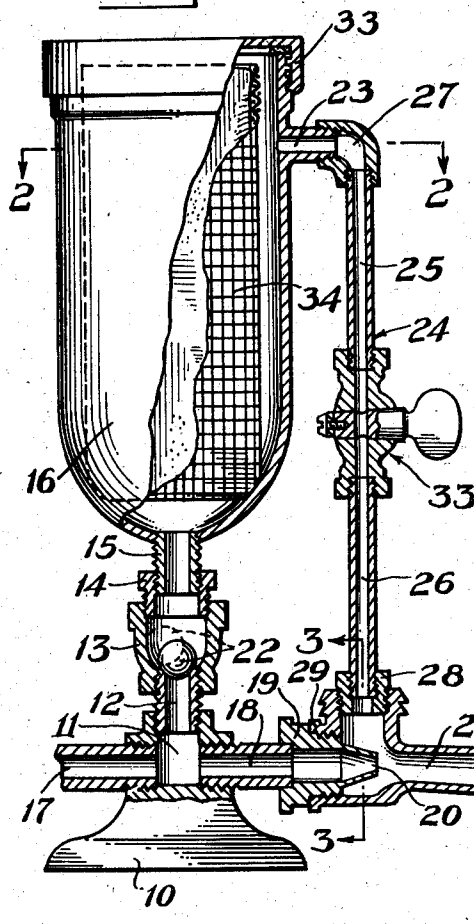
Nov. 8, 1938. J. G. DONALDSON 2,135,969

APPARATUS FOR PRODUCING AND DISPENSING SOAPY SOLUTIONS

Filed Jan. 26, 1938

Fig. 1.



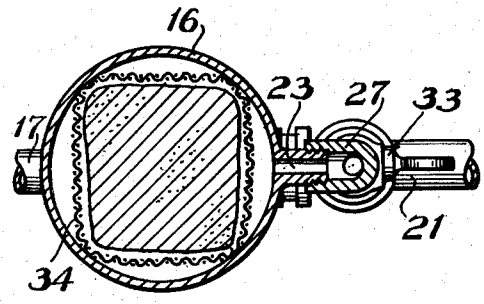


Fig. 2.

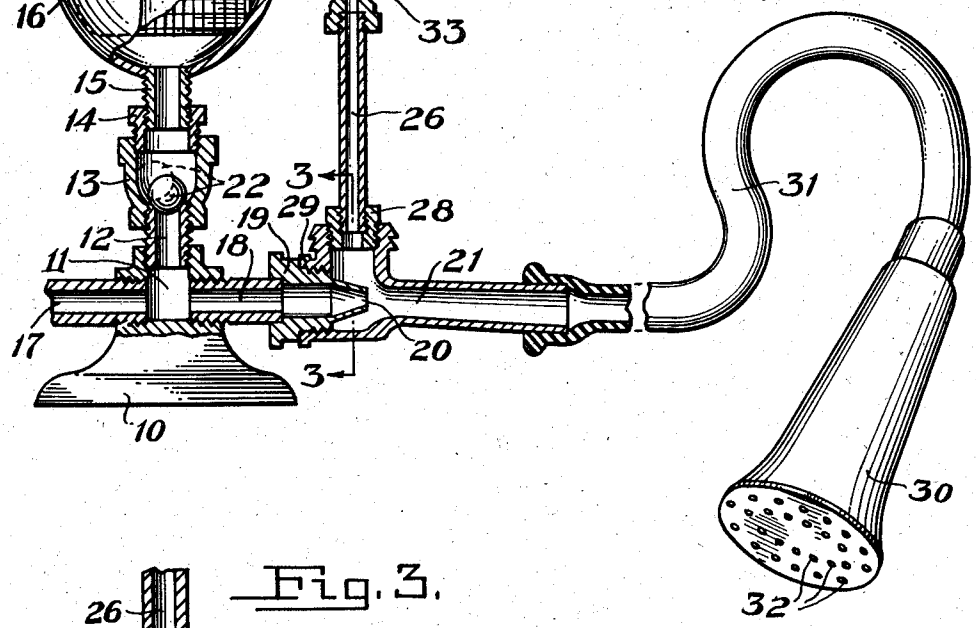
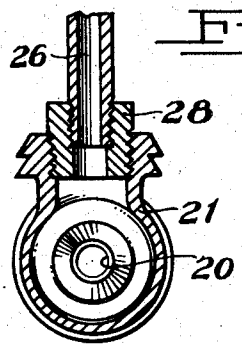


Fig. 3.



