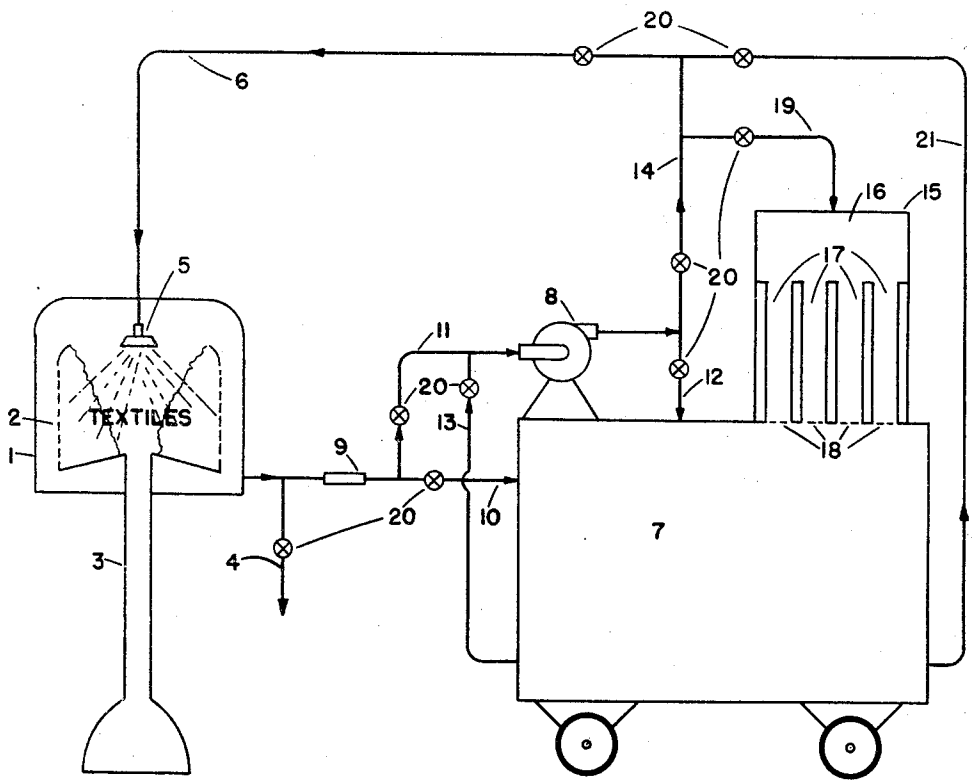
July 25, 1950 A. C. SMITH 2,516,349

APPARATUS FOR TREATING TEXTILES

Filed Aug. 2, 1946



ADRIAN C. SMITH. INVENTOR.

BY Arnold E. Lyden

ATTORNEY.

Patented July 25, 1950 2,516,349

UNITED STATES PATENT OFFICE

2,516,349

APPARATUS FOR TREATING TEXTILES

Adrian C. Smith, Cheltenham, Pa., assignor to The Pennsylvania Salt Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application August 2, 1946, Serial No. 687,985

5 Claims. (Cl. 91—44)

1

This invention relates to the impregnation of textiles or similar materials with protective agents, in connection with dry cleaning or laundry operations.

It is customary to impregnate articles of clothing and other textile materials with protective agents, e. g., mothproofing agents, by incorporating the agent in a liquid solvent therefor, treating the textile material with the resulting solution, e. g., by dipping, often following by heating to remove excess impregnating liquid or some constituent of this liquid such as the carrier for the protective agent.

In recent years it has appeared desirable to carry out such treatment of textiles in connection with dry cleaning or laundry operations. The methods and apparatus heretofore employed, however, for carrying out such treatment as an auxiliary operation to the regular dry cleaning or laundry operation have been quite cumbersome, usually involving considerable additional handling of the clothing or other textile material.

My invention comprises apparatus for carrying out such impregnation of articles of clothing or other textile materials in connection with dry cleaning or laundering operations, having the remarkable advantage that additional handling of the clothing or other textile materials is almost entirely eliminated and the cleaned or laundered materials are uniformly impregnated with the desired protective agent with a minimum of effort and apparatus.

