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 APPARATUS FOR CHEMICALLY CLEANING FABRICS,
 TEXTILES, GARMENTS, AND THE LIKE
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1,986,548

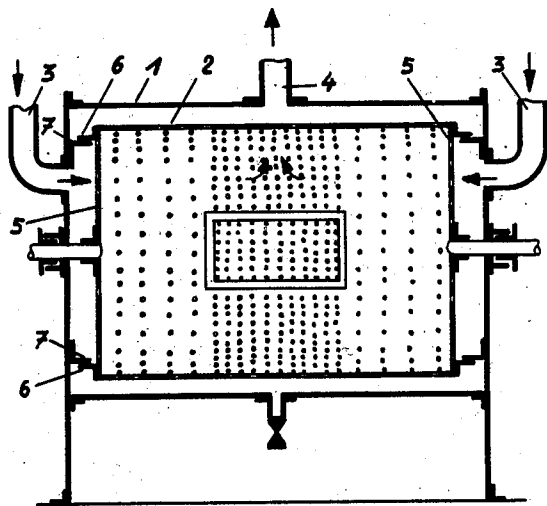


Fig. 1.

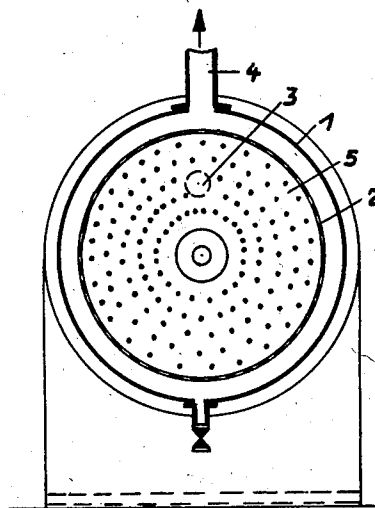


Fig. 2.

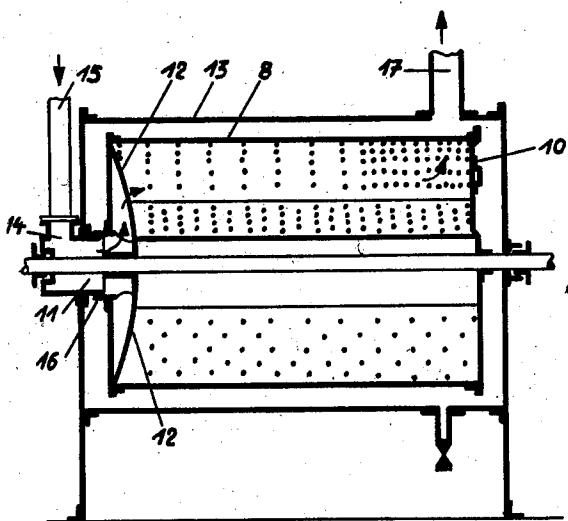


Fig. 3.

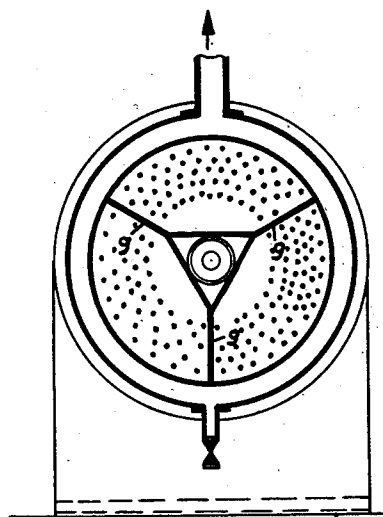


Fig. 4.

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APPARATUS FOR CHEMICALLY CLEANING
FABRICS, TEXTILES, GARMENTS, AND
THE LIKE

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7 Claims. (Cl. 34—5)

This invention relates to apparatus for chemi-
cally cleaning fabrics, textiles, garments and the
like, and has for its object to improve the con-
struction and operation of such apparatus and
particularly to accelerate the evaporation of the
solvent and the drying of the articles in the
apparatus after cleaning.

