A space saving fan for desktop use is provided. The device includes a compact motorized impeller, a front elevation plate and/or a light dissemination plate for improved and efficient illumination of a room or work surface.
SPACE SAVING FAN WITH FRONT ELEVATION/ILLUMINATION PLATE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This Application claims the benefit of Application No. 60/794,643, filed Apr. 24, 2006, the entirety of which is incorporated herein by reference.

TECHNOLOGY FIELD

[0002] This invention relates generally to portable desk top fans. More particularly, the invention relates to a structure for a fan that will enhance and improve work area function and not be detracting to persons working in the vicinity of the fan.

BACKGROUND

[0003] The need to cool a human when sitting at a work area, such as for example a desk, table or work bench, has been long established. Industry has responded to this need with the use of small fans and cooling devices. The conventional devices may indeed permit some relief, however they have several shortcomings.

[0004] One such shortcoming is the ability to have non-disruptive or non-distracting apparatus within the work area. Employers are constantly searching for methods to improve the employee work environment. Entire industries of office furniture and appliances have emerged in response to this need. Conventional desk fans utilizing standard impellers, motors and protective grills can be disruptive to the work area environment, having a net negative effect on the employee. Conventional desk fans located in close proximity to a user tend to be disruptive while functioning. The structural size required to protect the rotating impeller and the distinctive operational movement of the impeller of conventional desk fans does not complement the work environment. Conventional desk fans have little to commend them to the user and may contribute to a loss in productivity.

[0005] Another disadvantage of conventional desk fans is the excessive volume of air produced. Since such devices are located close to the user, the excess air volume serves to disturb objects from there intended place. For example, papers, notes and other light objects can easily be dislodged from work surfaces. The production of this excess volume of air also needlessly wastes energy.

[0006] Another disadvantage of conventional desk fans that use conventional impellers and motor configurations is the need of a large base for stabilization. The large base often requires the user to sacrifice a portion of work surface. A desk or table top has a limited surface area and most of the area ideally is used for productive gains instead of being occupied by a conventional desk fan. Many conventional desk fans using conventional impellers and motor configurations often require a dimensional depth and height that tends to impair the user’s ability to see the area around the device. In addition, the required height makes these devices more susceptible to accidental contact and tip-over. Accidental tip over can cause time and work loss.

[0007] Conventional desk fans that are widely available in the market have no real differentiation to attract attention in the consumer market. This lack of differentiation not only produces a lack of choice for the consumer but zero marketing “novelty” for the manufacturer and/or vendor.

SUMMARY

[0008] In light of the aforementioned shortcomings there is a need for a fan that may be presented on a desk or work area with a new and an improved structure and space saving form. The size of the space saving fan, as described, has been minimized to conserve the area of a work area, such as a desk or table top. Although the size of the space saving fan may be reduced, the structure of the device improves the functionality and usefulness of the device.

[0009] The use of a small impeller and motor configuration further allows the overall depth of the device to be reduced, thus maximizing the available area on a work surface for productive use. The physical location of the motor relative to the impeller permits greater space saving characteristics than those found in a conventional desk fan.

[0010] The space saving fan of the present invention may also include features to enhance the efficiency of generating an air flow with a velocity capable of cooling the user. The cooling effect of air movement is proportional to the velocity of the air. Higher velocities increase the ability of the air to impinge a surface, such as for example, the user’s skin and thus increase the evaporative cooling effect. Ideally, the air flow velocity will be generated in an energy efficient manner without the need to move an excess volume of air.

[0011] The space saving fan in accordance with embodiments of the present invention may also include a front elevation plate that is not distracting to the user and that may permit a more attractive and evocative presence on a desk or table top. The dimensional structure of the front elevation plate provides space saving characteristics to conserve the usable work area on a desk or table top. The dimensional structure of the front elevation plate does not obstruct the user’s ability to see the area around the device. These advantages provide a non-disruptive and non-distracting device that promote a more efficient use of the limited surface area on a desk or table top.

[0012] In accordance with other embodiments of the invention, the structure of the front elevation plate may allow the use of indirect or low level lighting to provide additional functionality and enhance the overall appearance of the device. The use of light emitting diodes (LED) in conjunction with a front elevation plate functioning as a light dissemination plate further commend the device to the user. The use of a LED in lieu of a common incandescent light source reduces both the heat produced and the energy consumed by the device.

[0013] The structural and feature innovations of the invention also achieve the goal of re-invigorated interest on the part of the user and sale-ability on the part of the manufacturer and/or vendor.

