged by an empty bottle 3, and an unloading station where device 1 is detached from the by then full bottle 3.

Device 1 extends vertically downwards from a bottom surface 4 of conveyor 2, and comprises a tubular, substantially cylindrical element 5 having an axis A parallel to the rotation axis of conveyor 2, and in turn comprising a through inner supply conduit 6 coaxial with axis A; and an output distributing element 7 for the liquid, fitted to the bottom of tubular element 5 and maintained coaxial with axis A and in fluidtight contact with element 5 by a ring nut 8 screwed to one end of element 5.

Device 1 also comprises a valve element 9, which is fitted in sliding manner inside conduit 6, is moved axially back and forth, by a known actuating device (not shown), with respect to conduit 6 to engage distributing element 7 in fluidtight manner and regulate supply of the liquid, and in turn comprises a stem 10 with a substantially spherical bottom head 11, and guide means defined by a number of guide fins 12 extending radially from stem 10 and contacting an inner surface 13 of conduit 6 to guide stem 10 axially and keep it equidistant from surface 13. More specifically, head 11 comprises a bowl-shaped bottom cap 14 defining the bottom end of head 11, and which may be separate from head 11 and made of rubber, teflon or steel.

As shown in Figures 2 and 3, distributing element 7 comprises an upper input portion 15 defining an end portion of supply conduit 6; and a lower output portion 16, which is positioned facing the inlet 26 of an empty bottle 3, and has a number of through liquid outlet holes 17 communicating with conduit 6. More specifically, on the side facing conduit 6, upper input portion 15 comprises a hemispherical seat 18, the bottom surface 19 of which is of the same shape as, and is engaged in fluidtight manner by, cap 14 of stem 10; and lower portion 16 is defined at the bottom by a flat surface 20 crosswise to axis A, and holes 17 extend between seat 18

and surface 20, and are arranged parallel to one other in two concentric rows 21, 22.

Distributing element 7 also comprises, for each hole 17, a respective tubular diffusing element 23, which is fitted inside hole 17 and comprises a respective end portion 24 projecting crosswise from surface 20. More specifically, tubular elements 23 are fitted removably inside respective holes 17, and have an inside diameter depending on the type of liquid being dispensed and, like a pipet, such as to prevent the liquid from dripping once head 11 engages seat 18 with cap 14 contacting bottom surface 19. The end portions 24 of tubular elements 23 comprise beveled bottom outer edges 25, and project from surface 20 by a given length L such as to interrupt surface 20 and prevent the formation of a film of liquid on surface 20. Distributing element 7 is positioned facing inlet 26 of bottle 3 so that axis A coincides with the axis of bottle 3.

Distributing element 7 also comprises an annular jacket 27 integral with lower output portion 16, extending from surface 20 and about tubular elements 23, and of an axial length L1 greater than length L of elements 23, so as to extend axially beyond the projecting end portions 24 of elements 23. Jacket 27 defines, together with surface 20, an open-bottomed cylindrical cavity 28, and comprises a number of horizontal radial orifices 29 formed through jacket 27 substantially at surface 20 and for connecting cavity 28 to the outside atmosphere. More specifically, as the liquid is dispensed through tubular elements 23, orifices 29 prevent the formation inside cavity 28 of a vacuum capable of expanding the jet of liquid from elements 23 and producing turbulence preventing bottle 3 from being filled.

In actual use, conveyor 2 rotates continuously about said rotation axis to feed dispensing device 1 through said loading station, where device 1 receives a respective bottle 3 positioned with inlet 26 beneath elements 23 and coaxial with element 7.

Once inlet 26 is so positioned, said actuating device raises stem 10 along conduit 6 to detach head 11 from seat 18 and permit the liquid the flow into bottle 3 through tubular elements 23. Bottle 3 is filled at it travels along said circular path, and the liquid supply is cut off as head 11 once more engages seat 18 upstream from the unloading station, where the by now full bottle 3 is detached in known manner from device 1, which is fed back to the loading station.

Once head 11 engages seat 18 and bottle 3 is detached from device 1, the liquid remaining inside tubular elements 23 is retained inside elements 23 themselves, which, given their inside diameters, function in the same way as a pipet, which, once filled and closed at the top, may be positioned vertically without the liquid inside issuing from the open bottom end.

