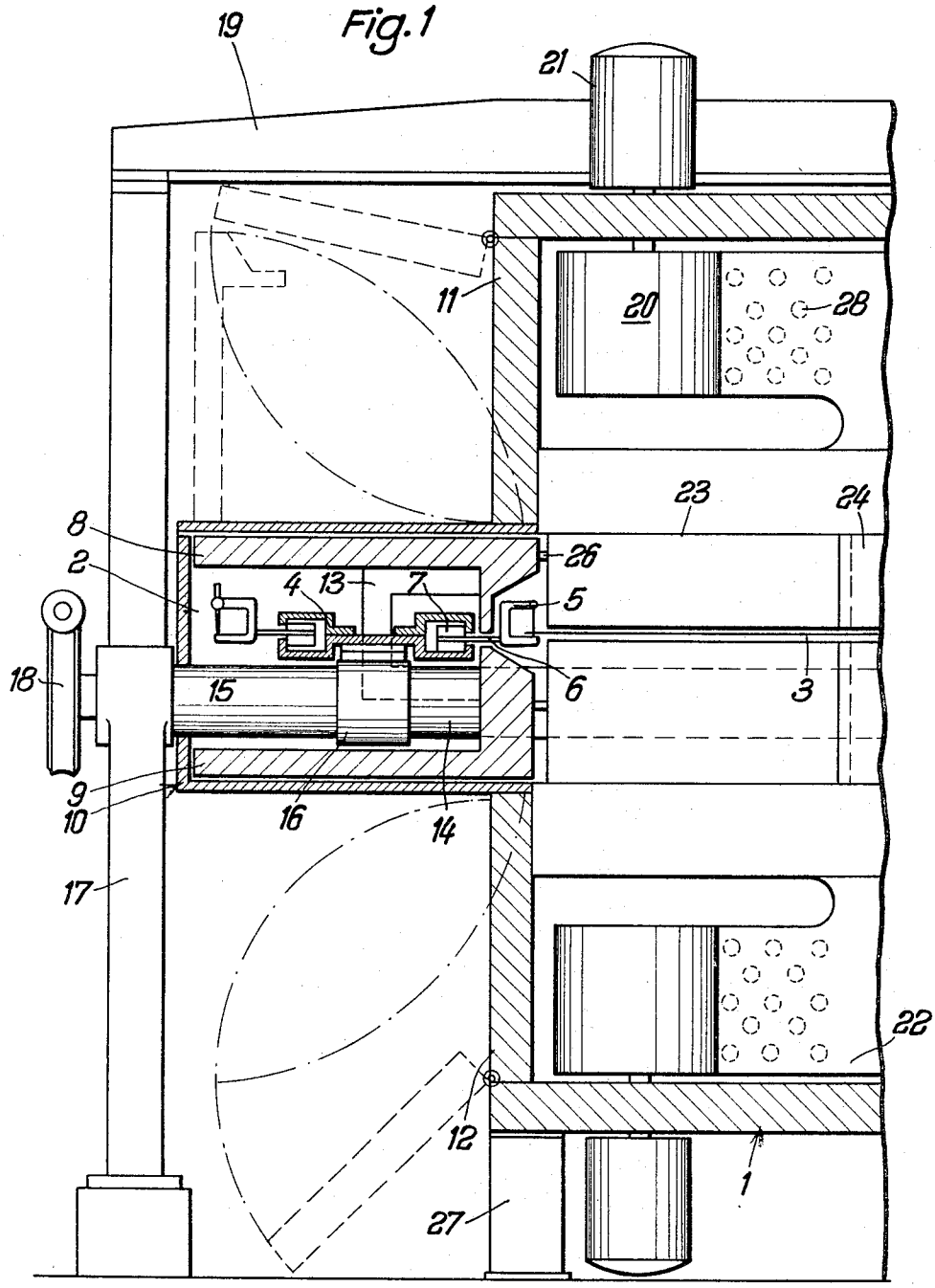
June 27, 1967 J. DUNGLER 3,327,367

APPARATUS FOR THERMIC TREATMENT OF TEXTILE MATERIALS

