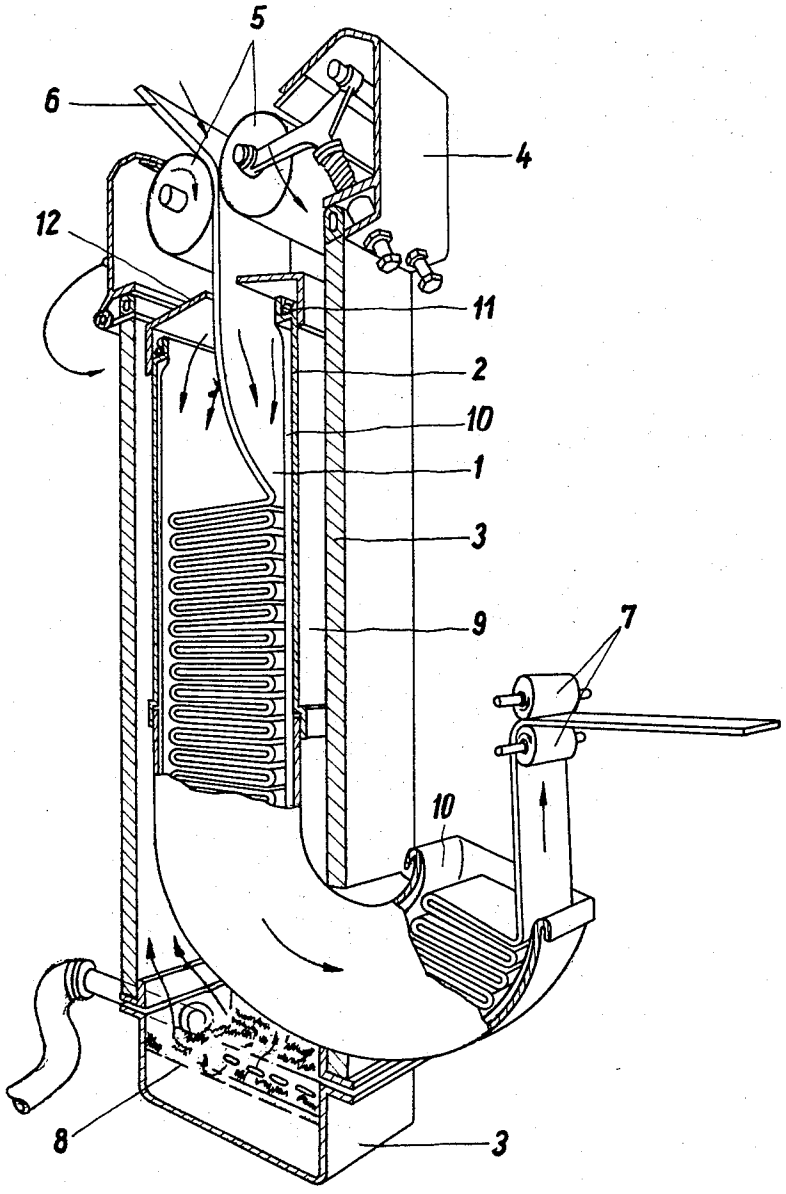
Nov. 19, 1968 G. FLEISSNER 3,411,328

HEAT TREATMENT CHAMBER WITH REMOVABLE HOSE LINING

Filed Feb. 24, 1967



Inventor:

GEROLD FLEISSNER

BY Dicke & Craig

ATTORNEYS

United States Patent Office 3,411,328 Patented Nov. 19, 1968

3,411,328

HEAT TREATMENT CHAMBER WITH REMOVABLE HOSE LINING

Gerold Fleissner, Egelsbach, near Frankfurt am Main, Germany, assignors to VEPA AG, Basel, Switzerland

Filed Feb. 24, 1967, Ser. No. 618,498
Claims priority, application Germany, Feb. 24, 1966, A 51,662
8 Claims. (Cl. 68—5)

ABSTRACT OF THE DISCLOSURE

The present disclosure relates to an apparatus for the heat-treatment of a textile material wherein the material to be treated is introduced into a heated chamber, that portion of said chamber in contact with the material being treated providing a smooth surface for said material, said smooth surface also being resistant to acid-forming substances. More particularly, the present disclosure concerns the use of a synthetic material, such as for example, polytetrafluoroethylene, as the contacting surface in the heat-treatment of a textile material.

Background of the invention

The present invention relates to an apparatus containing a heated chamber, preferably in the form of a J-box, a U-box or a duct, for the continuous treatment, for example, for dyestuff setting, of a textile material with a treatment medium, preferably steam. The walls of the treatment chamber are made of or provided with a synthetic material which is resistant to a corrosive media, for example, to the acid of anionic dyestuffs.

