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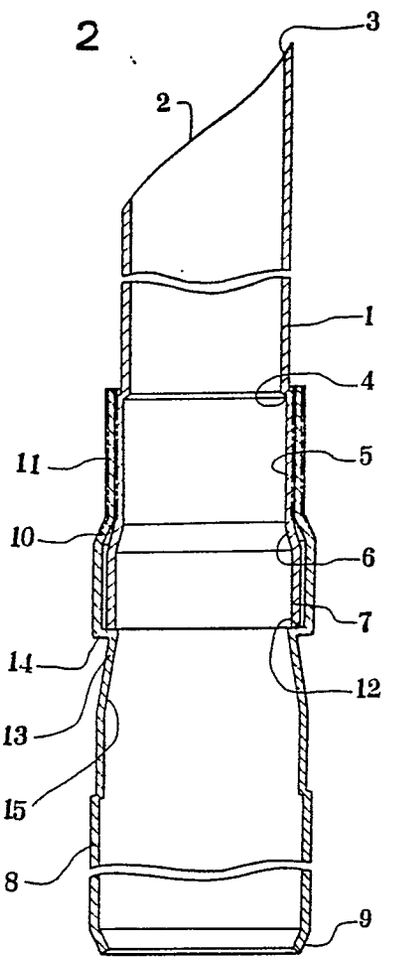
(54) Extensible straw assembly used to take beverage.

(57) In accordance with the present invention an inner straw component has an outer diameter smaller than an inner diameter of a tapered portion (11) formed adjacent the forward end of the outer straw component to facilitate a telescopical movement of the inner and outer straw components so that even the powerless users such as children or women easily handle the extensible straw assembly consisting of said inner straw component and said outer straw component. Additionally, at the final stage of extension, an intermediate diameter-enlarged portion (5) of the inner straw component presses against the inner wall of the tapered portion (11) formed on the outer straw component in tightly engaged relationship and, accordingly, the inner and outer straw components are coupled to each other firmly enough to overcome a reaction encountered by the extended straw assembly during piercing the container of beverage. Furthermore, the tightly engaged relationship established between said both portions contributes also to assure a desired air-tightness.



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EXTENSIBLE STRAW ASSEMBLY USED TO TAKE BEVERAGE

The present invention relates to an improvement in the slidably extensible straw assembly comprising an inner straw component and an outer straw component into which said inner straw component is telescopically inserted.

The straw assembly attached to a beverage container should be preferably longer than a depth of the beverage container to avoid an inconvenience that the assembly might fall into the container when it is actually used. However, the assembly which can be conveniently used for this purpose will be substantially longer than the largest dimension of the associated beverage container and, therefore, it will be impossible to attach such straw assembly to said container. To overcome this problem, it is desired to provide a straw assembly which can be contracted to attach it to the container and extended in actual use. Such extensible straw assembly comprising an inner straw component telescopically inserted into an outer straw component is well known, but this straw assembly of prior art has encounted various problems as will be mentioned below because of its construction in which the ends of these inner and outer straw components to be coupled to each other are merely diameter-enlarged.

When the assembly is extended and inserted into the container of beverage in actual use, the assembly can be properly handled so far as the inner straw component is pulled in a proper direction, i.e., with its forward end ahead, but the inner straw component will slip off from the outer straw component if the inner straw component is carelessly pulled out in the opposite direction. Further, such assembly of prior art has no means for reliably maintaining the assembly in the extended state, namely, means by which the straw assembly is prevented from readily contracting again and there is a danger that the straw assembly might contract and fall into the container if a taker of beverage carelessly pushes the assembly against the bottom of the container.

In view of the problems as set forth above, an extensible straw assembly for this purpose has already been developed, see European Patent Application 0 139 074, in which, not only to prevent the inner straw component from readily slipping off from the outer straw component but also to maintain the assembly in its extended state without readily contracting again once it has been extended, the inner straw component is diameter enlarged at its root to form a diameter-enlarged portion while the outer straw component is diameter-reduced at its forward end to form a diameter-reduced portion so that the root of the inner straw component is engaged with the forward end of the outer straw component when these inner and outer straw components are telescopically extended, the outer straw component being further provided adjacent its forward end, e.g., at a boundary position between the blank portion and the diameter-reduced portion of the outer straw component with an inwardly projecting stopper adapted to block the inner straw component against retraction into the outer straw component, and the root of the outer straw component also being diameter-reduced to form a diameter-reduced portion.