My new apparatus is a compact unit, readily attached to and detached from, conventional laundry or dry cleaning equipment, for storing, using and renewing impregnating liquid containing protective agent for incorporation in textile material in connection with laundry or dry cleaning operations. In use this unit is associated with the extractor of the dry cleaning or laundry plant, i. e. the centrifugal basket where the cloth or other textile material is whirled to remove most of the cleaning fluid, i. e., either the dry cleaning solvent or the aqueous cleaning liquid in the case of a laundry plant.

My unit includes a storage vessel for the impregnating liquid, and a liquid-treating chamber so communicating with this storage vessel that impregnating liquid may be readily conveyed to the liquid-treating chamber from the storage vessel or to the storage vessel from the liquid-treating chamber or both. My compact unit also includes means such as a conduit and spray head for conveying impregnating liquid into intimate contact with textile material in the centrifugal

2

basket of the extractor of the dry cleaning or laundry plant as well as means such as another conduit for withdrawing the impregnating liquid from said contact with the textile material and returning it to the storage vessel. All these parts of my apparatus as above described are preferably arranged and associated so that they may be withdrawn as a unit from association with the extractor of the dry cleaning or laundry plant.

The accompanying drawing, which forms a part of this application, illustrates a preferred embodiment of my apparatus invention. In this drawing reference numeral 1 indicates a centrifugal extractor of a laundry or dry cleaning plant shown in a diagrammatic form, and 2 indicates a perforated basket of such an extractor designed to be rotated on a vertical axis by means of the shaft 3. Reference numeral 4 indicates a drain pipe from the centrifugal extractor, which may communicate with the usual storage vessels (not shown) for the cleaning fluids employed, or with a drain. The equipment so far described is conventional equipment in a dry cleaning plant or a laundry, and is associated with the conventional tanks, pumps, conveyors and filters (none of which is shown in the drawing) for handling the clothes and the cleaning fluid, i. e., vessels for agitating clothes with cleaning fluid, conduits for withdrawing cleaning fluid from such vessels as well as from the extractor 1, and pumps and conveyors to facilitate such handling.

The embodiment of the new apparatus of my invention illustrated in the drawing includes the spray head 5 adapted to spray impregnating liquid on textile material within the centrifuge basket 2, and a conduit 6 connecting this spray head 5 with the storage vessel 7 either directly through the conduit 21 or through the conduits 13 and 14, by means of the pump 8, depending on whether or not the liquid in the storage vessel 7 is kept under sufficient pressure to spray the liquid properly from the spray head 5. The pressure in tank 7 may be any convenient working pressure, at, above, or below atmospheric. The drain 4 is connected by an easily removed connection 9 with storage vessel 7. This connection is either directly through the conduit 10 or indirectly through the conduits 11 and 12, by means of the pump 8, depending on whether or not gravity is sufficient to drain the liquid from the extractor 1 into the storage tank 7.

Reference numeral 15 indicates the liquid-treating chamber for treating the impregnating liquid contained with the storage vessel 7 to bring it up to desired strength in the protective agent

content therein, as well as to clean the impregnating liquid if this is considered desirable. In the liquid treating chamber 15 is a tube head 16 and a series of relatively wide cylindrical tubes 17 communicating with the storage vessel 7 through perforated plates 18. A supply of additional protective agent to be dissolved in the impregnating liquid, and preferably a filter aid as well, to clarify the liquid, are contained in the cylindrical tubes 17 as will be hereinafter described. Impregnating liquid is brought to the liquid-treating chamber 15 through the conduit 19 by means of the pump 8 either from the storage vessel 7 or directly from the extractor 1 through the conduits provided as shown in the drawing. Various valves are provided in the conduits shown in the drawing, indicated by the reference numeral 20 in each case, to make possible the alternative connections and operation of the unit as above described.

As can readily be seen, my entire apparatus for the handling and use of impregnating liquid is associated in a single compact unit that can be withdrawn in a body merely by breaking the connection 9 and lifting the spray head 5 out of the extractor. I wish to emphasize that the tank 7 and the other principal elements of my new unit are separate and distinct from the vessels and conduits used to handle the cleaning fluid, except for the connection which may be made to the drain 4.

Many variations in the design of my new unit are obvious. Thus the tube-head chamber 16 may be looked upon, or may be associated with, an additional storage vessel for liquid effluent from the extractor (for example the connection 9 may be to a sump tank, not shown, for storage of dirty impregnating liquid, and this sump tank may connect with the chamber 16 through a pump) and the storage vessel 7 may be employed only for fortified and clarified liquid.

