Feb. 27, 1962 A. C. LARSON 3,022,791

MOBILE TYPE CLEANING UNIT

Filed June 10, 1958

3 Sheets-Sheet 1

Fig. 1

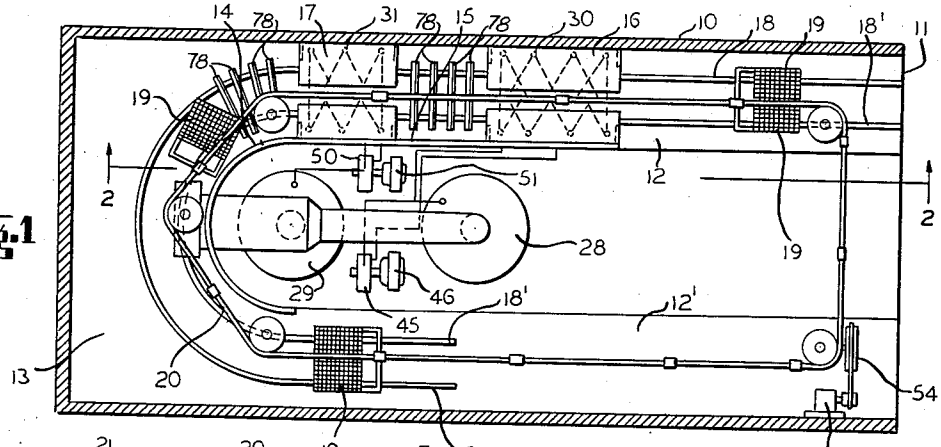


Fig. 2

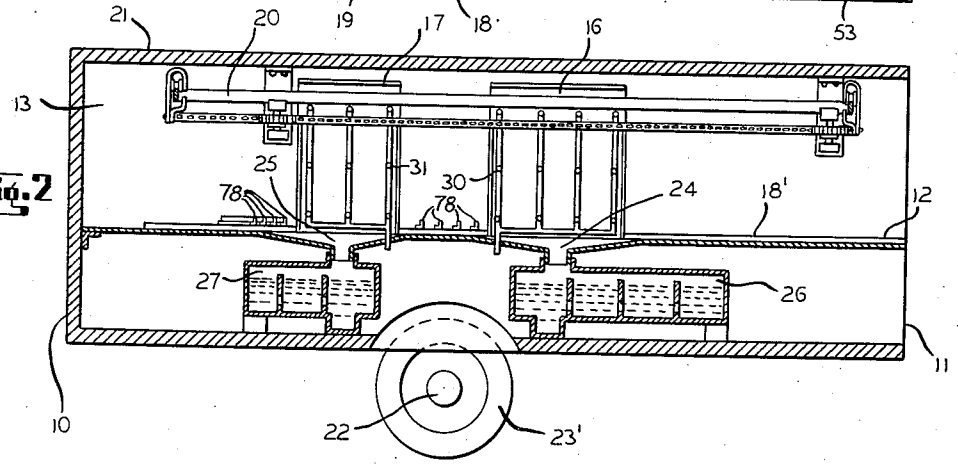
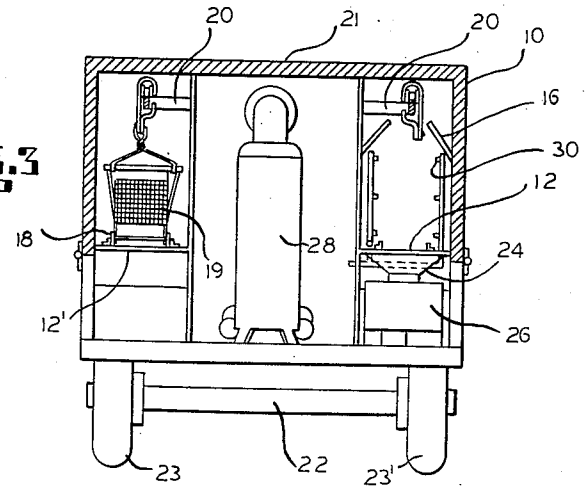


