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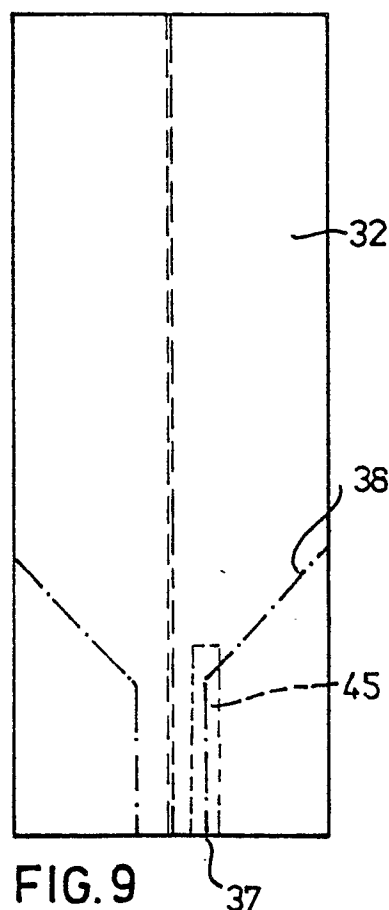
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(54) **Double-walled bag of high loading capacity.**

(57) The openable discharge spout (35) of a relatively elastic and fluid-proof inner bag (32) of a double-walled bag of high loading capacity comprises four first lines (37) which are parallel to the longitudinal axis of the inner bag forming the spout itself, and four second lines (38) which extend between the discharge spout and the corners of the bottom of the outer bag when the double-walled bag has been filled. Those first and second lines are created by heat welding plies (39-42) of an originally tube-shaped material and removing waste material from it to create the spout.



EP 0 300 539 A1

Double-walled bag of high loading capacity.

The invention relates to a double-walled bag of high loading capacity for fine-powdered or fluid material, comprising an outer bag of flexible and yet hardly elastic material having a rectangular bottom, and an inner bag of relatively elastic and fluid-proof material also having a rectangular bottom, which double-walled bag is destined to be filled from above and to be emptied through an openable discharge spout, said outer and inner bags being mutually connected by at least one tab which is connected in a fluid-proof manner to the inner bag.

Such a double-walled bag is known from EP-A-0168974. The tabs of the known completely rectangular or cylindrical bags prevent the inner bag from falling out when emptying it, and thus blocking the discharge spout.

The spouts of the known bags consist of tubes which have to be adhered to a hole in the bottom or top of the inner bag, which bottom and top in their turn have to be adhered to the inner bag itself. In view of the great dimensions of the bags this is a very difficult procedure, which can easily result in bags which do not satisfy the high demands as to being fluid-proof.

The invention aims to improve the above. According to the invention, this has been attained in that the inner bag has been extruded in tubular form, then folded into four plies and laid down in such a way that the upper and lower broad plies are delimited by outer folds, whereas the smaller inner plies are delimited by the outer folds and two inner folds which substantially extend in the longitudinal axis of the tube, and in that each of the at least four pairs of outer and inner plies have been heat-welded and cut along a first line parallel to the longitudinal axis of the tube for forming the discharge spout and a second line at an angle of substantially 45° in relation to the first line, which second lines extend between the discharge spout and the corners of the bottom of the outer bag when the double-walled bag has been filled.

In case the double-walled bag is embodied with an open top, the inner and outer bags can merge into a more or less tubular form. In this case there are four pairs of plies, which have been heat-welded. If the invented bag is embodied with a closed top, there are eight such pairs, of course.

It is remarked that a single bag of any material having a square bottom and a circular top is known from NL-A-6904720. These known bags are specially dimensioned for the use on Europool-pallets.

Preferably an even number of tabs is adhered or sealed to the inner bag, which strips are at least fastened by a stitch to the outer bag near its upper

edge. In this case, the strips preferably extend peripherally.

A rope can be connected to the tabs, which ropes can extend through holes of the outer bag to be knotted therein. In this case one could think of a re-usable outer bag in combination with a disposable inner bag.

The inner bag and/or said tabs consist of polypropylene or polyethylene, preferably polyethylene film, from PE-coated paper or from another fluid-proof material and preferably consist of polyethylene strip-woven fabric.

