POWERED CARPET SCRUBBING AND COMBING MACHINE

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ABSTRACT
A powered carpeted floor scrubbing and combing machine is described. The machine includes first and second scrubbing pads, followed by a combing head having cylindrical shaped counter-rotating brushes, which in turn followed by a carpet shoe having vacuum ability. This invention provides for simultaneous scrubbing and combing of carpeted floors. The machine is powered with an internal engine and has a user control panel for the control/driving of the machine.
POWERED CARPET SCRUBBING AND COMBING MACHINE

[0001] This application is a continuation in part of co-pending application Ser. No. 09/865,766 filed May 25, 2001. The benefit of the filing date of this earlier filed application is claimed under 35 USC § 120.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to floor cleaning devices. More specifically, this invention relates to automatic powered carpet scrubbing, combing, vacuuming, and cleaning devices.

[0004] 2. Description of Related Art

[0005] A variety of machines and devices have been developed to clean floors. Typically, such machines are designed to either clean or polish or perform some other single floor or floor covering maintenance function. Some machines can be selected to do either cleaning, scrubbing, combing or polishing, but generally they do not scrub and comb a carpeted floor simultaneously. Moreover, most such cleaning machines do not provide a plurality of scrubbing pads independent from a carpet combing, brushing, and cleaning head in order to scrub and clean a carpeted floor.


[0007] U.S. Pat. No. 3,600,735 describes a drive connection for a floor polisher, which permits ready removal from an attachment of brush units to the vertical shaft driven by the motor.

[0008] U.S. Pat. No. 3,742,546 describes a surface treating apparatus having rotatable treating members movable over a surface, a container for liquid wax, which is positioned in a compartment, and has an outlet at its bottom normally closed by a valve having a vertically movable stem.

[0009] U.S. Pat. No. 3,795,933 discloses a multi-purpose cleaning implement includes a base member supporting a sponge mop type work head and an auxiliary implement such as a brush, squeegee, scraper, spreader, or similar implement.


[0011] U.S. Pat. No. 3,931,659 discloses a floor treating machine supported at the floor or surface to be treated by means of a work disk arranged beneath a substantially ring-shaped stop member, the work disk being detachably coupled with a drive motor.

[0012] U.S. Pat. No. 3,952,361 discloses a floor treating machine having laterally spaced drive wheels driven by separate electric traction motors under electronic control so as to be driven by a separate train of pulses, comprising means for recording the trains of pulses to the traction motors and means for replaying the record to reproduce the trains of pulses whereby the machine will repeat the operation.

[0013] U.S. Pat. No. 3,972,088 discloses an electric floor scrubber and buffer having its scrubber or buffer pad attached to the underside of an oscillating plate.

[0014] U.S. Pat. No. 4,094,034 discloses a floor treating machine of the rotary brush type in which, in operation, the weight of the machine is, at least a significant extent, supported by the rotary brush or brushes, in which a brush mounting member is flexibly suspended between resilient elements for limited universal movement.

[0015] U.S. Pat. No. 4,096,084 discloses a method for cleaning surfaces such as floors and pavements that includes incorporating a polyelectrolyte in the cleaning solution and a surface-scrubbing machine for carrying out the process.

[0016] U.S. Pat. No. 4,118,819 discloses a floor treating machine of the single rotary brush type having a handle and a motor both laterally offset from the axis of rotation of the brush in a direction to impart a tilting couple opposed to that arising from operator forces counteracting the reaction couple on the handle.

[0017] U.S. Pat. No. 4,122,576 discloses a manually operated floor polishing machine comprising a polishing pad or brush rotatable at a speed above 660 rpm, pressing against the floor with a force of less than about 25 lbs., and positioned so that one segment of the pad presses harder against the floor than the other, such as by mounting the pad's driving plate or disc to that its plane of rotation is at an angle less than about 10 degree to the plane of the floor.

[0018] U.S. Pat. No. 4,150,456 discloses a floor scrubber with a propane powered internal combustion engine which is mounted on a wheel dolly and which is attached by its rotary output shaft to a circular cage provided with a plurality of rotary brushes on the underside thereof.

[0019] U.S. Pat. Nos. 4,214,337 and 4,237,571 disclose compact floor polishers including a base supporting an electric motor having a vertically oriented output shaft and driving a circular brush.

