US 20120051884A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0051884 A1

(43) Pub. Date: Mar. 1, 2012

Junkel et al.

(54) AIR BLOWING DEVICE

(75) Inventors: **Eric Junkel**, Mount Prospect, IL (US); **Zhixiang Kuang**, Zhongshan (CN)

(73) Assignees: **Zhongshan Longde Electric Industries Co., Ltd.**; **GLJ, LLC**

(21) Appl. No.: **12/807,091**

(22) Filed: **Aug. 28, 2010**

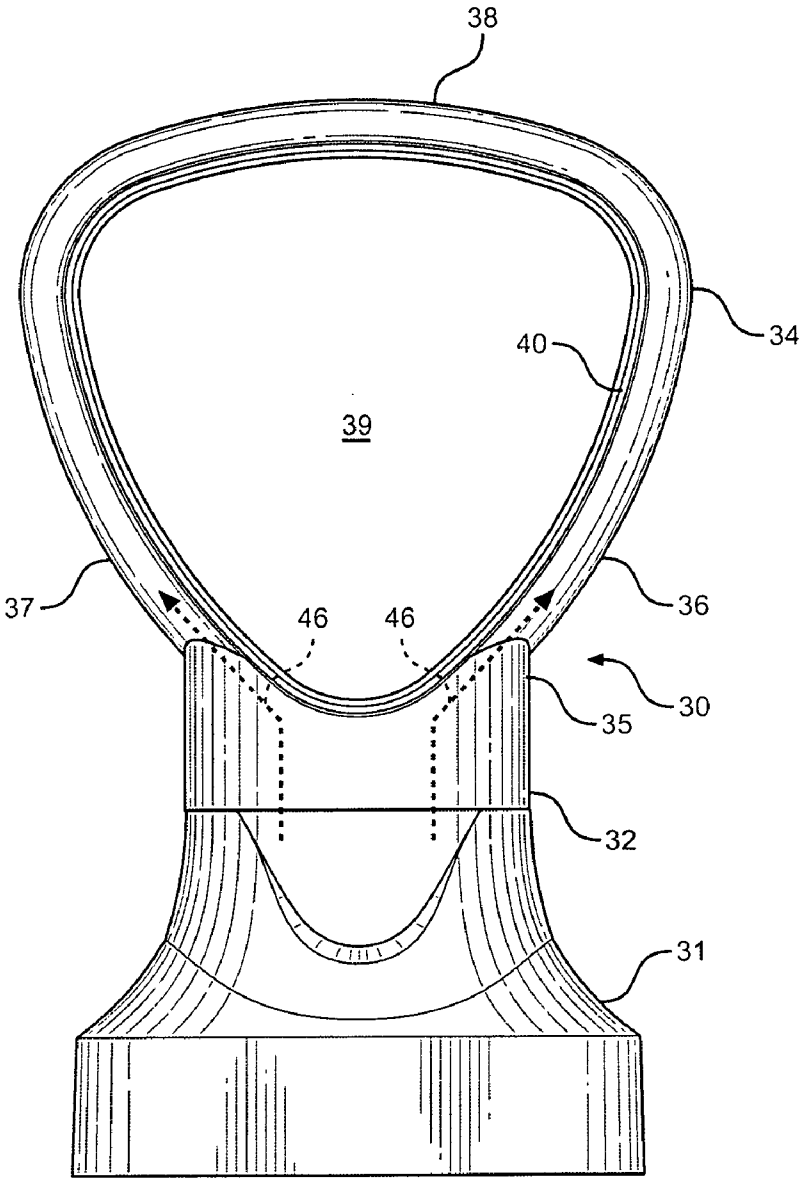
Publication Classification

(51) **Int. Cl.**
F04D 17/00 (2006.01)

(52) **U.S. Cl.** **415/90**

(57) **ABSTRACT**

The present invention provides an improved air blowing device formed by a base housing and a motor driving an impeller to create an air flow. A hollow housing is mounted on the base at a connection point. The housing assumes a substantially triangular configuration with the apex of the triangle forming the connection with the base and the forming the top of the housing. The housing is provided with an air discharge slot opening formed by an outer extended flat side wall and an inner shortened flat side wall. The air flow created by the motor impeller enters the hollow housing and exits through the air discharge slot opening thereby creating a collimated beam of air forward of the air blowing device.



