

SANDER DEVICE WITH VACUUM FUNCTIONALITY***Related Application Data***

[0001] This application claims priority to U.S. Patent Application No. 63/547,224 filed on November 3, 2023, which is incorporated herein by reference.

Technical Field

[0002] In general, the present invention relates to a powered pole sander assembly, and in particular to a cordless powered pole sander with vacuum functionality for collecting dust.

Background of the Invention

[0003] Pole sanders can be used to smooth and finish drywall or gypsum board. Pole sanders generally include at least a sanding head attached to a pole to allow the user to reach areas like the top of the wall or the ceiling. Some pole sanders can be powered. The sanding heads of these powered pole sanders generally have a circular rotating sanding disk mounted to the end of the pole that removes material from the drywall surface. The circular sanding heads cannot access corners of the walls because of the shape of the sanding disk and the housing around it. A dust collection system is used in conjunction with pole sanders because a lot of dust is generated through sanding drywall. Commonly, shop vacuums or other vacuum systems are connected to the pole sander with a vacuum hose to collect the dust and minimize the dust in the air or remaining on the surface after the sanding process. It can be very cumbersome for a user to both position and control the pole sander and pull the shop vacuum while using the pole sander.

Summary of the Invention

[0004] In accordance with an embodiment of the present invention, a sanding device may include a sander assembly having a sander motor mounted to a sanding plate and a main body comprising a vacuum motor, dust bin, and a motor control. The sanding device may include a hollow extension pole having a first end configured to pivotally attach to the sander assembly and a second end configured to attach to the main body and configured to provide fluid communication between an

outlet of the sander plate and the dust bin. The sanding device may include a power supply and a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.

[0005] In another embodiment, a sanding device may include a sanding pad comprising a sanding surface and a mounting surface opposite the sanding surface. The sanding device may include a sander assembly comprising a sander motor connected to a sanding plate. The sanding plate may be removably connected to the mounting surface of the sanding pad. The sanding device may include a main body comprising a vacuum motor, dust bin, and a motor control. A hollow extension pole may have a first end configured to pivotally attach to a body of the sander assembly and a second end configured to attach to the main body and configured to provide fluid communication between an outlet of the sander plate and the dust bin. The sanding device may include a power supply and a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.

[0006] In yet another embodiment, a sanding device may include a sanding pad comprising a sanding surface configured to secure a piece of sandpaper and a mounting surface opposite the sanding surface. The sanding pad may include at least one corner, a vacuum port that extends from sanding surface to the mounting surface, and a plurality of grooves partially extending into the sanding pad from the sanding surface and extending outward from the at least one vacuum port on the sanding surface. The sanding device may include a sander assembly comprising a sander motor within a sander body. The sander motor may be mounted to the mounting surface of the sanding pad. The sander motor may be configured to oscillate the sanding pad along at least one of a first linear axis or a second linear axis perpendicular to the first linear axis. The sanding device may include a main body comprising a vacuum motor, a selectably removable dust bin, and a motor control. A hollow extension pole may have a first end configured to pivotally attach to at least one of the mounting surface of the sanding pad or the sander assembly and a second end configured to attach to the sander body and configured to provide fluid communication between the sander plate and the dust bin. The sanding device may include a rechargeable power supply and a controller configured to control and to provide power from the power supply to at least one of the sander motor or the vacuum

motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad through the plurality of grooves, moves the dust through the extension pole, and draws the dust into the selectively removable dust bin.

[0007] These and other objects of this invention will be evident when viewed in light of the drawings, detailed description and appended claims.

Brief Description of the Drawings

[0008] The invention may take physical form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in the specification and illustrated in the accompanying drawings which form a part hereof, and wherein:

[0009] FIG. 1 is a block diagram of an exemplary sander device with vacuum functionality.

[0010] FIG. 2 is a side view of an exemplary sander device positioned against a wall.

[0011] FIG. 3 is a front view of an exemplary sander device.

[0012] FIG. 4 is a top perspective view of an exemplary sander head attached to an extension pole.

[0013] FIG. 5 is a top perspective view of an exemplary sander head attached to an extension pole.

[0014] FIG. 6 is a side perspective view of an exemplary sander device.

[0015] FIG. 7 is a top perspective view of an exemplary sanding pad.

[0016] FIG. 8 is a top view thereof.

[0017] FIG. 9 is a bottom view thereof.

[0018] FIG. 10 is a top perspective view of an exemplary sanding pad.

