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APPARATUS FOR CONTROLLING HEATED STAIN REMOVING DIGESTER BATHS

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Fig. 1.

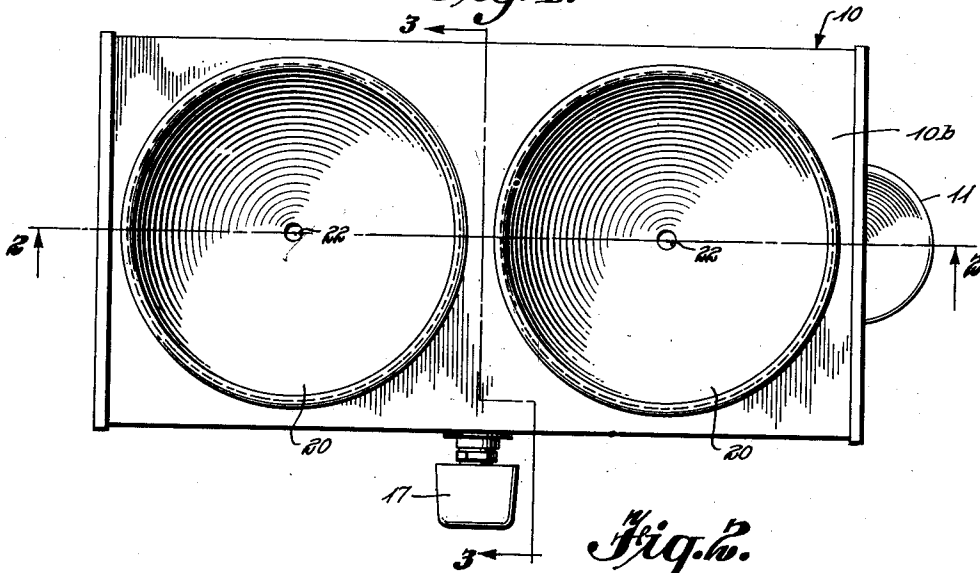


Fig. 2.

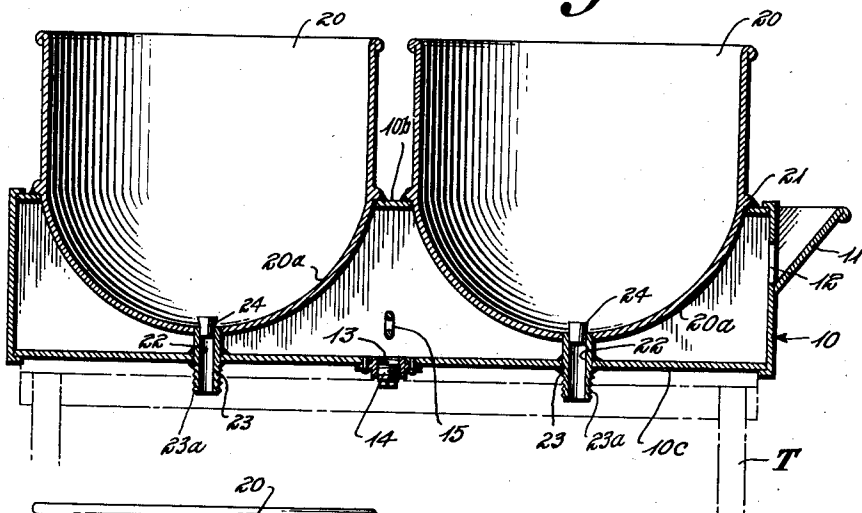
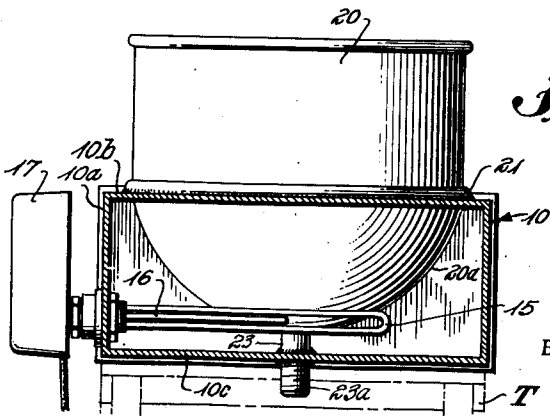


Fig. 3.



