CARPET CLEANING DEVICE

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ABSTRACT

A carpet cleaning apparatus comprises a housing and wheels rotatably connected to the housing for moving the housing over a carpet. A brushroll, supported by the housing, is rotatable about a first axis. A pulley, supported by the housing, is rotatable about a second axis parallel to the first axis. A drive wheel, supported by the housing, is rotatable about a third axis parallel to the first axis. A belt has inner and outer surfaces. The inner surface extends about and engages the brushroll and the pulley. The outer surface engages the drive wheel. The belt is pulled by the pulley downward against the drive wheel for the drive wheel to drive the brushroll through the belt.
CARPET CLEANING DEVICE

TECHNICAL FIELD

[0001] This application relates to a device for cleaning a carpet. More specifically, the application relates to a device for vacuum cleaning and shampooing a carpet.

BACKGROUND

[0002] A carpet cleaning device includes a base unit, a vacuuming head and a shampooing head. The vacuuming head can be removably attached to the base unit. The base unit with the vacuuming head attached can be used to vacuum clean a carpet. Similarly, the shampooing head can be removably attached to the base unit. The base unit with the shampooing head attached can be used to shampoo the carpet.

SUMMARY

[0003] A carpet cleaning apparatus comprises a housing and wheels rotatably connected to the housing for moving the housing over a carpet. A brushroll, supported by the housing, is rotatable about a first axis. A pulley, supported by the housing, is rotatable about a second axis parallel to the first axis. A drive wheel, supported by the housing, is rotatable about a third axis parallel to the first axis. A belt has inner and outer surfaces. The inner surface extends about and engages the brushroll and the pulley. The outer surface engages the drive wheel. The belt is pulled by the pulley downward against the drive wheel for the drive wheel to drive the brushroll through the belt.

[0004] Preferably, the belt is pulled by both the pulley and the brushroll downward against the drive wheel. Alternatively, the apparatus comprises a second pulley located in the housing and rotatable about a fourth axis parallel to the first axis, and the pulley is pulled by both the first and second pulleys downward against the drive wheel. The apparatus preferably further comprises a base portion and a separate cleaning head portion removably attachable to the base portion, with the wheels and the drive wheel supported by the base portion, and the brushroll and the pulley supported by the head portion.

[0005] A cleaning head is for use with a base for cleaning a floor. The base has a base housing with a front opening. The base further has a drive wheel that is located in the base housing and rotatable about a drive axis. The cleaning head comprises a housing and a brushroll supported by the housing and rotatable about a brushroll axis. A pulley, supported by the housing, is rotatable about an axis parallel to the brushroll axis. A belt extends about the brushroll and the pulley. The head has an installed position in which the head is removably attached to the base such that the head extends through the opening, with the pulley located in the base, the brushroll located outside the base, and the brushroll axis parallel to the drive axis. Movement of the head into the installed position can bring the belt into engagement with the drive wheel for the drive wheel to drive the brushroll through the belt.

[0006] A carpet shampooing apparatus comprises a first brushroll supported for rotation about a first axis. The first brushroll includes a first dowel and first bristles. The first bristles extend a first distance radially outward from the first dowel. A second brushroll is supported for rotation about a second axis parallel to the first axis and includes a second dowel and second bristles. The second bristles extend a second distance radially outward from the second dowel. A distance between the dowels is less than or equal to the sum of the first and second distances. A scraper blade contacts the second brushroll. The first brushroll can brush shampoo into a carpet. The second brushroll can lift the shampoo from the carpet toward the scraper blade. The scraper blade can scrape the shampoo off of the second brushroll.

[0007] Preferably, a dispenser is oriented to dispense shampoo directly onto the first brushroll, whereby the first brushroll can apply the shampoo to the carpet as the first brushroll rotates. A shampoo collection container is connected to the scraper blade and is configured to collect the shampoo from the scraper blade. A drive mechanism is configured to rotate the brushrolls in opposite directions, with the first and second bristles moving upward between the dowels.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of an apparatus comprising a vacuuming head, a shampooing head, and a base unit that includes a base;

[0009] FIG. 2 is an expanded break-away perspective view of the base;

[0010] FIG. 3 is an exploded view of the vacuuming head;

[0011] FIGS. 4-7 are side sectional views of the vacuuming head and the base, illustrating a sequence of steps for attaching the vacuuming head to the base;

[0012] FIG. 8 is an exploded view of the shampooing head;

[0013] FIGS. 9-12 are side sectional views of the shampooing head and the base, illustrating a sequence of steps for attaching the shampooing head to the base.

