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(54) **Title**: FLOOR STRIPPING MACHINE

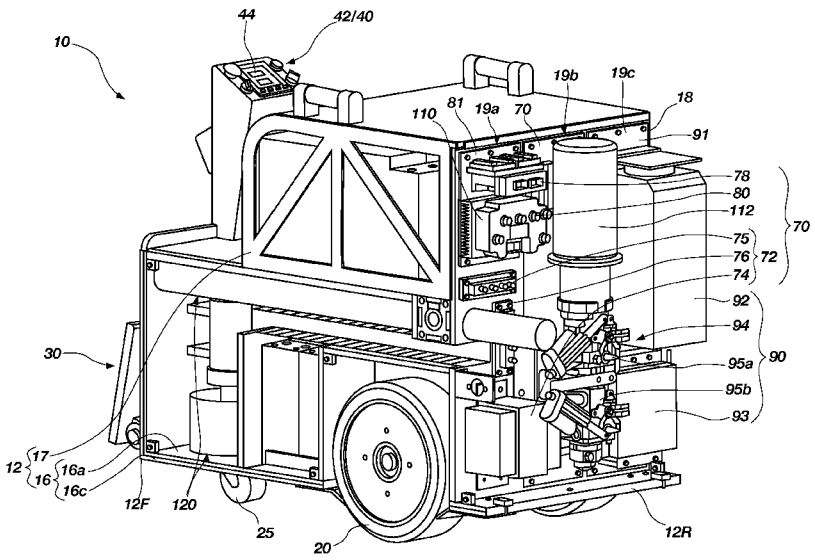

FIG. 6

(57) **Abstract**: Machines for stripping floors include improved operation and/or maintenance features. A floor stripping machine of the present invention may be driven and steered under control of a linear actuator that controls operation of a pair of hydraulic motors associated with a pair of drive wheels. A floor stripping machine may be battery powered, but include electrical components (e.g., a primary motor) that operate under AC power, enhancing battery life. The various components of a floor stripping machine may be located and arranged (e.g., in modules) for easy access and simplified (e.g., user) replacement. The location of a seat upon a floor stripping machine may be tailored to enable a user of any weight to ride the floor stripping machine without interfering with a weight distribution of the floor stripping machine.

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FLOOR STRIPPING MACHINE

This application claims priority to U.S. Provisional Patent Application No. 61/299,870, filed on January 29, 2010, titled FLOOR STRIPPING MACHINE, the entire disclosure of which is, by this reference, hereby incorporated herein.

TECHNICAL FIELD

The present invention relates generally to machines for stripping floors. More particularly, the present invention relates to floor stripping machines with improved operation and/or maintenance features.

SUMMARY

In one aspect, the present invention includes a floor stripping machine with a hydraulically actuated linear drive system. Such a floor stripping machine may, in some embodiments, include an electrical system with components that are designed to operate under an alternating current (AC). By using electrical components that operate under AC power, the operating temperature of the floor stripping machine and its various components, including its hydraulic fluid, may be minimized. Minimization of the temperature of the components of the floor stripping machine, including the hydraulic fluid, results in less of a need for cooling those components. In addition, since there may be a reduced need to cool the hydraulic fluid, a floor stripping machine of the present invention may include a minimized volume of hydraulic fluid, as well as a hydraulic fluid reservoir of minimal volume.

Embodiments of a floor stripping machine that include AC-operated electrical components may be battery powered. As batteries provide direct current (DC) power, such an embodiment may also include an inverter. Some embodiments of battery powered floor stripping machines may additionally include an on-board charger. Accordingly, the battery or batteries of such an embodiment of floor stripping machine may be charged by simply plugging the floor stripping machine into a suitable electrical outlet. An on-board transformer may, in some embodiments, be associated with the on-board charger.

In another aspect, a floor stripping machine of the present invention may include a diagnostic system for monitoring various components. In some

embodiments, such a diagnostic system may include one or more temperature sensors, such as a sensor for monitoring the temperature of a motor for controlling a hydraulic drive system, and/or one or more sensors for monitoring fluid temperatures, such as the temperature of hydraulic fluid. Such a diagnostic system may include a processing element (*e.g.*, a computer, etc.) and a display for providing a user with specific information (*e.g.*, in the form of readily translatable diagnostic codes, etc.) on errors with any components monitored by the diagnostic system. In some embodiments, a processing element of the diagnostic system may be configured (*e.g.*, programmed, etc.) to automatically react to and correct certain component errors. As an example, when an undesirably high (*e.g.*, an "error" threshold, etc.) motor temperature or fluid temperature is monitored, operation of an electric motor may be temporarily decreased or terminated until the monitored temperature decreases to an acceptable level (*e.g.*, a "reset" threshold, etc.). Once the monitored temperature returns to an acceptable level, the processing element may allow increased operation (*e.g.*, normal operation, full operation, etc.) of the electric motor to resume.

A floor stripping machine may, according to another aspect of the present invention, include a plurality of readily removable, readily replaceable modular subassemblies of components, which may simplify maintenance and repair of the floor stripping machine, and may enable a user to readily maintain and/or repair the floor stripping machine. In one embodiment, a floor stripping machine includes a panel that provides access to a plurality of modular component subassemblies, including an electrical subassembly, a motor-pump subassembly, and a hydraulic subassembly. The modular component subassemblies may be secured to (*e.g.*, with bolts, fasteners, etc.) or otherwise associated with a subassembly carrier, such as a fixed panel of the floor stripping machine, or they may be associated with sliding carriers that may be inserted into and removed from an interior of the floor stripping machine.

In various embodiments, the various components of a floor stripping machine of the present invention may be arranged to impart the floor stripping machine with a weight distribution that applies a sufficient load to a floor stripper at one end of the machine to enable the floor stripper to operate optimally, while applying a sufficient

load to drive wheels of the machine to enable the drive wheels to maintain constant traction with a surface on which the floor stripping machine is used.

In some embodiments of a floor stripping machine, a seat may be located somewhat centrally over a length of a chassis and/or body of the floor stripping machine. Such a seat location may be configured to enable a user to ride the floor stripping machine without substantially modifying a weight distribution of the floor stripping machine, regardless of the user's size and/or weight.

Other aspects of the present invention, as well as other features and advantages of various aspects and embodiments of the present invention, will become apparent to those in the art through consideration of the ensuing description, the accompanying drawings, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS:

In the drawings:

FIG. 1 is a front isometric view of an embodiment of floor stripping machine of the present invention;

FIG. 2 is a rear isometric view of an embodiment of floor stripping machine shown in FIG. 1;

FIG. 3 is a side plan view of the embodiment of floor stripping machine depicted by FIGs. 1 and 2;

FIG. 4 is a front plan view of the embodiment of floor stripping machine illustrated by FIGs. 1 through 3;

FIG. 5 is a top plan view of the embodiment of floor stripping machine of FIGs. 1 through 4;

FIG. 6 is a rear isometric view of an embodiment of floor stripping machine, showing various features in increased detail;

FIGs. 7A through 7C depict various embodiments of modular component subassemblies that may be used with some embodiments of a floor stripping machine of the present invention; and

FIG. 8 is a schematic diagram illustrating an embodiment of hydraulic system that may be used in a floor scraping machine of the present invention.

