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WINTERIZING SYSTEM FOR CAR WASH AND THE LIKE

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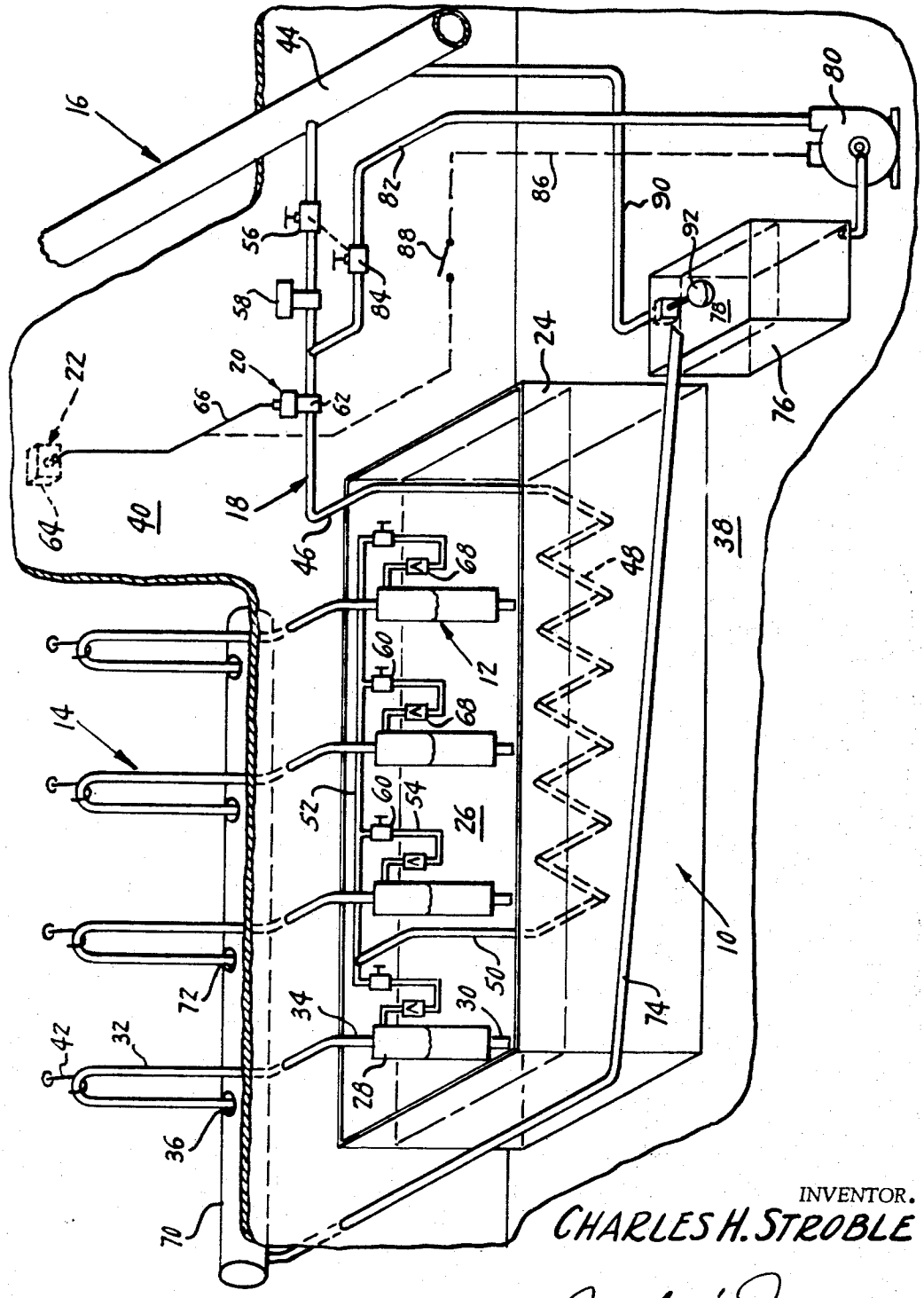

