United States Patent [19]

Bartram et al.

[11] **3,763,573**

[45] **Oct. 9, 1973**

[54] **HAIR DRYER**

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[73] Assignee: **Schick Incorporated,** Lancaster, Pa.

[22] Filed: **Oct. 11, 1972**

[21] Appl. No.: **296,544**

[52] **U.S. Cl.** **34/99,** 34/90

[51] **Int. Cl.** **A45d 20/24**

[58] **Field of Search** 34/90, 91, 96–101, 34/239; 267/160, 164

[56] **References Cited**

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Primary Examiner—Kenneth W. Sprague
Assistant Examiner—James C. Yeung
Attorney—Fred S. Lockwood et al.

[57] **ABSTRACT**

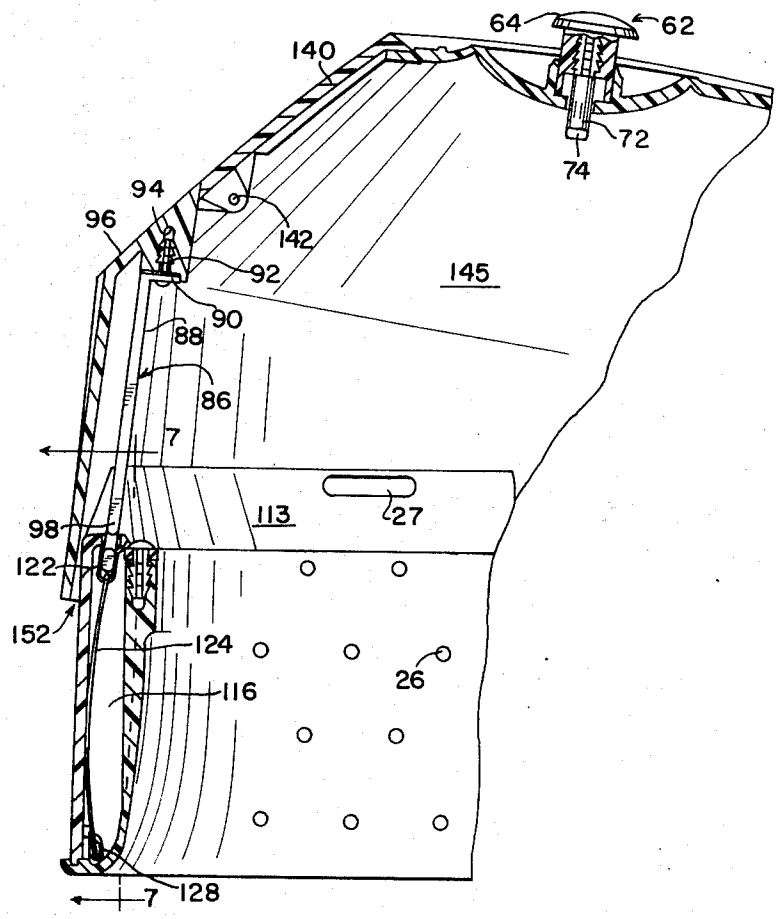
A portable hair dryer which includes a base, a head supporting assembly, and a dryer head assembly which automatically increases in volume when unlocked from a storage configuration. The dryer head assembly includes a generally annular air distribution plenum therein for receiving drying air and directing it generally radially inwardly, and a hood or cover which is pivotally mounted in respect to the annular plenum.

The portable hair dryer is of the hard-hat type having the general configuration of an articulated, collapsible Z, and the entire base and head supporting assembly nests for storage within the head assembly, even though the volume of the head assembly is substantially smaller in the storage configuration than in the expanded or raised operating configuration.

Upon being unlocked from the nested storage configuration, the hood or cover is automatically raised with respect to the plenum to increase the volume within the head assembly for receiving a greater portion of the head of the user in the head assembly. The cover is automatically lowered with respect to the plenum when the unit is locked into a nested storage position with the hood closely overlying the plenum to provide an effective dust and contamination shield.

In a preferred embodiment, a vent gap between the hood and plenum is automatically created at the upper-front region of the user's head space. A non-jamming latch mechanism automatically pivots the shell to the raised position.