[0014] Additional features and advantages of the invention will be made apparent from the following detailed description of illustrative embodiments that proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention is best understood from the following detailed description when read in connection with the accompanying drawing. It is emphasized that, according to common practice, the various features of the drawing are not
to scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity. Included in the drawing are the following Figures:

[0016] FIG. 1 is a perspective view of an exemplary embodiment of the space saving fan in accordance with the present invention;

[0017] FIG. 2 is an exploded view of the space saving fan of FIG. 1;

[0018] FIG. 3A and 3B are top and side views respectively of the embodiment of FIG. 1;

[0019] FIG. 4 is a perspective view of another exemplary embodiment of a space saving fan in accordance with the present invention.

[0020] FIG. 5 is a perspective view of another exemplary embodiment of a space saving fan;

[0021] FIG. 6 is a perspective view of another exemplary embodiment of a space saving fan;

[0022] FIG. 7 is an exploded view of the space saving fan of FIG. 6;

[0023] FIG. 8 is a vertical cross section through the space saving fan of FIG. 6;

[0024] FIG. 9A is a partial perspective view of an exemplary embodiment of a space saving fan;

[0025] FIG. 9B is a cross section view along plane 9-9 of FIG. 9A;

[0026] FIG. 10A is a partial perspective view of another exemplary embodiment of a space saving fan;

[0027] FIG. 10B is a cross section view along plane 10-10 of FIG. 10A;

[0028] FIG. 11A is a partial perspective view of another exemplary embodiment of a space saving fan;

[0029] FIG. 11B is a cross section view along plane 11-11 of FIG. 11A;

[0030] FIGS. 12A and 12B are partial cross sectional views of another exemplary embodiment of a space saving fan;

[0031] FIGS. 13A and 13B are partial cross sectional views of another exemplary embodiment of a space saving fan;

[0032] FIGS. 14A and 14B are partial cross sectional views of another exemplary embodiment of a space saving fan.

DETAILED DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0033] FIG. 1 is a perspective view of an exemplary space saving fan 100. Space saving fan 100 includes air generator 120, front elevation plate 140 and support 150. As shown, air generator 120 may be located in a centralized portion of front elevation plate 140. Support 150 attaches to front elevation plate.

[0034] Front elevation plate 140 includes, outer edge 144, a rear surface 146 and a front surface 148. Front elevation plate 140 may be constructed of clear or translucent glass or polymer material, such as, for example, poly carbonate. As shown, support 150 and a bottom portion of outer edge 144 may be used to support the structure of space saving fan 100 in an upright position.

[0035] The use of a translucent or clear material in the construction of front elevation plate 140 contributes to the unobtrusive appearance of space saving fan 100 when placed on a desk or other work surface. As can be appreciated, objects, such as for example, pencil 180 can be seen through front elevation plate 140, thereby allowing the perceived size and obstructiveness of space saving fan 100 to be minimized.

[0036] Plug 170 may be used to connect space saving fan 100 to a power source, such as for example, a standard wall receptacle (not shown). Power cord 172 transfers power from plug 170 to air generator 120. As shown in FIG. 1, plug 170 may include a transformer 174 thereby indicating the use of direct current (DC) power by air generator 120. The transformer of plug 170 may be a conventional wound coil type transformer or electronic switching type transformer. The electronic switching transformer has several advantages when compared to the wound coil transformer. The ability to include safety features such as, for example, over current monitoring can easily be incorporated into the design of an electronic switching transformer. Another advantage of an electronic switching transformer is a lower cost when compared to the wound coil transformer. The lower cost and increased safety augments the market appeal of space saving fan 100. It is contemplated that direct current or alternating current could be used to power air generator 120.

[0037] FIG. 2 is an exploded view of space saving fan 100. As shown, air generator 120 may include housing 122, rear grill 124, front grill 126 and motorized impeller assembly 130. When air generator 120 is assembled, motorized impeller assembly 130 may be disposed within cavity 123 defined by housing 122. Rear grill 124 and front grill 126 are shown located on the opposite ends of cavity 123, and work in conjunction with housing 122 to safely enclosing motorized impeller assembly 130. Rear grill 124 and front grill 126 may be fastened to housing 122 using conventional means, such as for example, adhesives, screws, snap fits and the like. It is also contemplated that one or both of rear grill 124 and front grill 126 may be partially or completely unitary with another component of space saving fan 100, such as for example, housing 122 or front elevation plate 140.

[0038] Although not shown, it is contemplated that switches, wires, power cords, batteries, and other such well known electrical devices will be utilized to supply and control the energy required for motorized impeller assembly 130.

[0039] Front elevation plate 140 includes opening 142, internal edge 143, outer edge 144, rear surface 146 and front surface 148. Air generator 120 may be disposed in opening 142 of front elevation plate 140 upon assembly. Air generator 120 may be attached to front elevation plate 140 using conventional means, such as for example, adhesives, screws, snap fits and the like. It is also contemplated that front elevation plate 140 may be partially or completely unitary with another component of space saving fan 100, such as for example, housing 122.