DESCRIPTION

[0014] Overview

[0015] The apparatus 1 shown in FIG. 1 has parts that are examples of the elements recited in the claims.

[0016] The apparatus 1 is used for cleaning a carpet 6 that is lying flat on a floor. It includes a base unit 10, a vacuuming head 12 and a shampooing head 14. The vacuuming head 12 can be removably attached to the base unit 10 in an installed position. The base unit 10 and the vacuuming head 12 together comprise a vacuum cleaner for vacuuming the carpet 6. Alternatively, the shampooing head can be removably attached to the base unit 10 in an installed position. The base unit 10 and the shampooing head together comprise a shampooer for shampooing the carpet 6.

[0017] Base Unit

[0018] The base unit 10 comprises a base 20, a handle 22 extending upward from the base 20, and a filter bag 24 supported by the handle 22.

[0019] As shown in FIG. 2, the base 20 has a base housing 30. The base housing 30 has a front face 32 with an opening 33 that provides access to a vacuum chamber 35 within the housing 30. The vacuum chamber 35 is bounded by chamber
walls 36. A fan 40 within the base housing 30 has an inlet section 42. The inlet section 42 is located at an outlet opening 43 in one of the chamber walls 36. The fan 40 has an outlet section 44 connected by a duct 46 to the filter bag 24.

[0020] A motor 50 within the base housing 30 has an output shaft 52 that drives the fan 40. The output shaft 52 extends through the fan 40 into the vacuum chamber 35 to drive a base belt 54 that is permanently located within the chamber 35. The belt 54, in turn, drives a drive shaft 56 centered on a rotational axis 57. The drive shaft 56 is rotatably fixed to the base housing 30 by a shaft mounting structure 58. A drive wheel 60, in this case a drive gear, is attached to the drive shaft 56 and rotatable about the axis 57. The drive wheel 60 is located in the vacuum chamber 35, behind the front opening 33. The drive wheel 60 provides power to the vacuuming head 12 or the shampooing head 14 when either of those heads 12 or 14 is in the installed position.

[0021] Two front wheels 70 and two rear wheels 72 enable the base 20 to be moved over the carpet 6. The front and rear wheels 70 and 72 are rotatable about respective parallel axes 73 and 75. The front wheels 70 are rotatably connected to the base housing 30 by a height-adjust mechanism 76 represented schematically in FIG. 2 as a lever. The height-adjust mechanism 76 enables the user to raise and lower the front face 32 of the base 20 relative to the carpet 6.

[0022] Two arms 80 extend forward from the front face 32. They support a perch pin 82 in a horizontal orientation parallel to the front face 32. The perch pin 82 is configured to support either head 12 or 14 in the installed position.

[0023] A latch 90 is used for latching the respective head 12 or 14 in the installed position. Parts of the latch 90 include a flexible stem 92 and a wedge-shaped latch head 94. The stem 92 is fastened at its rear end to a top wall 96 of the base 20 and is joined at its front end to the latch head 94. A front surface 98 of the latch head 94 is inclined forward and upward. A vertical rear surface 99 of the latch head 94 faces, and is spaced slightly forward from, the front face 32 of the base 20.

[0024] Vacuuming Head

[0025] The vacuuming head 12 is shown in FIG. 3. It includes a bracket 110. The bracket 110 supports upper and lower idler pulleys 120 and 122 centered on respective rotational axes 125 and 127. The bracket 110 further supports a brushroll 130 centered on a rotational axis 131 that is parallel with the pulley axes 125 and 127. A perch structure 132 of the bracket 110 comprises a pair of forks, each having a groove 134. The grooves 134 are configured to receive the perch pin 82 when the head 12 is in the installed position.

[0026] The brushroll 130 has an axially-extending dowel 136 and bristles 140 extending radially outward from the dowel 136. The bristles 140 are grouped in clusters called tufts 142. The tufts 142 are arranged in two axially-extending rows 144 and 146 located at radially-opposite sides of the dowel 136. In this example, the axially-extending rows 144 and 146 are straight. Each row 144 and 146 is interrupted by a poly-V pulley surface 148 axially centered on the dowel 136.