5 Claims, 7 Drawing Figures



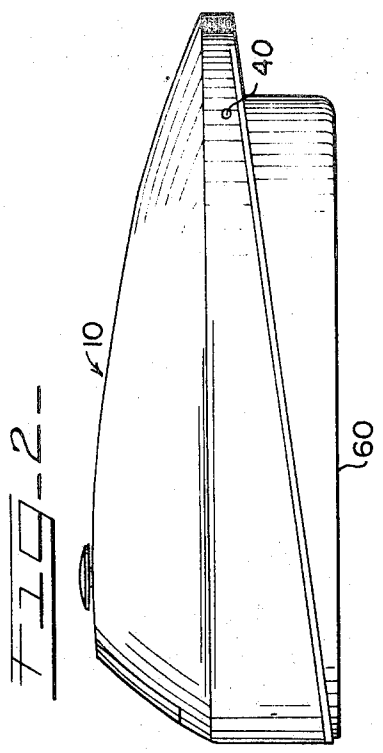


FIG-2-

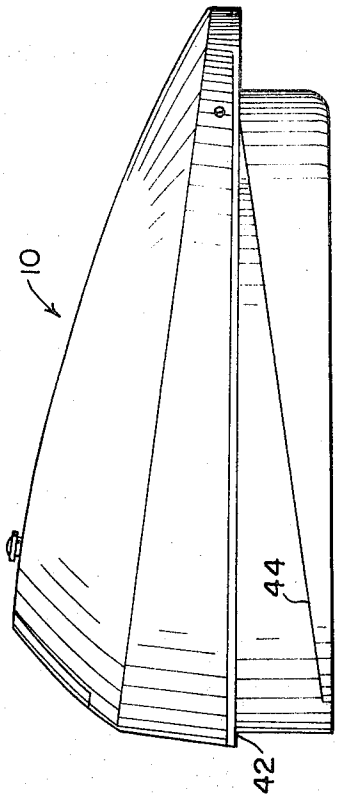


FIG-3-

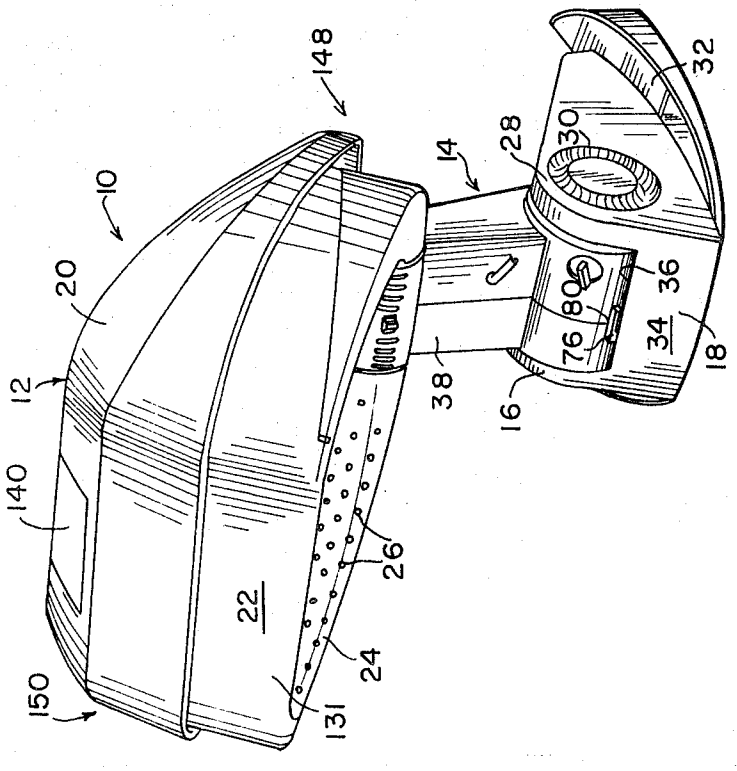
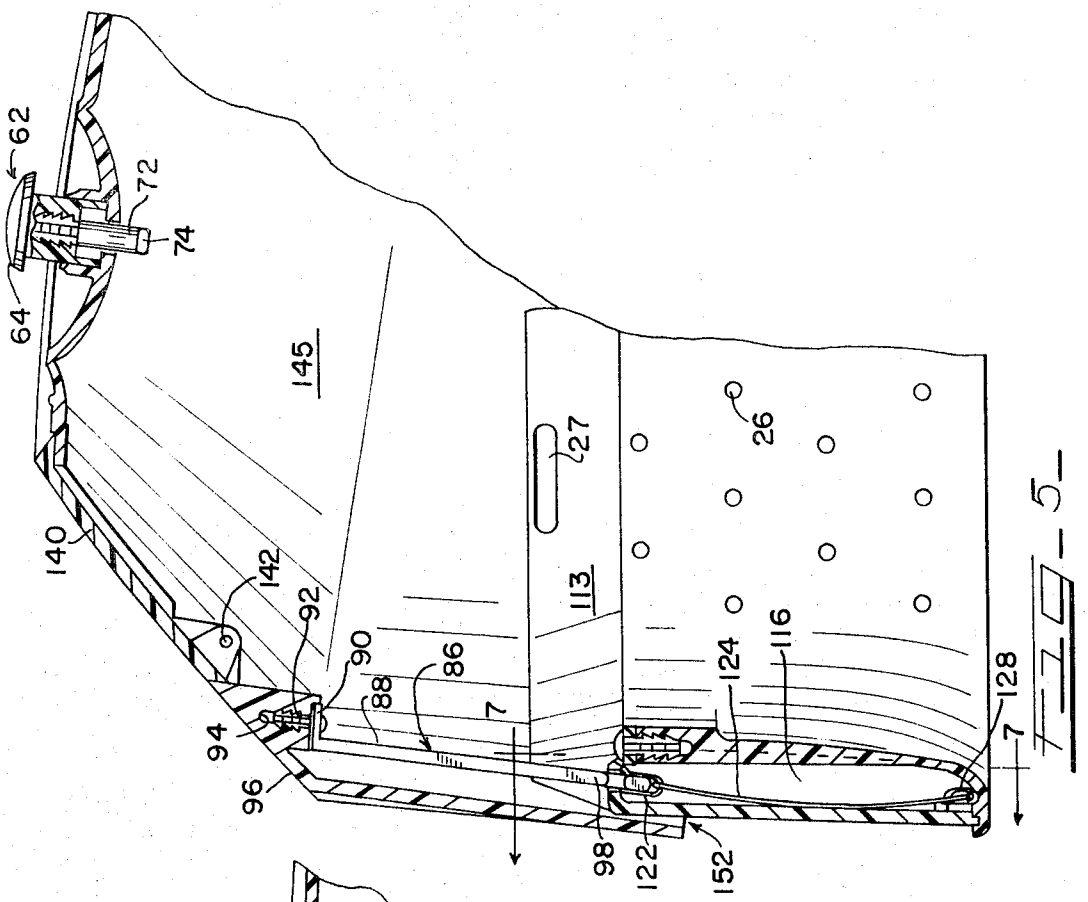


