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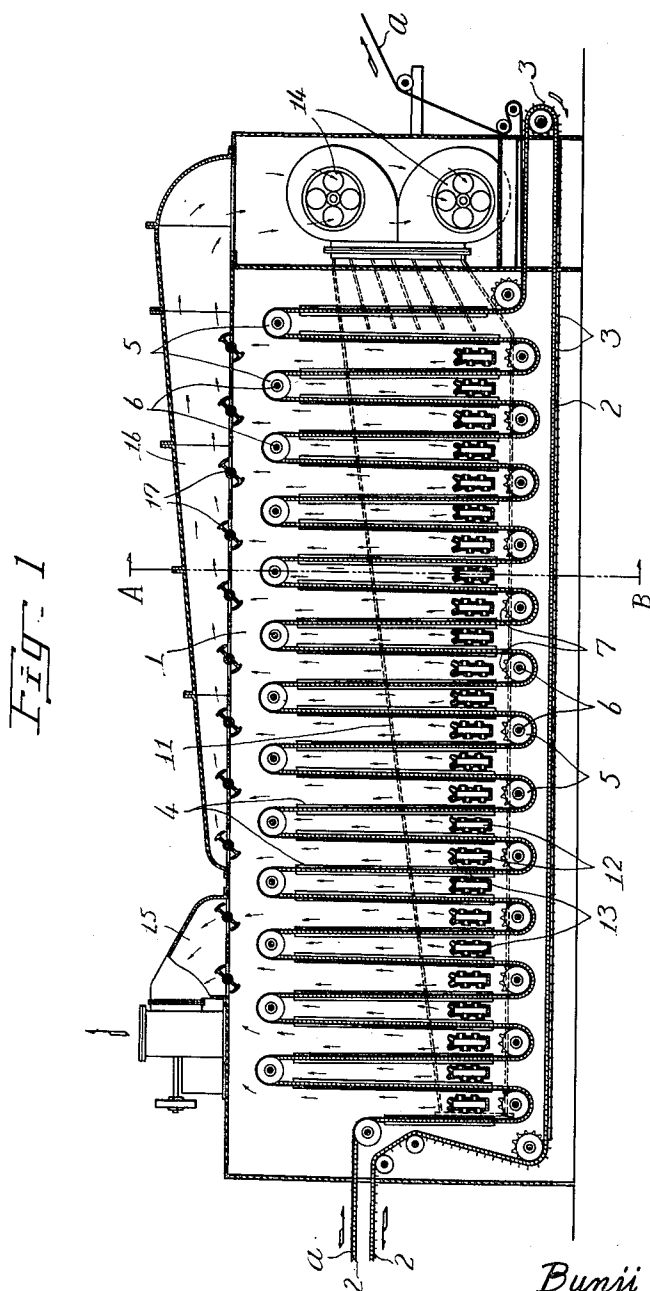
BUNJI KAWAGUCHI