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APPARATUS FOR PRODUCING AND DISPENSING SOAPY SOLUTIONS

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2 Claims. (Cl. 299—84)

This invention relates to cleansing apparatus, capable of performing cleaning functions without the need for manual handling of the article being operated upon during the cleaning operation.

The usual procedure in washing dishes and kitchen utensils is essentially a manual one. The articles must be handled in the process of removing the matter adhering thereto; causing contact or immersion of the hands with the cleansing agent and hot water, producing deleterious effects on the person's hands in the nature of redness, chapping, etc. To prevent or diminish such effects mild forms of soap are used, having a materially lesser cleansing action than stronger soaps, which are preferably desirable not only because of their more efficient cleansing action but also because of their relatively low cost. Moreover, because of the need for immersion of the hands the temperature of the water is necessarily low, making it more difficult for the soapy solution being used to cut the grease from the articles being cleaned. As a result a vigorous rubbing action must be performed upon the articles with a cloth, and in many instances the adherence of the grease or dirt is so strong as to necessitate the use of metallic pads. Even so, the quantity of energy necessary in the performance of an effective cleaning operation is beyond the ability of most persons, particularly women.

A further disadvantage of the usual mode of cleaning dishes and kitchen utensils lies in the fact, that as the washing operation proceeds the cleaning fluid becomes progressively mixed with grease and waste matter, making washing increasingly difficult. One possible manner of overcoming this latter drawback is to change the washing fluid frequently, but this obviously wastes cleaning agents and water, which in commercial establishments is an important item of expense.

Accordingly, it becomes an object of this invention to provide an improved washing apparatus, particularly useful in connection with the cleansing of articles such as dishes and kitchen utensils.

A further object of the invention lies in the provision of an apparatus the use of which eliminates the need for manually handling articles during cleaning thereof, this making possible the use of very hot water and relatively inexpensive soaps to produce a very efficient cleaning of the articles at a minimum of expense.

A further object of the invention is to provide a cleaning apparatus capable of dispensing either clean water or a solution of water and soap of various degrees of concentration, depending upon the will of the operator.

Another object of the invention is the provision of a cleaning apparatus which can selectively dispense either a solution of water and soap or clean water, and which will prevent commingling of the soap and water when the latter condition is desired.

A still further object of the invention is to provide an apparatus capable of dispensing a sudsy cleaning substance at a high velocity.

A further object of the invention lies in obtaining a soapy solution which is admixed with, and agitated by, a fluid stream and in then dispensing the admixture in the form of suds issuing at a relatively high velocity.

It is still another object of the invention to provide an apparatus embodying a removable container for cleaning agents, which will prevent solid particles of said agents from clogging parts of the apparatus, while at the same time permitting effective solution of the agents in a fluid moving relative thereto and in contact therewith.

This invention possesses many other advantages, and has other objects which may be made more easily apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawing accompanying and forming part of the present specification. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawing:

Figure 1 is an elevational view of the apparatus, portions of which are shown in section.

Figure 2 is a transverse sectional view taken as indicated by line 2—2 of Figure 1, and

Figure 3 is a sectional view on a slightly enlarged scale, taken as indicated by line 3—3 of Figure 1.

In its general aspects the present invention contemplates the provision of a receptacle for containing a cleaning agent soluble in a fluid, the fluid flow being divided, with one part acting directly upon the cleaning agent to place it in solution, which is then acted upon by the other part, for diluting the solution and agitating the same so that a high degree of suds at a high velocity will be obtainable at the dispensing end of the apparatus.