[0040] As shown support 150 may be attached to rear surface 146 of front elevation plate 140. Support 150 may be attached via conventional means, such as for example, adhesives, screws, snap fits and the like. It is also contemplated that support 150 may be removably or rotatably attached to elevation plate 140 and/or may be attached to the front surface of front elevation plate 140. As can be appreciated, removable or rotatable attachment of support 150 to front elevation plate 140 will contribute to efficient packaging and shipment of space saving fan 100.

[0041] FIG. 3A and 3B are top and side views respectively of the embodiment of space saving fan 100 of FIG. 1. Front elevation plate 140 supports air generator 120 relative to
support surface 300. As shown, front elevation plate 140 may be defined by dimensions FW, FH and FD. FW is the horizontal width of front elevation plate 140, FH is the vertical height of front elevation plate 140, and FD is the thickness of front elevation plate 140. Air generator 120 may be defined by dimensions AGW, AGH and AGD. AGW is the horizontal width of air generator 120, AGH is the vertical height of air generator 120, and AGD is the thickness of air generator 120. As shown, the overall dimensions of space saving fan 100 is defined by FW, FH and OAD. OAD is measured perpendicular to FW along a horizontal plane.

[0042] Limiting the dimensions contribute to the space savings and utilitarian characteristics of space saving fan 100. More specifically, limiting the thickness FD of front elevation plate 140 increases the ability of the user to view around the device. The limitation of thickness FD combined with the limited thickness AGD of air generator 120 minimizes the depth of the device and further conserves space on a desk or work surface. In one embodiment, FD is less than 15% of either FW or FH.

[0043] Limiting the thickness FD of front elevation plate 140 in conjunction with the use of clear or translucent glass or polymer materials increases the ability to view object behind the front elevation plate 140 and hence the non-distracting value of elevation plate 140 (e.g., allowing the full work surface to be viewed). The ability of front elevation plate 140 to collect, reflect, diffract and/or refract ambient light is enhanced by the limited dimension for thickness FD. Preferably, ambient light may easily able to penetrate thickness FD of front elevation plate 140. The full penetration of ambient light into front elevation plate 140 increases the illumination that the ambient light is able to effect on front elevation plate 140. Further enhancements can be achieved with the inclusion of pale tints within the clear or translucent material. The addition of tints provides an edge glow effect with such color intensification at edge 144. The subtle color intensification may provide a radiant glow at edge 144. These light illumination features differentiate space saving fan 100 from conventional space saving fans and increase the non-distracting value of space saving fan 100 when compared to conventional desk fans.

[0044] Although shown in a specific profile, front elevation plate 140 may have a variety of shapes, for example, polygonal, elliptical, free form and the like, without departing from the spirit of the invention. It is also contemplated that outer edge 144 of front elevation plate 140 may have various surfaces textures and finishes, such as for example, serrations, waves, bevels, angles and the like. space saving fan 400 includes air generator 420, front elevation plate 440 and support 450. Space saving fan 400 may be similar in other respects to space saving fan 100 of FIG. 1, except that front elevation plate 440 may include an alternative shape, for example, triangular. Support 550 may be constructed to have similar characteristics as front elevation plate 540.

[0047] FIG. 6 is a perspective view of another exemplary space saving fan 600. Space saving fan 600 includes air generator 620, light dissemination plate 640 and support 650. As shown in the exemplary embodiment light dissemination plate 640 is similar to front elevation plate 140 of FIG. 1, however light dissemination plate 640 is capable of emitting a low intensity light utilizing one or more light sources 628 as shown in FIG. 7. As shown, air generator 620 is preferably located in a centralized portion of light dissemination plate 640. Support 650 may attach to light dissemination plate and support the entire structure of space saving fan 600 in an upright position.

[0048] FIG. 7 is an exploded view of space saving fan 600 from FIG. 6. As shown, air generator 620 includes housing 622, rear grill 624, front grill 626, one or more light sources 628 and motorized impeller assembly 630. When air generator 620 is assembled motorized impeller assembly 630 is disposed within cavity 623 defined by housing 622. Rear grill 624 and front grill 626 may be located on the opposite ends of cavity 623, and in combination with housing 622 safely enclose motorized impeller assembly 630. Rear grill 624 and front grill 626 may be fastened to housing 622 using conventional means, such as for example, adhesives, screws, snap fits and the like. It is also contemplated that one or both of rear grill 624 and front grill 626 may be partially or completely unitary with another component of space saving fan 600, such as for example, housing 622.

[0049] As shown, light sources 628 may be disposed within pockets 629 and located near outside surface 625 of housing 622. As shown, the location of light sources 628 and pockets 629 coincide with internal edge 643 of light dissemination plate 640 when space saving fan 600 is completely assembled. The exemplary embodiment shows four light sources 628, the invention however is not so limited. It is contemplated that one or multiple light sources 628 may be used without departing from the invention.

