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3,401,874

UMBRELLA AND FAN COMBINATION

Filed Nov. 4, 1966

2 Sheets-Sheet 1

FIG. 1.

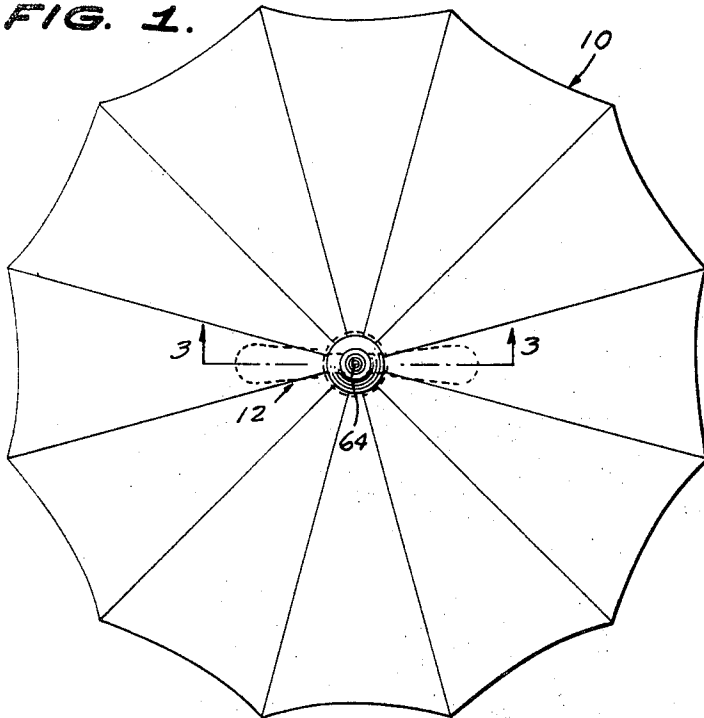


FIG. 2.

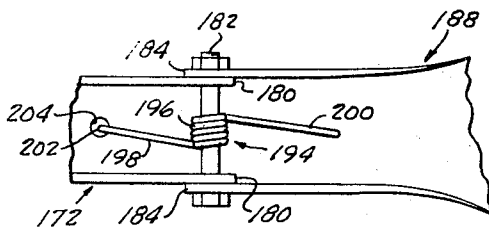
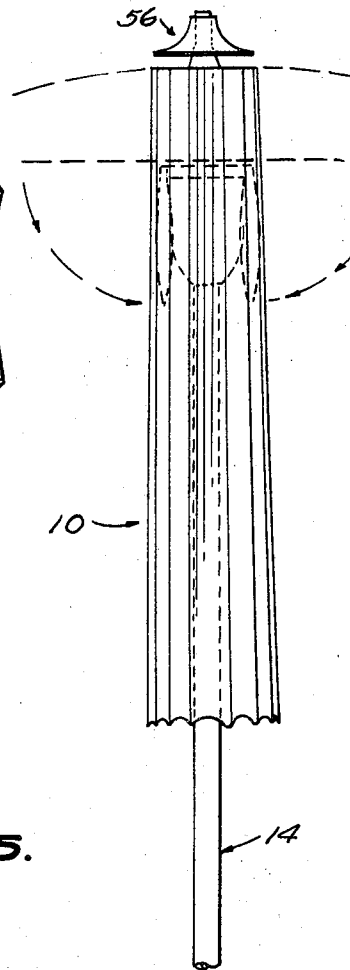


FIG. 5.

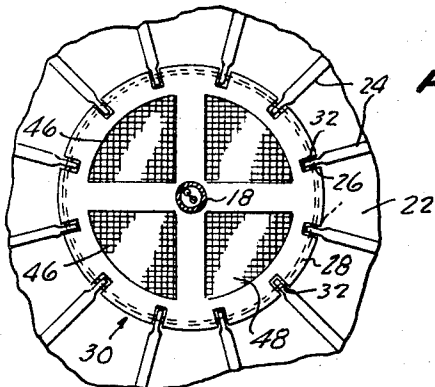


FIG. 6.

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2 Sheets-Sheet 2

FIG. 3.

