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(54) Title: PORTABLE CLOTHES DRYER

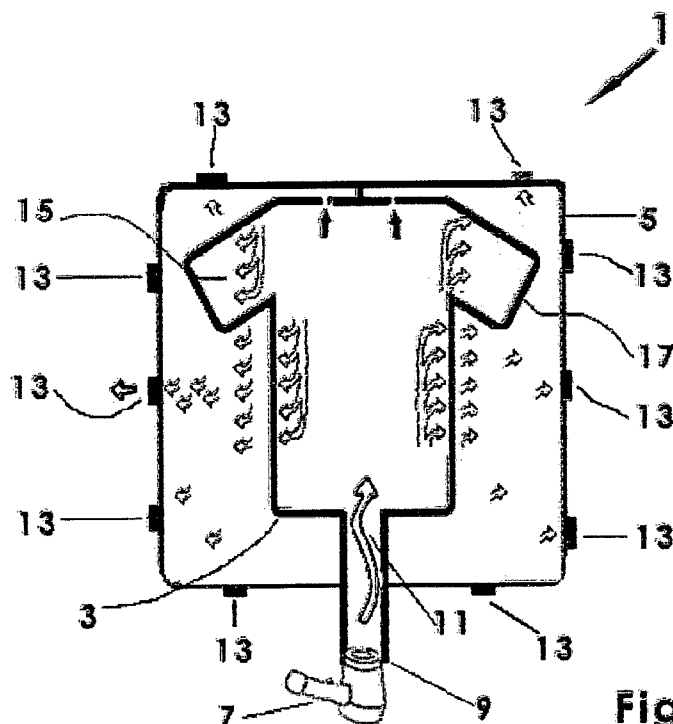


**Fig. 1**

(57) Abstract: The present invention relates to a portable clothes dryer. In particular an external dryer cover which is impervious to air. The impervious cover encompasses an inflatable shaped bladder which is not impervious to air. Heated air can permeate the internal bladder and any garments placed on the inner bladder. With the cover in place air is not immediately lost to the atmosphere, instead the heated air temporarily retained by the external cover. The advantage of the invention is hot air is recycled and not wasted. It reduces heat loss, improves drying times and energy efficiency. The external cover has one or more venting apertures.

**Title****Portable clothes dryer**5 **Field of invention**

This invention relates to portable clothes dryers. In particular the invention relates to a method and system which utilizes inflatable bladders and a heated air source to force dry air through clothing and other textile materials. Thereby evaporating moisture in an efficient and speedy manner.

**Background to the invention**

Portable clothes dryers are devices that can be connected up to a standard hair dryer and used to dry a garment. Portable clothes dryers are typically used by people in situations where access to a fixed clothes dryer is not readily available, such as when travelling, or in those situations where it is necessary to dry the garment very quickly. Some of the known portable clothes dryers claim to be able to dry a garment from wet in approximately 10 minutes and it will be apparent that if the item of clothing is to be worn imminently, the portable clothes dryer can dry the garment quicker than many of the known types of fixed clothes dryers, such as tumble dryers.

One such portable clothes dryer is that described in European Patent Publication No. EP0,761,865, in the name of Griffin. EP0,761,865 describes a portable clothes dryer that consists of an inflatable bladder constructed from an air permeable material. The inflatable bladder is inserted into an item of clothing and hot air is then blown into the bladder to inflate the bladder inside the garment. The hot air passes through the bladder and out through the garment surrounding the bladder thereby drying the garment in the process.

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Although very useful, there are however some problems with the known types of portable clothes dryers. Perhaps most importantly, although effective in operation, many of the known types of portable clothes dryers are relatively inefficient in operation. As the garment begins to dry, it will tend to do so unevenly. Areas where the garment fabric is thickest such as collars, cuffs and waist bands will take longer to dry than other areas of the garment where the fabric is thinner. Accordingly, the dryer will have to be in operation for as long as it takes to dry those areas where the fabric is thickest. At the same time, hot air will continue to pass freely through the dry sections of the garment and this hot air is effectively wasted as it is not being used to dry the garment. This increases the cost of operating the portable clothes dryer.

It is an object of the present invention to provide a portable clothes dryer that overcomes at least some of the problems of the known portable clothes dryers and that is both effective and efficient in operation.

### **Statements of Invention**

According to the invention there is provided a portable clothes dryer comprising an inner inflatable bladder and an outer enclosure substantially encapsulating the inner inflatable bladder, in which the inner bladder is constructed from an air permeable material and comprises an air inlet extending from the inner bladder through the outer enclosure thereby providing an air passageway from the interior of the inner bladder to the external atmosphere, and in which the outer enclosure is constructed from an air impermeable material and comprises an aperture to allow a garment to be inserted into the interior of the outer enclosure between the inner bladder and the outer enclosure substantially surrounding the inner bladder, means to releasably seal the aperture, and at least one venting aperture.

By having such a portable clothes dryer, as the garment begins to dry, the hot air that passes through the dry sections of the garment will not simply be wasted. Instead, the hot air will be retained temporarily inside the outer enclosure and will be recirculated over

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the fabric. This will greatly improve the drying process thereby enhancing the efficiency and the effectiveness of the portable clothes dryer.