The invention will be further elucidated hereafter with reference to the drawing, in which as an example some details of a double-walled bag of high loading capacity according to the invention are represented. In the drawing:

Fig. 1 shows in perspective a known inner bag,

Fig. 2 shows, at a larger scale, a schematic detail of the inner bag fastened inside the outer bag, viewed in the direction of arrow II of fig. 1, the wall proportions having been represented exaggerated and interspaced,

Fig. 3 shows in perspective another inner bag,

Fig. 4 shows, at a larger scale, in perspective a corner point of an inner bag,

Fig. 5 shows in perspective a possible way of tying an inner bag of fig. 4 to an outer bag,

Fig. 6 shows an alternative of the embodiment of fig. 4,

Figs. 7 and 8 show some details of the inner bag of the invention, and Figs. 9 and 10 show details of how to produce a spout at the inner bag.

The double-walled bag represented in figs. 1 and 2 consists of an outer bag 1 of woven polypropylene with a specific density ranging from ± 180 to 400 g/m^2 or of polyethylene strip-woven fabric (stretched polyethylene), and an inner bag 2 of polyethylene film with a thickness ranging from ± 80 to $150 \text{ }\mu\text{m}$.

The inner bag 2 comprises four side walls 3 and two end walls 4. The end walls are provided with central holes and a spout 5 is connected to the edge of said holes. Such an inner bag is manufactured by sealing, connecting by hot-melt, adhering or connecting fluid-proof or in any other way cut-to-size parts to one another. Two tabs 6 project from the two end walls 4. These tabs can simply be pairwise extensions of the pertaining side walls 3 and be connected, in the manner represented in fig. 2, to the outer bag 1 by a stitching 7. However, it is also possible that the tabs 6 consist of another material than that of the

inner bag 2.

In the represented case the outer bag has an exterior appearance that corresponds with that of the inner bag, and thus it also comprises spouts. Before filling such a double-walled bag the bottom spouts are firmly tied with a rope or a cord. The same is done to the upper spout, if present, after filling. The rope or cord should be applied as far as possible from the outer ends of the spouts; not only to provide optimum stability during transportation, but also to be able, when filling the bag, to insert the inner spout into a discharge tube first, then to attach the outer spout to the periphery of the tube by means of a rope, cord or the like and finally to remove the first-mentioned rope or cord. In order to handle such bags with a loading capacity of one or more tonnes, at least two crane hooks have been applied at the top of the outer bags, which are not shown in the drawing because they are not covered by the scope of the present invention.

The inner bag 12 represented in fig. 3 consists of a seamless tubular polyethylene film. On said tube, a set of two tabs 16 of the same material has been adhered, sealed or applied in some other fluid-proof manner such as hot-melt, at such a distance from the end walls that those portions of the tube facing away from the tabs 16 can be formed into a spout and then be projected through the corresponding spout (not drawn) of the outer bag and there tied with e.g. a rope or cord. The connection between the tabs 16 and the outer bag may again consist of a stitching or any other non-fluid-proof connection.

Fig. 4-6 relate to alternatives in which the inner bag is not permanently connected to the outer bag, so that these alternatives can be used for a reusable outer bag and disposable inner bag. In the embodiment of figs. 4 and 5 a single rope or cord 28 is connected to the end of each tab 26, which rope or cord can, in the manner shown in fig. 5, extend through two holes 27 of the outer bag. In the embodiment of fig. 6 a doubled-up rope or cord is attached, each of the legs of which can be projected through a hole 27, after which the legs can be tied together. The connection of the rope or cord 28 to the tabs 26 may consist of stitching threads 29.

Figs. 7 and 8 relate to an inner bag 32 having, over the greater part of its height and when being filled, a tubular outer wall 33, and a square bottom 34. A square hole has been made in said bottom, and a spout 35 is connected to the edges of said hole. The top of this inner bag is open. Fig. 8 clarifies that the periphery of the rectangular bottom 34 is substantially equal to the periphery of the unloaded tubular shape of the side wall 33.