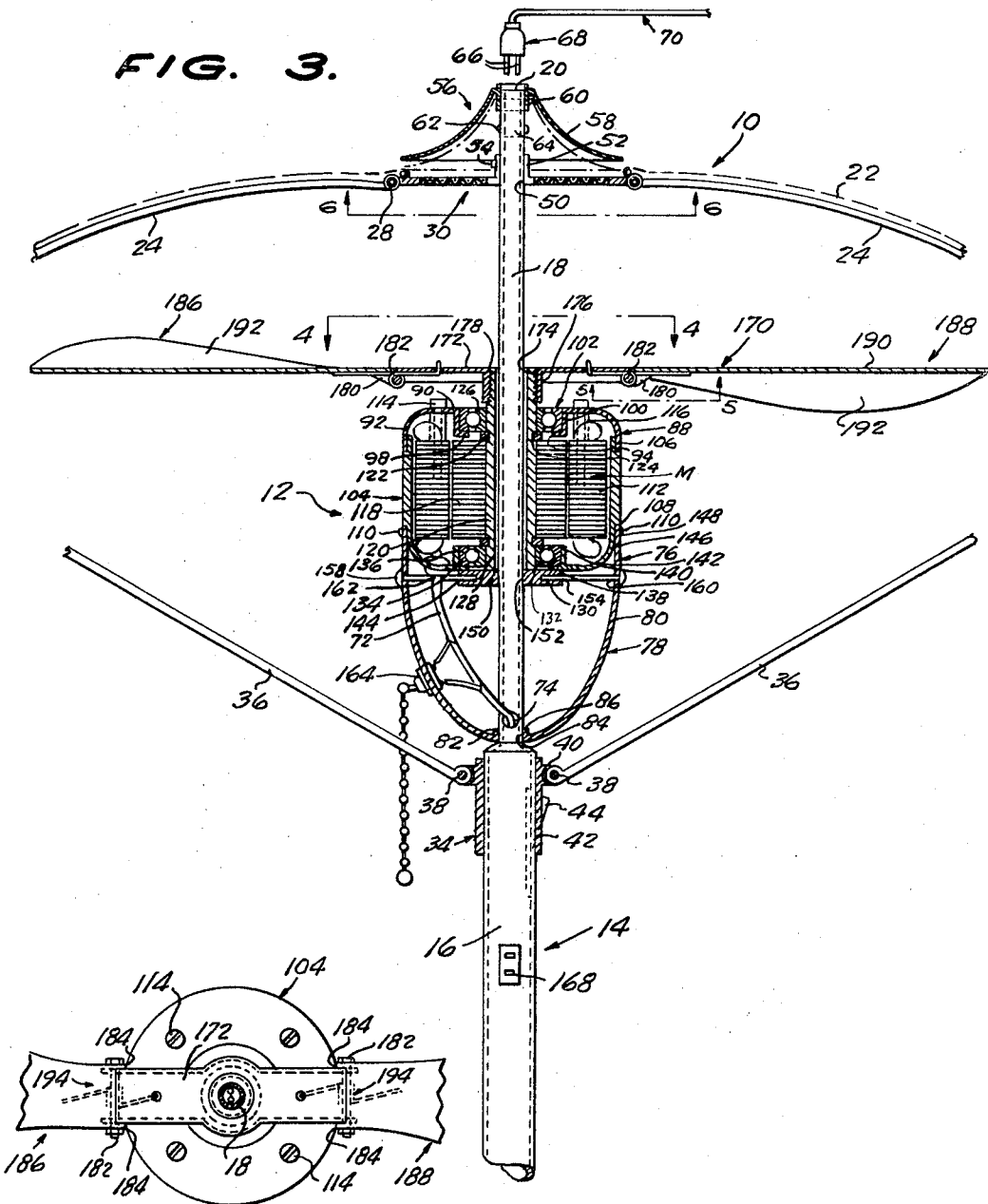
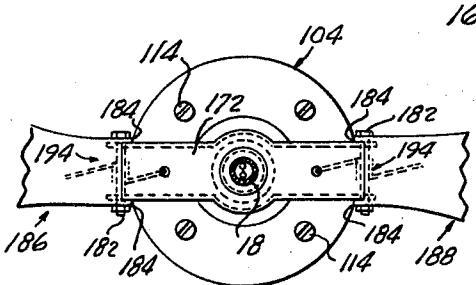


FIG. 4.



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1

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UMBRELLA AND FAN COMBINATION

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9 Claims. (Cl. 230-241)

ABSTRACT OF THE DISCLOSURE

A collapsible fan and umbrella combination wherein the umbrella has a central air intake beneath which the fan rotates about the umbrella stick. Air is continuously drawn downwardly through the intake and rotated beneath the umbrella to provide effective cooling.

This invention relates to an umbrella and fan combination.

The primary object of the invention is the provision of a more practical and efficient combination of the kind indicated, wherein the electrically driven fan component is in the form of a unit which is designed to be easily installed on existing umbrellas, especially, but not exclusively, patio and lawn umbrellas.

