Aug. 5, 1952 B. FRANKLIN 2,606,273

COMBINATION SPACE HEATER, FAN, AND AIR CIRCULATOR

Filed Sept. 9, 1950 3 Sheets-Sheet 1

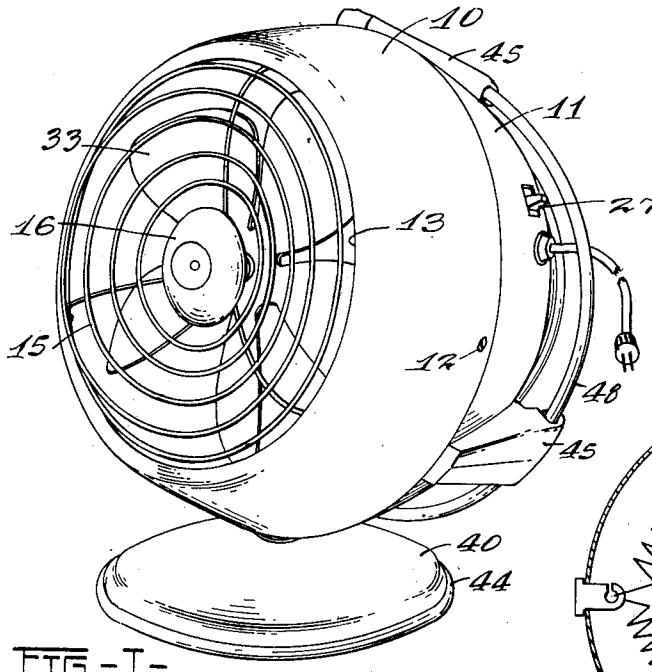


FIG - I -

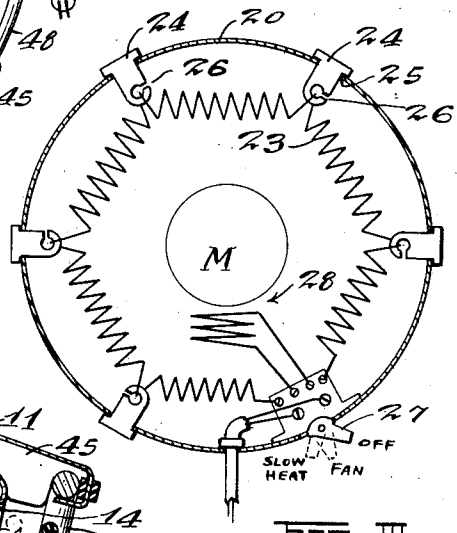


FIG - III -

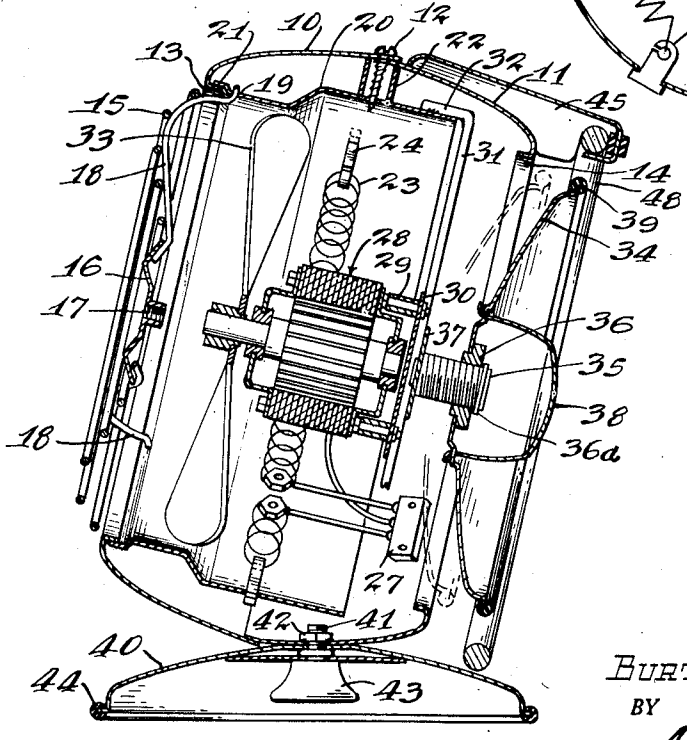


FIG - II -

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COMBINATION SPACE HEATER, FAN, AND AIR CIRCULATOR

Filed Sept. 9, 1950 3 Sheets-Sheet 2

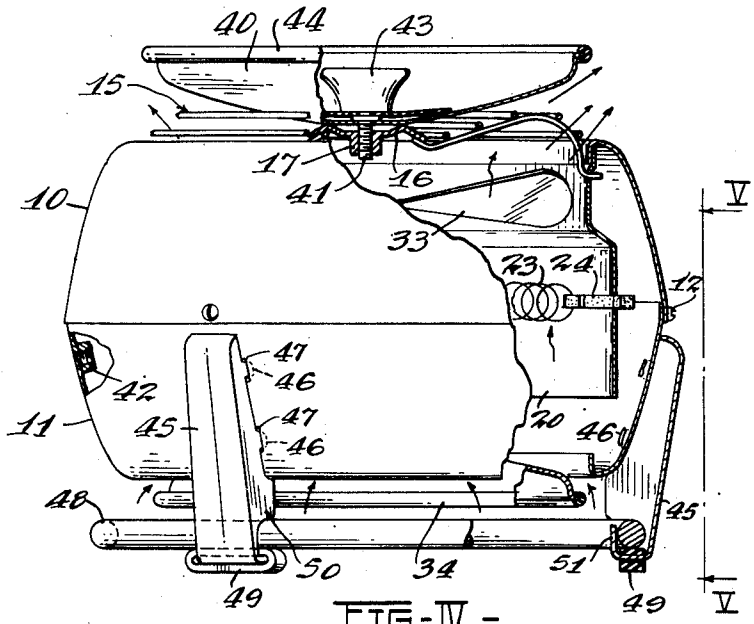


FIG-IV-

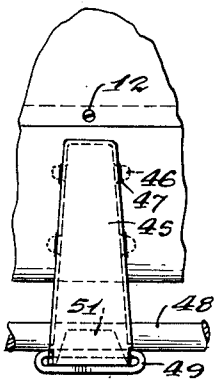


FIG-V-

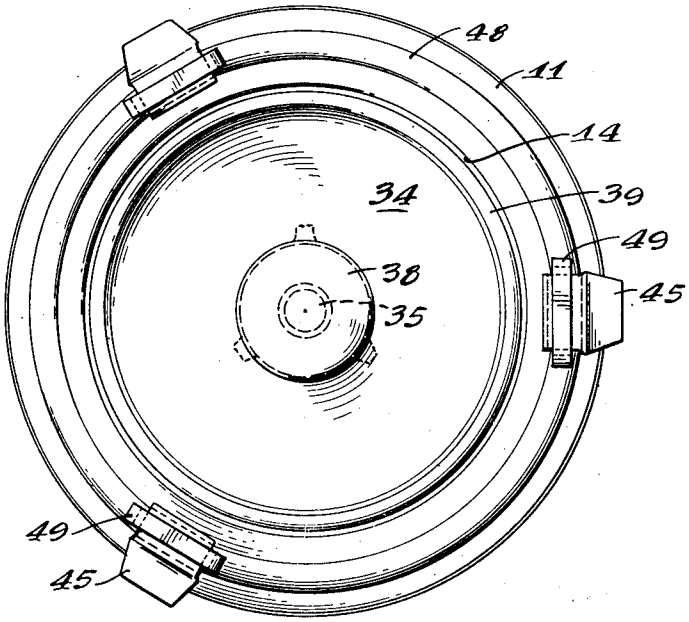


FIG-VI-