5 In one embodiment of the invention there is provided a portable clothes dryer in which the venting aperture is provided with an adjustable valve to permit adjustment of the rate of flow of air through the venting aperture. This is seen as particularly useful as the rate of air flow through the venting aperture can be controlled and in those embodiments with multiple venting apertures, the valves may be used to control the direction of flow of air within the outer enclosure.

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In one embodiment of the invention there is provided a portable clothes dryer in which the outer enclosure comprises a transparent inspection panel. As the article of clothing begins to dry, condensation will form on the inside of the outer enclosure. By providing a transparent inspection panel, it will be possible to determine when the article of clothing  
15 is dry by observing the lack of condensation inside the outer enclosure.

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In one embodiment of the invention there is provided a portable clothes dryer in which the outer enclosure is constructed from a transparent material. This is seen as particularly useful embodiment of the present invention as the condensation will tend to form on the  
20 inner surface of the outer enclosure adjacent the areas of damp fabric. By providing the outer enclosure in a transparent material, as the garment begins to dry, it will be possible to see with a degree of certainty if and where the garment is still damp. In those cases where there are multiple venting apertures each of which is provided with a valve, the flow of air in the outer enclosure can be controlled to direct airflow over those areas that  
25 are still damp.

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In one embodiment of the invention there is provided a portable clothes dryer in which the inner inflatable bladder is provided with a plurality of inflatable sections and there is provided means to releasably seal one or more of the sections so that the inflatable  
30 bladder is configurable to the shape of a plurality of different types of garments. In this

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way, a single portable clothes dryer may be used to dry several different types and sizes of garments and it will not be necessary to provide multiple inner bladders.

5 In one embodiment of the invention there is provided a portable clothes dryer in which there is provided adjustment means to adjust the shape of the inner bladder.

In one embodiment of the invention there is provided a portable clothes dryer in which the adjustment means comprises a clip.

10 In one embodiment of the invention there is provided a portable clothes dryer in which the outer enclosure is constructed from a flexible material.

In one embodiment of the invention there is provided a portable clothes dryer in which the outer enclosure comprises a tent-like structure having a substantially rigid frame and a  
15 flexible material supported by the frame.

In one embodiment of the invention there is provided a portable clothes dryer in which the outer enclosure comprises a substantially rigid casing.

20 In one embodiment of the invention there is provided a portable clothes dryer in which there are provided a plurality of venting apertures distributed about the outer enclosure.

#### **Brief Description of the Drawings**

The invention will now be more clearly understood from the following description of  
25 some embodiments thereof given by way of example only with reference to the accompanying drawings, in which:-

Figure 1 is a diagrammatic representation of a portable clothes dryer according to the invention; and

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Figure 2 is diagrammatic representation of part of the portable clothes dryer of Figure 1 with a shirt mounted on the inner bladder.

### **Detailed Description of the Invention**

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Referring to Figure 1, there is shown a portable clothes dryer, indicated generally by the reference numeral 1, comprising an inner inner inflatable bladder 3 and an outer enclosure 5 substantially encapsulating the inner inflatable bladder 3. A hot air source, in this case hair dryer 7, is shown delivering hot air into the inner bladder 3 through an air inlet 9 which extends from the inner bladder 3 through the outer enclosure 5 thereby providing an air passageway 11 between the interior of the inner bladder to the exterior of the portable clothes dryer.

The inner bladder 3 is constructed from an air permeable material such as, but not limited to, Nylon 60 and the outer enclosure 5 is constructed from a transparent, air impermeable material such as, but not limited to, PVC. The outer enclosure comprises an aperture (not shown) to allow a garment to be inserted into the outer enclosure between the inner bladder 3 and the outer enclosure 5 to a position substantially surrounding the inner bladder 3. A zip or other releasable sealing means is provided to seal the aperture when the item of clothing is in place.

The portable clothes dryer 1 comprises a plurality of venting apertures 13 spaced about the outer enclosure 5, each of which has an adjustable valve (not shown) therein to allow control of the flow of hot air through the venting aperture. By appropriate control of the valves, the direction of flow of hot air in the outer enclosure can be controlled to a degree which will allow concentration of the flow of hot air to those places that require it the most. In the embodiment shown, the inner bladder is shown with short "sleeve" sections 15, 17 however this is for illustrative purposes only as will be understood from the following description of Figure 2.

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Referring to Figure 2 of the drawings, the outer enclosure 5 has been removed for clarity and a garment, in this case a short sleeved shirt 19, is shown in ghost outline mounted on an alternative embodiment of inner bladder 20. The inner bladder 20 is provided with means to adjust the shape of the inner bladder, in this case provided by way of clips 21, 23 and 25 that are positioned appropriately along the "sleeve" portions 27, 29 and torso portion 31 respectively of the inner bladder 20. The region of the inner bladder above the clips 21, 23 and 25 is inflated while the clips act to seal the parts of the "sleeve" portions 27, 29 and torso portion 31 below the clips. In this way, only the part of the inner bladder inside the garment will be inflated thereby improving the efficiency of the portable clothes dryer and allowing the inner bladder 20 to be sized appropriately to match the size of the garment.