DETAILED DESCRIPTION

FIGs. 1 through 6 illustrate an embodiment of a floor stripping machine 10. Floor stripping machine 10 includes a chassis 12 (FIG. 6) that carries a variety of other components.

Among the components that are visible from an exterior of the floor stripping machine 10 are drive wheels 20, which, in the depicted embodiment, are rotatably secured to opposite sides 13 and 14 of the chassis 12; one or more caster wheels 25 for supporting the chassis 12; a floor stripper 30, which is associated with a front end 12F of the chassis 12; a user interface system 40 for enabling a user to operate the floor stripping machine 10; a seat 50; and a body 60 for carrying the elements of the user interface system 40 and the seat 50, and for containing various internal components of the floor stripping machine 10.

Referring now to FIGs. 6 through 7C, the internal components of the floor stripping machine 10 may include, but are not limited to, an electrical system 70 and a hydraulic system 90, which may be operated under control of the electrical system 70. Additionally, in some embodiments, a floor stripping machine 10 may include a diagnostic system 110 for monitoring one or more components, or parts, of the floor stripping machine 10. Some embodiments of a floor stripping machine 10 of the present invention, such as that illustrated by FIG. 6, may include a vacuum system 120 for collecting debris that has been stripped from a floor surface.

As depicted by FIG. 6, chassis 12 of the floor stripping machine 10 includes a frame assembly 16 and a number of support elements 17 secured to and extending upwardly from the frame assembly 16. The frame assembly 16 is configured to carry and/or support all of the other elements of the floor stripping machine 10, as well as a user of the floor stripping machine 10. In addition, the frame assembly 16 may distribute the weight of the floor stripping machine 10 in a manner that enables the floor stripper 30 to function optimally. As an example, the frame assembly 16 may be configured to receive and distribute a sufficient load to the drive wheels 20 to enable the drive wheels 20 to achieve and maintain constant traction with a floor surface over which the floor stripping machine 10 is used.

The frame assembly 16 may also be configured to distribute a significant portion (*e.g.*, about 25%, about 30%, about 40%, etc.) of its vertical load to a

front 16F of the frame assembly 16. Such a vertical load, or a portion of such a vertical load, may be transferred to a floor stripper 30 or other implement associated with the front 16F of the frame assembly 16. The vertical load that is transferred to a floor stipper 30 may, in turn, enable the floor stripper 30 to apply a sufficient load to a floor surface to cause the floor stripper 30 to effectively and efficiently remove material (*e.g.*, a flooring material, a coating, etc.) from the floor surface.

In some embodiments, the frame assembly 16 may be configured to support lifting of the floor stripping machine 10 (*e.g.*, with a fork lift, etc.) and to bear an entire weight of the floor stripping machine 10 as the floor stripping machine 10 is lifted.

In a specific embodiment, a frame assembly 16 of a floor stripping machine 10 of the present invention may include an undercarriage 16U that supports and/or carries all of the other components of the floor stripping machine 10, as well as one or more cover plates 16C mounted to a bottom surface of the undercarriage 16U. The cover plate(s) 16C may add to the overall strength of the frame assembly 16. In embodiments where a single cover plate 16C covers an entire (or substantially entire) bottom surface of the undercarriage 16U, the cover plate 16C may prevent debris from entering into an interior of the floor stripping machine 10. By reducing or eliminating debris within the floor stripping machine 10, the cover plate 16C may prevent debris-induced wear of internal components of the floor stripping machine 10, thus extending the useful lives of such components. In addition, by preventing the build-up of debris within the interior of the floor stripping machine 10, the cover plate 16C may reduce or eliminate debris-related overheating issues.

The frame assembly 16 of a floor stripping machine of the present invention may be manufactured from any suitable material. In a specific embodiment, a suitable sheet metal, such as steel, may be used. In embodiments, where the frame assembly 16 includes an undercarriage 16U and one or more cover plates 16U, when these element are formed from steel, the cover plate(s) 16C may be welded to the undercarriage 16U.

The support elements 17 of the chassis 12 of a floor stripping machine 10 of the present invention may also be manufactured from any suitable material or

materials. Like the frame assembly 16, the support elements 17 may, in a specific embodiment, be made of steel.

Regardless of the material or materials from which they are made, the frame assembly 16 and/or the support elements 17 of the chassis 12 of a floor stripping machine 10 of the present invention and, thus, the chassis 12 itself, are configured to directly or indirectly (*e.g.*, by way of internal support panels, sliding supports, body panels, etc., secured to the frame assembly 16 and or to the support elements 17) support and retain various other components of the floor stripping machine 10. In the specific embodiment shown in FIG. 6, the chassis 12 at least partially carries the drive wheels 20, the caster wheel(s) 25, the floor stripper 30, the user interface system 40 (*see also* FIGs. 1 though 5), the various panels that make up the body 60 (FIGs. 1 through 5), the seat 50 (FIGs. 1 through 5), the electrical system 70, the hydraulic system 90, the diagnostic system 110, and the vacuum system 120.

As shown in FIG. 6, in one embodiment of floor stripping machine 10 of the present invention, the chassis 12 includes or supports a subassembly carrier 18. The subassembly carrier 18, in turn, carries various modular component subassemblies 19a, 19b, 19c, etc., as well as a number of other components. Each modular component subassembly 19a, 19b, 19c, etc., of a floor stripping machine 10 that incorporates teachings of the present invention may be easily and readily removable from and replaceable upon the floor stripping machine 10. In the illustrated embodiment, the subassembly carrier 18 is located at a back end 12R of chassis 12 to provide easy access to a number of different internal components of the floor stripping machine 10. In the depicted embodiment, all of the major components of the floor stripping machine 10 (*e.g.*, components of the electrical system 70 and the hydraulic system 90) may be accessed simply by opening a single panel 68 (FIG. 2) secured over the back end 12R of chassis 12.

The modular subassemblies of the depicted embodiment include an electrical subassembly 19a (see also FIG. 7A), a motor-pump subassembly 19b (see also FIG. 7B), and a hydraulic subassembly 19c (see also FIG. 7C).