Filed Dec. 15, 1964 3 Sheets-Sheet 1

Fig. 1



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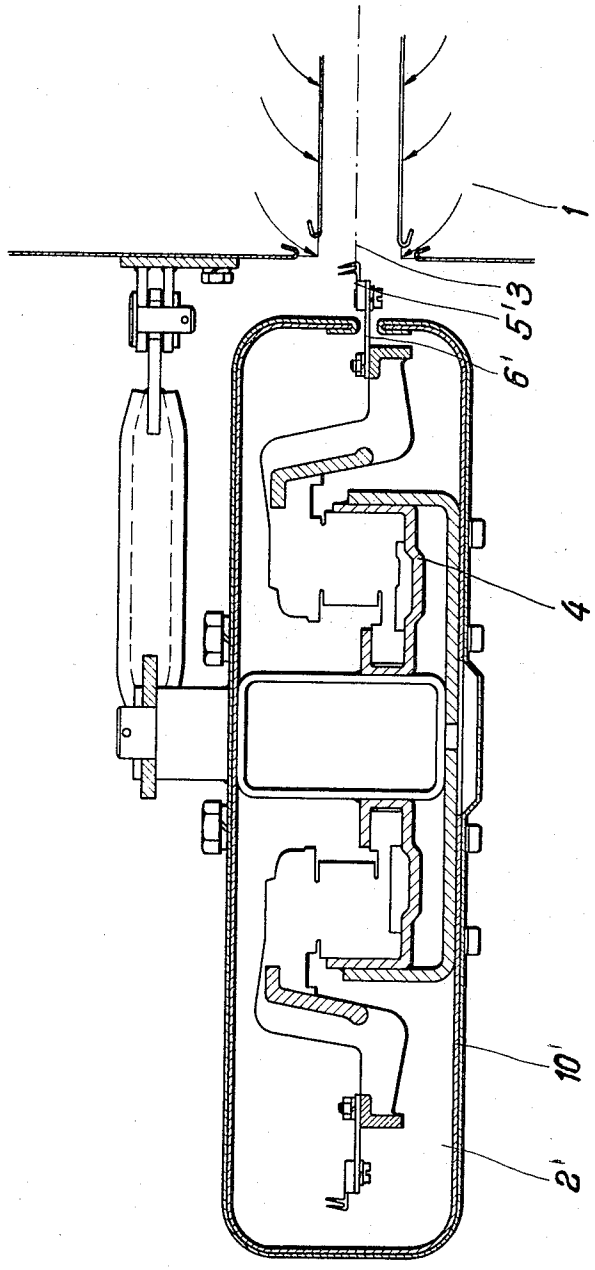