Fig. 3



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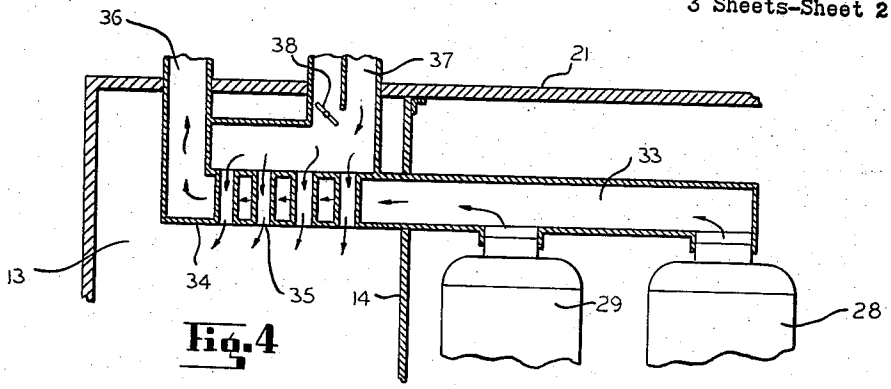


Fig. 4

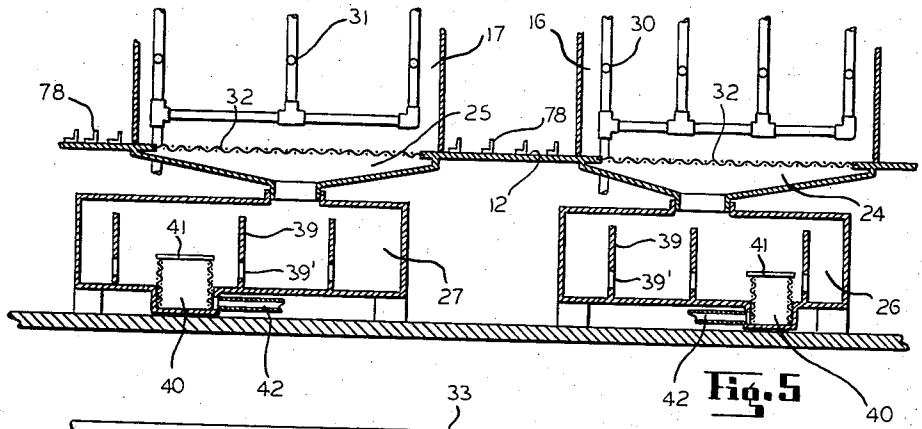


Fig. 5

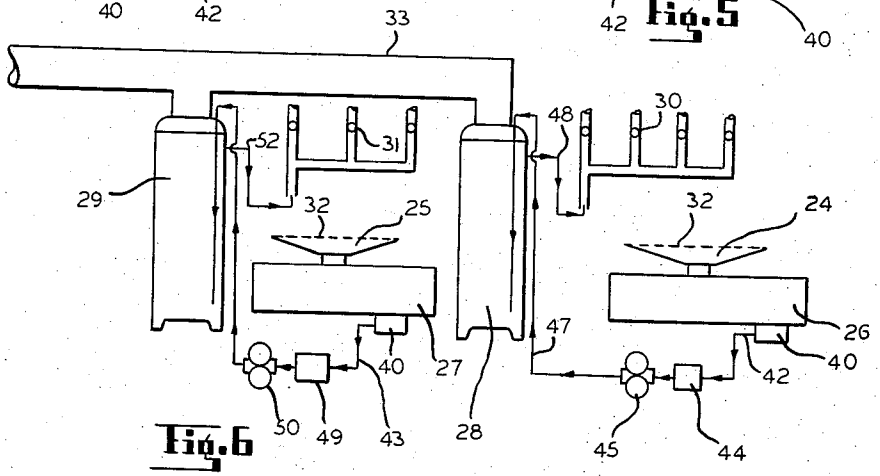


Fig. 6

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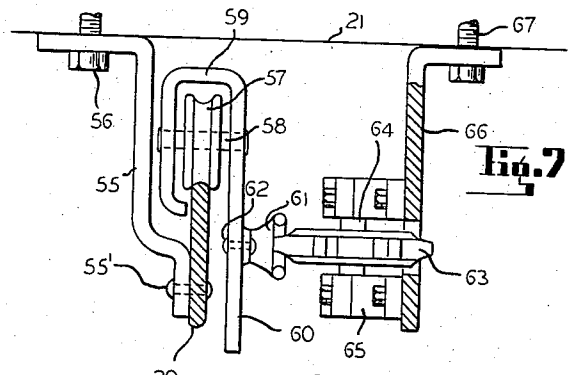