The hydraulic subassembly 19c, which includes components that are part of the hydraulic system 90, may include a hydraulic component carrier 91, such as the depicted panel. One or more other components of the hydraulic system 90 may be

secured to or otherwise supported by the hydraulic component carrier 91. For example, as depicted in FIGs. 6 and 7C, the hydraulic component carrier 91 may carry a hydraulic tank 92, as well as a cooler 93 that communicates with tank to cool hydraulic fluid used in the hydraulic system.

Other elements of the hydraulic system 90 may be carried by the hydraulic component carrier 91 or by other features of the floor stripping machine 10. In the embodiment shown in FIGs. 6 and 7B, the hydraulic system 90 includes a hydraulic pumping system 94 that is carried by a motor-pump assembly carrier 101 of the motor-pump assembly 19b. More specifically, the hydraulic pumping system 94 may include a pair of pumps 95a and 95b, that are assembled in tandem. One pump 95b may enable operation of the drive wheels 20, while the other pump 95a may enable operation of other hydraulic components (*e.g.*, the floor stripper 30, etc.) of the floor stripping machine 10.

Additionally, with added reference to FIG. 8, the hydraulic system 90 may include one or more hydraulic drive components of known type. Without limiting the scope of the present invention, the hydraulic system 90 may include a hydraulic motor (not shown) associated with each drive wheel 20. In addition, each of the hydraulic motors is associated with a dedicated linear actuator 98a, 98b, which controls the flow of hydraulic fluid from pump 95b into and out of its corresponding hydraulic motor and, thus, controls operation of its corresponding hydraulic motors. Each linear actuator 98a, 98b may operate under control of (*e.g.*, its position may be controlled by) an electrical signal (*e.g.*, a 24 V signal, etc.) from the user interface system 40 (in a specific embodiment, from an electrical signal generated during movement of its corresponding drive control joystick 46, 48) and, thus, may comprise part of the electrical system 70 of the floor stripping machine 10. In some embodiments, the hydraulic drive components provide the floor stripping machine 10 with a so-called "zero turn radius."

In addition, the hydraulic system 90 may include components (*e.g.*, a hydraulic motor that operates under control of a linear actuator or other control (*e.g.*, by way of an electrical toggle switch atop one of the drive control joysticks 46, 48, etc.) that enables the movement and use of the floor stripper 30 or another implement used in place of the floor stripper 30 in a manner known in the art.

The various components of the hydraulic system 90 communicate with one another in a manner known in the art (*e.g.*, through direct interconnection or by way of hydraulic conduits, or lines, etc.).

Pressurization of hydraulic fluid within the hydraulic system 90, which enables operation of the hydraulic components (*e.g.*, the hydraulic motors 97, etc.) of the floor stripping machine 10, may be provided by a motor 112, which is a component of the electrical system 70 of the depicted embodiment of the floor stripping machine 10. The motor 112 may be coupled to the hydraulic pumping system 94 in a manner known in the art to directly controls operation of the hydraulic pumping system 94 (*i.e.*, the pumps 95a and 95b). In addition, the motor 112 may be secured to and carried by the motor-pump assembly carrier 101.

In a specific embodiment, the motor 112 comprises an AC motor, which operates at a lower temperature than the DC motors that are used in the battery powered floor stripping machines that are currently available. Since the motor 112 has a relatively low operating temperature, other components of the floor stripping machine 10, such as its hydraulic system and the hydraulic fluid used in the hydraulic system, will not heat up as much as they would in a currently available battery powered floor stripping machine. Thus, when motor 112 comprises an AC motor, there is less of a need to cool the hydraulic fluid, and a lesser volume of hydraulic fluid may be included in the hydraulic system 90.

In addition to the motor 112, the electrical system 70 of a floor stripping machine 10 of the present invention includes a power source 72 and, in some embodiments, may also include one or more processing elements 80 (*e.g.*, a controller, a computer, etc.) and associated componentry.

In a particular embodiment, the power source 72 includes an on-board charger 74, one or more batteries 76, and an inverter 78. The on-board charger 74 may be configured for coupling (i.e., to be plugged into via an electrical socket 75, etc.) an AC power source, such as a 110V source of electricity and/or a 220V source of electricity. The on-board charger 74 communicates an electrical current to each battery 76 of the floor stripping machine 10. A transformer 75 may be associated with the on-board charger 74 to ensure that the, regardless of the voltage of

the power introduced into the on-board charger 74, the appropriate voltage will be applied to each battery 76.

In some embodiments, the battery (or batteries) 76 may be configured to substantially continuously operate the floor stripping machine 10 for at least eight hours, or even up to twelve hours or more. Absorbed glass mat (AGM) batteries are particularly suitable for this purpose. In a specific embodiment, one or more AGM batteries providing at least 48V of power may be used.

The long battery life may also result, at least in part, from the use of electronic components (*e.g.*, the motor 112, etc.) that operate under control of AC power. Accordingly, a floor stripping machine 10 that incorporates teachings of the present invention may also include an inverter 78, which converts at least a portion of the DC power from the battery (or batteries) 76 to AC power.

Of course, other components, such as a processing element 80 and its associated componentry, may operate under control of DC power, which may converted to an appropriate voltage (or appropriate voltages) in a manner known in the art (*e.g.*, by use of a suitable inverter 82 (*e.g.*, a 48V DC to 12V DC inverter, etc.), which conveys power from the battery (or batteries) 76 to the processing element 80 and its associated componentry. In the embodiment depicted by FIGs. 6 and 7A, the processing element 80, which comprises a controller, or on-board computer, and the inverter 82 are part of the electrical subassembly 19a, and are carried by an electrical component carrier 81 of the electrical subassembly 19a.

The processing element 80 may be programmed to at least partially control operation of the motor 112 (*i.e.*, the flow of power from the battery (or batteries) 76 to the motor 112) and, optionally, other components, such as the hydraulic pumps 95a and 95b, of the floor stripping machine 10. In some embodiments, the processing element 80 may operate under control of a program provided on a plug-in chip (*i.e.*, by firmware). Without limiting the scope of the present invention, the processing element 80 may be programmed to provide the floor stripping machine 10 with a soft, smooth starting motion and soft, smooth stopping motion.

In some embodiments, the processing element 80 may provide for a variety of selectable driving modes. Such driving modes may include, but are not limited to, a variety of speed and power (torque) combinations. In a specific embodiment, the

processing element 80 may be programmed to provide the floor stripping machine 10 with ten speed and power (torque) combinations, with a first setting providing maximum power and low speed, a fifth setting providing medium power and speed, and a tenth setting providing low power and maximum speed. The fifth setting may be desirable for normal use of the floor stripping machine 10, while lower settings may be desirable for harder to remove materials (where more torque is needed) and higher settings may be desirable when removal is relatively easy, and less power is needed.