[0050] It is contemplated that light sources 628 may be miniature lights, neon lights, light emitting diodes (LEDs) and the like. The preferred embodiment, light source 628 uses LED technology. The use of LED technology has several advantages. First, the power usage is low compared to other types of light sources. Also, the life span of an LED is much greater than other light sources. In addition, the construction of the LED is simple when compared to other conventional lighting technologies, such as for example, incandescent lights that require several components, such as, sockets. Further, the use of LEDs for light sources 628 in conjunction with light dissemination plate 640 creates a compact light emission structure that can be easily trained into many shapes and sizes.

[0051] Although not shown it is contemplated that switches, wires, power cords, batteries, and other such well known electrical devices will be utilized to supply and control the energy required for both motorized impeller assembly 630 and light sources 628. Preferably, these electrical components are located safely behind light dissemination plate 640.

[0052] Air generator 620 may be disposed in opening 642 of light dissemination plate 640 upon assembly. As noted
before, light sources 628 should align with internal edge 643 of light dissemination plate 640.

[0053] As shown, light dissemination plate 640 includes opening 642, internal edge 643, outer edge 644, rear surface 646 and front surface 648. Light dissemination plate 640 is preferably a good conductor of light. Preferably, light dissemination plate 640 is constructed of glass or a clear polymer material such as poly carbonate. Air generator 620 may be attached to light dissemination plate 640 using conventional means, such as for example, adhesives, screws, snap fits and the like. It is also contemplated that light dissemination plate 640 may be partially or completely unitary with another component of space saving fan 600, such as for example, housing 622.

[0054] FIG. 7. Light dissemination plate 640 may attach to support 650 via notches 652. As shown outer edge 644 of light dissemination plate 640 will fit within notches 652. In a preferred embodiment, light dissemination plate 640 may be removable attached to support 650. It is also contemplated that light dissemination plate 640 may be permanently attached to support 650 using conventional means, such as for example, adhesives, screws, snap fits and the like.

[0055] Although shown as circular in form, light dissemination plate 640 is not so limited. It is contemplated that light dissemination plate 640 may have a variety of shapes, for example, polygonal, elliptical, free form and the like without departing from the spirit of the invention. It is also contemplated that outer edge 644 of light dissemination plate 640 may have various surfaces textures and finishes, such as for example, serrations, waves, bevels, angles and the like.

[0056] FIG. 8 is a vertical cross section through space saving fan 600. As shown, motorized impeller assembly 630 includes impeller 631, stator 632, rotor 633, shaft pin 634, stationary frame 635 and bearings 636. As shown, motorized impeller assembly 630 utilizes A.C. motor technology including stator coils 632a, stator laminations 632b, rotor inductor 633a and rotor laminations 633. Although space saving fan 600 is shown using A.C. motor technology the invention is not so limited. It is contemplated that D.C. motors, permanent magnet motors and other conventional motor types could be used without departing from the spirit of the invention.

[0057] Impeller 631 may be attached to rotor 633 using shaft pin 634. As shown impeller 631 includes hub 631a and blades 631b. Bearings 636 may be attached to stationary frame 635, which in turn may be fixedly attached to front grill 626. Shaft pin 634 may be rotatably disposed through bearings 636 allowing impeller 631, rotor 633 and shaft pin 634 to rotate relative to stationary frame 635 and the rest of the components of space saving fan 600.

[0058] When electrical power is supplied to stator coils 632a, rotor 633 rotates thereby rotating impeller 631. The rotation of impeller 631 generates air flow 800. As shown, air flow 800 enters housing 622 through rear grill 624. In a preferred embodiment, light dissemination plate 640 may be mounted at an angle a relative to support 650. Inclination of air stream 800 relative support surface 802 helps avoid or reduce disturbance of objects resting on support surface 802. It is also contemplated that the incline of air stream 800 may be adjustable relative to support surface 802.

[0059] In the present exemplary embodiment, stationary frame 635 is attached to front grill 626 with fasteners 660. It is also contemplated that other conventional means, such as for example, adhesives, snap fits and the like may be used. It is also considered that stationary frame 635 may be partially or completely unitary with another component of space saving fan 600, such as for example, rear grill 624 or front grill 626.

[0060] The location of stator 632, rotor 633, shaft pin 634, stationary frame 635 and bearings 636 within hub 631a of impeller 631, permits a conservation of size for motorized impeller assembly 630. This further contributes to the space saving characteristics of space saving fan 600. As can be appreciated, the diameter and or size of light dissemination plate 640 is greater than the axial thickness of air generator 620. In one embodiment, the ratio of the diameter light dissemination plate 640 to the axial thickness of air generator 620 is greater than 2 to 1.

[0061] Although not shown, it is contemplated that space saving fan 600 may also include additional features, such as for example, air filtration, heaters, clocks, oscillation, storage compartments and the like. It is also contemplated that support 650 may be an elevating structure, such as for example, a pedestal to increase the elevation of air flow 800 produced by air generator 620 above support surface 802.

