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LOW VOLTAGE CONVERSION UNIT

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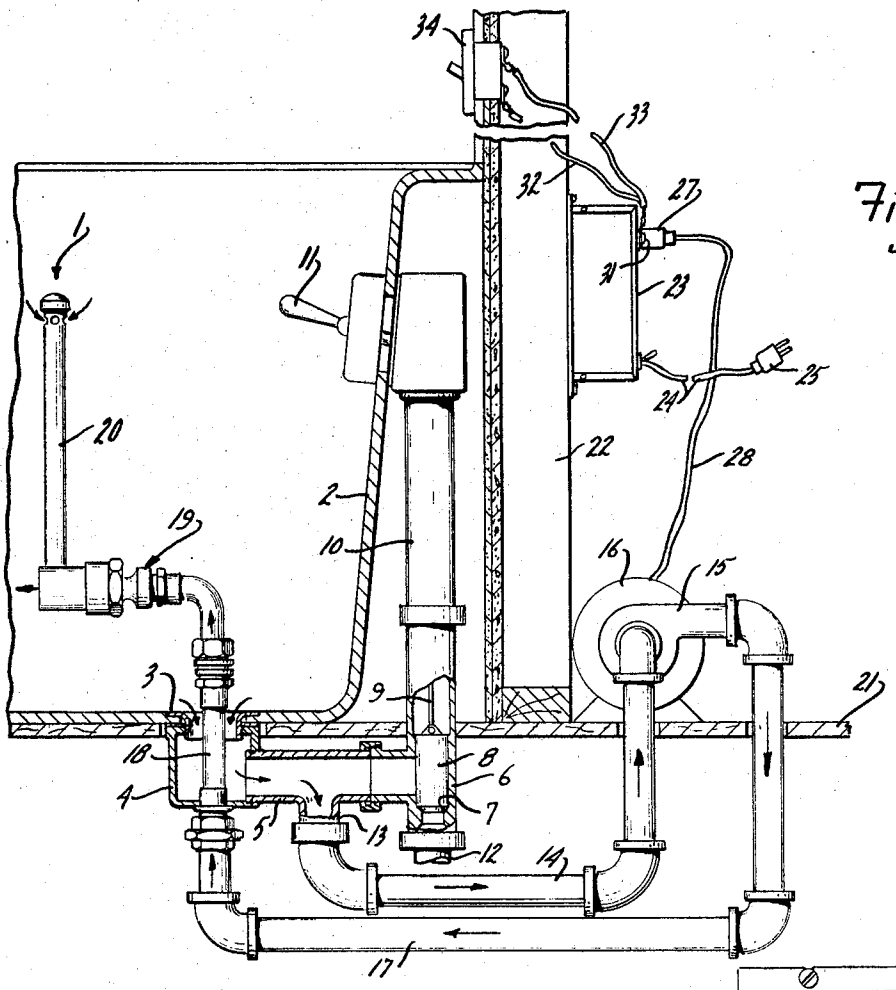

Fig. 1.

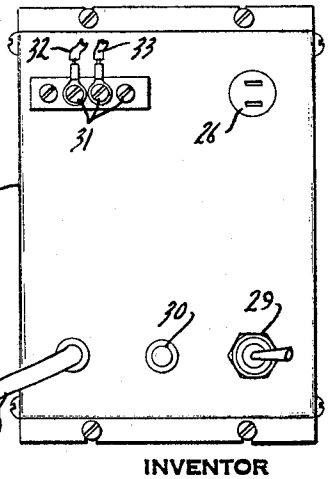

Fig. 2.

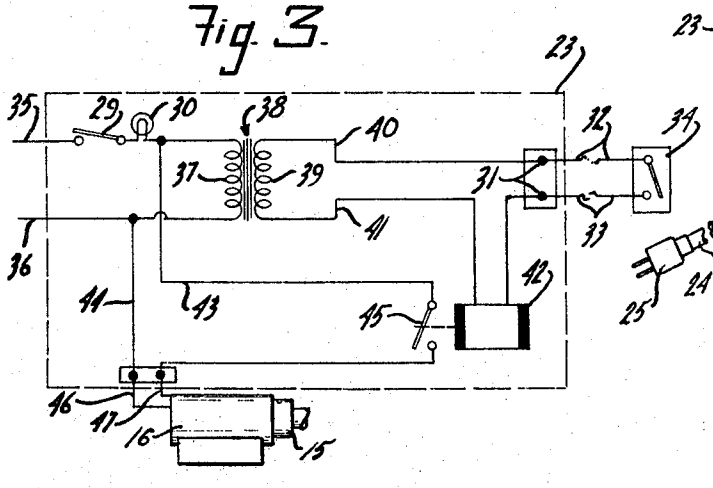

Fig. 3.

INVENTOR
DOUGLAS C. STELTZ
BY
Andrus & Starke
Attorneys

United States Patent Office

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LOW VOLTAGE CONVERSION UNIT

Douglas C. Steltz, 13385 Kenmar Court, Brookfield, Wis. 53005

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ABSTRACT OF THE DISCLOSURE

A control circuit or low voltage conversion kit to be used in combination with a hydrotherapeutic unit or other electrical device which is to be used in a bathtub or other zone exposed to moisture. The low voltage conversion kit is a prewired package which can readily be installed without any alteration or modification of the electrical system of the home or building.