In some embodiments, when use of the floor stripping machine 10 for purposes other than floor stripping is desired (*e.g.*, as a tugger, etc.), the processing element 80 may be reprogrammed with a program that provides one or more settings with the combination(s) of power (torque) and speed that are appropriate for such other use(s). In embodiments where programming for the processing element 80 is stored on a plug-in chip, such alternate programming may be provided by removing and replacing the plug-in chip with another plug-in chip that stores the desired programming. In an alternative embodiment, communication may be established between a control device (*e.g.*, a laptop computer, another handheld electronic device, etc.) operating under control of appropriate programming and the processing element 80 to modify the programming of the processing element 80.

In order to enable a user to select a desired operation setting (*e.g.*, power (torque) and speed setting, etc.), the processing element 80 communicates with various controls of the user interface system 40 of the floor stripping machine 10. Without limiting the scope of the present invention, the user interface system 40 may include a console 42 with one or more input/output features that enable a user to select from various functionality options controlled by programming of the processing element 80. In the depicted embodiment, the console 42 includes a touch screen 44 of a known type. The touch screen 44, which communicates with the processing element 80 in a manner known in the art, provides a visual display that may be understood by the user, as well as input capabilities that enable the user to provide the controller with instructions (*e.g.*, on power (torque) and speed settings, etc.).

In various embodiments, a user interface system 40 of a floor stripping machine 10 of the present provides a user with control over the movement of the floor

stripping machine 10, as well as control over any implements (*i.e.*, the floor stripper 30, etc.) of the floor stripping machine 10. In the depicted embodiment, the user interface system includes a pair of drive control joysticks 46 and 48, one corresponding to each drive wheel 20.

Each drive control joystick 46 and 48 controls operation of a corresponding linear actuator 98a, 98b (FIG. 8). In some embodiments, movement of the drive control joysticks 46 and 48 may send electrical signals to the corresponding linear actuators 98a, 98b. In addition, electrical signals may be sent from the drive control joysticks to processing element 80, which may, in turn, control the operation of the motor 112 to pressurize the hydraulic system 90.

One or both joysticks 46 and 48 may also include other features (*e.g.*, buttons, switches, etc.) that controls operation of the floor stripper 30 (*e.g.*, movement of the floor stripper 30 up or down, etc.) and other features of the floor stripping machine 10 in a manner known in the art. Such features may electronically (*e.g.*, through direct electrical signals, through the processing element 80, etc.) and/or mechanically control operation of various components associated with the floor stripping machine 10.

In some embodiments, the user interface system 40 may also include a diagnostic system 110. A diagnostic system 110 of a floor stripping machine 10 of the present invention may include the processing element 80, or a separate processing element, which may operate under control of a diagnostic program. In such embodiments, the processing element 80 may communicate electronically with one or more diagnostic elements of a type known in the art (not shown) (*e.g.*, temperature sensors, pressure sensors, etc.), which monitor characteristics of one or more elements of the floor stripping machine 10 (*e.g.*, the temperature of the motor 112, the hydraulic fluid temperature, etc.).

In a specific embodiment, the programming of the processing element 80 may enable the processing element to determine when one or more characteristics have reached undesirable levels (*e.g.*, a monitored temperature has exceeded a predetermined threshold, operation of a monitored component is below an acceptable level, etc.). The processing element 80 may be programmed to output a predetermined error code (*e.g.*, E1 through E12, etc.) to an output element (*e.g.*, the

touch screen 44, etc.) of the user interface system 40 to provide a user with a specific indication of a problem with the floor stripping machine 10, which may enable the user to correct the error (*e.g.*, by ordering and replacing a failed component or modular component assembly 19a, 19b, 19c, etc.).

When a user receives an error code that indicates that a part needs to be replaced, the user may order a replacement part, or a modular component assembly that includes the replacement part, from the manufacturer, or from a suitable parts supplier. Due to the modularity of some embodiments of the present invention, user repairs are simplified and encouraged, which enables a user to maximize use of a floor stripping machine 10 of the present invention.

In some embodiments, the programming of the processing element 80 may further enable the processing element 80 to automatically address a monitored error by altering the operation of one or more components of the floor stripping machine (*e.g.*, the motor 112, etc.) until the monitored characteristic(s) return to acceptable levels (*e.g.*, a monitored temperature has cooled to a temperature below a predetermined, acceptable reset temperature, etc.).

The floor stripper 30 of a floor stripping machine 10 of the present invention may include a self-leveling blade 32 (FIG. 1). The self-leveling feature of the blade 32, which may comprise a mechanical center pivot point 36, maintains constant contact between a scraping edge 34 of the blade 32 and a floor surface as the blade 32 is lowered for use—even when the blade 32 travels over debris on the floor surface.

A vacuum system 120 may also be incorporated into various embodiments of floor stripping machines 10 of the present invention. The vaccum system 120 may be carried upon the chassis 12 of the floor stripping machine. A vacuum system 120 may collect dust and smaller debris from a floor surface as material is stripped from the floor surface, which may be required at some job sites.

As shown in FIGs. 1 through 5, the floor stripping machine 10 also includes a body 60, which encloses various internal components of the floor stripping machine 10, while providing access to certain features, such as an electrical socket of the charger 74. The body 60 may be comprised of a number of panels 62-66, as well as a rear access panel 68, best illustrated by FIG. 2, that enables a user to access the various modular component subassemblies 19a, 19b, 19c, etc. (FIG. 6) of the floor

stripping machine 10. The panels 62-66 and access panel 68 of the body 60 may be secured to the chassis 12 (FIG. 6) of the floor stripping machine 10 in any suitable manner known in the art (*e.g.*, with fasteners, such as bolts, hinges, latches, etc.). One or more of the panels 62-66 may be provided with smaller access doors 67, such as that depicted by FIGs. 2 and 3, to enable an individual to access other interior components of the floor stripping machine 10.

In the embodiment of floor stripping machine depicted by FIGs. 1 through 5, a seat 50 is carried upon the body 60. The seat 50 is located somewhat centrally over a length of the floor stripping machine 10 (*e.g.*, with a front edge of the seat 50 being located about 18 inches behind a front end 12F of the chassis 12 (FIG. 6). Such a seat 50 location may be configured to enable a user to ride the floor stripping machine 10 without substantially modifying a weight distribution of the floor stripping machine 10, regardless of the user's size and/or weight.

In a specific embodiment, a floor stripping machine of the present invention has a weight of about 3,000 pounds, a length of about 65 inches, a width of about 26 inches (enabling the floor stripping machine 10 to travel through 30 inch doors), and a height of about 48 inches. Such a floor stripping machine 10 may remove material (*e.g.*, vinyl composition tile (VCT)) from a floor surface at an average rate of about 4,000 square feet per hour.