In the continuous dyeing of textile material with anionic dyestuffs, the textile material must generally dwell for a period of time in a chamber at elevated temperatures, preferably in a saturated steam atmosphere, for setting the dyestuff. Furthermore, it is also desirable for a material enriched with a bleaching liquor to dwell for a period of time in a saturated steam atmosphere. Also, in various washing processes the washing effect can be improved if the detergent acts upon the material for an extended period of time in a steam atmosphere. In all of these treatment processes, duct-shaped dwelling chambers are generally used, preferably in the form of a J-box or an U-box.

A heated dwelling chamber in the form of a J-box or an U-box is especially suitable for the continuous treatment of length of material. Textile lengths are folded in a serpentine manner into the long leg of the chamber so that the individual folds are superimposed upon each other. Because of the weight of the stacked textile material in the substantially vertical duct of the long leg, the lower portion of the stacked textile material is forced through the curvature into the short leg and finally to the open end of the short leg, where the textile material can be drawn off by a suitable device and where the loose material can be removed. By stacking the material in a serpentine manner, it is possible to accommodate large quantities of lengths of textile material and/or loose textile material in relatively small treatment chambers and to provide a dwelling time in the treatment chamber of, for example, about 10 to 30 minutes.

In dyeing processes with coacervates, it is especially important that no condensate is formed on the walls of the dwelling chambers since the condensate dropping onto the material being treated causes a bleeding of the dyestuff which has not yet set. For this reason, the chamber walls are heated. In known apparatus, the treatment chamber is surrounded by a housing disposed at a prescribed distance from the treatment chamber walls. Steam is passed between the housing and the chamber walls which ensures a uniform temperature on all parts of the chamber walls.

When dyeing with anionic dyestuffs, acid is formed which corrodes the metal walls of the chamber. For example, chrome dyes contain chromium fluoride, and when dyeing with these dyestuffs hydrofluoric acid is formed which is extremely corrosive and thus attacks metal surfaces, such as for example, stainless steels. Because of the acid attack, the inner walls of the treatment chamber become rough and thus the material which is guided by these walls and glides along these walls can be damaged. Moreover, dyestuff particles deposit on this rough surface and stick to the metal and are very difficult to remove. For this reason, the cleaning time for such devices are extremely long, and in practice, separate chambers are used for dark shades and for light shades in order to avoid the long cleaning times. However, this is only possible if correspondingly large quantities of material are to be dyed to both light and dark shades. If only one plant or chamber is available, extended stoppages when changing over from dark to light shades cannot be avoided, as the plant must be thoroughly clean and the duct in some cases must be ground out.

Accordingly, it is an object of the present invention to provide an apparatus for the continuous heat-treatment of textile material which avoids the disadvantages of the known devices.

Another object of the present invention is to provide in a heat-treatment apparatus a chamber having substantially smooth walls which facilitate gliding the material being treated through the treatment chamber.

A further object of the present invention is to provide in a heat-treatment apparatus, a chamber containing walls made up or containing a synthetic material, for example, a synthetic polymer, which is resistant to acid-forming materials.

Other objects and further scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

Summary of the invention

According to the present invention, an improved apparatus for the continuous heat-treatment of textile materials has been discovered wherein the chamber walls of said apparatus which are in contact with the material being treated are made of, lined with, or otherwise contain a synthetic material, for example, a synthetic polymer such as polytetrafluoroethylene, or other acid-resistant material. If the inner walls of the treatment chamber are covered with a coating of the synthetic material, this can be effected in any manner, such as for example, by spraying the synthetic material onto the inner walls followed by slightly baking said synthetic material.

In a particularly advantageous embodiment of the present invention, a thin-walled hose, preferably made of said synthetic material, is arranged in the chamber. Generally, it is sufficient to fasten the hose at the inlet of the chamber and let it hang loosely throughout the rest of the chamber. If this hose is interchangeable, for example, if it can be fastened by means of a clamping device to the chamber, a very rapid change during a dyeing process from one shade to another can be effected by simply replacing the hose. Of course, it is also possible to use such a hose with

dark shades only. It is advantageous to always use such a hose in order to avoid corrosion of the inner chamber walls by the acid formed during the treatment process, for example, a dye-setting process. The hose can be fastened in a simple manner by bending its ends over the lip of the chamber inlet and possibly the chamber outlet and by clamping the hose ends to the outer chamber wall by elastic means.

Furthermore, it is often advantageous if the cross-section of the hose is adapted to the cross-section of the chamber. Small differences in the cross-sections can be compensated for if the hose consists of elastic material. Thus, for example, the hose is forced against the inner chamber walls at all sides by the material stacked in the hose during the treatment process.