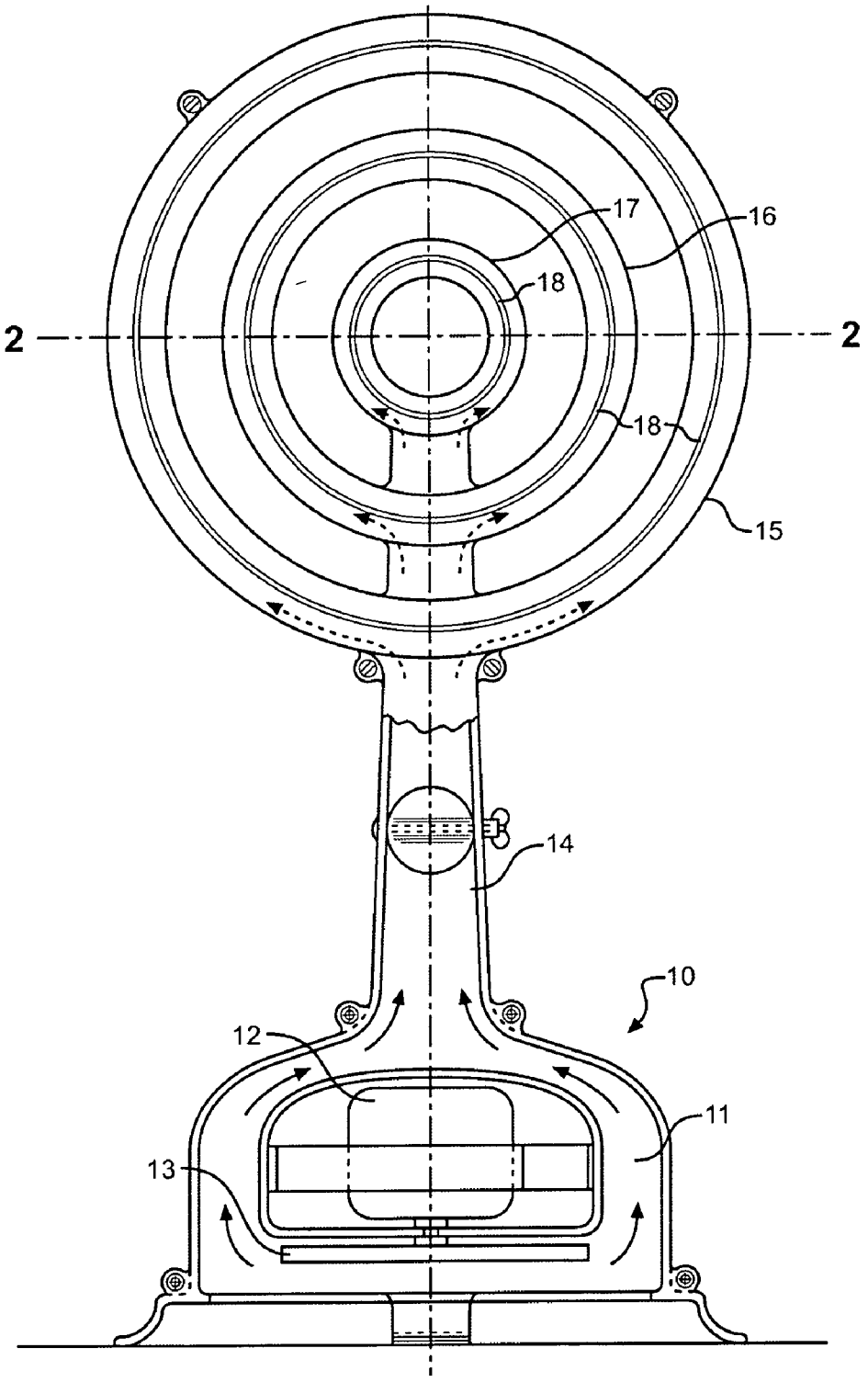


FIG. 1
PRIOR ART

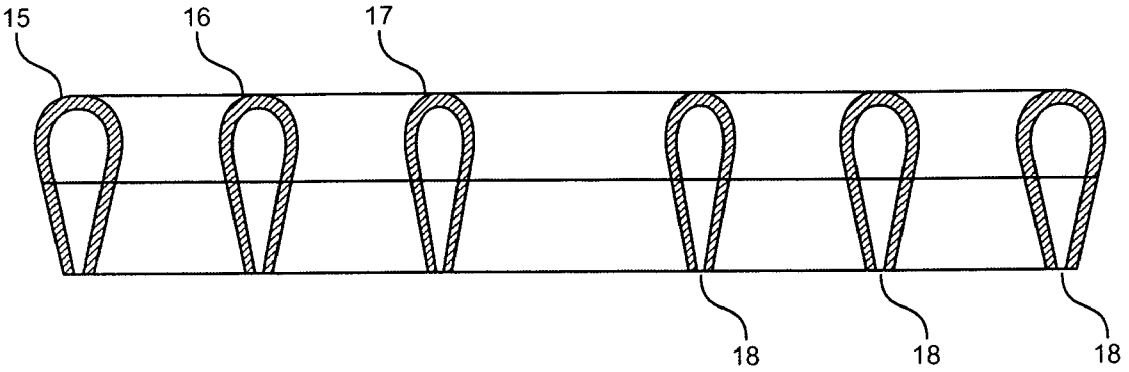


FIG. 2
PRIOR ART

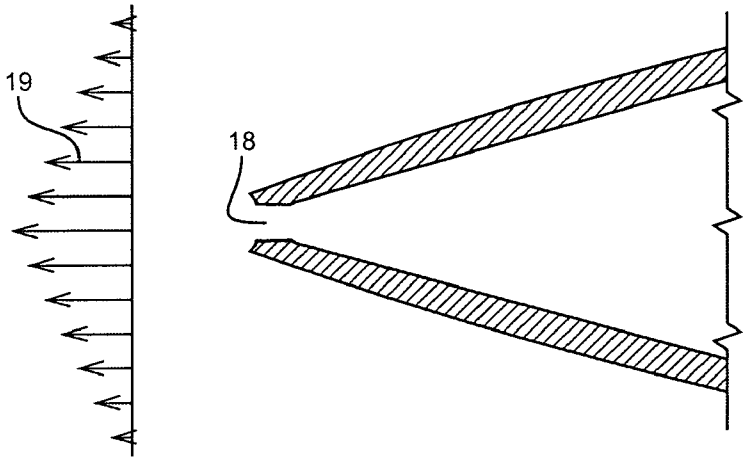


FIG. 3
PRIOR ART

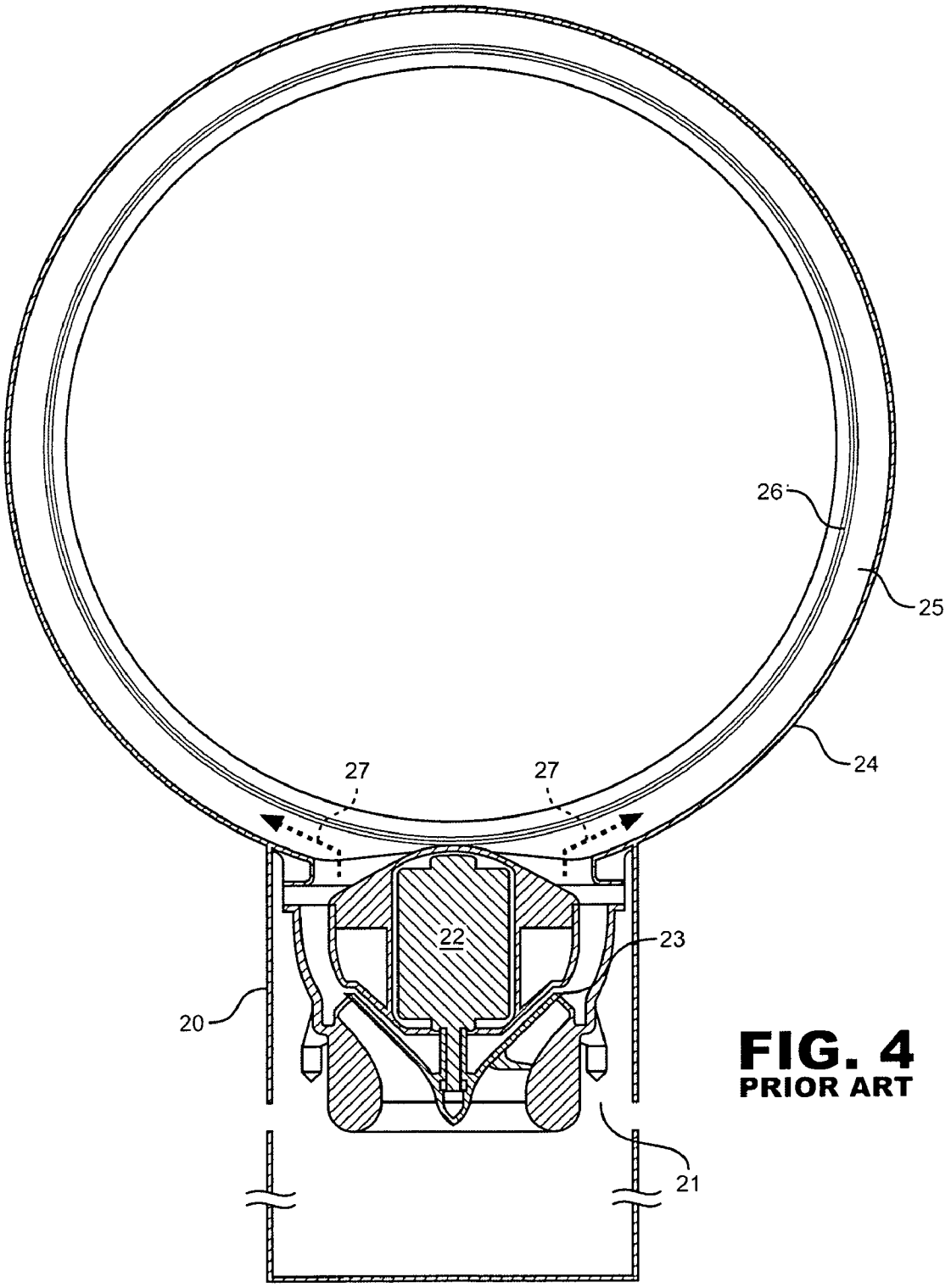


FIG. 4
PRIOR ART

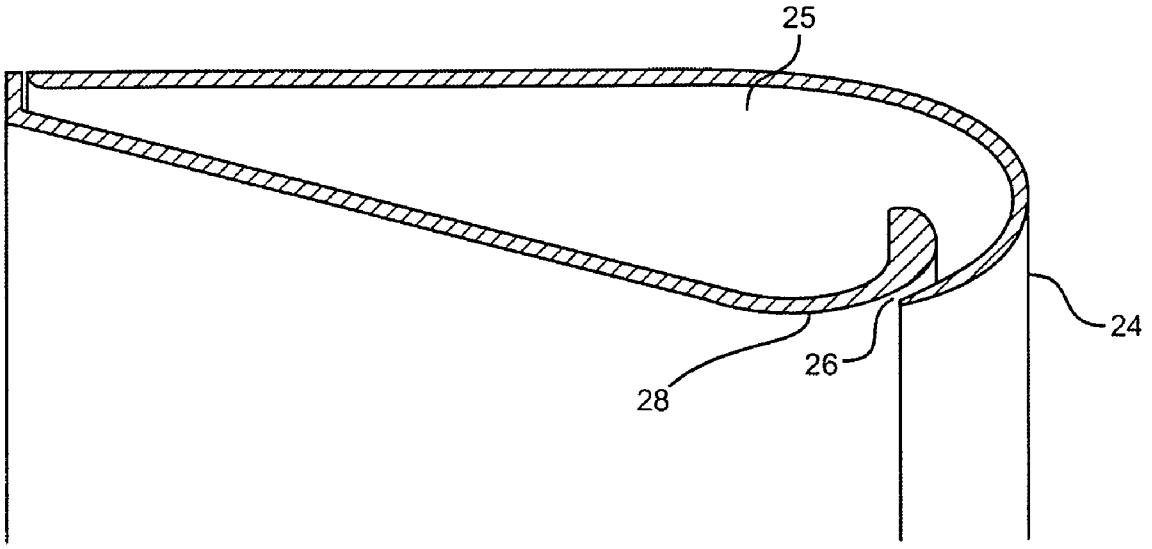


FIG. 5
PRIOR ART

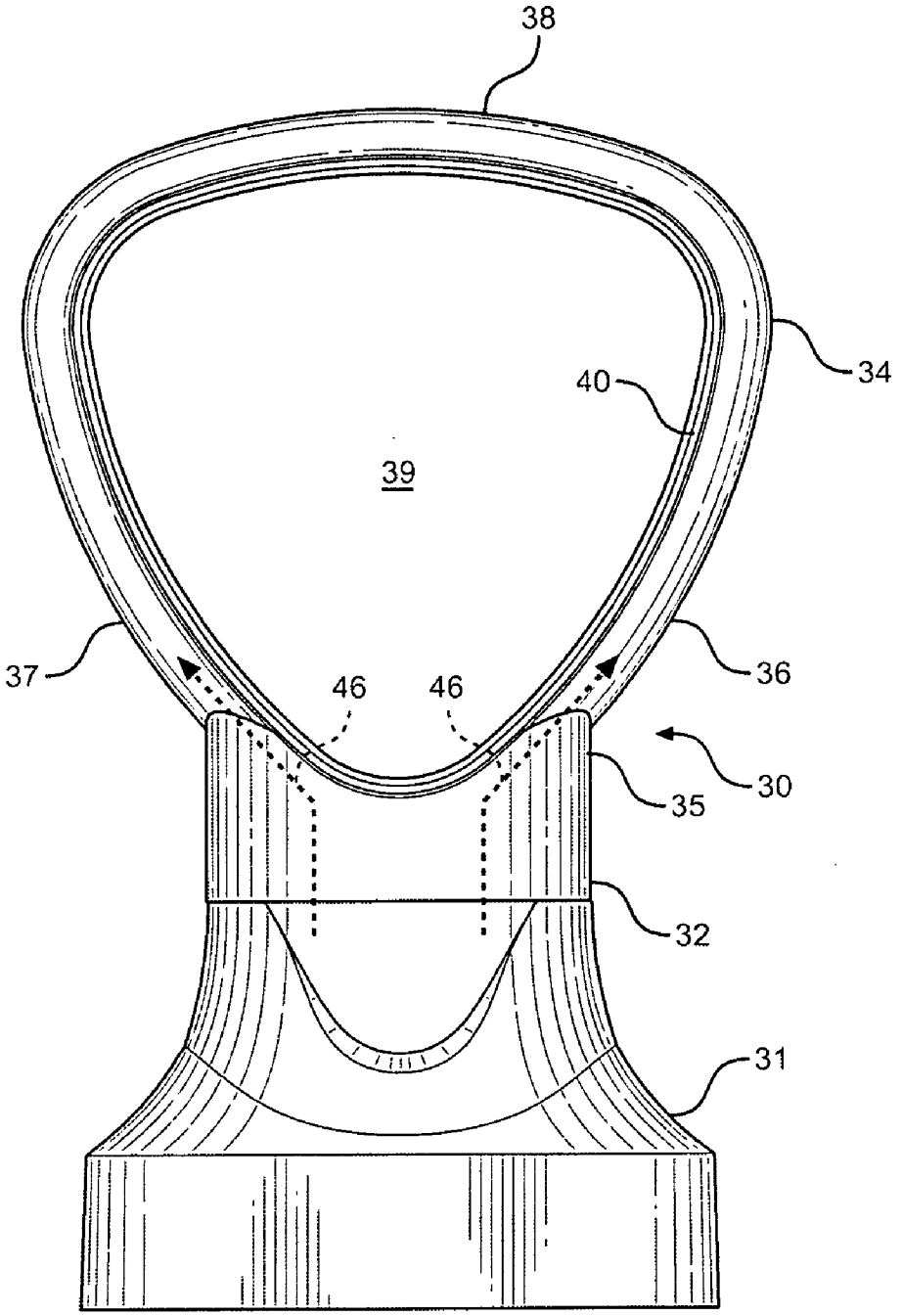


FIG. 6

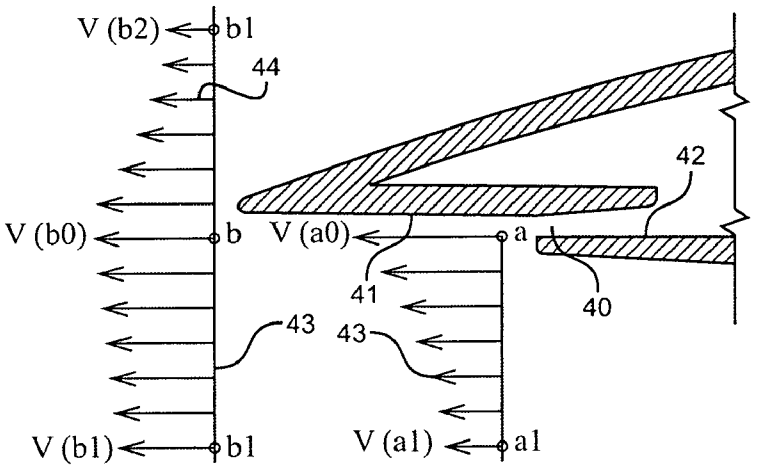


FIG. 7A

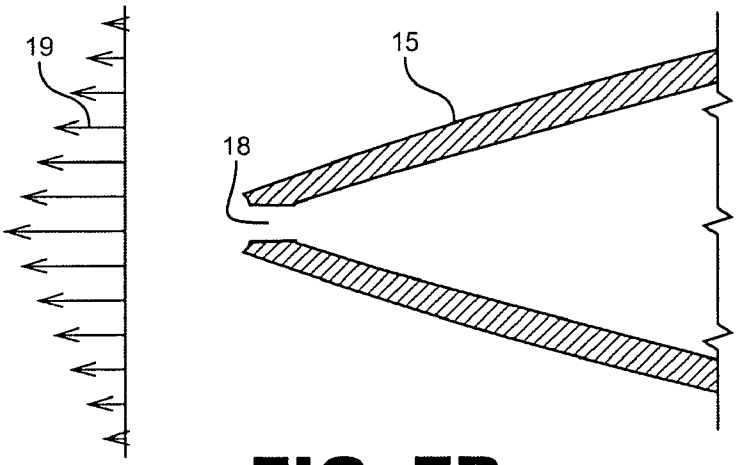


FIG. 7B

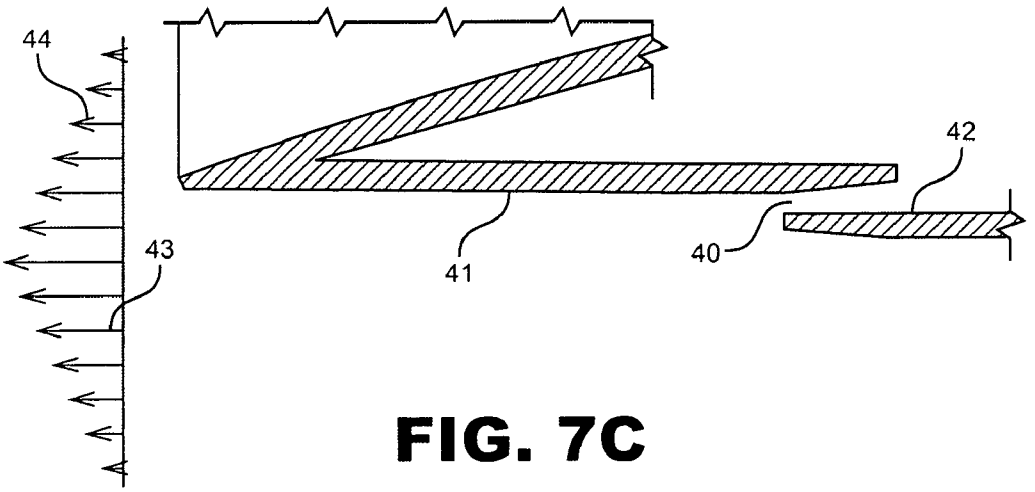


FIG. 7C

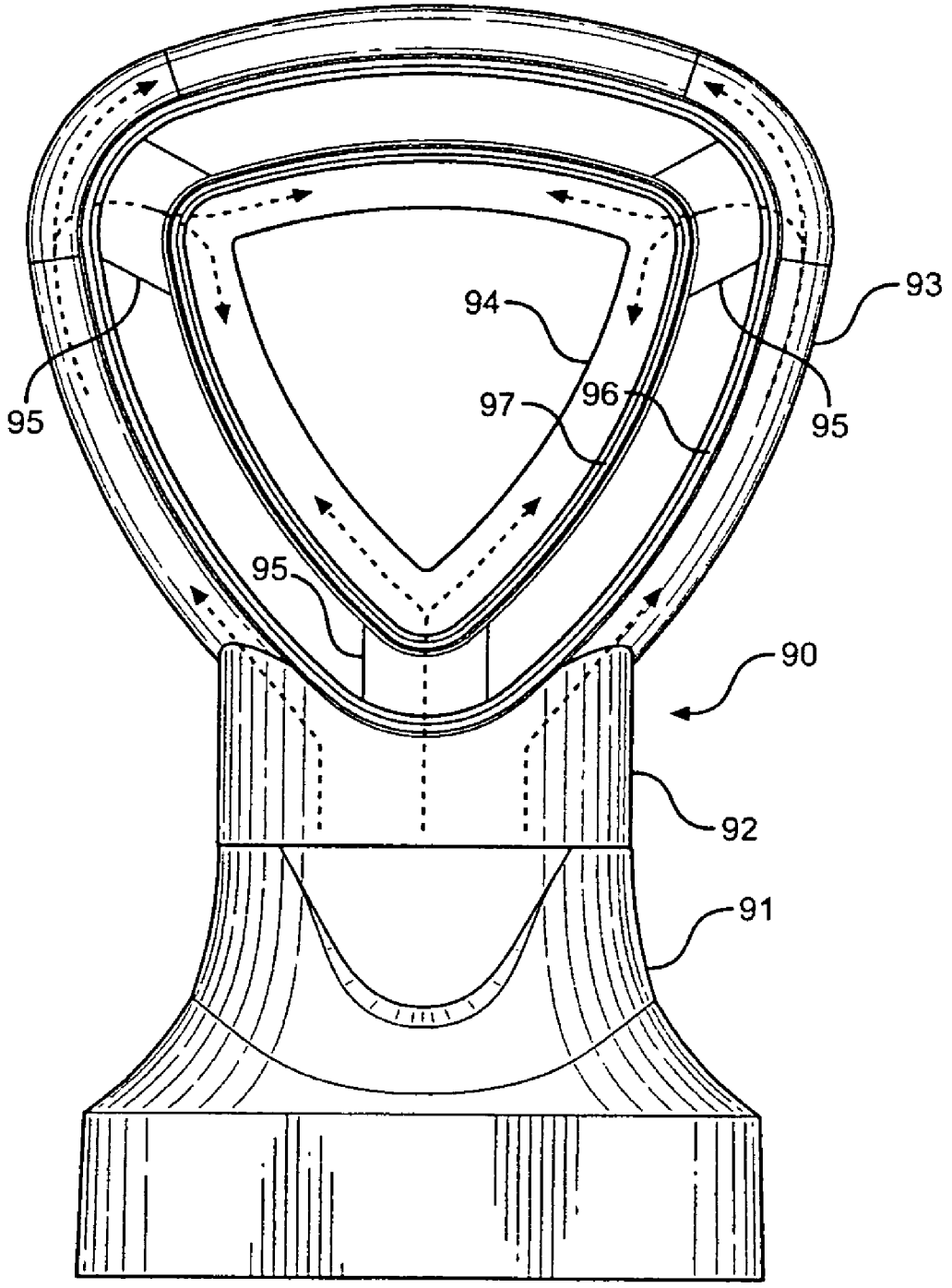


FIG. 8

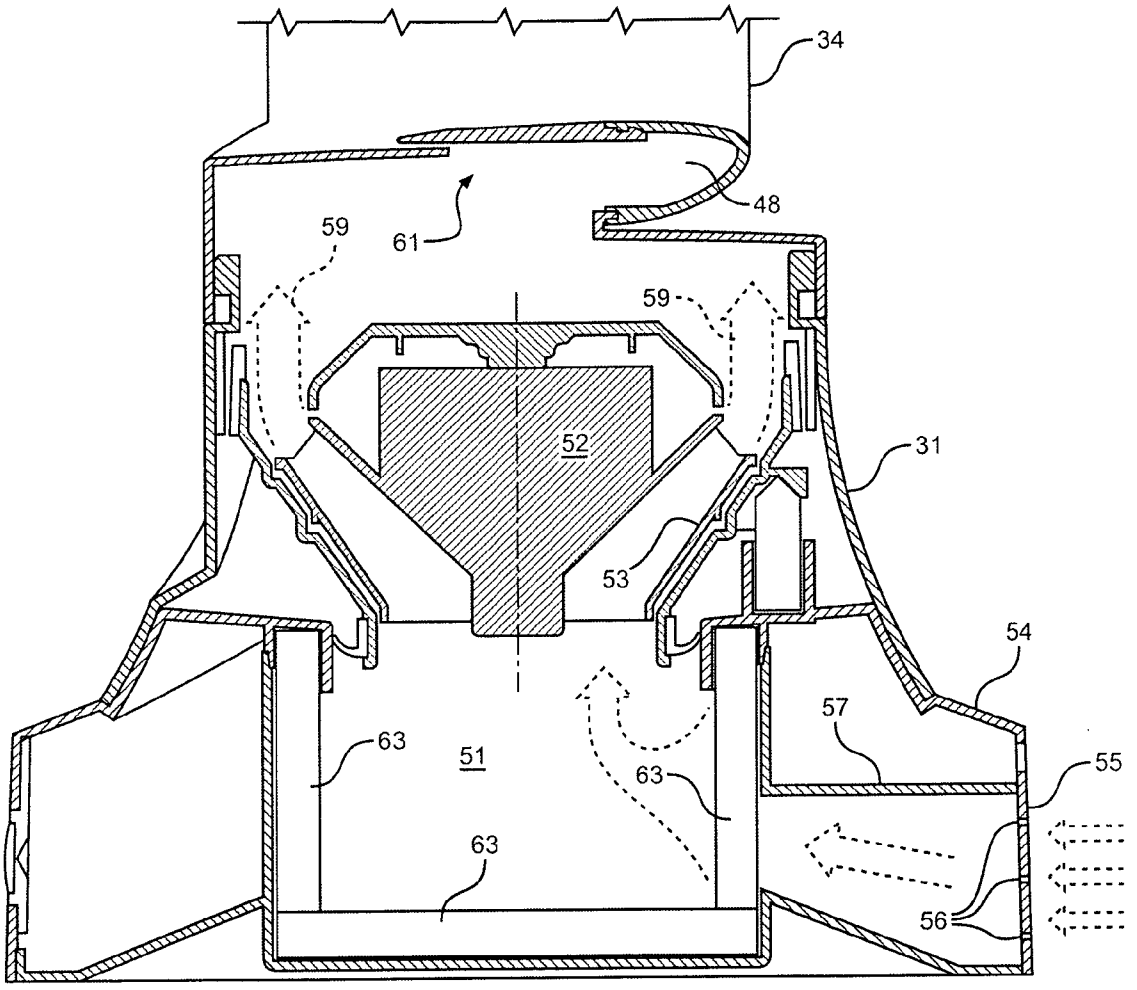


FIG. 9

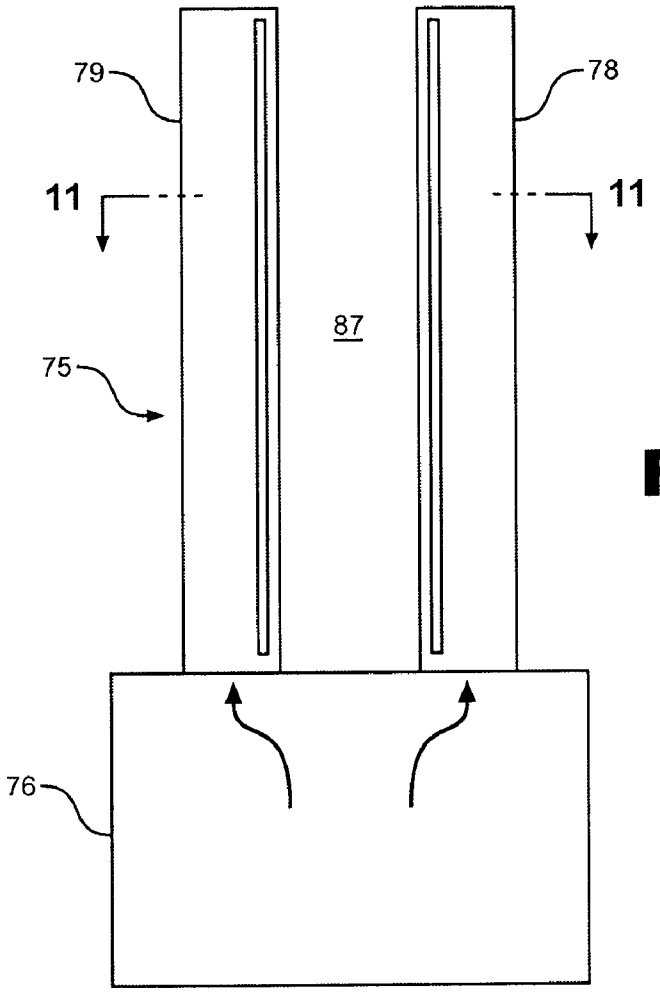


FIG. 10

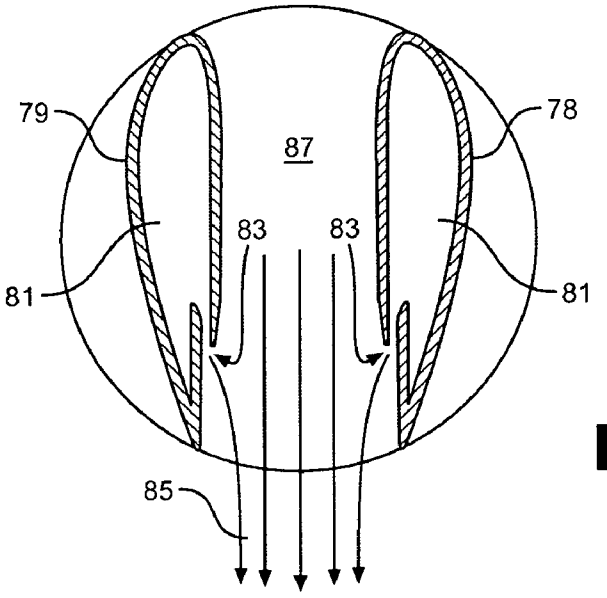


FIG. 11

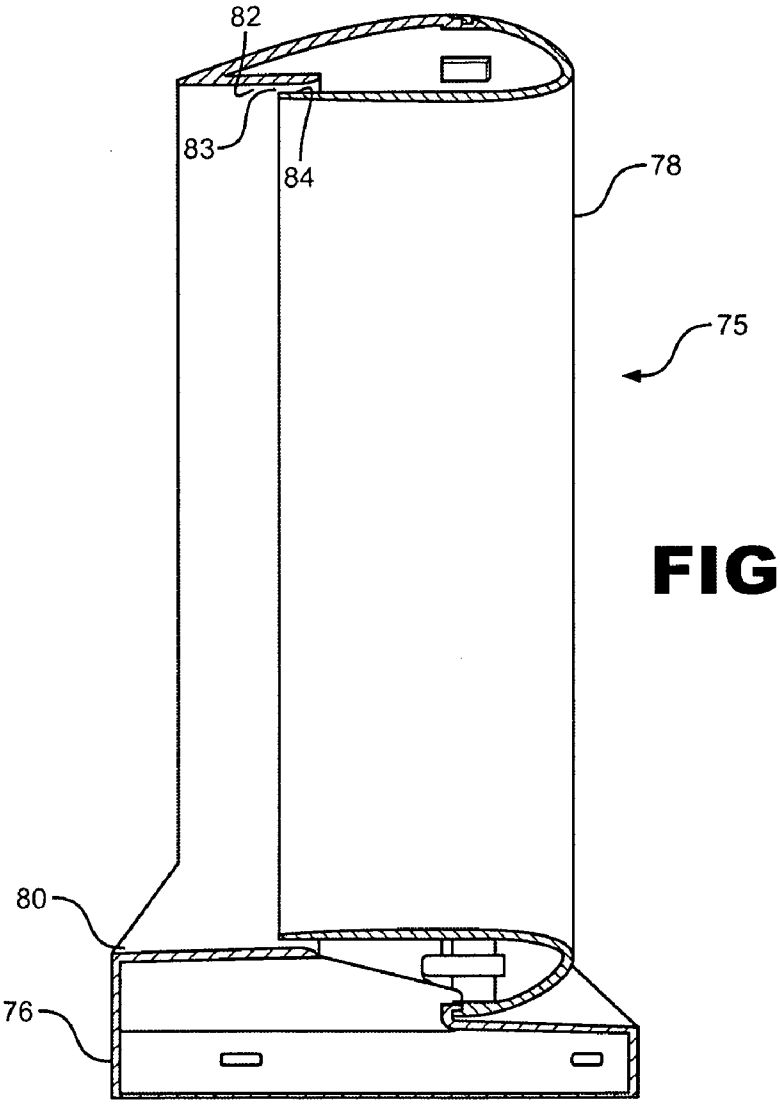


FIG. 12

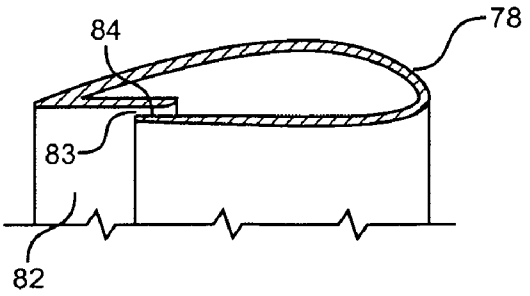


FIG. 13

AIR BLOWING DEVICE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an improvement in an air blowing device. Typically such a device incorporates a bladed fan wherein the blades are mounted on a shaft which is fitted into a motor for rotational purposes. The rotation of the shaft rotates the blades in order to create an air flow forward of the blades which rotate, to accelerate the air in front of the blades forward of the blade fan, while suction draws air from behind. Typically, such devices will be provided with grilles or grates surrounding the fan blades to avoid injury to the user. Such grilles or grates will also be provided with vanes or louvers which will direct the air stream from the radial and/or tangential components of the air flow toward the axial flow. It is also well known that the blades may be manufactured from metal, in which case, clearly a grille or grate of some type must be used to surround the blades to protect the user from any type of injury. The prior art similarly shows bladed fans wherein the fan blades are formed of a foam or plastic material, which minimizes injury to the user, and in the case of foam blades, permits the fan to be used without the need of a protective grille. However, all of such prior art devices require that the fan blades be mounted on a shaft which is in turn carried or mounted in a motor of some type, which operates to rotate the shaft, and it turn, the blades to create the air flow. Hence, all of the mechanisms necessary to create the air flow are exposed to the user, in one form or another.