Although the present invention has been shown and described with respect to various illustrated embodiments, various additions, deletions and modifications that are obvious to a person of ordinary skill in the art to which the invention pertains, even if not shown or specifically described herein, are deemed to lie within the scope of the invention as encompassed by the following claims.

CLAIMS

What is claimed:

1. A floor stripping machine, comprising:

a chassis;

a pair of drive wheels associated with the chassis;

an electrically actuated linear drive system for controlling operation of hydraulic motors associated with the pair of drive wheels; and

drive controls for operating the linear drive system and the pair of drive wheels.

2. The floor stripping machine of claim 1, wherein the drive controls include a computer for controlling the linear drive system.

3. The floor stripping machine of claim 2, wherein the computer is programmable from a user interface of the drive controls.

4. The floor stripping machine of claim 2, wherein the drive controls comprise a removable, replaceable computer chip for programming the computer and altering operation of the hydraulically actuated linear drive system.

5. A floor stripping machine, comprising:

a chassis;

a pair of drive wheels associated with the chassis;

a drive system associated with the pair of drive wheels; and

a diagnostic system for monitoring a plurality of components of the drive system, providing a user with specific information regarding an error associated with each component of the plurality of components, and controlling operation of at least one component of the plurality of components to correct an error associated with that component.

6. The floor stripping machine of claim 5, wherein the drive system includes hydraulic fluid, a hydraulic tank, a hydraulic cooler, an AC motor, a pair of hydraulic pumps, and a hydraulic transaxle.

7. The floor stripping machine of claim 6, wherein the diagnostic system monitors a temperature of the hydraulic fluid and a temperature of the AC motor and reduces operation of the AC motor if the temperature of the hydraulic fluid exceeds a predetermined hydraulic fluid temperature threshold or the temperature of the AC motor exceeds a predetermined motor temperature threshold.

8. A floor stripping machine, comprising:

a chassis;

a body carried by the chassis;

a removable access panel at a rear of the chassis;

an internal subassembly carrier accessible through the removable access panel; and

a plurality of modular subassemblies securable to and removable from the internal subassembly carrier, the plurality of modular subassemblies including:

an electrical subassembly, including:

an electrical component carrier configured to be secured to the internal subassembly carrier; and

a plurality of electrical components secured to the electrical component carrier;

a motor-pump subassembly, including:

a motor-pump carrier configured to be secured to the internal subassembly carrier;

a motor secured to the motor-pump carrier; and

a pair of hydraulic pumps secured to the motor-pump carrier; and

a hydraulic subassembly, including:

a hydraulic component carrier configured to be secured to the internal subassembly carrier;

a tank secured to the hydraulic subassembly carrier; and

a cooler secured to the hydraulic subassembly carrier.

9. A floor stripping machine, comprising:

a chassis;

a body carried by the chassis;

at least two drive wheels associated with the chassis;

a floor stripper at a front end of the chassis; and

a seat carried by the body, at a central location over a length of the chassis.

10. The floor stripping machine of claim 9, having a weight distribution that, without coupling additional displacement weights to the floor stripping machine, causes the floor stripping machine to apply a sufficient load the floor stripper to enable the floor stripper to operate properly while causing the floor stripping machine to apply a sufficient load to the at least two drive wheels to enable the at least two drive wheels to maintain constant traction with a surface on which the floor stripping machine is being used.

11. A floor stripping machine, comprising:

a chassis;

a pair of drive wheels associated with the chassis;

an electrical system carried by the chassis, the electrical system including:

an electrical charging system;

a transformer associated with the electrical charging system;

at least one battery in communication with the electrical charging system; and

an inverter associated with the at least one battery to provide alternating current (AC) to electrical components of the floor stripping machine.

12. The floor stripping machine of claim 11, further comprising:

a hydraulic system, including:

hydraulic fluid;

a tank for containing the hydraulic fluid;

a cooler for cooling the hydraulic fluid; and

a pair of hydraulic pumps controlled by an AC motor of the electrical components,

inclusion of the AC motor minimizing a volume of the hydraulic fluid in the hydraulic system.