Combinations of the kind indicated above have heretofore been characterized by the fact that their fan components serve to produce rotation of the air beneath their umbrella components, accompanied by a certain amount of down-draft of the air, with corresponding limitation of the cooling effectiveness thereof.

An object of the present invention is the provision of a combination of the character indicated above, wherein the umbrella component is formed with a central air intake, beneath which the fan component operates, whereby air is drawn downwardly through the intake, in a manner to produce a positive cooling down-draft of air, accompanied by rotation of the air beneath the umbrella component, so that a substantially greater and more effective cooling effect is provided for the user or users of the combination, than is obtainable with prior umbrella and fan combinations.

In the drawings:

FIGURE 1 is a top plan view of a combination of the invention;

FIGURE 2 is a side elevation thereof, showing the umbrella component and the fan component in closed position;

FIGURE 3 is an enlarged fragmentary vertical transverse section, taken on the line 3-3 of FIGURE 1;

FIGURES 4 and 5 are further enlarged fragmentary horizontal sections, taken on the lines 4-4 and 5-5 of FIGURE 3, respectively; and,

FIGURE 6 is a fragmentary horizontal section, on the scale of FIGURES 4 and 5, taken on the line 6-6 of FIGURE 3.

Referring in detail to the drawings, the illustrated combination comprises an umbrella component 10, and a fan component 12.

The umbrella component 10 is in the form of a substantially conventional umbrella, comprising a shaft or stick 14 composed of a relatively large diameter, hollow lower portion 16, and a reduced diameter tubular upper portion 18, the latter terminating in an upper end 20. The fabric umbrella cover 22 is stretched on and is suitably secured to radial, circumferentially spaced ribs 24, which have flattened ears 26, on their inner ends, which are journaled on a ring 28. The ring 28 is secured to and extends concentrically around the outer edge of a circular screen disc 30, formed in its peripheral edge with radial slots 32, in which the rib ears 26 are positioned.

2

The umbrella ribs 24 are operatively connected to a conventional tubular slide 34, circumposed on the lower portion 16 of the umbrella shaft or stick 14, by means of links 36. The links 36 are pivoted at their outer ends, to intermediate parts of the ribs 24, and at their inner ends, as indicated at 38, to ears 40 on the exterior of the slide 34. The sidewall of the slide 34 is formed with a vertical slot 42, adapted to receive an outwardly spring-pressed detent 44, of conventional form, mounted on the shaft 14, for releasably locking the slide 34 in its depressed position on the shaft, wherein the ribs 24 and the cover 22 are in depressed closed positions. As shown in FIGURE 2, where the diameter of the disc 30 is relatively large, the ribs 24, in the closed position of the umbrella, are substantially parallel to the shaft 14.

The screen disc 30 constitutes an air intake, and is formed with circumferentially spaced quadrant openings 46, which occupy the major area of the disc 30, and are covered by screens 48, in the interest of screening out dust, debris, and insects, from being drawn down through the air intake. The disc 30 is formed with a central opening 50, dimensioned to closely and slidably receive the upper portion 18 of the umbrella shaft 14, the opening 50 being surrounded by an upstanding sleeve 52, provided with a set screw 54, for securing the disc 30 to the shaft, at a location spaced downwardly from the upper end 20 of the shaft.

An imperforate bell 56 is axially circumposed on the shaft portion 14, above the disc 30, in shielding relation thereto, to prevent ready access to the air intake of such as dust, rain, and insects. The bell 56 has a downwardly flaring skirt 58 which is larger in diameter, at its lower end, than the disc 30 and is spaced thereabove. The skirt 58 is formed, on its upper end, with a downwardly extending sleeve 60, which is slidably circumposed on the upper end of the shaft 14. Rivets 62 serve to fix in place, in the upper end of the shaft, a ferrule electrical socket 64, adapted to receive the prongs 66 of a conventional electrical outlet plug 68, on a cord 70 leading from a suitable source (not shown) of electrical current, for energizing the fan component 12 of the combination. An insulated electrical cord 72 leads downward from the socket 64, through the upper umbrella shaft portion 18, and extends outwardly therefrom through a hole 74 provided in the sidewall of the portion 18.

The fan component 12 comprises a vertically elongated tubular housing 76, composed of a relatively long dome-shaped lower section 78, having a preferably downwardly tapering side wall 80, and a bottom wall 82. The bottom wall 82 is formed with an axial opening 84, surrounded by an upstanding reinforcing rib 86, which slidably accepts the upper umbrella shaft portion 18, above the larger diameter lower portion 16.

