

[54] **HAIR DRYER HOOD TILT MECHANISM**

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[58] Field of Search..... 34/99, 97, 96, 3, 80, 100, 34/239, 240; 285/184, 185

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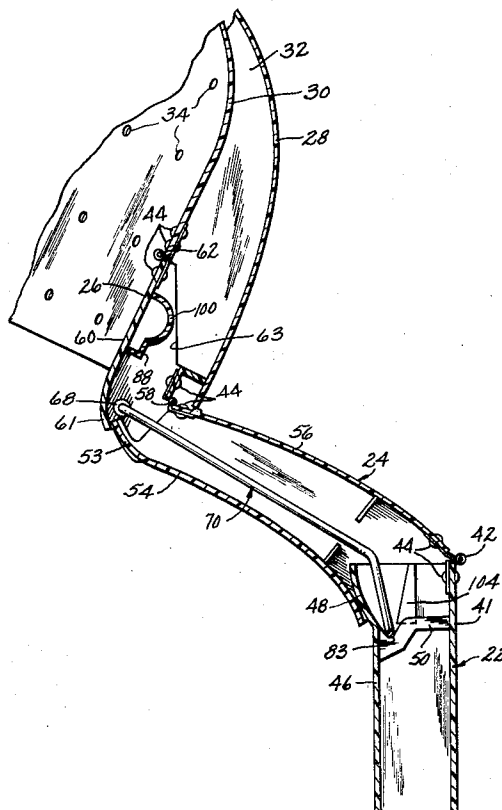
Assistant Examiner—J. C. Yeung