[0027] A vacuuming head belt 150 extends permanently about the idler pulleys 120 and 122 and the brushroll 130. In the uninstalled position of the head 12 shown in FIG. 3, the belt 150 has a certain amount of slack. The belt 150 has a poly-V inner surface 152 and a gear-toothed outer surface 154. The poly-V inner surface 152 faces, and is configured to engage, the idler pulleys 120 and 122 and the poly-V pulley surface 148 of the brushroll 130. The gear-toothed outer surface 154 of the belt 150 is configured to engage the drive gear 60 (FIG. 2) when the vacuuming head 12 is in the installed position.

[0028] A top cover 160 is attached to the bracket 110. It has an upwardly extending latch plate 164 configured to be captured by the latch 90 (FIG. 2) when the head 12 is in the installed position. The top cover 160 and the bracket 110, attached together as shown in FIG. 4, comprise a vacuuming head housing 170. The housing 170 has front and rear sections 172 and 174 delineated in FIG. 4 by a vertical dashed line 175. The front section 172 supports the brushroll 130, and the rear section 174 supports the pulleys 120 and 122.

[0029] The vacuuming head 12 can be installed on the base 20 as follows. A first step is illustrated in FIG. 4. The head 12 is positioned in front of the base 20, with the rear housing section 174 facing the front opening 33 of the base 20 and angled upward.

[0030] A second step is indicated by an arrow 181 in FIG. 4. The head 12 is moved rearward until the perch structure 132 receives the perch pin 82 as shown in FIG. 5. In this configuration, the head 12 is perched on the perch pin 82, with the rear section 174 extending through the front opening 33 into the chamber 35.

[0031] A third step is indicated by an arrow 183 in FIG. 5. The rear section 174 pivots downward about the perch pin 82 and the perch structure 132, bringing the belt 150 into engagement with the drive wheel 60. Concurrently, the latch plate 164 pivots rearward as indicated by an arrow 185. This continues until the latch plate 164 snaps in place behind the latch head 94 as shown in FIG. 6. The vacuuming head 12 is thus in the installed position. In this third step, the same pivoting motion that brings the head 12 into the installed position also brings the belt 150 into engagement with the drive wheel 60.

[0032] A fourth step is indicated by an arrow 187 in FIG. 6. In this step, the height-adjustment mechanism 76 lowers the base 20 to bring the brushroll 130 into contact with the carpet 6 as shown in FIG. 7.

[0033] With the head 12 in the installed position shown in FIG. 7, the following features are apparent. The latch plate 164 is captured by and between the rear surface 99 of the latch head 94 and the front face 32 of the base housing 30. The housing 170 of the head 12 extends through the front opening 33 of the base housing 30. Both the front housing section 172 and the brushroll 130 are located outside the base housing 30. Conversely, the rear housing section 174 and the pulleys 120 and 122 are located within the base housing 30 and, more specifically, within the vacuum chamber 35.

[0034] Further, in the installed position, the outer surface 154 of the belt 150 engages the drive wheel 60. The inner surface 152 of the belt 150 extends about and engages the
brush roll 130 and the pulleys 120 and 122. Both the brush roll 130 and the lower pulley 122 pull the belt 150 downward against the drive wheel 60. The brush roll axis 131 is forward of the drive wheel axis 61, and the lower pulley axis 127 is rearward of the drive wheel axis 61. The upper pulley 120 keeps an upper portion 190 of the belt 150 spaced upward from a lower portion 192 of the belt 150 to prevent the portions 190 and 192 from scraping against each other.

[0035] Referring to FIGS. 2 and 7, the rotational axes 73, 75, 61, 131, 125 and 127 of the front and rear wheels 70 and 72, the drive wheel 60, the brush roll 130 and the pulleys 120 and 122 are all horizontal and parallel to each other. They are all, additionally, perpendicular to movement of the base 20 as it is pushed forward and rearward over the carpet 6.

[0036] The base unit 10 and the head 12, attached together, comprise a vacuum cleaner for vacuum cleaning carpet 6. The vacuum cleaner has a vacuum cleaner housing comprising the base housing 30 and the head housing 170. The vacuum cleaning process can be performed by turning on the motor 50 and moving the vacuum cleaner over the carpet 6. In this process, the motor 50 drives the fan 40. It also drives the drive wheel 60 through the belt 54. As shown in FIG. 7, the drive wheel 60 drives the brush roll 130 through the housing belt 150. As indicated by arrows 193 and 195, the drive wheel 60 and the brush roll 130 rotate in opposite directions. The brush roll 130 beats the carpet 6 to dislodge dirt from the carpet 6. The dirt is carried to the filter bag 24 by air driven by the fan 40.