[0020] U.S. Pat. No. 4,217,671 discloses a multipurpose cleaning device which can be used as a bath and tile scrubbing device as well as being adapted for use in conjunction with floors, walls, ceilings and the like.

[0021] U.S. Pat. No. 4,295,243 discloses an apparatus for cleaning, waxing, polishing and otherwise treating the surface of a floor, where the apparatus includes a carriage or frame with a handle for guiding and maneuvering, several containers for dispensing several selected types of fluids or solutions to the floor where a reciprocating scrubber, such as steel wool or a buffing pad operates with a solution to effectively clean, strip, wax or polish the floor surface. In addition, there is a vacuum means, which removes and carries away any excess liquid, solution or dirty cleaning fluids from the floor surface.

[0022] U.S. Pat. No. 4,319,434 describes a surface processing machine that includes at least one motor-driven spider arm assembly, each of the arms of the spider having rotatably mounted at the ends thereof a surface processing tools such as a brush, buffing pad, grinding stone or the like and wherein the surface processing tools are mounted on an axis which is substantially parallel to the axis.
U.S. Pat. No. 4,322,920 discloses an attachment for use on a rotary floor-conditioning machine comprising a master block, which is integrally molded of a urethane elastomer including a centrally located hub with a circular flange member extending radially from the base thereof.

U.S. Pat. No. 4,391,548 describes a coupling device adapted for use with floor maintenance machines of the type such as floor brushing, buffing, polishing, scrubbing or the like which enables automatic coupling of the maintenance element without direct manual implementation thereof.

U.S. Pat. No. 4,393,534 discloses an apparatus for mechanically varying the speed of a disk, such as a floor treating pad, mounted for rotation about the axis of elongation of a shaft powered by a fixed speed motor.

U.S. Pat. No. 4,407,040 describes a pad drive assembly that detachably grips and rotationally drives a selected maintenance pad by a floor maintenance pad by a floor maintenance machine.

U.S. Pat. No. 4,506,405 discloses a floor-treating machine adapted to operate as a floor scrubber and a floor polisher or buffer includes a main housing or support frame structure from which extends a brush housing assembly.

U.S. Pat. No. 4,523,411 describes a rotatable element and a surface-treating device.

U.S. Pat. No. 4,577,364 discloses a floor-cleaning machine including a support frame with a handle attached to the upper end of the support frame for guiding the machine along the floor and a wheel assembly attached to the lower end. A plurality of disc-shaped floor cleaning pads disposed and held adjacent one another such that a floor pad cylinder having a horizontally disposed and held adjacent one another such that a floor pad cylinder having a horizontally-disposed longitudinal axis is formed are located to the lower end of the frame.

U.S. Pat. No. 4,633,541 discloses a floor-treating machine adapted to operate as a floor scrubber and a floor polisher or buffer, which includes a main housing or support frame structure from which extends a brush housing assembly.

U.S. Pat. No. 4,654,918 describes a buffer deck assembly for floor scrubbing, cleaning and polishing machine that includes a replaceable buffer deck housing mounted to the machine through a substantially U-shaped mounting frame having a pair of sleeves that each slidably receive a cantilever support arm.

U.S. Pat. No. 4,783,872 discloses a high-speed floor-treating machine is provided comprising a frame, a control and guiding handle extending rearward of the frame and an electric motor for rotating a floor-contacting pad is secured.

U.S. Pat. No. 4,910,824 discloses a floor polisher, which causes a pad to rotate at a high speed to polish a floor. The floor polisher has a vertically moving mechanism adapted to move the pad in the vertical direction with respect to the floor, a ground pressure adjusting mechanism adapted to maintain a ground pressure of the pad at a set pressure by controlling the vertically moving mechanism and a floor protecting mechanism adapted to actuate the vertically moving mechanism to lift the pad immediately when the travel of the floor polisher is stopped.

U.S. Pat. No. 5,054,245 describes a combination of cleaning pads, cleaning pad mounting members and a base member for a rotary cleaning machine.

U.S. Pat. No. 5,127,124 describes an apparatus for adjusting the height above the floor of a plate to which is attached a pad in a rotary floor machine to accommodate pads having a range of thicknesses.

