

## Claims



We claim:

1. A portable self-contained Car Washing Machine that can spray multi-pattern of water or diluted car soap water out steadily and at an acceptable and useful discharge pressure to wash a car. The machine comprises the combination: -
  - (a) The series connection of two DC-12V centrifugal pumps to increase the discharge pressure.
  - (b) The pumps are encapsulated to provide waterproofing and cooling by heat conduction.
  - (c) The use of an industrial pail with lid that provide airtight sealing by snapping it on.
  - (d) The mechanically valve system that allows a selection between the water and the diluted soap water.
  - (e) The mounting of all the components to the pail's lid which acts as the structure.
  - (f) The machine can be powered by an external DC-12V power source such as the car power source from the car's cigar socket or external lightweight battery station.
  - (g) It is connected with a multi-pattern water nozzle available in the market.
2. The machine when filled with water and diluted car soap water to the full capacity is sufficient to wash one car.
3. The mounting bracket and screws and a detachable strap that comes with the machine to enable the following :-
  - (a) Easy mounting and dismounting of the machine to common hand-trolleys.
  - (b) Easy mounting and dismounting of an external battery station onto the machine.

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## Description

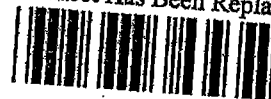
### TITLE OF INVENTION

The present invention is a Portable Car Washing Machine.

### FIELD OF THE INVENTION

The invention is a car washing machine. It consists of 2 encapsulated DC-12V centrifugal pumps connected in series and mounted at the bottom of a 20-litre industrial pail. The pumps can pump water in the pail or diluted car soap water from a 3-litre plastic container mounted at the pail's lid out at an acceptable and useful pressure to wash car. The choice of either water or car soap water is selectable by a mechanical valve. The machine is then connected to a common multi-pattern water nozzle to produce different spray patterns to soap and rinse the car. The machine can be powered by the car power source from the cigar socket or by an external DC-12V battery station.

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## BACKGROUND OF INVENTION

The cleansing of a car manually at a location far away from a washing point would generally require the tedious tasks of fetching a few pails of water, a pail of diluted car soap water and some brushes. It is also tedious to apply soap water on the car and repeatedly rinse it with the pails of water. Instead, a better method is to use a pail with water pump mounted inside to pump the water out steadily. With multi-pattern nozzle available in the market, useful spray patterns are available to soap and rinse the car with just one 20-litre pail.

A DC-12V centrifugal pump was found quite suitable due to the low cost and high discharge pressure. However, the pump is not waterproof and continuous operation of it can lead to undesirable consequences. The major innovation in this invention lies in the encapsulation of the pumps to enable them to be submersible in water. The submersion will create enough cooling without which the pumps will fail due to overheating. However, due to the drop in discharge pressure caused by any downstream components, two pumps are used to increase the discharge pressure. They are also connected in series so that the number of inlet and outlet remains the same such that construction can be kept simple.

An industrial pail with a Snap-On lid to provide airtight enclosure is specially selected for use. The construction of the pail allows components to be mounted on the pail's lid and be easily snapped onto the pail to provide a watertight compartment.

Subsequently, a mechanical valve system was designed to select the flow of water or soap water into the pump. The full design of the machine has been kept simple and cost effective to replace the conventional pail used in car washing.

The machine is then connected to a common multi-pattern water nozzle to produce different spray patterns to soap and rinse the car.

The machine can be powered by an external DC-12V power source from the car's cigar socket or by a lightweight DC-12V battery station. It can be kept inside the car boot when not in used or easily transported by fitting it onto commonly used hand-trolleys.

The machine when filled with water and diluted soap water to the full capacity is sufficient to wash one car.

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## DESCRIPTION OF PRIOR ART

The use of car washing systems is known in the prior art. More specifically, car washing systems heretofore devised and utilized for the purpose of washing cars are known to consist basically of familiar, expected and obvious structural configurations, notwithstanding the myriad of designs encompassed by the crowded prior art which have been developed for the fulfillment of countless objectives and requirements.

By way of example, U.S. Pat. No. 5,029,758 to Chayer discloses a high-efficiency, portable car washing system.

U.S. Pat. No. 4,546,903 to Burch discloses a portable car wash unit.

U.S. Pat. No. 4,089,446 to Logan, II et al. discloses a portable water supply and disbursing unit.

U.S. Pat. No. 4,967,960 to Futrell discloses a vehicle wash system.

U.S. Pat. No. 5,405,086 to Kranzle discloses a high-pressure cleaner.

U.S. Pat. No. 5,328,096 to Stenge et al. discloses a spray apparatus and method of operation for spraying heavy viscous material.

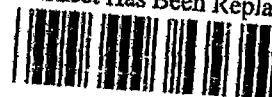
U.S. Pat. No. 5,800,087 to Tomasik discloses a portable car wash system.