The unit is merely plugged into a normal 120 volt household line and the leads from the motor are plugged into a socket on the casing of the package. By connecting low voltage leads from the low voltage terminals on the casing to the switch, which is located at the tub, the installation is complete.

This invention relates to a low voltage conversion unit and more particularly to a low voltage conversion unit for use with a hydrotherapeutic device.

In the conventional hydrotherapeutic unit a nozzle assembly is located within a tub or tank containing water and a motor driven pump is generally located outside of the tub. This discharge side of the pump is connected to the nozzle assembly so that high pressure water is discharged through the nozzle assembly underneath the level of water in the tub while water is returned through the drain opening in the tub to the suction side of the pump. From a convenience standpoint, the operating switch for the pump motor would best be located at the tub so that the person using the hydrotherapeutic unit can start and stop the unit while remaining in the tub. However, from a safety standpoint, the operating switch is generally located a substantial distance from the tub so that the person cannot actuate the switch while in the tub and is forced to get out of the tub to actuate the switch. Locating the switch a substantial distance from the tub is a safety precaution which eliminates the possibility of a person being subjected to the line voltage in the case of a faulty switch.

The present invention is directed to a low voltage conversion unit for use with an electrically driven apparatus, such as a hydrotherapeutic unit, which is adapted to be used in water or moist conditions. In accordance with the invention, the switch which controls the operation of the pump motor of the hydrotherapeutic unit is operated by low voltage thereby eliminating any inherent danger to the person using the unit in the case of a short in the switch. More specifically, the invention includes a prewired package which is installed near the location of the pump. The package includes a casing which houses a transformer and a relay. The high voltage winding of the transformer is connected to the standard 120 volt lines, while the low voltage winding is connected to terminals on the outer surface of the casing. The low voltage terminals are connected to a switch located at or near the tub where the hydrotherapeutic unit is to be used. Connected in the low voltage line to the switch is a relay and the relay contacts are connected in the high voltage line to the pump. By closing the switch located at the pump, the relay closes the contacts to close the high voltage circuit to the pump so that the pump will operate.

With the present invention, the low voltage switch is located at the tub so that the person within the tub can

actuate the switch without the inherent danger of being subjected to the high line voltage.

The low voltage conversion unit is a prewired package which can be readily installed without any alteration or modification of the electrical system of the home or building. The unit is merely plugged into a 120 volt line and the leads from the motor are plugged into a socket on the casing. By connecting the low voltage leads from the terminal on the casing to the switch, the installation is complete.

Other objects and advantages will appear in the course of the following description.

The drawings illustrate the best mode presently contemplated of carrying out the invention.

In the drawings:

FIG. 1 is a vertical section of a hydrotherapeutic unit associated with a bathtub and utilizing the low voltage conversion unit of the invention;

FIG. 2 is a plan view of the casing of the low voltage conversion unit; and

FIG. 3 is a wiring diagram.

The drawings illustrate a hydrotherapeutic unit **1** associated with a standard bathtub **2**. The particular structure of the hydrotherapeutic unit is not in itself critical, and the drawings illustrate a unit similar to that disclosed in the copending application Ser. No. 468,048, filed June 29, 1965.

As shown in FIG. 1, the lower surface of the tub **2** is provided with a standard drain fitting **3** which is connected to fitting **4**. One arm of a T-fitting **5** is connected to the fitting **4** and the opposite arm of T-fitting **5** is connected to a waste valve fitting **6** which defines a valve seat **7**. A standard waste valve **8** is adapted to engage the valve seat **7** and the valve **8** is raised and lowered through a rod **9** which extends upwardly through the overflow conduit **10**. The upper end of the rod **9** is connected to a handle or lever **11** and by pivoting the handle **11** the rod is raised and lowered in a conventional manner to open and close the valve **8**. The lower end of the waste fitting **6** is connected by line **12** to a sewer or other disposal site.

The stem **13** of T-fitting **5** is connected by pipe **14** to the inlet or suction side of a pump **15** driven by electric motor **16**. The outlet or discharge side of the pump is connected by pipe **17** to a riser **18** which extends upwardly through the drain fitting **3** to the interior of the tub **2**. A nozzle assembly **19**, similar to that described in the copending application, Ser. No. 468,048, filed June 29, 1965, is connected to the upper end of riser **18** and water being pumped through the riser is discharged from the nozzle beneath the level of the water in tub **2** in the form of a high pressure stream. To aerate the water being discharged from the nozzle assembly, a stand pipe **20** is connected to the nozzle assembly and air is drawn into the stand pipe through openings in the upper end by an aspirating action.

As shown in the drawings, the pump **15** and motor **16** are supported on the floor **21** of the building behind the bathroom wall **22**. While the drawings illustrate the pump being supported on the floor **21**, it is contemplated that the pump and motor may be mounted on the studs of wall **22** or between the floor joists or they may be located in the basement of the building.