Fig. 7

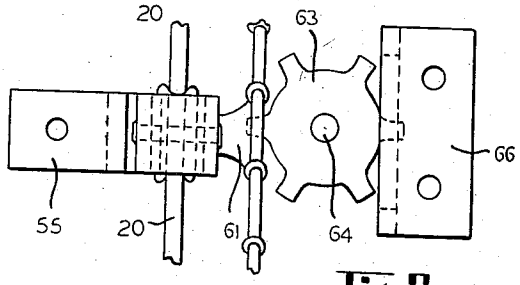


Fig. 8

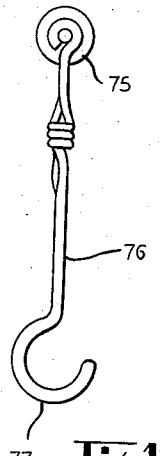


Fig. 11

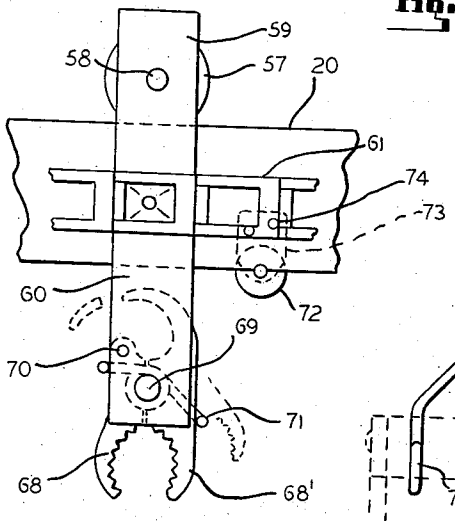


Fig. 9

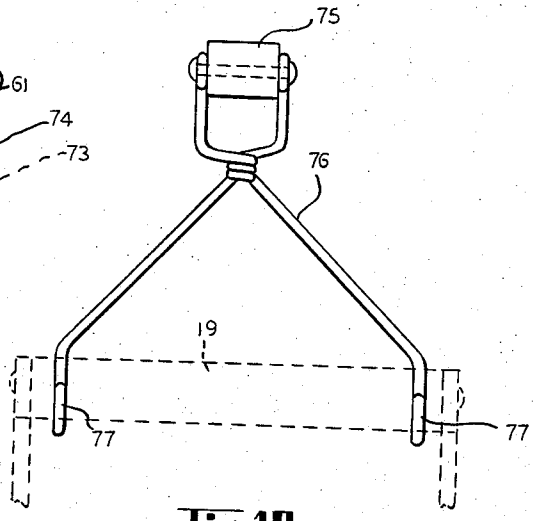


Fig. 10

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United States Patent Office 3,022,791 Patented Feb. 27, 1962

3,022,791

MOBILE TYPE CLEANING UNIT

Alvin Charles Larson, 324 E. Wisconsin Ave., Milwaukee, Wis.

Filed June 10, 1958, Ser. No. 741,141
2 Claims. (Cl. 134—70)

My invention relates to improvements in cleaning devices and more particularly to a device and a process for cleaning food conveying carts, baskets, or the like, such as are used in self-serve retail stores.

It is manifest to anyone familiar with food handling equipment of the general type above referred to, which is manipulated and handled by the public, that due to the variety of commodities conveyed therein, the equipment usually accumulates foreign matter during constant use, and for sanitary reasons it is imperative to clean the workpieces such as carts or baskets periodically.

The principal object of my invention is to provide a cleaning device that, as a unit, may be employed to clean carts, or the like, with a minimum of manual labor.

Another object of my invention is to provide a unit which will apply cleaning solution to the workpieces under pressure, and at a high temperature, rinse and clean the workpieces at a high temperature, remove all excess moisture from the workpieces, and apply warm circulated air to the unit to dry them.

Still another object of my invention is to provide a device of the character described which is continuous in operation, in which the workpieces to be cleaned are mounted at one end, conveyed and automatically released when the operation is completed.