[0037] After the vacuuming cleaning is completed, the head 12 can be removed from the base 20 by first engaging a thumb against the front surface 98 of the latch head 94. The thumb pushes the latch head 94 upward until the latch plate 164 is released. The vacuuming head 12 can then be withdrawn from the chamber 35 and pulled forward and away from the base 20.

[0038] Shampooing Head

[0039] The shampooing head 14 is shown in FIG. 8. It includes a bracket 210. The bracket 210 supports an upper idler pulley 220 and front and rear lower idler pulleys 222 and 224. The pulleys 120, 122 and 124 are rotateable with respect to respective parallel axes 225, 227 and 229. The bracket 210 further supports front and rear brushes 230 and 231 centered on rotational axes 233 and 234. A grooved perforated structure 236 of the bracket 210 is configured to receive the brush pin 82 of the base 20 when the shampooing head 14 is in the installed position.

[0040] As shown in FIGS. 8 and 9, each of the two brushes 230 and 231 has an axially-extending dowel 238 and 239. Front brushroll bristles 240 extend radially outward from the front dowel 238 a first distance D1. Rear brushroll bristles 241 extend radially outward from the rear dowel 239 a second distance D2. The dowels 238 and 239 are spaced from each other a third distance D3 that is less than the sum of the first and second distances D1 and D2. Although the third distance D3 can be greater than the sum of D1 and D2, it is preferably less than or equal to the sum of D1 and D2.

[0041] The bristles 240 and 241 of the brushroll 230 and 231 are arranged in tufts 242. The tufts, each of brushroll 230 and 231, are arranged in two axially-extending rows 243 and 246 located at radially-opposite sides of the dowel 238 and 239. The rows 244 and 246 of the front brushroll 230 are interrupted by a poly-V pulley surface 248 axially centered on the front dowel 238. The rows 244 and 246 of the rear brushroll 231 are interrupted by a gear-toothed surface 249 axially centered on the rear dowel 239.

[0042] A shampooing head belt 250 extends permanently about the idler pulleys 220, 222 and 224 and the front brushroll 230. The belt 250 has a poly-V inner surface 252 and a gear-toothed outer surface 254. The poly-V inner surface 252 engages the pulleys 220, 222 and 224 and the poly-V pulley surface 248 of the front brushroll 230. The toothed outer surface 255 engages the toothed surface 249 of the rear brushroll 231. To take up any slack in the belt 250, the upper pulley 220 is attached to the bracket 210 by a lever 256. The lever 256 is spring loaded to pull the upper pulley 220 upward. This keeps the shampooing head belt 250 taut even in the unlatched position of the shampooing head 14 shown in FIG. 8. Alternatively, the upper pulley 220 can be fixed to the bracket 210 as in the vacuuming head 12 (FIG. 3), in which case the belt 250 will be slack when the head 14 is in the unlatched position.

[0043] A top cover 260, shown in FIGS. 8 and 9, is attached to the bracket 210. It includes a wall 262 for covering the bracket 210, a lattice plate 264 for latching the shampooing head 14 in the installed position, a container 266 for storing shampoo, a discharge outlet 268 for discharging shampoo onto the front brushroll 230, and a conduit 270 for conducting the shampoo from the container 266 to the discharge outlet 268. These components are explained individually as follows.

[0044] The lattice plate 264 extends upward from the wall 262. It is configured to be captured by the latch 90 (FIG. 2) when the head 14 is in the installed position.

[0045] The shampoo container 266 is shown in FIG. 9. It defines a cavity 271 that can be filled with shampoo 272 through a fill opening 273 at the top of the container 266. The fill opening 273 is capped with a cap 274. The shampoo 272 can be released from the container 266 through an outlet opening 275 at the bottom of the container 266. Release of the shampoo 272 is controlled by a discharge gate 276 in front of the outlet opening 275. The gate 276 is lowered to block the shampoo 272 from exiting through the outlet opening 275 and is raised to release the shampoo 272 through the outlet opening 275. The gate 276 can be controlled directly by hand. Alternatively, to avoid the user having to bend down, the gate 276 can be connected by cable to a lever (not shown) on the handle for the gate 276 to be controlled by the lever.