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WINTERIZING SYSTEM FOR CAR WASH AND THE LIKE

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ABSTRACT OF THE DISCLOSURE

A system for winterizing a self-service car wash which includes a primary liquid supply and a secondary liquid supply arranged so that the primary liquid supply is used in the car washing operation. When cars are not being washed and the ambient temperature is generally above freezing, the secondary liquid supply is cut off. When the temperature drops below a pre-selected level, usually freezing, the secondary liquid supply passes heated liquid to the hose means which direct the liquid for the car washing operation, thereby preventing a freezing condition in the hose means and the lines connecting them with other portions of the system. When cars are being washed, the liquid is supplied from the primary supply means through pump means which deliver the same at a high pressure, the high pressure automatically activating flow control means to prevent back flow into the secondary liquid supply. In one embodiment the flow circuit means between the secondary liquid supply and the hose means includes a portion immersed within the primary liquid supply in heat exchange relationship. In another embodiment the heated water passing through the hose means is collected in a collection tank and passed to an auxiliary tank from which it can be recycled.

This invention relates generally to liquid distribution systems and in particular it relates to an arrangement for winterizing a liquid distribution system such as is present in a self-service type of car wash.

Recently, self-service type car washes have become quite popular and their use has become wide-spread. Such car washes are generally of the coin-operated type wherein the user inserts the appropriate amount of coins and is supplied with a quantity of wash water which lasts for a preselected interval and is thereafter supplied with a quantity of rinse water which lasts for a preselected interval. Generally, in systems of this type, most of the car wash system equipment is housed within a building, and only the washing hoses are accessible to the customer. Thus, it is usual for the customer to locate his car adjacent the building housing the car wash equipment, to thereafter insert the appropriate amount of coins in a coin-slot, and to then take one of the hoses projecting beyond the building and to use the same for washing his car.

Naturally, in such self-service car washes, the water is delivered through the hose means by a pump or pumps, which customarily operate responsively to insertion of the appropriate amount of coins. Thus, once coins are inserted into a particular slot, a particular pump will operate for a short interval of time to deliver water under pressure through a particular hose means. However, at all other times when no coins have been inserted into the slot, the pump will remain inoperative and no water under pressure will normally be delivered through the hose means.

In car wash systems of this type, a particular problem has arisen in attempting to properly winterize the system. That is, it is necessary to make certain that the water does not freeze within the hose means even when the temperature drops below freezing. Since, as aforementioned, the hose means associated with such car washes are generally located outside of a building while the remainder of the equipment forming the car wash is housed within the building, it has been found that there is a tendency for water trapped within the hose lines to freeze therewithin. Naturally, if this occurs, each of the hoses must be properly thawed to remove any ice therefrom before the system can properly operate to permit the pumps to deliver high pressure water through the hoses.

The only known prior art techniques for winterizing a car wash system of this type accomplished such winterization by draining each of the hoses themselves, so that no water remained therein to freeze if the temperature dropped too low. However, in practice, most of such self-service car washes are unattended for long periods of time, and it is only on periodic intervals, such as early morning and late evening, that an operator arrives to check the car wash system. In using the aforementioned prior art technique, an operator would arrive each evening and would manually drain each of the hose means until all water was exited therefrom. However, to assure that the system would remain properly winterized overnight, it was then necessary to entirely de-activate the car wash so that no customer could come in that evening and operate the car wash, thereby again filling one of the hoses with water. Of course, this was extremely disadvantageous since it effectively took the car wash system out of operation for an extended period of time from one evening until the following morning. Also, such a prior art proposal did not recognize the fact that many times during the day itself, particularly in the wintertime, one or more of the hoses at a car wash might go unused for a period of several hours. In such event, the water in that hose would freeze thereby creating the difficulties discussed hereinabove. Finally, it will be recognized that it was a cumbersome manipulative job to carefully drain each of the hoses at a car wash, and such job took a certain amount of time, thereby limiting the number of different car wash stations that one attendant could properly service.

With the foregoing explanation in mind, it is, therefore, an object of the present invention to overcome the difficulties and deficiencies associated with the prior art and to provide in their stead, a new and improved system for winterizing a car wash.