U.S. Pat. No. 5,253,384 discloses an electric buffing machine and a method for buffing waxed floors. The buffing machine comprises a molded plastic housing, a foldable handle and a DC drive motor directly driving a buffing pad holder.

U.S. Pat. No. 5,289,605 discloses a cleaning apparatus in the form of a scrubber that is a motor driven by a direct current (DC) motor driving a rotatable scrubber unit which includes a scrubber disc with the motor and scrubber disc forming a power head supported from a detachable and adjustable length pole which enables surfaces that are normally out of reach to be easily scrubbed.

U.S. Pat. No. 5,371,912 discloses an electric floor and baseboard-cleaning machine which includes a motor assembly attached to a medium frame in which the movement thereof is adjustable for either straight line or circular motion.

U.S. Pat. No. 5,402,559 discloses a floor scrubber is provided which consists of a rectangular head assembly.

U.S. Pat. No. 5,797,157 describes a floor buffer having the power source and drive means mounted at one end of an elongate handle, and a buffer head mounted at the other end, such that the center of gravity of the machine is roughly at the midpoint of the elongate handle.

U.S. Pat. No. 6,023,813 describes an automatic floor scrubber and buffer that provides for simultaneous scrubbing and buffing of floors through the use of a plurality of pads operating at different speeds to optimize the scrubbing and buffing operation of the device.

SUMMARY OF THE INVENTION

It is desirable to provide an automatic carpet scrubber and combing machine that simultaneously scrubs and combs a carpet in one pass and vacuums dirty cleaning solution and moisture from a carpeted floor.

Accordingly, it is an object of this invention to provide a carpeted floor scrubbing and combing machine that provides separate scrubbing and combing heads to thereby permit simultaneous scrubbing and combing of carpeted floors.

Another object of this invention is to provide a floor scrubbing and combing machine that employs a carpet combing head having cylindrical shaped counter-rotating brushes along with one or more scrubbing pads for the simultaneous scrubbing and combing of a carpeted floor.

Another object of this invention is to provide a carpeted floor scrubbing and combing machine that is compatible with a variety of power devices or motors, including electrical motors, battery powered motors, natural gas powered engines, propane powered engines, and gasoline engines.

Another object of this invention to provide a carpeted floor scrubbing and combing machine that provides separate scrubbing and combing heads wherein the combing head is readily substituted for a buffing and polishing head.

Additional objects, advantages, and other novel features of this invention will be set forth in part in the description that follows and in part will become apparent to those skilled in the art upon examination of the following or may be learned with the practice of the invention. The objects and advantages of this invention may be realized and attained by
means of the instrumentalties and combinations particularly pointed out in the appended claims. Still other objects of the present invention will be readily apparent to those skilled in the art from the following description wherein there is shown and described the preferred embodiment of this invention. As it will be realized, this invention is capable of other different embodiments, and its several details, and specific configurations, are capable of modification in various aspects without departing from the invention. Accordingly, the drawings and descriptions should be regarded as illustrative in nature and not as restrictive.

To achieve the foregoing and other objectives, and in accordance with the purposes of the present invention, this invention is provided with separate powered scrubbing pads and combing brushes in combination with a vacuum powered squeegee device for removing fluid from a carpeted floor subsequent to scrubbing and combing.

DESCRIPTION OF DRAWINGS

The accompanying drawings incorporated in and forming a part of the specification, illustrate a preferred embodiment of the present invention. Some, although not all, alternative embodiments are described in the following description. In the drawings:

FIG. 1 is an isometric view of the preferred embodiment of the invention.

FIG. 2 is a tricentric view of the preferred embodiment of the invention with the view oriented as looking upward towards the bottom of the invention.

FIG. 3 is a partially exploded isometric view of the preferred embodiment of the invention.

FIG. 4 is an isometric view of the preferred embodiment of the invention showing select covers removed.

FIG. 5 is a partially exploded isometric view of the preferred embodiment of the invention showing the exploded relationship of various subassemblies of the preferred embodiment. Some portions of the machine are not shown for clarity.

FIG. 6 is an isometric view of the carriage assembly portion of the preferred embodiment of the invention with the covers shown removed.

FIG. 7 is a partially exploded isometric view of the carriage assembly portion of the preferred embodiment of the invention with the covers shown removed.

