APPARATUS FOR TREATING TEXTILES

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UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING TEXTILES

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5 Claims. (Cl. 91—44)

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 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, 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 2 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 impreg
ating liquid if this is considered desirable. In
the liquid treating chamber 18 is a tube head 18
and a series of relatively wide cylindrical tubes
17 communicating with the storage vessel 7
through perforated plates 18. A supply of addi
tional protective agent to be dissolved in the im
pregnating liquid, and preferably a filter aid as
well, to clarify the liquid, are contained in the
cylindrical tubes 17 as will be hereinafter de
scribed. Impregnating liquid is brought to the
liquid-treating chamber 18 through the conduit
19 by means of the pump 9 either from the stor
age 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 28 in each case, to make pos
sible 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
as sociated in a single compact unit that can be
withdrawn in a body merely by breaking the con
nection 3 and lifting the spray head 6 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 18
may be looked upon, or may be associated with,
an additional storage vessel for liquid effluent
from the extractor (for example the connection
3 may be to a sump tank, not shown, for storage
of dirty impregnating liquid, and this sump tank
may connect with the chamber 18 through a
pump) and the storage vessel 7 may be employed
only for fortified and clarified liquid.

The apparatus of my invention may advan
tageously 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 de
scribed 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 con
ventional 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, hexa
chlorocyclohexane 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 6 and liquid may be dissolved or sus
pended in the solvent similar or identical to the
dry cleaning fluid. The agent may be incorporated
into the liquid by spraying, or by emulsion with
the solvent. The agent may be incorporated into
the solution by filtration. The agent may be added
to the solution either before or after the liquid
has been impregnated into the cloth. The solution
may be directly applied to the clothes, or by
means of a pump, or other suitable means.

The concentration of protective agent in the im
pregnating 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 ves
sel as above described. The tubes 17 in chamber
18 may be charged with close-fitting cylindrical
cloth bags containing a fixed proportion of com
minuted filter aid and protective agent mixed
together. These charges of filter aid and protec
tive agent form the subject matter of a co
pending application filed December 6, 1949. The
proportion of protective agent in each bag may be
so fixed that replacement of all the contents of
the portion of the bags in the tubes 17, for each batch of
clothes, reinforces 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, hexachlorocyclohexane for
moth-proofing cloth; chlorinated paraffin, para
fin, waxes, stearic acid, or silicones for water
proofing 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 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 con
tain residual aqueous liquid, the protective agent
which it is desired to incorporate into the clothes
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 reg
ulated 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 clean
ing or laundering fluid, retained by the clothing
after centrifuging, with a solvent or carrier con
taining dissolved or dispersed material which im
parts special properties to the clothing. How
ever, the apparatus of my invention may also
advantageously be used, in a substantially iden
tical manner, to treat the clothing with mate
rials capable of being preferentially absorbed on
the fabrics. For example, laundry clothing with
aqueous solutions of zinc fluosilicate, it is unnec
essary 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 re
inforcing the impregnating liquid. Such a com
minuted filter aid and protective agent is used in
suitable quantity for clarifying and reinforcing
the impregnating liquid. Such a com
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minuted filter aid and protective agent is used in
suitable quantity for clarifying and reinforcing
the impregnating liquid. Such a com
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 1 1/2 lbs. of a water-proofing agent such as stearic acid and 1 1/2 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 fluoride and 7 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 having 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 carried by the upper portion of said storage container, a solvent treating chamber in fluid communication with said storage container, a conduit for fluids connecting said textile treating chamber with said pump intake, and a conduit for fluids connecting said textile treating chamber with said pump exhaust.

2. In an apparatus for impregnating textiles with a solvent having 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 textile treating chamber with said pump intake, a conduit for fluids connecting said textile 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 which enters said textile treating chamber.

3. In an apparatus for impregnating textiles with a solvent having 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 textile treating chamber with said pump intake, a conduit for fluids connecting said textile 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 which enters 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. An apparatus for impregnating textiles with a solvent having 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 a fluid communication with said storage container, a conduit for fluids connecting said storage container with said pump intake, a conduit for fluids connecting said storage container 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.

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