FIG-1-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145
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FIG. 5

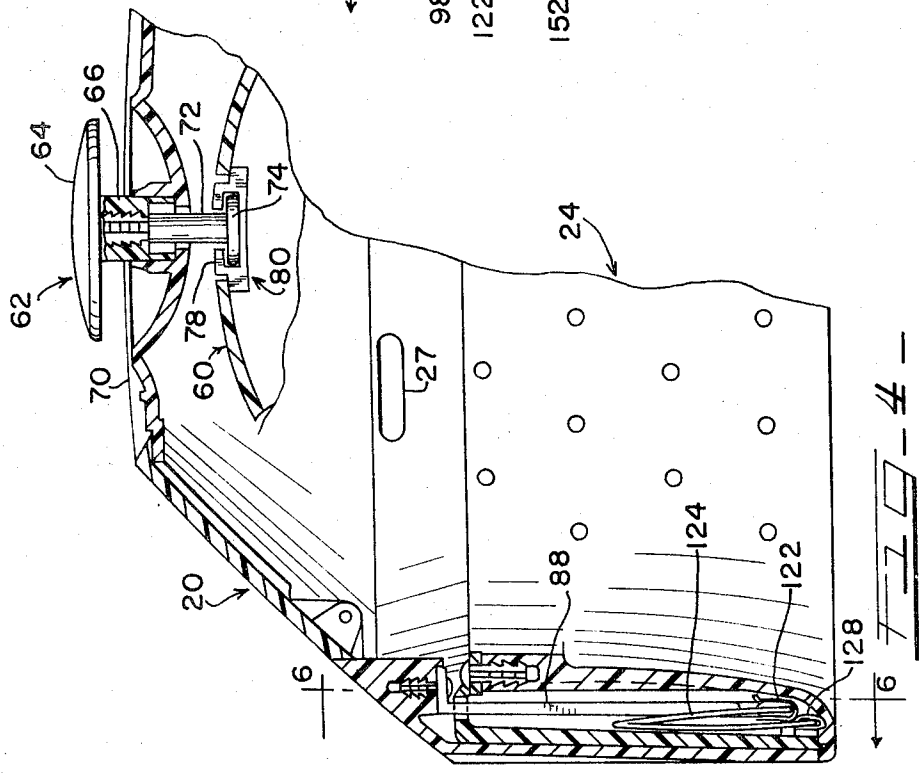
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FIG. 4