[0002] Another form of prior art air blowing devices demonstrated in the prior art is especially shown in U.S. Pat. No. 2,488,467. The device as demonstrated in the foresaid patent is a motor driven fan and eliminates fan blades. In this instance, the fan consists of a base in which the motor is contained, the motor driving an impeller to create the air flow, the base extends upwardly via a neck portion, which has three distinct nozzles mounted to the upper portion of the neck, and each of which includes a hollow interior chamber, into which the air flow created by the motor's impeller will flow. Each of the nozzles are provided with a slot formed along the outer forward edge thereof, and which functions as an exit port for the air flow generated by the impeller of the motor. As indicated in the aforesaid patent, the device is intended to produce a uniform flow of air which may be regulated without changing the speed of the motor and which moves the moving elements including the motor and the impeller into an enclosed base, providing a safety feature for the user. Further note that the impeller here would spin much faster than the blades of a typical motor driven fan for ventilation. This gives the air flow a greater velocity even if the total flow rate were the same.

[0003] The prior art has advanced to a further improvement over the bladeless motor driven fan as shown in U.S. Pat. No. 2,488,467, as demonstrated by US patent application publication US 2009/0060710. This device makes use of the concept of a nozzle or housing which incorporates a Coandă surface adjacent to the slot opening of the housing or nozzle. As described in the aforesaid publication, the device includes a base which contains the motor and impeller device which creates the air flow, and exits the base into a circular housing or nozzle which has a hollow interior, and exits