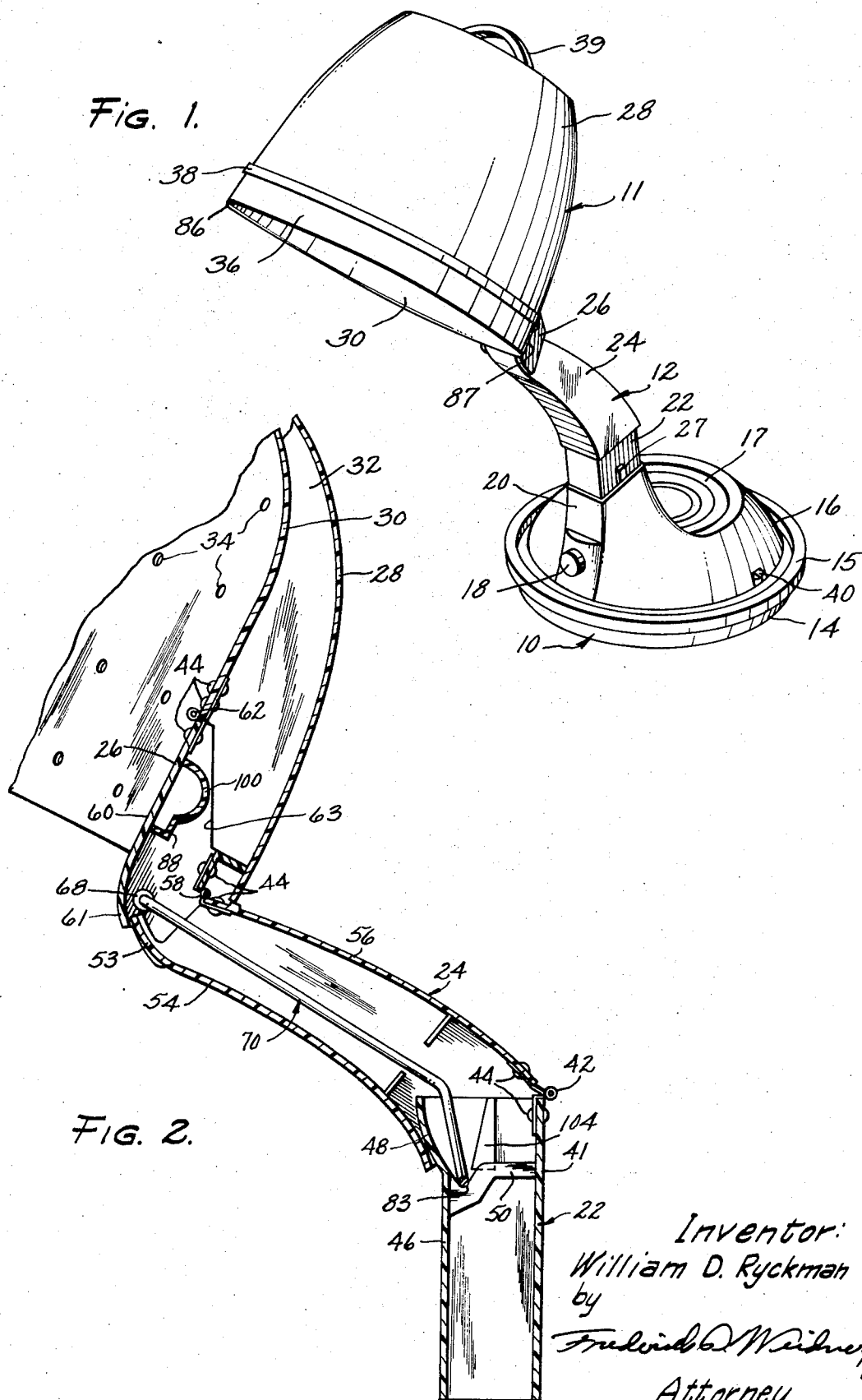
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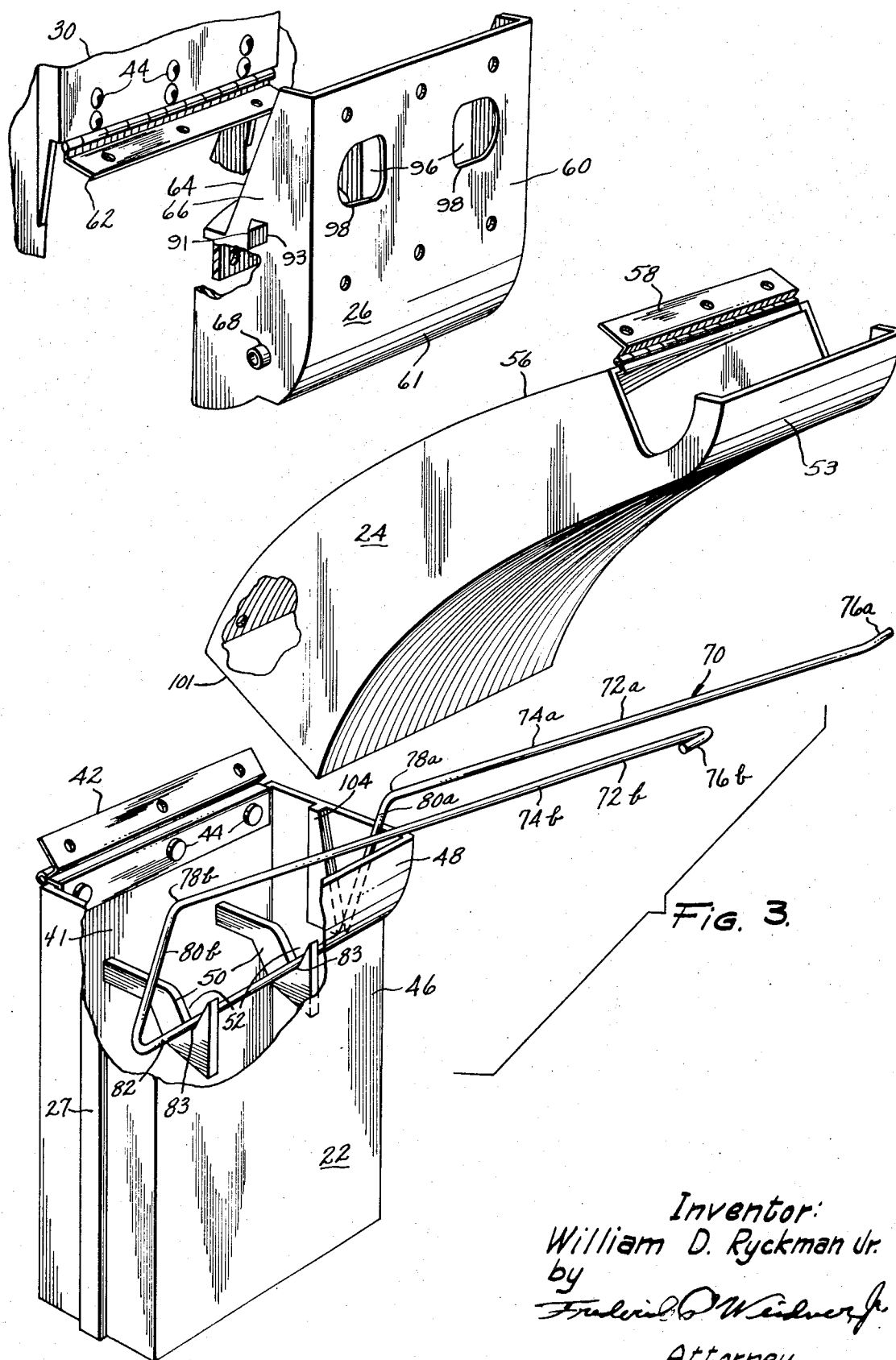
[57] **ABSTRACT**

A hair dryer that may be collapsed for carrying and erecting for operation, including a base assembly, a rigid tiltable hood assembly to be positioned about the head of the user for distributing heated air to the head and a strut hinged at both ends to the hair dryer between the hood assembly and base assembly one end of the strut being connected to the hood assembly. A push-rod member pivotally movable about two points and maintained under compression force cooperates with the hinged strut to apply supporting force to the hood assembly when the hair dryer is in the erected position. In the carrying position the push-rod is out of compression so that the hair dryer may be collapsed.