[0062] FIG. 9A is a partial perspective view of an embodiment of space saving fan 600. FIG. 9B is a view of a cross section through the partial perspective view of FIG. 9A along plane 9-9. As shown, light vector 900 may be the predominant direction of travel through light dissemination plate 640.

[0063] As shown in FIGS. 7, 9A and 9B, light sources 628 may be located near internal edge 643 of light dissemination plate 640. The majority of the light may be maintained between rear surface 646 and front surface 648 and travels in an outward or radial direction between rear surface 646 and front surface 648. In a preferred embodiment, rear surface 646 and front surface 648 are flat and smooth and the angle of incidence of the light is high relative to rear surface 646 and front surface 648, thereby reflecting the majority of light vector 900 along a radial path from internal edge 643 towards outer edge 644.

[0064] The angle of incidence is the angle between a light beam incident on a surface and the line perpendicular to the surface at the point of incidence. The optical phenomenon, internal reflection will occur within light dissemination plate 640 as light vector 900 strikes rear surface 646 and front surface 648 at an angle of incidence greater than the critical angle. The critical angle is the angle of incidence above which the internal reflection occurs. This phenomenon of reflectivity and angle of incidence is widely known and described from Fresnel’s equations.

[0065] In another embodiment, rear surface 646 and front surface 648 may be coating with a reflective material. Reflective materials may further enhance the light transport and guide characteristics of the light dissemination plate 640.

[0066] As shown in FIG. 9B, light vector 900 may exit light dissemination plate 640 through outer edge 644 due to the high angle of incidence between light vector 900 and outer edge 644. It is contemplated that outer edge 644 may have a textured surface, thereby diffusing the light as it exits light dissemination plate 640 giving a glowing appearance to outer edge 644.
[0067] Other light exit points may be provided on, for example, the front surface 648 of the light disseminator plate 640. These points of use may include a diffuser for spreading and/or directing the light into the room and/or onto the work surface.

[0068] FIG. 10A is a partial perspective view of another embodiment of space saving fan 600. FIG. 10B is a view of a cross section cut through the partial perspective view of FIG. 10A along plane 10-10. As shown, light vector 900 may be the predominant direction of travel of light through light dissemination plate 1040. FIGS. 10A and 10B include an additional surface treatment 1000 on rear surface 646. Surface treatment 1000 may include the texturizing of rear surface 646, paint, and/or an additional surface attached to rear surface 646. For example, a paint containing reflective glass beads, an adhesive material with reflective properties, mirrors, and the like could be used as surface treatment 1000.

[0069] Although the majority of light vector 900 may exit light dissemination plate 1040 through outer edge 644, a portion of light, as shown reflected vectors 1002, may be directed at an angle θ to rear surface 646 and cause rear surface 646 to be visible through front surface 648. As shown, the reflected vectors 1002 may be directed substantially perpendicular to rear surface 646. The reflectivity of rear surface 646 may be increased or decreased with various surface treatments 1000 including the amount of texturization, type of texturization and the quantity and size of glass beads in the paint or adhesive material, etc.

[0070] FIG. 11A is a partial perspective view of another embodiment of space saving fan 600. FIG. 11B is a view of a cross section cut through the partial perspective view of FIG. 11A along plane 11-11. As shown, light vector 900 may be the predominant direction of travel of light through light dissemination plate 1140.

[0071] FIGS. 11A and 11B, include an additional reflective feature 1100 on rear surface 646. Reflective feature 1100 may include numbers, letters, symbols and various graphics recessed into light dissemination plate 1140 on rear surface 646. Further, the surface of reflective feature 1100 may be texturized or the recess may contain a filler 1104, such as for example, a paint or epoxy containing reflective glass beads, mirrors, and the like.

[0072] Although as shown the majority of light vector 900 may exit light dissemination plate 1140 through outer edge 644, a portion of light, as shown reflected vectors 1102, may be directed at an angle θ to rear surface 646 by reflective feature 1100 and thus causing reflective feature 1100 to be visible through front surface 648. As shown, reflected vectors 1102 may be directed substantially perpendicular to rear surface 646 by reflective feature 1100. The visibility of reflective feature 1100 may be increased or decreased with various types of texturization and the amount of glass beads in filler 1104, the intensity of the light source, etc. It is also contemplated that colors may be added to reflective feature 1100 to convey different moods and contribute to its aesthetic appeal.

[0073] In the exemplary embodiment of FIGS. 11A and 11B, reflective feature 1100 is shown as a single entity. It is contemplated that multiple reflective features 1100 may be used on light dissemination plate 1140 without departing from the spirit of the invention. Multiple reflective features 1100 may be used to direct and distribute light and also create an aesthetic design that will further contribute to the consumer appeal of space saving fan 600.