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COMBINATION SPACE HEATER, FAN, AND AIR CIRCULATOR

Filed Sept. 9, 1950 3 Sheets-Sheet 3

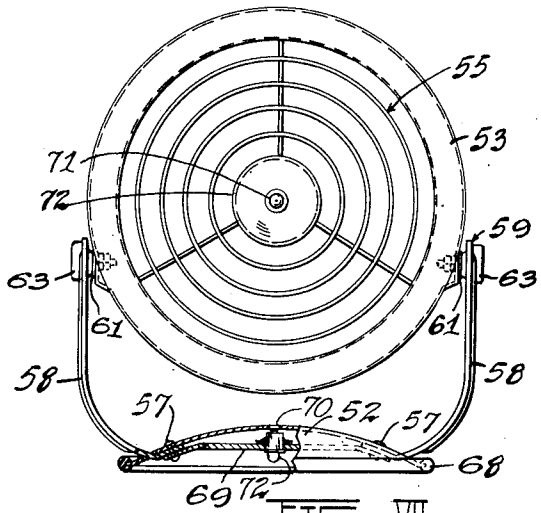


FIG-VII-

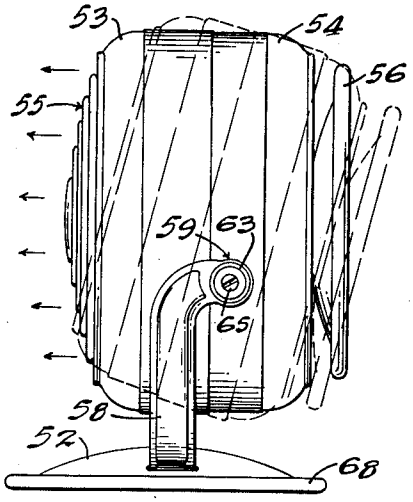


FIG-VIII-

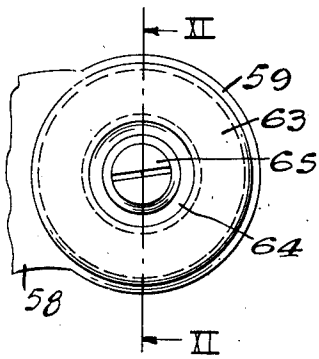


FIG-X-

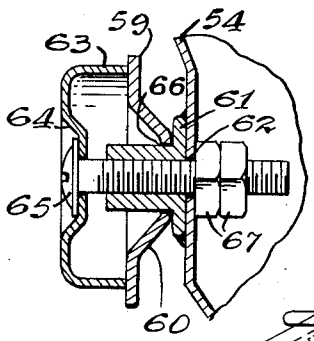


FIG-XI-

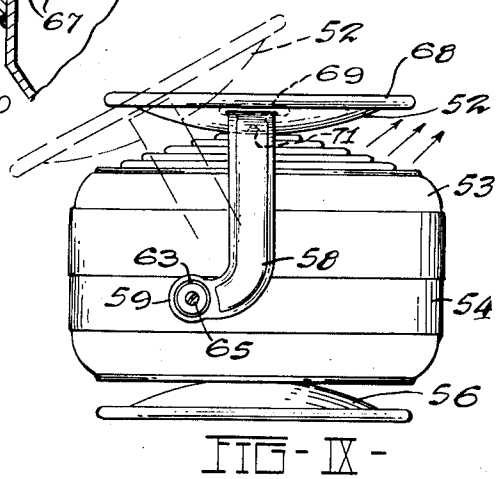


FIG-IX-

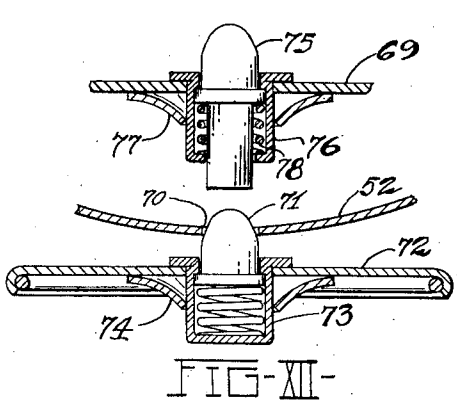


FIG-XII-

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Patented Aug. 5, 1952

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UNITED STATES PATENT OFFICE

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COMBINATION SPACE HEATER, FAN, AND AIR CIRCULATOR

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Application September 9, 1950, Serial No. 184,091

9 Claims. (Cl. 219—39)

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This invention relates to improvements in combination space heaters and fans and, more particularly, to a compact, electrically motivated, combination fan and heater in which the structure is designed for use not only as a direct draft fan and space heater but also as an air circulator.