Fig.2

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Fig.3

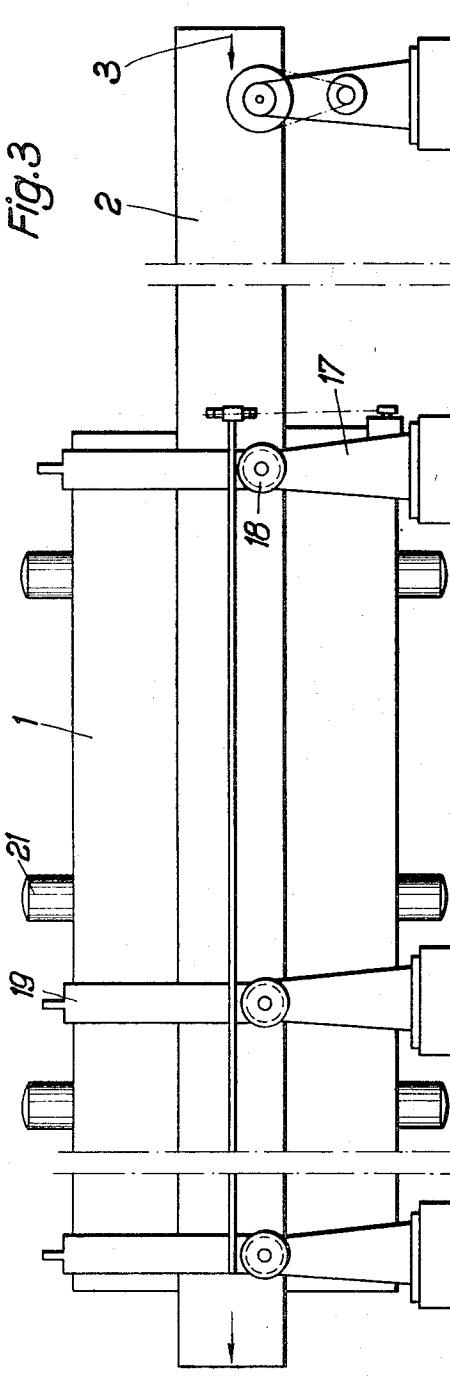
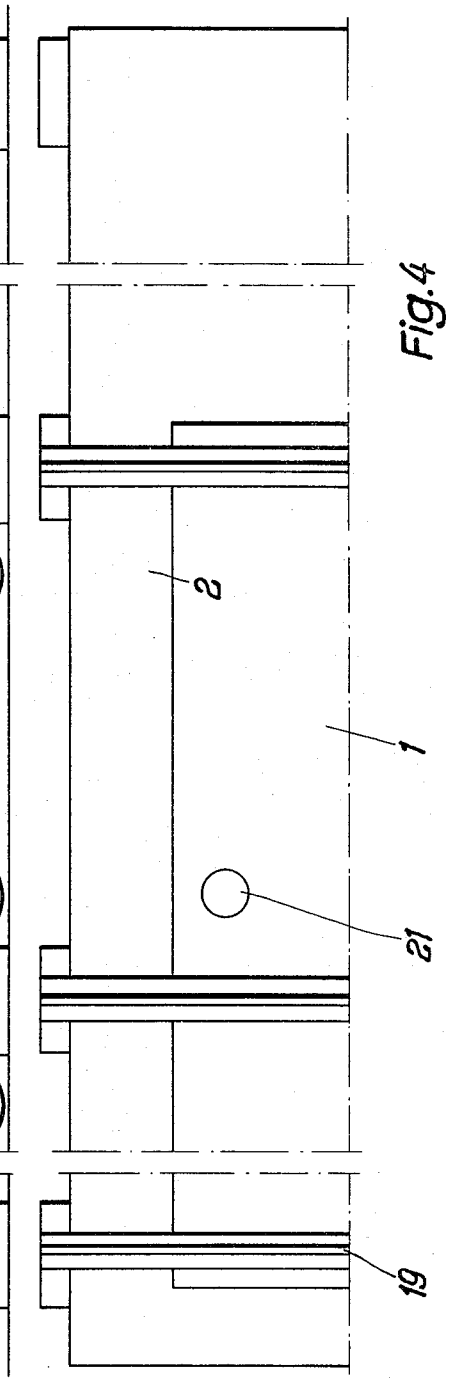


Fig.4



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APPARATUS FOR THERMIC TREATMENT OF TEXTILE MATERIALS

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This invention relates to an apparatus for a thermic treatment of lengths of textile materials and refers more particularly to heat treatments involving drying, polymerization and fixing of such materials.

Stretching and drying frames operated in the past on the average with temperatures ranging between 100° C. and 120° C. and the treating medium was usually air. Modern processes and treating media require, however, considerably higher temperatures. By way of example, when fixing nylon the temperature must be brought up to 220° C. In order to make fabrics of natural fibers or cellular wool crease resistant, it is necessary to maintain the temperature in the drying chamber at 180° C. Besides air which was utilized in the past, present-day processes operate predominantly with superheated steam, so that closed chambers for the treating medium are necessary.

Thus stretching frames which are among the most complicated devices used in the refining of textiles, are subjected to continuously increased requirements.

However, with the exception of some unimportant changes in details, the stretching frames have not been adapted in any way to these modern requirements. For example, present day devices retain all prior art mechanical guiding means for tenter hooks or selvedge needles, including guiding rails, as well as the tenter chain itself which is movable in opposite directions, and also width adjusting means located in drying or treating chambers. More specifically, the problem of rational lubrication of all movable parts subjected to high temperatures has not been satisfactorily solved to the present day. On the other hand, if these devices are not properly lubricated, expensive parts will be worn out prematurely. Furthermore, the problem of proper lubrication becomes more and more difficult at the above-described high temperatures. Above all, evaporation of oil cannot be prevented, although it is most undesirable.