[0019] FIG. 11 is a top view thereof.

[0020] FIG. 12 is a bottom view thereof.

Detailed Description of the Invention

[0021] Embodiments of the invention relate to methods and systems that relate to a sanding device with vacuum functionality. The sanding device may have a sander head attached to a main body of the sanding device by a hollow extension pole. The sanding device head includes a square or rectangular sanding pad that allows the sanding head to access corners of walls. The main body of the

sanding device includes a vacuum assembly such that the dust collection system and the sanding device are integrated into one device. Accordingly, the user of the sanding device will no longer be encumbered by a separate dust collection vacuum while using a pole sander. Additionally, the sanding device may be powered by a replaceable and rechargeable battery that powers both the sander on the sander head and the vacuum assembly of the main body. The sanding device is therefore cordless and not reliant on a separate shop vacuum. The disclosed sander minimizes the effect of the weight of the sanding head at the end of the extension pole by providing for a more balanced design and improves the user's ability to hold and position the sander.

[0022] With reference to the drawings, like reference numerals designate identical or corresponding parts throughout the several views. However, the inclusion of like elements in different views does not mean a given embodiment necessarily includes such elements or that all embodiments of the invention include such elements. The examples and figures are illustrative only and not meant to limit the invention, which is measured by the scope and spirit of the claims.

[0023] Turning now to Figs. 1-2, the sander 10 will be discussed. The sander 10 has a sander head 12 connected to a main body 14 by an extension pole 20. The sander head 12 has a sander assembly 16 including a sander motor 52 and sander plate 52 described in further detail below. The main body 14 has a vacuum assembly 18 including a vacuum motor 80 and vacuum chamber 82 described in further detail below. The main body 14 may also include a controller 64 configured to operate the vacuum motor 80 and the sander motor 52 as described in further detail below. In one embodiment, the controller 64 may be a simple control circuit. In other embodiments, the controller 64 may be implemented with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. The controller 64 may be a microprocessor, but in the alternative, the controller 64 may be any processor, controller, microcontroller, or state machine. The controller 64 may also be implemented as a combination of computing devices, for example a combination of a DSP and a microprocessor, a plurality of microprocessors, multi-core processors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0024] The extension pole 20 has a first end 22 configured to attach to the sander head 12 and a second end 24 configured to attach to the main body 14. In certain embodiments, the extension pole 20 may be hollow to minimize weight and allow for fluid communication between the sander

assembly 16 and vacuum assembly 18. As illustrated in Fig. 2, the extension pole 20 may have a length to allow a user to reach multiple areas of a wall. For instance, the extension pole 20 may be of sufficient length to allow a user to reach the top of a wall, the bottom of the wall, and a ceiling from the same standing position. In certain embodiments, the extension pole 20 may have a fixed length. In other embodiments, the extension pole 20 may be telescoping or extendible to allow for different reaches. Alternatively, the extension pole 20 may be configured to be selectably removable to allow for multiple extension poles 20 of different lengths to be used with the sander 10. Additionally, the selectably removable extension pole 20 allows for the sander 10 to be easily broken down and transported when not in use. To provide more control in moving and positioning the sander 10, the extension pole 20 may have one or more handles 26a, 26b disposed between the first end 22 and second end 24. The extension pole 20 may be made of a metal (like aluminum), a composite material, polymer, or any other suitable material.

[0025] The sander head 12 has a sanding pad 30 having a sanding surface 32 and a mounting surface 34 opposite the sanding surface 32. The sanding pad 30 may be rectangular to allow the sander head 12 to sand in the corners of walls. Alternatively, the sanding pad 30 may be circular, triangular, tear-drop shaped, an irregular pentagon (for example home-shaped), or any other suitable shape. Accordingly, it will be appreciated that the sanding pad 30 may have at least one corner to allow the sander head 12 to access inside corners of walls. The rectangular sanding pad 30 may have a width of 9 inches and a length of 11 inches to allow it to accept a standard piece of sandpaper. The sandpaper may be coupled to the sanding surface 32 of the sanding pad 30 by clamps, hook and loop fasteners, adhesives, or any other suitable fastening means.