Claims

1. A dispensing device for liquids, comprising a supply

conduit (6); an output distributing element (7) for the liquid, fitted to the bottom of the conduit (6) for engagement with a bottle (3) to be filled; and a valve element (9) movable with respect to the conduit (6) to engage the distributing element (7) and regulate supply of the liquid from the conduit (6); the distributing element (7) comprising an upper input portion (15) defining an end portion of the conduit (6), and a lower output portion (16) having at least one through hole (17) communicating with said conduit (6) and defined at the bottom by a flat surface (20) crosswise to the hole (17) itself; and the dispensing device (1) being characterized in that said distributing element (7) comprises a tubular element (23) fitted inside said hole (17) and having an end portion (24) projecting from and crosswise to said flat surface (20); said upper input portion (15) of said distributing element (7) comprising a seat (18) defining said hole (17) at the top; and said valve element (9) comprising a bottom rigid head (11) movable from and to an engagement position, wherein said rigid head (11) engages said seat (18) and closes said hole (17) at the top in a fluidtight manner.

2. A device as claimed in Claim 1, characterized in that said rigid head (11) is a spherical head and said seat (18) is a hemispherical seat.
3. A device as claimed in Claim 1 or 2, characterized in that the lower output portion (16) comprises a number of holes (17); and a tubular element (23) fitted inside each hole (17) and having a respective end portion (24) projecting from and crosswise to said flat surface (20).
4. A device as claimed in Claim 3, characterized in that said holes (17) are arranged on said flat surface (20) in at least two concentric rows (21, 22).
5. A device as claimed in Claim 3 or 4, characterized in that said tubular elements (23) are fitted removably inside the respective holes (17).
6. A device as claimed in any one of the foregoing Claims, characterized in that said distributing element (7) also comprises an annular jacket (27) surrounding said lower output portion (16) and said tubular elements (23), and extending beyond the end portions (24) of the tubular elements (23).
7. A device as claimed in Claim 6, characterized in that said jacket (27) comprises a number of horizontal orifices (29) formed through the jacket (27) substantially at said flat surface (20).
8. A device as claimed in any one of the foregoing Claims, characterized in that said valve element (9)

comprises a stem (10) supporting said rigid head (11) and movable back and forth inside said supply conduit (6), and guide means (12) for keeping the stem (10) substantially parallel to the conduit (6).