Many simple prior art electrical heaters consist in resistance coils which heat air merely passing over them by connection; some are equipped with electrically driven fans for circulating the air. Ventilating fans can be combined with such circulating space heaters merely by so designing the structure that when it is desired to circulate cool air the heating coils are not energized and when it is desired to heat the space in which the device is used, the heating coils are energized.

It has been observed that in most instances combination heaters and fans are of the direct draft type such as the conventional electric fan and are merely equipped with heating coils so that the device may be used for heating the blast of air. In contrast, air circulators usually rest on the floor and are equipped with deflecting means so that a cone of air is emitted from near their upper surface, creating a circulating effect without a direct draft. These two types of devices have developed separate statuses in the art. The air circulator has, for the most part, become an expensive, large-sized device occupying almost as much space as a foot stool or an ottoman and, indeed, some circulators have been designed to serve dual purposes, for example, coffee or cocktail tables, as well as housing the elements of the air circulator.

It is the principal object of this invention to provide a simple, compact, inexpensive device for selectively circulating air or heated air or emitting a direct blast of air or of heated air.

It is another object of this invention to provide a combination heater, fan and circulator in which a single element of the device serves both as a base when the device is in use for emitting a direct blast of air or heated air and as a deflector when the device is in use as an air circulator.

It is another object of this invention to provide a simple effective means for controlling the temperature of heated air emitted from the device when it is in use as a space heater.

It is a further, more specific object of this invention to provide a simplified, inexpensive construction for a device of the general nature set forth.

Other objects and advantages will be apparent from the drawings, in which:

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Figure I is a view in perspective of a combination heater and fan embodying the invention and shown in position for emitting a direct blast of air.

Figure II is a vertical, longitudinal, sectional view of the device shown in Figure I and on a slightly enlarged scale.

Figure III is a transverse, sectional view through the heater coil mounting means and diagrammatically illustrating the wiring circuit.

Figure IV is a view in elevation, parts being broken away of the device shown in Figure I but in the air circulating position.

Figure V is a fragmentary view in elevation taken substantially from the position indicated by the line V—V in Figure IV.

Figure VI is a bottom view of the device as illustrated in Figure IV.

Figure VII is a front elevational view, with parts broken away, of a modified construction showing a different way of mounting the combination stand and deflector.

Figure VIII is a side elevation of the device shown in Figure VII with a broken line indication of its position when tilted to elevate the blast of air.

Figure IX is a view in elevation of the device shown in Figures VII and VIII, but in position as an air circulator.

Figure X is a fragmentary view in elevation on a greatly enlarged scale of bracket mounting means with which the heater shown in Figures VII, VIII and IX is equipped.

Figure XI is a fragmentary, vertical, sectional view taken substantially on the line XI—XI of Figure X.

Figure XII is a greatly enlarged fragmentary view showing a lock for holding the deflector in the position shown in Figure IX.

A combination heater, fan and circulator embodying the invention may have a housing comprising two generally matching opposed casing sections 10 and 11 which are joined together with their edges overlapping by several sheetmetal screws 12 on a generally median transverse plane. The two casing sections 10 and 11 may be substantially identical in shape, each having flanged opening 13 or 14, respectively. A guarding grill 15 is mounted across the opening 13 and supports a centrally located hub 16 having an axial threaded boss 17. The grill 15 is secured in place in the opening 13 by the engagement of the outermost ends of its radial frame wires 18 in holes 19 punched near the forward edge of a generally tubular "venturi" 20 which extends co-

axially with the casing elements 10 and 11. The venturi 20 is held in place by the engagement of its forward edge 21 exteriorly of the flange on the opening 13 and by the screws 12 which are threaded through holes in its wall; spacers 22 being positioned between the inner walls of the casing sections 10 and 11 and the outer wall of the venturi 20.