the housing interior toward the central axis via a slot formed along the periphery of the rear portion of the housing. As described in the aforesaid publication, the air discharge slot is formed adjacent to a curved or Coandă surface which is formed along the wall on the downstream side of the slot throughout. As indicated by the specification therein, the Coandă surface is intended to draw air from outside the fan assembly through the opening formed by the housing, by bending in a forward direction the air flow directed over the Coandă surface. As indicated therein, air exiting from the slot hugs the Coandă surface, expands downstream of the slot and this air stream will cause air from outside of the fan device to draw air through the central opening therein to produce an enhanced air flow forward of the air device. Again, as indicated therein, the primary air flow directed over the Coandă surface combined with the secondary air flow entrained by primary air flow acts as an air amplifier and gives a total air flow emitted or projected forward to a user from the opening defined by the nozzle. Hence, the total air flow is sufficient for the fan assembly to create an air current suitable for cooling.

[0004] A companion publication describes the relationship between the fan nozzle and the base as described in publication US 2009/0060711. It is stated therein that the base is no more than twice the depth of the nozzle and width of the base is no more than 75% the width of the nozzle. These relationships appear to permit the device to be made as small and as compact as possible due to space restrictions in domestic environments.

[0005] The present invention relates to a further improvement to the design of an air blowing device or ventilating device and acts like a conventional axial bladed fan without exposure to rotating blades in the same manner as the prior art referenced hereinabove. The present invention takes advantage of the principals of induction or entrainment wherein a jet of air directed into a volume of stationary air accelerates adjacent volumes of stationary air to increase or magnify