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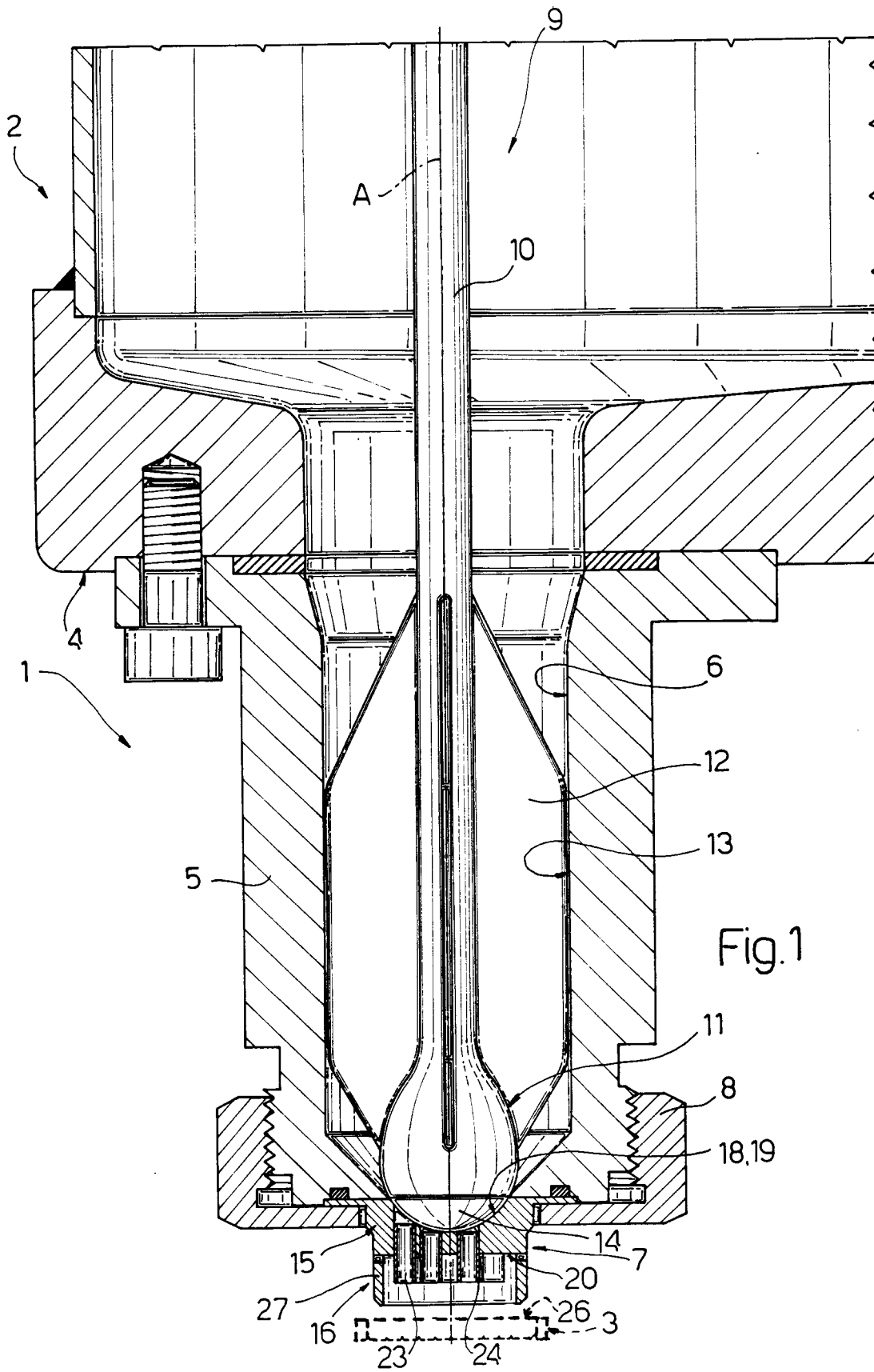
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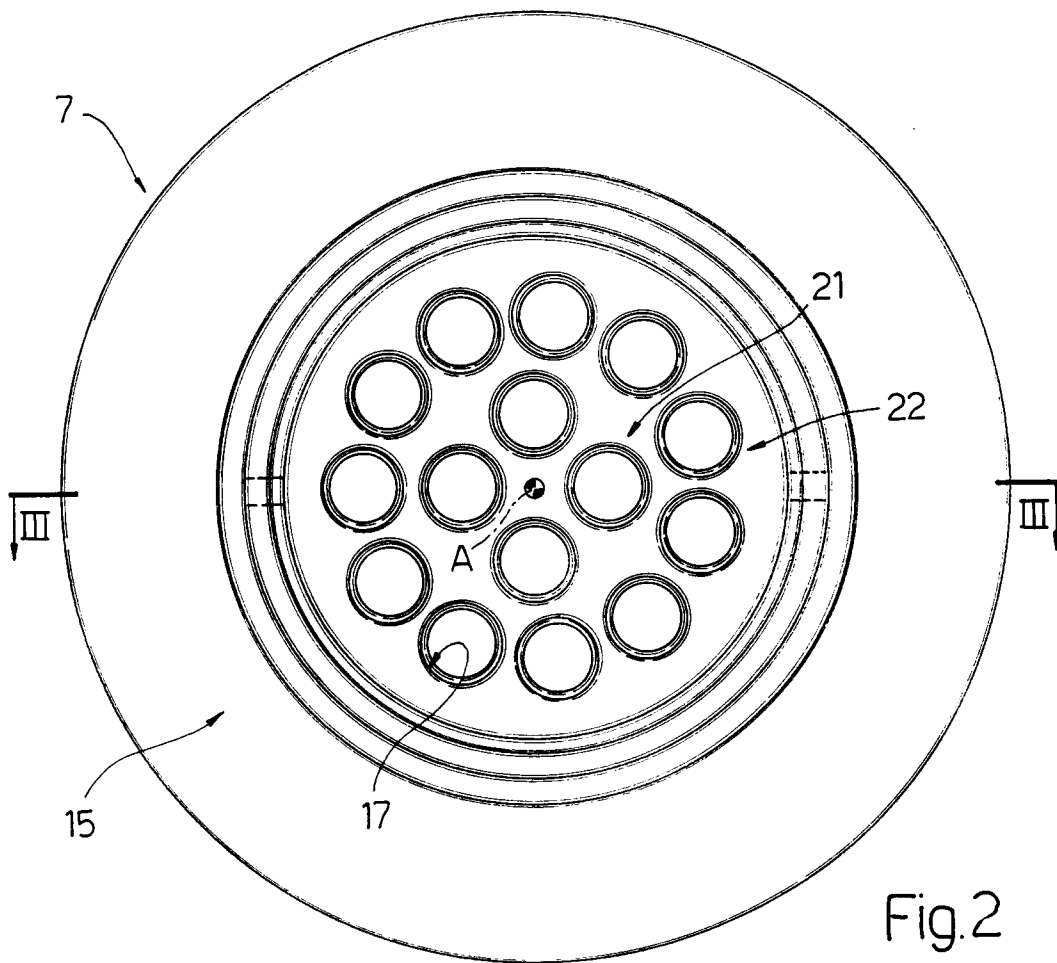