The housing 76 further comprises a relatively short, pan-shaped upper section 88, having a flat top wall 90 and a side wall 92. The top wall 90 is formed with an axial opening 96, larger in diameter than the upper shaft portion 18, the opening 96 being defined by the inner edge of a lateral annular flange 98, on the lower end of a vertical annular flange 100 extending downwardly from the upper section top wall 90. The flanges 98 and 100 together define a seat for an upper annular ball bearing 102, which is suitably secured therein.

An annular electric motor case 104 of a reversible electric motor M is formed, at its upper and lower edges, with annular grooves 106 and 108, in which seat the adjacent edges of the upper and lower housing sections 78 and 88, respectively. The lower housing section 78 is fixed in place in the lower groove 108, as by means of screws 110.

The motor case 104 has therein an annular field coil assembly 112, which is secured in place, as by means of

vertical screws 114 extending downwardly through the upper section top wall 90, and spacer sleeves 116, and threaded into the assembly 112.

A rotary armature assembly 118, disposed within the field coil assembly 112, comprises a vertically elongated tube 120, spacedly and concentrically surrounding the upper umbrella shaft section 18, and extending above and below the armature assembly 118. The upper part of the tube 120 extends up through the upper bearing 102, and is formed with an external annular groove 122, in which an upper snap ring 124 is engaged. The snap ring 124 is engaged between the underside of the inner race 126 of the upper bearing 102 and the top of the armature assembly 118.

Below the armature assembly 118, the tube 120 is formed with another annular groove 128, in which a lower snap ring 130 is engaged, the lower snap ring 130 being engaged with the bottom of the armature assembly 118 and with the top of the inner race 132, of a lower annular ball bearing 134.

The outer race 136 of the lower annular bearing 134 is supportably seated in a groove 138 formed around a center opening 140 of a cup-shaped support pan 142. The pan 142 has a flat bottom wall 144, in which the groove 138 is formed, and an upstanding side wall 146 having an upper end 148 which is engaged with the lower end of the motor case 104.

The pan 142 is held up in place by a support disc 150, smaller in diameter than the motor case 104. The support disc 150 is formed with a central opening 152, snugly and slidably receiving the shaft portion 18, and with a plurality of radial screw-threaded bores 154, opening to its peripheral edge. Screws 158, extending inwardly through openings 160, formed in the side wall of the lower housing section 78, and threaded into the bores 154, secure the support disc 150 up in place.

The fan component 12 is supported in place on the upper umbrella shaft portion 18 in spaced relation to the air intake disc 30, by any suitable means, as by engagement of the lower end of the lower housing section 78, with the shoulder 166 defined by the meeting of the upper and lower sections of the umbrella shaft 14.

The electrical cord 72 extends upwardly from the shaft hole 74, through a grommeted opening 162, in the pan 142, and is suitably connected to the motor M. An on-and-off switch 164 secured through the side wall of the lower housing section 78, is connected in the cord 72, for turning the motor M on and off.

An additional current input socket 168, connected to the cord 72, is adapted to be mounted in the sidewall of the lower portion 18 of the umbrella shaft 14.

A two-bladed fan 170 is mounted on the upper end of the tube 120. The fan 170 comprises a horizontal, transversely elongated, channel cross section member 172, formed with a central opening 174, larger in diameter than the shaft portion 18. An internally threaded socket 176, surrounding the opening 174, is threaded, as indicated at 178, on to the upper end of the tube 120. The cross member 172 is formed with relatively widely spaced pendant ears 180, traversed by headed pivot pins 182, which extend also through pendant ears 184 which extend downwardly from the inner ends of opposed fan blades 186 and 188.

The fan blades have straight horizontal portions 190, from which oppositely angled portions 192 extend, with the effect that the blade 186 is angled upwardly, relative to the horizontal, and the blade 188 is angled downwardly, relative to the horizontal.

The fan blades 186, 188 are yieldably maintained up in horizontal operative position, in the general plane of the cross member 172, by means of springs 194, having portions 196 corded around the pivot pins 182, inner arms 198 engaged with the underside of the cross member 172, and outer arms 200, which are engaged with the undersides of the blades. The inner spring arms 198 terminate

in upstanding terminals 202 which are securably engaged through openings 204, provided in the cross member 172.

In use and operation, when the umbrella component 10 is closed, the related ribs 24 bear against the fan blades 186, 188 and press the same down to vertical positions, against the resistance of the springs 194. When the umbrella component is opened, the springs 194 are freed to elevate the fan blades to their horizontal operative positions.

With the umbrella component 10 in open position, and the motor M in operation, the fan blades are rotated, in a direction to draw screened air down through the air intake disc 30, and force this air in a positive down-draft, and in circular motion, for effectively cooling the user of the combination.