9 Claims, 7 Drawing Figures







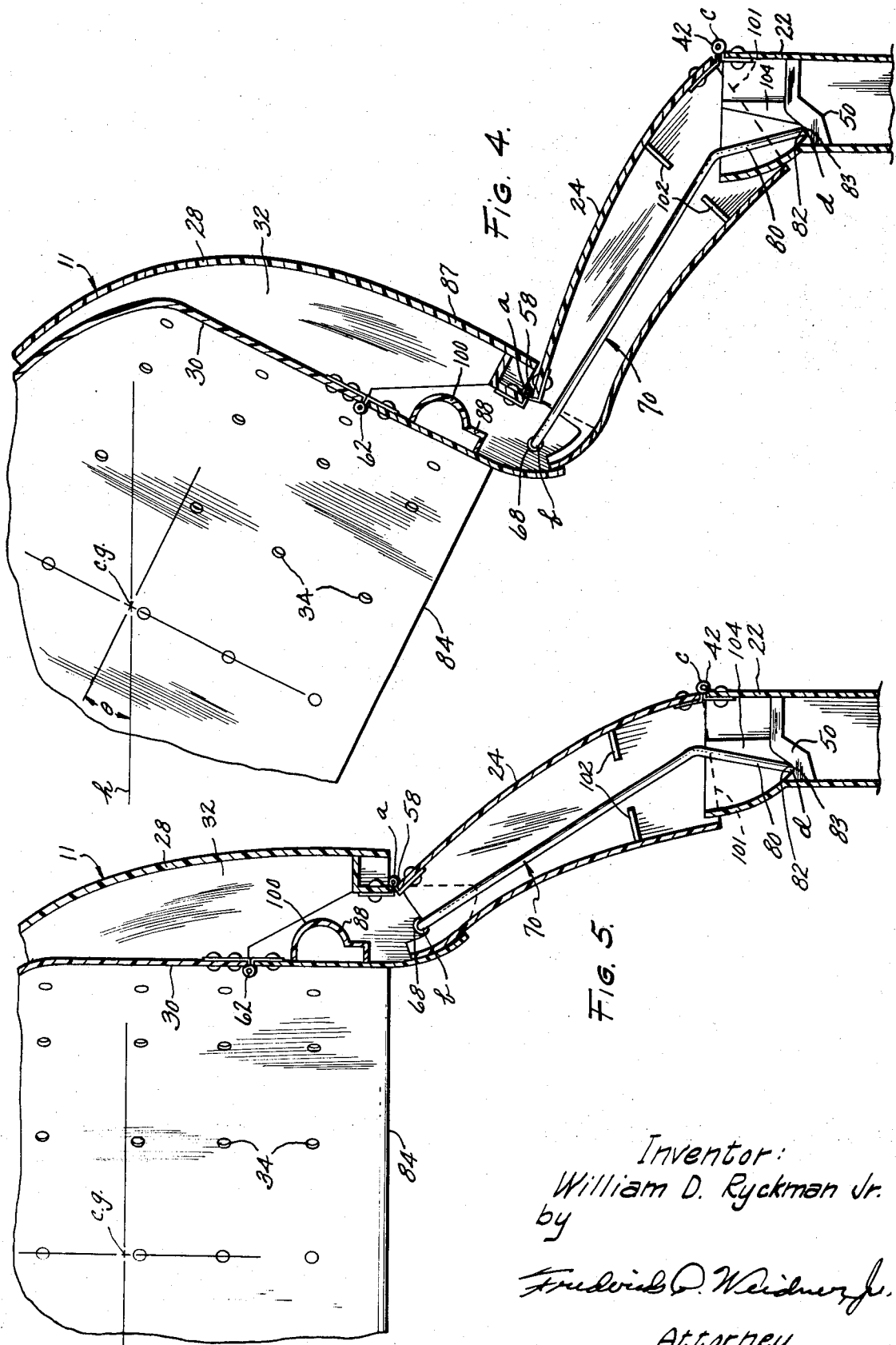


FIG. 6.