Another object of the present invention is to provide an improved arrangement for winterizing a car wash system to prevent freezing in any portion of the system, regardless of the ambient temperature.

Anothe robject of the present invention is to provide a winterizing system for a car wash, wherein such system automatically operates when the temperature drops to a preselected level, and which does not require the presence of an attendant to manually winterize the system.

Another object of the present invention is to provide a car wash winterizing system which is relatively simple in construction and is inexpensive to produce and install, yet which will operate efficiently and economically to prevent freezing in any portion of the system and resultant damage to the system.

Other objects, advantages and salient features of the present invention will become apparent from the following detailed description, which, taken in conjunction with the annexed drawing, discloses a preferred embodiment thereof.

The foregoing objects are attained generally by providing a secondary liquid or water supply and a flow circuit means communicating the secondary liquid supply through the pumps and to the hose means. A flow control means is provided within the flow circuit to prevent the secondary liquid supply from communicating with the hose means so long as the ambient temperature exceeds a pre-

selected level, such as the freezing temperature or slightly thereabove. Temperature responsive means including a temperature sensing element to sense the outside ambient temperature are provided in controlled coupling with the flow control means. Thus, when the ambient temperature drops below the preselected level, the temperature responsive means opens the flow control means or valve to permit water from the secondary supply to flow to and through the hose means. As long as there is a continual flow through the hose means, the water therein will be prevented from freezing. Also, it is comprehended by the present invention that the water delivered from the secondary supply means can be heated on its way to the hose means, so that warm water is flowed through the hose means to prevent freezing even at very low temperatures. Since the flow circuit means communicates with the hose means through at least a portion of the pumps, a check control means, such as a one way check valve, must be provided in the flow circuit means. Such check control means prevents the high pressure water delivered by pump operating from backflowing through the flow circuit means to the secondary supply. However, when the pumps are not operating, the water supply from the secondary supply will open the check valves to permit flow to the hose means.

Although the present invention is described particularly in connection with, and is intended particularly for use in, a car wash system, and particularly a self-service type car wash, it should be understood that the principles of the present invention and the novel arrangement described hereinafter can be utilized with equal efficacy in winterizing any other form of liquid distribution system which has a tendency to freeze during cold weather.

Referring now to the drawing, the sole figure thereof is a diagrammatic perspective view of an improved winterizing system in accordance with the principles of the present invention.

Referring with greater particularity to the drawing, there is shown therein a system which includes a tank means generally designated **10** adapted to contain a primary liquid supply, a pump means generally designated **12** operative to deliver liquid from the primary supply under high pressure to and through a hose means generally designated **14**, a secondary liquid supply means generally designated **16**, a flow circuit means generally designated **18** communicably coupling the secondary liquid supply means **16** with the hose means **14**, a flow control means generally designated **20** within the flow circuit means **18** and a temperature responsive means generally designated **22** controllably coupled with the flow control means **20**.

The tank means **10** is primarily provided by a container **24** having a partially or completely open top, such container having a primary supply of liquid **26** therein, such as water or the like. Preferably, the water **26** is heated by any suitable means, not illustrated, and such liquid is intended to provide the rinse water for the car wash system. In addition to the tank means **10**, which customarily forms the rinse tank of a car wash system, it is customary to provide another similar type of tank means for containing the detergent or wash water for the car wash system, but since this wash tank does not form a part of the present invention, as such, the same is not illustrated in the drawing.

The pump means **12** includes one or more high pressure fluid delivery pumps **28**, each having a lower end **30** immersed within the primary liquid supply **26**. When operated, the pumps **28** deliver the liquid **26** under high pressure, approximately 600 lbs. per square inch, to and through the hose means **14**.

As can be seen, the hose means **14** is an elongated flexible conduit **32**, preferably formed of rubber, plastic or the like, such conduit having an inner end **34** coupled to the output of the pump **28** and an outer end **36** through which the liquid is dispensed.