More specifically, the particular embodiment of the invention disclosed in the drawing includes

a supporting base 10 carrying the essential operating portions of the apparatus. To this end, the base is provided with a chamber 11 whose upper end threadedly receives a nipple 12 carrying a housing 13 which functions to enclose a valve mechanism hereinafter described. The upper end of the valve housing threadedly receives a reducer fitting 14 which in turn threadedly receives a hollow stem 15 connected with the lower end of a chamber 16 adapted to contain a cleaning agent.

For the purpose of dissolving the cleaning agent a fluid is conveyed from a convenient source of supply (not shown) and is caused to pass through a conduit 17 threadedly connected to the base and communicating with the chamber 11. Part of the fluid passes from the conduit 17 into the chamber 11 and through a nipple 18 threadedly connected with the base 10. The other end of the nipple 18 threadedly receives a nozzle 19 having a reduced discharge orifice 20 for the purpose of diminishing the flow of fluid from the nipple and nozzle, while at the same time discharging fluid at an increased velocity into a mixing chamber 21 which is threadedly connected with the nozzle 19 and which is provided for a purpose hereinafter fully described.

That part of the fluid which does not pass through the nozzle moves upwardly from the chamber 11 through the nipple 12, opening a check valve 22 consisting of a ball seated at the upper end of said nipple and enclosed within the valve housing 13. Upon passing beyond the valve the fluid enters the container where it is free to act upon any cleaning agent contained therein to place a portion thereof in solution.

The solution thus produced passes from the container outlet 23 through a valve controlled conduit generally designated 24 and may be discharged into the mixing chamber 21 in the vicinity of the discharge orifice 20 of the nozzle 19. The conduit 24 includes tubular sections 25 and 26, the section 25 connecting the valve inlet with the container outlet 23 through the elbow 27, while the section 26 connects the valve outlet with the mixing chamber 21 through the reducer fitting 28. The nozzle 19 is preferably provided with a shoulder 29 abutting against the end of the mixing chamber 21 so as to position the reduced portion of the nozzle with respect to the soapy solution entering said mixing chamber.

By the arrangement described, only a portion of the fluid functions to dissolve the cleaning agent in the container 16. In effect, this fluid may be termed "primary" fluid and the solution produced thereby can be mixed in the mixing chamber 21 with the "secondary" fluid issuing from the nozzle. An efficient mixture will be produced by properly positioning the nozzle with respect to the inlet of the soapy solution into the mixing chamber 21, since such positioning will provide an effective aspirating effect upon the soapy solution, drawing it into the mixing chamber at an increased velocity and mixing and agitating it with the secondary fluid to further dissolve and dilute the soapy solution. Of course, agitation and dilution would also occur if the nozzle were omitted, but it is found to be desirable to incorporate it in the apparatus due to the increased aspirating effect produced thereby and also because the nozzle restriction 20 causes a greater rate of flow of primary fluid through the chamber 16 containing the cleaning agent.

The highly agitated solution in the mixing chamber 21 can pass into the dispensing nozzle 30 through the flexible hose 31 fitted over the discharge end of the mixing chamber. The solution will leave the perforations 32 of dispensing nozzle 30 at a high velocity and in the form of minute and multitudinous suds capable of readily removing waste matter and grease from articles to be cleaned.

The degree of concentration of cleaning agent in the solution leaving the mixing chamber 21 can readily be controlled by manual manipulation of the valve 33 in the conduit 24. For that matter, whenever required, the valve 33 can be closed entirely so that only clean secondary fluid will pass into the mixing chamber 21 and through the dispensing nozzle 30 for action upon the articles to be cleaned. This latter operation will be required whenever it is desired to rinse the articles. As an insurance that only clean secondary fluid will be dispensed under this latter requirement, the ball 22 of the check valve will seat upon the upper end of the nipple 12 and prevent drainage of the soapy solution into the base chamber 11 from where it would be carried through the mixing chamber 21 and dispensing nozzle 30, thereby preventing rinsing of the articles in clean liquid. The check valve 22 further possesses the advantage of maintaining the soap container 16 full of soapy solution so that a practically instantaneous supply of suds will be presented at the dispensing nozzle 30 upon reopening the manually controlled valve 33.