[0074] FIGS. 12A and 12B are partial cross sections of yet another embodiment of space saving fan 600. Similar to the embodiment shown in FIG. 7, light source 628 may be disposed within one or more pockets 629 located on outside surface 625 of housing 622. As shown, light vectors 900 radiate from light source 628 along a straight trajectory through light dissemination plate 640. As can be seen, the location of light source 628 within pocket 629 may limit the angular range through which light vectors 900 are able to radiate. As shown, the angular range may be defined by angle ω1. The limited range of angle ω1 may create non-lit areas 1204 and 1206 on either side of angle ω1. Non-lit areas 1204 and 1206 create a non-uniform light pattern consisting of bright and dim areas throughout light dissemination plate 640.

[0075] FIGS. 13A and 13B are partial cross sections of another embodiment of space saving fan 600. As shown, light source 628 may be disposed within pocket 1329. Pocket 1329 may be located proximate internal edge 643 within light dissemination plate 640. As shown, light vectors 900 radiate from light source 628 along a straight trajectory through light dissemination plate 640. As can be seen, the location of light source 628 within pocket 1329 increases the angular range through which light vectors 900 are able to radiate when compared to FIGS. 12A and 12B. As shown, the angular range may be defined by angle ω2. The increased range of angle ω2 eliminates/reduces non-lit areas 1204 and 1206 that are shown in FIGS. 12A and 12B.

[0076] Referring again to FIGS. 13A and 13B, light shrouds 1310 are shown adjacent rear surface 646 and front surface 648 of light dissemination plate 640. Light shroud 1310 may be utilized to block a direct view of light source 628 by the user of space saving fan 600. As shown, outer edge 1312 of light shroud 1310 extends radially outward and beyond light source 628 thereby effectively shielding the full intensity of light source 628 from view.

[0077] Although shown as circular or arcuate in form, light shroud 1310 is not so limited. It is contemplated that light shroud 1310 may have a variety of shapes, for example, polygonal, elliptical, free form and the like without departing from the spirit of the invention. It is also contemplated that outer edge 1312 of light shroud 1310 may have various surfaces textures and finishes, such as for example, serrations, waves, bevels, angles and the like.

[0078] In one embodiment angle α1 of FIG. 12A and/or angle α2 of FIG. 13A is greater than about 180°. In another embodiment angle α1 of FIG. 12A and/or angle α2 of FIG. 13A is between about 140° and about 270°.

[0079] The location of light source 628 as shown and described in FIGS. 13A and 13B has advantages over the location of light source 628 as shown and described in FIGS. 12A and 12B. For example, the increased range of angle α2 permits a more uniform light distribution throughout light dissemination plate 640. When compared to the embodiment of FIGS. 12A and 12B, the embodiment of FIGS. 13A and 13B would require fewer light sources 628 around internal edge 643 of light dissemination plate 640 to achieve complete illumination of light dissemination plate 640. This reduces both the assembly and material costs associated with space saving fan 600.

[0080] Another advantage of the use of light shrouds 1310 as described in FIGS. 13A and 13B is the ability to utilize
a reflective surface on light shrouds 1310 in the areas of interface between light shrouds 1310 and rear surface 646 and/or front surface 648 of light dissemination plate 640. The use of reflective surfaces helps preserve the intensity of light vectors 900 thereby increasing/improving the illumination of light dissemination plate 640. The increased/improved illumination may permit the use of lower power light sources 628, thereby conserving energy and expense.

[0081] FIGS. 14A and 14B are partial cross sections of another embodiment of space saving fan 600. FIGS. 14A and 14B are similar to FIGS. 13A and 13B in other respects except for the configuration of pocket 1429. As shown, pocket 1429 may be circular in form and substantially larger than the size of light source 628. It has been found that the circular form of pocket 1429 and a comparatively larger size with respect to the size of light source 628 increases the angular range through which light vectors 900 are able to radiate. As shown, the angular range of radiation of light vectors 900 is about 360°. It has also been found that this configuration of light source 628 and pocket 1429 creates a more homogeneous light radiation throughout light dissemination plate 640 when compared to FIGS. 12A and 12B and/or FIGS. 13A and 13B.

[0082] Further, internal edge 643 and/or outside surface 625 of housing 622 may include a reflective material. Light vectors radiating toward this reflective material may be reflected back into the light dissemination plate 640. This feature further improves light radiation throughout light dissemination plate 640.

[0083] In one embodiment the diameter of pocket 1429 is greater than about 2 times the cross sectional width of light source 628. In another embodiment, the diameter of pocket 1429 is greater than about 0.30 inches. In yet another embodiment the diameter of pocket 1429 is between about 0.25 inches and about 0.75 inches.