According to Figs. 9 and 10, manufacturing of

the square bottom 34 can be performed by folding an extruded tube into a broad upper ply 39, two pairs of smaller inner plies 40, 41 and a lower broad ply 42. Those plies are delimited by four outer folds 43 and two inner folds 44. Each of the four pairs of outer and inner plies are then heat-welded and cut along a first line 37 parallel to the longitudinal axis of the tube for forming the discharge spout 35, and along a second line 38 at an angle of substantially 45° in relation to the first line, which second lines extend between the discharge spout and the corners of the bottom of the outer bag when the double-walled bag has been loaded. If one wants to make four welded seams along the lines 37 and 38 at once, one has to place a Teflon glass fibre matt 45 between the inner plies 40 and 41. One can, however, also manufacture in two stages by welding and cutting along the lines 37 and 38 first and then fold the welded plies away before laying a new "side wall" on the welding table.

The trapezoid-shaped corners delimited by lines 37 and 38 in Fig. 9 have thus to be considered as waste material. The advantage, however, is that the inner bag is provided with a spout in an efficient and reliable way.

According to the invention, the inner bag 33 can also comprise two peripherally extending tabs 36.

All details ensure that the inner bag 2, 12 remains in place during emptying, so that it cannot get into the spout and block it. Furthermore all embodiments meet the requirement that the inner bag is completely fluid-proof so that it can also be used for e.g. transporting cocoa.

Embodiments in which the tab or tabs 6, 16, 26, 36 of the inner bag are connected in other ways to the outer bag are also within the scope of the invention. In the first place press-studs, Velcro and the like fastening means are considered, which are certainly useful in cases in which the inner bag exerts forces that are parallel to the wall during emptying, whereas it is also possible to consider a slipknot connection in the outer bag, so that its strength is not affected by the holes 27.

Claims

1. Double-walled bag of high loading capacity for fine-powdered or fluid material, comprising an outer bag (1) of flexible and yet hardly elastic material having a rectangular bottom, and an inner bag (2, 12, 32) of relatively elastic and fluid-proof material, also having a rectangular bottom (34), which double-walled bag is destined to be filled from above and to be emptied through an openable discharge spout (5, 35), said outer and inner bags

being mutually connected by at least one tab (6, 16, 26, 36) which is connected in a fluid-proof manner to the inner bag, characterized in that, the inner bag (32) has been extruded in tubular form, then folded into four plies (39-42) and laid down in such a way that the upper and lower broad plies are delimited by outer folds (43), whereas the smaller inner plies are delimited by the outer folds (43) and two inner folds (44) which substantially extend in the longitudinal axis of the tube, and in that each of the at least four pairs of outer and inner plies have been heat-welded and cut along a first line (37) parallel to the longitudinal axis of the tube for forming the discharge spout and a second line (38) at an angle of substantially 45° in relation to the first line, which second lines extend between the discharge spout and the corners of the bottom of the outer bag when the double-walled bag has been filled.

2. Bag as in claim 1, characterized in that an even number of tabs (16, 36) is adhered or sealed to the inner bag (12), which tabs are at least fastened by a stitch to the outer bag (1) near its upper edge.

3. Bag as in claim 1 or 2, characterized in that a rope (28) is connected to the tabs (26), which ropes can extend through holes (27) of the outer bag (1) to be knotted therein.

4. Bag as in one of the preceding claims, characterized in that the inner bag and/or said tabs consist of polypropylene or polyethylene, preferably polyethylene film, from PE-coated paper or from another fluid-proof material.