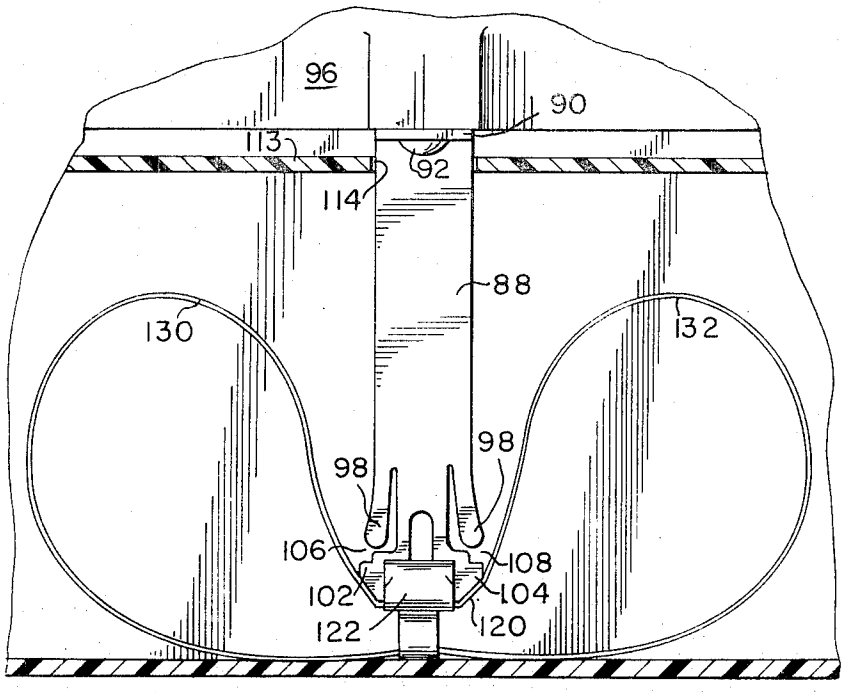
96
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FIG. 6.

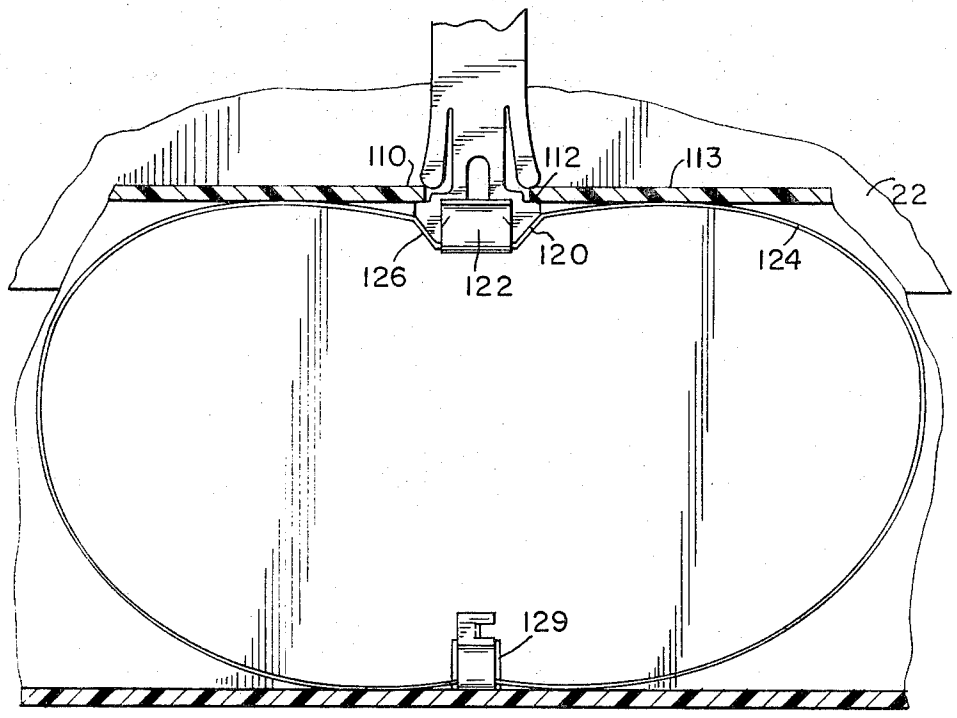
110
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FIG. 7.

HAIR DRYER

The present invention relates generally to hair dryers of the hard-hat type having the configuration of an articulated, collapsable Z. It relates particularly to an improvement providing automatic expansion of the head assembly when the dryer is released from storage configuration and automatic reduction in the volume of the head assembly when the dryer is locked in storage configuration.

The present invention relates to those hair dryers having a rigid head assembly which includes portions adapted to surround at least a portion of the head of the user. Such "hard-hat" dryers are distinguishable from other dryers, such as dryers having flexible bags, or caps, which surround the head of the user, and which includes a flexible hose-like conduit extending between the cap and a blower for heated air, and from dryers of hand-held type wherein no means are provided for surrounding any substantial portion of the head of the user.