While these devices fulfill their respective, particular objective and requirements, the aforementioned patents do not describe a portable car washing system for providing a portable source of water pumped out steadily by DC-12V centrifugal pumps for washing a car.

In this respect, the portable car washing system according to the present invention substantially departs from the conventional concepts and designs of the prior art. In doing so, an apparatus is provided primarily for the purpose of providing a portable source of water pumped out steadily by DC-12V centrifugal pumps for washing a car.

Therefore, it can be appreciated that there exists a continuing need for new and improved portable car washing system for providing a portable source of water pumped out by DC-12V centrifugal pumps for washing a car. In this regard, the present invention substantially fulfills this need.

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## SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of car washing systems now present in the prior art, the present invention provides an improved portable car washing system. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved portable car washing system and method which has all the advantages of the prior art and none of the disadvantages.

To attain this, the present invention uses miniature centrifugal pumps to pump water or diluted car soap water steadily out at an acceptable and useful pressure from a pail of water and a container of diluted car soap water. This allows a user to completely soap and rinse a normal sedan with just one 20-litre pail of water and soap water.

Two DC-12V centrifugal pumps with discharge pressure of 1.4kg/cm<sup>3</sup> and flow rate of 1100cc/min each are connected in series for more discharge pressure. Each pump is encapsulated to allow it to be submerged to the bottom of the pail filled with water.

A 20-litre industrial pail is used as the pail. It is constructed with robust high density PP material and built with maximum protection against repeated knocks and bumps. This leak-proof pail is designed with a safety lid with tear-off strip that provides airtight sealing. The conventional usage of the pail is to store chemicals. However, this design capitalizes on the inherent advantages of the pail. With all the other components mounted onto the pail's lid, the pail forms a perfect container for the body of our car washing machine.

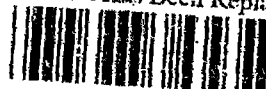
A 3-litre plastic container is used for containing car soap water. It is mounted on the pail's lid. The plastic container provides a compartment sufficient for storage of diluted car soap water.

The inlet of the pump is connected to the outlet of the mechanical water valve also at the bottom. The first inlet of the valve is connected to the plastic container by means of a pipe reaching up to the bottom of the plastic container. The other inlet of the valve is open to the water around it. The knob of the valve which control the flow of water and soap water to the pump is also extended up to the pail's lid by means of a tube. The user can turn the knob above the pail's lid to select between water or soap water.

The internal structure of the machine is thus formed with the pipe to the plastic container and tube to the knob of the valve holding the valve and pumps in position. The plastic container and the tube to the knob are in turn held securely by the pail's lid.

The first inlet of the valve is placed close to and to the bottom of the pail so that most of the water in the pail can flow in.

The outlet of the pump is connected to a hose. The hose is then connected to a female snap on hose adapter, which is also mounted on the pail's lid.



The power cable from the pump is connected through a cable gland that is also mounted on the pail's lid. It is then terminated with 3 meters of wire to a hand-switch. The other end of the hand-switch is connected to a 3-meter power cord terminated with a cigar plug.

An opening for water is built onto the cover with a cap to cover it as well.

With all the components mounted on the pail's lid, it is then snapped onto the pail to provide a rigid structure and a watertight compartment.

It is then connected to a common multi-pattern water nozzle to produce different spray patterns to soap and rinse the car. The multi-pattern water nozzle is connected with a 5-meter hose and terminated with a male snap on adapter. With the long hose, the user does not have to move the machine with him while washing all parts of the car.

Additional features of the washing machine allow an external battery station to hook on to the machine by means of 2 screws mounted at the flange of the pail. The washing machine can also be mounted to common hand-trolley locked in safely by a detachable belt and locking plate at the 2 mounted screws.

The completed machine can be understood to be highly flexible as it can either be operated by the car power source and be kept in the car boot when not in use. Otherwise, the machine can be mounted to commonly available hand-trolley to easily transport water from a distant water point.

Since the motivation in the design of the washing machine is to employ parts that are commonly and easily available in the market, this innovation is able to drastically reduce the cost of design and production. Thus, the product is kept highly affordable for consumers.

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## BRIEF DISCRIPTION OF THE DRAWING

The invention will be better described and understood with the following description making reference to the annexed drawing.

FIG. 1 is a 3-D view of a DC-12V centrifugal pump.

FIG. 2 is a 3-D view of 2 centrifugal pumps connected in series.

FIG. 3 is a 3-D view of a 20-litre industrial pail.

FIG. 4 is a 3-D view of a 3-litre plastic container.

FIG. 5 is a 3-D view of the basic structure of the pumping system.

FIG. 6 is another 3-D view of the basic structure of the pumping system.

FIG. 7 is a 3-D view of the pumping system mounted with components.

FIG. 8 is a 3-D view of the pumping system mounted to the pail's lid.