FIG. 8 is an isometric view of the carriage frame assembly portion of the preferred embodiment of the invention.

FIG. 9 is an isometric view of the comb head assembly portion of the preferred embodiment of the invention. A cover of the comb head assembly is shown exploded.

FIG. 10 is a partially exploded isometric view of the comb head assembly portion of the preferred embodiment of the invention with a cover and a gear housing shown removed.

FIG. 11 is an isometric view of the scrub head assembly portion of the preferred embodiment of the invention with the scrubbing pad cover and skirt shown removed.

FIG. 12 is a partially exploded isometric view of the scrub head assembly portion of the preferred embodiment of the invention.

FIG. 13 is an isometric view of the engine assembly portion of the preferred embodiment of the invention.

Reference will now be made in detail to the present preferred embodiment of the invention, and example of which is illustrated in the accompanying drawings.

DETAILED DESCRIPTION OF THE INVENTION

This invention is a machine for simultaneously scrubbing, combing and removing cleaning solution and moisture from a carpeted floor. This invention in its preferred embodiment is equipped with multiple scrubbing pads, multiple brush like combing devices or combs, and vacuum assisted squeegee shoe for removing water, refuse and cleaning fluid from a carpeted floor. This invention is provided with a motor means, both for driving the drive wheels and for powering the scrubbing pads and combs. In the present preferred embodiment, the motor means is a propane engine, although alternative engines or motor, including gasoline or battery powered electric motor can be substituted without departing from the concept of this invention. In order to facilitate the understanding of the present invention in reviewing the drawings accompanying the specification, a feature list is provided below. It is noted that like features are like numbered throughout all of the figures.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Scrubbing and combing machine</td>
</tr>
<tr>
<td>112</td>
<td>Water and chemical mixture tank opening</td>
</tr>
<tr>
<td>120</td>
<td>Waste water tank assembly</td>
</tr>
<tr>
<td>123</td>
<td>Waste water tank pocket</td>
</tr>
<tr>
<td>128</td>
<td>Left side vacuum unit</td>
</tr>
<tr>
<td>130</td>
<td>Left side grill</td>
</tr>
<tr>
<td>134</td>
<td>Waste water drain tube assembly</td>
</tr>
<tr>
<td>138</td>
<td>Adjustment bracket</td>
</tr>
<tr>
<td>150</td>
<td>Front cover</td>
</tr>
<tr>
<td>160</td>
<td>Rear cover assembly</td>
</tr>
<tr>
<td>164</td>
<td>Rear cover tank receiving cavity</td>
</tr>
<tr>
<td>168</td>
<td>Control handle bar</td>
</tr>
<tr>
<td>172</td>
<td>Electronic control unit</td>
</tr>
<tr>
<td>200</td>
<td>Carriage assembly</td>
</tr>
<tr>
<td>204</td>
<td>Carriage assembly right side cover</td>
</tr>
<tr>
<td>220</td>
<td>Frame assembly</td>
</tr>
<tr>
<td>222</td>
<td>Frame</td>
</tr>
<tr>
<td>224</td>
<td>Drive axle</td>
</tr>
<tr>
<td>228</td>
<td>Drive wheels</td>
</tr>
<tr>
<td>232</td>
<td>Scrub head assembly adjustment cable</td>
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</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>110</td>
<td>Water and chemical mixture tank</td>
</tr>
<tr>
<td>114</td>
<td>Water and chemical mixture tank cover</td>
</tr>
<tr>
<td>122</td>
<td>Waste water tank</td>
</tr>
<tr>
<td>124</td>
<td>Waste water tank opening</td>
</tr>
<tr>
<td>128</td>
<td>Right side vacuum unit</td>
</tr>
<tr>
<td>132</td>
<td>Right side grill</td>
</tr>
<tr>
<td>136</td>
<td>Guide brackets</td>
</tr>
<tr>
<td>140</td>
<td>Rear cover mounting plate</td>
</tr>
<tr>
<td>162</td>
<td>Rear cover</td>
</tr>
<tr>
<td>166</td>
<td>Tank mounting strap</td>
</tr>
<tr>
<td>170</td>
<td>Propane tank</td>
</tr>
<tr>
<td>174</td>
<td>Control panel</td>
</tr>
<tr>
<td>202</td>
<td>Carriage assembly left side cover</td>
</tr>
<tr>
<td>222</td>
<td>Frame</td>
</tr>
<tr>
<td>226</td>
<td>Drive axle motor</td>
</tr>
<tr>
<td>230</td>
<td>Scrub head assembly mounting arms</td>
</tr>
<tr>
<td>234</td>
<td>Scrub head assembly adjustment shaft</td>
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</tbody>
</table>
Referring now to the drawings, the invention is a powered scrubbing and combing machine 100 for use in scrubbing, combing and cleaning carpeted floors comprising a water and chemical mixture tank 110, a waste water tank assembly 120, a front cover 150, a rear cover assembly 160 and a carriage assembly 200.