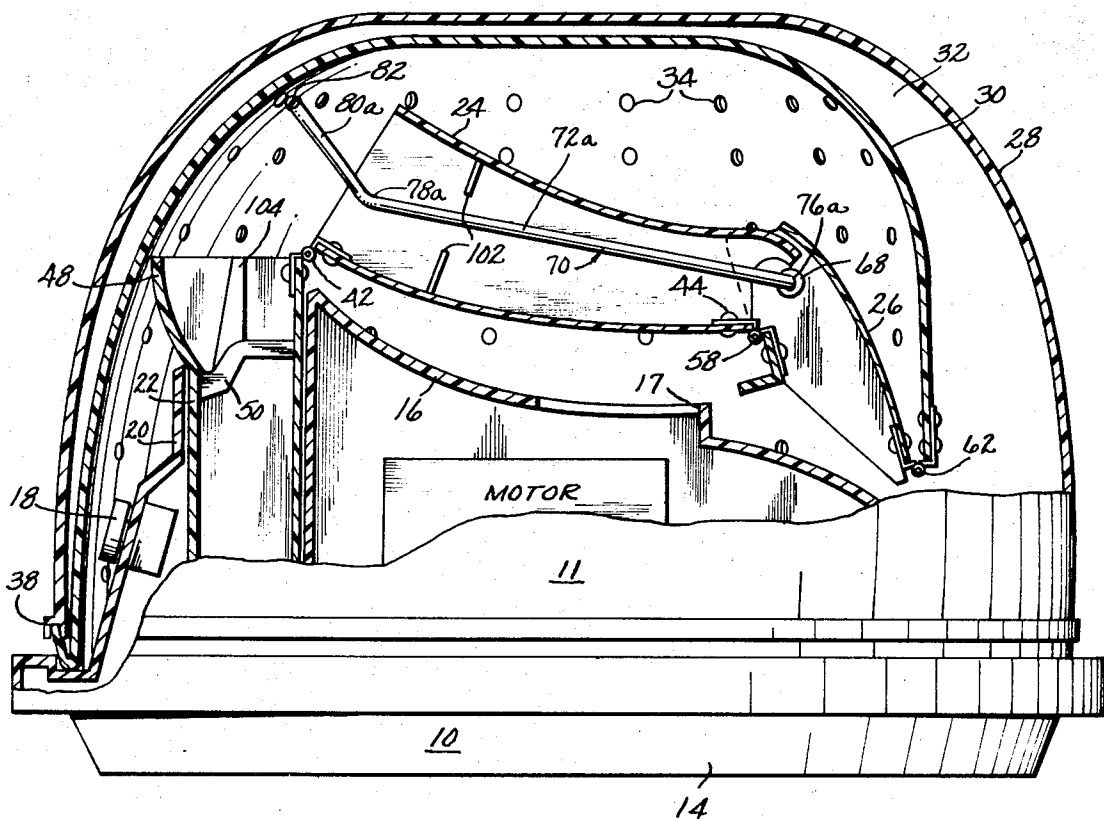
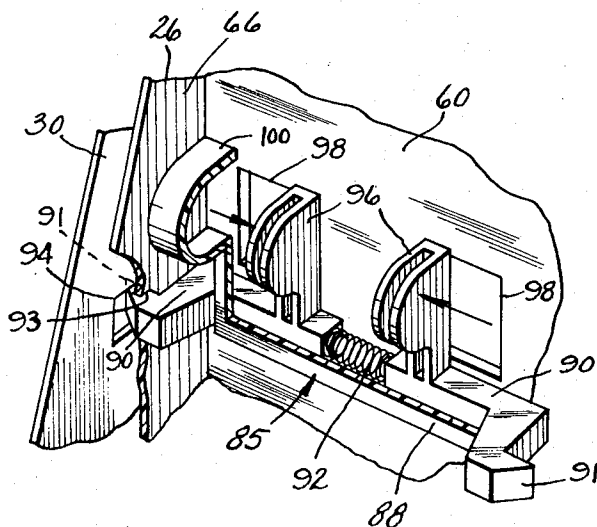


FIG. 7.



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HAIR DRYER HOOD TILT MECHANISM

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to hair dryers and, more particularly, to hair dryers having a rigid hood.

2. Description of the Prior Art

Hair dryers generally fall into two types, namely, those which are usually permanently installed in beauty parlors, and those of the household type which are small portable appliances. The professional type is massive, costly, and does not lend itself to feasible utilization in the home. This invention relates particularly to household type hair dryers that utilize a rigid hood.

In a beauty parlor any adjustments that are necessary to properly position the hair dryer hood relative to the head of the person whose hair is being dried are made by an attendant, whereas, when a household rigid hood hair dryer is employed the user herself usually must make any necessary adjustments. In such household rigid hood hair dryers, the problem of providing a satisfactory adjustable means for the hood so that it can be readily selectively adjusted for convenient and proper positioning by the user on her head during the hair drying operation has not been completely solved. Normally hair dryers are constructed so that when erected to operating position the hood position is fixed at an incline of approximately 20°–25° off the horizontal plane. Height adjustment of the rigid hood relative to the user's head may be accomplished by telescoping ducts between the base of the hair dryer and the rigid hood. This height adjustment technique is commonly found in hair dryers presently on the market. However, if the user during the hair drying operation wishes to orient her head downwardly, as to perhaps read, manicure, sew, etc., the hood should be tiltable to accommodate the user's head but yet not change the height adjustment. Tilting of the hood should be easy, convenient to the user, and effective in holding the hood at the desired adjusted tilt angle.

Many hair dryers are used not only for drying hair but also for applying water vapor to the hair to help set it. In such hair dryers a vapor generator is associated with the hair dryer such that the vapor is distributed to the hair via the rigid hood in the same manner as heated air. It has been found advantageous to have the hood positioned relatively horizontal to get better water vapor distribution characteristics as compared to the normal hood position of approximately 20°–25° off the horizontal.

By my invention, there is provided a rigid hood hair dryer that includes a hood tilt mechanism that accomplishes the above-mentioned desirable results.