[0026] Turning now to Figs. 3-6, the sander head 12 may also have a coupler 36 configured to connect the sander head 12 to the first end 22 of the extension pole 20. As illustrated in Figs. 4 and 5, the coupler 36 may be configured to pivotally attach to the mounting surface 34 of the sanding pad 30. Alternatively, the coupler 36 may pivotally attach to sander assembly 16. The coupler 36 may be attached to the mounting surface 34 in a central location or at the center mass of the sander head 12 so the sander head 12 is sufficiently balanced at the end of the extension pole 20 to aid in positioning the sander head 12 while operating the sander. The coupler 36 may be fork, arc-shaped, semi-circular, or wishbone-shaped such that it attaches at two spots on the mounting surface 34 of the sanding pad 30. In the embodiment shown in Fig. 4, the coupler 36 includes an arc-shaped mounting portion and a corresponding receptacle directly or indirectly coupled to the first end 22 of the extension pole 20. The arc-shaped mounting portion can be configured to either be fixed within the receptacle or

alternatively, the arc-shaped mounting portion can slide within the receptacle such that the sanding pad 30 is pivotable about the receptacle. It should be appreciated that the coupler 36 can have any number of mounting arms chosen using sound engineering judgment, and each of the mounting arms can mount at a respective location on the mounting surface 34 or on the sander assembly 16. Alternatively, the coupler 36 may be a gimbal-style mount attached to the mounting surface 34 or the sander assembly 16.

[0027] The sander assembly 16 has a sander housing 50 and a sander motor 52 disposed within the sander housing 50. The sander assembly 16 also includes a sander plate 54 coupled to an output of the sander motor 52. The sander motor 52 is configured to rapidly oscillate the sander plate 54. As opposed to a rotary sanding head, the oscillating motion allows the sander head 12 to access corners of walls. For example, the sander motor 52 can be configured to oscillate the sander plate 54 along a first linear axis, along a second linear axis perpendicular to the first linear axis, or along both the first and second linear axes in an alternating manner. The sander plate 54 is also configured to couple to the sander assembly mount 38 on the sanding pad 30. The sander motor 52 may be a brushless or a brushed motor. The sander housing 50 may include vents to prevent the sander motor from overheating. The sander housing 50 may be configured to pivotally couple to the coupler 36 to attach the sander head 12 to the first end 22 of the extension pole 20. In some embodiments, as illustrated in FIG. 4, the sander assembly 16 may have an integrated dust collection functionality provided by a hole that extends through the sanding plate 54 and corresponds with the vacuum port 44 in the sanding pad 30 and is in communication with a hose mount 46 disposed on the sander housing 50. The hose 48 provides communication from the hose mount 46 on the sander housing 50 to the first end 22 of the extension pole 20. In another embodiment, the sanding assembly 16 may not have a sanding plate 54 and the sanding pad 30 may be directly coupled to the output of the sander motor 52 using the at least one sanding assembly mount 38 of the sanding pad 30.

[0028] As shown in Fig. 6, in certain embodiments, the main body 14 has a main body housing 60 with a body grip 62. The body grip 62 may be configured to provide ergonomic handling of the sander 10. A user may have two handed control of the sander 10 by holding the body grip 62 with one hand and the handle 26 on the extension pole 20 with the other hand. As shown in Fig. 1, the vacuum assembly 18 and a controller 64 are disposed within the main body housing 60. A power supply 66 is configured to provide power to the controller 64.

[0029] The housing 60 may also include vacuum controls 68 and sander controls 70 disposed on or near the body grip 62. When actuated, the vacuum controls 68 and sander controls 70 provide

power to the vacuum assembly 18 and the sander assembly 16, respectively, through the controller 64. The vacuum controls 68 and sander controls 70 may be push buttons, sliders, triggers, or any other suitable switch mechanism. The vacuum controls 68 and sander controls 70 may be simple on/off switches. Alternatively, they may be switches with multiple power levels or modes or switches with variable power levels or modes. The vacuum controls 68 and sander controls 70 can be coupled to a trigger. The trigger can be configured such that the controller 64 operates the vacuum motor 80 and sander motor 52 when the trigger is depressed. The controller 64 can be configured to provide variable power to the vacuum motor 80 and the sander motor 52 depending on how far the trigger is depressed. Alternatively, the vacuum controls 68 and the sander controls 70 can be actuated individually and independently of each other. For instance, in one operation mode, only the vacuum controls 68 may be in an on position and only the vacuum assembly 18 may be powered on. In another operation mode, only the sander controls 70 may be in an on position and only the sander assembly 16 may be powered on. In another operation mode, both the vacuum controls 68 and the sander controls 70 may be in an on position and both the vacuum assembly 18 and the sander assembly 16 may be powered on. Alternatively, both the vacuum assembly and the sander assembly may be powered on and off by one control component (e.g. a single switch, slider, knob, button, etc.). In still another embodiment, the sander controls 70 may include a control for switching between an oscillating sanding mode and an orbital sanding mode.