**2,758,356**

# TEXTILE TENTERING AND DRYING APPARATUS

Filed July 23, 1953

4 Sheets-Sheet 1



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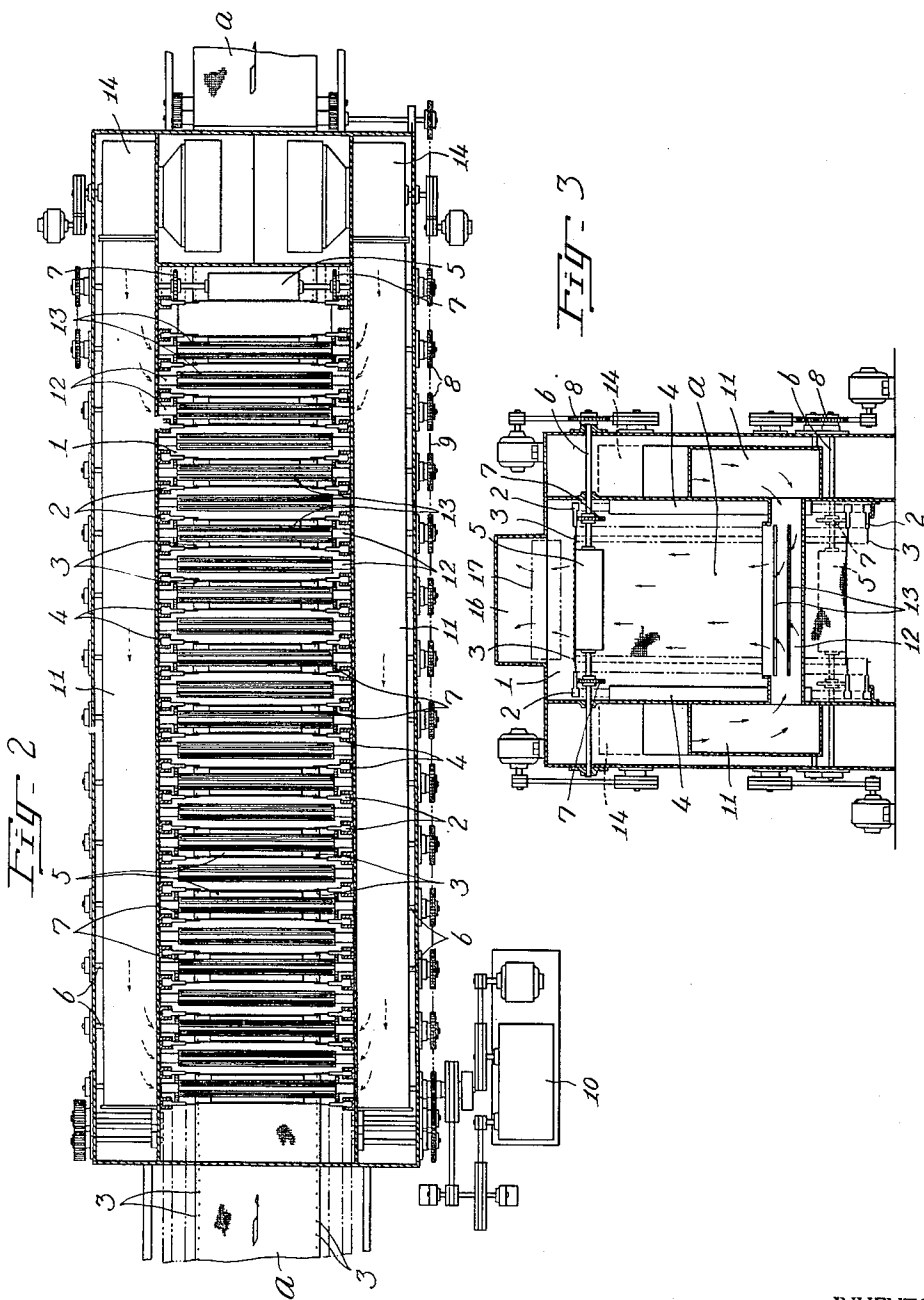
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4 Sheets-Sheet 2