This extensible straw assembly is very convenient in that the inner straw component is effectively prevented from accidentally slipping off from the outer straw component and the straw assembly is assured to be maintained in its extended state once it has been fully extended without a danger that the inner straw component might fall into the outer straw component due to a careless handling. Additionally this prior art provides an improved design such that the tapered portion of the outer straw component has its inner surface adapted to be brought into a surface-contact with the outer surface of the inner straw component's blank portion or the diameter-reduced portion formed at the forward end of the outer straw component has an angle of inclination corresponding to that of the diameter-enlarged portion formed at the root of the inner straw component so that no air leakage occurs or air tightness is assured after the straw assembly has been fully extended. However, it is very difficult for cylindrical or conical surfaces to assure an exact surface-contact therebetween and, to achieve it, dimensional errors must be avoided as strictly as possible during production. Thus, quality control is very difficult particularly in mass-production and such design involves a serious problem to be practically employed. In addition, if it is tried to improve a dimensional precision in order to assure a desired air-tightness, a stickiness would correspondingly increase between the inner surface of the outer straw component's tapered portion and the outer surface of the inner straw component's blank portion. Such stickiness would increase a resistance to such an extent that powerless users such as children or women can not extend the straw assembly in its use. Furthermore, if the diameter-reduced portion formed at the forward end of the outer straw component presents a relatively gentle angle of inclination, the inner straw component would not be effectively locked by said diameter-reduced portion and slip off from the out-

er straw component when the user tries to extend the straw assembly with an excessive force in order to overcome said high resistance due to said stickiness.

A principal object of the present invention is, in view of the above-mentioned problems, to provide a novel straw assembly used with a beverage container, involving essential improvement such that the inner straw component is effectively held against readily slipping off from the outer straw component, the assembly is reliably maintained in its extended state once the assembly has been fully extended, this extension is lightly achieved even by the powerless users such as children or women, the inner and outer straw components are tightly locked by each other at a final stage of the extension, a sufficient air-tightness is assured regardless of more or less dimensional errors and mass-production can be practically adopted.

To achieve the object as set forth above, the present invention provides an extensible straw assembly used to take beverage comprising an inner straw component telescopically inserted into an outer straw component, a blank portion of the inner straw component being of a smaller diameter and having adjacent its root an intermediate diameter-enlarged portion and a root itself of further enlarged diameter, a blank portion of the outer straw com ponent being of a larger diameter and having adjacent its forward and a stepped portion to define a tapered portion contiguous with said stepped portion, the blank portion of the inner straw component having an outer diameter slightly smaller than an inner diameter of the tapered portion of the outer straw component while the intermediate diameter-enlarged portion of the inner straw component having an outer diameter slightly larger than the inner diameter of the outer straw component tapered portion so that the intermediate diameter-enlarged portion of the inner straw component is tightly engaged with the tapered portion of the outer straw component as the inner and outer straw components are telescopically extended.

A more detailed unterstanding of the invention can be gained from the following description of various preferred embodiments to be understood in conjunction with the accompanying drawings, in which

Fig. 1 is a front view showing an embodiment with components telescopically contracted;

Fig. 2 is a partially broken enlarged longitudinal section showing the embodiment with the components telescopically extended;

Fig. 3 is a view similar to Fig. 2 but showing a portion of an outer straw component adjacent a forward end thereof;

Fig. 4 is a view similar to Fig. 2 but showing a portion of an inner straw component adjacent a root thereof;

Fig. 5 is a view similar to Fig. 2 but showing a portion of the inner straw component adjacent the root thereof according to another embodiment; and

Figs. 6 through 8 are views similar to Fig. 2 showing important portions of still another embodiments, respectively, with components telescopically extended.