[0084] The features and structure of space saving fan 100 and 600, as described in the exemplary embodiments, enhance space saving characteristics when compared to conventional desk and table fans. The physical location of the motor relative to the impeller permits greater space saving characteristics than those found in a conventional desk fan. The use of motorized impeller assembly 630 having the motor disposed substantially within hub 631 allows further size economization, thus maximizing the available area on a table or desk for productive use. The use of front elevation plate 140 captures indirect lighting to enhance the overall appearance of space saving fan 100. Light dissemination plate 640 in conjunction with light sources 628 is capable of emitting a low level light for use on a desk. Additionally the use of front elevation plate 140 and/or light dissemination plate 640 serves to protect and isolate electrical components from direct contact by the user.

[0085] As can be appreciated the use of front elevation plate 140 and/or light dissemination plate 640 further distinguishes space saving fans 100 and 600 from conventional desk top fans. Embodiments of space saving fans 100 and 600 have features that allow for a more functional, attractive and evocative presence on a desk or table top. The structural and feature innovation of space saving fan 100 and 600 also achieve the goal of re-invigorated interest on the part of the user and sale-ability on the part of the manufacturer and/or vendor.

[0086] Although the invention has been described with reference to exemplary embodiments, it is not limited thereto. Rather, the appended claims should be construed to include other variants and embodiments of the invention, which may be made by those skilled in the art without departing from the true spirit and scope of the present invention.

What is claimed:
1. A space saving fan with a front elevation plate comprising:
   a front elevation plate comprising;
   a front surface;
   a rear surface;
   an outer edge;
   an opening located within a central region of said front elevation plate, said opening connecting said front and rear surfaces;
   a width, height, and depth dimension, wherein said depth dimension is limited to less than about 15% of either the width dimension and/or the height dimension;
   an air generator disposed within said opening and connected to said front elevation plate, said air generator comprising:
   a housing;
   an electric motor;
   an air impeller rotatably coupled to said motor, wherein rotation of said air impeller causes air to move from a rear of said front elevation plate to a front of said front elevation plate;
   an air generator width, height, and depth dimension, wherein said air generator depth dimension is limited to less than 50% of either the width dimension and/or the height dimension of said front elevation;
   wherein said limitation of said depth dimension of said front elevation plate and said limitation of said depth dimension of said air generator provide space saving characteristics for said space saving fan.
2. The space saving fan of claim 1, wherein said front elevation plate comprises a clear or semi-clear polymer and/or glass material and said front elevation plate is illuminated by ambient light.
3. The space saving fan of claim 2, wherein said front elevation plate further comprises colored tints and said illuminated front elevation plate includes a color intensification of said outer edge.
4. The space saving fan of claim 1, wherein one and/or both of said front and rear surfaces of said front elevation plate further comprises a surface treatment.
5. The space saving fan of claim 1, wherein said front elevation plate further comprises multiple sections.
6. The space saving fan of claim 1, wherein said front elevation plate supports said space saving fan relative to a support surface.
7. The space saving fan of claim 1, wherein said electric motor further comprises a direct current motor.
8. The space saving fan of claim 7, further comprising a power supply cord comprising:
   conductors having a first and a second end;
   a plug connected to said first end of said conductors and said motor electrically connected to said second end of said conductors; and
   a transformer disposed within said plug and/or between said plug and said motor, said transformer converting an alternating electric current from a power source to a direct electric current.
9. The space saving fan of claim 1, wherein said air impeller further comprise:
   a center hub; and
   multiple blades extending radially outward from said hub;
   wherein said electric motor is disposed substantially
   within said hub.
10. The portable fan of claim 1, wherein said front elevation plate is a clear and/or semi-clear polymer and/or
glass material.
11. The space saving fan of claim 10 further comprising:
   a light source located proximate said opening in said front
   elevation plate;
   wherein light generated by said light source is disseminated
   through said front elevation plate.
12. The portable fan of claim 11, wherein said light source comprises multiple light sources.
13. The portable fan of claim 11, wherein said light source comprises one or more light emitting diodes (LEDs).
14. The portable fan of claim 11, wherein said front elevation plate further comprises a pocket, wherein said
   light source is disposed within said pocket.
15. The portable fan of claim 14, wherein said pocket has a circular shape.
16. The portable fan of claim 11, further comprising a light shroud, wherein said light shroud impedes a user from
directly seeing said light source.
17. The portable fan of claim 11, wherein said outer edge of said front elevation plate is illuminated by said light
   generated by said light source.
18. The portable fan of claim 17, wherein said polymer and/or glass material further comprises colored rains and said
   outer edge includes an illuminated color intensification.
19. The portable fan of claim 11, wherein one and/or both of said front and rear surfaces of said front elevation plate
   further comprises a reflective feature.
20. The portable fan of claim 11, wherein one and/or both of said front and rear surfaces of said front elevation plate
   further comprises a surface treatment.
21. The portable fan of claim 11, wherein said front elevation plate further comprises multiple sections.
22. The portable fan of claim 11, further comprising a base connected to said front elevation plate, wherein said
   base supports said portable fan relative to a support surface.
23. The portable fan of claim 11, wherein said electric motor further comprises a direct current motor.
24. The portable fan of claim 23, further comprising a power supply cord comprising:
   conductors having a first and a second end;
   a plug connected to said first end of said conductors and
   said motor electrically connected to said second end of
   said conductors; and
   a transformer disposed within said plug and/or between
   said plug and said motor, said transformer converting
   an alternating electric current from a power source to a
direct electric current.
25. A space saving fan with a front elevation plate comprising:
   a front elevation plate, said front elevation plate comprising:
   a front surface;
   a rear surface;
   an outer edge;
   an inner edge;
   an opening defined by said inner edge, said opening
   located in a central region of said front elevation plate;
   a depth of said front elevation plate defined by the
distance between said front surface and said rear
surface;
   a length and a height of said front elevation plate;
   an air generator disposed within said opening in said
central region of said front elevation plate, said air
   generator comprising:
   a housing;
   an air inlet in said housing on a rear of said space saving
   fan;
   an air outlet in said housing on a front of said space
   saving fan;
   an impeller rotatably disposed within said housing;
   a motor a rotating said impeller;
   a depth of said air generator defined by the distance
   between said air inlet and said air outlet;
   a length and a height of said air generator;
   wherein said air generator moves air from a rear of said
   space saving fan to a front of said space saving fan as
   said air impeller rotates, wherein said front elevation plate
   provides a barrier between said front of said space
   saving fan and said rear of said space saving fan.
26. The space saving fan of claim 25, wherein said front elevation plate further comprises a translucent or clear
   material such that objects located behind said front elevation plate may be viewed from in front of said space saving fan.
27. The space saving fan of claim 25, wherein said front elevation plate further comprises a light conducting mat
   erial, wherein said front elevation plate further comprises:
   one or more light entrance points located on said inner
   edge of said front elevation plate; and
   one or more light exit points located on one or both of said
   outer edge and/or said front surface.
28. The space saving fan of claim 27, further comprises:
   a light collector at each of said one or more light entrance
   points, wherein said light collector collects and reflects
   light into said front elevation plate;
   and
   a diffuser at each of said light exit points, wherein said
   diffuser spreads light from said front elevation plate into
   a room in which said space saving fan is located
   and/or onto a work surface on which said space saving
   fan is located.
29. The space saving fan of claim 27, further comprises one or more light sources located proximate said light
   entrance point(s), wherein light rays from said one or more
   light sources radiate into said front elevation plate.
30. The space saving fan of claim 29, wherein said one or more light sources are located in said air generator
   housing and said one or more light entrance points are located on said
   inner edge of said front elevation plate, wherein said light
   entrance point(s) on said inner edge of said front elevation
   plate coincides with said light source(s) in said air generator
   housing.
31. The space saving fan of claim 29, wherein said one or more light sources comprise natural light.
32. The space saving fan of claim 29, wherein said one or more light sources comprise LEDs.
33. The space saving fan of claim 29, further comprising one or more reflective features on said front elevation plate
   for directing and distributing light from said light source to
   one of said light exit points.
34. The space saving fan of claim 29, further comprising pockets formed in said front elevation plate proximate said inner edge, wherein said one or more light sources are located in said pockets.