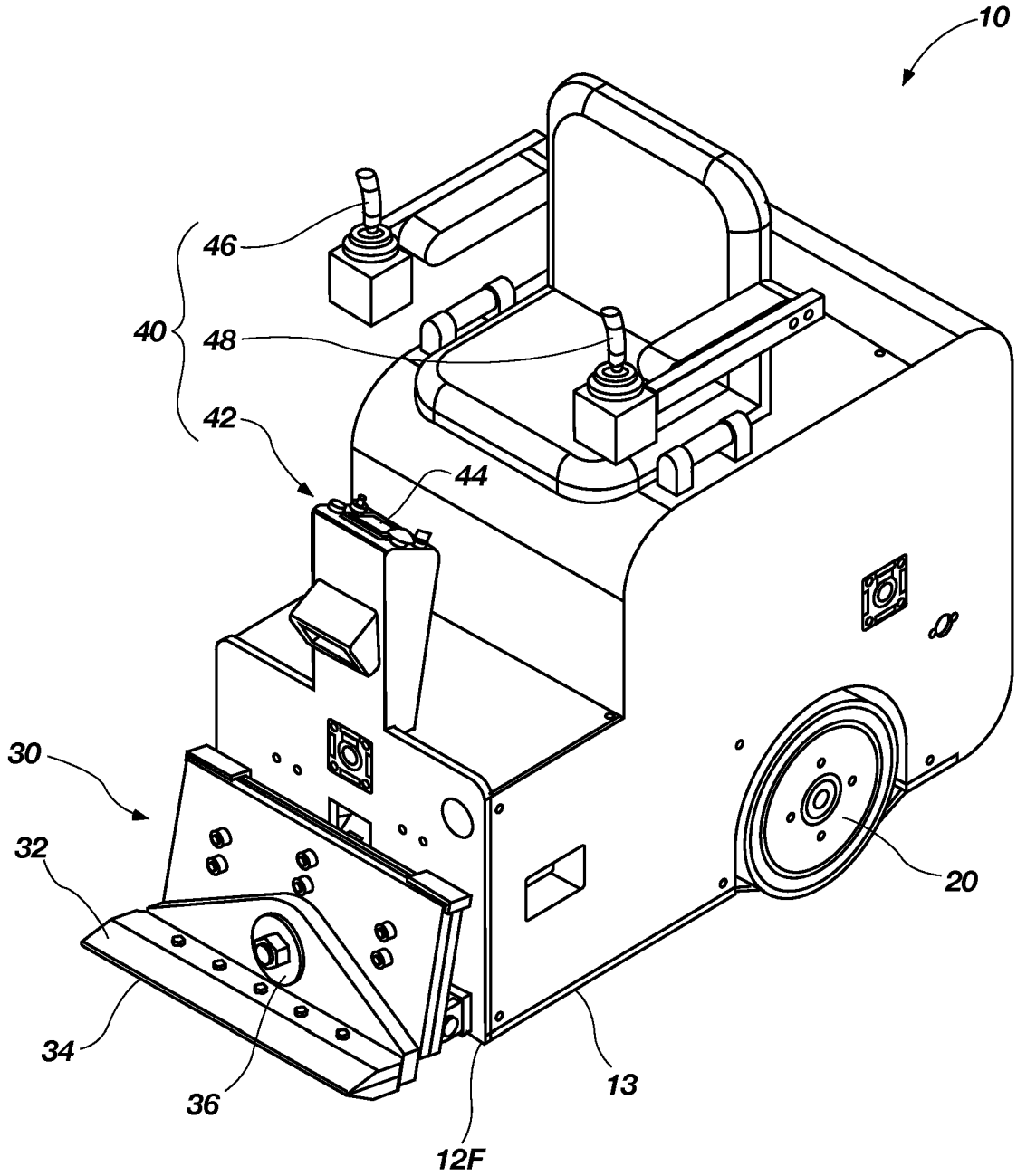

FIG. 1

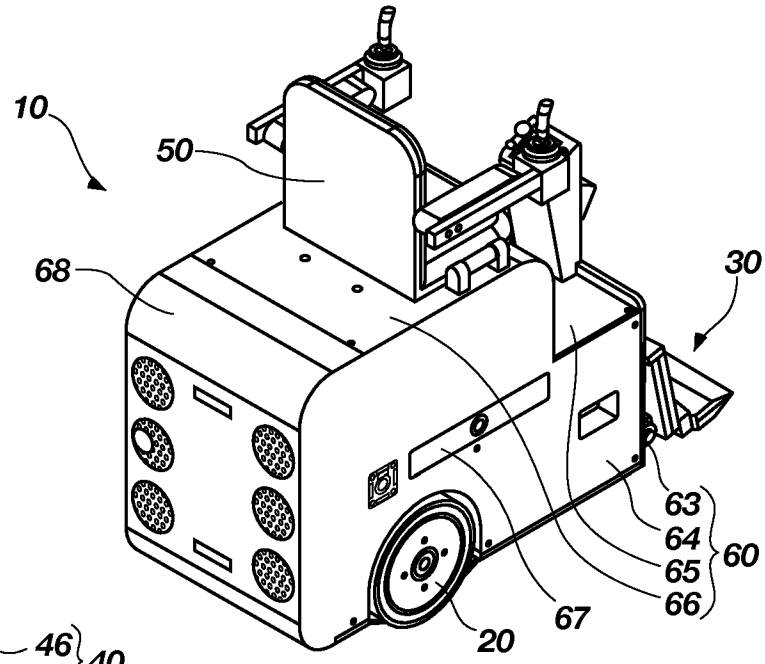

FIG. 2

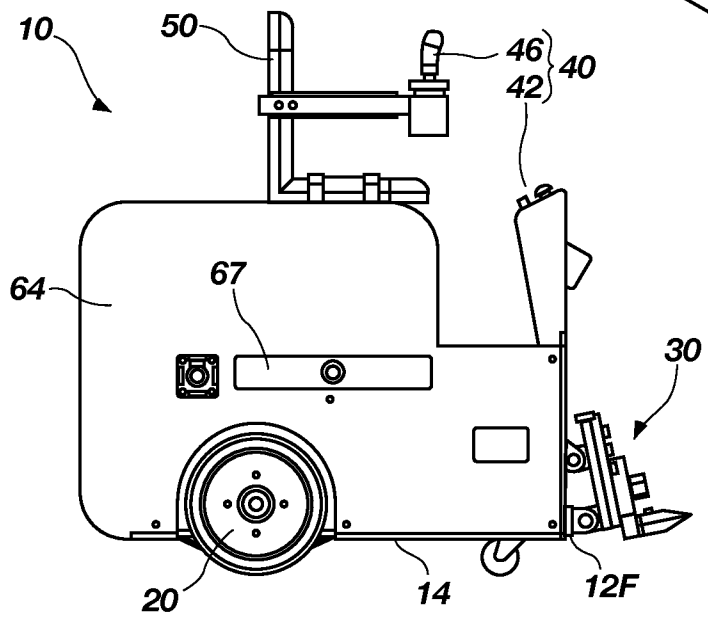

FIG. 3

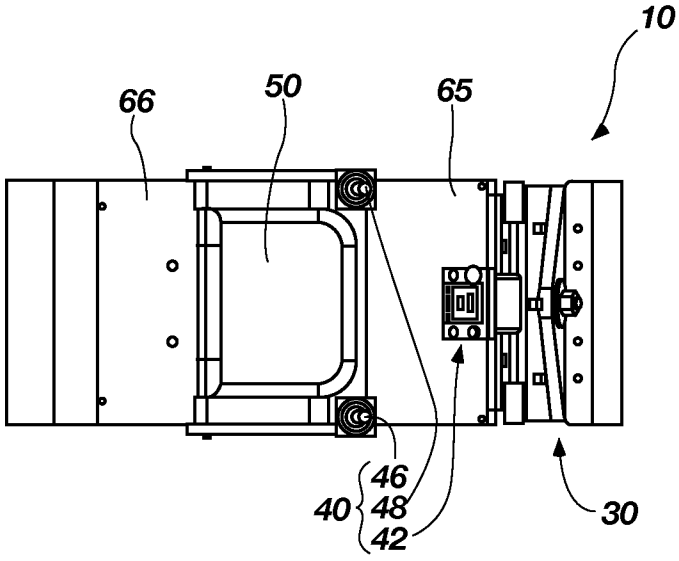

FIG. 4