The venturi 20 serves to mount a resistance element 23 (see also Figure III) which consists in a generally hexagonally extending coil of resistance wire held in place by engagement with key hole slotted, T-shaped insulators 24. Each of the insulators 24 extends through a slot 25 punched in the wall of the venturi 20 and is provided with a key hole slot 26 in which the element 23 is engaged. The ends of the heating element 23 are connected to a three position switch 27 as is the coil of a motor 28. The switch 27 is so designed that in one position the motor alone is energized and in a second position both the motor and heating coil are energized in series, thus slowing down the rotation of the motor and providing for the emission of heated air through the grill opening 13.

The motor 28 is mounted by means of studs 29 on a plate 30 which is coaxially positioned with respect to the venturi 20 and the casing sections 10 and 11 by several radially extending wires 31, the outer ends 32 of which are engaged over and may be spot welded to the rear, larger edge of the venturi 20. A fan blade 33 is mounted on the shaft of the motor 28 and is positioned immediately in back of the grill 15 at the narrowing point of the venturi 20 in order to project the blast of air through the grill in as narrow a cone as possible.

A generally dish-shaped damper 34 is mounted by means of a damper stud 35 and damper nut 36 in position to be rotated and thus to move axially for the purpose of closing or opening the flanged opening 14 at the rear of the heater casing. The damper stud 35 is mounted by a plate 37 coaxially with the motor on the mounting wires 31. A stamped, sheet metal knob 38 covers the end of the damper stud 35 and forms a handle by means of which the damper may be rotated. The rim of the damper 34 has a bead 39 which may be formed of soft rubber or other similar material. A snap ring 36a is provided for retaining the nut 36 on the stud 35.

As is illustrated in Figure II, by rotating the damper 34 on its stud 35, it can be moved inwardly to a desired position. This reduces the area of the annular intake space between the bead 39 and the edge of the flanged opening 14, decreasing the amount of air taken into the device and is particularly effective when it is desired to increase the temperature of the air being emitted when the device is used as a heater. The decrease in volume of air that can be pulled in the narrower annular space, loads the fan blades and slows down the motor. This allows the air to remain adjacent the element 23 for a longer period of time and thus it is heated to higher temperature. For example, the temperature of the air can be increased from 90° F. with the damper open (in the position shown in solid lines in Figure II) to 140° F. with the damper closed, the motor and heater coil consuming the same wattage in both positions. This increase in temperature of the emitted air results solely from the decrease in velocity and volume of air passing through the heater.

When it is desired to mount the combination heater and fan in the position shown in Figures I and II, a generally dish-shaped base 40 is threaded by means of a central, axially extending screw 41 into a nut 42 welded or otherwise secured to the interior of the casing section 11 at the bottom and in line with a hole provided in the casing section 11. The base 40 has a hand knob 43 in which the screw 41 is secured and a molded rubber rim 44 which rests on the surface supporting the heater fan when in this position.

When it is desired to employ the combination heater, fan and circulator embodying the invention as a circulator it is placed in the position shown in Figures IV, V and VI. The base 40 is unscrewed from the mounting nut 42 and inverted and its mounting screw 41 threaded into the boss 17 of the hub 16 at the center of the grill 15. The casing sections 10 and 11 are then so located that the flanged opening 13 of the casing 10 is aimed directly upwardly. The base 40 thus serves as a deflector and, as can be seen in Figure IV, the blast of air emitted is deflected outwardly and downwardly by the dish-shaped base-deflector 40, forming a general cone of air which creates circulation within the room.

When the device is used as a circulator with the base 40 in position as a deflector, it is supported by three legs 45 which are illustrated as being stamped from sheetmetal and as having tabs 46 which are inserted through slots 47 in the casing section 11 to retain the legs 45 in place. The legs 45 mount a ring 48 which guards the perimeter of the damper 34 and also serves to brace the ends of the legs 45. Each of the legs 45 is provided at its lower end with a rubber foot 49 which rests on the surface supporting the device in its air circulator position. The ring 48 is retained in place between sides 50 and turned up ends 51 of the legs 45.