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APPARATUS FOR CONTROLLING HEATED
STAIN REMOVING DIGESTER BATHS

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2 Claims. (Cl. 219—38)

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The present invention relates to an apparatus or unit especially suitable for use by dry cleaners, launderers and garment dyers and kindred businesses, for accurately heating digester baths or other solutions and maintaining such baths or other solutions at optimum temperatures preselected by the operator of such apparatus or unit whereby an improved usage of enzymic solutions or other solutions is made possible and essential for optimum results from the solutions used.

For many years dry cleaning, laundering and garment dyeing establishments have been using various enzyme preparations for the removal of albuminous stains and blood from wearing apparel sent to them for cleaning or dyeing. So far as is known, such stains cannot be removed readily from such garments by any other method. The enzyme preparations are well known to the trade.

The customary manner for the application of these enzyme preparations is to dissolve a certain amount of the powdered product in warm water and immerse the stained fabric in the bath for a length of time necessary for the enzyme to convert the stain into water soluble matter which is then flushed out of the fabric. It has also long been known that these enzyme solutions are active only so long as the bath in which they are contained is kept warm. It is also a fact that, if the enzyme bath is too hot, the enzymes are destroyed and also that, if the bath becomes too cool, it becomes inactive. In general, the activity of all the enzymes is affected by concentration, time, temperature and hydrogen-ion concentration or pH. One of the most important factors is that of temperature. However, my invention relates to apparatus rather than to methods.

Up until the present time the trade has had no means or apparatus for properly maintaining the temperature of the enzyme bath, commonly called "digester bath." Usually the bath is prepared in a pan or similar vessel and the bath is started out at the desired temperature but there has been no way to maintain that temperature. Consequently, the baths have cooled rapidly and have quickly become inefficient and ineffective. If a bath is reheated with direct steam or any other method of direct heating, the enzymes are destroyed.

A principal object of this invention is to provide an improved digester apparatus or unit for use in dry cleaning, laundering and garment dyeing establishments, or the like, to remove digestible spots by means of enzyme preparations

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more efficiently and effectively than has been possible with apparatus heretofore employed for the purpose; and to provide a digester apparatus or unit of the character described which is highly practical, efficient and economical in use, and can operate to remove many stains heretofore considered to be unremovable.

Another object of this invention is to provide a digester unit or apparatus of the character described and one which will properly heat the enzyme baths or other solutions contained in such unit to the optimum temperature and then maintain such baths or solutions at the exact temperature pre-selected by the operator as being the best temperature for the particular material and stains being treated.

A further object of this invention is to provide a digester apparatus or unit of the character described and one which is simple, sturdy and durable in construction easily charged with and emptied of the fluids used, either in whole or in part. It is, therefore, ideal for continued operations, being simple to operate and to clean.

To commence operations initially requires only the screwing of the heating unit into the flange, and filling with water. The operation itself requires no manipulation or adjustment of screws, bolts, catches or other fastening means. Operation of the apparatus or unit hereafter requires only the changing of the solution and turning-on of electrical current.

Other objects of this invention will be in part obvious and in part pointed out hereinafter.

In accordance with this invention I provide a tank adapted to hold water, the tank being equipped with a thermostatically controlled heating unit which becomes covered by water in the tank, the thermostatic control of the heating unit being regulatable so that the heating element will heat the water in the tank to any temperature within its range and pre-selected by the operator. Immersed in the water in the tank are the lower portions of one or more vats which are adapted to contain fluid enzyme bath or other solution, the immersed portions of the vats being of heat conducting material so that the heat from the water in the tank will be transmitted through the walls of the vats and will heat the fluid enzyme or other solutions therein. By properly setting the thermostatic control of the heating unit the water in the tank and the fluid enzyme baths or other solutions in the vats are maintained at a substantially constant temperature almost indefinitely. It will be noted that the direct heat is applied to the liquid in the tank

portion of the apparatus or unit and that it is therefore impossible to produce a point of heat to the enzyme solution or other solution in the vats due to the physical fact of liquid dispersing heat uniformly throughout its volume. Preferably a visible tell-tale is associated with the tank to show at all times the water level in the tank. The vats are provided with drains through which the vats may be emptied; vats are affixed to the tank by welding or soldering same at the head and by welding or soldering at the point where the vat drain pipes pass through the bottom of the tank.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be more clearly set forth hereinafter and the scope of the application of which will be set forth in the claims that follow.