In use, the zip (not shown) on the aperture is opened and the garment is inserted into the outer enclosure. The garment is mounted about the inner bladder 3, 20 and the inner bladder is sized appropriately to match the garment by appropriate positioning of the clips 21, 23 and 25. The zip is then closed and the hair dryer's nozzle is introduced into the inlet 9. The inlet 9 will preferably be elasticated or provided with other means such as a Velcro ® strap to form a seal at the inlet surrounding the hair dryer nozzle. The hair dryer is turned on and hot air is blown into the inner bladder 3, 20. The inner bladder will inflate and as it is made from an air permeable material, air will pass through the inner bladder wall and out through the garment 19. Instead of escaping, the hot air will then be held temporarily in the outer enclosure and will circulate about the garment further drying the garment. The valves in the venting apertures 13 will be operated appropriately to control flow of air through the outer enclosure.

An operator can observe the formation of condensation on the inner surface of the transparent outer enclosure 5 and these will be indicative of where the damp sections on the garment 19 are. The operator can then control the flow of hot air in the outer enclosure by shutting the valves of the venting apertures 13 remote from those areas and opening the valves of the venting apertures in close proximity to the damp areas to promote flow of hot air through the regions of the outer chamber where the garment is

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damp. Furthermore, it may be preferable to gradually close all of the valves as the garment begins to dry. It is envisaged that initially the hot air will be close to saturated with moisture and it will be better to discharge the hot air from the outer enclosure but as the garment dries, there will be less moisture in the hot air and the amount of hot air  
5 allowed to escape from the outer enclosure can be reduced gradually.

In addition to the above, various modifications can be made to the above-described implementation without departing from the scope of the present invention. For example, it is envisaged that the inlet 9 may be suitably dimensioned to allow insertion of a runner or shoe into the inner bladder and the shoe or runner may be dried inside the inner  
10 bladder. Furthermore, the bladder could be elongate to facilitate the drying of other articles such as towels or the like. The inner bladder could be provided in a modular format instead of the adjustable format described above in which case parts of the inner bladder may be added or removed and several parts of an inner bladder may be combined together in order to make an inner bladder appropriate to dry a particular garment or item.

15 The diameter of the inner bladder could also be adjustable through appropriate use of fasteners to match the dimensions of the garment or other item being dried.

The adjustment means and the sealing means have been described as clips and a zip respectively. However, it will be readily understood that other items could be used in  
20 their place including by not limited to Velcro ® straps, eye and hook fasteners, buckles, ties and the like. What is important is that the outer enclosure can be closed sufficiently to delay release of air from the outer enclosure for a period of time and the size of the inner bladder can be adjusted sufficiently to fit several different types and sizes of garment.

25 In this specification the terms "comprise, comprises, comprised and comprising" and the terms "include, includes, included and including" are all deemed totally interchangeable and should be afforded the widest possible interpretation.

30 The invention is in no way limited to the embodiment hereinbefore described but may be varied in construction and detail within the scope of the claims.

**Claims:**

- (1) A portable clothes dryer comprising an inner inflatable bladder and an outer enclosure substantially encapsulating the inner inflatable bladder, in which the inner bladder is constructed from an air permeable material and comprises an air inlet extending from the inner bladder through the outer enclosure thereby providing an air passageway from the interior of the inner bladder to the external atmosphere, and in which the outer enclosure is constructed from an air impermeable material and comprises an aperture to allow a garment to be inserted into the interior of the outer enclosure between the inner bladder and the outer enclosure substantially surrounding the inner bladder, means to releasably seal the aperture, and at least one venting aperture.
- (2) A portable clothes dryer as claimed in claim 1 in which the venting aperture is provided with an adjustable valve to permit adjustment of the rate of flow of air through the venting aperture.
- (3) A portable clothes dryer as claimed in claim 1 or 2 in which the outer enclosure comprises a transparent inspection panel.
- (4) A portable clothes dryer as claimed in any preceding claim in which the outer enclosure is constructed from a transparent material.
- (5) A portable clothes dryer as claimed in any preceding claim in which the inner inflatable bladder is provided with a plurality of inflatable sections and there is provided means to releasably seal one or more of the sections so that the inflatable bladder is configurable to the shape of a plurality of different types of garments.
- (6) A portable clothes dryer as claimed in any preceding claim in which there is provided adjustment means to adjust the shape of the inner bladder.

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(7) A portable clothes dryer as claimed in claim 6 in which the adjustment means comprises a clip.

5 (8) A portable clothes dryer as claimed in any preceding claim in which the outer enclosure is constructed from a flexible material.

10 (9) A portable clothes dryer as claimed in claims 1 to 7 in which the outer enclosure comprises a tent-like structure having a substantially rigid frame and a flexible material supported by the frame.

(10) A portable clothes dryer as claimed in claims 1 to 7 in which the outer enclosure comprises a substantially rigid casing.

15 (11) A portable clothes dryer as claimed in any preceding claim in which there are provided a plurality of venting apertures distributed about the outer enclosure.

