Claims:

1. A fan system, wherein the fan system comprises:

(a) a hub, wherein the hub is configured to rotate;

(b) a plurality of fan blades mounted to the hub;

(c) a drive system, wherein the drive system comprises a rotatable hollow output shaft, wherein the hollow output shaft is in communication with the hub, wherein the drive system is operable to rotate the hub via the hollow output shaft;

(d) a stationary tube inserted through the hollow output shaft, wherein the stationary tube is configured to remain stationary as the hollow output shaft rotates, wherein the stationary tube defines a longitudinal opening, wherein the stationary tube has an upper end and a lower end; and

(e) a platform secured to the lower end of the stationary tube, wherein the platform is positioned below the hub, wherein the platform is configured to remain stationary as the hollow output shaft rotates.

2. The fan system of claim 1, further comprising one or more lights coupled with the platform.

3. The fan system of claim 2, wherein the lights comprise LED lights.

4. The fan system of claim 2, further comprising a cover positioned over the lights.

5. The fan system of claim 1, further comprising one or more sensors coupled with the platform.

6. The fan system of claim 5, wherein the one or more sensors are selected from the group consisting of thermometers, heat detectors, and smoke detectors.

7. The fan system of claim 1, further comprising one or more sprinkler heads coupled with the platform.

8. The fan system of claim 1, further comprising a safety cable coupled with the platform.

9. The fan system of claim 1, further comprising a motor control module coupled with the platform.

10. The fan system of claim 1, further comprising a speaker coupled with the platform.

11. The fan system of claim 1, further comprising a dome coupled with the platform.

12. The fan system of claim 11, wherein the dome is formed of metal.

13. The fan system of claim 1, wherein the hub has a plurality of outwardly extending blade mounting members, wherein the fan blades are mounted to the blade mounting members of the hub;

the fan system further comprising a plurality of fan blade retainers, wherein each of the fan blade retainers is secured to corresponding first and second blade mounting members of the hub, wherein each of the fan blade retainers is further secured to corresponding first and second fan blades associated with the corresponding first and second blade mounting members.

14. The fan system of claim 13, wherein the blade retainers each comprise a first portion and a second portion, wherein the first portion extends radially outwardly relative to the axis, wherein the second portion extends circumferentially about the axis, wherein the first portion and the second portion are joined at a third portion.

15. The fan system of claim 14, wherein each of the blade retainers comprise a first opening formed through the first portion, a second opening formed through the second portion, and a third opening formed through the third portion.

16. The fan system of claim 15, wherein the first and third openings of a first blade retainer are configured to align with openings formed in a first fan blade, wherein the second opening of the first blade retainer is configured to align with an opening formed in a second fan blade.

17. The fan system of claim 16, wherein the second fan blade is adjacent to the first fan blade.

18. The fan system of claim 16, wherein the second opening of the first fan blade retainer is further configured to align with the third opening of a second fan blade retainer.

19. The fan system of claim 14, wherein the third portion of a first blade retainer overlaps the second portion of a second blade retainer.

20. The fan system of claim 1, further comprising:

(a) a mounting fixture, wherein the mounting fixture couples the fan system with a ceiling structure; and

(b) a cable extending through the stationary tube, wherein a first end of the cable is secured to the stationary tube, wherein a second end of the cable is secured to the mounting fixture or the ceiling structure.

21. The fan system of claim 20, wherein the mounting fixture defines a hollow interior, wherein the second end of the cable is secured to the hollow interior of the mounting fixture.

22. The fan system of claim 21, further comprising a second cable, wherein the second cable is secured to the mounting fixture, wherein the second cable is further secured to the ceiling structure.

23. The fan system of claim 20, wherein the stationary tube has an upper end and a lower end, wherein the platform is secured to the lower end, wherein the first end of the cable is secured to the stationary tube via the platform.

24. The fan system of claim 23, further comprising a bolt secured to the platform, wherein the first end of the cable is secured to the stationary tube and the platform via the bolt.

25. The fan system of claim 1, wherein the drive system further comprises a motor, wherein the motor comprises a rotatable rotor and a stationary stator, wherein the fan system further comprises a flange secured to the bottom of the motor, wherein the flange extends radially outwardly to define a first circumference, wherein the flange is located at a first longitudinal position;

wherein the hub is in communication with the rotor of the motor, wherein the motor is operable to rotate the hub, wherein the hub comprises an axially extending lip and a plurality of pins extending radially inwardly from the lip, wherein the lip defines a second circumference at a second longitudinal position, wherein the pins are located at the second longitudinal position, wherein the second circumference is greater than the first circumference, wherein the second longitudinal position is above the first longitudinal position such that the pins extend inwardly above the flange, wherein the pins have free ends that together define a third circumference, wherein the third circumference is less than the first circumference.