Referring to the drawing, reference numeral 1 designates a blank portion of an inner straw component having a smaller diameter and having its forward end slant cut to form an oblique end 2. An angle at which the forward end is cut to form said oblique end 2 is so varied as to provide a sharp tip 3 with which a beverage container can be easily pierced by application of a light force. This blank portion 1 of the inner straw component has adjacent its root an intermediate diameter-enlarged portion 5 connected by a stepped portion 4 integrally to said blank portion 1 of the inner straw component and a further diameter-enlarged portion 7 formed at said root itself, which is connected by a gently sloped portion 6 integrally with said intermediate diameter-enlarged portion 5.

Reference numeral 8 designates a blank portion of an outer straw component having at its root 9 a diameter-reduced portion serving to hold the inner straw component against slipping off from the outer straw component. This blank portion 8 of the outer straw component has adjacent its forward end a stepped portion 10 of a relatively steep slope to effect diameter-reduction and a tapered portion 11 contiguous with said stepped portion 10.

Said blank portion 1 of the inner straw component is telescopically inserted in the blank portion 8 of the outer straw component and the blank portion 1 of the inner straw component has an outer diameter slightly smaller than an inner diameter of the tapered portion 11 formed adjacent the forward end of the outer straw component's blank portion 8 so as to facilitate pulling out of the inner straw component from the outer straw component for extension of the straw assembly. The intermediate diameter-enlarged portion 5 of the inner straw component has an outer diameter slightly larger than the inner diameter of the tapered portion 11 formed adjacent the forward end of the outer straw component to avoid a danger that the inner straw component might be pulled off from the outer straw component at the end of said extension. Upon overlapping each other, these intermediate diameter-enlarged portion 5 of the inner straw component and the tapered portion 11 formed adjacent the forward end of the outer straw component are brought into a tightly pressurized engagement with each other. Although the intermediate diameter-enlarged por-

tion 5 of the inner straw component has a longitudinal dimension substantially equal to that of the tapered portion 11 formed at the forward end of the outer straw component in the specific embodiment as shown, the intermediate diameter-enlarged portion 5 may have the dimension larger than that of the tapered portion 11 instead of being equal. In this way, the forward end of the intermediate diameter-enlarged portion 5 projects from the tapered portion 11 after the straw assembly has been fully extended and, accordingly, it is possible to visually confirm that the extension has been completely done.

The blank portion 8 of the outer straw component is provided with an inwardly directed positioning projection 13 serving also as a stopper and the diameter-enlarged portion 7 formed at the root of the inner straw component rides over this positioning projection 13 just before said intermediate diameter-enlarged portion 5 and said tapered portion 11 overlap each other. This inwardly directed projection 13 has an inner diameter substantially corresponding to the outer diameter of the inner straw component. The projection 13 is configured to be longitudinally elongate. The forward end 14 of the projection is substantially perpendicular to the surface of the outer straw component while the root 15 thereof is gently sloped with respect to said surface of the outer straw component. Although said projection 13 has an elongate shape extending longitudinally along the straw in the embodiment as shown, the projection 13 is never limited to such longitudinally elongate shape and may be of a spot-like or laterally elongate shape.

Fig. 5 illustrates another embodiment of the inner straw component. This embodiment is essentially similar to the embodiment of Fig. 4 except that the diameter-enlarged portion 7 formed at the root has an edge 12′ which slightly projects outwardly. The edge 12′ thus slightly projecting outwards is not only effective for reinforcing the root of the inner straw component but also facilitates a dimensional control of the outer diameter and thereby improves the dimensional precision.

Further embodiment of Fig. 6 is characterized by the diameter-enlarged portion 7′ formed at the root. Namely, the diameter-enlarged portion 7′ of Fig. 6 is formed by widening the root toward the end while the diameter-enlarged portion 7 of Figs. 4 and 5 is cylindrical.

Fig. 7 illustrates still another embodiment of the present invention characterized in that the intermediate diameter-enlarged portion 5′ of the inner straw component as well as the tapered portion 11′ formed adjacent the forward end of the outer straw component presents a cross-section which is swollen outwards. This feature contributes to make the pressurized engagement of these portions more reliable. Finally, Fig. 8 illustrates further another embodiment of the present invention in which the positioning projection serving also as the stopper is implemented as an outwardly directed projection 16 formed on the outer periphery of the inner straw component, e.g. on the outer periphery of the intermediate diameter-enlarged portion 5 in the specific embodiment as shown.