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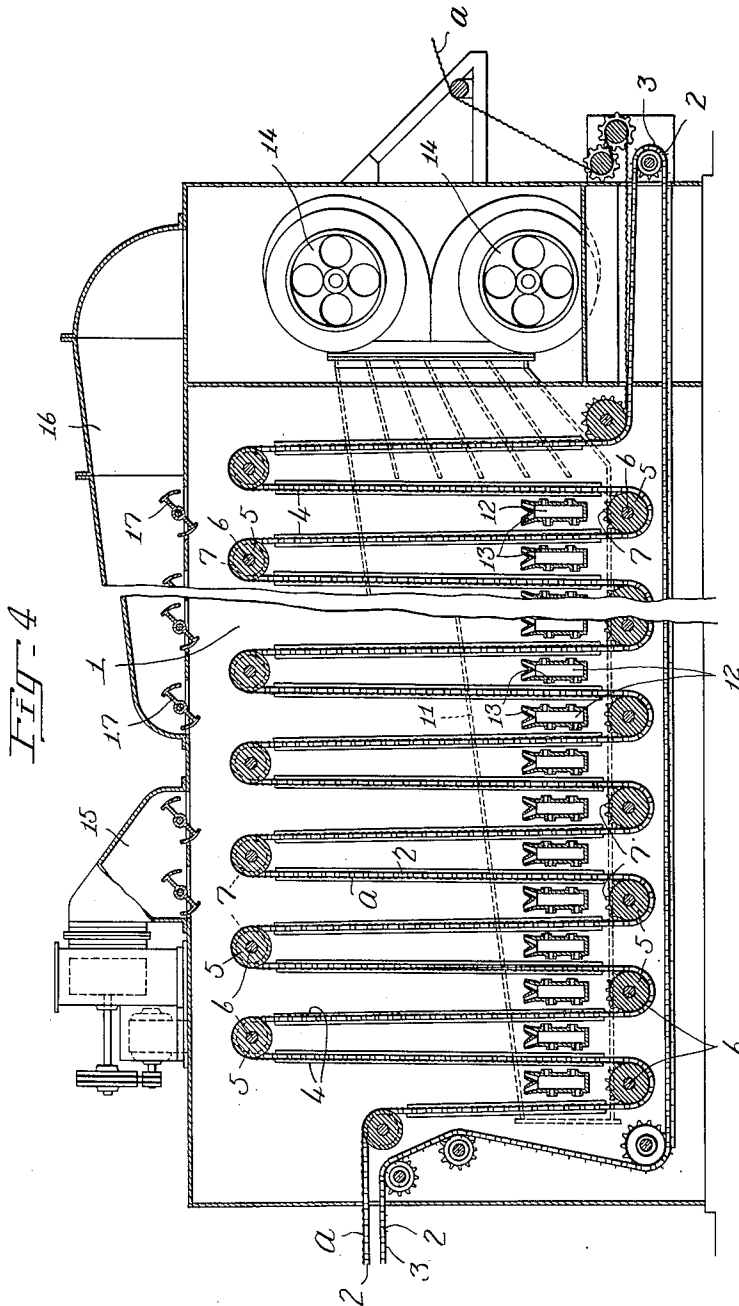
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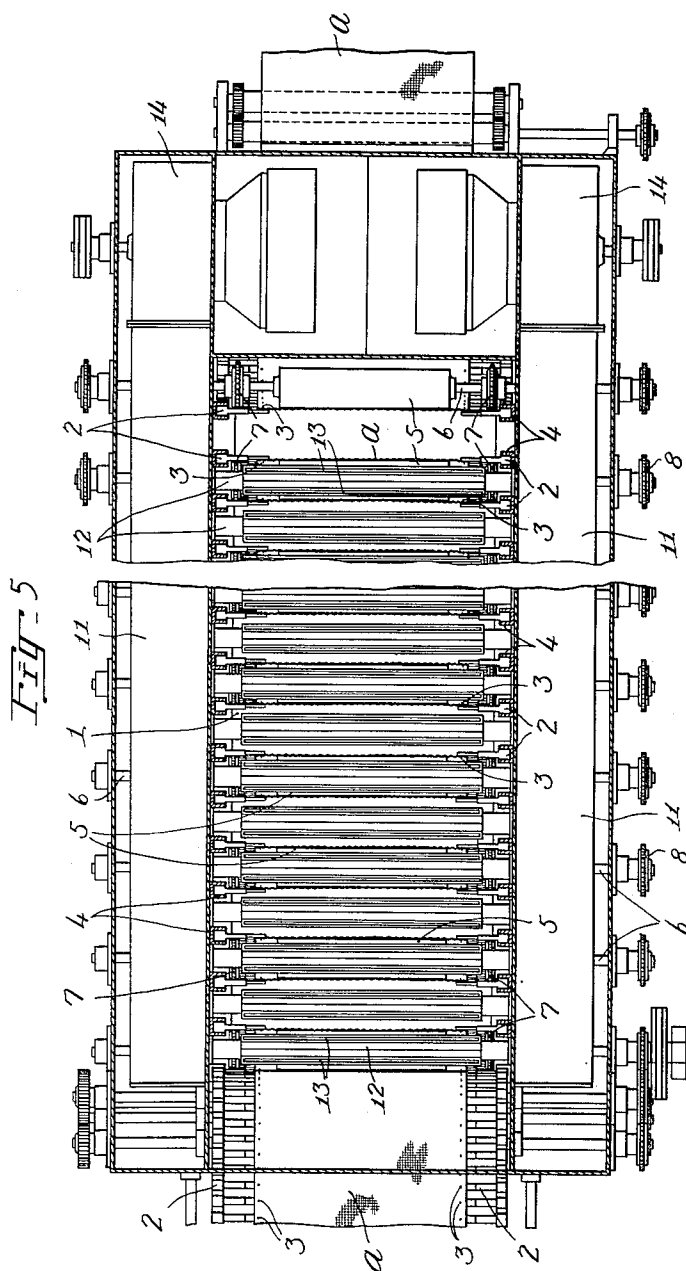
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TEXTILE TENTERING AND DRYING APPARATUS

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2,758,356

TEXTILE TENTERING AND DRYING  
APPARATUS

Bunji Kawaguchi, Ukyo-ku, Kyoto, Japan

Application July 23, 1953, Serial No. 369,859

1 Claim. (Cl. 26—60)

The present invention relates to textile tentering and drying apparatus and is more particularly directed to textile tentering and drying apparatus in which the cloth is carried through a drying chamber by means of a tenter chain which travels alternately up and down in a substantially vertical direction along a zigzag path, and hot air is blown against the cloth's surface.

It is the principal object of this invention to provide an improved apparatus whereby textile material, supported by the tender chain, can be carried up and down alternately in a substantially vertical direction along a zigzag path and tentered and dried simultaneously while in an almost tensionless state.

A further and important object of the invention is to provide an improved apparatus whereby the cloth may be uniformly and rapidly tentered and dried and a satisfactory finished cloth is secured with economy in the use of heat and time.

Other and further objects of the invention will be made clear by the following description of the embodiments shown on the accompanying drawings, in which:

Fig. 1 is a longitudinal section through the apparatus.

Fig. 2 is a plane section thereof.

Fig. 3 is a detail section taken on the line A—B of Fig. 1.

Fig. 4 is an enlarged longitudinal section, partly broken away of the apparatus.