The low voltage conversion unit of the invention includes a casing **23** which is mounted on studs of the wall **22** of the building. The casing is best illustrated in FIG. 2 and a power line **24** extends outwardly from the casing and terminates in a plug **25** which is adapted to be engaged with a standard 120 volt line in the building.

In addition, a socket **26** is provided in the face of casing **23** and a plug **27** connected to motor line **28** is adapted

to be plugged into the socket **26**. In addition, an on-off switch **29** and indicating light **30** are mounted in the face of the casing.

The casing also contains a series of low voltage terminals **31** and the low voltage terminals are connected by leads **32** and **33** to a switch **34** which is mounted on the wall **22** adjacent the tub in a location where it can be actuated by the person using the hydrotherapeutic unit in the tub. While the drawings illustrate the switch **34** being located on the wall above the forward end of the tub, it is contemplated that the switch can be mounted in any convenient location on the wall bordering the tub or, if desired, the switch **34** can be located on the cover for the overflow unit which is on the wall of the tub.

FIG. 3 illustrates the circuitry for the low voltage conversion unit. Leads **35** and **36** which comprise the line **24** are connected between a 120 volt power source and a high voltage winding **37** of transformer **38**. The on-off switch **29** and indicating light **30** are connected in lead **35**.

The low voltage winding **39** of transformer **38** is connected by leads **40** and **41** to the terminals **31** which are located on the outer surface of the casing **23** and a relay **42** is connected in the line **41**. As previously mentioned, lines **32** and **33** connect the terminals **31** to the switch **34**.

Lines **43** and **44** connect the power lines **35** and **36** to the socket **26** and relay contacts **45** are located in the line **42**. As previously mentioned, the pump motor **27** is connected to the socket **25** by leads **46** and **47** which comprise the line **28**. With this circuitry, when the low voltage switch **34** is closed, the relay **42** will be energized to close the contacts **45** which then close the high voltage line to the pump motor **16** to operate the pump.

The present invention provides a low voltage conversion unit which is particularly adaptable for use with a hydrotherapeutic unit associated with a bathtub or other tank. With the use of the invention, low voltage is utilized for the operating switch which is located at the tub and any danger through electrical shorting to the user is thereby eliminated.

Moreover, the conversion unit of the invention is a prewired kit or package which can be readily installed without any substantial modification or alteration of the electrical circuit of the building. The plug **25** is merely plugged into a standard 120 volt outlet in the building and the plug **27** of the motor line **28** is engaged with the socket **26** in casing **23**. With the connection of the low voltage lines **32** and **33** to the switch **34**, the wiring is completed.

While the drawings illustrate the low voltage conversion unit associated with a hydrotherapeutic unit in a bathtub or other tank, it is contemplated that the conversion unit can be employed with any electrical apparatus which is adapted to be used in water or other moist conditions where there is an inherent danger to the user in the event of an electrical short.

Various modes of carrying out the invention are contemplated as being within the scope of the following claims particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

1. In combination with an electrically operated apparatus adapted to operate in a zone exposed to moisture, an electrical prime mover connected to said electrically operated apparatus and located outside of said zone, transformer means disposed outside of said zone and having a low voltage wining and a high voltage winding connected to a source of high voltage power, a high voltage circuit connecting the high voltage winding to said electrical prime mover, a low voltage circuit connected to said low voltage winding, switch means located within the zone and assessible to a person in said zone and connected in said low voltage circuit, and relay means connected in the low voltage circuit and having contacts in said high voltage circuit, closing of said switch means energizing said relay means to thereby complete the high voltage circuit and operate said prime mover, a person in said zone being able to actuate said switch means to operate said prime mover without the danger of exposure to said high voltage circuit.

2. In combination, a tub to contain water, a hydrotherapeutic unit including a discharge nozzle located in the tub, said unit also including a pump located outside of the tub and an electrical motor located outside of the tub and operably connected to said pump, a transformer located outside of the tub and having a low voltage winding and a high voltage winding connected to a source of high voltage power, a high voltage circuit connecting the high voltage winding to said motor, a low voltage circuit connected to said low voltage winding, switch means disposed adjacent the tub and accessible to a person in the tub and connected in said low voltage circuit, and relay means connected in the low voltage circuit and having contacts in the high voltage circuit, closing of said switch means energizing said relay means to thereby complete the high voltage circuit and operate said motor, a person in the tub being able to actuate said switch means to operate said motor without danger of exposure to said high voltage circuit.

3. The combination of claim **2**, and including a casing located outside of the tub, said transformer means being located within the casing, first terminal means located on the casing and connected to said high voltage winding, said high voltage circuit being connected to said first terminal means, and second terminal means located on the casing and connected to said low voltage winding, said low voltage circuit being connected to said second terminal means.

4. The combination of claim **3**, and including socket means located in the casing and connected to said high voltage winding, said high voltage circuit including plug means disposed to engage said socket means in said casing.

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LAVERNE D. GEIGER, Primary Examiner

HENRY K. ARTIS, Assistant Examiner

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