With this embodiment, the user may conveniently stop pulling out of the inner straw component upon appearance of this projection 16. Therefore, this construction is advantageous in that the optimal position at which the pulling out of the inner straw component 1 should be stopped is visually confirmed.

With the extensible straw assembly according to the present invention which may be embodied in various manners as has been described hereinabove, the inner straw component 1 is telescopically surrounded by the outer straw component 8 with the forward end of the inner straw component 1 slightly projecting out of the outer straw component 8 as seen in Fig. 1 prior to its use, as in the case of the well known extensible straw assembly. In use, said inner straw component 1 is pulled out from the outer straw component with the forward end of said inner straw component held between the user's fingers. Operation of such pulling out can be easily and smoothly done because the inner straw component 1 is of a smaller diameter and the outer diameter thereof is slightly smaller than the inner diameter of the tapered portion 11 formed adjacent the forward end of the outer straw component. At the final stage of this pulling out, i.e., when the intermediate diameter-enlarged portion 5 of the inner straw component 1 has reached the tapered portion 11 of the outer straw component 8, this pulling out is resisted. Now the inner straw component 1 is further pulled with a force enough to overcome this resistance until said intermediate diameter-enlarged portion 5 and said tapered portion 11 overlap each other. At this point, the edge 12 of the diameter-enlarged portion 7 formed at the root of the inner straw component 1 has rode over the positioning projection 13 formed on the outer straw component 8. A touch of click indicates completion of this pulling out and, thereupon, the user may stop the operation of pulling out. In this state, the intermediate diameter-enlarged portion 5 of the inner straw component 1 presses against the inner wall of the tapered portion 11 of the outer straw component in a tight engagement therewith, developing an extremely high resistance adapted to reliably prevent the inner straw component 1 from its undesired retraction. The tightly engaged relationship of these both portions contributes also to assure a high airtightness.

Claims

1. An extensible straw assembly used to take beverage comprising an inner straw component telescopically inserted into an outer straw component, a blank (1) of the inner straw component being of a smaller diamter and a root (7) of the inner straw component being of enlarged diamter, a blank (8) of the outer straw component being of a larger diameter and having adjacent its forward end a stepped portion (10) to define a tapered portion (11) contiguous with said stepped portion,
characterized in that the blank (1) of the inner straw component having adjacent its root an intermediate diameter-enlarged portion (5) and that the blank of the inner straw component having an outer diameter slightly smaller than an inner diameter of the tapered portion (11) of the outer straw component while the intermediate diameter-enlarged portion (5) of the inner straw component having an outer diameter slightly larger than the inner diameter of the outer straw component's tapered portion (11) so that the intermediate diameter-enlarged portion (5) of the inner straw component is tightly engaged with the tapered portion (11) of the outer straw component as the inner and outer straw components are telescopically extended.

2. An extensible straw assembly as defined by claim 1, **characterized** in that there being provided a positioning projection (13 ,16) adjacent the forward end of the outer straw component or adjacent the root (7')of the inner straw component respectively.

3. An extensible straw assembly as defined by claim 1 or 2, **characterized** in that the diameter-enlarged root (7) of the inner straw component comprises a short inclined portion (6) contiguous with the intermediate diameter-enlarged portion (5) and a substantially cylindrical portion of a larger diameter contiguous with said short inclined portion (6).

4. An extensible straw assembly as defined by claim 1 or 2, **characterized** in that the diameter-enlarged root (7) of the inner straw component comprises a flared portion (7') contiguous with the intermediate diameter-enlarged portion (5).

5. An extensible straw assembly as defined by one of claims1 till 4,
characterized in that the intermediate diameter-enlarged portion (5') of the inner straw component and the tapered portion (11') formed at the forward end of the outer straw component are formed with portions swollen outwards, respectively, so that these swollen-out portions are engaged with each other when the inner and outer straw components have been fully extended one from another.