the volume of moving air. However, the present invention avoids having to resort to Coandă effect flow to achieve this magnification, rather, using simpler methods of collimating and redirecting air flows to shape the velocity distribution of the discharged air stream. As demonstrated in the -710 and -711 prior art devices, the device employs a Coandă surface. The Coandă effect in fluid flow describes the tendency of a jet of air to appear to be attracted to convex solid surface as the jet passes near. This results in a pressure drop in the region between the jet and the surface drawing the jet toward the surface. The effect is used to bend the discharge of the jet from a nozzle toward an adjacent curved surface and has the effect of directing the stream of air forward. This stream induces the volume of still air within the annulus or open space of the nozzle to move forward by induction, giving the multiplier effect as claimed therein. It will be noted, however, that the single ring disclosed therein includes a slot or opening located toward the rear of the ring and designed with the Coandă surface so that the jet emerges almost parallel to the inside surface of the ring. This construction will cause the still air behind the annulus or opening of the nozzle to be induced to move forward once the air flow emanates from the slot of the nozzle.

[0006] In the previously mentioned prior art device of the -467 patent, it will be observed that the slot of each of the rings is located at the forward edge of each of the rings. The air jets out through the orifices or slots into an annular pattern of air stream through concentric streams as demonstrated in the aforesaid patent. The air streams will therefore diffuse radially outward and inward and merge forming a more typical bell shape distribution pattern of air flow that varies with radial distance from the center axis of the diffuser. The air

flow exiting the nozzle will tend to separate out and not be collimated into a beam of air. The result of this construction is that the user of the fan will not feel a beam of cool air when utilizing the device.