SUMMARY OF THE INVENTION

In accordance with this invention, there is provided a hair dryer having a tiltable rigid hood assembly to be positioned over the head of the user for distributing air to the hair, a base assembly, means for producing a flow of heated air to be distributed to the hair by the hood assembly, and a strut hingedly secured at both ends thereof to the hair dryer between the hood assembly and base assembly one end of the strut being connected to the hood assembly. The hair dryer is constructed so that the hood assembly may be lowered or collapsed relative to the base assembly for carrying or

storing the hair dryer and also raised or erected relative to the base assembly for operating the hair dryer. A push-rod member pivotally movable about two points cooperates with the hinged strut to apply supporting force to the hood assembly and thereby enable the hood assembly to be rotated about its center of gravity. The push-rod member is maintained under compression force when the hair dryer is in the operative position and released from compression when the hair dryer is in its carrying position.

It is an object of this invention to provide a hair dryer that has a hood that may be conveniently tilted by the user.

It is also an object of this invention to provide a hair dryer with a rigid hood that is selectively tiltable and retained automatically in its selected position.

It is another object of this invention to provide a rigid hood hair dryer whose hood may be tilted by the user when in operation and collapsed onto the base assembly for easy carrying and storage.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a rigid hood hair dryer in condition for operation.

FIG. 2 is a partial cross-sectional view of my hair dryer in operating position showing the tilt mechanism.

FIG. 3 is an exploded perspective view of the components of my hair dryer tilt mechanism.

FIG. 4 is the same as FIG. 2 showing one tilt position of my hair dryer hood relative to a horizontal plane.

FIG. 5 is the same as FIG. 4 but showing another tilt position.

FIG. 6 is a partial cross-sectional view of my hair dryer in the collapsed condition for carrying or storage.

FIG. 7 is a perspective view of the hood and air duct latch arrangement.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail, FIG. 1 illustrates my hair dryer in erected condition ready for operational use, such as in the home, and it generally includes a hair dryer having a base assembly 10, a rigid hood assembly 11 to be placed over the head of the user, and a strut in the form of a connecting air conduit between the hood assembly and base assembly that includes a hollow air duct assembly 12 which may be selectively adjustable as by telescoping the sections to position the hood at a height comfortable for the user. The hair dryer may be the type shown in FIG. 1 where it is contemplated to be used by placing the entire hair dryer on a table or similar appropriate countertop support and the user sits on a chair and positions her head within the rigid hood assembly 11. It is to be understood, however, that other rigid hood type hair dryers may also be employed in my invention and that the hair dryer shown in the drawings is merely illustrative of one embodiment of my invention.

The base assembly 10 includes a housing which contains the usual means for producing a flow of heated air. That is, the housing contains an electrical heating means for heating air, electrically operated impeller means for causing the heated air to flow and regulating means for both the heating and impeller means including a manually operated selector switch accessible from

the exterior of the housing. There are also suitable air passages formed in the housing including an ambient air inlet and an integral heated air outlet which communicates with the air duct assembly 12.

The housing of the base assembly 10 includes a base member 14 and a cover 15 which are secured to each other in any convenient manner. The base member and cover may be made of rigid plastic material of any suitable known type. The top of the cover 15 forms a deck 16. Centrally, on the upper side of the deck is an air inlet grill 17. An air outlet tubular section 20 is molded integrally with cover 15. A selector switch operating knob 18 is mounted on the deck 16 and is accessible to the user for manually operating the hair dryer. The air duct assembly 12 between the base and hood assemblies comprises three sections of air ducts — lower duct 22, upper duct 24, and hood duct 26. These ducts may be made of the same rigid plastic material as that from which the base housing is made. The ducts are hollow tubular members that are generally rectangular in cross section. The lower duct 22 comprises a vertically disposed elongated tubular section of similar cross section to that of air outlet tubular section 20; however, it is slightly smaller in lateral cross section so that it can be telescopically slidably disposed inside air outlet tubular section 20. Along each side of both air outlet tubular section 20 and lower duct 22 is a guide track means 27 to aid in orienting the lower duct 22 and air outlet tubular section 20 relative to each other for ease of raising and lowering the lower duct 22 whereby adjusting the height of hood assembly 11 relative to the base assembly 10. Stop means, not shown, may be used to prevent complete removal of lower duct 22 from air outlet tubular section 20. Hingedly fastened to the upper rear edge of lower duct 22 is upper duct 24. Upper duct 24 is slightly curved and when the hair dryer is erected upper duct 24 extends forwardly of the base assembly 10. Hinged to the upper rear edge of upper duct 24 is hood duct 26 which in turn is hinged to the rigid hood assembly 11.

The hood assembly 11 comprises two main rigid plastic molded head receiving members 28 and 30. They are nested with respect to each other in spaced relationship to define an air distributing space or manifold 32 therebetween. The outer shell 28 is air tight, whereas the inner liner 30 has a plurality of air distributing apertures 34 formed throughout the surface thereof for the purpose of directing heated air into the hair of the user. The inner liner 30 has an outwardly and upwardly directed peripheral flange 36 formed integrally therewith which engages the bottom edge of the outer member 28 along a meeting line 38 that may be covered by a trim member if desired. The top of the outer shell 28 has a handle 39 for carrying the hair dryer when it is in its collapsed carrying position. In that event, hood assembly 11 is collapsed onto the top of base assembly 14 with the heated air duct assembly 12 folding inside the hood. The hood assembly is latched to the base by conventional latches 40 and then the entire hair dryer may be carried as a unit by the handle.