5. Bag as in one of the preceding claims, characterized in that the tabs consist of polyethylene strip-woven fabric.

6. Bag as represented in the drawing and/or discussed on the basis thereof.

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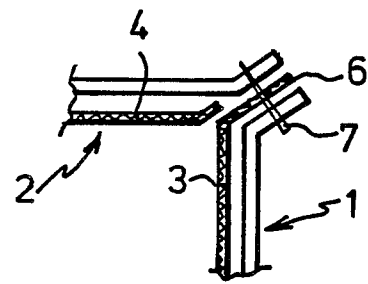
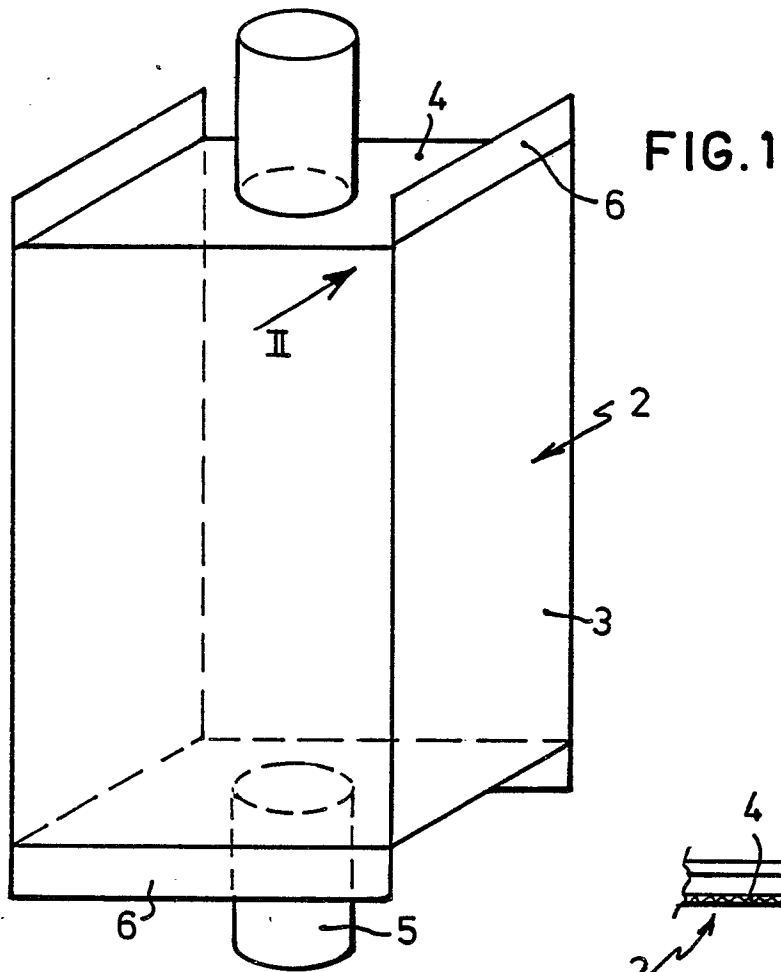