The invention described and claimed herein provides a means of accomplishing the cleaning with a minimum of physical effort or manual labor, except for attaching the carts, or units to a continuous conveyor. The device is designed to utilize the cleaning agent employed, without waste or loss, and is equipped with heaters, pumps, and drying equipment arranged in a manner whereby they may be built into a mobile unit which can be moved, or conveyed, from one establishment to another, the mobile unit being provided with portable drums containing the fuel supply, and being electrically actuated by equipment which may be connected to any source of current supply by means of extension cords.

The entire mobile unit is designed to be compact and serviceable, and may be conveyed from one store to the other for convenience and accessibility of the workpieces to be cleaned, whether they be carts, baskets, trays, or any other food handling equipment.

Other and further objects of my invention will become more apparent as the description proceeds, when taken in conjunction with the drawings, in which—

FIGURE 1 is a plan view of the assembled mobile unit, with the roof removed;

FIGURE 2 is a cross-section taken generally along the line 2—2 of FIGURE 1;

FIGURE 3 is a transverse section of the unit shown in FIGURE 1;

FIGURE 4 is a schematic fragmentary cross-section of the heat exchanger, in its relation to the exhaust and air inlets associated with the heating units;

FIGURE 5 is a fragmentary schematic section of the spray, drain, and tank arrangement;

FIGURE 6 is a diagrammatic showing of the heater, tank, spray, and pump arrangement;

FIGURE 7 is an enlarged fragmentary detail section of the rail conveyors, the chain and the sprocket arrangement;

FIGURE 8 is a top view of the parts of FIGURE 7;

FIGURE 9 is a detail view of the clamp arrangement

used for supporting the hooks for conveying the carts, or the like;

FIGURE 10 is a front view of the hook arrangement; and

FIGURE 11 is a side view of the hook arrangement.

Similar characters of reference indicate corresponding parts throughout the several views, and referring to FIGURE 1, it will be noted that the invention is applied to the body of a trailer-type vehicle indicated at **10**. This body has an opening at its rear end **11** and has elevated counters or runways **12** and **12'** along opposite sides of the inside of the body **10**, and joined at the forward end within a heating chamber **13**. This heating chamber **13** has a curved upright partition or wall **14**, extending into a straight partition part way along the runway **12** which acts as an inner wall for a spray booth **16**, which is employed for applying a cleaning liquid adjacent the open end of the trailer, and a second spray booth **17**, which is employed for hot water rinse, adjacent but spaced along the runway **12** from the first spray booth **16**.

The runways **12** and **12'**, as well as the heating chamber **13**, have generally parallel guide rails **18** and **18'** attached along the upper surfaces thereof, to guide the workpieces, such as carts **19**, during the cleaning process. The unit shown is primarily designed for carts such as are used by customers in the self-serve market, but is equally applicable for cleaning baskets, trays, or any other food handling equipment.

The trailer body is supported in a conventional manner on an axle, shown as **22**, having wheels **23** and **23'** rotatably mounted thereon. Inasmuch as the trailer body may be of any suitable design to accommodate the cleaning equipment, further details thereof need not be described herein.

FIGURE 2 shows a support rail **20** which is suspended from the roof **21** of the trailer body **10**, over and along the runways **12** and **12'** and around the heating chamber **13**. The runway **12** has two drains **24** and **25** beneath the spray booths **16** and **17**, respectively, and leading into a pair of tanks **26** and **27**, respectively, below said runway. The tank **26** is a reservoir for a cleaning liquid, which is heated by a hot water heater **28**, connected to a source of gas supply (not shown). The tank **27** is a reservoir for containing clean hot rinse water, heated by means of the hot water heater **29**, also connected to a gas supply (not shown). The heaters **28** and **29** are preferably disposed adjacent the heating chamber **13** and between the runways **12** and **12'**, leaving a space adjacent the open rear end of the trailer for the operator.

The spray booth **16** is provided with a plurality of spray nozzles **30** along opposite sides, while the spray booth **17** is provided with a plurality of similar spray nozzles **31**. The drains **24** and **25** are equipped with strainers **32**, as shown in FIGURE 5.