[0046] The conduit 270 extends forward along the wall 262 from the outlet opening 275 of the container 266 to the discharge outlet 268. The discharge outlet 268 has a discharge opening 282. This opening 282 is located directly above the front brushroll 230 in order to discharge the shampoo directly onto the bristles 240 of the front brushroll 230. Preferably, the discharge opening 282 is totally located directly above the dowel 238 of the front brushroll 230. The opening 282 is elongated. It extends, lengthwise, parallel with the brushroll 230 along almost the full length of the brushroll 230.

[0047] A shampoo collection container 290, in this example a tray, is shown in FIGS. 8 and 9. It has a removable installed position supported on a shelf 292 of the
bracket 210. Alongside a top opening 294 of the tray, a wall portion of the tray 290 is in the form of a scraper blade 296 with a scraping edge 298. The edge 298 contacts the rear brushroll bristles 241 when the tray 290 is in the installed position in order to scrape shampoo off of the rear brushroll bristles 241. The shampoo can then flow downward over the blade 296 to be collected in the tray 290. The blade 296 is interrupted by a raised section 300 of the floor 302 of the tray 290 that bridges over a rear section of the bracket 210.

[0048] The top cover 260 and the bracket 210, joined together as in FIG. 9, comprise a shampooing head housing 310. Front and rear sections 312 and 314 of the housing 310 are delineated in FIG. 9 by a dashed line 315. The front section supports the brushroll 130. The rear section supports the pulleys 220, 222 and 224.

[0049] The shampooing head 14 can be installed on the base 20 in a manner similar to that explained above for the vacuuming head 12. In a first step illustrated in FIG. 9, the head 14 is positioned in front of the base 20.

[0050] A second step is indicated by an arrow 321 in FIG. 9. The head 14 is moved rearward until the perch structure 236 receives the perch pin 82 as shown in FIG. 10. In this configuration, the head 14 is perched on the perch pin 82, with the rear section 314 extending through the front opening 33 into the chamber 35.

[0051] A third step is indicated by an arrow 323 in FIG. 10. The rear section 314 pivots downward about the perch pin 82 and the perch structure 236, bringing the belt 250 into engagement with the drive wheel 60. Concurrently, the latch plate 264 pivots rearward as indicated by an arrow 325. This continues until the latch plate 264 snaps into position behind the latch head 94, as shown in FIG. 11. The head 14 is thus in its installed position. The same pivoting motion that brings the head 14 into its installed position also brings the belt 250 into engagement with the drive wheel 60.

[0052] A fourth step is indicated by an arrow 327 in FIG. 11. The base 20 is lowered using the height-adjustment mechanism 76. This brings the brushroll 130 in contact with the carpet 6 as shown in FIG. 12.

[0053] With the head 14 in the installed position shown in FIG. 12, the following features are apparent. The latch plate 264 is captured by and between the rear surface 99 of the latch head 94 and the front face 32 of the base housing 30. The housing 310 of the head 14 extends through the front opening 33 of the base 20. Both the front housing section 312 and the brushrolls 130 and 132 are located outside the base 20. Conversely, the rear housing section 314 and the pulleys 220, 222 and 224 are located within the base 20.

[0054] Further, in the installed position, the outer surface 254 of the belt 250 engages the drive wheel 60 and the rear brushroll 131. The inner surface 252 of the belt 250 extends about and engages the front brushroll 130 and the three idler pulleys 220, 222 and 224. The two lower pulleys 222 and 224 pull the belt 250, under tension, downward against and about the drive wheel 60. This is enabled by the axes 227 and 229 of the front and rear lower pulleys 222 and 224 being located at opposite sides of the drive wheel axis 61. For example, as in FIG. 12, the axes 227 and 229 of the front and rear lower pulleys 222 and 224 are located, respectively, before and behind the drive wheel axis 61. The upper pulley 225 keeps an upper portion 330 of the belt 250 spaced upward from a lower portion 332 of the belt 250 to prevent the portions 330 and 332 from scraping against each other.

[0055] The rotational axes 61, 73, 75, 225, 227, 229, 233 and 234 (FIGS. 2 and 12) of the drive wheel 60, the front and rear wheels 70 and 72, the three pulleys 220, 222 and 224, and the two brushrolls 230 and 231 are all horizontal and parallel to each other. The axes 61, 73, 75, 225, 227, 229, 233 and 234 are all, additionally, perpendicularly to the forward/rearward movement of the base 20.