[0030] To provide power to the assemblies of the sander 10, the controller 64 receives power from the power supply 66 and control signals from the vacuum controls 68 and the sander controls 70 as inputs as illustrated in Fig. 1. Based on the positions of the vacuum and sander controls, the controller is configured to output power and/or control signals to the sander motor 52 and/or the vacuum motor 80 to place the sander 10 in one of the operation modes described above.

[0031] To make the operation of the sander 10 less cumbersome, the sander 10 may be cordless as shown in the embodiment of Fig. 6. The power supply 66 may be a rechargeable battery configured to be selectively removable from the main body housing 60. The rechargeable battery may be a lithium-ion battery or any other suitable battery commonly used with cordless power tools. Alternatively, the sander 10 may include a cord to receive power from a standard wall outlet. The removable battery may be positioned on the main body housing such that it effectively acts as a counter weight to the sander head 12 on the first end 22 of the extension pole 20. The battery may effectively position the center of mass of the sander 10 such that it is located in a position that balances the sander 10 and improves the ease of operation of the sander 10. It will be appreciated that the

position of the power supply 66 can be determined and optimized through sound engineering judgment. The power supply 66 may provide power to both the vacuum assembly 18 in the main body 14 and the sander assembly 16 on the sander head 12. In this configuration, the sander head 12 does not need a battery and therefore the weight of the sander head 12 can effectively be minimized leading to improved handling and operation of the sander 10. To provide power from the power supply 66 and/or the controller 64 in the main body 14 to sander assembly 16, the extension pole 20 may include internal wiring, integrated wiring, or wiring coupled to the outside of the extension 20 that extends from the second end 24 of the extension pole to the first end 22 of the extension pole 20. The positioning and routing of any wiring on or in the extension pole 20 may be determined through sound engineering judgment. Alternatively, the sander assembly 16 may have its own power supply 66. For instance, the vacuum assembly 18 and the sander assembly 16 may both have their own independent battery. In this configuration, wires would not need to be routed or connected to the extension pole 20. The sander head 12 may further include LED lights (not shown) also powered by the power supply 66 through the controller 64 to illuminate the work area while the sander 10 is in use.

[0032] To provide vacuum suction to collect dust from sanding, a vacuum assembly 18 is disposed within the main body housing 60, as shown in Fig. 1. The vacuum assembly 18 includes a vacuum motor 80 configured to be in communication with a vacuum chamber 82. For instance, the vacuum motor 80 may have a fan disposed in the vacuum chamber 82 or in communication with the vacuum chamber 82 that creates vacuum suction in the vacuum chamber 82. In certain embodiments, the vacuum motor may be a brushless or brushed motor. The vacuum chamber 82 has an inlet 84 that extends through the main body housing 60 and is configured to couple to and be in communication with the second end 24 of the extension pole 20. The vacuum chamber 82 further includes an air discharge 86 that exhausts air out of the main body housing 60 and a particle discharge 88 that disposes physical particles in a dust bin 90 attached to the main body housing 60. The dust bin 90 may be selectively removable from the main body housing 60 to allow a user to dispose of the dust in the dust bin 90 when the dust bin 90 is full. A particle separator 92 in the vacuum chamber 82 removes the physical particles in the air stream created by vacuum suction in the vacuum chamber 82 and the particle discharge 88 directs the physical particles to the dust bin 90. The particle separator can be a filter, like a HEPA, cloth, cartridge, or foam filter, a cyclonic separator, or any other suitable particle separator that can remove small particles like dust from the air stream.

[0033] Turning now to Figs. 7-12, the mounting surface 34 of the sanding pad 30 has one or more sander assembly mounts 38 that can be used to connect the sander assembly 16 to the sanding pad 30.

The sander assembly mounts 38 may comprise a bolt pattern configured to correspond with a bolt pattern on the sander assembly 16. To provide stiffness to the sanding pad 30, a plurality of support ribs 40 may extend up from the mounting surface 34. The support ribs 40 may extend around the perimeter of sanding pad 30 and may be evenly distributed on the mounting surface 34 of the sanding pad 30. The support ribs 40 keep the sanding pad 30 sufficiently flat and prevent the sanding pad 30 from flexing to maintain maximum surface contact with the wall while operating the sander 10. In one embodiment, the support ribs 40 can include one or more circular or partial circular ribs with increasing diameters. In another embodiment, the support ribs 40 can include one or more linear ribs extending from a point on the mounting surface 34 outwards towards the perimeter of the mounting surface 34. In certain embodiments, the support ribs 40 can include one or more of a combination of circular, partial circular, or linear ribs as illustrated in Figs. 7-8 and 10-11.