Although hair dryers of both the hand-held type and the flexible cap type having proven acceptable to the trade, it is well known that hair dryers having rigid drying heads or hood units are superior in use, principally becuase they are sufficiently rigid to contain fixed physical structures which serve to direct the air to desired portions of the hair of the user in accordance with a predetermined pattern. Recently, hair dryers of the rigid head or hard-hat type have become relatively common home appliances and have achieved a certain currency because they have been able to be manufactured and sold at reasonable prices. Such dryers are generally designed so as to overcome the drawbacks associated with commercial or heavy-duty hair dryers, namely, substantial mass, lack of portability, and requirement of use of substantial amounts of electric current.

The present invention can be regarded as an improvement over the dryers which are disclosed in copending application Ser. No. 229,763, filed Feb. 28, 1972 by Robert S. Waters, Edward J. Doyle, Meyric K. Rogers and Nial C. Bartram, and assigned to a common assignee with the present invention. The hard-hat dryer disclosed in that patent application provides a head assembly and a base, each of which are respectively pivotally mounted at the opposite ends of the head mounting assembly on parallel, horizontal axes so that the base and the head assembly can be pivoted to nest the base and head mounting assembly within the head assembly, or opened into the general configuration of a Z without requiring dismantling or separation and reassembly of the dryer.

In the dryers described in the aforementioned patent application, the head assembly included an upper shell disposed above and about a generally annular plenum, and this shell is pivotally mounted on a separate horizontal axis to expand the volume generally enclosed by the annular plenum and shell assembly.

An important feature of that construction is that the plenum is of substantially annular construction, rather than hemispherical construction, although openings in the annular plenum at the top inner portions thereof directed hot dry air obliquely upwardly toward the upper extremes of the enclosure within the shell.

It is desirable to provide a dryer configuration in which the head assembly which will occupy the necessary but minimum volume when the dryer is in storage configuration. Also, it is found to be desirable that the head assembly be expanded automatically to provide adequate volume for use by a person having a plurality of relatively large curlers, for example.

In the heretofore available dryers having the hemispheric plenum configuration, all the hot dry air is generally directed downwardly and inwardly to the head of the user from all directions within the hemisphere, and the moisture-laden air, even that moisture-laden air which is above the head of the user, must be vented downwardly adjacent the face of the user. An important advantage of the annular plenum-expanding shell dryer structure is the fact that the latter permits sweeping of dry air upwardly over the hair, and also permits the option of venting moisture-laden air above the user's head that is, above the plenum, through the upper structures, rather than downwardly adjacent the face of the user. In one of the embodiments described in the aforementioned patent application, a special vent door is provided by which the user may elect not to vent, or to increase the venting, in the upper regions within the plenum-cover enclosure. However, the specific embodiment described in the aforementioned application required the manual adjustment, by the user, of the plenum-cover assembly to convert the plenum-cover assembly to the configuration in which the cover is raised. There was a tendency on the part of the user to commence the use of the dryer without raising the cover to the raised configuration, thus providing no venting whatsoever in the upper regions above the oval plenum, and providing minimized head space for penetration of the user's head between plenum outlets.

It is now appreciated that at least some upward venting in a hard-hat dryer having an annular or oval, rather than hemispheric, plenum shifts the drying pattern at least slightly to better assure complete and uniform drying of the top regions within the plenum-cover enclosure, yet providing permanently open vent openings in the shell would seriously diminish its effectiveness as a dust and contamination shield when the unit is in storage.

It is an object of the present invention to provide a hooded dryer of the hard-hat type having an annular plenum cover and combination which automatically assures raising of the hood to automatically increase the volume of the head assembly and provide at least a minimal venting of the enclosed space above the plenum.

It is another object of the present invention to provide a hard hat dryer of the hinged Z-configuration in which the head assembly automatically expands to a relatively large volume immediately upon being unlocked from a nested storage configuration in which the volume of the head assembly is automatically reduced.

It is a further object of the present invention to provide a hard hat hair dryer of the hinged Z-type which has the characteristic of being simpler to use than those heretofore available, and which automatically provides more satisfactory use in drying in many instances.

These and other objects which will be apparent hereinafter are all achieved in accordance with the present invention which will be described hereinafter in connection with a particularly preferred embodiment, and with the aid of the accompanying drawings in which:

FIG. 1 is a perspective view illustrating a hard-hat dryer which is improved in accordance with the present invention.

FIG. 2 is a side elevational view of the dryer shown in FIG. 1 locked in storage configuration.

FIG. 3 is a side elevational view of the dryer shown in FIG. 2 with the shell automatically pivoted to the raised configuration after the dryer is unlocked from storage configuration.