The base 40 thus serves as a stand or base when the device is in position for a direct blast of air (Figures I and II) and as a deflector when the device is in position as a circulator (Figure IV). Conversely, the knob 43 serves as a carrying handle when the device is in the position shown in Figure IV and the ring 48 serves as a carrying handle when the device is in the position shown in Figures I and II.

In the embodiment of the invention disclosed in Figures I through VI the combination base and deflector must be bodily disengaged from and reengaged with the device when it is moved between either of its two functional positions.

In the embodiment of the invention disclosed in Figures VII through XII, a base and deflector 52 is provided which need not be disengaged from the device when moved between its two functional positions but which is so designed as to permit its being swiveled from one position to another.

A combination heater and fan embodying the invention as illustrated in Figures VII through XII has substantially the same components as the embodiment of the device illustrated in Figures I through VI. The combination heater, fan and circulator has two casing sections 53 and 54 which are similar to the casing sections 10 and 11 of the earlier embodiment and which have opposed central openings, the front opening being closed by a grill 55 similar to the grill 15 and the rear opening being provided with a damper 56 similar in its use for retarding the flow of air to the damper 34 of the earlier embodiment of the invention. Interiorly of the housing formed by the casing sections 53 and 54 there are lo-

cated a motor, fan blade, heater coil, etc. (not shown), all of which are substantially identical with those disclosed in Figures I through VI.

The combination base and deflector **52** is mounted by means of rivets **57** on a pair of arms **58**, the upper ends of which are turned over forming flattened ears **59**. The arms **58** are channeled to increase their rigidity and the ears **59** consequently have central depressed portions **60**. The arms **58** are mounted on the sides of the casing section **54** by means of flanged nuts **61** which are welded to the exterior of the casing section **54** coaxially with a hole **62** punched therethrough. A swivel cap **63** having a central depression **64** is mounted outside the ear **59** by means of a washer head machine screw **65** which is threaded into the flanged nut **61**. The depressed portions **60** of the ears **59** have a central aperture **66** freely engaged over the exterior of the flanged nut **61** and swivelable thereon. By tightening the washer head machine screws **65**, the swivel cap **63** is pressed more tightly against the surface of the ear **59** and a desired degree of friction is established to retain the arm **58** in any adjusted position relative to the heater housing. The inner end of the washer head machine screw **65** passes into the interior of the housing through the opening **62** and receives a pair of lock nuts **67** which prevent its being worked loose by the swiveling movement. A curved bar **69** is also mounted on the base **52** by the rivets **57**, serving as a handle for the device when the base is in its upper, or deflector position, as illustrated in Figure IX.

When it is desired to employ this modification of the combination heater, fan and circulator embodying the invention as a circulator, it is turned over to the position illustrated in Figure IX and the damper **56** employed as a base. The position illustrated in Figure IX corresponds to the position illustrated in Figure IV with respect to the earlier embodiment of the invention. The base **52** is swung upwardly into the position shown in solid lines in Figure IX until it is concentric with the grill **55** and, like the base and deflector **40**, it is then in position to serve its second functional purpose as a deflector, causing the air emitted through the grill **55** to be deflected outwardly and downwardly forming a circulating cone. The base and deflector **52**, like the base and deflector **40**, is provided with a bead or rim **68** of soft rubber to prevent injury to the surface on which the device is supported when in the position illustrated in Figures VII and VIII.

In order to retain the base and deflector **52** in the position shown in solid lines in Figure IX, the handle **69** and the grill **55** are provided with cooperating means shown in Figure XII. The handle **69** has a centrally located hole **70** which is engageable by a spring pressed bullet clip **71** mounted at the center of a grill plate **72**. The bullet **71** is retained in a housing **73** mounted in the plate **72** by a metal clip **74**.

An associated bullet plunger **75** is mounted in its housing **76** by a clip **77** in the handle **69** so that the bullet **71** can be disengaged from the hole **70** when desired by depressing the plunger **75**, compressing its spring **78** and engaging its lower end with the bullet **71** to press the bullet **71** downwardly, permitting the members to be swung away.