Furthermore, existing constructions of stretching frames do not provide satisfactorily operating means for closing the inlet and outlet openings for the tenter guides. This makes it practically impossible, however, to operate solely with superheated steam to the exclusion of air in the treating chamber containing the treating apparatus provided with the stretching frame. On the other hand, purity of the steam medium treating the fabric is of paramount importance in many modern high refining processes in order to bring to its boiling point the impregnating liquid in the fibers.

An object of the present invention is to eliminate these drawbacks of prior art constructions.

Other objects will become apparent in the course of the following specification.

In the accomplishment of the objectives of the present invention it was found desirable to provide an apparatus for the thermic treatment, particularly drying, polymerization and fixing, of lengths of materials, wherein the material is guided through a treating chamber by means of tenter hooks or selvedge needles fixed to movable endless chains, the invention being characterized in that all the guiding rails, chains and other equipment serving to guide and support the tenter hooks or selvedge needles are located outside of the treating chamber. Of all the components of the side guiding means of the material only the tenter hooks and selvedge needles of the left or right

hand guiding elements are located in the treating chamber. All other parts are located outside of the chamber. According to a preferred embodiment of the apparatus of the present invention the guiding rails, chains and the like are located in antechambers separated from the treating chamber. The two side walls of each of the antechambers have a narrow longitudinal slit which permits the introduction of the two rows of tenter hooks or selvedge needles holding the textile material. The remaining parts, namely, the guiding rails, chains, holders and the like are located in the antechambers. The connection between the chain elements and the corresponding tenter hooks is provided by thin small connecting plates which move along longitudinal slots and hold the tenter hooks or the selvedge needles. The antechambers are arranged on both sides of the treating chamber. However, they can also surround the inlet and outlet of the treating chamber.

The antechambers are constructed as casings which are completely closed to the outside, namely, to the atmosphere and are provided with slot-like free openings only at locations for the inlet and outlet of the length of textile material. The antechambers have a lower temperature than that prevailing in the actual drying chamber. When superheated steam is used, the temperature inside the antechambers should not drop below 110° C., while the temperature in the actual treating chamber can amount, for example, to 220° C. or even more. The slot-like openings at the inlet and outlet between the antechambers and the treating chamber can be provided with the usual means for diminishing the size of the slots.

Since all the guiding and supporting devices are located in the antechambers, they can be guided or set from the outside. It is advantageous if at least a part of the walls of each of the antechambers be made adjustable in the direction of the width of the length of material being treated. The side movements of the walls of the antechambers can be coupled with the adjustment of the guiding rails for the tenter hooks or selvedge needles, whereby this adjustment can be also combined with an adjustment in the transverse positions of the blowing nozzles of the treating chamber. By these means it is possible to shift from the outside the blowing nozzles, the guiding rails for the tenter hooks or selvedge needles, as well as the antechambers themselves, or at least a part of their walls, without being exposed to the danger of leakage.

Since longitudinal slots in the antechambers and the treating chamber divide substantially the entire treating apparatus at the level of the length of material, it is advantageous to hang all the parts of the apparatus located above the length of material, for example, upon columns by means of transverse supports, and to mount the entire lower part of the treating apparatus upon a special understructure.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example preferred embodiments of the inventive idea.

In the drawings:

FIGURE 1 is a vertical section through a portion of the treating apparatus of the present invention, some parts being shown in side elevation.

FIGURE 2 is section through a treating apparatus of a somewhat different construction.

FIGURE 3 is a side view of the apparatus shown in FIG. 1 on a smaller scale.

FIGURE 4 is a top view of the apparatus shown in FIG. 3.

The apparatus shown in FIGS. 1, 3 and 4 has a treating chamber **1** and antechambers **2**. A length **3** of textile material is located in the treating chamber **1** and is held by tenter hooks **5** which are connected with a chain **7** by small connecting plates **6**. The chains **7** are guided by

guiding rails 4 and travel in an endless path in the antechambers 2. The rearwardly moving hooks are located in the antechamber, while the forwardly moving hooks 5 carrying the textile material 3 are located in the treating chamber 1.