FIG. 9 is a 3-D view of the pumping system inserted into the pail.

FIG. 10 is a 3-D view of the completed washing machine.

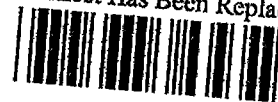
FIG. 11 is a 3-D view of the mounting screw and bracket.

FIG. 12 is a 3-D view of a detachable belt.

FIG. 13 is a 3-D view of a common hand-trolley and battery station.

FIG. 14 is a 3-D view of the washing machine complete with accessories and add-on.

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## DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawings from FIG. 1 through FIG. 14, the preferred embodiment of the portable car washing machine embodying the principles and concepts of the present invention will be described.

FIG. 1 shows the DC-12V centrifugal pump. It is of a lightweight, miniaturized construction and does not consume high power but can provide a high discharge pressure of 1.4kg/cm<sup>3</sup> and flow rate of 1100cc/min. It is also available in the market at a low cost.

However, prolong usage of this pump in its original form will cause overheating that lead to premature failure. To overcome the problem of overheating, the pump is submerged in water. It is therefore encapsulated with thermally conductive epoxy glue 100 FIG. 2 at the end of the motor where the electrical terminals are located. Thus the pump can be sufficiently cooled by the water. Secondly, the pump noise will be greatly reduced as it is immersed in water.

The power cable connecting the pump is waterproof by laying it through small water hose 101.

To overcome a drop in discharge pressure caused by any downstream components, 2 pumps are used. They are connected in series FIG. 2 so as to keep the structure simple, as there will still be only one inlet 102 and one outlet 103. The series-connected pumps are connected by a joint 104 and secured by an S-bracket 105 as shown in FIG. 2.

FIG. 3 shows a 20-litre industrial pail. The pail is constructed with robust high-density PP material and built with maximum protection against repeated knocks and bumps. This leak-proof pail is designed with a safety lid 106 with tear-off strip that seals airtight.

FIG. 4 shows a 3-litre plastic container with cover. It is used as a compartment for storing diluted car soap water.

To connect all the parts together, the structure of the machine has been carefully designed. As seen from FIG. 5, the first inlet 107 of the mechanical water valve 108 is left open. The second inlet 113 FIG. 6 of the water valve is connected with pipes and pipe joints 114. The outlet 109 of the valve is connected to the inlet 110 of the series-connected pumps. As seen from the structure, water is allowed to enter at 107. Soap water is allowed to enter at 111. After which either the water or soap water is allowed to flow into the pump by controlling the valve at the knob 112.

FIG. 7 shows the rest of the components attached to the structure. A tube 115 is connected to the knob of the valve and extends to the top and end with a knob 116. This will provide easy control of the valve above the pail's lid. The outlet 117 of the pump is connected to a hose that is connected to a female snap on hose adapter 118.



The power cable 119 from the pump is extended to the top through a cable gland 120. It is then terminated with 3 meters of wire 121 to a hand-switch 122. The other end of the hand-switch is joined to a 3-meter power cord 123 and terminated with a cigar plug 124. The total length of 6 m of the power cord is sufficiently long to plug into the car's cigar socket for power.

The 3-litre plastic container is connected to the pipe at 125 FIG. 7, 126 FIG. 8.

FIG. 8 shows the components 127,128,129,130 mounted at the pail's lid. A rigid structure is formed with the 3-litre plastic container's pipes and the tube that control the valve's knob holding the pumps and valve in place.

There are many advantages to this structure. Firstly, the components are easily and securely mounted on the pail's lid. Secondly its modular form is easily snapped onto the pail. Thirdly, and most important of all, no holes need to be drilled into the pail. Thus the integrity of the pail is maintained. Finally, components above the pail's lid are conveniently accessible by the user.

An opening 131 for water inlet to the pail is also built onto the pail's lid. There is a cap 132 FIG. 9 to cover this opening as well.

FIG. 9 shows the mounting of the structure such that the first inlet of the valve 133 is near the wall of the pail and at the bottom. This will ensure that most of the water can be pump out.

With all the components mounted on the pail's lid, it is snapped onto the pail to provide a rigid structure and watertight compartment FIG. 10.

To use the machine, simply connect a multi-pattern water nozzle 134 to the female snap on hose adapter 137 and connect power to it using the power cord 135. The hose 136 connecting to the water nozzle is 5 m long so that the user does not have to move the machine with him while washing all parts of the car.

FIG. 11 shows 2 screws 138 mounted on the flange of the pail. A mounting bracket 139 together with a detachable belt FIG. 12 is provided with the machine. The mounting bracket and belt can be used to secure the completed machine onto a common hand-trolley 140 FIG. 13 and dismounted easily. The mounting bracket 141 can also be screw onto a lightweight battery station 142. The battery station can be then mounted securely on the machine and dismounted easily.

FIG. 14 shows the completed machine used with a common hand-trolley and a battery station.

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