Both the heaters **28** and **29** are connected at their upper end to a manifold, shown as **33** in FIGURE 4, which manifold terminates in a heat exchanger unit having a plurality of tubes **35** extending therethrough. The manifold has an outlet **36** extending through the roof **21** of the trailer. The tubes **35** have a double inlet **37** and **38** extending through the roof **21** of the trailer **10**. One inlet **38** may have a damper **38** to control the admission of outside air to pass through the tubes **35** into the heating chamber **13**, from where the air may be exhausted by means of a suitable blower or fan (not shown). Thus, dry outside air may enter the heating chamber **13**, and heated by the exchanger as it passes through the tubes **35**, from which it is directed toward the workpieces for drying the latter.

The tanks **26** and **27** are provided with baffles **39** to keep the liquid from excess movement while the device is being moved about. The baffles **39** have apertures **39'**

to permit the liquid therein to maintain a uniform level. Both of the tanks have sumps **40** into which a strainer **41** is disposed and from which tubular outlets, shown as **42** and **43**, extend.

By referring to FIGURE 6, the general circulating system will become more manifest. The liquid in the tank **26** is conveyed through the tube **42** to a strainer **44** by a pump **45** actuated by a motor **46**, and is forced through the heater **38** through a tubular member **47**, and from the heater **28** through a tube **48** through the spray nozzles **30**, from where it will be forced, under pressure, against a workpiece **19** being cleaned as it passes through the spray booth **16**. The liquid cleaner is then permitted to drain back to the tank **26** from where it is again circulated. This arrangement eliminates waste of the cleaning agent in the solution.

A similar arrangement for circulating the rinsing water from the tank **37** is provided and shown, as conveyed through a tube **43**, through the strainer **49** by the pump **50**, operated by a motor **51**, and into the heater **29**. From the heater **29** the water is forced through the tubular member **52** to the spray nozzles **31** in spray booth **17**.

The exhaust from the gas heaters **28** and **29** enter the manifold **33**, leading into the heat exchanger **34**, in the drying chamber **13**, separated from the operator's station by an upright wall **14**.

A conveyor **61** is of the continuous chain type, driven by a motor **53**, actuating a speed reducer unit shown as **54** in FIGURE 1, as is more fully illustrated in FIGURES 7 to 11, inclusive. The continuous rail **20** is supported by means of brackets **55**, which are attached to the top **21** of the trailer **10** by means of bolts, shown as **56**. The brackets **55** are attached to the rail **20** by means of rivets, shown as **55'**.

A plurality of hangers **59** are provided in spaced relation along the conveyor **61**, each consisting of a flanged roller **57** resting on top of the rail **20** and supported on a shaft **58** which is journalled in the hanger **59**, which may be of a U shape and equipped with a downwardly extending arm **60**, supporting the conveyor chain **61**, attached to each arm **60** as by rivets **62**.

The rail **20** follows the curved shape of the guide rails **18** and **18'** as seen in FIGURE 1, and obviously the chain **61** must generally follow that same shape as it conveys the hangers **59** along the rail **20**. The chain is driven by sprockets **63** mounted on shafts **64** rotatably journalled in bearings **65** mounted on plates **66**, which are attached to the top **21** of the trailer unit **10**, and supported by bolts **67**, as shown in FIGURE 7.

The downwardly extending arms **61** of hangers **59** are equipped with clamps, consisting of two serrated jaws **68** and **68'**, mounted on the arm **60**, by a pin **69**, and jaw **68** being fixed by a rivet **70**, and the jaw **68'** being pivoted, so as to be normally urged into engagement with the other jaw by spring **71**. As the bracket **60** is moved along rail **20** by the chain **61**, an arcuate tripping projection **68''** at the upper end of jaw member **68'** will engage a roller **72**, rotatably mounted in a bracket **73**, riveted at **74** to the rail **20** in suitable position adjacent the end of the guide rails **18**, **18'**, so as to cause the jaw **68'** to move into open position as shown by the dotted lines in FIGURE 9. The jaws **68** and **68'**, when in a closed position are adapted to engage a roller **75** at the top of a suspension member shown as **76** in FIGURES 10 and 11. This suspension member has two laterally spaced hook members **77** arranged to engage the handle portion of the cart **19**. Thus, when the tripping projection of the jaw **68'** contacts roller **72**, it will cause the roller **75** to drop out of engagement with the jaws **68** and **68'**, thereby releasing the cart.