As was mentioned previously, it is customary in car wash systems of this type to provide most of the equipment within a building or other housing. Thus, the tank means **10** is shown resting on the floor **38** of a building of suitable sort, such building having a side wall **40**. The hose means **14** extends from the pumps **28** and through the side wall **40** so that the outlet end **36** on the hose means is disposed outside the building. Also, as shown, a considerable length of the flow conduit **32** is disposed outside the building, since it is this length of hose which the customer will use in washing his car. Suitable support means, such as hooks **42**, may be provided outside the building, so that the hose means **14** can be hung thereupon when not being used by the customer.

The secondary liquid supply **16** of the present invention is customarily provided by the city waterline **44**. Water generally flows through this line under a low pressure of approximately 12 lbs. per square inch, thereby providing a source of water for the entire car wash system.

The flow circuit means **18** communicably couples the city waterline **44** with the hose means **14**. As shown, the flow circuit means **18** includes a conduit **46** which branches from the city waterline **44** and converts into a coil portion **48** disposed within the tank means **10** beneath the level of the liquid **26** therewithin. From the coil portion **48**, the flow circuit means extends through a conduit portion **50** to a manifold **52** having a series of legs **54**, one connected from the manifold to each of the pumps **28**. A manually operated valve **56** is provided in the conduit **46** of the flow circuit means, whereby, if desired, the entire flow of water from the city waterline **44** can be closed off. Also, if necessary, a pressure reducer valve **58** can be provided in the line **46**. Finally, needle valves **60** can be provided in each of the manifold legs **54** to control individual flow to each of the hose means **14**.

As aforementioned, the flow circuit means **18** also includes a flow control means **20**, with such means being a flow valve or flow switch **62**. The flow valve or switch **62** is normally closed, thereby preventing delivery of water from the secondary supply **16** thereof. However, to open the valve or switch **62**, the temperature responsive means **22** is provided and such means includes a temperature sensing element or mechanism **64** located at least partially outside the building wall **40**. As such, the element **64** is capable of sensing the ambient temperature at the hose means **14**, or at least at that portion thereof disposed outside the building wall **40**. The sensing element **64** is controllably coupled with the switch **62** by a line **66** and the overall combination of the parts **62**, **64** and **66** serves to provide, in effect, a thermostatically controlled valve means. That is, so long as the ambient temperature exceeds a preselected level, such as, for example, 33° F., the valve or switch **62** will remain closed thereby preventing the secondary water supply **16** from communicating with the hose means **14**. However, when the temperature drops below the preselected level, as sensed by the element **64**, the valve or switch **62** is opened, thereby permitting flow from the secondary supply **16** through the flow circuit means **18** and to the hose means **14**.

In order to prevent system backflow, check control means **68** are provided in each of the manifold legs **54**. Such check control means **68** can be a check valve of any suitable variety which is seated or closed by the high pressure fluid from the pumps **28**. In other words, when the pumps **28** operate to deliver the liquid **26** under high pressure, a portion of such liquid will start to pass through that portion of the manifold leg **54** which is coupled to the pump **28**. However, as soon as such high pressure liquid reaches the check valve **68**, it seats the same thereby preventing such high pressure liquid from flowing through the legs **54**, manifold **52**, conduit **50** and so on, back through the flow circuit means **18**. On the other hand, when the pump **28** is not operating, the check valve **68** can be unseated by low pressure liquid being delivered from the secondary supply **16** thereof. Thus, secondary liquid

being supplied through the flow circuit means **18** to pass through the manifold legs **54** will serve to open the check valve means **68**, thereby permitting the flow to pass through the upper portion of the pumps **28** and through the hose means **14**.