6. An extensible straw assembly as defined by one of claims 1 till 5,
characterized in that the intermediate diameter-enlarged portion (5) of the inner straw component has the dimension larger than that of the tapered portion (11), so that the forward end of the intermediate diameter-enlarged portion (5) projects from the tapered portion (11) after the straw assembly has been fully extended.

7. An extensible straw assembly as defined by claim 2, **characterized** in that the positioning projection (16) is implemented as an outwardly directed projection formed on the outer periphery of the inner straw component.

8. An extensible straw assembly as defined by claim 2, **characterized** in that the positioning projection (13) has an elongate shape extending longitudinally of the straw.

9. An extensible straw assembly as defined by claim 2, **characterized** in that the positioning projection has a laterally elongate shape extending transversely with respect to the length of the straw.

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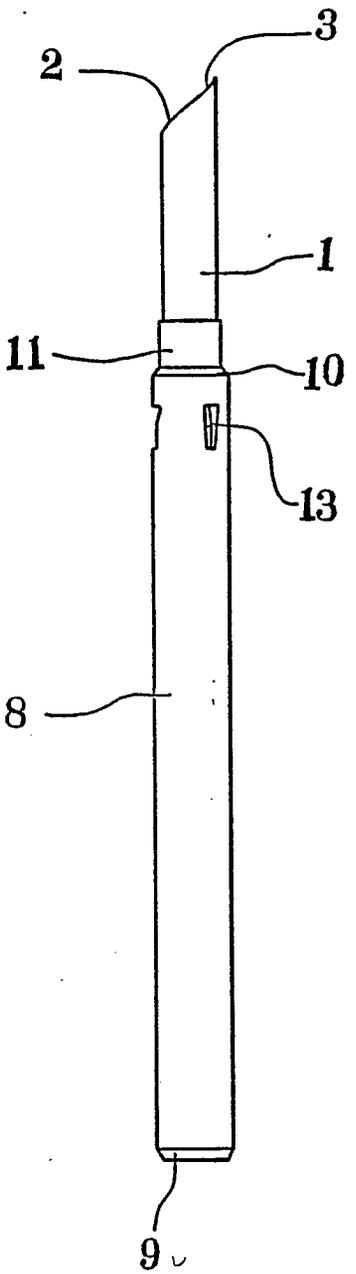

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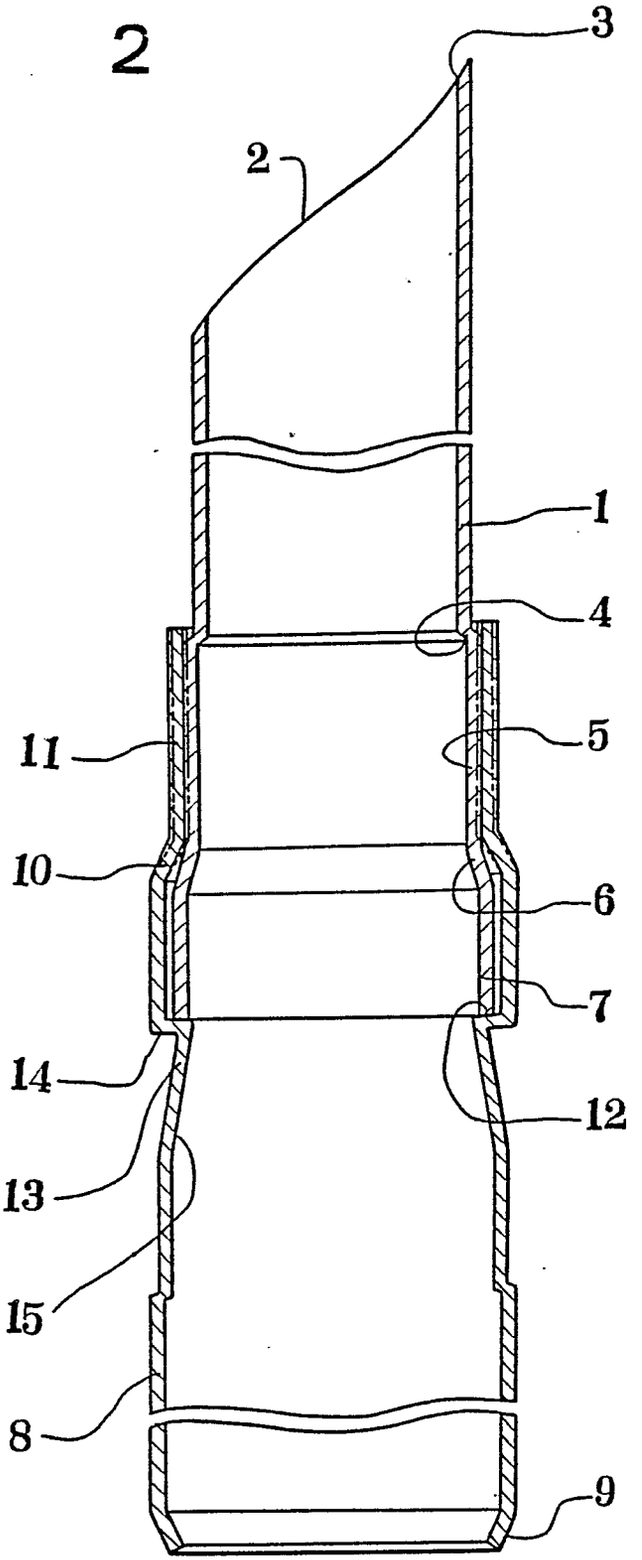