FIG. 2

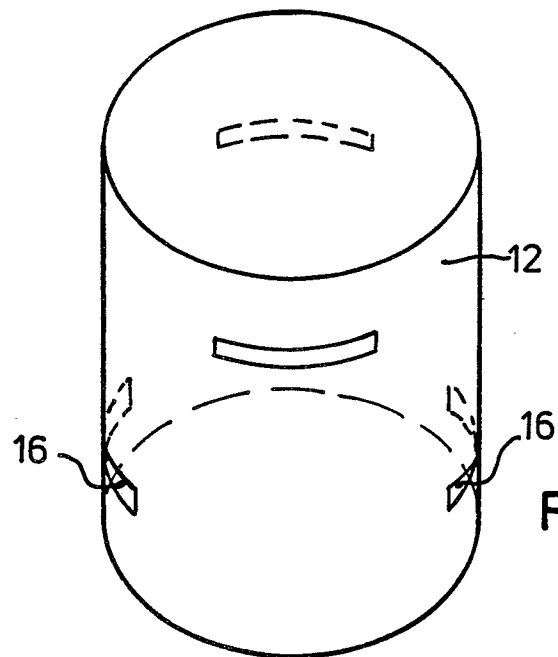
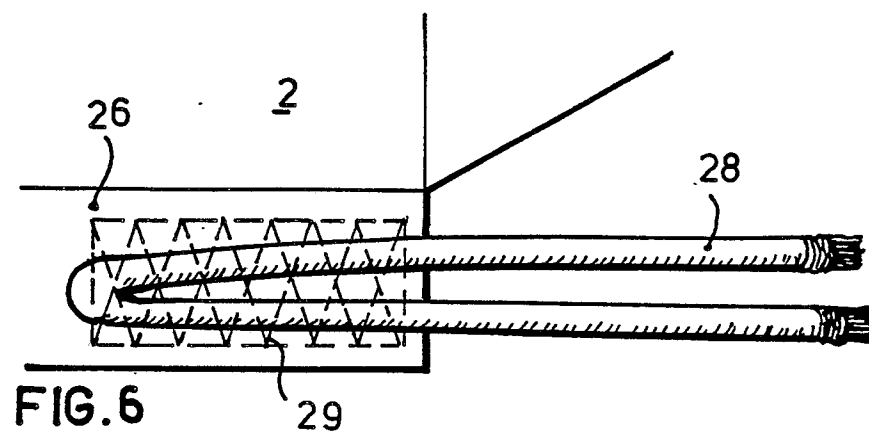
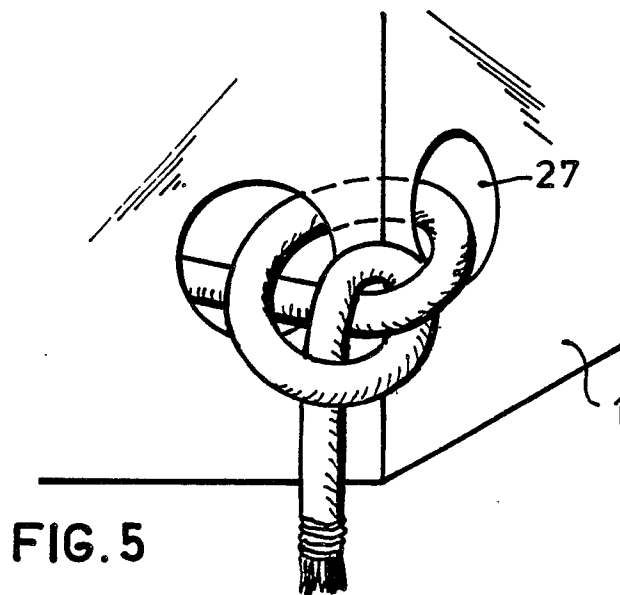
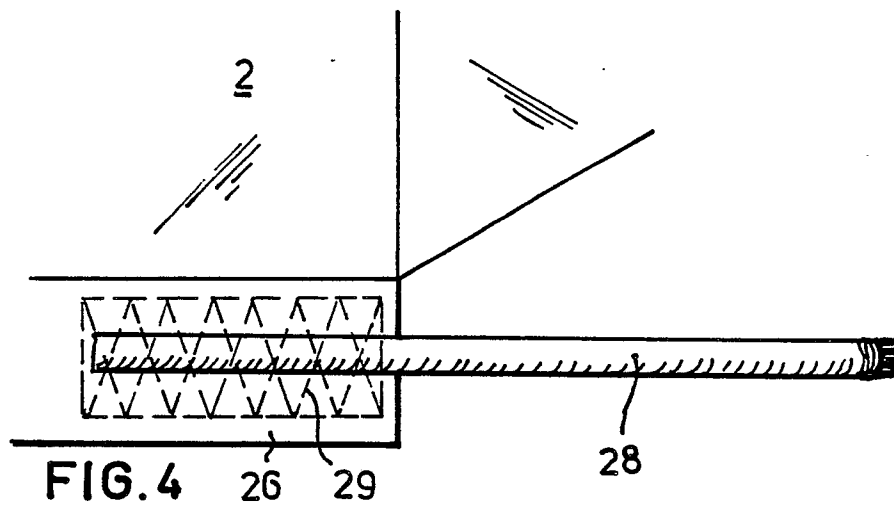
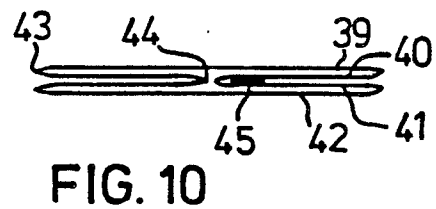
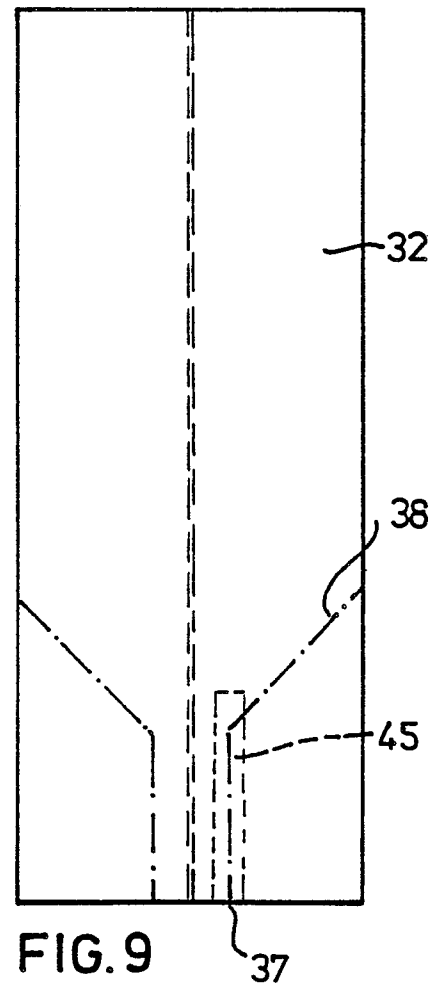
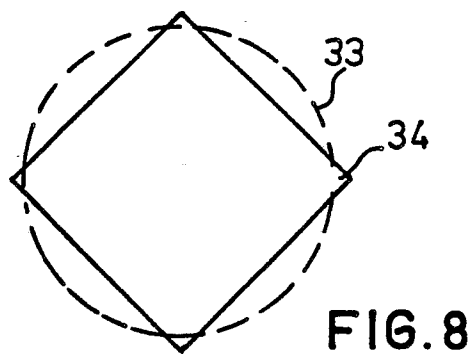
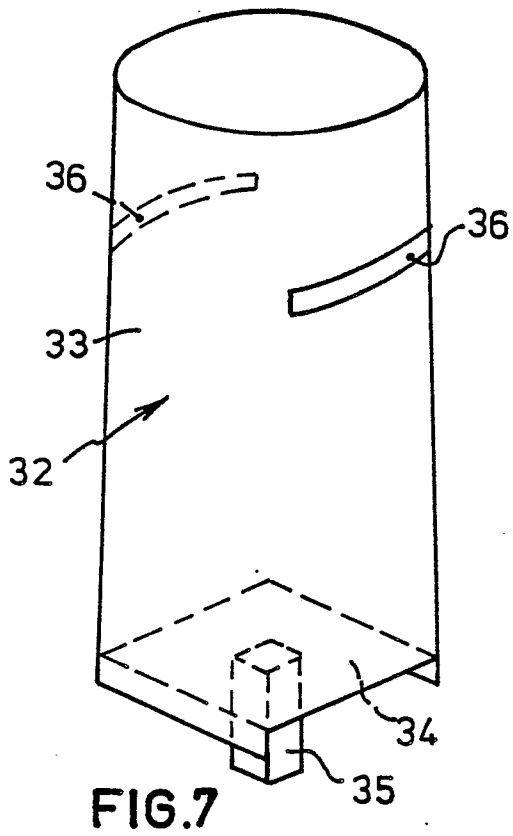


FIG. 3







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. 4)		
X	EP-A-0 105 238 (CUSTOM PACKAGING SYSTEMS) * Page 5, line 9 - page 8, line 16; figures * ---	1	B 65 D 88/16		
X	DE-C-3 539 619 (BAYER AG) * Column 4, line 53 - column 5, line 35; figures * ---	1,2			
A	---	4,6			
A	FR-A-2 570 352 (PAPETERIES DE L'EST) * Abstract; figures * ---	2			
A	FR-A-2 251 489 (UNITED STATES LINES) * Pages 16-18; figures * -----	3,5,6			
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)		
			B 65 D		
The present search report has been drawn up for all claims					
Place of search THE HAGUE		Date of completion of the search 06-10-1988	Examiner VAN ROLLEGHEM F.M.		
<table><tr><td>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</td><td>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</td></tr></table>				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
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				