Fig.2

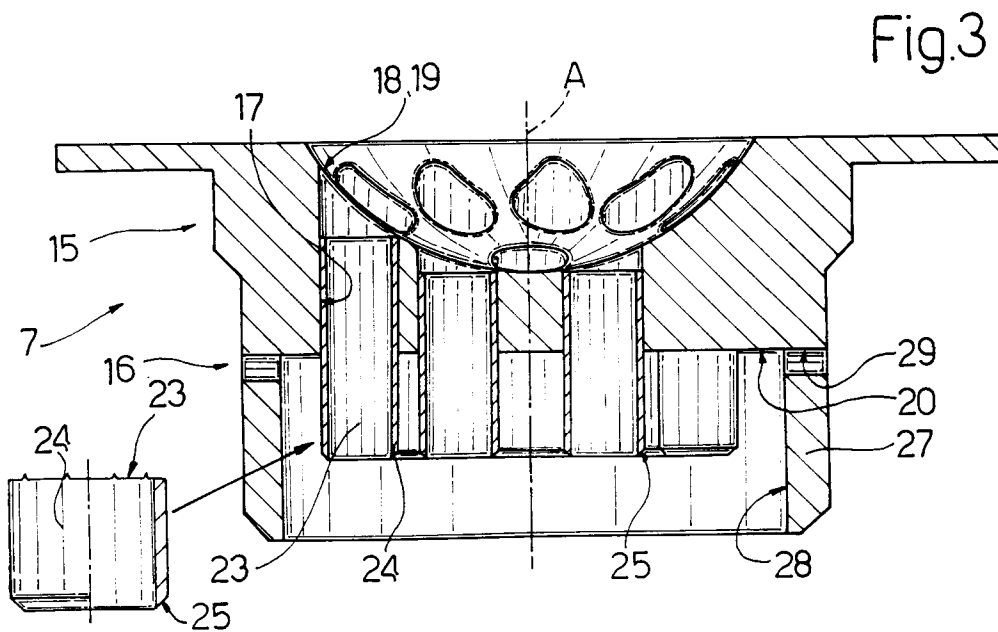


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 3163

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.6)
P,X	EP 0 770 549 A (SOCIETE DES PRODUITS NESTLE SA) * claim 1; figures * ----	1,2,5	B65B39/00 B67C3/26
X	DE 39 21 791 C (HASSIA VERPACKUNGSMASCHINEN) * column 3, line 2 - line 25; figures * ----	1,2	
X	DE 16 07 945 A (ACMA) * page 6, line 8 - page 7, line 7; figure 1 * ----	1,2	
A	EP 0 402 535 A (SHIKOKU KAKOKI CO.) ----		
A	EP 0 643 011 A (ELOPAK A/S) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B B67C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 May 1998	Examiner Deutsch, J.-P.
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			

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