The bell 56 is adapted to be moved down on the shaft 14 to cover the screen disc 30, whenever desired, as in a heavy rain. The motor M is adapted to be operated, in one direction, to draw cooling air downwardly through the disc 30, and on to the user of the device. However, with the bell 56 down, in disc covering position, the motor is adapted to be reversed, so as to throw air up against the umbrella and out at the sides thereof.

What is claimed is:

1. A combination of the character described, an umbrella component comprising a shaft, a slide engaged on the shaft, means for releasably holding the slide in a depressed position, ribs pivoted on the shaft above the slide, and links pivoted at one end to the slide and at their other end to the ribs; and an electric motor driven fan component comprising an electric motor surrounding the shaft between the slide and the ribs, means positioning the motor on the shaft, said motor having a fixed field coil assembly surrounding the shaft and a rotary armature component surrounding the shaft, and a fan assembly carried by the armature assembly and rotating around the shaft at a location between the ribs and the motor.

2. The combination of claim 1, wherein said fan assembly comprises a cross member fixed to the armature assembly, fan blades pivoted on related ends of the cross member, and spring means yieldably urging the blades upwardly to coplanar relationship to the cross member, the ribs of the umbrella component being adapted to pivot downwardly and to engage and depress the fan blades, against the resistance of said spring means, as the slide is moved downwardly along the shaft for closing the umbrella component.

3. The combination of claim 1, wherein the said shaft is tubular and has an upper end, an electrical socket mounted on said upper end with which an electric current source plug is adapted to be engaged, said socket having a cord leading down through the shaft and connected to the motor.

4. The combination of claim 1, wherein an air intake screen disc is fixed to and surrounds the upper part of the shaft, said disc being formed with screened opening means, the ribs being pivoted to the disc.

5. The combination of claim 1, wherein an air intake disc is fixed to and surrounds the upper part of the shaft, said disc being formed with screened opening means, the ribs being pivoted to the disc, an impermeate bell fixed to and surrounding the shaft and spaced above the disc, said bell having a lower end larger in diameter than and concentric with respect to the disc, said bell being slidable on the shaft from an elevated position relative to said disc to a depressed position occluding said disc.

6. The combination of claim 1, wherein said fan component comprises a hollow housing surrounding the umbrella component shaft, said housing having a lower section extending below the motor and an upper section spaced above the lower section, said motor having an annular case interposed between said upper and lower sections, said field coil assembly being fixed in said case and surrounding the armature assembly.

7. The combination of claim 1, wherein said fan com-

5

ponent comprises a hollow housing surrounding the umbrella component shaft, said housing having a lower section extending below the motor and an upper section spaced above the lower section, said motor having an annular case interposed between said upper and lower sections, said field coil assembly being fixed in said case and surrounding the armature assembly, a tube surrounding the shaft, said armature surrounding and being fixed to the tube, upper and lower bearings mounted within said housing through which said tube is supportably journalled, said tube having an upper end portion extending above the housing, said fan being fixed on the upper end portion of the tube.

8. The combination of claim 1, wherein said fan component comprises a hollow housing surrounding the umbrella component shaft, said housing having a lower section extending below the motor and an upper section spaced above the lower section, said motor having an annular case interposed between said upper and lower sections, said field coil assembly being fixed in said case and surrounding the armature assembly, a tube surrounding the shaft, said armature surrounding and being fixed to the tube, upper and lower bearings mounted within said housing through which said tube is supportably journalled, said tube having an upper end portion extending above the housing, said fan being fixed on the upper end portion of the tube, said fan comprising a cross member fixed to the upper end portion of the tube and extending to opposite sides of the umbrella component shaft, and fan blades mounted on the ends of the cross member.

9. The combination of claim 1, wherein said fan com-

6

ponent comprises a hollow housing surrounding the umbrella component shaft, said housing having a lower section extending below the motor and an upper section spaced above the lower section, said motor having an annular case interposed between said upper and lower sections, said field coil assembly being fixed in said case and surrounding the armature assembly, a tube surrounding the shaft, said armature surrounding and being fixed to the tube, upper and lower bearings mounted within said housing through which said tube is supportably journalled, said tube having an upper end portion extending above the housing, said fan being fixed on the upper end portion of the tube, said fan comprising a cross member fixed to the upper end portion of the tube and extending to opposite sides of the umbrella component shaft, and fan blades mounted on the ends of the cross member, said fan blades being pivoted at their inner ends on the ends of the cross member to pivot downwardly from coplanar relationship with the cross member to pendant inoperative positions, and spring means yieldably urging the fan blades upwardly to coplanar relationship to the cross member.

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