[0056] The motor 50 (FIG. 2), the base belt 54, the drive wheel 60 and the shampooing head belt 250 together comprise a drive mechanism that drives the brushrolls 230 and 231. This drive mechanism rotates the brushrolls 230 and 231 in opposite directions as indicated by arrows 341 and 343 in FIG. 12, with the bristles 240 and 241 of both brushrolls 230 and 231 moving upward between the dowels 238 and 239. The rear brushroll 231 rotates in the same direction as the drive wheel 60, and the front brushroll 230 rotates in the opposite direction.

[0057] The base unit 10 (FIG. 2) and the shampooing head 14, attached together as in FIG. 12, comprise a shampooer for shampooing the carpet 6. A shampooing process can be achieved by lifting the gate 276, turning the motor 50 on, and moving the shampooer over the carpet 6. Lifting of the gate 276 releases the shampooer 272 from the container 266. This enables the shampoo to flow through the conduit 270 to the discharge outlet 268.

[0058] The discharge outlet 268 dispenses the shampoo directly onto the bristles 240 of the front brushroll 230. Upon receiving the shampoo, the front brushroll bristles 240 initially carry the shampoo forward and away from the rear brushroll 231 and downward toward the carpet 6. The front brushroll bristles 240 then contact the carpet 6 to apply the shampoo to carpet 6, and thereafter move upward in-between the dowels 238 and 239.

[0059] The bristles 240 and 241 of both brushrolls 230 and 231 brush the shampoo into the carpet 6. This enables the shampoo to entrain dirt from the carpet 6. Since the brushrolls 230 and 231 rotate in opposite directions, each tuft of the carpet 6 is brushed at two opposite sides of the tuft. This promotes impregnation of the shampoo into the carpet 6. It also promotes dislodging of dirt from the tufts. A layer of shampoo 244 accumulates on top of and within the carpet 6 as the shampooer moves over the carpet 6.

[0060] Concurrently, the rear brushroll bristles 241 remove a portion of the dirt-entrained shampoo from the carpet 6 and lift the shampoo upward between the dowels 238 and 239 toward the scraper blade 296. The shampoo, along with entrained dirt, is scraped off the rear brushroll bristles 241 by the scraper blade 296 and flows into the collection tray 290.

[0061] The front brushroll 230 can also remove shampoo from the carpet 6. If the brushrolls 230 and 231 are configured such that, in-between the dowels 238 and 239, the front brushroll bristles 240 come sufficiently near to the rear brushroll bristles 241, the shampoo lifted from the carpet 6 by the front brushroll bristles 240 can be transferred to the rear brushroll bristles 241. The rear brushroll 231 can then transport the shampoo to the scraper blade 296 for collection in the tray 290.
The front brushroll 230 improves the efficiency with which the rear brushroll 231 removes shampoo from the carpet 6. This is explained as follows. As each row 244 and 246 of rear brushroll bristles 241 contacts a section of the carpet 6 and then disengages from that section, it lifts a portion of the shampoo from that section upward to the collection tray 290. However, some of the shampoo from that section does not adhere to the rear brushroll bristles 241 and is thus not successfully lifted. Instead, it is swept by the rear brushroll 231 toward the front brushroll 230. The front brushroll 230 then sweeps the unlifted shampoo back toward the rear brushroll 231. This provides a second chance for the rear brushroll 231 to lift the shampoo to the tray 290, thereby improving the shampoo removal efficiency of the rear brushroll 231. The unlifted shampoo continues to be swept back and forth between the brushrolls 130 and 131 until it is finally successfully lifted by the rear brushroll 231 to the tray 290. This process is made possible by there being two brushes 230 and 231 that are adjacent each other and each rotating so as to sweep shampoo toward the other.

Periodically during the shampooing process, the shampoo collection tray 290 can be removed from the shampoo head housing 310 and emptied. After the shampooing process is completed, the shampooing head 14 can be removed from the base 20 in a manner similar to that described above for the vacuuming head 12. Briefly, the latch head 94 is moved upward, preferably by a thumb, until it releases the latch plate 264 and thus the shampooing head 14. The head 14 is then withdrawn from the vacuum chamber 35 and pulled forward away from the base 20.