Turning now to the FIGS. 2 and 3, a detailed description of the components of the hair dryer hood assembly tilt mechanism and their arrangement with respect to

each other to provide the selective hood tilting feature will be described. The upper end of lower duct 22 has a hinge 42 that is secured to rearward wall 41 by rivets 44. The front wall 46 of lower duct 22 has at its upper end an outwardly and upwardly directed curved portion 48. Within the hollow center of lower duct 22 are two hook-shaped members 50 both being attached to rear wall 41 and front wall 46 by any suitable means. Each hook-shaped member 50 has a V-shaped upwardly directed opening 52.

Upper duct 24 is secured to lower duct 22 by hinge 42 again as by rivets 44 such that both ducts are hingedly secured to each other to afford hinged movement of one relative to the other. The body of upper duct 24 is slightly curved and terminates at its upper end with an upwardly curved lip portion 53 formed in forward wall 54 of the air duct. Hinge 58 is secured to rear wall 56 of air duct 24 and also to hood duct 26 again as by rivets 44.

Hood duct 26 has formed in its forward wall 60 a curved portion 61 to cooperate with the curved lip portion 53 of upper duct 24. These curved portions are complimentary to each other so that when hood duct 26 and upper duct 24 are moved relative to each by pivoting about hinge 58 they will not bind each other yet they are spaced only slightly apart to minimize air leakage during operation of the hair dryer. Hinge 62 is in turn attached to the inner hood liner 30 by rivets 44. Inner liner 30 has mating surfaces 63 formed therein that cooperate with mating surfaces 64 of hood duct 26. The side walls 66 of hood duct 26 have at the lower portion thereof bearing sleeves 68, one on each side wall thereof.

Within the hollow central portions of all three of the above-described air ducts 22, 24 and 26 is a bifurcated push-rod member 70. This push-rod member has two legs 72a and 72b. Each leg has a central portion 74a and 74b terminating at one end with out-turned end portions 76a and 76b which are journaled in bearing sleeves 68 in hood duct 26. At the opposite ends of the central portions 74a and 74b there is a 45° bend elbow 78a and 78b then an extension portion 80a and 80b. Legs 72a and 72b are joined by a transverse spanning portion 82. The entire push-rod member 70 may be formed from suitable rigid material such as metal wire of desired size, diameter, and strength. The transverse spanning portion 82 is seated in the V-shaped openings of hook-shaped members 50 in lower duct 22. It should be noted that push-rod member 70 merely rests in the bottom 83 of V-shaped opening 52 and is not securely attached to hook-shaped members 50. The significance of this feature will be discussed later in connection with the operation of the tilt mechanism.

When all of the heated air duct sections are joined together to form the air duct assembly 12 as indicated above and the push-rod member 70 is positioned within the air duct portions the components are arranged as shown in FIG. 2 when the hair dryer is erected for operational use. To securely fasten the hood assembly 11 to hood duct 26 there is provided a finger-operated releasable latch assembly 85 as shown in FIG. 7. The latch assembly 85 comprises a channel-shaped portion 88 integrally formed on hood duct 26 just below the attachment of hinge 62 and adjacent the bottom edge of the hood liner 30. A pair of opposing latch elements 90

are located in this channel 88 at opposite ends thereof. A coil spring 92 is positioned between the latches 90 to bias them in an outward direction. The latch elements 90 and coil spring 92 are retained in channel 88. Holes 93 are provided in the side walls 66 of hood duct 26 so that the outer ends 91 of latch elements 90 may protrude therethrough. These latches protrude into notches 94 formed in the inner liner 30 of the hood assembly. When the outer ends 91 of latch elements 90 catch in notches 94 the hood is retained in a fixed position relative to hood duct 26. To release the latch elements 90, it is necessary to move the latches out of notches 94. This is accomplished by squeezing finger-gripping latch elements 96 toward each other against bias spring 92. The finger grip elements 96 are accessible through finger openings 98 formed in the upper end of front wall 60 of hood duct 26. A finger-grip channel 100 is formed in upper duct 26 behind the openings 98 to prevent leakage of air from the air duct assembly during the hair drying operation. After the outer ends 91 of latch elements 90 are withdrawn from notches 94 the hood assembly 11 can be moved to a stored position on base assembly 10 with a single lowering operation or movement during which time the hood pivots about hinge 62 and the other hinges 42 and 58 operate to collapse the air duct assembly 12 toward the base assembly 10. When the hood assembly and base assembly are centered with respect to each other the latch elements 40 are aligned so that the hood assembly can be latched closed on the base assembly 10. This position is shown in FIG. 6 wherein the hair dryer is ready for carrying or storage. To erect the hair dryer the latches 40 are released and the hood assembly is lifted up and forward thus unfolding the hinged components thereby readying the hair dryer for operation. At the end of the lifting movement of the hood assembly the outer ends 91 of the spring-biased latch elements 90 will snap into latch notches 94. At this point the setup operation is completed.