[0007] The problem which exists with respect to the prior art devices is that the air flow may not be strong because there is too much of a transverse or radial flow of air relative to the central axis of the air flow stream. This results in weak air flow and inefficient operation. As far as the device shown in the -467 patent is concerned, the outer diffuser ring or nozzle will spray a good portion of its air stream outward and not forward as it lacks any kind of nozzle, guide or louvers downstream of the nozzles. The more the air stream expands laterally, the less force is felt by the user at a distance in front of the fan. As far as the device shown in the -710 and -711 prior art devices, the use of a Coanda effect surface means that the friction losses of the jet flowing along the surface of the air foil shaped diffuser reduces efficiency and the ultimate flow rate of air from the fan. Further, the Coandă effect cannot be scaled up to higher air flows without increasing the size of the diffuser.

[0008] Further with respect to the prior art devices mentioned hereinabove, the air flow generated by the impeller must make a sudden almost 90° turn when exiting from the base into the diffuser ring or nozzle and therefore suffers a head loss due to the air having to bend almost 90° to enter into the hollow chamber of each of the nozzles or diffuser rings. If one attempts to put a larger motor in order to move more air, the extra speed and size adds noise so that the motor driving the impeller must be slowed down in order to get into the range of noise accepted by the consumer and hence, a loss of performance in addition to a loss in efficiency.

[0009] The present invention is intended to provide an air blowing device which employs a ring or diffuser nozzle, which shall be termed herein as a housing, which is constructed to avoid the problems noted above. The device of the present invention avoids the need for having a Coandă surface, by moving the slot to the forward portion of the housing, and is constructed with a pair of inner and outer walls which are flat, but are constructed in a manner which has the net effect of collimating the air flow emitting therefrom into a beam of air thereby improving the cooling effect observed by the user thereof.

OBJECTS AND ADVANTAGES

[0010] It is therefore the object of the present invention to provide an air blowing device the type generally described, which is formed by a base which incorporates a motor therein, driving an impeller to create an air flow. A housing is mounted on the top of the base, which incorporates a hollow chamber therein, so that air flow created by the motor and impeller can exit the chamber of the base and enter into the interior chamber of the housing. The housing is designed to be mounted on the base with angled branches so that the air flow emanating from the impeller as it enters the interior housing chamber is bent less than 70°, and preferably approximately 45°, in order to reduce the loss of the air pressure or air flow as the air enters into the housing chamber.

[0011] A further object of the present invention is to design the slot forming the air discharge opening adjacent the forward edge of the housing, the slot being formed by an outer extended side wall, and an inner shortened side wall, both of which are flat surfaces.

[0012] A further object of the present invention is to provide a device of the type described, wherein the base is formed as a chamber which contains a motor therein with an impeller to create the air flow, and wherein the base is surrounded by an outer chamber which has air ducts formed therein for feeding outside air into the base interior chamber. The outer chamber is provided with air inlet openings, to permit outside air to be drawn into the device when the impeller is activated. The outer chamber further serves the purpose of reducing the noise which emanates from the motor when in operation.

[0013] In conjunction with the foregoing object, a further object of the invention is to provide an air blowing device of the type described wherein the interior chamber of the base may further be provided with a noise reducing filter material mounted to the interior side walls of the chamber, so that the combination of the outer chamber and the noise reduction filter material, will greatly reduce the noise which emanates from the operation of the motor.

[0014] A further object of the invention is to provide an air blowing device of the type described wherein the housing mounted to the base takes the form of an inverted triangle having the apex of the triangle forming the two branches mounted to the base, and the base of the triangle forming the top portion of the subject device.

[0015] In conjunction of the foregoing object, a further object of the invention is to provide a device as the type described wherein the housing may take the form of a diamond shaped device. It is considered that any geometric configuration may be used so long as the branches when mounted to the base, will bend the air flow entering the housing to bend less than 90°, and preferably more on the order of only 45° when entering the interior chamber of the housing.

[0016] Further objects and advantages will best be understood by reference to the accompanying drawings taken in conjunction with the following specifications.

SUMMARY OF THE INVENTION

[0017] In summary, the present invention is intended as an improvement over prior art air blowing devices which improves the air flow emanating from the device by collimating the air flow emanating from the device into a beam of air to enhance the cooling effect felt by the user. This is accomplished by providing a device which consists of a base which has an interior chamber housing a motor which drives an impeller to create an air flow, and the base having suitable air inlet openings to take in outside air for the impeller to create an air flow. A housing structure is mounted to the top of the base, the housing structure being mounted at a connecting point. The housing has an internal chamber which is in fluid communication with the chamber of the base through the connection point. The housing is provided with a slot air discharge opening adjacent the forward edge of the housing, the slot being formed by an outer extended flat surface, and an inner shortened flat surface. Further, the housing will take the form of a triangle or other geometric shape wherein the branches of the housing being mounted to the base of the connection point, will form an angle with the base such that the air flow emanating from the impeller of the motor blowing up through the connection point into the housing will bend no more than and preferably around 45°. Hence, the housing will ideally take the shape of triangular structure the apex of the triangle forming the connection to the base at a connection point, and the base of the triangle forming top portion of the air blowing device. Alternatively, the housing may take the

shape of a diamond shaped structure. It is to be considered within the scope of the present invention to employ any geometric shape which avoids air having to bend almost 90° when entering the housing or nozzle of the base.

BRIEF DESCRIPTION OF DRAWI NGS

[0018] The invention as illustrated in the following drawings wherein:

[0019] FIG. **1** is a front elevational view in partial cross section, showing the prior art device described above, formed by a base, a neck extending up from the base, and three concentric nozzles in fluid communication with the air chamber of the base;

[0020] FIG. **2** represents a cross sectional view taken along the line **2-2** of FIG. **1**, showing the construction of the three concentric nozzles including the air discharge slot formed therein;

[0021] FIG. **3** is a schematic view of the construction of the nozzle as shown in FIGS. **1** and **2** and the air flow pattern created thereby;

[0022] FIG. **4** is a front elevational view and partial cross section, showing a further prior art device including a ring nozzle mounted on a base, of the type described hereandabove;

[0023] FIG. **5** is a perspective view in cross section, showing the construction of the housing or nozzle of the prior art device as illustrated in FIG. **4**;

[0024] FIG. **6** is a front elevational view of the air blowing device of the present invention, showing the base, a neck portion extending upwardly from the base, and having a housing formed as a triangular construction mounted to the top of the neck;

[0025] FIG. **7***a* is a cross sectional schematic view of a slot air discharge opening in accordance of the present invention, the slot being formed by an outer flat extended surface and a lower shortened flat surface, the slot air discharge opening formed adjacent the forward end of the housing;

[0026] FIG. **7***b* is comparison schematic view in cross section, showing a construction of the slot as shown of the device in FIG. **1** of the drawings and a comparison of the air flow emanating from the slot air discharge opening therefrom;

[0027] FIG. **7***c* is a further embodiment of an slot air discharge opening in cross section, of a possible alternative embodiment of the present invention wherein the outer flat surface wall of the slot is further extended, and the inner shortened flat surface is set further back from the forward edge of the housing;

[0028] FIG. **8** represents a further alternative embodiment of the present invention, wherein the housing includes a pair of concentric housings mounted to the base via neck portion but incorporating the slot air discharge opening as described with respect to the present invention;

[0029] FIG. **9** is a front elevational view in cross section, showing the details of construction of the base of the unit having a motor mounted therein, and the construction of an outer chamber surrounding a base chamber which functions as a means for controlling the air flow into the base and into the housing via the opening between the base and the housing and further shows the noise reduction the capacity by the inclusion of filter material mounted to the inside walls of the interior chamber;

[0030] FIG. **10** is a front elevational view illustrating a further embodiment of the present invention which takes the form of a tower fan blowing device, and functions by the use of a pair of opposed housing members mounted to the base, and creates a beam of collimated air flow there between;

[0031] FIG. **11** is a cross sectional view taken in the direction of the arrows **11-11** of FIG. **10**, showing the construction of the two housing members including the slot air discharge opening associated with each of said housing;

[0032] FIG. **12** is a side elevational view, partly in cross section, showing the construction of the housing of the air blowing device shown is FIG. **6**;

[0033] FIG. **13** is a cross sectional view of the housing as shown in FIG. **12** of the drawings; and

DETAILED DESCRIPTION OF DRAWINGS

[0034] With specific reference to FIGS. **1-3** of the drawings, a prior art device is illustrated therein. As was mentioned in the description of the prior art, FIG. **1** represents the device as illustrated in U.S. Pat. No. 2,488,467. It will be observed that the device is formed by a base **10**, which has an air chamber **11** formed therein. The base incorporates a motor **12** which drives an impeller **13** in order to create the air flow. An air chamber **11** extends upwardly through the neck **14**, and enters into each of three rings, **15**, **16** and **17** respectively, and noted as "nozzles" in the subject patent. Each of the rings **15**, **16** and **17** respectively terminate in annular slot or air discharge opening denoted by the numeral **18**. It will therefore be appreciated that the air flow created by the impeller **13** blows upwardly through the neck **14** and into each of the rings **15**, **16** and **17** respectively, and exits the device through each of the air discharge openings **18**. Hence, an air flow is created forward of the device toward the user thereof.