This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to make and use the invention. 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 elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal language of the claims.

1. A carpet cleaning apparatus comprising:
   a housing;
   wheels rotatably connected to said housing for moving said housing over a carpet;
   a brushroll supported by said housing and rotatable about a first axis;
   a pulley supported by said housing and rotatable about a second axis parallel to said first axis;
   a drive wheel supported by said housing and rotatable about a third axis parallel to said first axis; and
   a belt having inner and outer surfaces, said inner surface extending about and engaging said brushroll and said pulley, said outer surface engaging said drive wheel, and said belt being pulled by said pulley downward against said drive wheel for drive said drive wheel to drive said brushroll through said belt.

2. The apparatus of claim 1 wherein said belt is pulled by both said pulley and said brushroll downward against said drive wheel.

3. The apparatus of claim 1 further comprising a second pulley located in said housing and rotatable about a fourth axis parallel to said first axis, and wherein said belt is pulled by both of said pulleys downward against said drive wheel.

4. The apparatus of claim 1 wherein said housing comprises a base portion and a separate cleaning head portion removably attachable to said base portion, with said wheels and said drive wheel supported by said base portion, and said brushroll and said pulley supported by said head portion.

5. A cleaning head for use with a base for cleaning a floor, the base having a base housing with a front opening, and the base further having a drive wheel that is located in the base housing and rotatable about a drive axis, said cleaning head comprising:
   a housing;
   a brushroll supported by said housing and rotatable about a brushroll axis;
   a pulley supported by said housing and rotatable about a pulley axis parallel to said brushroll axis; and
   a belt extending about said brushroll and said pulley;
   said head having an installed position in which said head is removably attached to the base such that said head extends through the front opening with said pulley located in the base and said brushroll located outside the base such that movement of said head into said installed position can bring said belt into engagement with the drive wheel for the drive wheel to drive said brushroll through said belt.

6. The cleaning head of claim 5 further comprising a perch structure configured to be pivotally supported on a mating perch structure of the base, and wherein said movement is a pivoting movement of said head about said perch structure of said head.

7. The cleaning head of claim 5 further comprising a second pulley rotatable about a second axis parallel to said first pulley axis and configured such that said belt can be pulled by both said first and second pulleys downward against the drive wheel upon movement of said head into said installed position.

8. A carpet shampooing apparatus comprising:
   a first brushroll supported for rotation about a first axis and including a first dowel and first bristles, said first bristles extending a first distance radially outward from said first dowel;
   a second brushroll supported for rotation about a second axis parallel to said first axis and including a second dowel and second bristles, said second bristles extending a second distance radially outward from said second dowel, with a distance between said dowels being less than or equal to the sum of said first and second distances; and
   a scraper blade contacting said second brushroll;

   whereby said first brushroll can brush shampoo into a carpet, said second brushroll can lift the shampoo from the carpet toward said scraper blade, and said scraper blade can scrape the shampoo off of said second brushroll.

9. The apparatus of claim 8 further comprising a dispenser oriented to dispense shampoo directly onto said first brush-
roll, whereby said first brushroll can apply the shampoo to the carpet as said first brushroll rotates.

10. The apparatus of claim 8 further comprising a shampoo collection container connected to said scraper blade and configured to collect the shampoo from said scraper blade.

11. The apparatus of claim 8 further comprising a drive mechanism configured to rotate said brushrolls in opposite directions with said first and second bristles moving upward between said dowels.

12. A carpet shampooing apparatus comprising:

a first brushroll supported for rotation about a first axis and including a first dowel and first bristles, said first bristles extending a first distance radially outward from said first dowel;

a second brushroll supported for rotation about a second axis parallel to said first axis and including a second dowel and second bristles, said second bristles extending a second distance radially outward from said second dowel, with a distance between said dowels being less than the sum of said first and second distances;

a drive mechanism configured to rotate said brushrolls in opposite directions with said first and second bristles moving upward between said dowels; and

a dispenser oriented to dispense shampoo directly onto said first bristles for said first bristles to apply the shampoo to a carpet as said first brushroll rotates.

13. The apparatus of claim 12 further comprising a scraper blade contacting said second brushroll, whereby said second brushroll can lift the shampoo from the carpet toward said scraper blade, and said scraper blade can scrape the shampoo off of said second brushroll.

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