In operation of that portion of the system described so far, it will be understood that the manual valve **56** is normally open and that the temperature responsive means **22** is of the type which can be adjusted or set to any particular desired temperature level. Accordingly, the car wash attendant normally presets the means **22** to the temperature desired, which usually is some temperature slightly above freezing, opens the valve **56**, and adjusts the needle valves **60** to achieve the proper flow rate through the hose means **14**. So long as the temperature remains above the level preset on the means **22**, the flow control means **20** prevents any secondary liquid from flowing through the flow circuit means **18**. Therefore, when an operator desires to use the system, he inserts the proper amount of coins into a coin-controlled unit, not shown herein, which unit is linked with a particular pump **28**. The pump **28** will thereupon operate for a timed interval to deliver water **26** under high pressure through the hose or flow conduit **32** associated therewith. The customer removes the hose from its supporting means **42** and directs the water flow coming through the outlet end **36** of the flow conduit means onto his automobile to rinse the same. During the time that the pump **28** is operating, the check valve means **68** prevents any backflow of the high pressure water to the manifold **52**.

At the time that the ambient temperature drops below the preselected level, as set on the means **22**, such means operates through the line **66** to open the valve or switch **62** thereby permitting secondary water from the city waterline **44** to flow through the flow circuit means **18**. Such water is delivered under low pressure of approximately 12 lbs. per square inch, and is passed through the conduit **46** and the coil **48**. Since the coil **48** is immersed within the primary water supply **26**, and since, as aforesaid, such primary water supply is customarily heated, the effect of the secondary water passing through the coil is that such secondary water is warmed or heated. The heated secondary water then passes through the conduit **50**, into the manifold **52**, and through the manifold legs **54** to pass through the upper portion of the pumps **28** and to flow through each of the hose means **14**. Naturally, the flow of such heated secondary water through the hose means or flow conduits **32** prevents any freezing therewithin, regardless of the ambient temperature surrounding such hose means. Now, even if a customer wants to operate the system, he can do so regardless of the fact that secondary water is being supplied. That is, if one particular pump **28** is operated, operation of that pump will close the check valve **68** associated therewith and will thus terminate delivery of the secondary water supply to that particular flow conduit **32**. However, the secondary water will still be supplied through all of the other manifold legs and will thus be delivered to all of the other flow conduits **32**. As soon as the one pump **28** terminates operation, secondary water will again be supplied to the flow conduit **32** associated with that pump. Thus, regardless of whether the system is operated or not, secondary water will nevertheless be supplied in a heated manner and at a constant flow to and through each of the flow conduits **32** at all times except when a particular pump is operating. This flow of heated water under pressure through the flow conduits **32** will prevent any freezing therewithin.

As an ancillary portion of the inventive system disclosed hereinabove, a collection tank or trough **70** is provided outside the building wall **40**. Such tank or trough has a series of openings **72** in the top thereof to receive the ends **36** of the hose means when the same are not in use. In other words, when a customer completes use of a particular hose means, he re-hangs the same upon a hook **42** so that the end **36** of the hose is inserted within an opening **72** of the collection trough **70**. In fact, if desired, suitable biasing means may be provided in lieu of the hooks **42** so that when the customer ceases use of a particular hose, the same will automatically be raised to the position shown in the drawings, with the end **36** being disposed within or above an opening **72** in the collection trough **70**.

A first conduit means or return line **74** extends from the collection trough **70** to empty into an auxiliary tank means **76**. Preferably, the line **74** is inclined so that return flow from the collection trough to the auxiliary tank **76** can be gravitational flow. It will thus be apparent that the secondary water supply which flows through the hose means **14** can be recollected in the collection trough **70** and can be returned through the return line **74** to the auxiliary tank means **76**. The auxiliary tank means thus has a supply of water **78** therewithin which can be used as the secondary liquid supply **16**, in a manner to be disclosed hereinafter.