The apparatus of my invention may advantageously be employed to impregnate articles of clothing with solid or liquid moth proofing agents in connection with dry cleaning operations, and the process of my invention, as applied to dry cleaning operations, will for convenience be described with reference to the drawing. Thus in a conventional dry cleaning process the clothes will have been agitated with dry cleaning solvent in the usual equipment before introduction of the clothes into the extractor 1. In the extractor 1 most of the dry cleaning solvent is removed from the clothes by centrifugal force. In conventional dry cleaning operation, the clothes may retain, as residual fluid after centrifuging, up to about 10% of the dry cleaning solvent.

In order to incorporate in the clothing a moth proofing agent such as 2,4-dichlorophenoxyacetic acid, 2,4,5-trichlorophenoxyacetic acid, hexachlorocyclohexane or DDT, the agent may be dissolved or suspended in a solvent similar or identical to the dry cleaning fluid, e. g., Stoddard solvent or carbon tetrachloride, and the resulting solution placed in the storage vessel 7. As above described this impregnating liquid may then be sprayed into the almost dry clothing through the spray head 5 and, simultaneously or subsequently, the centrifuge may be operated to remove excess liquid; after a suitable time of treatment, the liquid containing moth-proofing agent will have displaced the residual dry cleaning fluid already in the clothing. Effluent liquid from this treatment is withdrawn from the conduit 9 either directly back to the storage vessel 7 or to the

liquid-treating chamber 15 as above described. The concentration of protective agent in the impregnating liquid may be so calculated that the residual liquid that cannot readily be removed from the clothes by centrifuging contains just the amount of protective agent it is desired to incorporate in the clothes. For example, Stoddard solvent containing from 5 to 6% dissolved DDT will leave, in usual centrifuging operations, the desired amount of from 0.2 to 0.6% DDT in the dried clothing.

In order to maintain the desired strength of protective agent in the impregnating liquid, some impregnating liquid is passed either continuously or intermittently through the liquid-treating vessel as above described. The tubes 17 in chamber 15 may be charged with close-fitting cylindrical cloth bags containing a fixed proportion of comminuted filter aid and protective agent mixed together. These charges of filter aid and protective agent form the subject matter of a copending application filed December 6, 1949. The proportion of protective agent in each bag may be so fixed that replacement of all or a fixed proportion of the bags in the tubes 17, for each batch of clothes, reenforces the impregnating liquid with the proper amount of protective agent. Suitable protective agent for use in connection with dry cleaning operations include DDT, 2,4-dichlorophenoxyacetic acid, 2,4,5-trichlorophenoxyacetic acid, or hexachlorocyclohexane for moth-proofing cloth; chlorinated paraffin, paraffin, waxes, stearic acid, or silicones for waterproofing cloth; or phenyl mercuric acetate or salicylate for protecting cloth against mildew. Suitable filter aids for admixture with protective agent to clarify the impregnating liquid while it is being fortified include activated fuller's earth, activated bentonite, activated carbon, etc.

In laundry operations the clothes will have been agitated with water containing soap and the usual cleaning aids, and will usually have been rinsed, before incorporation of protective agents into the centrifugally drained clothes. Since the textile material in the case of laundry operations contain residual aqueous liquid, the protective agent which it is desired to incorporate in the textile will generally also be dissolved in an aqueous liquid. By this means a moth-proofing agent such as zinc fluosilicate may be incorporated in clothing; or agents for mildew-proofing, e. g., agents such as phenyl mercuric acetate, may be incorporated in the clothing. Concentrations and proportions will in general be calculated and regulated for laundry operations just as in the dry cleaning operations above described.

The above discussion relates chiefly to textile treatment by replacement of residual dry cleaning or laundering fluid, retained by the clothing after centrifuging, with a solvent or carrier containing dissolved or dispersed material which imparts special properties to the clothing. However, the apparatus of my invention may also advantageously be used, in a substantially identical manner, to treat the clothing with materials capable of being preferentially absorbed on the fabrics. For example, in treating clothing with aqueous solutions of zinc fluosilicate, it is unnecessary so completely to displace residual liquid from the clothing, since the clothing tends to absorb the zinc fluosilicate from the solution.