Water and chemical tank 110 defines a substantially elongated rotationally molded plastic tank having an opening 112 and an opening cover 114 removably attached to opening 112.

Waste water tank assembly 120, defines a tank assembly comprising a rotationally molded plastic tank 122 having a formed pocket 123 and an opening 124, a left side vacuum unit 126, a right side vacuum unit 128, a left side grill 130, a right side grill 132, a waste water drain tube assembly 134, guide brackets 136, adjustment bracket 138 and a rear cover mounting plate 140. Waste water tank assembly 120 is assembled such that left side vacuum unit 126 and right side vacuum unit 128 are mounted within formed pocket 123, left side grill 130 and right side grill 132 are mounted on sides of tank 122, drain tube assembly 134 is attached to and in fluid communication with a lower surface of tank 122, guide brackets 136 and adjustment bracket 138 are mounted to a front surface of tank 122 and rear cover mounting plate 140 is attached to a rear surface of tank 122. The attachment of drain tube assembly 134 to tank 122 is such that waste water may be selectively drained from tank 122.

Front cover 150 defines a substantially thin formed cowling type cover.

Rear cover assembly 160 defines a rear cover assembly comprising a rear cover 162 having a receiving cavity 164, a tank mounting strap 166, control handle bars 168, a propane tank 170, an electronic control unit 172 and a control panel 174. Rear cover assembly 160 is assembled such that mounting strap 166 is hingedly connected to rear cover 162 and such that propane tank 170 is removably retained within receiving cavity 164 by being secured by strap 166. Rear cover 162 further includes handle bars 168 substantially rigidly connected to an upper portion of rear cover 162, and rear cover 162 includes a control panel 174 mounted to an upper external surface of rear cover 162 and an electronic control unit 172 mounted within cavity 164.

Carriage assembly 200 defines a carriage assembly comprising a carriage assembly left side cover 202, a carriage assembly right side cover 204, a frame assembly 220, a comb head assembly 260, a scrub head assembly 310 and an engine assembly 360. Carriage assembly 200 is assembled such that comb head assembly 260 and scrub head assembly 310 are movably and adjustably mounted to frame assembly 220, and such that carriage assembly left side cover 202, carriage assembly right side cover 204 and engine assembly 360 are substantially rigidly mounted to frame assembly 220. Carriage assembly 200 is further adapted such that comb head assembly 260 is readily replaceable with a conventional buffing and polishing head such as the buffing and polishing head disclosed in U.S. patent application Ser. No. 09/865,766.

Frame assembly 220 defines a frame assembly comprising a frame 222, a drive axle 224, a drive motor 226, drive wheels 228, scrub head assembly mounting arms 230, scrub head assembly adjustment cable 232, scrub head assembly adjustment shaft 234, adjustment cable mounting bracket 236, swivelable wheels 238 and rear cover assembly mounting brackets 240. Frame assembly 220 is assembled such that drive axle 224, adjustment cable mounting bracket 236 and rear cover assembly 240 are substantially rigidly mounted to frame 222, scrub head assembly mounting arms 230 and swivelable wheels 238 are swivelably mounted to frame 222 and scrub head assembly adjustment shaft 234 is slidingly
mounted to frame 222. Drive axle wheels 228 are rotatably connected to drive axle 224 and drive axle motor 226 is drivingly connected to drive axle 224. Scrub head assembly adjustment cable 232 is movably connected to scrub head assembly adjustment shaft 234 and adjustment cable mounting bracket 236 such that a forward or rearward movement of cable 232 causes a corresponding movement of adjustment shaft 234.