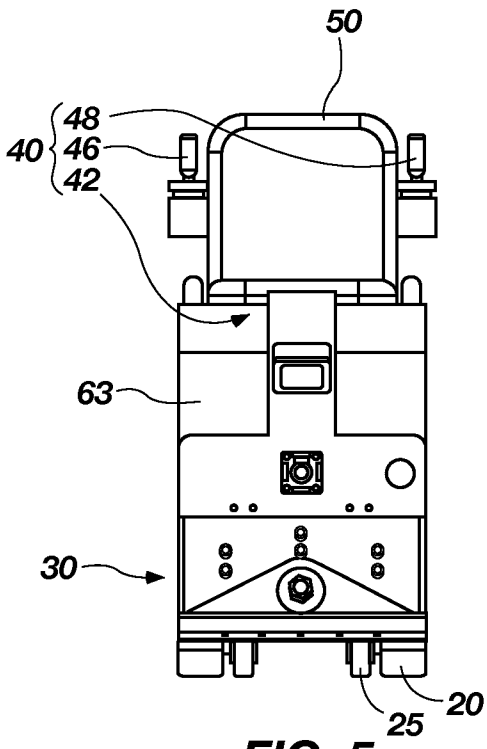

FIG. 5

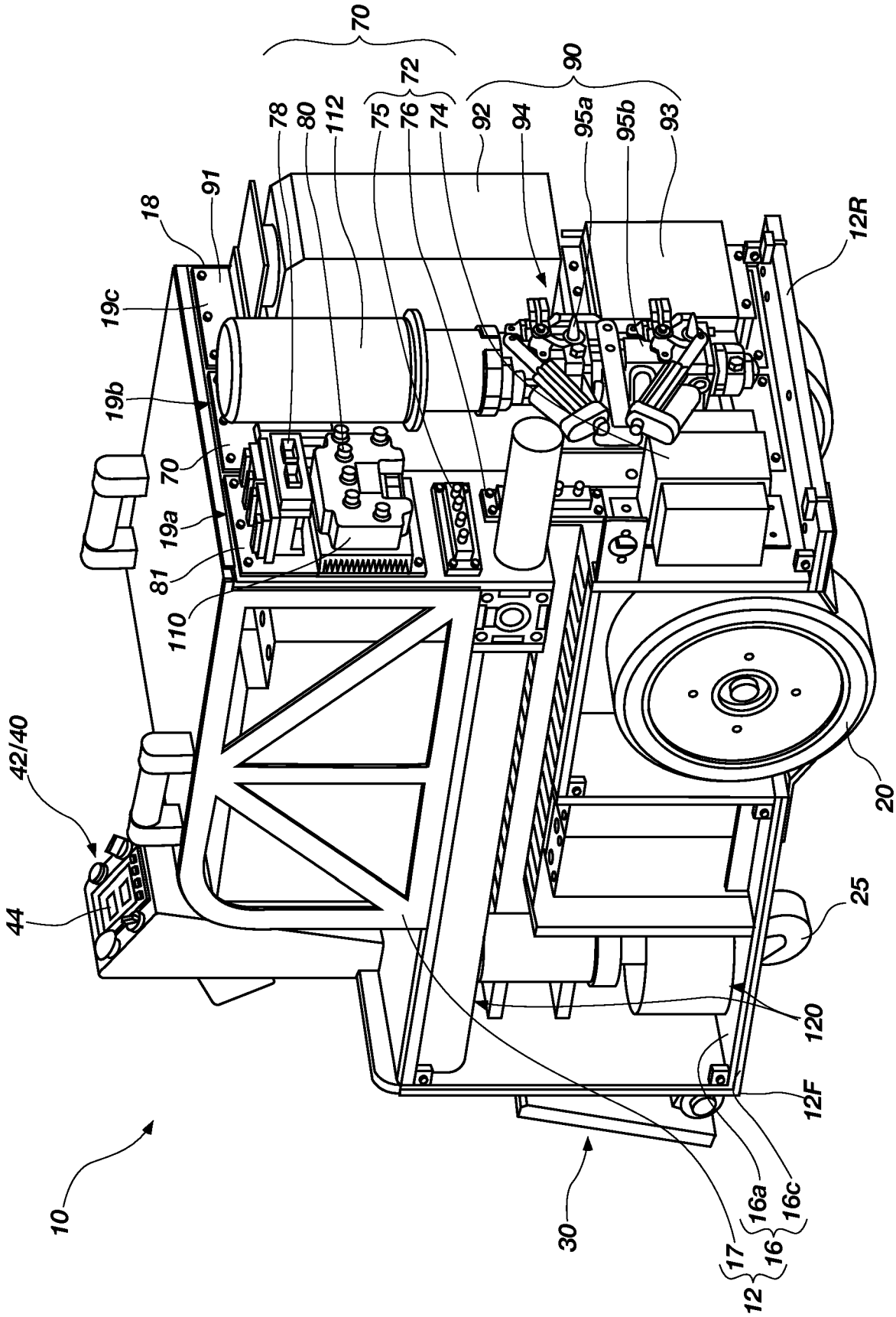
70
72
90
78
80
112
75
76
74
92
94
95a
95b
93
18
91
12R
19c
19b
70
19a
81
110
42/40
44
20
25
120
12F
10
30
16a
16c
17
16
12