In order that a clearer understanding of this invention may be had attention is hereby directed to the accompanying drawing forming a part of this application and illustrating certain possible embodiments of the invention and in which:

Figure 1 is a top plan view of a digester unit embodying this invention;

Figure 2 is a section view thereof and is taken on the line 2—2 of Figure 1, and

Figure 3 is a sectional view thereof and is taken on the line 3—3 of Figure 1.

Similar reference characters refer to similar parts throughout the several views of the drawings.

The digester unit includes a tank 10 of suitable material, such as sheet metal, adapted to contain water. At one side of the tank is a funnel-like member 11 open at the top and toward its lower end communicates with the interior of the tank through an aperture 12 in the side of the tank. This provides a visible tell-tale showing the water level in the tank and also provides an opening for filling the tank section of the apparatus or unit.

The bottom of the tank has a drain opening 13 closed by a removable nipple 14.

Mounted on the front wall 10^a of the tank and in an aperture therein is a heating unit having a heating element 15 and a thermo-responsive element 16 both within the tank and positioned to be immersed in water contained in the tank. An electrical control 17 for controlling the temperature of the heating element 15 in response to the call of the thermo-responsive element 16 is mounted on the outside of the tank and operatively associated with the heating element 15 and the thermo-responsive element 16. This heating unit and its control may be of any standard or conventional type such as is available on the market and no details of the unit need be given here.

The tank 10 is provided with a cover 10^b having in the particular embodiment shown in the drawings two circular holes or apertures. There are also shown two vats 20, each of circular shape and each having a bowl-like bottom portion 20^a and an annular bead 21 extending around and outwardly of the vat approximately at the top of the bowl portion 20^a. Each vat is adapted to be inserted into one of the openings in the cover 10^b of the tank with the bead 21 resting on the top 10^b of the tank about said opening. When so positioned and supported each vat will have its lower bowl-shape portion 20^a extended downwardly into the tank 10 and immersed in the water in the tank. The bottom of each vat 20 has

a drain opening 22 from which a drain tube 23 leads through a hole provided therefor in the bottom wall 10^c of the tank. The drain tube 23 of each vat is closed by a removable rubber cork 24 so that by removing the cork 24 the vat can be drained. Drain tubes 23 have their lower ends threaded, as at 23^a, for extension of drain facilities whenever necessary. Vats 20 are affixed to tank 10 at top wall 10^b by soldering or welding angular bead 21 to said top wall 10^b and by soldering or welding the drain tubes 23 to bottom wall 10^c of the tank at point through which drain tubes 23 extend through bottom wall of tank 10. Thus making tank 10 liquid tight at all points except at tell-tale funnel 11 and drain opening 13 when drain-opening plug 14 is removed.

In operation the tank 10 is filled with water to its top and it will be noted that when so filled the water will be visible in the tell-tale funnel 11. The digester solution is then introduced into the vat or vats 20. The thermostat of the heating unit is set to heat the water in the tank and thereby the enzyme solution in the vats to the optimum temperature for the particular fabric and stains to be treated and then the stained fabric is introduced therein and treated for the proper period of time. The temperature of the enzyme solutions in the vats will reach the optimum temperature selected. The height of the water in the tell-tale funnel 11 will indicate when the water in the tank requires replenishing and this can be done very easily by merely pouring water into the funnel 11 until the water in the tank has been restored to the desired level. Any vat may be quickly and easily drained of enzyme solution, which may have become worn out, for replacement by another enzyme solution, by merely removing the rubber cork from the drain outlet of the vat, allowing the solution to empty from the vat, replacing the cork and putting the new solution into the vat.