Washing machines of the type referred to
usually consist of a perforated drum containing
the articles to be cleaned and rotating in a closed
casing which is partially filled with a volatile
solvent such as benzine, ethylene trichloride, car-
bon tetrachloride or the like, or ethylene perchlo-
ride may be used according to my copending
application Serial No. 632,953, filed September
13, 1932.

In the modern construction and use of such
washing machines the cleaning operation is fol-
lowed by drying the articles to be cleaned within
the machine by centrifuging or by blowing hot
air through from a suitable ventilator. In order
to recover the solvent the hot air leaving the
machine is passed through a cooler in which the
vapor of the solvent is largely condensed. The
air is afterwards reheated and returned to the
machine so that it circulates continuously.

When the hot air is introduced into the casing
of the machine at any one place and is discharged
at another place, as is conventional, it passes
around the slowly rotating washing drum. This
air heats the drum so that the volatile solvent
which is still contained in the articles is evapo-
rated. The vapors of the solvent thus produced
pass through the perforated wall of the drum and
are carried along by the stream of air. This pro-
cess takes a long time to dry the articles.

I have found that the time required for dry-
ing can be materially reduced if the current of
hot air is made to enter into the interior of the
washing drum and to pass directly over the arti-
cles contained therein as this accelerates the
evaporation of the solvent. According to my in-
vention this is accomplished by introducing the
stream of air directly into the drum (instead of
into the channel intermediate the drum and cas-
ing) and substantially limiting the discharge to a
main discharge area of the drum wall. This
main discharge area which is positioned adjacent
a vent in the surrounding casing, preferably takes
the form of a series of perforations which by
reason of their spacing and/or size have a greater
effective discharge area per unit of drum wall
than the secondary or usual perforations.

Regardless of the particular form of the main
discharge passage it is designed, positioned and

arranged to limit the discharge and/or circulation
of the drying medium in the channel intermedi-
ate the drum and casing, and serves as a terminal
for the direct course of the air through the drum.

The usual perforations now serve chiefly as a
drain for the solvent residue and have no other
useful function.

These and other features and advantages of
the invention will be described in connection with
the accompanying drawing, in which:

Fig. I is a longitudinal section and Fig. II a
transverse section through a machine embody-
ing the invention;

Fig. III is a longitudinal section and Fig. IV a
transverse section of a modified machine having
a rotatable drum divided into a plurality of com-
partments.

The washing machine shown in Figs. I and
II has a closed casing 1 containing a receptacle
or rotatable drum 2. The two ends and the cy-
lindrical wall of the drum are preferably made
of perforated sheet metal. Hot air is blown by
a suitable ventilator through pipes 3 at both ends
of the casing, and is discharged through pipe
4 arranged in the central part of the casing. In
order to force the air into the interior of the
drum through end walls 5 thereof, a flange 6 is
arranged on each end wall 5 concentric with
the axis of the drum and each of these flanges
cooperates with a stationary close-fitting flange
7 fastened to the inner end of the casing. The
closure effected in this manner prevents con-
siderable quantities of air from passing around
between the drum and casing, and directs the
stream of air through the interior of the drum.

In the machine shown in Fig. I there are many
more perforations in the central portion of drum
2, adjacent discharge pipe 4, than there are ad-
jacent the ends, so that the greatest volume of
air leaves the drum at this place. The drum,
which rotates slowly during the passage of the
air, should be filled only a short distance above
its axis with the articles to be cleaned so that
the latter are continuously shifted during the
rotation of the drum and continuously offer new
surfaces to the stream of drying air. The cool-
ing action produced by the evaporation of the
solvent prevents the articles from being heated
to a high temperature even when the air enters
the drum in a very hot state, so that there is no
danger of the hot air having an unfavorable
influence on the articles which are being treated.