[0072] Comb head assembly 260 defines a comb head assembly comprising a comb head frame 262, a counter-balance apparatus 264, a squeegee shoe 266, a substantially elongated cylindrically shaped front comb 280 having a plurality of bristles 281, a left side gear cluster 282, a left side gear cluster housing 283, a left side drive motor 284, a left side cover 286, a front scrub 288, a substantially elongated cylindrically shaped rear comb 290 having a plurality of bristles 291, a right side gear cluster 292, a right side gear cluster housing 293, a right side drive motor 294, a right side cover 296 and a rear cover 298. Squeegee shoe 266 further defines a squeegee shoe having a vacuum connection port 268, a vacuum opening 270, a shoe flange 272 and a shoe mounting arm 274. Comb head assembly 260 is assembled such that squeegee mounting arm 274, left side gear cluster housing 283, left side cover 286, front cover 288, right side gear cluster housing 293, right side cover 296 and rear cover 298 are mounted to comb head frame 262, front comb 280, left side gear cluster 282, rear comb 290 and right side gear cluster 292 are rotatably mounted to comb head frame 262 and counter-balance apparatus 264 is swivelably mounted to comb head frame 262. Left side drive motor 284 is drivingly connected to left side gear cluster 282 and right side drive motor 294 is drivingly connected to right side gear cluster 292 such that when said motors 284 and 294 drive combs 280 and 290 respectively, combs 280 and 290 counter-rotate with respect to each other. To adapt to varying types of carpets, combs 280 and 290 are readily replaceable by combs having greater or lesser aggression. For instance, combs 280 and 290 may be readily substituted for combs having fewer, shorter, and stiffer bristles. Comb head assembly 260 is further adapted such that with a swivel type adjustment of counter-balance apparatus 264 causes a change in the downward load applied by the Com head assembly 260 to a carpeted floor when machine 100 is resting on a carpeted floor. It is noted that rather than gear clusters 282 and 292 driving brushes 280 and 290 respectively, alternate means such as a system of pulleys and fan belts may be used to drive brushes 280 and 290.

[0073] Scrub head assembly 310 defines a scrub head assembly comprising a scrub head frame 312, a pad pressure adjustment apparatus 316, and a scrubbing pad cover 350. Frame 312 includes scrub head mounting arms 314 fastened to frame 312. Pad pressure adjustment apparatus 316 further defines a pad pressure adjustment bar 318 connected to a pad pressure adjustment handle 320, with a pad pressure adjustment release strap 322 connected to handle 320. Scrub head assembly 310 is assembled such that pad pressure adjustment apparatus 316 and scrubbing pad cover 350 are mechanically attached to frame 312. Cover 350 further includes left side drive motor 330, right side drive motor 340, and scrubbing pad skirt 352 connected to cover 350. Left side drive motor 330 is further connected to a left side gimbal 332, which is in turn connected to a left side pad driver 334, which in turn connected to a left side scrubbing pad 336. Right side drive motor 340 is further connected to a right side gimbal 342, which is in turn connected to a right side pad driver 344, which is in turn connected to a right side scrubbing pad 346. Scrub head assembly 310 is adapted such that scrubbing pads 336 and 346 may be independently driven by motors 330 and 340 respectively and preferably such that scrubbing pads 336 and 346 are counter-rotatingly driven with respect to each other. To adapt to varying types of carpets, scrubbing pads 336 and 346 are readily replaceable by scrubbing pads having greater or lesser aggression. For instance, scrubbing pads 336 and 346 may be readily substituted for stiffer and more course scrubbing pads.

[0074] Engine assembly 360 defines an engine assembly comprising an engine assembly mounting frame 362, a propane engine 364 having a propane engine shaft 365, adjustable alternator mounting arms 366, alternator mounting brackets 368, an alternator 370 having an alternator shaft 374 and an alternator drive belt 372. Engine assembly 360 is assembled such that propane engine 364 is substantially rigidly mounted to mounting frame 362 and such that first ends of adjustable alternator mounting arms 366 are adjustable to hung from ends of alternator mounting brackets 368, and second ends of alternator mounting brackets 368 are substantially rigidly mounted to alternator 370. Alternator drive belt 370 is movably mounted to engine shaft 365 and alternator shaft 374 such that a rotation of engine shaft 365 causes a corresponding rotation to alternator shaft 374 to cause the production of electrical power. Engine assembly 360 is adapted such that alternator 370 may be adjusted with respect to engine 364 so as to obtain proper tension in alternator drive belt 372.