A sump pump **80** is associated with the auxiliary tank means **76** and is connected by a flow conduit **82** to the conduit **46** of the flow circuit means **18**. A manually operated valve **84** is provided in the conduit **82** and such valve is intended for operation in opposition to the manual valve **56**. That is, if the manual valve **56** is opened, the secondary water supply is provided from the line **44** and the manual valve **84** must therefore be closed. On the other hand, if the manual valve **56** is closed, the secondary water supply is provided from the auxiliary tank means **76** and the manual valve **84** must therefore be opened. If desired, the valves **56** and **84** can be linked or geared together so that opening of one will automatically close the other. The temperature responsive means **22** is linked with the pump **80** as shown schematically by the line **86**. A switch **88** is provided in the line and when such switch is closed, the temperature responsive means **22** will set the pump **80** into operation when the ambient temperature drops below the preselected level. In order to assure that the auxiliary tank **76** will always have a suitable supply of water **78**, a conduit **90** can supply water thereto from the city waterline **44**. A float control valve **92** is provided in the auxiliary tank **76** to permit flow through the conduit **90** when the level of liquid **78** drops too low, but to prevent flow therethrough once the level of liquid **78** reaches a preset level. Naturally, operation of the system will be the same even if this auxiliary portion of the system is utilized. To set this auxiliary system into operation, the operator need only close the switch **88**, close the valve **56** and open the valve **84**. When this occurs, the liquid **78** will provide the secondary liquid supply **16**.

After reading the foregoing detailed description, it should be apparent that the objects set forth at the outset of the specification have been successfully achieved by the present invention.

What is claimed is:

1. In a system particularly adapted for winterizing a self-service car wash, the combination comprising:

tank means having a primary liquid supply therein;

pump means juxtaposed to said tank means and operative to deliver liquid under high pressure from said primary liquid supply;

hose means coupled with said pump means for directing the liquid delivered under high pressure from said primary liquid supply;

secondary liquid supply means;

flow circuit means communicably coupling said secondary liquid supply means with said hose means;

flow control means within said flow circuit means to prevent communication between said secondary liquid supply and said hose means so long as the ambient temperature exceeds a preselected level;

temperature responsive means controllably coupled with said flow control means to permit communica-

tion between said secondary liquid supply and said hose means when said ambient temperature drops below said preselected level, thereby causing liquid from said secondary supply to flow through said hose means to prevent freezing therewithin;

said flow circuit means including a portion immersed within said primary liquid supply in heat exchange relationship.

2. The combination defined in claim 1 wherein said portion is formed as a coil.

3. The combination defined in claim 1 wherein said flow circuit means is coupled to said hose means at least partially through said pump means.

4. The combination defined in claim 3 further including check control means in said flow circuit to prevent backflow from said primary liquid supply to said secondary liquid supply when said pump means operates to deliver liquid under high pressure.

5. The combination defined in claim 1 wherein said flow circuit means includes a manually adjustable regulating valve for varying the rate of flow from said secondary liquid supply to said hose means.

6. The combination defined in claim 1 further including collection tank means into which said hose means can be inserted to permit said collection tank to collect liquid flowing from said hose means.

7. In a system particularly adapted for winterizing a self-service car wash, the combination comprising:

primary liquid supply means;

pump means juxtaposed to said primary liquid supply and operative to deliver liquid under high pressure from said primary liquid supply;

hose means coupled with said pump means for directing the liquid delivered under high pressure from said primary liquid supply;

secondary liquid supply means;

flow circuit means communicably coupling said secondary liquid supply means with said hose means;

flow control means within said flow circuit means to prevent communication between said secondary liquid supply and said hose means so long as the ambient temperature exceeds a preselected level; and

temperature responsive means controllably coupled with said flow control means to permit communication between said secondary liquid supply and said hose means when said ambient temperature drops below said preselected level, thereby causing liquid from said secondary supply to flow through said hose means to prevent freezing therewithin;

collection tank means into which said hose means can be inserted to permit said collection tank to collect liquid flowing from said hose means;

an auxiliary tank means;

first conduit means coupling said collection and auxiliary tank means to permit said collection tank means to empty into said auxiliary tank means; and

second conduit means coupling said auxiliary tank means with said flow circuit means.

8. The combination defined in claim 7 wherein said flow circuit means and said second conduit means each includes a manually operable valve means upstream from the junction thereof, one of said valve means normally being open and the other of said valve means normally being closed.

9. The combination defined in claim 7 further including auxiliary pump means associated with said auxiliary tank means and selectively connectable means for controllably coupling said temperature responsive means with auxiliary pump means.

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