And Fig. 5 is an enlarged detail horizontal section, partly broken away, of the apparatus.

Referring now more particularly to the accompanying drawings, wherein like and corresponding parts are designated by similar reference characters, numeral 1 is the drying chamber, 2 refers to a pair of endless tenter-chains provided with tenter-pins 3 or tenter-clips fixed thereon. Numeral 4 refers to the guide rails of this chain 2 and these rails 4 are arranged symmetrically and almost vertically on the inside surface of both sidewalls of this chamber 1.

The drying chamber 1 is also provided with a series of axes 6 of idle rollers 5 on the top and in the bottom respectively, the idle rollers 5 in each series being properly spaced apart and arranged so as to let the cloth *a* be guided over these rollers 5 up and down in a substantially vertical direction.

Tenter chain wheels 7 and driving chain wheels 8 are fixed also to each axes 6 of these rollers 5 and endless tenter chains 2 are chained to these wheels 7 in a zigzag arrangement so that the cloth may be carried through the drying chamber 1 in a zigzag path, while upper and lower groups of the driving chain wheels 8 are rotated respectively by the chains 9 in an opposite direction with the aid of a driving apparatus 10 in order to drive the cloth *a* in one direction.

The ventilating chambers 11 which are in communication with the blowers 14 are built along both sides of the drying chamber 1. The ventilating chambers are connected at the lower part of the drying chamber 1 by a number of pipes 12 having long slits 13. These pipes 12 are fixed horizontally between the vertical sections of the cloth, while the slits 13 are directed to the moving cloth at right angle to or at the direction of the movement of the cloth *a*. Numeral 15 is the exhausting opening for the air, 16 is the channel through which hot air re-

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turns to the fan, 17 is the control valves by which the volume ratio of the exhausting air to the returning air can be controlled.

When the cloth *a*, by these means, is carried from one side of the apparatus into the drying chamber 1 as shown in Fig. 1 or Fig. 2, it is engaged on both its edges to the tenter pins 3 of endless tenter chains 2. These tenter chains 2 are driven by the aid of chain wheels 8, chains 9, and driving apparatus 10, and they carry the cloth *a* through the drying chamber 1 alternately up and down in a vertical direction, while the tenter chains 2 are guided by the guide rails 4 in its vertical travel.

During this travel, the cloth is supported by the idle rollers 5 and it can be easily and uniformly tentered, because it is supported with chain pins 3 on its both edges.

In this zigzag travel of the cloth *a*, the hot air is sent through the ventilating chambers 11, by means of fan 14 as shown in Fig. 1 or Fig. 2, and from the slits 13 of the pipes 12 directed against both surfaces of the cloth *a*. Thus, the hot air passes through the vertical cloth removing the moisture in the cloth and runs rapidly along the cloth's surface passing out through the exhausting opening 15 out of the chamber 1. In this way, the cloth *a* in a state of tentering can be rapidly and uniformly dried. Lastly, the cloth *a* is taken out from the other side of the chamber 1.

In this apparatus, by travelling the cloth *a* in nearly a vertical path, there is no tension thereon caused by the self-weight of the cloth which often occurs in the case of the horizontal carrying type of machine, and also by driving the cloth by means of a tenter chain, creation of tension forces caused by the driving forces of the rollers which occurs in the apparatus of roller driving type is avoidable.

In addition to these advantages, I realize considerable economy in heat and time by the system of passing hot air in vertical paths.

Further, the moist air produced by contact with the wet cloth passes away rapidly out of the chamber 1 through the exhaust opening 15, while comparatively drier air produced at the end of the travel of the cloth goes back to the fan 14 through the returning channel 16, and thus I can utilize the waste heat of the air. The volume ratio of the exhausting air to the returning air can easily and voluntarily be controlled by the control valves 17.

My invention thus being described, I declare that what I claim is:

In textile tentering and drying apparatus of the type in which the cloth to be treated is carried through a drying chamber by tenter chains travelling up and down in a substantially vertical direction and in a zig-zag path, drying air conveying means comprising a pair of ventilation chambers, one of which extends along each side of said drying chamber, a plurality of horizontally extending conduits connecting said ventilating chambers, each of said conduits being positioned in the lower part of the space between one upward and one adjacent downward run of said cloth during its travel through said drying chamber, each said conduit having a plurality of air directing openings distributed along its length and arranged for directing hot air against both adjacent surfaces of said moving cloth, hot air blowers communicating with said ventilating chambers and means for drawing off damp air from the top of said drying chamber.

## References Cited in the file of this patent

## UNITED STATES PATENTS

|           |              |               |
|-----------|--------------|---------------|
| 1,531,826 | Wigglesworth | Mar. 31, 1925 |
| 2,304,506 | Morrill      | Dec. 8, 1942  |
| 2,390,451 | Morrill      | Dec. 4, 1945  |