Figs. III and IV show a washing machine with
a rotatable drum 8, the interior of which is sepa-
rated into three compartments by radially ar-

5 ranged perforated intermediate walls 9. The articles to be cleaned are inserted into these compartments through openings 10 which are arranged in one end of the drum and are adapted to be closed by suitable covers. Entrance openings 11 for the stream of air are arranged in the other end of the drum around the main shaft which extends through the drum. The stream of air is distributed to the three compartments of the drum by a perforated and inwardly curved sheet metal or other plate 12. An air chamber 14 surrounding the shaft and fastened to the end of stationary casing 13 is arranged opposite the air openings in the end of the drum. Air is introduced into chamber 14 through pipe 15 and the cylindrical open part of the chamber extending into the casing is closely surrounded by a flange 16 fastened to the end of the drum, so that practically the entire stream of air is guided from air chamber 14 into the drum. The air is discharged from the drum through the perforated cylindrical wall, the greater portion being discharged at the end adjacent filling openings 10 as this end contains many more perforations than the rest of the drum. The air therefore passes through the entire length of all three compartments of the drum before it is discharged from the machine through pipe 17. It will be evident that drum 8 may have more or less than three compartments if desired.

30 The drawing does not show parts of the cleaning plant which form no part of my invention, such as ventilators or other means for circulating the hot air, coolers, heaters, etc., as they may be employed in any one of the conventional forms. Neither have I shown all forms of my invention which is capable of various modifications and adaptations within the scope of the appended claims.

40 Also, it is possible to use a stream of any kind of heated gas instead of hot air for removing the residues of the solvent and for drying the cleaned articles. The residues of such solvents as benzine, which form an explosive mixture with air, can be removed by an inert gas as carbon dioxide or nitrogen.

The invention claimed is:

1. Apparatus for chemically cleaning fabrics, textiles and the like comprising a casing adapted to contain a volatile solvent, a rotatable perforated drum in said casing adapted to contain articles to be cleaned, means for passing air through one end of said drum into direct contact with said articles, and an outlet in said casing for discharging said air at a point remote from the inlet, said drum containing more closely spaced perforations in the region adjacent said outlet than in the rest of the surface.

2. Apparatus for chemically cleaning fabrics, textiles and the like comprising a casing adapted to contain a volatile solvent, a rotatable drum in said casing having a perforated end and a perforated cylindrical wall and adapted to contain articles to be cleaned, an air opening in the end of

said casing adjacent the perforated end of said drum, an annular flange on said drum and a close-fitting cooperating flange on the interior of said casing concentric with the axis of said drum forming an enclosed air passage between said air opening and the interior of said drum, and a second air opening in said casing at a point remote from the first-mentioned air opening, said drum containing more closely spaced perforations in the region adjacent said second air opening than in the rest of its surface, whereby air may be passed into one of said openings and discharged from the other opening after direct passage through said drum.

3. Apparatus for chemically cleaning fabrics, textiles and the like, comprising a casing adapted to contain a volatile solvent, a rotatable perforated drum in said casing adapted to contain articles to be cleaned, means for passing air into the interior of said drum, an outlet in said casing, the perforations in said drum adjacent said outlet having a greater effective discharge area per unit of drum surface than that provided by the perforations in the rest of the surface.

4. Apparatus for chemically cleaning fabrics, textiles and the like, comprising a casing adapted to contain a volatile solvent, a rotatable perforated drum in said casing, an air passage in said casing communicating with the interior of said drum, a second air passage in said casing remote from said first passage, said drum containing more closely spaced perforations in the region adjacent said second passage than in the rest of its surface.

5. Apparatus for chemically cleaning fabrics, textiles and the like, comprising a casing adapted to contain a volatile solvent, a perforated drum therein, means for passing air into said drum at both ends thereof, an outlet in said casing between said ends, the perforations in said drum adjacent said outlet having a greater effective discharge area per unit of drum surface than that provided by the perforations in the rest of said surface.

6. Apparatus for chemically cleaning fabrics, textiles and the like, comprising a casing adapted to contain a volatile solvent, a rotatable perforated drum in said casing adapted to contain articles to be cleaned, means for passing air into said drum at both ends thereof, an air outlet in said casing substantially midway of said inlet means, said drum containing more closely spaced perforations in the region adjacent said outlet than in the rest of its surface.

7. Apparatus for chemically cleaning fabrics, textiles and the like, comprising a casing adapted to contain a volatile solvent, a rotatable perforated drum in said casing adapted to contain articles to be cleaned, means for passing air into said drum at one end thereof, an air outlet in said casing adjacent the end opposite said inlet means, said drum containing more closely spaced perforations in the region adjacent said outlet than in the rest of its surface.

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