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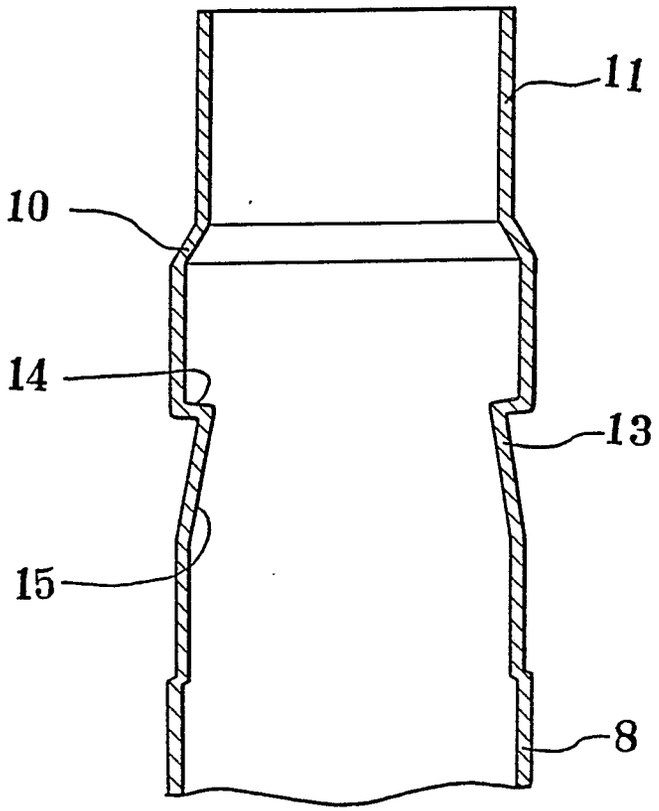

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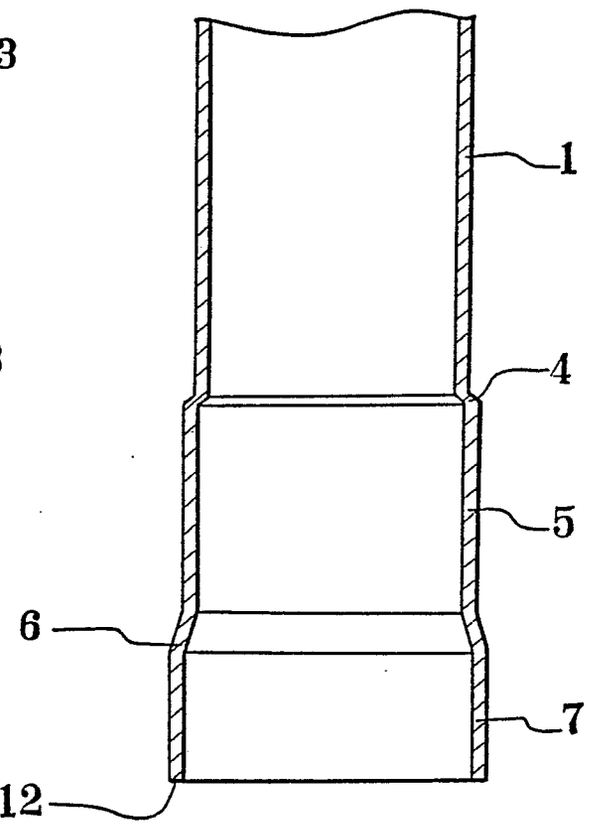