According to the present invention, when using such a hose material, whereby roughened chamber walls are substantially eliminated since the chamber walls are in no way attacked by the acid being formed, it is also possible according to the present invention to change lots in a minimum amount of time even in the case where very different color shades are used. The cost of such a hose is lower than the wages required for one single thorough cleaning of the apparatus. Because of the substantially shorter stoppage times when changing lots, the plant is much better utilized and the production of the plant per year is substantially higher.

Brief description of the drawings

The present invention will become fully understood from the detailed description hereinbelow and the accompanying drawing which is given by way of illustration only and thus is not limitive of the present invention and wherein,

The figure is a perspective view of the heat-treatment apparatus in the form of a J-box, wherein the front side wall of the housing and the chamber are not shown in order to better illustrate the mode of operation of the apparatus.

Description of the preferred embodiments

Referring now to the drawing, the apparatus of the present invention is provided with a J-shaped chamber **1** with metal walls **2** surrounded by a housing **3** with a tiltable upper part **4**. For sealing the chamber and for feeding the material to be treated into the chamber, a pair of rollers **5** is used which is supported on the upper part **4**. Lengths of material **6** are folded in a serpentine manner into the long leg of chamber **1** by the stiffness of the material. The weight of the stacked material being treated forces the material through the lowered curved part of the chamber into the short leg hereof where said material can be drawn off by a pair of rollers **7** at the outet.

In the lower part of the housing a liquid **8**, preferably water, is provided which is heated to its volatilization temperature by a heating means so that saturated steam is constantly produced in space **9** between the metal walls **2** and the housing **3**, said steam heating up the metal walls. At the inlet of the apparatus this steam also simultaneously heats the material **6** and enters chamber **1** with said material so that in chamber **1** a saturated steam temperature and a saturated steam atmosphere also prevails.

According to the present invention, between the material **6** and the metal walls **2** a hose **10** of synthetic material or other suitable material is disposed. In this particular embodiment of the present invention the end of this hose is bent over the chamber wall at its inlet and outlet and at the inlet it is clamped to the outer chamber wall by means of an elastic cord **11**. Below the pair of rollers **5** condensate traps **12** are attached to chamber **1**. The hose can be exchanged by a few manipulations. For example, the upper part **4** can be lifted and/or tilted away and then the condensate traps **12** and the elastic cord **11** can be removed. Now the hose **10** can be drawn out and another hose can be inserted and fastened accordingly. The exchange of the hose takes but a few minutes. As previously mentioned, in an alternative embodiment, the walls of the chamber can be made of, lined with or otherwise contain the synthetic material which is resistant to acid-producing materials.

Synthetic materials other than polytetrafluoroethylene which can be used according to the present invention include polyethylene, polypropylene, polyurethanes, etc.

Since modifications of this invention will be apparent to those skilled in the art, it is not desired to limit the invention to the exact constitution shown and described. Accordingly, all suitable modifications and equivalents may be resorted to which fall within the scope of the appended claims.

I claim:

1. An apparatus for the heat-treatment of textile materials which comprises a duct-type chamber, a housing substantially surrounding said chamber and defining a free space between said housing and said chamber, means for providing a heating medium in said free space, said medium heating the walls of said chamber, means for introducing the material to be treated into the heated chamber thin-walled hose means made at least in part of a synthetic acid-resistant and corrosive-resistant material disposed in the chamber and means for removing the treated material from the heated chamber.

2. The apparatus of claim **1**, wherein first roller means are used to introduce the material to be treated to the treatment chamber and second roller means are used to remove the treated material from the treatment chamber and wherein condensation traps are disposed at the inlet of the treatment chamber below the first roller means.

3. The apparatus of claim **1**, wherein the synthetic material is polytetrafluoroethylene.

4. The apparatus of claim **1**, wherein the hose is fastened only at the inlet of the treatment chamber.

5. The apparatus of claim **4**, wherein the hose is exchangeable and can be fastened to said treatment chamber by means of a clamping device.

6. The apparatus of claim **1**, wherein the hose is bent over the edge of the chamber walls at the chamber inlet and at the chamber outlet and clamped to the outer walls of said chamber by elastic means.

7. The apparatus of claim **1**, wherein the cross-section of the hose is adapted to the cross-section of the treatment chamber.

8. The apparatus of claim **7**, wherein the hose comprises an elastic synthetic material.

References Cited

UNITED STATES PATENTS

3,019,631	2/1962	Freyberg	68—178
3,210,967	10/1965	Schwab et al.	68—5

FREDERICK L. MATTESON, JR., *Primary Examiner.*

A. D. HERRMANN, *Assistant Examiner.*