[0075] Scrubbing and combing machine 100 is assembled such that waste water tank assembly 120 is mounted to carriage assembly 200 and chemical mixture tank 110, front cover 150 and rear cover assembly 160 are mounted to waste water tank assembly 120. Further, alternator 370 is electrically connected to motors 226, 284, 294, 330 and 340 such that electrical power produced by alternator 370 is selectively distributed to motors 226, 284, 294, 330 and 340 to cause selective rotation of motors 226, 284, 294, 330 and 340 and in turn to power drive wheels 228, combs 280 and 290 and scrubbing pads 336 and 346 respectively. Chemical mixture tank 110 is provided with a fluid transmission connection to scrubbing pads 336 and 346 so as to selectively deliver water and chemical mixture from chemical mixture tank 110 to scrubbing pads 336 and 346. Waste water tank 122 is provided with a fluid transmission connection to squeegee shoe 266 such that when a vacuum type negative pressure is created by vacuum units 126 and 128, fluid and dirt are drawn through squeegee vacuum opening 270, through vacuum connection ports 268 and into waste water tank 122.

[0076] In practice, with scrubbing and combing machine 100 assembled and resting on a carpeted floor, engine 364 is started, and electrical power is transmitted to motors 226, 284, 294, 330 and 340 to cause rotation of drive wheels 228, combs 280 and 290 and scrubbing pads 336 and 346 respectively. Scrubbing and combing machine 100 then moves across the carpeted floor at a selected rate, and the carpeted floor is simultaneously scrubbed, combed and vacuumed in a single pass. Scrubbing and combing machine 100 is selectively operated by means of control panel 174. Further scrubbing and combing machine 100 is selectively steered by applying a predetermined load to handle bars 168, causing swivelable wheels 238 to swivel and causing scrubbing and combing machine 100 to be turned. It is noted that the
counter-rotation action of combs 280 and 290 of comb head assembly 260 causes the pile of a carpet to be lifted and cleaned on both sides of the pile and in combination with scrubbing, squeegeeing and vacuuming, provides a cleaned carpet with a manicured or groomed look.

[0077] The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

1. A scrubbing and combing machine comprising: a frame; a scrubbing device attached to said frame; a combing device attached to said frame, said combing device having a front end and a rear end; and a shoe mounted to said rear end of said combing device, said shoe having at least one vacuum port providing vacuum suction to said shoe.

2. The machine of claim 1 wherein said combing device defines a combing device having a first cylindrical shaped brush having an axis of rotation and a second cylindrical shaped brush having an axis of rotation and wherein said axis of rotation of each of said brushes is substantially parallel to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

3. The machine of claim 2 wherein said cylindrical shaped brushes define counter-rotating brushes.

4. The machine of claim 1 wherein said scrubbing device defines a scrubbing device having at least one rotating scrubbing pad having an axis of rotation, and wherein said axis of rotation of said scrubbing pad is substantially normal to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

5. The machine of claim 1 wherein said combing device includes at least one rotating combing brush, and wherein said combing device includes at least one rotating scrubbing pad, and wherein said combing device includes at least one combing brush and said at least one pad each include an electrical motor that drives each of said brush and said pad.

6. The machine of claim 1 wherein said machine includes a motor mounted on said frame and providing power to at least one of said devices of said machine.

7. The machine of claim 6 wherein said motor defines a motor selected from the group of motors consisting of a propane powered engine, a gasoline powered engine, an electric motor, and a battery powered motor.

8. The machine of claim 6 wherein said motor defines an internal combustion engine, and wherein said motor includes an alternator mounted to said frame and an in electrical communication to said machine devices, and wherein said alternator is mechanically driven by said engine such that said alternator provides electrical power to at least one device of said machine devices.