FIG. 4 is an enlarged fragmentary sectional view of the dryer while in the configuration shown in FIG. 2 through the left end portion of FIG. 2.

FIG. 5 is an enlarged fragmentary view of the dryer while in the configuration shown in FIG. 3, through the left end of FIG. 3.

FIG. 6 is an enlarged fragmentary sectional view taken approximately along the line 6—6 of FIG. 4.

FIG. 7 is an enlarged fragmentary sectional view taken approximately along the line 7—7 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

Although it will be understood that the invention may be embodied in a number of different forms, a description thereof will be made with reference to an embodiment wherein a head assembly, which includes a pivotally mounted cover surrounding the upper portion of a generally annular or oval plenum is automatically pivoted to an expanded condition when the dryer is unlocked from the collapsed storage configuration. For storage and transportation, the cover or shell portion of the head is moved downwardly automatically to a position closely overlying the plenum, and the head mounting unit is pivoted relative to the base as well as to the head assembly to permit both the head and the base mounting unit to be received within the head assembly and retained therein with the movably mounted plenum cover being in a collapsed configuration, and retained in that configuration by the storage lock mechanism.

Referring now to the drawings in greater detail, FIG. 1 shows the invention to be embodied in a dryer assembly generally designated by the numeral 10 having a head assembly 12 pivotally mounted atop a head mounting assembly 14, the lower portion of which forms an impeller housing 16 received within a base unit 18. The head assembly 12 includes an upper cover or shell 20 which closely overlies the exterior wall portion 22 of a somewhat elongated, generally annular, drying air distribution plenum 24 having a plurality of radially inwardly directed openings 26—26 and 27—27 therein.

The base assembly 18 includes a pair of legs 28—28, each having a louvered annular inlet openings 30—30 for fresh air, and each having a tray assembly 32 associated therewith for receiving pins, curlers, or the like. The front wall 34 of the base assembly 18 includes an edge portion 36 of reduced height, permitting the neck portion 38 of the head mounting unit 14 to be placed in various positions with respect thereto.

In operation, air is drawn through openings 30 by impellers (not shown) in impeller housing 16 and is forced through the hollow portion of head mounting assembly 14 into plenum 24. FIG. 2 shows the dryer 10 locked in storage configuration and FIG. 3 shows the unit 10 unlocked with shell 20 pivoted about horizontal pivot line 40 to the raised configuration. The dryer unit 10 shown in FIG. 1 may be collapsed for storage as shown in FIG. 2 by pivoting the cover or shell 20 about a horizontally disposed pivot and by pivoting head support element around a central axis of annular openings 30, to lower the cover 20 to a position wherein the lower edge 42 of cover 20 closely overlies an upper locating edge 44 formed in the wall 22 of plenum 24. This provides an effective enclosure wherein shell 20 shields the elements nested within the plenum from dust and other contamination during storage. It will be appreciated from a consideration of FIG. 2, when dryer 10 is in storage configuration that the bottom surface (not shown) of base unit 18 lies at least approximately flush with and closely adjacent the bottom 50 of the lower shell 22. Also, the configuration of bottom 40 of base 18 can be such that it serves as a bottom cover for head assembly 120. By reason of the design of the principal elements 12, 14 and 18 of dryer 10, the profile represented by the unit 10 in the retracted or collapsed condition thereof as shown in FIG. 3 is much lower than the profile able to be achieved with dryers of other designs.

The dryer which is improved in accordance with the present invention can be regarded as having the configuration of an articulated Z, that is, a hinged, collapsible, nestable Z in which the base element 18 and the lid element 12 can be considered to be generally horizontally disposed end portions of the hinged Z and wherein the head support element 14 can be considered to be the middle portion of the hinged Z. The hood support element 14, and the base portion 28 are, as a consequence of the structural relationships described hereinbefore, completely retractable or nestable within the head assembly 12.

Details of the hinging and locking mechanisms which can be used in the hinged Z configuration hard-hat type hair dryers do not constitute a part of the novel aspects of the present invention, and details of an imminently satisfactory construction for hinging and locking the relative positions of the elements 12, 14 and 18 in operation configurations or in a storage configuration are found in the aforementioned copending Pat. application Ser. No. 229,763 filed Apr. 28, 1972 for Hair Dryer, said application being assigned to a common assignee with the present application.

In FIGS. 4 and 5, elements relating to the plenum 22 and shell 12 and closely associated elements are shown. In FIG. 4, an enlarged fragmentary cross-sectional view of the plenum 24, the upper shell 20, and a curved portion 60 of the head mounting assembly 14 are shown. The relative position of the structural elements shown in FIG. 4 corresponds to the position of these elements when in the configuration illustrated in FIG. 2, that is, when the dryer 10 is in collapsed, retracted, or storage configuration.