The comminuted filter aid and protective agent is used in suitable quantity for clarifying and reinforcing the impregnating liquid. Such a composition will generally contain from about 25 to

98% filter aid, preferably from about 50% to 95%. In a typical operation such cloth bag may contain, for example 2 lbs. of a moth-proofing agent such as DDT and 2 lbs. of a filter aid such as activated bentonite, for use in moth-proofing textiles in connection with dry cleaning operations; or 1½ lbs. of a water-proofing agent such as stearic acid and 1½ lbs. of a filter aid such as activated bentonite for water-proofing textiles in connection with dry cleaning; or 2 lbs. of a water-soluble moth-proofing agent such as zinc fluosilicate and 2 lbs. of a filter aid such as activated carbon for moth-proofing textiles in connection with laundry operations.

Many modifications are possible in the apparatus of my invention as above described without departing from the scope of the invention. It is intended that the above description of my invention should be interpreted as illustrative, and the invention is not to be limited except as set forth in the claims which follow.

I claim:

1. In an apparatus for impregnating textiles with a solvent carried protective material, a pump having a fluid intake and a fluid exhaust, a textile treating chamber, a conduit for fluids connecting said textile treating chamber with said pump intake, a conduit for fluids connecting said textile treating chamber with said pump exhaust, a storage container for a liquid solvent, a solvent treating chamber in fluid communication with said storage container, a conduit for fluids connecting said storage container with said pump intake, and a conduit for fluids connecting said solvent treating chamber with said pump exhaust.

2. In an apparatus for impregnating textiles with a solvent carried protective material, a pump having a fluid intake and a fluid exhaust, a textile treating chamber, a conduit for fluids connecting said textile treating chamber with said pump intake, a conduit for fluids connecting said textile treating chamber with said pump exhaust, a storage container for a liquid solvent, a solvent treating chamber in fluid communication with said storage container, a conduit for fluids connecting said storage container with said pump intake, a conduit for fluids connecting said solvent treating chamber with said pump exhaust and valve means disposed in at least one of said fluid conduits for regulating the amount of impregnating solution passing therethrough so as to control the condition of the impregnating solution which enters said textile treating chamber.

3. In an apparatus for impregnating textiles with a solvent carried protective material, a pump having a fluid intake and a fluid exhaust, a textile treating chamber, a conduit for fluids connecting said textile treating chamber with said pump intake, a conduit for fluids connecting said textile treating chamber with said pump exhaust, a storage container for a liquid solvent, a solvent treating chamber in fluid communication with said storage container, a conduit for fluids connecting said storage container with said pump intake, a conduit for fluids connecting said solvent treating chamber with said pump exhaust and valve means disposed in each of said fluid conduits for regulating the amount of impregnating solution passing therethrough so as to control the condition of the impregnating solution entering said textile treating chamber.

4. An apparatus as described in claim 3 in which the solvent treating chamber comprises a closed container having a fluid inlet, a fluid outlet and a section for holding charges of filter and soluble protective material, said charge holding section comprising a plurality of longitudinally extending compartments, the compartments extending in the direction of solvent flow and each compartment being provided at its fluid exit end with a perforated closure to prevent escape of said charges.

5. In an apparatus for impregnating textiles with a solvent carried protective material, a pump having a fluid intake and a fluid exhaust, a textile treating chamber, a conduit for fluids connecting the lower portion of said textile treating chamber with said pump intake, a conduit for fluids connecting the upper portion of said textile treating chamber with said pump exhaust, a storage container for a liquid solvent, a solvent treating chamber carried by the upper portion of said storage container and in fluid communication with said storage container, a conduit for fluids connecting said storage container with said pump intake, a conduit for fluids connecting the upper portion of said solvent treating chamber with said pump exhaust and valve means disposed in each of said fluid conduits for regulating the amount of impregnating solution passing therethrough so as to control the condition of the impregnating solution entering said textile treating chamber.

ADRIAN C. SMITH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,202,165	Conner	Oct. 24, 1916
1,526,495	Hertler	Feb. 17, 1925
1,711,774	Coleman	May 7, 1929
1,937,256	Taylor	Nov. 28, 1933
2,206,179	Frank	July 2, 1940
2,275,593	Muskat	Mar. 10, 1942
2,376,327	Chuck	May 27, 1945