[0034] To facilitate collecting dust, the sanding pad 30 has a plurality of dust channels 42 in the sanding surface 32 as illustrated in Figs. 9 and 12. The sanding pad 30 may also include at least one vacuum port 44 that extends through the sanding pad 30 from the sanding surface 32 to the mounting surface 34. At least one hose mount 46 may extend from the mounting surface 34 aligned and in communication with a vacuum port 44 that corresponds with the hose mount 46. Each dust channel 42 of the plurality of dust channels 42 are in communication with the at least one vacuum port 44. Further, the dust channel 42 may extend out from the at least one vacuum port 44 and be evenly distributed on the sanding surface 32 to maximize dust collection over the entire surface area of the sanding surface 32. In one embodiment, as shown in Fig. 9, the sanding surface 32 can include at least two vacuum ports 44 arranged on opposing halves of the sanding pad 30. Linearly arranged dust channels 42 in the sanding surface 32 can extend outward from each vacuum port 44 in a star or asterisk shape such that each of the dust channels 42 leads to its respective vacuum port 44. As shown in Fig. 9, multiple dust channels 42 are in fluid communication with a common vacuum port 44. In other words, dust channels 42 can share a vacuum port 44. In another embodiment, as shown in Fig. 12, each dust channel 42 can lead to its own vacuum port 44. In such embodiments, each of the vacuum ports 44 that are specific to each dust channel 42 can be connected to the same hose mount 46. Alternatively, each vacuum port 44 can correspond to its own hose mount 46. While linear dust channels 42 are shown in star or asterisk shapes, it should be appreciated that the dust channels 42 may also be arranged in non-linear arrangements and in other shapes. By way of example and not limitation, the dust channels 42 can be arranged in a helical pattern, a spiral pattern, a zig-zag pattern, a curved pattern, a random pattern, among others. To further maximize dust collection over the

surface area of the sanding surface 32, secondary dust channels (not shown) may branch off of the primary dust channels 42 that are in communication with the at least one vacuum ports 44. In order for dust to enter the dust channels 42, sandpaper can be manufactured to include holes or slots that align with the dust channels 42. Alternatively, a punch plate (not shown) can punch holes in standard sheets of sandpaper that align with the dust channels 42. A hose 48 is configured to attach to the at least one hose mounts 46 on one end of the hose and the first end 22 of the extension pole 20 on the other end of the hose. The hose 48 provides fluid communication from the vacuum ports 44 on one end and the extension pole 20 on the other end. As illustrated in Fig. 4, in embodiments with more than one vacuum port 44 and more than one hose mount 46, the hose 48 may include a fitting 49 to couple multiple sections of hoses coupled with the more than one hose mount 46.

[0035] The sander 10 generally functions by powering on the sander assembly 16 and the vacuum assembly 18 with the sander controls 70 and the vacuum controls 68, respectively, by placing both sets of controls in an on position. It should be appreciated that in certain embodiments, a single control can be used to control both sander motor 52 and the vacuum motor 80. Through the controller 64, the power supply 66 will supply power to the sander motor 52 causing the sander plate 54 and the sanding pad 30 to oscillate. A user can place the sanding surface 32 with a piece of sandpaper attached to it against the wall as shown in Fig. 2. The oscillating motion of the sanding pad 30 will cause the sandpaper to remove material from the wall, which creates dust. The power supply 66 will also supply power to the vacuum motor 80 creating vacuum suction in the vacuum chamber 82 and a resulting air flow from the sander head 12, through the extension pole 20, to the vacuum chamber 82, and out the air discharge 86. Specifically, the dust created by the oscillation of the sanding pad 30 will be drawn into the dust channels 42 (as shown in Figs. 9 and 12), through the vacuum ports 44 and hose mounts 46 of the sanding pad 30 by the suction air flow. The air flow with the dust will continue through the hose 48 in communication with the hose mounts 46 to the first end 22 of the extension pole 20. The air flow containing the dust will move from the first end 22 of the extension pole 20 to the second end 24 of the extension pole 20 where the extension pole is in communication with the vacuum inlet 84. The air flow containing the dust passes through the particle separator 92. The dust particles are removed from the air flow and collected in the dust bin 90 and the clean air is discharged out of the air discharge 86. In certain embodiments, the vacuum motor 80 can be configured to produce enough suction at the sander head 12 such that the sander head 12 is suctioned to a wall when the sanding surface 32 is placed against a wall. In these embodiments, the suction force of the sander head 12 to

the wall reduces the weight of sander 10 as felt by a user holding the sander 10, therefore reducing the possibility of muscle fatigue on the user.