With reference FIGS. 4 and 5, the hair dryer incorporating the tilt mechanism is shown in two positions relative to a horizontal plane designated h which plane passes through the center of gravity, designated $c.g.$ of the rigid hood assembly 11. FIG. 4 shows the hair dryer in what has been heretofore the normal attitude of hair dryer hoods in position for operational use. The rigid hood assembly is tilted up with respect to the horizontal plane h at an angle, designated θ , close to 30° relative to the horizontal plane. This means that the lower edge 84 of the rigid hood assembly is inclined 30° relative to the horizontal plane. As pointed out previously, it is highly desirable that the hood assembly be manually selectively tiltable more nearly to the horizontal but without significantly changing the height adjustment. In this instance then the hair dryer would be positioned as shown in FIG. 5. It can be seen that when the hood assembly is near the horizontal position upper duct 24 more nearly approaches the vertical. Upper duct 24 has pivoted about both hinges 42 and 58 during this adjustment. In both of the hair dryer positions shown in FIGS. 4 and 5, push-rod member 70 is pivotally moved in its journal, bearing sleeves 68, which are located in close proximity to the rear lower edge of hood assembly 11. Push-rod member 70 extends completely through the hollow interior of upper

air duct 24 and has its transverse spanning portion 82 pivotally movable in the bottom 83 of V-shaped hooks 50. Because of this arrangement it will be appreciated that as downwardly directed compression force is applied to push-rod member 70 the transverse spanning portion will be prevented from downward movement but yet it may pivot about the V-shaped bottom 83 of the hook-shaped member 50. Push-rod member 70 therefore is free to pivot about two points at opposite ends thereof while applying supporting force to the hood assembly. The extension portions 80 of the push-rod assembly are downwardly directed by an angle approximately 30° from the central portions 74 in order to clear the walls of the lower duct 22 and upper duct 24 when these air ducts are moved relative to each other about hinge 42. It will be noted that in FIG. 4 when the hood assembly is tilted up the lower pivot point designated d is a certain distance from the lower edge 101 of upper duct 24. On the other hand, when the hair dryer hood is tilted down as shown in FIG. 5, pivot point d is located further from the lower edge of upper duct 24. In doing so, push-rod member 70 projects further out the bottom of upper duct 24 thereby causing upper duct 24 to be tilted up toward the vertical. Thus when the front edge 86 of rigid hood assembly 11 is pulled down by the user the rear edge 87 is forced up thereby causing rotation of the rigid hood assembly about a horizontal line approximately through its center of gravity. The pivot points of the tilt system are designated a , b , c and d wherein a is the pin connection of hinge 58, b is the outturned portions 76a and 76b pivoting in bearing sleeves 68, c is the pin connection of hinge 42, and d is the transverse spanning portion 82 pivoting in the bottom 83 of V-shaped openings 52. By proper choice of location for pivot points a , b and d with respect to pivot point c , a nearly balanced tilt system exists for any tilt angle within the structural limits of angle range built into the hair dryer. The tilting system will be balanced if the total potential energy remains constant as the hood assembly is tilted within the tilt range. That is, if the weight of the hood assembly times the distance its center of gravity is above a horizontal plane through pivot point c , plus the weight of the upper duct 24 times the distance its center of gravity is above the horizontal plane through pivot point c , plus the weight of push-rod member 70 times the distance its center of gravity is above the horizontal plane through point c remains constant throughout the tilt range then the system will always be balanced. Any slight unbalance may be overcome by purposely providing some slight friction between the push-rod member 70 and the inside of the upper air duct side walls. This may be accomplished by a bow-shaped spring (not shown) spanning the legs 72a and 72b biasing the legs outwardly against the side walls of the upper duct or the legs may simply be bowed outwardly during the forming operation of the push-rod member. Calculation of the location of the pivot points of the tilt mechanism based on the above may be accomplished by standard engineering practice. As can be seen in FIGS. 4 and 5, the three air ducts 22, 24, and 26 cooperate structurally with each other so that during the hood assembly tilting operation each is permitted to move relative to the other without materially effecting the air flow characteristics through the heated air duct assembly.

With particular reference to FIG. 6 the hair dryer incorporating my hood tilt mechanism is shown in its collapsed condition wherein the hood assembly is placed on top the base assembly with the air duct assembly folded and stored inside the hood assembly. It is important in a hair dryer constructed in this fashion that the tilt mechanism also accommodate the folding characteristics of the hair dryer air duct assembly. In this regard, upon collapsing the hair dryer to its carrying position, the push-rod member 70 out-turned portions 76a and 76b remain secured in their pivoting position *b* within sleeve bearings 68. However, the opposite end of the push-rod member 70, which is the transverse spanning portion 82, is not seated in the bottom 83 of V-shaped opening 52 of hook members 50. Push-rod member 70 is then no longer subject to compression force. In fact, push-rod member 70 is free to pivot about point *b* within the interior confines of upper duct 24, however, it may be desirable to somewhat restrict that movement to obtain more efficient hair dryer collapsing characteristics by molding stop members 102 into the side wall of the upper duct 24. During the erection of the hair dryer to its operative position the push-rod member 70 swings downwardly toward lower duct 22 and the hook-shaped members 50 carried interiorly of that air duct. To assist in guiding the push-rod member 70 and its transverse spanning portion 82 into the V-shaped opening 52 there is molded in both of the side walls of lower duct 22 guide elements 104 that acts to guide the push-rod member directly down into the V-shaped opening 52 until it is seated in the bottom 83. By this arrangement the push-rod member is rigidly retained within the air ducts under compression force when the hair dryer is in its erected operational position and the push-rod member may move about pivot points at both ends, one of which being the outturned portions 76a and 76b in bearing sleeves 68 (point *b*) and the other the transverse spanning portion 82 in the bottom of the V-shaped opening 83 (point *d*).