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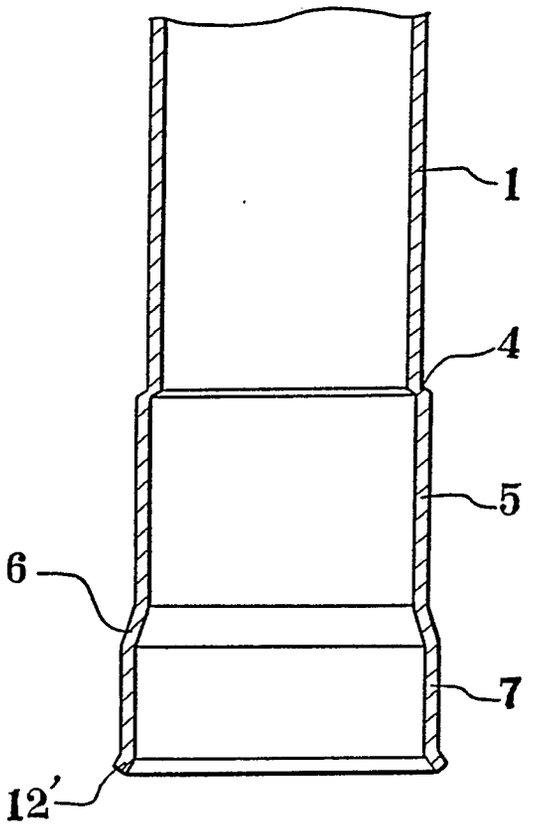

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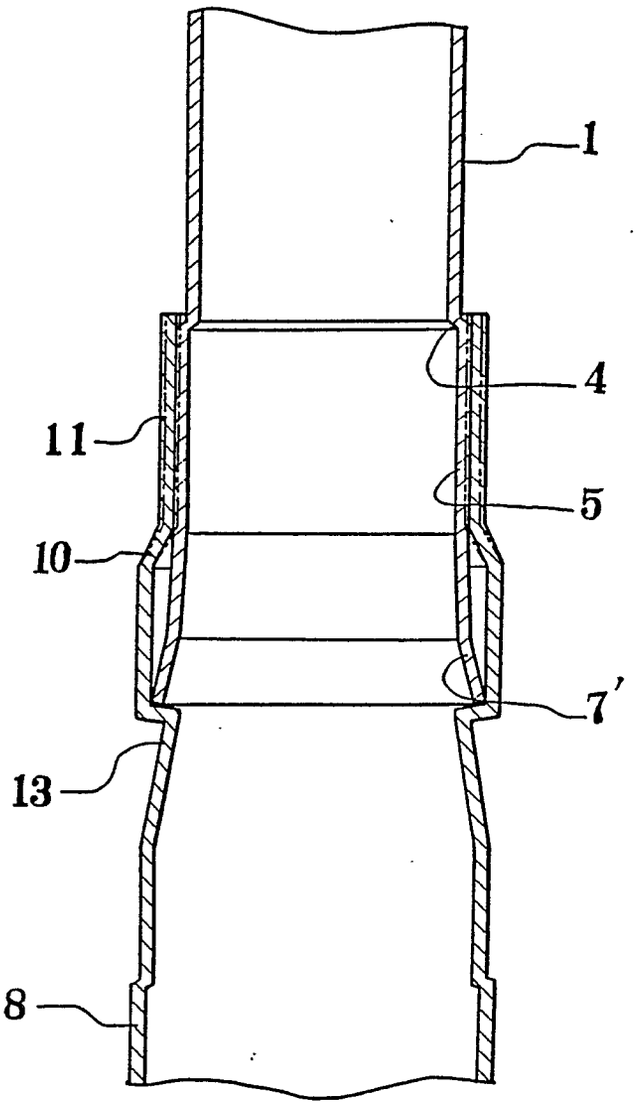