FIG. 6

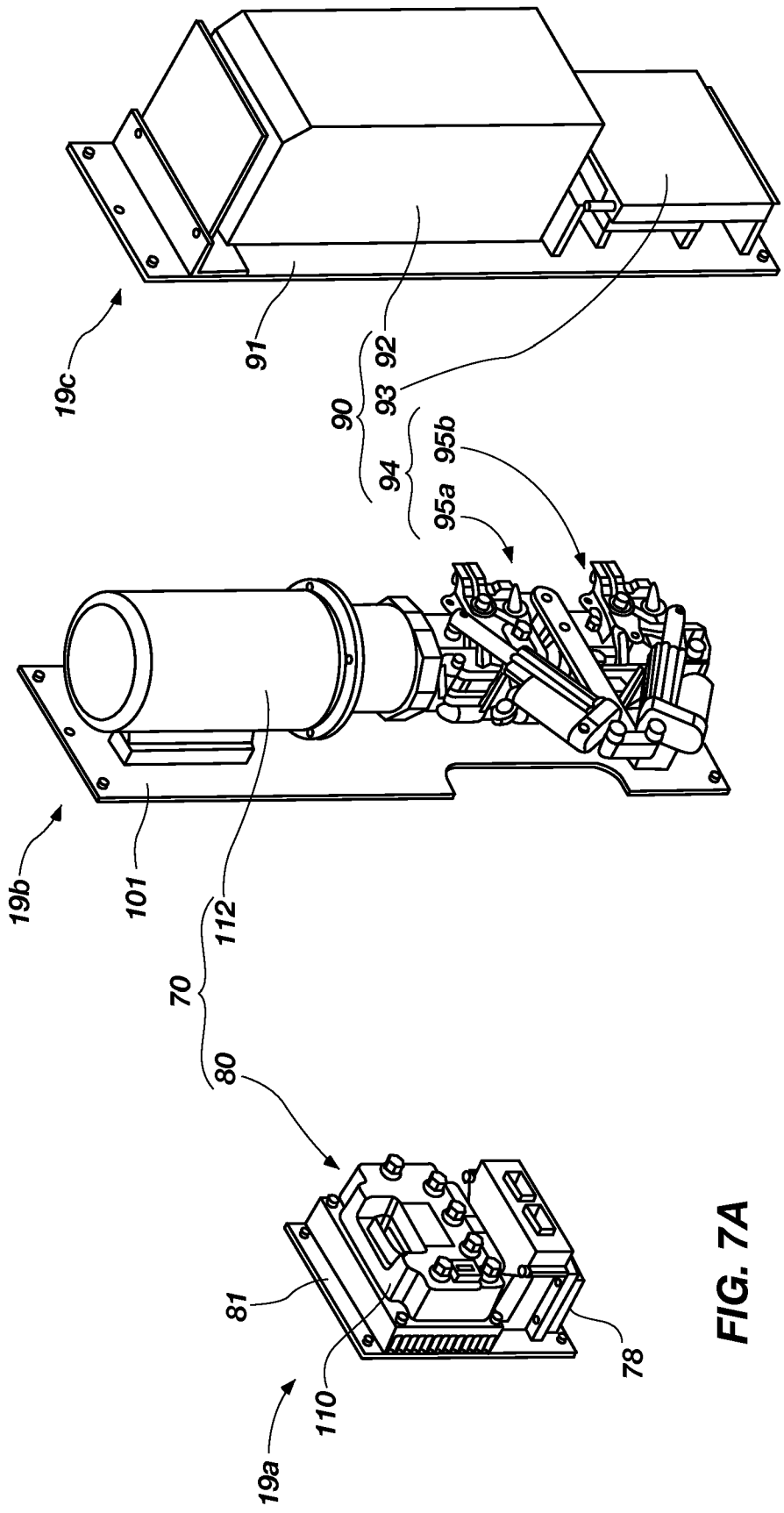

FIG. 7C

FIG. 7B

FIG. 7A

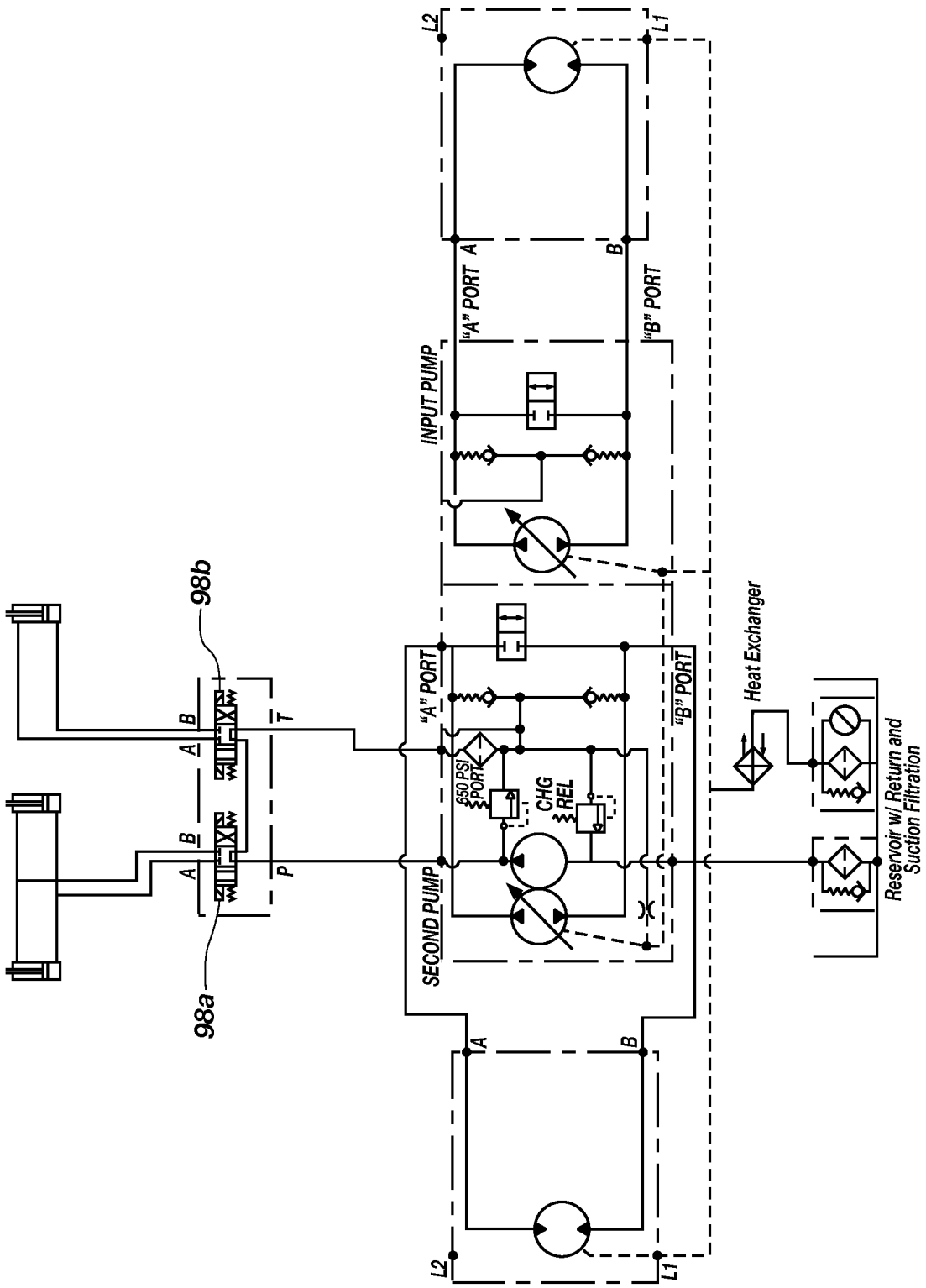
L2
L1
A
B
"A" PORT
"B" PORT
INPUT PUMP
98b
98a
T
P
650 PSI PORT
CHG REL
SECOND PUMP
Heat Exchanger
Reservoir w/ Return and Suction Filtration

FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/023243

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - A47L 11/12 (2011.01)
USPC - 299/37.1
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - A47L 11/12, 13/02 (2011.01)
USPC - 15/93.1; 299/37.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
MicroPatent, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 6,540,305 B2 (PHILLIPS) 01 April 2003 (01.04.2003) entire document	9, 10 --------- 1-8, 12
Y	US 6,354,184 B1 (HANSEN et al) 12 March 2002 (12.03.2002) entire document	1-4
Y	US 7,648,440 B2 (WU et al) 19 January 2010 (19.01.2010) entire document	2-7, 11, 12
Y	US 7,379,801 B2 (HEFFINGTON) 27 May 2008 (27.05.2008) entire document	3
Y	US 7,562,412 B1 (ANDERSON) 21 July 2009 (21.07.2009) entire document	11, 12
Y	US 2004/0163893 A1 (LANGEN) 26 August 2004 (26.08.2004) entire document	8
Y	US 2006/0201017 A1 (ELLIS et al) 14 September 2006 (14.09.2006) entire document	8
Y	US 6,035,930 A (SCHWARTZ) 14 March 2000 (14.03.2000) entire document	8

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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 March 2011	25 MAR 2011
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774