The casing 10 of the antechambers 2 includes an upper movable wall 8 and a lower movable wall 9. As shown by broken lines in FIG. 1, the wall 8 can be swung upwardly. Similarly, the wall 9 may be swung downwardly, so as to make the chain 7 accessible to an operator.

When a narrower length of textile material is introduced into the treating chamber, the operator pushes the guide rail 4 with the chain 7 and the tenter hooks 5 along with the movable walls 8 and 9 of the antechambers further into the treating chamber so as to adapt them to the reduced width of the material.

The walls 8 and 9 as well as the entire guiding mechanism for the tenter hooks are also connected with nozzles 26, so that the extent of the operation of the nozzles may be adapted to the width of the material.

The treating chamber 1 is enclosed by a casing which includes an upper wall 11 and a lower wall 12 on each side thereof. As shown by broken lines in FIG. 1, the wall 11 may be swung upwardly, while the wall 12 may be swung downwardly to enable the operator to reach the interior of the treating chamber and the parts located therein.

An angular support 13 connects the hook-guiding rail 4 with the upper movable wall 8 of the antechambers. Furthermore, the hook-guiding rail 4 is connected with a slide 16 which is slidably mounted upon a transverse support 15. The slide 16 can be actuated by any suitable means driven by a gear drive 18.

The entire upper part of tthe treating apparatus is hung from upper transverse supports 19 which are mounted upon vertical columns 17. The lower part of the treating apparatus with all the devices pertaining thereto is mounted upon short supporting columns 27. Thus the upper and lower parts of the treating apparatus are supported independently of each other.

The length of material 3 located within the treating chamber 1 is treated through the use of ventilators 20 connected with motors 21 and transmitting the treating medium over heating bodies 28 and through connecting conduits 22 to the blowing nozzles. Each blowing nozzle may consist of a centrally located fixed nozzle 24 and movable nozzles 26 connected therewith and located to the sides thereof. A separate connecting member (not shown) is located between the movable nozzles and the movable wall 8 and serves the purpose of providing common movement for the walls of the antechambers and the nozzles.

As shown in FIGS. 3 and 4, the antechambers extend around the inlet and outlet zones of the treating chamber. The antechambers are provided with elongated slots communicating with the inlet and outlet zones of the treating chamber. FIGS. 3 and 4 show also the manner in which the upper part of the treating device hangs from transverse carriers 19 mounted upon vertical columns 17; furthermore, they show the drive 18 for the movement of the tenter hooks or selvedge needles along with the side walls of the antechambers and the blowing nozzles.

FIGURE 2 shows a slightly different construction wherein the treating chamber 1 contains a length 3 of material to be treated which is held upon selvedge needles 5' connected by plates 6' with a chain carried upon a guide rail 4'. The elongated antechambers 2' comprise a wall 10' and is hung from a support carried by a side wall of the treating chamber.

It is apparent that the examples described above have been given solely by way of illustration and not by way of limitation and that they are capable of many variations and modifications within the scope of the present invention. All such variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. An apparatus for thermic treatment of textile materials, comprising in combination, a casing forming a treating chamber having two sides, an inlet and an outlet, the sides of said second casing having swingable walls, a casing extending around said treating chamber having slots communicating with the chamber sides, the inlet and the outlet of said treating chamber, said second casing forming an antechamber adjacent each side of the treating chamber, the walls of said second casing forming said antechambers being swingable outwardly, two endless driven chains located in said antechambers and having sections extending adjacent the two sides of the treating chamber and between said inlet and said outlet, connecting plates carried by said chains, fabric supporting members connected with said plates, said members which are carried by the plates during travel along the aforesaid sections extending into said treating chamber for supporting a full length of fabric within the treating chamber and guide rails carrying said chains and connected with the aforementioned swingable walls of the casing of the antechambers, said guide rails along with the swingable walls of the casing of the antechambers being movable into and out of said treating chamber to adjust the location of said fabric supporting members to the size width of the fabric.

2. An apparatus in accordance with claim 1, comprising fixed nozzles located centrally in said treating chamber, and movable side nozzles connected therewith carried by the swingable walls of the casing of the antechambers and extending into the treating chamber.

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