In FIG. 2, the locking assembly 69 is shown in the locked condition. This unit 62 includes a handle member 64 having an associated shank portion 66 received within an opening 68 of the top portion 70 of cover 20. A stiff fastener element, such as a metal stud 72 is pressed fit or otherwise secured into the shank 66. An oblong head 74 forms the lower end of the fastener 72. The oblong head portion 74 of the fastener 72 is adapted to be received within an opening 76 and defined between opposite legs 78—78 of a latch assembly generally designated 80 and located on an outer surface portion of the impeller housing 16. Upon rotating

handle 64 one-quarter turn, the configuration illustrated in FIG. 5 is obtained, after the latch head 74 passes through the openings of the latch mechanism 80 to release cover 20 from the impeller housing 16. This frees the base unit 18 to be moved from its position of storage inside the head assembly 12. Also, in accordance with the present invention, unlocking of the locking assembly 62 automatically frees the cover, or upper shell 20 to be biased upwardly into the expanded or raised configuration illustrated in FIG. 3 and 5. Thus, cover 22 is mounted for pivotal movement about pivot 40, and, in accordance with this invention, a biased latch assembly generally designated 86 is provided to move cover 20 between the positions shown in FIGS. 4 and 5 automatically upon unlocking of the storage lock mechanism. This assembly 86 includes a latch unit 88 having a flange 90 on the top thereof, through which is received a fastener 92 pressed within a recess 94 in the front wall 96 of shell 20. The body of the latch unit 88 includes a pair of stiff but resilient oppositely directed fingers 98—98 near the bottom thereof. Spaced apart from the ends of the fingers 98—98 are a pair of oppositely directed shoulders 102–104 with spaces 106–108 being defined between the respective shoulders 102–104 and respective fingers 98—98 for reception of inwardly directed portions 110–112 of top wall 113 defining an opening 114 therein.

Latch assembly 86 can be moved vertically between positions corresponding to open and closed positions of cover 20 and body 88 moves in an arcuate path in a vertical plane which is perpendicular to the axis of rotation of cover 20. The margins 110–112 around the opening 114 are received in the notches 106, 108 when body 88 is in the open or raised position. The opening 114 through which the latch unit 88 moves is sized so as just to permit movement of the latch and, accordingly, little or no air leaks from the interior 116 when the cover 20 is in the raised position and little lateral play is permitted the latch member 88. The latch unit 88 is preferably made of a stiff but resilient plastic material.

At the lower end 120 of the latch unit 88, a U-shaped spring clip 122 confines spring 124 against end 120. Spring 124 is made from an elongated spring wire having a central shaped portion 126 conforming substantially to the shape of end 120 of body 88, and small coupled loops 128—128 at the ends thereof maintain spring 124 substantially in the general configuration of a closed loop. Clip 129 may be employed to secure the end loops 128—128 at a point in the same vertical plane which is perpendicular to the axis of pivot 40 of shell 20, and is below the lowest travel of end 120 when shell 20 is in closed position. Alternatively, spring 124 can be sized in length so that it is confined with respect to lateral shifting from the position shown in FIGS. 6 and 7 due to the size of the straight end portion 131 of plenum 24. The relatively stiff character of spring 124 will prevent it from shifting around sharp curves within plenum 24.

As indicated in FIGS. 5 and 7, spring 124 has an oblong closed loop configuration when shell 20 is in the open or raised position. Shaped mid-portion 126 is depressed to provide bi-laterally symmetrical pair of open loops 130–132 when shell 20 is in the closed configuration illustrated in FIGS. 4 and 6. It is noted that in the configuration illustrated in FIG. 6, the body 88 is being urged downwardly to generate the tensioned double open loop configuration shown in FIG. 6. The opposing bias of spring 124 generated by open loops 128—128 is balanced due to the bilateral symmetry of the double open looped configuration. As a consequence, the body 88 radially moves through opening 114 in proper alignment between the open configuration shown in FIG. 7 and the closed configuration shown in FIG. 6 and vice versa. The non-jamming feature of latch 86 is also due in part to the cooperative relationship between structural elements involving the anchoring of the body 88 at a point on cover 22 which, because of the pivoting of cover 22 along a substantially horizontal axis, moves in a vertical plane. This factor, coupled with the closely confined movement of body 88 through opening 114, further coupled with the bilaterally balanced tensioning or biasing of body 88 by spring 124 towards the raised configuration, provides a non-jamming biasing means which is emminently satisfactory for the combination of elements involved, and which is relatively inexpensive to manufacture.