9. A scrubbing and combing machine comprising: a frame; a scrubbing device attached to said frame; and a combing device attached to said frame, wherein said combing device defines a combing device having a first cylindrical shaped brush having an axis of rotation and a second cylindrical shaped brush having an axis of rotation and wherein said axis of rotation of each of said brushes is substantially parallel to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

10. The machine of claim 9 wherein said cylindrical shaped brushes define counter-rotating brushes.

11. The machine of claim 9 wherein said scrubbing device defines a scrubbing device having at least one rotating scrubbing pad having an axis of rotation, and wherein said axis of rotation of said scrubbing pad is substantially normal to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

12. The machine of claim 9 wherein said combing device includes at least one rotating combing brush, and wherein said scrubbing device includes at least one rotating scrubbing pad, and wherein said at least one brush and said at least one pad each include an electrical motor that drives each of said brush and said pad.

13. The machine of claim 9 wherein said machine includes a motor mounted on said frame and providing power to at least one of said devices of said machine.

14. The machine of claim 13 wherein said motor defines a motor selected from the group of motors consisting of a propane powered engine, a gasoline powered engine, an electric motor, and a battery powered motor.

15. The machine of claim 13 wherein said machine defines an internal combustion engine, and wherein said machine includes an alternator mounted to said frame and an in electrical communication to said machine devices, and wherein said alternator is mechanically driven by said engine such that said alternator provides electrical power to at least one device of said machine devices.

16. The machine of claim 9 wherein said combing device further defines a combing device having a front end and a rear end, and wherein said combing device includes a shoe mounted to said rear end of said combing device, said shoe having at least one vacuum port providing vacuum suction to said shoe.

17. A scrubbing and combing machine comprising: a frame; a scrubbing device attached to said frame; a combing device attached to said frame; and a motor mounted on said frame and providing power to at least one of said devices of said machine.

18. The machine of claim 17 wherein said scrubbing device defines a scrubbing device having a first cylindrical shaped brush having an axis of rotation and a second cylindrical shaped brush having an axis of rotation and wherein said axis of rotation of each of said brushes is substantially parallel to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

19. The machine of claim 18 wherein said cylindrical shaped brushes define counter-rotating brushes.

20. The machine of claim 17 wherein said scrubbing device defines a scrubbing device having at least one rotating scrubbing pad having an axis of rotation, and wherein said axis of rotation of said scrubbing pad is substantially normal to a floor surface when said machine is engaged in scrubbing and combing said floor surface.

21. The machine of claim 17 wherein said combing device includes at least one rotating combing brush, and wherein said scrubbing device includes at least one rotating scrubbing pad, and wherein said at least one brush and said at least one pad each include an electrical motor that drives each of said brush and said pad.

22. The machine of claim 17 wherein said motor defines a motor selected from the group of motors consisting of a propane powered engine, a gasoline powered engine, an electric motor, and a battery powered motor.
23. The machine of claim 17 wherein said motor defines an internal combustion engine, and wherein said machine includes an alternator mounted to said frame an in electrical communication to said machine devices, and wherein said alternator is mechanically driven by said engine such that said alternator provides electrical power to at least one device of said machine devices.

24. The machine of claim 17 wherein said combing device further defines a combing device having a front end and a rear end, and wherein said combing devices includes a shoe mounted to said rear end of said combing device, said shoe having at least one vacuum port providing vacuum suction to said shoe.

25. A scrubbing and combing machine comprising: a frame; a scrubbing device attached to said frame; a combing device attached to said frame; a propane powered engine mounted on said frame; and an alternator attached to said frame; wherein said scrubbing device defines a scrubbing device having at least one rotating electric motor driven scrubbing pad having an axis of rotation, and wherein said axis of rotation of said scrubbing pad is substantially normal to a floor surface when said machine is engaged in scrubbing and combing said floor surface, and wherein said combing device defines a combing device having a first cylindrical shaped electric motor driven brush having an axis of rotation and a second cylindrical shaped electric motor driven brush having an axis of rotation and wherein said axis of rotation of each of said brushes is substantially parallel to a floor surface when said machine is engaged in scrubbing and combing said floor surface, and wherein said cylindrical shaped electric motor driven brushes define counter-rotating brushes and wherein said alternator is mechanically driven by said propane engine such that said alternator generates electricity, and wherein said alternator is in electrical communication with said electric motors of said scrubbing device and said combing device such that electrical power is provided to said electric motors of said scrubbing device and said combing device.

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