Claims

What is claimed is:

1. An exercise device comprising:

a base ~~defining an inner volume~~;

a top supported by the base~~,~~ and having a perimeter bounding a lowermost planar surface of the top, wherein the top ~~defining~~defines an aperture;

a force sensor disposed under the lowermost planar surface of the top and configured to measure forces on the top;

a motor assembly including a motor disposed under the top within the base and ~~below the top, the motor including~~ a cable coupled to the motor, the cable extendable through the aperture; and

a controller communicatively coupled to each of the force sensor and the motor, the controller configured to actuate the motor in response to forces applied to the top as measured by the force sensor.

2. The exercise device of claim 1, wherein the force sensor is a load cell disposed between the base and the top.

3. The exercise device of claim 1 further comprising a plurality of force sensors including the force sensor, wherein the plurality of force sensors are configured to measure forces applied to the top and the controller is further configured to actuate the motor in response to the forces on the top as measured by the plurality of ~~load~~ force sensors~~cells~~.

4. The exercise device of claim 3, wherein the plurality of force sensors is distributed between the base and the top ~~such that the top is supported by~~, the plurality of force sensors supporting the top.

5. The exercise device of claim 3, wherein:

the top comprises a first plate and a second plate; and

the plurality of force sensors comprises:

a first set of force sensors configured to measure a force distribution on the first plate, each of the first set of force sensors positioned at a respective corner of the first plate to measure forces at the respective corner of the first plate; and

a second set of force sensors configured to measure a force distribution on the second plate, each of the second set of force sensors positioned at a respective corner of the second plate to measure forces at the respective corner of the second plate.

6. The exercise device of claim 1, wherein the controller is further configured to actuate the motor in response to at least one of force produced by the motor on the cable, one or more user settings, one or more forces measured on a structural element of the exercise platform, or one or more motor parameter measurements.

7. The exercise device of claim 1, wherein the top comprises an omnidirectional fairlead comprising a plurality of rollers for guiding the cable, the omnidirectional fairlead defining the aperture.

8. An exercise device comprising: ~~The exercise device of claim 1, further comprising~~

a base defining an inner volume;

a top supported by the base, the top defining an aperture;

a force sensor configured to measure force on the top;

a motor disposed within the base and below the top, the motor including a cable extendable through the aperture;

a controller communicatively coupled to each of the force sensor and the motor, the controller to actuate the motor in response to forces applied to the top as measured by the force sensor; and

a battery electrically coupled to the motor, wherein the controller is further configured to selectively operate the motor in a power generation mode during which power is generated at the motor as the user extends the cable and transmitted to the battery.

9. An exercise device comprising:~~The exercise device of claim 1, further comprising~~

a base defining an inner volume;

a top supported by the base, the top defining an aperture;

a force sensor configured to measure force on the top;

a motor disposed within the base and below the top, the motor including a cable extendable through the aperture;

a controller communicatively coupled to each of the force sensor and the motor, the controller to actuate the motor in response to forces applied to the top as measured by the force sensor; and

a force multiplying feature accessible from the top, the force multiplying feature configured to fix or route a portion of the cable such that a handle may be coupled to an intermediate portion of the cable disposed between the aperture and the force multiplying feature.

10. A method of operating an exercise device, comprising:

receiving, at a controller, a force measurement from a force sensor communicatively coupled to the controller, the force measurement corresponding to a force applied to a top supported by a base, wherein the top has a perimeter bounding a lowermost planar surface of the top; and

actuating, using the controller, a motor in response to the force measurement, wherein the force sensor is disposed ~~within the base in response to the force measurement~~under the lowermost planar surface of the top,

wherein the motor is disposed under the top within the base, and

wherein the motor is coupled to a cable extending out of the base ~~such that actuating the motor in response to the force applies force to the cable~~.

11. The method of claim 10, wherein actuating the motor is further in response to an exercise parameter, the exercise parameter corresponding to an amount of force to be applied to the cable or a movement speed of the cable.

12. The method of claim 10, wherein the force sensor is one of a plurality of force sensors communicatively coupled to the controller, wherein the force measurement is one of a plurality of force measurements respectively corresponding to the plurality of force sensors, the method further comprising receiving, at the controller, the plurality of force measurements from ~~each of~~ the plurality of force sensors, wherein actuating the motor is further in response to ~~each of~~ the plurality of force measurements.

13. The method of claim 12, wherein the top includes a first plate and a second plate and the plurality of force sensors includes a first set of force sensors, each of the first set of force sensors positioned at a respective corner of the first plate, and a second set of force sensors, each of the

second set of force sensors positioned at a respective corner of the second plate, the method further comprising:

measuring forces from at least one of the first set of force sensors and the second set of force sensors to determine a force distribution on at least one of the first plate and the second plate, respectively.

14. The method of claim 10, further comprising measuring, ~~at~~ using the controller, one or more sensed parameters comprising a load on the motor, a cable speed, a force direction, a user position, and time, wherein actuating the motor is further in response to the sensed parameter.

15. The method of claim 14, further comprising transmitting, from the controller to a remote computing device, exercise data based, at least in part, on the sensed parameter.

16. An exercise system comprising:

an elevated platform supported by a base and having a perimeter bounding a lowermost planar surface of the elevated platform;

a motor disposed under the elevated platform within the base;

a cable coupled to the motor;

one or more sensors configured to measure one or more sensed parameters including forces applied to the elevated platform resulting from a user manipulating the cable while in contact with the elevated platform, wherein the one or more sensors are disposed under the lowermost planar surface of the elevated platform; and

a controller communicatively coupled to each of the motor and the one or more sensors to actuate the motor ~~to vary force on the cable provided by the motor~~ in response to the one or more sensed parameters.

17. The exercise system of claim 16, wherein the controller is configured to transmit exercise data based at least in part on the one or more sensed parameters to a display device communicatively coupled to the controller.

18. The exercise system of claim 16, wherein the controller is further configured to actuate the motor to vary the force on the cable based on an exercise parameter.

19. The exercise system of claim 18, wherein the controller is configured to be communicatively coupled to a computing device and to receive the exercise parameter from the computing device.

20. The exercise system of claim 16, wherein the controller is further configured to transmit exercise data corresponding to the one or more sensed parameters to a remote computing device.