35. The space saving fan of claim 34, wherein said pockets are located in said front elevation plate at a distance from said inner edge such that light vectors radiated from said light source are radiated over an angular range greater than 180 degrees.

36. The space saving fan of claim 34, wherein said pockets are located in said front elevation plate at a distance from said inner edge such that light vectors radiated from said light source are radiated over an angular range greater than 270 degrees.

37. The space saving fan of claim 34, further comprising a light shroud extending over a portion of said front elevation plate proximate said inner edge and covering a surface of said front elevation plate proximate said one or more light sources, wherein said one or more light sources are blocked from direct view from in front of said space saving fan.

38. The space saving fan of claim 34, wherein said pockets comprise circular-shaped pockets.

39. The space saving fan of claim 27, further comprises one or more light sources located proximate said light entrance point(s), wherein primary light rays from said one or more light sources radiate along a first path through said front elevation plate.

40. The space saving fan of claim 39, wherein said first path is substantially radial.

41. The space saving fan of claim 39, further comprises secondary light rays, wherein said secondary light rays radiate along a second path that is at an angle with respect to said first light path.

42. The space saving fan of claim 41, further comprises a surface treatment that reflects all or a portion of said primary light rays to form said secondary light rays.

43. The space saving fan of claim 42, wherein said surface treatment comprises a reflective material on said rear surface, wherein said secondary light rays travel along said second light path from said rear surface toward said front surface.

44. The space saving fan of claim 41, wherein said second light path is substantially orthogonal to said rear surface.