Obviously, any equivalent type of suspension or hook construction may be employed to accommodate any workpiece that is being processed, and in suitable cases, the workpiece itself may be engaged directly by the jaws **68** and **68'**.

From the above description it will be manifest that the entire cleaning unit may be mounted in the trailer body for transportation from one place to another. Since all the parts are arranged in the proper sequence, it becomes a self-contained unit for the cleaning of food carts, trays, or the like, used for food handling in the retail channel.

The carts or the like are initially placed on the runway **12** so that the casters or rollers of the carts will engage the guides **18** and **18'**. The upper portion of the cart **19** is suitably suspended by the hanger **59** on the rail **20**. As the conveyor chain is moved by the motor **53**, the cart is progressed along the runway **12** towards the spray booth **16**, having spray nozzles **30** on opposite sides. As the cart moves between the spray jets or nozzles, the cleaning liquid within the tank **26**, which is under pressure due to the pump **45**, is forced against the cart. When the unit or cart reaches the space between the spray booth **16** and **17**, it will be noted in FIGURE 5 that there are a group of transverse serrations or ribs **78**, mounted on the top of the runway **12**, which will be engaged by the casters of the cart so as to jar off the drops of excess cleaning liquid from the cart **19**. The cart then enters the spray booth **17**, which has hot water forced from the tank **27** by means of the pump **50**, onto the cart to rinse off the remainder of the cleaning liquid. The cleaning liquid in the spray booth **16** will drain back to the tank **26** to be used over again, and the hot water in the spray booth **17** will drain back into the tank **27**, to be used over again. When the cart leaves the spray booth **17** it will again contact serrations **78**, as shown in FIGURE 5, thereby removing surplus drops of water that adhere to the cart **19** after the rinsing operation. The cart will then be passed through the heating chamber **13**, where it will be caused to dry due to the air circulation from the heat exchanger **34**.

As the carts reach the runway **12'** on the opposite side of the enclosure, they will be automatically released by tripping the jaw **68'**, and will be caused to engage or nest one against another on runway **12'** from where they can be removed from the open end of the unit.

Any foreign material removed from the carts during the cleaning or rinsing operation will be removed by the filter units **32** and **44**, **49**, which will be cleaned from time to time as necessary.

Although I have shown and described a certain embodiment of my invention, it will be understood that various changes and modifications may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In a cleaning apparatus for food conveying containers or the like, a runway having guiding means therealong, overhead conveyor means for moving workpieces along said runway and having a plurality of connecting means for detachable engagement with workpieces for moving the latter along said runway, a spray booth along said runway having nozzles for directing liquid cleaning fluid onto the sides and top of said workpieces as they are moved through said spray booth, and transversely disposed serrations on said runway between said spray booth and a drying means, said serrations being adapted for engagement by said workpieces to shake off excess cleaning fluid from the latter, said drying means being disposed on said runway adjacent the outlet side of said spray booth and having means for directing heated air across said workpieces.

2. A mobile cleaning unit for food containers or the like comprising a wheel mounted body open at one end, said body comprising a floor, a top, two sides and a closed end, channelled runways on the floor of said body and disposed along opposite sides and the closed end of said body, overhead conveyor means suspended from the roof of said body and movable along said runway, said conveyor means having a plurality of connecting means for detachable engagement with workpieces for moving

the latter along said runway, spray means having nozzles for directing liquid cleaning fluid on said workpieces as they are moved along said runway, a second spray means spaced from said first spray means along said runway and having a plurality of nozzles for directing rinsing fluid on said workpieces as they are moved along said runway, a plurality of reservoirs for liquid disposed beneath said runway and beneath said spray means, drainage means beneath each of said spray means for returning the liquid to said reservoirs, pump means connecting the reservoirs for supplying liquid under pressure to the nozzles in said spray means, a drying zone disposed at the closed end of said body adjacent the outlet side of the second spray means and having means for directing heated air upon the workpieces as they pass along the runway, and a series of transverse serrations on said runway and positioned between the spray means and said drying zones, said serrations being adapted for engagement with workpieces traveling along said runway to shake off excess liquid from the workpieces.

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