Dryer 10 includes top vent door 140 which can be opened by pivoting door 140 around horizontally disposed pivot support means 142 (see FIG. 5). Thus, at the user's option, the opening of vent door 140 permits major venting of that portion of the plenum-cover enclosed region 145 which is most likely to be uppermost, that is, highest, when the head assembly 12 is in the operating configuration, such as, for example, that illustrated in FIG. 1.

Furthermore, by automatically raising the cover 20 by means which pivot cover 20 with respect to plenum 24 around a horizontally disposed pivot point 40 which is in that region 148 of shell 20 which is adjacent head mounting support 14, and by providing biasing means for pivoting shell 20 with respect to plenum 24 at the opposite or free end 150 of shell 20, a vent gap 152 between cover 20 and the outer wall 22 of plenum 24 occurs at free end 150. However, although pivoting in this manner provides a gap 152 at that free end 150 which is raised, substantially no gap is generated at the other end 148 which is pivoted, and which is lower than end 150 in most normal operations. This provides a distinct advantage in that no room temperature air is admitted in the lower portions of region 145, and no hot air is vented in that lower region, thus enhancing the natural upwardly rising flow of the hot air coming through openings 26, 27 through vent 152 out of region 145.

In the illustrated embodiment (see FIG. 5), vent gap 152 is relatively small, and it is to be understood that the size of this gap can be increased or decreased in alternative embodiments, and, furthermore, cover 20 can be pivoted to varying angular extents in alternative embodiments to increase or decrease the relative change in volume of region 145 of head assembly 12 due to the pivotal movement of cover 20 with respect to plenum 24.

Numerous other variations and modifications will be apparent to those skilled in the art which do not depart from the spirit or scope of the present invention which is to be interpreted from the claims.

We claim:

1. A portable hair dryer unit having a hot air distribution plenun in general configuration of a loop with generally radially inwardly directed air distribution openings therein, and having a shell cover pivotally associated with the top of said plenum, said shell including a

skirt portion which extends downwardly around at least a portion of said plenum;

pivot means for pivoting said shell with respect to said plenum to raised and lowered positions;

said plenum and shell consituting part of a head assembly;

said dryer also including a head support element and a base assembly;

said head assembly, supporting element and base being articulated for pivoting with respect to each other around horizontal axes and for nesting in a configuration in which said support assembly and said base assembly is received within said plenum and said cover;

automatic biasing means for biasing said shell to said raised position with respect to said plenum wherein the volume of the region within the plenum and shell is automatically increased, the location of the shell pivot axis and the dimensioning of said plenum and shell being such that a gap is provided between said plenum and said shell when said shell is in said raised position; and

locking means for securing said shell to said head support element adjacent said base element when said shell is in said lowered position when the dryer is in said nested configuration.

2. The hair dryer of claim **1** wherein said biasing means comprises a stiff elongated band of resilient material secured at one end thereof to said shell at the free end of said shell, said stiff band passing axially along a perpendicular plane through a closely confined opening in said plenum into the hot air-channel within the interior of said plenum;

a spring loop secured at a first point thereon to the other end of said band, said spring loop also being supported within said plenum at said vertical plane at a second support point which is below the lowermost movement of the first support point when said shell is in said closed position, the length of said spring between said first and second support points of said spring being equal whereby equal lengths of spring material are provided at both sides of each of said points between said second point of support and said first point of support.

3. The dryer of claim **2** wherein said spring loop is made from a length of spring wire which is formed into a generally closed loop by coupling of small closed end loop at each end thereof, wherein said first point of support is at the middle of said length and wherein the second point of support is at said coupled small end loops.

4. In combination in a hair dryer having a head assembly, a base and support means for supporting said head assembly on said base, said support means pivotally supporting said head assembly at one end thereof, a hot air distribution plenum having the general configuration of a loop with generally radially inwardly directed air distribution openings therein and having a shell cover pivotally mounted on said plenum, said shell including a cover portion which covers the top of said plenum, and a skirt portion which extends downwardly around at least a portion of said plenum, said plenum and shell constituting part of a head assembly;

pivot means for pivoting said shell with respect to said plenum to raised and lowered positions, said pivot means providing a horizontal axis of pivoting near said one end;

means for nesting said dryer whereby said base and support means are pivoted within said head assembly for storage and said head assembly is locked into said nesting configuration by locking means which secures a free end of said shell to either said support means or said base assembly while automatically pivoting said shell to said lowered position with respect to said plenum; and

means responsive to release of said locking mechanism for automatically pivoting said shell to said raised position with respect to said plenum upon the release of said locking mechanism.

5. The combination of claim **4** wherein said means for expanding also include means for opening vent means for releasing air from said head assembly through conduits passing above said plenum.

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