The foregoing is a description of the preferred embodiment of the invention and variations may be made thereto without departing from the spirit of the invention, as defined in the appended claims.

I claim:

1. A hair dryer comprising:

- a. a base assembly,
- b. means for producing a flow of heated air,
- c. a rigid hood assembly arranged to be positioned about the head of the user and having means for distributing heated air to the head,
- d. a strut hingedly secured at both ends to the hair dryer between the hood assembly and base assembly, one end of which is connected to the hood assembly,
- e. means including a strut for lowering said hood assembly relative to said base assembly for carrying the hair dryer and for raising the hood to an elevated position relative to the base assembly for operating the hair dryer, and
- f. a push-rod member pivotally movable about two points and maintained under compression force when the hair dryer is in the operative position and out of compression when the hair dryer is in the carrying position, said push-rod member cooperating with said hinged strut to apply supporting force to said hood assembly whereby the hood assembly may be rotated about its center of gravity.

2. The hair dryer of claim 1 wherein the push-rod member is taken out of compression by releasing the push-rod member from one of its pivot points.

3. A hair dryer comprising:

- a. a base assembly housing means for producing a flow of heated air,
- b. a rigid hood assembly arranged to be positioned about the head of the user and having means for distributing heated air to the head,
- c. air conducting means for directing heated air from said producing means to said hood assembly, said air conducting means including a hollow air duct assembly hingedly secured at both ends to the hair dryer, one end of which is connected to the hood assembly,
- d. means including the air duct assembly for lowering said hood assembly relative to said base assembly for carrying the hair dryer and for raising the hood to an elevated position relative to the base assembly to an operative position, and
- e. a push-rod member being pivotally movable about two points and maintained under compression force when the hair dryer is in the operative position and out of compression when the hair dryer is in the carrying position, said push-rod member cooperating with said air duct assembly to apply supporting force to said hood assembly whereby the hood assembly may be rotated about its center of gravity to a desired angle of tilt.

4. A hair dryer comprising:

- a. a base assembly housing means for producing a flow of heated air,
- b. a rigid hood assembly arranged to be positioned about the head of the user and having means for distributing heated air to the head,
- c. heated air conducting means for directing heated air from said producing means to said hood assembly including three foldably hinged hollow air ducts comprising a lower duct, a upper duct and a hood duct hinged to said hood assembly, and
- d. an elongated push-rod member, said push-rod member extending through the middle air duct and having one end thereof pivotally attached to the hood duct and the opposite end removably pivotally mounted within the lower duct, said push-rod member cooperating with said air ducts to apply supporting force to said hood assembly whereby the hood assembly may be rotated about its center of gravity to a desired angle of tilt.

5. The hair dryer of claim 4 wherein the push-rod member is bifurcated and the two legs terminate in outwardly turned portions for pivotally attaching to the hood duct and the opposite end of the push-rod assembly has a transverse spanning portion connecting the two legs that acts as a pivot bar.

6. The hair dryer of claim 5 wherein the lower duct has hook-shaped members mounted internally therein for receiving and seating the transverse spanning portion.

7. The hair dryer of claim 4 wherein the rigid hood assembly and base assembly are dimensioned so that the hood assembly may be superimposed on the base assembly and said air ducts are foldably disposed within said hood assembly when the hood assembly is superimposed on the base assembly.

8. The hair dryer of claim 6 wherein the lower duct has guide means on the interior of the side walls thereof for guiding said push-rod member into the hook-shaped members.

9. A hair dryer comprising:

- a. a base assembly housing means for producing a flow of heated air,
- b. a rigid hood assembly arranged to be positioned about the head of the user and having means for distributing heated air to the head,
- c. air conducting means for directing heated air from said producing means to said hood assembly including three foldably hinged hollow air ducts comprising a lower duct, an upper duct and a hood duct hinged to said hood assembly, said lower duct having hook-shaped members mounted therein,
- d. means including the air ducts for lowering said hood assembly relative to the base assembly for carrying the hair dryer and for raising the hood to

- an elevated position relative to the base assembly to an operative position, and
- e. an elongated bifurcated push-rod member having at one end thereof outwardly turned portions and the opposite end a transverse spanning portion connecting the two legs, said push-rod member extending completely through the upper air duct and frictionally engaging the interior side walls of said air duct and the outturned portions pivotally attached to the hood duct and the transverse spanning portion being removably pivotally seated in the hook-shaped members mounted in the lower duct, said push-rod member cooperating with said hinged air ducts to apply supporting force to said hood assembly whereby the hood assembly may be rotated about a horizontal line through approximately its center of gravity.

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