Thus, in the embodiment of the invention illustrated in Figures VII through XII the base and deflector **52** serves the same functional purposes as the base and deflector **40** of the embodiment of the invention illustrated in Figures I through VI but it is permanently attached to the heater body being swiveled between its two functional positions. In each of the embodiments, however, the combination base and deflector is adapted to be employed for either of its dual purposes with rapid, simple adjustment and the flexibility of the device as a heater or fan is made even greater by also providing for flexibility of use as a circulator.

Other embodiments of the invention comprising other manners of assembling the elements of the invention are suggested by the two embodiments fully illustrated.

Having described the invention, I claim:

1. In an electrically actuated portable fan, in combination, a housing having a central air passageway, an electric motor mounted in said passageway, a fan actuated by said motor, a grill across the output end of said passageway, a dual-purpose base and deflector element selectively positionable on said housing out of the blast of air from said fan for supporting said housing and in front of said grill for deflecting the blast of air laterally from said grill and secondary base means for supporting said housing when said base and deflector is in its second position.

2. In an electrically actuated portable fan, in combination, a housing having two generally mating housing elements forming an air passageway, a fan coaxially mounted in said passageway, a motor for actuating said fan, a grill mounted across the output end of said passageway, a dual-purpose base and deflector element selectively positionable on said housing out of the blast of air from said fan for supporting said housing and in front of said grill for deflecting the blast of air laterally from said grill and secondary base means for supporting said housing when said base and deflector is in its second position.

3. In an electrically actuated portable fan, in combination, a housing having a central air passageway, an electric motor mounted in said passageway, a fan actuated by said motor, an electric resistance heater mounted in said housing, electrical means for selectively energizing said motor or said motor and said heater, a grill across the output end of said passageway, a dual-purpose base and deflector element selectively positionable on said housing out of the blast of air from said fan for supporting said housing and in front of said grill for deflecting the blast of air laterally from said grill and secondary base means for supporting said housing when said base and deflector is in its second position.

4. In a combination heater, fan and air circulator, in combination, a generally tubular housing forming an open ended air passageway, an electrically actuated fan and heater mounted in said housing and selectively energizable, a grill across the output end of said passageway, a dual purpose base and deflector element, means for selectively positioning said element to support said housing with the output flow of air unobstructed and in front of said grill for deflecting the output flow of air laterally, and auxiliary means mounted at the intake end of said passageway for supporting said housing in an upright position when said element is in air deflecting position in front of said grill.

5. A device as described in claim 4 in which the dual purpose element is supported by means including a pair of arms swivelably attached to said housing and movable between positions with said element beneath said housing in sup-

porting position and with said element in front of said grill in deflecting position.

6. A device as described in claim 4 in which the dual purpose element has an axially extending mounting means and cooperating mounting means are mounted at the side of said housing and the center of said grill for selectively mounting said element in its two positions.

7. In an electrically actuated portable fan, in combination, a housing having a central air passageway, an electric motor mounted in said passageway, a fan actuated by said motor, an electric resistance heater mounted in said housing, electrical means for selectively energizing said motor or said motor and said heater, a grill across the output end of said passageway, a disc mounted at the intake end of said passageway generally closing the same and means for selectively positioning said disc longitudinally relative to said passageway for varying the annular space between the edges of said disc and said housing for varying the intake area and the volume of air passing therethrough.

8. In an electrically actuated portable fan, in combination, a housing having a central air passageway, an electric motor mounted in said passageway, a fan actuated by said motor, an electric resistance heater mounted in said housing, electrical means for selectively energizing said motor or said motor and said heater, a grill across the output end of said passageway, a disc mounted at the intake end of said passageway and coaxial therewith, said disc being of a diameter substantially the same as said passageway, a crew concentric with said passageway and a nut threaded on said screw and mounting said disc, whereby rotation of said nut moves said disc longitudinally of said passageway thereby varying the annular space therearound and the volume and temperature of the air passing through said passageway.

9. The device of claim 1 wherein said dual-purpose base and deflector is cone shaped and is arranged with its apex toward said housing in both of its two positions.

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