[0035] FIGS. **2** and **3** denote the construction of each of the rings, **15**, **16** and **17** respectively, and the discharge air opening **18**. FIG. **3** illustrates the construction of the air discharge opening **18** and illustrates in schematic form, the air flow created therefrom. When the device is operational, air jets out through the air discharge openings, into an angular pattern of air stream, that is, three concentric streams in this case. Far from the unit, the air streams diffuse radially outward and inward and merge forming a typical bell shaped distribution pattern of air flow that varies with radial distance from the center axis of the diffuser. It is obvious from the views of FIGS. **2** and **3** of the drawings, that the air flow exiting the air discharge opening will tend to spread out and not be collimated into a beam of air. The air flow pattern mentioned herein is generally illustrated by the arrows **19** of FIG. **3**.

[0036] FIG. **4** illustrates still another prior art device of the type previously mentioned hereinabove, and as depicted in patent publication -710 and -711. This device is formed by base **20** which has an interior air chamber **21** and wherein the base **20** houses a motor **22**, which drives an impeller **23**. A housing **24** is mounted to the base **20** and takes the form of a ring and has a hollow interior **25**, which is in fluid communication with the air chamber **21** of the base **20**. The ring **24** is provided with a slot or air discharge opening **26** which has the construction as shown in FIG. **5** of the drawings. As illustrated in FIG. **5** of the drawings, the air discharge opening is constructed with a Coandă surface **28** formed immediately adjacent the opening **26**. As was previously mentioned, the Coandă surface provides a Coandă effect fluid flow which describes the tendency of a jet of air fluid to appear to be attracted to convex solid surfaces as the jet of air passes thereover. This results in a pressure drop in the region between the jet and the surface drawing the air jet toward the surface. The effect is used to bend the discharge of a jet from

the nozzle or air discharge opening toward an adjacent curved surface. According to the aforesaid prior art description, air from the opening formed in the ring is induced to flow forward. The air stream will draw outside air through the fan acting as an air multiplier. A further problem is caused by the air flow which must make a sudden almost 90° turn as illustrated by arrows **27** in FIG. **4**, as the air flows from the base air chamber **21** into the housing air chamber **25**. This, in effect, can cause a greater loss of air flow pressure than the pattern wherein the air makes a shallower bending angle from the base chamber into the housing chamber. In order to overcome that obstruction, the impeller has to work harder to move air through the closed system than a conventional axial flow fan and hence, the impeller has to be made larger or spin faster to move an equivalent amount of air. The extra speed and size will add noise so that the motor driving the impeller must be slowed to get back into the noise range that would be acceptable by a consumer. Hence, the additional problem that will be presented is the fact that the device would become overly large and cumbersome thereby defeating the purpose as set forth in the aforesaid prior art publication.

[0037] FIG. **6** represents the preferred embodiment of the present invention. The present invention provides an air blowing device **30** which is formed by a base **31**, which has an upper neck portion **32** associated therewith, and is completed by a housing **34** mounted to the neck portion **32** of base **31** at a connection point **35**. It will be observed that the housing **34** takes the shape of an inverted triangle having opposed branches **36** and **37** respectively, with the apex of the triangle formed by the two branches **36** and **37** being the mounting point at the connection point **35**. The base of the triangular housing **34** is denoted by the numeral **38** and forms the top of the air blowing device **30**. For purposes of the present discussion, the front side of the device **30** is considered to be the side from which the air flow emanates, and the top is referred by the numeral **38**, and the bottom consists of the two branches **36** and **37** respectively, mounted to the base neck portion **32** and the connection point **35**. The housing **34** forms an open central portion **39**, through which air is induced to flow. A slot air discharge opening **40** is formed adjacent the front side of the air blowing device **30** and assumes the shape and configuration as depicted in FIGS. **7***a* and **7***c* of the drawings. With specific reference to FIGS. **7***a* and **7***c*, it will be observed that the air slot discharge opening **40** is formed by an outer extended flat surface **41**, and inner short flat surface **42**. The arrows immediately forward of the air discharge opening **40** demonstrate the magnitude of the air velocity vectors across the aperture which are created when the device is operational and the air is being discharged through the opening **40**. The lower arrows **43** shows how the air flow is collimated to form a beam of air to the interior side of the device, causing the air stream to be concentrated and draws air from the rear side of the air blowing device **30** forwardly therefrom. The upper arrows **44** illustrate the fact that air from externally of the device will be inducted into the air flow, but not to the same extent that the interior air flow is collimated into a beam of air to impact the user thereof.

[0038] FIG. **7***b* illustrates the flow pattern of the slot formed in the rings **15**, **16** and **17** of the prior art device illustrated in FIGS. **1-3** of the drawings. The arrows **19** illustrate that the air flow pattern is not collimated, but rather spread out to the upper and lower sides of the upper and lower portions of the air discharge opening **18**.

[0039] FIG. **7***c* illustrates a further embodiment of the present invention, wherein the outer extended flat surface **41** is further extended than the inner shortened flat surface **42**, which has the effect of having even more of the air flow to the interior side of the housing **34**.

[0040] FIG. **7***b* represents the construction of the nozzle or housing of the air blowing device of the FIGS. **1-3** of the drawings. As was indicated, the nozzle or ring **15** has an air discharge opening **18** through which the air is discharged during use. The discharged air has a flow pattern as demonstrated by the arrows **19**. It will be observed that the air pattern is not collimated but rather, will radiate outwardly.

[0041] Again with a view in FIG. **6**, an advantage of the present invention is derived from the triangular configuration of the housing **34**. As previously indicated, the housing **34** takes the shape of a triangular configuration, with the triangle base **38** forming the top of the device **30**, and the branches **36** and **37** forming the connection to the neck portion **32** of the base **31** at the connection point **35**. With respect to FIG. **6**, the arrows **46** show the air flow that emanates from the base interior chamber into the housing chamber assuming an angle of less than 70°.

[0042] The construction of the base interior and the related upper housing is more clearly shown in FIG. **9** of the drawings. The base **31** includes an interior chamber **51**, and accommodates the mounting of a motor **52** therein which drives an impeller **53**. In the embodiment illustrated in FIG. **9**, the base **31** is provided with an outer chamber **54** which surrounds the base **31**. The outer chamber **54** includes an outer wall **55** which is provided with air inlet openings **56** to allow outside air into the device. The outer chamber **54** is constructed with at least one or more air ducts **57** which will direct the air flow into the interior chamber **51** of the base and provide a source of air for the motor **52** and impeller **53**. The air flow is illustrated by the arrows **59**, and is created by the air flow emanating by the impeller **53**. The air flow enters into the housing **34** via the opening **61** which exists between the base interior chamber **51**, and the housing interior chamber **48**.

[0043] It will be appreciated that the outer chamber **54** not only directs the air flow into the interior chamber **51** of the base, but also serves the purpose of deadening the noise created by the motor **52**. A further feature that helps in the noise deadening capacity of the device is the provision of the filter material mounted along the walls of the base interior chamber **51**. The filter material **63** is porous in nature, and hence, may be mounted over the air duct **57** and affords the device to have the opportunity to still have an inflow of air to feed air to the impeller **53** when it is operational.

[0044] From the above description it will be appreciated that the air blowing device **30** of the present invention operates in much the same manner as prior art devices, but improves upon the same by the construction of the housing, which takes the form of either a triangular configuration, or another geometric shape such as a diamond shape configuration. As will be appreciated from FIGS. **6** and **9** of the drawings, the efficiency of the air blowing device is maximized by using a geometric shape for the housing **34** which minimizes the angle of the bend of air as it flows from the base chamber into the housing chamber. Hence, an angle of 45° or even less results in an efficient air flow.

[0045] FIG. **8** represents a further alternate construction of the present invention. In this embodiment, the air blowing device **90** is formed by a base **91** which houses the motor driven impeller(not shown) and is connected to the housing

by a neck **92**. The housing takes the form of a pair of triangular shaped outer housing **93** and inner housing **94**. The inner housing **94** is connected to the outer housing **93** by a series of three braces **95**. The construction of the outer and inner housings **93** and **94** respectively is the same as described with respect to the device of FIGS. **6** and **9**. Each of the braces **95** has a hollow interior thereby to provide an air flow path from the base chamber via the outer housing chamber to the inner housing chamber. Further, each housing is provided with an air discharge opening **96** and **97** respectively, constructed in accordance with FIG. **7***a*. Hence, it is contemplated that an air blowing device having multiple concentric housings falls within the scope of the present invention.