[0036] In accordance with an aspect of the present disclosure, a sanding device may include a sander assembly having a sander motor mounted to a sanding plate and a main body comprising a vacuum motor, dust bin, and a motor control. The sanding device may include a hollow extension pole having a first end configured to pivotally attach to the sander assembly and a second end configured to attach to the main body and configured to provide fluid communication between an outlet of the sander plate and the dust bin. The sanding device may include a power supply and a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.

[0037] In an example, the sanding device may further include a sanding pad having a sanding surface and a mounting surface opposite the sanding surface, wherein the mounting surface is configured to removably attach to the sanding plate.

[0038] In another example, the sanding pad is rectangular

[0039] In another example, the sanding pad is 9 inches by 11 inches.

[0040] In another example, the power supply is a selectably removable and rechargeable battery.

[0041] In another example, the sander pad further includes at least one vacuum port that extends through the sander pad from the sanding surface to the mounting surface, wherein the vacuum port is in fluid communication with the first end of the extension pole.

[0042] In another example, the sander pad further includes a plurality of grooves extending outward from the at least one vacuum port and partially extending into the sanding pad from the sanding surface.

[0043] In another example, a first portion of the plurality of grooves are linear and extend outward from a center of the sanding pad, and a second portion of the plurality of grooves are circular.

[0044] In another example, the dust bin is selectably removable.

[0045] In another example, the extension pole is selectably removable and the outlet of the sander plate is in direct fluid communication with the dust bin.

[0046] In another example, the extension pole is telescopic.

[0047] In another example, the extension pole includes wiring within the extension pole to provide electrical communication between the body and the main body and the sander assembly.

[0048] In another example, the first end of the extension pole pivotally connects to the mounting surface of the sanding pad.

[0049] In another example, the first end of the extension pole pivotally connects to a body of the sander assembly.

[0050] In another example, the sanding device further includes a sander control, wherein the motor control is configured to change the operation of the vacuum motor, and the sander control is configured to change the operation of the sander motor.

[0051] In another example, the mounting surface further includes support ribs extending upwardly from the mounting surface, wherein the support ribs extend around a perimeter of the mounting surface and are evenly distributed around the mounting surface.

[0052] According to another aspect, a sanding device may include a sanding pad comprising a sanding surface and a mounting surface opposite the sanding surface. The sanding device may include a sander assembly comprising a sander motor connected to a sanding plate. The sanding plate may be removably connected to the mounting surface of the sanding pad. The sanding device may include a main body comprising a vacuum motor, dust bin, and a motor control. A hollow extension pole may have a first end configured to pivotally attach to a body of the sander assembly and a second end configured to attach to the main body and configured to provide fluid communication between an outlet of the sander plate and the dust bin. The sanding device may include a power supply and a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.

[0053] In another example, the sanding pad is rectangular.

[0054] In another example, the sander pad further includes at least one vacuum port that extends through the sander pad from the sanding surface to the mounting surface and a plurality of grooves partially extending into the sanding pad from the sanding surface and extending outward from the at least one vacuum port on the sanding surface, wherein the vacuum port is in fluid communication with the first end of the extension pole.

[0055] In yet another aspect, a sanding device may include a sanding pad comprising a sanding surface configured to secure a piece of sandpaper and a mounting surface opposite the sanding surface. The sanding pad may include at least one corner, a vacuum port that extends from sanding surface to the mounting surface, and a plurality of grooves partially extending into the sanding pad

from the sanding surface and extending outward from the at least one vacuum port on the sanding surface. The sanding device may include a sander assembly comprising a sander motor within a sander body. The sander motor may be mounted to the mounting surface of the sanding pad. The sander motor may be configured to oscillate the sanding pad along at least one of a first linear axis or a second linear axis perpendicular to the first linear axis. The sanding device may include a main body comprising a vacuum motor, a selectably removable dust bin, and a motor control. A hollow extension pole may have a first end configured to pivotally attach to at least one of the mounting surface of the sanding pad or the sander assembly and a second end configured to attach to the sander body and configured to provide fluid communication between the sander plate and the dust bin. The sanding device may include a rechargeable power supply and a controller configured to control and to provide power from the power supply to at least one of the sander motor or the vacuum motor according to operation of the motor control. The vacuum motor may be configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad through the plurality of grooves, moves the dust through the extension pole, and draws the dust into the selectively removable dust bin.