CLAIMS

What is claimed is:

1. A fan system, the fan system comprising:
(a) a hub, wherein the hub is configured to rotate;

(b) a plurality of fan blades mounted to the hub;

(c) a drive system comprising:
i. a rotatable hollow output shaft, and

ii. a motor,

wherein the hollow output shaft is in communication with the hub,

wherein the motor is operable to rotate the hub via the hollow output shaft,

wherein the motor defines a first axis, wherein the hollow output shaft defines a second axis, wherein the first axis and the second axis are not aligned with each other; and

(d) a stationary tube inserted through the hollow output shaft, wherein the stationary tube is configured to remain stationary as the hollow output shaft rotates, wherein the stationary tube defines a longitudinal opening.

2. The fan system of claim 1, further comprising a hub mounting plate, wherein the hub mounting plate is secured to the hollow output shaft, wherein the hub is secured to the hub mounting plate.

3. The fan system of claim 1, wherein the motor comprises an internal rotor and an external stator.

4. The fan system of claim 1, wherein the drive system further comprises a gearbox, wherein the gearbox is in communication with the hollow output shaft, and wherein the gearbox is in communication with the motor.

5. The fan system of claim 4, wherein the hollow output shaft extends through the gearbox.

6. The fan system of claim 4, wherein the gearbox has a housing with a top portion and a bottom portion, wherein the stationary tube is engaged with the top portion of the housing of the gearbox.

7. The fan system of claim 6, further comprising at least one plate secured to the housing of the gearbox, wherein the plate is configured to restrict vertical movement of the stationary tube.

8. The fan system of claim 1, wherein the stationary tube is substantially round.

9. The fan system of claim 1, wherein the stationary tube has a top end and a bottom end, wherein the bottom end of the stationary tube protrudes below the hub.

10. The fan system of claim 1, further comprising a bearing or bushing interposed between the hub and the stationary tube.

11. The fan system of claim 1, further comprising a mounting member having a hollow extension, wherein the hollow extension defines a longitudinal opening.

12. The fan system of claim 11, wherein the longitudinal opening of the hollow extension is substantially coaxial with the longitudinal opening of the stationary tube.

13. The fan system of claim 1, further comprising:
(a) a non-rotating plate secured to the drive system; and

(b) a plurality of brackets secured to the hub, wherein the brackets are configured to rotate with the hub, wherein each bracket has an inwardly extending portion positioned over the non-rotating plate.

14. The fan system of claim 1, further comprising:
(a) a control module in communication with the drive system; and

(b) a detector in communication with the control module.

15. The fan system of claim 14, wherein the detector comprises a heat detector, wherein the heat detector is configured to communicate a signal to the control module in response to detecting a rise in heat exceeding a threshold rate.

16. The fan system of claim 14, wherein the detector comprises an aspirating smoke detector, wherein the aspirating smoke detector is configured to communicate a signal to the control module in response to detecting smoke.

17. The fan system of claim 14, wherein the detector comprises an accelerometer, wherein the accelerometer is configured to communicate a signal to the control module in response to detecting an impact against the fan system or an imbalance of the fan system.

18. A fan system, the fan system comprising:
(a) a hub, wherein the hub is configured to rotate;

(b) a plurality of fan blades mounted to the hub;

(c) a drive system, wherein the drive system comprises:
(i) a motor,

(ii) a gearbox communicatively coupled with the motor,

(iii) a rotatable hollow output shaft communicatively coupled with the gearbox, and

(iv) at least one plate secured to a housing of the gearbox,

wherein the hollow output shaft is further communicatively coupled with the hub,

wherein the drive system is operable to rotate the hub via the hollow output shaft; and

(d) a stationary tube inserted through the hollow output shaft, wherein the stationary tube is configured to remain stationary as the hollow output shaft rotates, wherein the stationary tube defines a longitudinal opening,

wherein the at least one plate is configured to restrict vertical movement of the stationary tube.

19. A fan system, the fan system comprising:
(a) a hub, wherein the hub is configured to rotate;

(b) a plurality of fan blades mounted to the hub;

(c) a drive system, wherein the drive system comprises:
(i) a motor,

(ii) a gearbox communicatively coupled with the motor, wherein the gearbox has a housing, wherein the housing comprises a top portion and a bottom portion, and

(iii) a rotatable hollow output shaft communicatively coupled with the gearbox, wherein the hollow output shaft is further communicatively coupled with the hub, wherein the hollow output shaft has a top end and a bottom end, wherein the drive system is operable to rotate the hub via the hollow output shaft; and

(d) a stationary tube inserted through the hollow output shaft, wherein the stationary tube has a top end and a bottom end, wherein the top end of the stationary tube terminates at or above the

top portion of the gearbox housing, wherein the bottom end of the stationary tube terminates below the bottom end of the hollow output shaft, wherein the stationary tube is configured to remain stationary as the hollow output shaft rotates, wherein the stationary tube defines a longitudinal opening,

wherein the top end of the hollow output shaft terminates at a point below the top end of the stationary tube.