Whenever it is necessary to fill the container 16 with a cleaning agent, or whenever it is desired to change the kind of cleaning agent used, the cover 33 normally threaded to the upper end of the container 16 may be unscrewed and the cleaning agent either placed in the container or removed therefrom. After it is filled the container 16 may again be enclosed by replacing the cover 33.

The cleaning agent can be held within the container 16 by confining the same within a woven or other suitably perforated or pervious receptacle 34 which preferably is formed of woven wire, the mesh of which is chosen in accordance with the type of cleaning agent used. For example, the use of fine soap flakes would necessitate the receptacle 34 being of a much finer mesh than if a solid bar of soap were used. For that matter, the receptacle need not be used at all when the soap is used in bar form, inasmuch as proper dissolving of the soap in the primary fluid can take place. However, soap flakes require the use of a mesh receptacle to prevent the flow of fluid from moving solid particles into the conduit and valve portions of the apparatus and thereby clog the same. The finer the soap flakes the greater must be the mesh number used. When extremely fine flakes are used it might be necessary to contain them in a cloth bag insertible in the woven receptacle 34.

By use of the device described it will be obvious that the omission of the need for manually handling the dishes or kitchen utensils during the cleaning operation will permit the use of water at a much greater temperature than is feasible in the commonly employed method of handling and washing dishes. This enables a more rapid and effective cleaning of the articles to be performed, which effectiveness will be added to by the high velocity sudsy solution discharged from the dispensing nozzle and impinging upon the articles being cleaned. The high temperature fluid being used practically eliminates the need for wiping the articles, since removal of the spray therefrom will permit the

surrounding atmosphere to evaporate all liquid from the cleaned surfaces. Due to the ability of the present apparatus to rinse the articles solely with clean, hot, secondary water immediately following the washing of the articles in the sudsy solution, the cleaning agent does not have opportunity to solidify upon the surfaces of the articles, so that natural evaporation of the secondary fluid from said surfaces leaves them clean and with a high degree of luster.

While the invention has been described with particular reference to use in washing dishes and kitchen utensils, it will be apparent that it is applicable for other apparent uses too numerous to mention herein.

I claim:

1. A washing apparatus including a closed container, a fluid conduit, a by-pass leading from said conduit and communicating with the lower end of the container, a one-way valve positioned within said by-pass and permitting the fluid to pass into the container, a fluid outlet positioned at the upper portion of the container, a mixing chamber communicating with the first-mentioned fluid conduit beyond the by-pass, a conduit leading from the fluid outlet of the container to the mixing chamber, and a manually operable valve positioned within said last-mentioned conduit, said last-mentioned valve in one position of adjustment permitting ready flow of fluid from the container to the mixing chamber and when in another position of adjustment cutting off flow of fluid from the container to the mixing chamber but permitting building up of pressure in the container through the by-pass.

2. A washing apparatus including a closed container, a fluid conduit, a by-pass leading from said conduit and communicating with an inlet portion of the container, a one-way valve positioned within said by-pass and permitting the fluid to pass into the container, a fluid outlet positioned at another portion of the container, a mixing chamber communicating with the first-mentioned fluid conduit beyond the by-pass, a conduit leading from the fluid outlet of the container to the mixing chamber, and a manually operable valve positioned within said last-mentioned conduit, said last-mentioned valve in one position of adjustment permitting ready flow of fluid from the container to the mixing chamber and when in another position of adjustment cutting off flow of fluid from the container to the mixing chamber but permitting building up of pressure in the container through the by-pass.

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