[0056] The aforementioned systems, components, (e.g., motors, hoses, housings, among others), and the like have been described with respect to interaction between several components and/or elements. It should be appreciated that such devices and elements can include those elements or sub-elements specified therein, some of the specified elements or sub-elements, and/or additional elements. Further yet, one or more elements and/or sub-elements may be combined into a single component to provide aggregate functionality. The elements may also interact with one or more other elements not specifically described herein.

[0057] While the embodiments discussed herein have been related to the apparatus, systems and methods discussed above, these embodiments are intended to be exemplary and are not intended to limit the applicability of these embodiments to only those discussions set forth herein.

[0058] The above examples are merely illustrative of several possible embodiments of various aspects of the present invention, wherein equivalent alterations and/or modifications will occur to others skilled in the art upon reading and understanding this specification and the annexed drawings. In particular regard to the various functions performed by the above described components (assemblies, devices, systems, circuits, and the like), the terms (including a reference to a “means”) used to describe such components are intended to correspond, unless otherwise indicated, to any component, such as hardware, software, or combinations thereof, which performs the specified

function of the described component (e.g., that is functionally equivalent), even though not structurally equivalent to the disclosed structure which performs the function in the illustrated implementations of the invention. In addition, although a particular feature of the invention may have been disclosed with respect to only one of several implementations, such features may be combined with one or more other features of the other implementations as may be desired and advantageous for any given or particular application. Also, to the extent that the terms “including”, “includes”, “having”, “has”, “with”, or variants thereof are used in the detailed description and/or in the claims, such terms are intended to be inclusive in a manner similar to the term “comprising.”

[0059] This written description uses examples to disclose the invention, including the best mode, and also to enable one of ordinary skill in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that are not different from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

[0060] In the specification and claims, reference will be made to a number of terms that have the following meanings. The singular forms “a”, “an” and “the” include plural referents unless the context clearly dictates otherwise. Approximating language, as used herein throughout the specification and claims, may be applied to modify a quantitative representation that could permissibly vary without resulting in a change in the basic function to which it is related. Accordingly, a value modified by a term such as “about” is not to be limited to the precise value specified. In some instances, the approximating language may correspond to the precision of an instrument for measuring the value. Moreover, unless specifically stated otherwise, a use of the terms “first,” “second,” etc., do not denote an order or importance, but rather the terms “first,” “second,” etc., are used to distinguish one element from another.

[0061] As used herein, the terms “may” and “may be” indicate a possibility of an occurrence within a set of circumstances; a possession of a specified property, characteristic or function; and/or qualify another verb by expressing one or more of an ability, capability, or possibility associated with the qualified verb. Accordingly, usage of “may” and “may be” indicates that a modified term is apparently appropriate, capable, or suitable for an indicated capacity, function, or usage, while taking into account that in some circumstances the modified term may sometimes not be appropriate, capable, or suitable. For example, in some circumstances an event or capacity can be expected, while

in other circumstances the event or capacity cannot occur – this distinction is captured by the terms “may” and “may be.”

[0062] The best mode for carrying out the invention has been described for purposes of illustrating the best mode known to the applicant at the time and enable one of ordinary skill in the art to practice the invention, including making and using devices or systems and performing incorporated methods. The examples are illustrative only and not meant to limit the invention, as measured by the scope and merit of the claims. The invention has been described with reference to preferred and alternate embodiments. Obviously, modifications and alterations will occur to others upon the reading and understanding of the specification. It is intended to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof. The patentable scope of the invention is defined by the claims, and may include other examples that occur to one of ordinary skill in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differentiate from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

What is Claimed is:

1. A sanding device, comprising:
 - a sander assembly comprising a sander motor mounted to a sanding plate;
 - a main body comprising a vacuum motor, dust bin, and a motor control;
 - a hollow extension pole having a first end configured to pivotally attach to the sander assembly, and a second end configured to attach to the main body and configured to provide fluid communication between an outlet of the sander plate and the dust bin;
 - a power supply; and
 - a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control,wherein the vacuum motor is configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.
2. The sanding device of claim 1, further comprising a sanding pad comprising a sanding surface and a mounting surface opposite the sanding surface, wherein the mounting surface is configured to removably attach to the sanding plate.
3. The sanding device of claim 2, wherein the sanding pad is rectangular.
4. The sanding device of claim 3, wherein the sanding pad is 9 inches by 11 inches.
5. The sanding device of claim 1, wherein the power supply is a selectably removable and rechargeable battery.
6. The sanding device of claim 2, the sander pad further comprising at least one vacuum port that extends through the sander pad from the sanding surface to the mounting surface, wherein the vacuum port is in fluid communication with the first end of the extension pole.
7. The sanding device of claim 6, the sander pad further comprising a plurality of grooves extending outward from the at least one vacuum port and partially extending into the sanding pad from the sanding surface.

8. The sanding device of claim 7, wherein a first portion of the plurality of grooves are linear and extend outward from a center of the sanding pad, and a second portion of the plurality of grooves are circular.
9. The sanding device of claim 1, wherein the dust bin is selectably removable.
10. The sanding device of claim 1, wherein the extension pole is selectably removable and the outlet of the sander plate is in direct fluid communication with the dust bin.
11. The sanding device of claim 1, wherein the extension pole is telescopic.
12. The sanding device of claim 1, wherein the extension pole includes wiring within the extension pole to provide electrical communication between the body and the main body and the sander assembly.
13. The sanding device of claim 2, wherein the first end of the extension pole pivotally connects to the mounting surface of the sanding pad.
14. The sanding device of claim 1, wherein the first end of the extension pole pivotally connects to a body of the sander assembly.
15. The sanding device of claim 1, further comprising a sander control, wherein the motor control is configured to change the operation of the vacuum motor, and the sander control is configured to change the operation of the sander motor.
16. The sanding device of claim 2, the mounting surface further comprising support ribs extending upwardly from the mounting surface, wherein the support ribs extend around a perimeter of the mounting surface and are evenly distributed around the mounting surface.
17. A sanding device, comprising:

a sanding pad comprising a sanding surface and a mounting surface opposite the sanding surface;

a sander assembly comprising a sander motor connected to a sanding plate, the sanding plate being removably connected to the mounting surface of the sanding pad;

a main body comprising a vacuum motor, dust bin, and a motor control;

a hollow extension pole having a first end configured to pivotally attach to a body of the sander assembly, and a second end configured to attach to the main body and configured to provide fluid communication between an outlet of the sander plate and the dust bin;

a power supply; and

a controller configured to control and provide power from the power supply to the at least one of the sander motor and the vacuum motor according to operation of the motor control,

wherein the vacuum motor is configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad, moves the dust through the extension pole, and draws the dust into the dust bin.

18. The sanding device of claim 17, wherein the sanding pad is rectangular.

19. The sanding device of claim 17, the sander pad further comprising at least one vacuum port that extends through the sander pad from the sanding surface to the mounting surface and a plurality of grooves partially extending into the sanding pad from the sanding surface and extending outward from the at least one vacuum port on the sanding surface, wherein the vacuum port is in fluid communication with the first end of the extension pole.

20. A sanding device, comprising:

a sanding pad comprising a sanding surface configured to secure a piece of sandpaper and a mounting surface opposite the sanding surface, the sanding pad having at least one corner, a vacuum port that extends from sanding surface to the mounting surface, and a plurality of grooves partially extending into the sanding pad from the sanding surface and extending outward from the at least one vacuum port on the sanding surface;

a sander assembly comprising a sander motor within a sander body, the sander motor mounted to the mounting surface of the sanding pad, the sander motor configured to oscillate the sanding pad along at least one of a first linear axis or a second linear axis perpendicular to the first linear axis;

a main body comprising a vacuum motor, a selectably removable dust bin, and a motor control;

a hollow extension pole having a first end configured to pivotally attach to at least one of the mounting surface of the sanding pad or the sander assembly, and a second end configured to attach to the sander body and configured to provide fluid communication between the sander plate and the dust bin;

a rechargeable power supply; and

a controller configured to control and to provide power from the power supply to at least one of the sander motor or the vacuum motor according to operation of the motor control,

wherein the vacuum motor is configured to create a vacuum in the main body that draws in dust at the sanding surface of the sanding pad through the plurality of grooves, moves the dust through the extension pole, and draws the dust into the selectively removable dust bin.