[0046] FIGS. **10-11** represents still a further embodiment of the present invention. The present invention may take the form of what is commonly referred to as a tower fan. A tower fan is generally an elongated structure, which is typically rectangular in configuration. As shown in FIG. **10** of the drawings, the tower air blowing device **75** is again formed with a base **76** and includes a pair of opposed housings **78** and **79** respectively mounted thereon. As shown in FIG. **11**, each of the housings **78** and **79** are formed with a housing interior chamber **81** and a slot air discharge opening **83**. The air discharge opening **83** is again formed in the same manner as illustrated previously with respect to FIGS. **7***a* and **7***c* of the drawings, and as clearly shown in FIG. **11**, will create an air flow pattern which collimates the air to form an air beam represented by the arrows **85**. It will further be clear that the air flow emanating from the air discharge opening **83** will induce air from the rear side of the tower air blowing device **75** to flow through the central space **87** forward part of the device, and create the beam of collimated air as illustrated in FIG. **11**. It is contemplated that while FIG. **10** shows two separate housings **78** and **79** mounted to the base **76** the housing may take the form of a single housing connected at the top by a loop in the nature horseshoe shaped housing.

[0047] FIGS. **12** and **13** illustrate the details of construction of the housing **78** mounted on the base **76** at a connection point **80**. Once again, it will be observed that the slot air discharge opening **83** is formed by an outer extended flat surface **82** and an inner shortened flat surface **84**. The air which discharges through the slot **83** is collimated to form a beam of air to the interior side of the device **75**, as was described relative to FIG. **7**A. Hence, the user will feel a stream of air when positioned in front of the device **75**.

[0048] It will be appreciated from the above description that the present invention further improves upon the construction of an air blowing device which eliminates fan blades from the external portion of the device, and relies upon an internally housed motor with an impeller, to create an air flow and is formed with an air discharge opening formed near the portion of the fan device so that a beam of collimated air is formed to increase the effect of cooling upon the user.

[0049] While there has been described what is at present considered to be the preferred embodiment of the invention, further variations may be made without departing from the true spirit and scope of the invention and the claims appended hereto.

-continued

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	base
11	air chamber
12	motor
13	impeller
14	neck
15	ring
16	ring
17	ring
18	air discharge opening
19	arrows of FIG. 3
20	base
21	air chamber
22	motor
23	impeller
24	ring
25	air chamber of 24
26	air chamber opening
27	air flow arrow
28	conanda surface
29	
30	air blowing device
31	base
32	upper neck of base
33	
34	housing
35	connective point
36	leg
37	leg
38	base
39	
40	slot air discharge opening
41	upper extended flat surface
42	lower shortened flat surface
43	lower arrows
44	upper arrows
45	
46	arrows
47	
48	housing interior chamber
49	
50	
51	base interior chamber
52	motor
53	impeller
54	outer chamber
55	outer wall
56	
57	air duct
58	
59	air flow arrows
60	
61	opening at connective point
62	
63	filter material
64	
65	
66	
67	
68	
69	
70	
71	
72	
73	
74	
75	tower air blowing device
76	base
77	
78	housing
79	housing

-continued

80	connection point
81	housing interior chamber
82	outer extended flat surface
83	slot air discharge opening
84	inner shortened flat surface
85	arrows of air flow
86	
87	
88	
89	
90	air blowing device
91	base
92	neck
93	outer housing
94	inner housing
95	brace

1. An air blowing device for generating and directing a beam of collimated air flow from said device comprising;

a base formed by a top wall, bottom wall, surrounding side walls and an interior chamber,

air inlets formed in said surrounding side walls to allow air to enter said interior chamber,

a motor mounted in said interior chamber, said motor including blower means for creating an air stream within said interior chamber,

a housing having a top end and a bottom end and mounted on said base at its bottom end at a connection point,

said housing defining a central opening and having a hollow interior chamber and having a front side and rear side, and said central opening having a central axis,

a slot formed in said housing extending along the periphery thereof adjacent the front side thereof, said slot forming an air discharge opening,

said slot defined by an outer extended flat surface and an inner shortened flat surface,

said housing having an opening at said connection point being in fluid communication with said base interior chamber such that the air stream created by said blower means is directed from said base interior chamber into said opening and into said interior air chamber of said housing and exits through said slot air discharge opening, whereby the air stream created by said blower means exits said device through said slot discharge opening and expands inwardly toward said housing central opening to create a beam of collimated air flow paralleling the axis of said housing opening.

2. The air blowing device as set forth in claim **1** above wherein, the angle between said housing opening and said base interior chamber is less than 70°.

3. The air blowing device as set forth in claim **2** above, wherein said angle is approximately 45°.

4. The air blowing device as set forth in claim **1** above, wherein said housing is formed as a continuous structure having a top end and a bottom end, said housing being mounted to said base at the bottom end thereof at a connection point, such that the air stream created by said blower means will flow throughout said hollow interior chamber thereof and exit through said slot air discharge opening.

5. The air blowing device as set forth in claim **4** above, wherein said housing assumes a substantially triangular configuration with the apex thereof forming the bottom end which is mounted to said base at the connection point therebetween.

6. The air blowing device as set forth in claim **4** above, wherein said housing assumes a substantially diamond shaped configuration with narrowed top and bottom ends, and said narrow bottom end being mounted to said base at said connection point therebetween.

7. The air blowing a device as set forth in claim **1** above, wherein an outer chamber is provided, said outer chamber being mounted to said base's side walls and formed by surrounding side walls with air openings formed therein, said outer chamber forming at least one inlet duct thereby to optimize air flow into said base interior chamber.

8. The air blowing device as set forth in claim **7** above wherein said outer chamber extends around said base and forms an extension of said base.

9. The air blowing device as set forth in claim **7** above, wherein the interior of said base surrounding side walls are provided with porous filter material mounted thereon thereby to form a noise deadening barrier between said base interior chamber and said outer chamber.

10. The air blowing device set forth in claim **1** above, wherein said slot's air discharge opening has a defined width between said outer extended flat surface and said inner shortened flat surface.

11. The air blowing device as set forth in claim **10** above wherein said width of said slot air discharge opening is narrower adjacent said connection point and widens to its greatest width at the top end of said housing thereby to make the air flow more uniform at all points around the periphery of said housing.

12. An air blowing device for generating and directing a collimated air flow from said device comprising,

a base formed by a top wall, bottom wall, surrounding side walls and an interior chamber,

air inlets formed in said surrounding side walls to allow air to enter said interior chamber,

a motor mounted in said interior chamber, said motor including blower means for creating an air stream within said interior chamber,

at least one housing having a top end and a bottom end and mounted on said base at its bottom end at a connection point,

said housing having an interior chamber and defined by a front side, a rear side, an extended outer side wall and a shortened inner side wall,

a slot formed in said housing extending along the periphery thereof adjacent the front side thereof, said slot forming an air discharge opening,

said slot formed between said extended outer side wall and said shortened inner side wall,

said housing having an opening at said connection point being in fluid communication with said base interior chamber such that the air stream created by said blower means is directed from said base interior chamber into said opening and into said housing interior chamber and exits through said slot air discharge opening,

whereby the air stream created by said blower means exits said device through said slot air discharge opening and creates a beam of collimated air flow.

13. The air blowing device as set forth in claim **12** above, wherein said device includes at least one pair of opposed housing structures mounted on said base in horizontally opposed relation defining a central space therebetween,

whereby the air stream created by said blower means enters said interior chamber of each housing structure and exits through each of said slot air discharge openings,

and the air stream created by opposed housings creates a beam of collimated air flow therebetween.

14. The air blowing device as set forth in claim **12** above, wherein said housing comprises a continuous housing structure defined by a top end, a bottom end and mounted on said base at its bottom end at a connection point,

said housing defining a central opening and having an interior chamber extending throughout said housing structure, and having a front side and a rear side and said central opening having a central axis,

whereby the air stream created by said blower means flows into said housing interior chamber and exits through said slot air discharge opening to create a beam of collimated air flow toward the central axis of said housing central opening.

15. The air blowing device as set forth in claim **1** above, wherein said device further includes a secondary housing mounted internally of said housing by a series of braces interconnecting said secondary housing to said housing,

said secondary housing defining a central opening and having a hollow interior chamber and having a front side and rear side, and said central opening having a central axis,

each of said braces having a hollow interior and being in fluid communication with said hollow interior chamber of said housing and said secondary housing,

a secondary slot formed in said secondary housing extending along the periphery thereof adjacent the front side thereof, said slot forming a secondary air discharge opening,

and said secondary slot formed by an outer extended flat surface and an inner shortened flat surface.

16. The air blowing device as set forth in claim **15** above, wherein said secondary housing assures the same geometric configuration as said housing, and is sized to fit within the confines of said housing.

* * * * *