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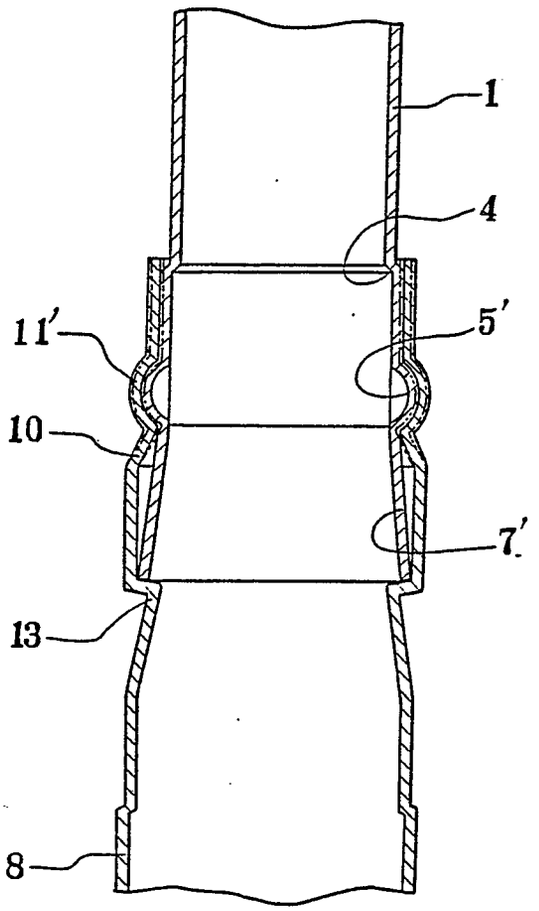

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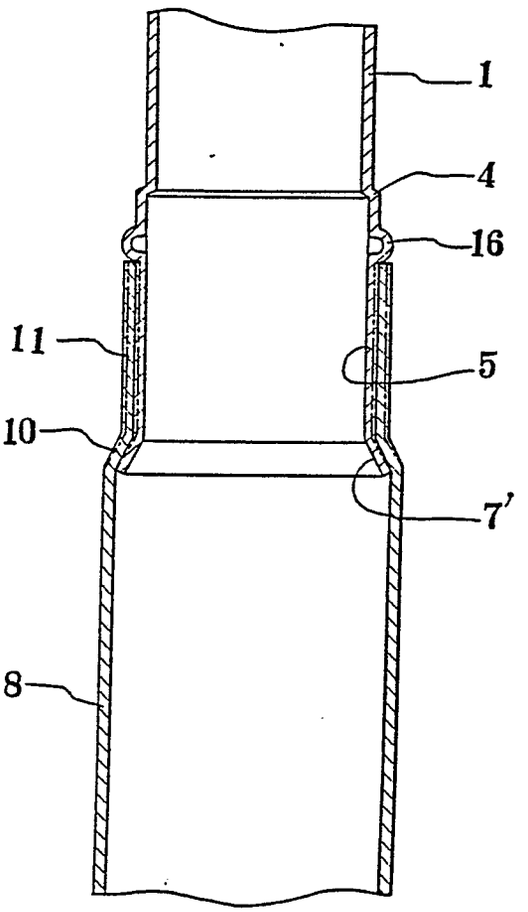

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EUROPEAN SEARCH REPORT

Application number

EP 87 10 4627

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)
A	EP-A-0 176 608 (TETRA PAK INTERNATIONAL AB) * Figure 4 *	1-3,9	A 47 G 21/18
A	EP-A-0 172 395 (OVERBECK GmbH & CO.) * Figures 1,2,26-28 *	1,2,4, 5,7,9	
A,D	EP-A-0 139 074 (SANYO SHIKI K.K.) * Figures 7,9 *	1,2,4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 47 G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	30-07-1987	BEUGELING G.L.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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