For convenience of operation the tank 10 may be placed on any suitable table or support, indicated by dot-and-dash lines at T in Figures 2 and 3, the table having an open top so as not to interfere with the drain tubes 23 of the vats 20 or the drain 13, 14 of the tank 10.

It will be apparent from the above that with my digester unit, by properly setting the heating unit, the enzyme solutions in the vats can be maintained for an indefinite length of time at the range of temperatures (i. e., between 100° F. and 130° F.) at which said enzymes are active for the purpose intended and, particularly, at a pre-selected temperature desired by the operator as the optimum temperature for the particular material and stains being treated. These enzymes in stain removing solutions are killed or destroyed at a temperature above 130° F. and are most effective at temperatures between 110° F. and 120° F. The temperature can be easily raised or lowered by merely adjusting the thermostatic control of the heating unit accordingly. The heating unit will maintain an adjusted temperature substantially constant (i. e., within a degree or two, plus or minus) for an indefinite period of time provided, of course, that an adequate supply of water be maintained in the tank. It is also noted that the apparatus or unit may be flushed and cleaned very easily without requiring the manipulation or unfastening of bolts, screws, catches, or the like, except that in flushing tank 10 it is desirable to unscrew the heating unit 17 from the tank 10 when it is desired to remove the heating unit therefrom.

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As many changes may be made in the above construction without departing from the scope of the invention it is understood that all matter contained in the above description or shown in the accompanying drawing be illustrated and not in a limited sense.

That which is claimed, as new, is:

1. An apparatus or unit useful for proper heating of and accurate temperature control of enzyme digester baths employed in the removal of stains from fabrics, said apparatus consisting of a tank adapted to contain water and to be supported on a table-like support, said tank being relatively flat and having its side, top and bottom walls closed except for an opening in one side wall thereof and extending for a distance below the top of the tank, a lip extending upwardly and outwardly from said wall of the tank and from below said opening to approximately the top of the tank to form a tell-tale funnel, at least two open-top digester-bath vats arranged in adjacent relation with one another and having their upper portion extending for a distance above the top of said tank and having their lower portions bowl-shaped and extending downwardly into the tank for the major portion of the depth of the tank but spaced from the bottom wall of the tank, a drain means for said tank, a drain duct extending downwardly from each vat, respectively, to discharge exteriorly of the tank, an opening and closing means for said drain means and said drain ducts, said vats being supported by the tank and closing the top wall of said tank and being of heat conducting material, an electric immersion heating means to heat the water in said tank and projecting into the tank from and supported by a side wall of the tank and lying between said lower portions of said vats and adapted to be submerged in the water in the tank, and a regulatable thermostatic device mounted on the apparatus and controllably connected to said heating means and having the thermo-responsive means thereof disposed to be immersed into the water in said tank and between said vats, thereby the proper and accurate temperature of enzyme digester baths or other solutions in said vats may be controlled and maintained for the essential optimum results from the solutions used in the vats.

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2. An apparatus or unit useful for proper heating of and accurate temperature control of enzyme digester baths employed in the removal of stains from fabrics, said apparatus consisting of a relatively flat tank adapted to contain water and to be supported on a table-like support, at least two open-top digester-bath vats arranged in adjacent relation with one another and having their upper portion extending for a distance above the top of said tank and having their lower portions bowl-shaped and extending downwardly into the tank for the major portion of the depth of the tank but spaced from the bottom wall of the tank, a drain means for said tank, a drain duct extending downwardly from each vat, respectively, to discharge exteriorly of the tank, an opening and closing means for said drain means and said drain ducts, said vats being supported by the tank and closing the top wall of said tank and being of heat conducting material, an electric immersion heating means to heat the water in said tank and projecting into the tank from and supported by a side wall of the tank and lying between said lower portions of said vats and adapted to be submerged in the tank, and a regulatable thermostatic device mounted on the apparatus and controllably connected to said heating means and having the thermo-responsive means thereof disposed to be immersed into the water in said tank and between said vats, thereby the proper and accurate temperature of enzyme digester baths or other solutions in said vats may be controlled and maintained for the essential optimum results from the solutions used in the vats.

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